MHCLG Consultation
on Part L and Part F 2020 and the Future Homes Standard

CIBSE Response

7th February 2020

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1.0 Summary of recommendations

1.1 Part L and Future Homes Standard

As the consultation document itself states, “Despite progress reducing emissions from homes, we need to go much further. New homes being built now and in the next 5-10 years will still exist in 2050 and therefore we must ensure that the energy efficiency standards we set for them put us on track to meet the 2050 target.” This echoes the statement by Chris Stark, Chief Executive of the Committee on Climate Change that “The UK has achieved major changes in complex systems before, but not at the scale that the Committee on Climate Change has now recommended to reach net-zero in the UK.”[1]

The report specifically recommends, in relation to reducing energy demand in buildings, that BEIS and MHCLG: “Ensure that the implementation of the Hackitt Review addresses the energy efficiency performance gap on the evolution of and compliance with buildings standards and in the development of skills, standards, procedures and capacity within the building industry sector.”

We very much agree with the stated overall ambition described, but have strong concerns that the proposals set out are not sufficiently ambitious to deliver significant progress towards meeting the objectives of reducing carbon emissions, annual energy consumption and peak demand, and ensuring affordability to consumers. The proposals for Part L 2020 do not represent the required “meaningful and achievable step” towards zero carbon, and the timeline and content of the Future Homes Standard is not ambitious enough, nor does it begin to address real in-use energy performance and carbon emissions.

In summary, we recommend the following:

- Tighten requirements on the performance of **buildings themselves** (independently from grid decarbonisation) to deliver additional savings in carbon emissions, reduce annual energy consumption and peak demand, and keep heating costs lower. There is evidence that more ambitious improvements are already being delivered – see Appendix 1 & 2, and this needs to be captured in the updated requirements of Part L. This is particularly important to minimise the building of new homes that might later need further retrofitting of energy efficiency measures, at much greater cost to the owners and at a significant penalty in embodied energy and diversion of resources from refurbishing some of the 27m buildings that need to be retrofitted by 2050. Economising on energy efficiency measures now might help to achieve favourable impact assessment calculations in the very short term but will lock in significant future costs and probably carbon emissions. The no-regrets objective now needs to be the most efficient fabric possible for new buildings.
- **Review the notional building, which is currently proposed to have a gas boiler:** instead, the notional building should encourage the transition to low-carbon heating and strongly discourage all-electric buildings with poor fabric performance. It should have excellent fabric efficiency and a low carbon source of heating. The currently proposed notional building sends the wrong signal and allows detrimental relaxations to fabric performance – see next point, and Appendix 3.
- **Ensure that the proposals overall strongly encourage a fabric first approach**: currently, the proposals for removing the FEES, combined with a gas-heated notional building and a lower grid carbon factor, mean that **a 2020 Part L compliant building could have worse fabric performance than one complying with 2013 Part** L – see Appendix 3. This is clearly very much in the wrong direction in terms of reducing energy consumption and peak demand and also causes fuel poverty concerns. We acknowledge that the consultation is to some extent aware of this risk and proposes to introduce a heat affordability metric to address it, however the plans for

[1] Statement in the Foreword to “Shifting the Focus” – full reference Eyre, N and Killip, G. (eds). 2019. Shifting the focus: energy demand in a net-zero carbon UK. Centre for Research into Energy Demand Solutions. Oxford, UK. ISBN: 978-1-913299-00-2

this metric are unclear. It seems more appropriate and straightforward to avoid the problem in the first place by retaining the full fabric energy efficiency standards, which were developed in collaboration with the industry through the work of the Zero Carbon Hub and changing the fuel setting of the notional building. FEES have the additional benefit of incentivising consideration of building form, including shape and orientation, a crucial step of passive design which is missed under the current approach of a notional building which has the same shape and orientation as the actual building – see Appendix 4.

- **Assess heat networks on a fair basis**: the current proposed "technology factor" for schemes connected to heat networks would provide an excessive (45%!) allowance for additional heating emissions. While we understand heat networks may benefit certain situations (e.g. hard-to-treat conservation areas), this should not be at the expense of increasing emissions for new development. Fudge factors which distort the assessment of building performance and do not treat technologies equitably are unfair and must be avoided. If proved beneficial for reasons other than reducing carbon emissions in new dwellings, then heat networks can be encouraged through other means than Part L. The argument that networks offer flexible low-carbon heating options in the future may be valid, but this needs to happen **now**, instead of potentially locking large areas into a gas-fired future, at significant initial expenditure of finances and embodied carbon and with impacts on air quality too.
- **Review performance metrics**: the proposals currently include 2 « system » metrics (carbon, and primary energy), which do not help connecting consumers with actual building performance and do not encourage building performance directly enough, as they are heavily dependent on the wider system. We understand this is considered necessary for the implementation of the Energy Performance of Buildings Directive (EPBD), but we strongly encourage other metrics to be considered e.g. retaining FEES (or other similar heating demand metric). With the proposals for changes to primary legislation in the planned Building Safety Bill, there is the scope to introduce powers to not only address the safety of buildings in use, as recommended by Dame Judith Hackitt and accepted by government, but also to address energy performance in use. This could be done through targets for metered energy in the future (either as kWh/m2/yr targets, or through a system similar to Display Energy Certificates, which would allow adjustments for some factors such as weather and occupancy, to take account of homes occupied by the elderly [2]). This could also go some way towards addressing heat affordability, alleviating the need for such a metric which, we believe, cannot entirely be dealt with under Part L alone.
- **Commit to developing the Future Homes Standard (FHS) in 2020**: as the consultation document itself states "We need to help the industry reach a position where it can deliver in 2025." "The first steps in facilitating these changes are to provide a clear vision for implementing the Future Homes Standard". The current consultation proposes what the FHS should require for fabric, which should allow MHCLG to release the FHS well before 2025, much earlier than proposed. Early certainty about the content and implementation of the FHS will drive market leaders to adopt it early; in addition, government should consider ways to incentivise early adoption. This will help MHCLG gather lessons learnt and will support expertise and supply chains, ensuring the whole industry is ready by 2025, at the least costs and with reduced risks of unintended consequences.
- Within the FHS, state a **clear trajectory towards operational requirements** covering all energy uses and create the necessary legislative framework accordingly. The evidence that this is required is compelling, as the current approach is not delivering the required step changes in energy consumption – see Appendix 5. There is now growing consensus that such a transition is required, as illustrated by the recent Building Performance Network joint position statement

[2] For a research paper exploring residential operational ratings, see for example: Lomas K. J. et al, *A domestic operational rating for UK homes: Concept, formulation and application*, Energy & Buildings, 2019

signed by key organisations in the built environment, including CIBSE[3]. CIBSE have in a 2019 Briefing Paper[4] proposed a route for this.

- Create the legislative framework allowing the introduction of a requirement for **disclosure of operational performance**. We have previously called for this to be introduced in time for Part L 2020; while we acknowledge the required legislative work may now be difficult to complete on time for the introduction of Part L 2020, we recommend that government should publish a statement of intent by the time Part L 2020 is introduced, **and** prepare the legislative framework to be ready by 2023 at the very latest). Disclosure is the necessary first step towards regulatory operational performance, in order to raise awareness of performance issues and build experience in monitoring and reporting procedures; this could for example be done on an aggregate basis for schemes above a certain number of dwellings, to protect privacy and reflect building performance trends regardless of variations in the behaviour of individual householders.
- **Retain the powers for local authorities to set requirements beyond minimum building regulations** requirements (subject to the usual viability testing of their local plans and planning applications). Again, this is a crucial part of helping to develop supply chains and expertise, benefiting the whole market. There is evidence from local authorities that preventing this would increase carbon emissions, compared to their current (already tested) plans. If local communities are to be given the powers to give priority to "beautiful homes", then they should be allowed to prioritise energy efficient, low carbon, homes as well.
- Part L and Part F are inextricably linked, particularly as we move towards very low energy buildings. We have indicated in our responses the key links between these documents. This means that **government needs to show the direction of travel on Part F**, whether in the Future Homes Standard or in Part F: it needs to be clear that low energy and low carbon buildings will mean exemplar airtightness and appropriate ventilation to deliver good indoor air quality, This may mean that many more homes have mechanical ventilation and heat recovery systems, and so it is essential to prepare supply chains and ensure that from 2025 new homes are not only very low in energy and carbon, but also provide healthy and comfortable environments.
- In order to truly prepare for a net zero carbon UK in a changing climate, the FHS should also include consideration of other elements, whether by introducing new requirements or setting a direction for travel, including:
    - **Peak demand:** this should at the very least be estimated and reported on; MCHLG could review this and consider the need to limit peak demand in the future if required, subject to how well buildings perform and the pressures on the electricity grid
    - **Embodied carbon**: we recommend that from 2025, the embodied carbon of key building elements should be considered, so that data is gathered by MHCLG for the purpose of benchmarking and future standard setting, and to develop the expertise of the industry.
    - **Adaptation and resilience to climate change**, including considerations of overheating, water consumption, flooding, and drainage.

We have a provided a substantial amount of supporting information to illustrate and justify our comments, and point at possible solutions. This is meant to be helpful. We would be very happy to discuss this with MHCLG and to review options for revised proposals and the development of the FHS.

We also look forward to the expected consultation on a new overheating standard, and on existing dwellings and non-domestic buildings. Existing buildings are the real challenge, hence why we must

[3] BPN joint position statement on building performance , November 2019: https://building-performance.network/advocacy/building-performance-joint-position-statement

[4] CIBSE Briefing Paper on route to net zero carbon buildings, August 2019 https://www.cibse.org/getmedia/bdaf4dee-5980-4b58-871c-a24e88c010d4/CIBSE-Steps-to-net-zero-carbon-buildings.pdf.aspx

get it right with new buildings as soon as possible, to avoid adding to future challenges. Many points made in this response, including the overall methodology approach and the need for a move to operational performance requirements, are as relevant to these sectors and we would hope they can be taken into account in the development of those upcoming proposals too.

Industry consensus

Our response has been informed by contributions from members and wider stakeholders, including impact assessments of the proposed changes. We want to stress the huge and unprecedented level of interest from industry, which reflects an undoubted appetite for more ambitious proposals and a meaningful step towards net zero carbon.

In very large part our response is consistent with that of other prominent built environment bodies, including the RIBA, Green Building Council, London Energy Transformation Initiative, and Greater London Authority. We are aware that the RTPI and CIEH also agree on the points relevant to their expertise.

The following section provides an explanation of our comments, through a more detailed assessment of the proposals.

1.2 Approved Document F

It is understood that the current proposals for changes to Approved Document F are measures to make improvements in the short term. However, given the research undertaken by the Department, coupled with the publication of "The inside story: Health effects of indoor air quality on children and young people", which was published on 29th January 2020 by the Royal College of Paediatrics and Child Health (RCPCH) and the Royal College of Physicians (RCP)[5], it is clear that the development of the Future Homes Standard will require a comprehensive review of Part F and Approved Document F.

The RCPCH and RCP report and the Departmental research all reveal that there are significant questions about how we deliver sufficient quantities of ventilation to maintain acceptable levels of indoor air quality in new homes and in a number of other building types.

The current functional requirement of reasonable provision of ventilation may not be sufficient to achieve this, as it does not require any attention to control of sources of indoor air pollution. Indeed, it rather implies that you can incorporate known long term sources of indoor air pollutants, as long as the ventilation is sufficient to continuously remove them over the long term. This does not follow the principle of source control, a fundamental principle in public health, and is neither rational, nor consistent with the overall direction of travel towards zero carbon buildings. It does not address the overall need for the building to be both "reasonably ventilated" and to make "reasonable provision for conservation of fuel and power". Simply put, if there are fewer sources of pollution in the building, then less ventilation will be needed, reducing the energy demand; reliance on systems to work will also be reduced, protecting occupants even in the case of plant failure, poor maintenance etc.

An issue which is not addressed by the questions asked in the consultation document is the repeated suggestion of consulting 'experts' or 'specialists' when something out of the ordinary is proposed. CIBSE broadly support the idea of consulting those with specific subject matter expertise, but as it is currently formulated it is too vague. It needs to be backed up by some description of what someone with such expertise might look like.

Although not consulted on, it may be that the use of some form of "competent persons" scheme should be considered. However, different indoor air quality issues may need to be addressed by different 'specialists'. For example, CIBSE and its members may be the right people to talk to about achieving 4 air changes per hour of purge ventilation using non-standard methods, but they are not the people to ask about whether there is a risk of high levels of pollution at a particular location.

[5] https://www.rcpch.ac.uk/resources/inside-story-health-effects-indoor-air-quality-children-young-people

We have provided links to Part L elements throughout our response, are both are inextricably linked. Please also see our previous comment in Section 1.1 on the need for government to indicate the future direction of travel for Part F as well as Part L, in order to prepare the industry for buildings with exemplar airtightness and ventilation systems which provide good air quality and comfort levels.

2.0 Assessment of the Part L and Future Homes Standard proposals

We have assessed the consultation proposals against the following key tests, which align with the government's own stated aims from this consultation:

- Reducing carbon emissions, with the Future Homes Standard delivering net zero carbon buildings and Part L 2020 an ambitious and meaningful stepping stone towards it
- Reducing annual energy use
- Reducing peak demand, to ensure availability, allow the continued decarbonisation of the electricity grid and support the electrification of transport
- Future-proofing new dwellings and limiting the needs for future retrofit
- Heat affordability for households.

These objectives need to be delivered in practice, with real cuts in operational energy consumption, peak demand, carbon emissions, and costs, rather than against theoretical tests. We have therefore checked the capacity of the proposals to:

- Reduce the gap between design and as-built performance
- Encourage more focus on operational performance (including all energy uses).

In addition, in order for these objectives to be met as effectively as possible, we have evaluated whether the proposals can encourage the development of skills, expertise and supply chains.

Comments on current proposals			Recommendations
Part L 2020	**Future Homes Standard (FHS)**	**Likely consequence, *vs* key objectives**	
Overall approach and carbon reduction target			
Opportunities to improve building performance have not been maximised, as detailed below for fabric and building services. Furthermore, and most importantly, the overall approach remains unchanged, which has serious limitations for energy and carbon savings i.e.: • compliance set by comparison with a notional building, rather than an absolute energy and/or carbon target • compliance demonstrated at the as-built stage, rather than based on actual in-use performance • requirements relating only to regulated energy uses.	**Ambition for 75-80% reduction** **No indication of a shift in approach to address operational performance and total energy use.** Unless a substantial shift in approach is adopted, the theoretical carbon savings will not translate into reality.	Savings in carbon emissions do not deliver a step change improvement to the performance of buildings themselves. The current proposals are expected to deliver only limited improvements to energy consumption and carbon reduction in practice, as evidenced by the limited progress in energy consumption of buildings of different EPC ratings – see Appendix 5	**The need for a shift to address operational performance is widely acknowledged across the industry,** as demonstrated by the recent joint position statement[3] signed by CIBSE, the RIBA, UK Green Building Council, Good Homes Alliance and London Energy Transformation Initiative. Operational performance should include all energy uses. We recommend the following steps; these will require the creation of the appropriate legislative framework, for which work should start now: **Part L 2020:** 1) Introduce a requirement for **disclosure of operational performance**. We have previously called for this to be introduced on time for Part L 2020; while we acknowledge the required legislative work may now be difficult to complete on time for the introduction of Part L 2020, we recommend that government should publish a statement of intent by the time Part L 2020 is introduced, and prepare the legislative framework to be ready by completion of the first Part L 2020 buildings (e.g. by 2023 at the very latest). Disclosure will help raise awareness and understanding of performance issues and build experience in monitoring and reporting procedures; this could for example be done on an aggregate basis for schemes above a certain number of dwellings, to protect privacy and reflect building performance trends regardless of variations in the behaviour of individual householders – See CIBSE position paper[4]. 2) Introduce an <u>optional</u> compliance route based on in-use performance. This would allow industry leaders to pioneer the approach, build capacity and skills, and help government test

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			and evaluate the requirements for the 2025 mandatory step. There should also be incentives for projects to adopt this voluntary route. **FHS:** 1) Continued requirement to disclose performance, incorporating lessons from the Part L 2020 introduction; 2) Operational performance to become the main compliance route, except from a small number of well-defined cases (e.g. individual dwellings) . See detailed recommendations in Appendix 2: CIBSE position paper on Route to Net Zero Carbon
Encouraging low-carbon leaders and driving supply chains, skills and expertise			
We are very concerned by the proposal that local authorities would not be allowed to set requirements beyond regulatory minima. The planning system can act as powerful driver for the development of skills, expertise and supply chain solutions.	The consultation proposes that the FHS would be available for consultation in 2024. This is **much too late** for it to be adopted effectively and at least burden to the industry in 2025, or for the supply chain to react positively and effectively. In particular, the industry needs to prepare for the widespread application of very high levels of airtightness, mechanical ventilation with heat recovery (MVHR) and heat pumps.	The proposals risk limiting the development of low-carbon skills, expertise and supply chain solutions. They also would represent a backwards step for local authorities where ambitious carbon savings requirements are already implemented – see Appendix 1. Overall, **this risks slowing down progress to net zero carbon buildings, and increasing the costs of doing so.**	The FHS should be developed as soon as possible and available in 2020, for voluntary adoption by market leaders. This is essential to deliver carbon savings earlier, while doing so effectively and at least cost. Local authorities should be allowed to set higher standards than the minimum regulatory requirements, subject to the usual viability tests on local plans and individual planning applications .
Fabric performance			
Removing the FEES removes an incentive for passive design, reflecting the efficiency not only of individual fabric elements but also dwelling shape and orientation. Under Part L 2013, FEES go some way towards	An ambition for "world-class fabric standards" – some fabric requirements could be improved, in particular airtightness (below 3 m^3:hr/m^2 at 50Pa), which should then be accompanied by MVHR.	Removing the FEES (without equivalent alternative) removes an incentive to reduce overall energy consumption, peak demand, and carbon emissions	**Part L 2020:** re-instate FEES, or similar measure aimed at reducing heating and cooling demand (regardless of building services efficiency) **FHS:** move away from the notional building approach in order to drive overall consideration of building shape, orientation and elemental fabric

Comments on current proposals			Recommendations
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encouraging form efficiency as, for a given fabric performance (and independently from the efficiency of heating systems), more efficient dwelling shapes score better FEES – see evidence in Appendix 4. FEES are the only incentive in SAP addressing this first step of passive design.	We also note that achieving world class standards would require not drawing back from the current requirement for FEES.		performance – see CIBSE position paper on Route to Net Zero Carbon4
Fabric requirements are not ambitious enough: The fabric performance of the proposed Part L 2020 notional building shows small improvements compared to that of Part L 2013, but some elements could still be. Similarly, minimum fabric requirements show small improvements compared to those under Part L 2013, but some elements could be tightened; in addition, they are not even as onerous as those of the Part L 2013 notional building - see Appendix xx	No information available other than an ambition for "world-class fabric standards"; we support the ambition but cannot comment without additional detail.	Fabric performance, in particular the minimum requirements, do not represent the necessary step; they do not guarantee that the fabric would not need retrofitting in the future, for a zero carbon UK. The consequences include: insufficient carbon emissions reduction, insufficient reduction in energy use, and insufficient reduction in peak energy demand	**Part L 2020:** review and tighten minimum fabric requirements. **FHS:** publish as soon as possible the fabric requirements in the FHS, to demonstrate alignment with truly world-class standards and drive the development of supply chains. Appendix 2 provides a comparison of current standards with the Zero Carbon Hub recommendations and with Passivhaus, often acknowledged as such a "world-class fabric standard"
Encouraging a transition to low-carbon heat, and heat affordability			
The notional building is proposed to have gas heating. This is a cause for concern on 2 grounds: Because electricity now has a lower carbon content than gas, a dwelling with electric heating could have worse fabric performance than the notional building, and still comply with Part L. **A dwelling with a heat pump could have worse fabric performance than to comply with Part L 2013, and comply with Part L 2020** – See Appendix 3. This is clearly a very worrying and significantly backward step.	No details available, other than an intention to ban fossil fuel heating, in new dwellings, which we support.	The current setting of the notional building with a gas boiler does not encourage the transition to low-carbon heating. In addition, there is a high risk that it will encourage dwellings which direct electric heating and hot water, and insufficient fabric performance. This is likely to be an attractive option in terms of capital costs, and therefore selected by a number of housebuilders, but is clearly counter-productive: it would	**PL 2020**: the requirements, including fabric and heating type, have to be set in order to encourage a transition to low-carbon heating, and discourage direct electric heating except when annual and peak demand are very low. While gas heating is still allowed, there should be incentives to move to other sources, so that only dwellings with exemplar fabric could comply with Part L if they opted for a gas boiler. As a very minimum, the notional building for electrically heated buildings should NOT have a gas boiler, as this allows a relaxation of other performance parameters. Re-instating FEES (or equivalent) would also add a limit to that relaxation – see previous point.

Comments on current proposals			Recommendations
Part L 2020	**Future Homes Standard (FHS)**	**Likely consequence, *vs* key objectives**	
This setting also sends a counter-productive signal to the market about the need to transition away from gas. If the notional building had heating of a lower carbon content than gas, dwellings with gas boilers would find it harder to comply, which would encourage them to adopt measures that reduce their demand (i.e. better fabric), or switch to low-carbon heating.		not lead to energy savings, could put a significant burden on the grid through high peak demand, and could represent significant running costs for occupants, with associated risks such as fuel poverty.	We would also recommend that expected peak demand be reported as part of the BRUKL report (though not necessarily yet subject to a limit). **FHS**: we support the proposal to ban fossil fuel heating in new dwellings from 2025, in line with the CCC recommendations.
We support the intention behind the proposed introduction of a **heat affordability metric,** but are not sure the proposed approach (based on EPC Energy Efficiency Rating) is the right one. Please refer to our comment above on the removal of FEES and the setting of the notional building, which could encourage direct heating and poor fabric, a key contribution to running costs While direct electric heating is one factor for high heating costs, there are others. A high proportion of heating costs is often due to fixed charges, rather than to energy consumption alone. Heat affordability could not alone be assessed by Part L, so the wording could be confusing to consumers	No information available.	Please refer to our comment above on the setting of the notional building, which could encourage buildings with poor fabric performance and direct electric heating, potentially placing a significant cost burden on occupants.	Our recommendation would be to: 1) ensure that Part L really drives reductions in peak and annual heat demand: retain FEES, upgrade minimum fabric standards, and change the setting of the notional building away from gas; and 2) consider alternative ways to deal with affordability outside of building regulations e.g. possibly as part of the expected upcoming consultation on regulating heat.
Schemes with heat networks are currently proposed to include a “technology factor” which would provide an additional allowance (45%) for heating emissions. This is an extremely significant skewing factor and clearly prevents a fair assessment of heating options and is very much against the aim to	No information available	The technology factor could lock large areas into a gas-fired future, at significant initial expenditure of finances and embodied carbon, and with impacts on air quality too	**Remove the technology factors**; ensure that heat networks are as encouraged to implement low-carbon options as individual buildings schemes Where heat networks are seen as positive (e.g. existing urban areas, rather than new build schemes), this can be encouraged through other means than Part L

Comments on current proposals			Recommendations
Part L 2020	**Future Homes Standard (FHS)**	**Likely consequence, *vs* key objectives**	
encourage a transition to low carbon heating.			
As-built checks			
We support the proposal that all dwellings should be air pressure tested. We support the proposal to strengthen the enforcement of current commissioning procedures, which need to be rigorously applied to low carbon heating as well as ventilation systems; we however do think they go far enough – see recommendations. We support the proposal to improve the reliability of as-built evidence.	No information available.	We expect the proposals will contribute to reducing the performance gap between design and as-built performance, which is welcome.	**Ensure appropriate training and resources of building control bodies**, without which the additional evidence requirements may be difficult to enforce in practice **Part L 2020:** retain proposals to strengthen air tightness testing, commissioning and as-built check requirements. **Amend Building Regulations Part 10 §47, under which contravening with requirements 42 - mechanical air flow testing, 43 - pressure testing and 44 - commissioning are currently not an offence: these requirements are fundamental to energy, carbon and health and wellbeing performance, and the current exemption very much limits enforcement powers.** Further as-built performance tests could be introduced on systems efficiency (heating, cooling). **FHS:** further fabric performance tests could be introduced, such as co-heating tests; current ones may be time-consuming and expensive, but trials are being carried out on cheaper and quicker alternative tests, (e.g. SMETER, supported by BEIS). Announcing them as soon as possible as part of the FHS would support R&D efforts and likely lead to technical developments and reductions in costs
We are concerned about the reliance on complex and relatively new mechanical systems in the notional building, in particular Waste Water Heat Recovery Systems; while we understand this is not a requirement as such, but a setting of the notional building, this is not technology neutral: it		Relying on complex systems risks not delivering the expected energy savings, if these savings are not well designed, installed, commissioned and maintained	In the appraisal of options, it is essential to consider a scenario which does not rely on complex systems such as WWHRS, and instead takes advantage (in capital as well as running costs) of reductions in loads. Such scenarios should be developed by MHCLG and publicised to ensure the industry is not provided with misleading signals.

Comments on current proposals			Recommendations
Part L 2020	**Future Homes Standard (FHS)**	**Likely consequence, *vs* key objectives**	
implies that the way to achieve compliance is to use WWHR and sends a signal to industry to turn to mechanical systems, while other solutions may be more appropriate; it will also influence the cost impact assessment, while solutions focused on fabric performance, reducing loads and reducing equipment could result in capital as well as running costs.			Complex systems will be at risk of incorrect installation, inadequate commissioning and a failure to deliver in practice. We should not rely on them when simpler solutions are available. There are low flow shower heads, for example, that can achieve the same energy savings as WWHR at a fraction of the cost. They meet European standards and comply with eco-design requirements

3.0 Consultation questions

Q1 Do you agree with our expectation that a home built to the Future Homes Standard should produce 75-80% less CO2 emissions than one built to current requirements?
a. Yes
~~b. No – 75-80% is too high a reduction in CO2~~
~~c. No- 75-80%is too low a reduction in CO2~~
If no, please explain your reasoning and provide evidence to support this.

(a): This seems about the right level **in theory**, however 1) a test should be done that, once the electricity grid is decarbonised in 2050, this results in net zero carbon homes; 2) more importantly, the Part L methodology has serious limitations described in our summary overview: as long as the assessment remains the same, the stated target will therefore only cover part of a new home's emissions, AND is unlikely to be realised in practice. We urge consideration of substantial changes to the approach, as described in our summary overview, in order to ensure that the ambition of 75-80% is delivered in practice.

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?

This is in line with the CCC's appraisal and seems the most appropriate assumption at this stage.

We agree heat pumps are among the most appropriate way to deliver low carbon heat. However, it is important that heat pumps are designed, specified, installed and operated correctly to deliver energy and carbon savings, and avoid high bills for the consumer. We would refer to the recent report[6] for the Greater London Authority on heat pump deployment in London, which includes important considerations.

[6] Etude, for the GLA, Sept 2018 https://www.london.gov.uk/sites/default/files/low_carbon_heat_-_heat_pumps_in_london_.pdf

Heat networks should be low-carbon NOW and NOT lead to further locking-in of fossil fuel heating; as detailed in our response to Q25, we do not agree with the current proposals for significant support through technology factors, which is counter-productive and skews the assessment. We would also like to make sure that under the term “heat networks”, low temperature ambient loops, which allow heat exchange between buildings, are included, and that this is considered in the options for future-proofing dwellings to low carbon heat.

Direct electric heating has a role to play only where heat demand, including hot water demand, is expected to be particularly small, and a heat pump is not suitable, for example very small dwellings (studios, 1-bed apartments); it should only be implemented where the most efficient fabric has been applied in order to reduce demand on the grid, and limit running costs for consumers. While it may be lower than carbon than it used to be, it is not compared to heat pumps, and it is not “low impact” at a system level, with potential impacts on peak demand.

Should other low-carbon solutions prove feasible in the future (e.g. a decarbonised gas grid), this could easily be taken into account in future amended regulations.

The important principle is to be technology agnostic i.e. buildings judged on their merit, fairly, against clear performance requirements.

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 basis for the fabric performance of the Future Homes Standard?

~~a. Yes~~
~~b. No – the fabric standard is too demanding~~
c. No – the fabric standard is not demanding enough.

It is not known whether this would be sufficient to deliver the government’s stated ambition for a 75-80% carbon reduction: this should be tested.

On an elemental basis, the proposed specifications of the notional building seem to be at about the right level, for example by comparison with Passivhaus and with recommendations from the Zero Carbon Hub, **with the important exception of air tightness** which could and should be improved; coupled with mechanical ventilation with heat recovery, it is a proven combination achieving very low energy dwellings, as exemplified by Passivhaus. Refer to Appendix 2 for a detailed comparison of the proposed standard with Passivhaus, Part L 2013, and the Zero Carbon Hub recommendations, and to Appendix 6 for a comparison of expected space heating demand under Options 1, 2 and Passivhaus.

In addition to the notional building specifications, it is really important to consider the minimum standards, as heating sources or building services efficiencies may be used to “compensate” for fabric relaxation. As detailed in our summary overview and illustrated in Appendix 3, this may well happen under the current proposals, due to the notional building having a gas boiler AND to the removal of FEES. These minimum standards are very much falling short of the stated level of ambition, as illustrated in Appendix 2.

Furthermore, the proposed approach, limited to the efficiency of individual elements, misses a crucial step in passive design to reduce annual and peak demand: overall consideration of building form and orientation. This was at least partially addressed through FEES (see illustration in Appendix 4), whose proposed removal represents a step backwards. We strongly advocate that FEES should be retained, or an equivalent requirement introduced.

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 standards for dwellings?

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

We would only support option (c) if substantial amendments were made to the FHS so that it truly represents homes that can become net zero carbon, as detailed in our Summary section, in particular with attention to whole energy consumption and a move to as-built performance. We understand the need for some harmonization of approaches across local authorities to reduce costs and complexity. However, this could be achieved if requirements were allowed within the right framework (e.g. options for overall improvements on Part L, options for including unregulated energy uses, and options for including verifications of performance in use).

At the moment, we therefore support option (d): We must as soon as possible stop building new homes which will need retrofitting, and local authorities across the country are playing a leading role in showing the way, helping to develop expertise and supply chains which then benefit the rest of the industry. There are already processes to check the viability of local requirements, both at the level of local plans before such requirements are adopted, and as part of viability assessments of individual projects. Higher requirements, where viable, not only achieve carbon cuts earlier, but they are also a crucial part of developing expertise and supply chains, which is precisely a stated objective of this consultation. We believe **this proposal is not required, will lead to higher emissions, and ultimately to higher costs for the rest of the industry** by limiting early learnings and supply chain developments.

A large number of local authorities already have requirements which go well beyond building regulations: from a recent Freedom of Information request by the Solar Trade association, this was the case for 51% of local authorities contacted by the STA, with 17% having “leading” standards[7]. This must continue to be allowed and encouraged.

CIBSE has received evidence from local authorities on this, including the Greater London Authorities and a number of West of England authorities, which represent areas with large populations and active housing markets. Their evidence shows that:

- more onerous requirements are currently being delivered, with no known impact on viability and house building; some of this is presented in Appendix 1
- this proposal would lead to increases in carbon emissions, compared to their existing or upcoming plans.

We expect numerous authorities to have carried out a similar analysis. We strongly advise against this option and would urge that, before adopting it, government analyse and make publically available the cumulative impact that this would have.

Q5 Do you agree with the proposed timings presented in Figure 2.1 showing the Roadmap to the Future Homes Standard?

~~a. Yes~~
~~b. No – the timings are too ambitious~~
c. No – the timings are not ambitious enough

[7] https://www.solar-trade.org.uk/over-half-of-all-local-authorities-already-enforcing-higher-building-standards/

The consultation proposes that the FHS would be available for consultation in 2024. This is **much too late** for it to be adopted effectively and at the least burden to the industry in 2025, or for the supply chain to react positively and effectively. **The FHS should be developed as soon as possible and available in 2020, for voluntary adoption by market leaders; the consultation proposals already set out that the fabric package under Option 1 is effectively expected to be the Future Homes Standard, therefore it should be relatively straightforward, following the analysis of the consultation responses, to make the full standard available in that timeframe, by the end of 2020**. This is essential to deliver carbon savings earlier, while doing so effectively and at least cost. One cannot see the rationale for delaying this to 2024. An early introduction of the FHS will help drive the market and provide very valuable feedback to government before its full introduction to the whole industry in 2025.

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

~~a. No change~~
~~b. Option 1 – 20% CO_2 reduction~~
~~c. Option 2 – 31% CO_2 reduction (the government's preferred option)~~
d. Other.
Please explain your reasoning.

First, we have concerns that the stated 20% and 31% savings have only been estimated on the basis of a single dwelling, a semi-detached home. As the new build stock includes about a quarter of apartments, this modelling may well lead to optimistic estimates of the potential savings, and we urge a more thorough assessment using more varied dwelling types, including apartments, which would provide a better representation of the new build stock – see our comments on the impact assessment.

In addition, we do not consider that a 20% or 31% reduction meets the government's stated goal for a "meaningful but realistic" step towards 2025 i.e. 75% or 80%. Schemes can already achieve more than this, as evidenced for example in the Greater London Authority – see Appendix 1. Please also refer to Q68, where we refer to reports on the options and cost impact of net zero carbon.

We welcome the government's ambition to select the more onerous option in terms of overall carbon reduction target, but think this must come with the more ambitious fabric (i.e. that of Option 1, with improved air tightness – see our response to Q3), as otherwise we will create yet more homes whose fabric will not be 2050-ready, and retrofitting fabric is the most disruptive and costly option for consumers.

In addition, we think that the 2025 standard should transition to total energy use and as-built performance, and there should therefore be a first step in this 2020 review towards this: we recommend the introduction of a requirement to disclose as-built energy performance. This could be required for an aggregate "per scheme" basis for schemes of a certain size to protect privacy (e.g. over 10 dwellings). This would provide valuable data etc etc – please refer to our position paper4 on recommendations towards net zero carbon buildings, and what should be included in the 2020 step.

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

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

We agree with the government's statement that carbon will become less useful as sole metric as the electricity decarbonises, and that a measure of efficiency is therefore required alongside. However, we do not think the principal metric should be primary energy: this is another "system-level" metric which does not directly and solely reflect the performance of the building itself, AND makes year-on-year comparisons less straightforward AND it is not familiar enough to consumers and does not directly relate to their bills. We think that CO2 should remain as a system-level metric which allows performance and policy effectiveness to be tracked overall, in a consistent manner with other policies; it should be accompanied by a metric reflecting the building performance alone, i.e. energy "at the meter" (or a domestic version of Display Energy Certificates, which would allow making allowance for some factors such as weather and 24/7 occupancy, such as in homes occupied by the elderly). We appreciate this was driven by the EPBD, but there must now be opportunities to move to metrics which truly deliver the desired outcomes.

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

a. Yes.
~~b. No~~
Please explain your reasoning.

We think that CO2 should remain as performance metric: this allow consistent messaging to consumers, and tracking against the UK's overall policy, which is based on carbon.

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

a. Yes
~~b. No~~
Please explain your reasoning.

Of course we agree with the ambition that homes should be affordable to run. We are however unsure that "affordability" is the right term here, as Building Regulations can only address some of the issues leading to affordability. The aspects it can address are whether demand is reduced through fabric, and met efficiently through services. The term affordability could be misleading to consumers. In terms of approach, see our response to Q10.

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

~~a. Yes~~
b. No
~~If yes, please suggest a minimum Energy Efficiency Rating that should be achieved and provide evidence to support this.~~
If no, please suggest an alternative metric, explain your reason and provide evidence to support this.
see above

The potential problem which this consultation rightly identifies is the fact that, due to electricity having a lower carbon factor than gas, direct electric heating could become an attractive low capital cost option for developers and housebuilders. We agree this is a concern – see responses to Q3 on FEES, and Appendix 3. However, we do not think the proposals are the right way to address this: Energy Efficiency Ratings, from EPCs, are known to be poor predictors of actual energy consumption – see evidence in Appendix 5.

We think the best approach would be to avoid this situation in the first place, which could be done through a combination of 1) retaining the FEES, as a metric for demand reduction before services efficiency – see details in our responses to Q3 and Appendices 3 and 4; 2) significantly upgrading the minimum fabric performance standards, and 3) NOT setting the notional building to have a gas boiler: this setting means that by putting electric heating, developers gain flexibility to reduce fabric standards i.e. not only do they install a system that is expensive to run, but they do so in a dwelling with higher demand.

In terms of running costs related to systems, this can be addressed through a combination of minimum standards AND reinforced requirements for commissioning - see section 3 on our assessment of proposals and key recommendations.

Q11 Do you agree with the proposed minimum fabric standards set out in Table 3.1? If you do not agree with any one or more of the proposed standards, please explain your reasoning and provide evidence to support this.

No. The proposed 2020 minimum standards are far from being onerous enough. As detailed in our response to Q3 and illustrated in Appendices 1 and 2, the current 2020 minimum standards show only small improvements compared to the 2013 minimum standards. Combined with the new carbon factors and the removal of FEES, this leads to a high risk of inefficient dwellings, and even to the potential that **new dwellings built under Part L 2020 could have worse fabric than those complying with 2013:** see analysis in Appendix 3. This clearly must be avoided.

We are concerned by the statement that these minimum standards have been set "based on a statistical analysis of data used to produce the EPCs of all new homes built to 2013 Part L standards. The proposed minimum standards would remove the worst performing 25% of each thermal element being currently built" (§3.26 of the consultation document). Given the pressing need to reduce carbon emissions, the aim here should not be to remove the worst performance, but to genuinely drive the whole stock towards the best possible, while realistic performance. there will always naturally be a proportion of schemes applying the bare minimum, therefore the standards they achieve does not reflect what can technically and financially be achieved, but what the minimum they can get away with.

We strongly recommend a review of these minimum standards, on the basis of "what is financially and technically reasonable to expect from all new dwellings, knowing the desired end goal of very low carbon buildings?". As starting point, we would suggest taking the Part L 2013 notional building values, and analysing how close to it the 2020 minimum standards could get, as a meaningful step change: this would firmly establish that no 2020 compliant building can be worse than 2013 compliant buildings, or only for as few elements as possible.

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)?

a. In the Building Regulations
~~b. In the Approved Document~~
Please explain your reasoning.

It is important that the minimum fabric standards are clearly a requirement and not guidance. They should therefore not be left to appear in the Approved Document, which is only guidance, but they need to be included in Part L itself, or in another regulation.

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?

~~*a. Yes*~~
b. No
If no, please explain your reasoning.

There is much value in the FEES, and we strongly recommend they should be retained (or an equivalent focused on reducing heating and cooling demand first, before services efficiency). Firstly, because the minimum standards are not onerous enough, as detailed in our response to Q12. Secondly, because the FEES relate to overall envelope efficiency, including building shape and orientation; without this, because building shape and orientation in the notional building as the same as those of the actual building, a very important incentive for passive design would be lost.

See Appendix 4 for evidence of how FEES reflect building form (at equal fabric specifications).

Q14 Do you agree that the limiting U-value for roof-lights should be based on a roof- light in a horizontal position?

a. Yes
~~*b. No*~~

Q15 Do you agree that we should adopt the latest version of BR 443?

a. Yes
~~*b. No*~~

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

a. Yes
~~*b. No*~~
If no, please explain your reasoning.

CIBSE have been advocating this for a while, as fuel factors prevented the fair assessment of buildings' carbon impact. Removing them will provide an incentive to move away from them and accelerate the transition away from high-carbon fossil fuels.

By the same logic, we are against the introduction of technology factors which significantly skew the assessment of heat networks – see our response to Q25.

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

~~*a. Yes*~~
b. No
If you do not agree with any or more of the proposed changes, please explain your reasoning and provide evidence to support this.

We support the improvement but think that this can go further, with cooling efficiencies increased to an SEER of 4, and lighting efficiencies increased to 80 lamp lumens per circuit-watt.

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*~~
b. No – the temperature should be below 55°C.
~~*c. No – dwellings should not be designed to operate with a low flow temperature*~~
~~*d. No – I disagree for another reason*~~
If no, please explain your reasoning and provide evidence.

This should depend on the heating system installed, to maximise efficiency and carbon savings from heat pumps, and reduce demand on the grid at times of cold weather (as air source heat pumps in particular would otherwise operate on very low efficiencies). We would recommend:

- 55°C may be appropriate for homes connected to low carbon heating networks
- 45°C for dwellings with ground or water source heat pumps
- 40°C for the other cases, including dwellings with air source heat pumps.

If this is not considered feasible now, then we would suggest the temperature should be 45°C as this is suitable for low temperature radiators and would allow conversion to heat pumps in the future. This would also be consistent with emerging industry thinking that supports reducing instantaneous domestic hot water temperatures of 50°C or lower.

The potential for conversion to low temperature heat networks should also be considered, especially for dwellings where this is most likely to happen in the future (if not already) e.g. mixed use schemes, dense urban areas. This is another reason why dwellings with direct electric heating should be strongly discouraged, in favour of wet heating systems which offer more flexibility for future options.

In addition to space heating, we think that future proofing needs to consider domestic hot water, and possible storage (i.e. space) requirements. CIBSE have established a working group to look at these issues, and in particular at guidance on domestic hot water temperatures[8]. We are also liaising with HSE to ensure safety concerns are considered. We would be happy to discuss this with MHCLG.

Q19 How should we encourage new dwellings to be designed to operate with a flow temperature of 55°C?

a. By setting a minimum standard
~~*b. Through the target primary energy and target emission rate (i.e. through the notional building)*~~
~~*c. Other*~~
Please explain your reasoning.

Option (a) is probably the most straightforward, but we would be open to another option if government had proposals for how to address it though option b) or another way.

Q20 Do you agree with the proposals to simplify the requirements in the Building Regulations for the consideration of high-efficiency alternative systems?

a. Yes
~~*b. No*~~
~~*If no, please explain your reasoning.*~~

[8] CIBSE Journal, Feb 2020 https://www.cibsejournal.com/technical/taking-the-temperature/

Q21 Do you agree with the proposal to adopt the latest Standard Assessment Procedure, SAP 10?

~~*a. Yes*~~
b. No
If no, please explain your reasoning.

In principle, if government is to retain the SAP methodology in Part L 2020, then we accept that adopting the latest version, SAP 10, is the right thing to do. However, there are significant limitations to the SAP methodology, which we strongly recommend needs revising. We understand that this may not be feasible in time for the 2020 changes, but there really needs to be a commitment alongside Part L 2020 to undertake the following work to establish a robust methodology for the Future Homes Standard. This is one example of the need to begin FHS development work now, not in mid 2021.

Work to revise SAP should include:

- Setting the notional building with gas heating: this should be amended – see details in Overview section and Appendix 3. This is one change that we believe is needed for Part L 2020, to start to drive a change in heat sources and reward early adopters.
- It should take account of total energy use
- It should more strongly encourages consideration of building shape and orientation, instead of using a notional building which ignores this step: **ultimately, the target should be absolute (i.e. kWh/m2/yr, potentially expressed as a domestic Display Energy Certificate), rather than relative to a changing notional building which removes incentives and prevents true comparison between dwellings.**
- There is a known tendency for SAP to under-estimated heating requirements (except in situations such as compact apartment blocks, where dwellings have limited heat loss areas, and where heating measured “at the dwelling” may be small and broadly in line with the SAP figure, but this is largely due to heat gains from communal parts and communal heating).
- SAP does not properly take account of system efficiency. In particular, in the case of MVHR systems, it focuses on the product efficiency but does not consider known influencing factors, such as the length of ducts and whether they are insulated everywhere heat loss can occur. Furthermore, to our understanding the efficiencies in the Product Characteristics Database are typically WITHOUT filters, while these in fact are routinely specified in urban environments for the very valid purpose of protecting the indoors from the effect of outdoor pollution. Tested values should clearly indicate whether they include or not the filters, and the SAP methodology should prompt that question from the user. This should also form part of as-built checks by Building Control. This could and should be incorporated in Part L 2020.

As an additional point of principle, we are aware that many of our members work on large multi-storey blocks which often require the use of dynamic simulation (e.g. for peak load calculations, overheating assessments etc). We do not advocate that a methodology based on dynamic simulation should be used for <u>all</u> dwellings, as this could prove too complex and onerous for some projects, and un-necessary as steady-state calculations have proved successful on domestic buildings (e.g. PHPP used in Passivhaus). However, we think it should be included as an optional methodology, as it would offer efficiencies in the design process, and may be more appropriate for some typologies with complex systems, and where residences are part of a mixed-use scheme which could take the benefits of heat exchange with other uses.

On the specific changes listed in §3.47, we have the following comments:

- *A minimum recognised level of airtightness in naturally ventilated buildings has been introduced (AP_{50} = 3m^3/m^2.h). Lower values may be entered, but further energy savings will not accrue below this level. This is outlined further in chapter five and is consulted on separately there*.

> At these levels, we would strongly recommend the introduction of mechanical ventilation with heat recovery for energy consumption and air quality purposes – see our response to the Chapters on airtightness and Part F.

- *Provision has been added to allow the standing losses for heat interface units (for use with heat networks) to be taken from Product Characteristics Database (PCDB). Where no PCDB data is available a default of 1.46 kWh/day will be used*.

> We very much support the introduction of standing losses from HIUs; these can be non-negligible in energy terms, and also contribute to overheating risk. However, we do not agree with the detail: based on best practice and the advice of our CIBSE expert group on the issue, we would recommend a limit of 1 kWh/day maximum, and an ambition to improve that limit in the Future Homes Standard (e.g. 0.7kWh, as is currently best practice); this would also be in line with the latest version of CIBSE CP1. As a general rule, we also caution against the use of default values unless they represent a very strong dis-incentive, as otherwise performance in practice may end up much worse. We do not think that 1.46 as default value is enough to act as incentive to select units which 1) are in the PCDB, and 2) show good performance.

- *The in-use factor of 1.15 for heat networks has been removed from specification and instead will be part of the PCDB record, allowing it to be varied depending on the nature of the source of the data*.

> This seems reasonable.

- *A procedure for modelling solar thermal heating systems implementing EN15316-4-3:2017 has been added*.

> This seems reasonable.

- *The minimum recognised rate for showers has been set to 8l/min for new homes, or 7l/min for existing homes*.

> No comment

- *A requirement and method to include 'significant' point thermal bridges has been added to meet a requirement of EN52016-1:2017*.

> This seems reasonable

- *The treatment of electricity generated by PV where not connected directly to the dwelling's meter has reverted to being as in SAP 2012*.

> No comment

- *The table of reference building characteristics used for setting regulatory targets has been updated. The key changes are to the fabric values and to the building services, which are considered in more detail in this chapter. Please consult Appendix R of SAP 10.1 for the full updated list of reference values*.

> Comments as per elsewhere in our response

Q22 Do you agree with the proposal to update the source of fuel prices to BEIS Domestic energy price indices for SAP 10.2?

a. Yes
~~b. No~~
~~If no, please explain your reasoning.~~

It seems reasonable to update fuel prices, however we understand that BEIS domestic energy prices are updated quarterly. How would this affect the SAP methodology, and design teams at advanced stages in a project?

Q23 Do you agree with the method in Briefing Note – Derivation and use of Primary Energy factors in SAP for calculating primary energy and CO2 emissions factors?

~~*a. Yes*~~
b. No
If no, please explain your reasoning.

We have carried out a brief review and find the method unclear, particularly in relation to electricity. It would be useful to explain more clearly how the different fuel sources are taken into account, especially renewable energy sources. Currently, our understanding is that energy generated from renewable sources and fed into the grid is not counted towards the primary factor of grid electricity. This is not consistent with the laws of physics, and seems to be an intent to align with a "carbon-based" approach. This concerns us: it would mean that not only both Part L metrics are "system" metrics, rather than directly related to the performance of the building itself, but they also do not represent the true pressure on the system exerted by a building, and therefore will not act as sufficient enough driver to limit consumption and demand in the first place. To be absolutely clear: energy is precious, whether or not it is from renewable energy sources.

If our understanding is incorrect then we would welcome correction, but it just demonstrates that the current proposal is not sufficiently clear.

Q24 Do you agree with the removal of government Approved Construction Details from Approved Document L?

~~*a. Yes*~~
b. No
If no, please explain your reasoning.

It is important to remember that poor thermal bridging is not only an issue for overall heat loss, but also creates the risk of local fabric degradation and mould growth, and is therefore potentially also an issue for air quality. It becomes all the more important (in absolute and relative terms) when the performance of the rest of the fabric elements improves.

In general, we support actual calculation rather than reliance on default values and assumptions: this means that ideally, thermal bridging values in SAP should be calculated. However, in practice, many smaller projects rely on accredited construction details (ACDs), and calculating the performance of all junctions would require significant upskilling across the industry. Obviously upskilling is required in order for us to achieve net zero, so government should encourage this by clearly setting out that in the Future Homes Standard will require thermal bridging calculations: coupled with a release of the FHS as soon as possible (see our Overview, and responses to the sections on Part L and the FHS), this could drive the industry.

With the only proposed options being "bespoke calculated" and "default", we expect many projects will resort to "default", and performance may be even worse in practice (this is similar to the point we make on HIU default value in Q21). This is even more of worse with the proposed removal of the FEES (which we recommend against – see our response to Q3), as worse thermal bridging in SAP could now be compensated by building services.

We would therefore recommend the current library should be retained and updated, and made available for use at least on small projects.

Q25 Do you agree with the proposal to introduce the technology factors for heat networks, as presented in the draft Approved Document?

~~*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*~~
Please explain your reasoning.

As we have been saying for fuel factors, which thankfully are proposed to be removed, Part L MUST avoid fudge factors which prevent the assessment of a building's real performance. The current factors would allow schemes with district heating to be **45% higher carbon** for their space heating & domestic hot water element, than schemes with on site systems. This is extremely significant and we strongly advise against it.

It is important to look at the common arguments for promoting heat networks:

- They offer heat decarbonisation solutions where other options are limited: this may indeed be valuable in some situations, for example in areas with hard to treat properties such as conservation areas with buildings of high heritage value, where fabric and on-site system options are not desirable. In these areas, it may be seen as useful for a nearby new development to be used as catalyst for the initial introduction of a heat network. However, we think this is the wrong answer to a valid problem: new developments should be as low carbon as possible, and if heat networks are considered valuable elsewhere, this should be 1) properly assessed, with consideration of a range of alternatives, and 2) if considered suitable, supported in other ways such as finances, legal agreements etc. Part L is meant to assess the performance of buildings, it must do so and be free of as many distortions as possible in order to send the right message.
- They offer flexibility for future low-carbon sources: this is only true to some extent, depending on the temperatures they are designed to: in particular, networks designed for CHP and gas boilers will typically not allow heat pumps to operate at their optimum efficiency. The time for low-carbon solutions is NOW: new networks should be low-carbon; new gas-fired networks would represent significant expenditure in finances and in embodied carbon, locking an area into fossil-fuel heating for possibly decades to come. In addition, they may also lead to concern about air quality in urban areas.
- Existing heat networks should be made use of, and new buildings should therefore be required to connect to it: caution should be exercised because, while this may seem valuable in the short term as it avoids embodied carbon expenditure in new plant, it also results in higher carbon emissions from the new development AND may well increase the lifetime of gas-fired solutions, by improving their business case. Connections should therefore be carefully assessed and should only be on the condition of a clear transition plan to low-carbon heating, within a certain time limit and to be checked at a later date- this would need careful consideration as it clearly raises questions of enforcement. Furthermore, this should be a specific scenario in SAP for connection to existing networks, NOT result in undue allowances for all types of networks.

Therefore, heat networks should remain an option, to allow the communal use of heat exchange and low-carbon heat sources where possible, but this should be assessed on a fair basis against the alternatives. If there is an over-riding case to use a heat network in a specific scheme then it should be allowed on a case by case basis – potentially through a relaxation by building control.

Q26 Do you agree with removing this supplementary guidance from Approved Document L, as outlined in paragraph 3.59 of the consultation document?

~~*a. Yes*~~

b. No
If no, please explain your reasoning.

We agree with some elements, for example removing guidance on oil-fired boilers and solid mineral fuel appliances. However, we do not know the rationale for removal guidance on elements such as:

- Energy Performance Certificates
- Providing adequate levels of daylight: guidance is useful as regulations do not actually require anything on this very important aspect of health and wellbeing
- Note that future temperatures may want to be considered: we are seriously concerned that government would think this is NOT useful guidance, unless there is a commitment that this will be considered in the upcoming new standard on overheating
- Detailed notes re SAP
- Advice on facilitating incorporation of improvements in system efficiencies
- Guidance on what might be useful to include in a commissioning plan
- Suggestion that until the building control body receives the commissioning notice, it may not consider it appropriate to give a completion / final certificate: contrary to the consultation document, we DO think this is necessary information to include in the AD.

While such guidance may be well-known and readily available to some projects, it will not be the case for all, particularly the smaller ones, or may represent a substantial additional cost.

See also our response to Q28.

Q27 Do you agree with the external references used in the draft Approved Document L, in Appendix C and Appendix D?

a. Yes
b. No
If no, please explain your reasoning and suggest any alternative sources.

No response. We will review these and advise if we think some need updating.

Q28 Do you agree with incorporating the Compliance Guides into the Approved Documents?

~~*a. Yes*~~
b. No
If no, please explain your reasoning.

The Compliance Guides can be very useful to designers in practice, and there is considerable unease in industry about the removal of the Compliance Guides. They were introduced at a time of significant regulatory change to assist the industry in adopting new ways of designing and building. The Future Homes Standard is going to require even more significant and radical change in the sector, and yet the government response to this is to withdraw the Compliance Guides. We believe that this is fundamentally the wrong thing to do. CIBSE would be willing to work with government to revise and update the Guides, but they are needed.

Q29 Do you agree that we have adequately covered matters which are currently in the Domestic Building Services Compliance Guide in the new draft Approved Document L for new dwellings?

a. Yes
b. No
If no, please explain which matters are not adequately covered.

As per Q26 and 28

Q30 Do you agree that we have adequately covered matters which are currently in the Domestic Ventilation Compliance Guide in the new draft Approved Document F for new dwellings?

a. Yes
b. No
If no, please explain which matters are not adequately covered.

As per Q26 and 28

Q31 Do you agree with all of the proposals for restructuring the Approved Document guidance?

a. Yes
b. No
If no, please explain your reasoning.

In principle, maybe, but at the moment only one element of the current ADs (= new dwellings) is available for consultation. We reserve our position until all elements covered by the current ADs are available.

Q32 Do you agree with our proposed approach to mandating self-regulating devices in new dwellings?
a. Yes
~~*b. No*~~
~~*If no, please explain your reasoning.*~~

Yes. TRVs are mentioned as “a common way” in the consultation document; this is fine, but we would recommend NOT requiring a particular type of self-regulating device. For example, a report by the Energy Saving Trust in 2011 (Report No: 6507 - The effect of Thermostatic Radiator Valves on heat pump performance) suggested that TRVs may not be appropriate in buildings with heat pumps, and that thermostats in heating zones may in this case be a more appropriate solution. Another potential issue is if the flow temperature is set too high, which can lead to over-reliance on closing TRVs for temperature control. Again, this can affect the operation of heat pumps but could be avoided with good design and commissioning to ensure a low flow temperature.

Q33 Are there circumstances in which installing self-regulating devices in new dwellings would not be technically or economically feasible?

a. Yes
~~*b. No*~~
If yes, please explain your reasoning and provide evidence.

This does not apply to ALL self-regulating devices: see Q32, in the case of TRVs in buildings with heat pumps.

Q34 Do you agree with proposed guidance on providing information about building automation and control systems for new dwellings?

a. Yes
~~b. No~~
~~If no, please explain your reasoning.~~

Building automation and control systems can notoriously operate poorly if they are not properly commissioned, or too complex for users to understand – see also our Overview section.

CHAPTER 4 – PART F

In addition to our responses to individual questions, please refer to our overall comments at the start at the document.

Q35 Do you agree that the guidance in Appendix B to draft Approved Document F provides an appropriate basis for setting minimum ventilation standards?

~~a. Yes~~
b. No
If no, please explain your reasoning.

There needs to be complete clarity about what is required, or a standard, and what is guidance. Levels of various pollutants cited in the guidance need to make clear whether those figures are advisory or that there is an expectation that achieving them is essential to demonstrate "reasonable performance". Locating such important guidance in an Appendix to a guidance document sends out unhelpful signals about the status of that guidance. **In line with the RCPCH recommendations5, we would recommend setting clear requirements in terms of pollutant levels**.

We welcome the introduction of a reference to WHO guidelines (§ B.4). However, this is still very incomplete:

- **The guidance needs to include particulate matter, and it is unclear why these have been omitted given that the health evidence around PM2.5 and 10 is very clear. WHO guidelines are the current gold standard backed up by the most robust epidemiological evidence, and government needs to make a compelling case not to follow them**.

- **It is also very unclear why ozone has been omitted, while it is included in the current version of the Approved Document. We know of no reason why this should be the case, and recommend this is retained. If anything, there are reasons to believe the population could be exposed to more frequent peaks in ozone levels in the future, due to heatwaves related to climate change.**

The guidance does not go far enough in describing the process by which compliance with the limits set in Appendix B is demonstrated. The document implies that the limits should be met but does not have a mechanism where the limits are tested or reported.

Echoing the RCPCH's 2nd recommendation5, testing of the indoor air quality should be conducted post completion and before occupancy. The results of these tests should form their own section within the commissioning and handover pack and be given to the occupier – ideally with some form of traffic-light style formatting so that it's clear to both the Building Control Officers and potential occupier that no construction-related pollutants remain, and that the ventilation and any filtration system are

operating effectively. We think that without this, it is far too easy to ignore the requirement, as is currently the case.

We are also concerned about the assumption that less airtight buildings have an infiltration rate of 0.15 air changes per hour (§B.7): the air path to some rooms may not be appropriate (e.g. enclosed wet rooms). Recent research in multi-apartment buildings also shows that common assumptions about internal air pathways may not always be accurate.

Q36 Do you agree that using individual volatile organic compounds, informed by Public Health England guidelines, is an appropriate alternative to using a total volatile organic compound limit ?

a. Yes
~~b. No – the Public Health England guidelines are not sufficient~~
~~c. No – individual volatile organic compounds should not be used to determine ventilation rates~~
~~d. No – I disagree for another reason~~
~~If no, please explain your reasoning, and provide alternative evidence sources if appropriate.~~

We agree that PHE guidelines are an appropriate alternative to the TVOC limit. We would go further than that, and encourage their use instead of the overall TVOC metric (TVOCs are only an indicator). Project teams should be encouraged to use PHE guidelines, and Building Control should have the ability to require their use if they have reasonable cause for concern.

Q37 Do you agree with the proposed guidance on minimising the ingress of external pollutants in the draft Approved Document F?

CIBSE TM21 is out of date. CEN/TR 16798-4:2017 **(**Sections 8.8.1 to 8.8.4) provides a more up to date set of guidance. We would also recommend referring to CIBSE TM40 (publication expected spring 2020), which includes guidance and reference to a number of recent sources.

Q38 Do you agree with the proposed guidance on noise in the draft Approved Document F?

~~a. Yes~~
~~b. No – this should not form part of the statutory guidance for ventilation, or the guidance goes too far~~
c. No – the guidance does not sufficiently address the problem
~~d. No – I disagree for another reason~~
If no, please explain your reasoning.

Noise is one of the main reasons why occupants turn off their mechanical systems, which can have serious consequences on air quality and overheating risk.

We agree that product testing is insufficient to adequately address noise from mechanical systems, since the system as a whole and the installation are very influential. The consultation proposal does not go far enough:

- § 1.5 merely state that mechanical ventilation systems “should be designed and installed to minimise noise”. This is very insufficient. The document should give clearer guidance or, ideally, set requirements, for overall noise levels and sound characteristics from mechanical systems. We would also strongy recommend that “and commissioned” is added after installed.
- §1.7 consideration of outside door re purge: this should also be the case when designing mechanical ventilation systems, which can transmit noise from outside.

- Should purge be achieved through mechanical means, it must be made clear what the requirement is. We recommend this should be at least the same as by openable windows, i.e. 4 ach/hr, which requires attention at early design stages.
- The consultation document states that in-situ noise testing is not proposed here and may be explored in a future consultation. We would very much support this and urge this to be consulted upon as soon as possible. **The culture of regulations must move towards verification of actual performance.**

There are more solutions to minimising noise, including: attenuators in ducts ; installation of anti-vibration mounts; rubber connections between fan housing and ductwork; use of curved 90° bends instead of straight corners. All solutions should be listed as an “and” not “or” way of preventing unwanted noise breakout i.e. all solutions should be used if needed.

This is an area where robust data on product performance is needed, and should be covered by the proposed new construction products regulator. Noise may not be a fire safety hazard, but it is a health hazard and should be taken seriously.

We would also refer to our general point about making commissioning enforceable: this will have numerous benefits in improving the performance of ventilation systems in terms of air quality, noise, and energy consumption.

Another point on the issue of noise, but not from mechanical systems : Whilst noise may be inconvenient, windows should always be able to be opened as it offers choice to occupants, may in some cases offer an option as a means of escape, and provides resilience in the case of mechanical ventilation being insufficient or failing.

For purge ventilation, which is only meant to apply for short periods of time, it should be acceptable to open windows, and it also provides potential backup for mechanical ventilation if MVHR is out of action. However, we would note that there is a lack of clarity on what ‘purge’ means in the industry, particularly in the context of MVHR; it should be made clear that the definition of “purge” does NOT cover increased ventilation requirements to mitigate against overheating risk, as this is required for long periods of time when noise levels must be a consideration.

Q39 Do you agree with the proposal to remove guidance for passive stack ventilation systems from the Approved Document?

a. Yes
~~b. No~~
~~If no, please explain your reasoning.~~

Q40 Do you agree with the proposal to remove guidance for more airtight naturally ventilated homes?

No.

Airtight naturally ventilated buildings are a risk to indoor air quality, and guidance should be provided to ensure ventilation is sufficient to guarantee good indoor air quality. In many cases in the future, this may mean a requirement for mechanical ventilation with heat recovery – see also response to Q41 and Q48.

We have received anecdotal evidence that a future switch to more hydrogen in the grid may increase indoor emissions (Nox). We would encourage more research on this in order to determine whether this would indeed be the case and if so, whether future kitchen vent rates may need to increase to compensate.

Q41 Do you agree with the proposal to remove guidance for less airtight homes with mechanical extract ventilation?

Yes, on the condition that this type of approach should be strongly discouraged by Part L, and ultimately mostly impossible except in very few exceptions.

We would also stress that the consultation states guidance will still be provided « for less airtight homes» with natural ventilation : as made clear in our response to the Part L and Future Homes section of this document, all new homes will need to become airtight in order to meet our net zero carbon target. This means that mechanical ventilation systems will increasingly need to be provided, well installed and commissioned, and well maintained. This is an important shift for designers, suppliers and occupants, which the whole industry needs to be prepare for. **This direction of travel therefore needs to be made clear as soon as possible, by releasing the Future Homes Standard as soon as possible, including mechanical ventilation with heat recovery. MVHR is a proven option to deliver very low energy consumption levels AND good indoor air quality[9].**

Q42 Do you agree with the proposed guidance for background ventilators in naturally ventilated dwellings in the draft Approved Document F?

No strong opinion, however as expressed elsewhere in our responses, ultimately new dwellings must move towards exemplar airtightness and mechanical ventilation, and this direction of travel must expressed in the guidance.

Q43 Do you agree with the proposed approach for determining minimum whole building ventilation rates in the draft Approved Document F?

We agree to some extent, however we would strongly recommend that ultimately, the focus of the requirements should move to the end outcome i.e. indoor pollutant levels, rather than the rates themselves. This must be made clear, and incorporated in the guidance on how to determine suitable ventilation rates.

Q44 Do you agree that background ventilators should be installed for a continuous mechanical extract system, at 5000mm2 per habitable room?

~~a. Yes~~
~~b. No – the minimum background ventilator area is too low~~
~~c. No – the minimum background ventilator area is too high~~
d. No – other

The focus should be on the desired outcomes, rather than a prescriptive design solution. There will be cases where this is not required, and others where it is insufficient. Guidance should be given in relation to the recommended rates in table 1.2.

Q45 Do you agree with the external references used in the draft Approved Document F, in Appendices B, D and E?

[9] For references, see TSB meta-analysis of ventilation systems : http://radar.gsa.ac.uk/4073/

CIBSE TM21 is out of date. CEN/TR 16798-4:2017 **(**Sections 8.8.1 to 8.8.4) provides a more up to date set of guidance.

CIBSE TM40 (upcoming, spring 2020) may be a useful reference as it includes overall guidance and references to recent sources such as Public Health England and WHO guidelines, indoor environment standards (BS, EN and ISO), filtration standards etc. PHE were involved in the steering group. We would be happy to provide a coy to MHCLG if this was useful.

Q46 Do you agree with the proposed commissioning sheet proforma given in Appendix C of the draft Approved Document F, volume 1?

No

The following should be added :

- 2.3b should include statement about balancing between total supply and extract ventilation rates, for all fan speeds.
- 2.3b should also mention insulation of the ductwork between the ventilation unit and the thermal envelope, even if spaces are not unheated: the supply ducts are cold, and condensation could form on the ducts.
- 2.3c there should be mention of noise, ideally with testing against set levels. This is particularly important in bedrooms, as people may otherwise switch off the units or have their sleep disturbed.
- 3.3 and 3.4 should include a total air flow rate measured at the intake and exhaust from the building and a column to record comments on noise.

In addition and as noted above, it is extremely important that it includes a section on testing of individual pollutant levels for, based on actual testing on completion and prior to handover. An incremental approach could be applied if needed e.g.

- Reduced requirements on sites where outdoor pollution levels are known to be acceptable i.e. meeting WHO requirements, AND not containing indoor combustion sources (indoor fires, gas cooking etc)
- For all others, 10% of developments to be tested (similar to acoustics testing), with mix of unit types and selected at random (not put forward by the applicant), with the option for Building Control to request remediation measures a nd testing of additional dwellings should they consider it appropriate.
- There is absolutely no point having a pro-forma unless building control are going to enforce it. If they do not it is a waste of time and money, and the systems will not work effectively.

Q47 Do you agree with the proposal to provide a completed checklist and commissioning sheet to the building owner?

Yes.

See comment above on indoor air quality testing. We would add that guidance should be provided on “what good looks like”, as commissioning sheets could otherwise be very difficult to interpret for building owners who are not specialists.

CHAPTER 5 – AIRTIGHTNESS

Q48 Do you agree there should be a limit to the credit given in SAP for energy savings from airtightness from naturally ventilated dwellings?
Yes

Yes in principle, because otherwise there is a risk that SAP benefits would drive towards dwellings where no consideration has been given to whether mechanical ventilation is needed: this means that either air quality would be inappropriate, or occupants would have to rely extensively on opening windows for background ventilation in winter, which would affect heating consumption. However, we recommend that, where airtightness is *3m^3/m^2*/hr or below, mechanical ventilation heat recovery should be the required option both for air quality purposes, and because the dwelling is then sufficient airtight for MVHR to offer energy saving benefits.

We would also stress that ultimately in order to achieve net zero, many more new dwellings will need to be very airtight AND have mechanical ventilation with heat recovery. Regardless of adjustments to SAP, this direction of travel needs to be made very clear in the AD and through the production of the Future Homes Standard as soon as possible – see our response to Question 41.

Q49 Do you agree that the limit to the credit should be set at 3m^3/m^2.h?

a. Yes
~~*b. No – it is too low*~~
~~*c. No – it is too high*~~
~~*If no, please explain your reasoning and provide evidence.*~~

We are aware that 3m^3/m^2/hr is often referred to as the threshold below which mechanical ventilation with heat recovery becomes beneficial for energy purposes, and below which it is needed for air quality purposes. This would tend to indicate it is a reasonable threshold, but cannot comment with certainty. The most important point though is that we think airtight buildings should transition to MVHR – see Q48.

Q50 Is having a standard level of uncertainty of 0.5m^3/m^2.h appropriate for all dwellings undergoing an airtightness test?

a. Yes
b. No – a percentage uncertainty would be more appropriate
c. No – I agree with having a standard level of uncertainty, but 0.5m^3/m^2.h is not an appropriate figure
d. No – I disagree for another reason
If no, please explain your reasoning.

A 0.5m^3/m^2/hr rate on a low expected rate of say 3m^3/m^2/hr gives a very large margin of error, and will allow more "sloppiness" to creep in during the build. A low percentage rate would be more appropriate. Whether this is the right level may still be a matter for further analysis

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

a. Yes
~~b. No~~
~~If no, please explain your reasoning and provide evidence to support this.~~

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

a. Yes
~~b. No~~
~~If no, please explain your reasoning and provide evidence to support this.~~

Q53 Do you agree that the Pulse test should be introduced into statutory guidance as an alternative airtightness testing method alongside the blower door test?

~~b. No~~
~~If no, please explain your reasoning~~

We are not providing a response to this question.

CIBSE will provide MHCLG with a report on the responses to our parallel consultation on this topic.

Q54 Do you think that the proposed design airtightness range of between 1.5m^3/m^2.h and the maximum allowable airtightness value in Approved Document L Volume 1 is appropriate for the introduction of the Pulse test?

a. Yes
b. No
If no, please explain your reasoning and provide evidence to support this.

We are not providing a response to this question.

Q55 Do you agree that we should adopt an independent approved airtightness testing methodology?

a. Yes
~~b. No~~
~~Please explain your reasoning.~~

Yes. It should incorporate existing guidance and standards including Air Tightness Measurement Association (ATTMA) technical standards, now Building Compliance Testers Association (BCTA).

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, subject to addressing the various comments received from industry.

CHAPTER 6 – COMPLIANCE, PERFORMANCE AND PROVIDING INFORMATION

Q57 Do you agree with the introduction of guidance for Build Quality in the Approved Document becoming part of the reasonable provision for compliance with the minimum standards of Part L?

a. Yes
~~b. No~~
~~Please explain your reasoning and provide evidence to support this.~~

There are many designers and contractors who are not aware of the importance of quality build. It is also essential that this information is passed on to and explained clearly to the site workers as they will have the biggest influence over the final build.

Q58 Do you have any comments on the Build Quality guidance in Annex C?

Yes, please see changes we support:

- **Build Quality: Insulation gaps / Insulation boards:** / "…..boards should be lapped or sealed with tape." Change to: "…..boards should be sealed with tape, even in the case of lapped boards."
- **Build Quality: Thermal bridging at junctions / Buildability:** / "junction details should be reviewed for their buildability in practice and sequencing carefully considered." Add in "……carefully considered by an experienced installer."
- **Build Quality: Airtightness around openings – including windows, doors, loft hatches / Fixings:** "….compressible seals and expanding foam help….." should be changed to: "….compressible seals and small amounts of expanding foam help….."

Q59 Do you agree with the introduction of a standardised compliance report, the Building Regulations England Part L (BREL) report, as presented in Annex D?

a. Yes
~~b. No – there is no need for a standardised compliance report~~
~~c. No – I agree there should be a standardised compliance report, but do not agree with the draft in Annex D~~
~~If no, please explain your reasoning.~~

Q60 Do you agree with the introduction of photographic evidence as a requirement for producing the as-built energy assessment for new dwellings?

a. Yes
~~b. No~~
~~If no, please explain your reasoning.~~

Having date/time-stamped and geo-tagged photos included would help keep the onus on the developer to maintain high standards.

However, while we agree in principle with the proposal, this could result in significant resource requirements to review the evidence, or be meaningless. The use of this evidence needs to be aligned to the QA regime for the Energy Assessor bodies. There will need to be conventions agreed on the number of photographs needed, and what should be photographed.

Q61 Do you agree with the proposal to require the signed standardised compliance report (BREL) and the supporting photographic evidence to be provided to Building Control?

a. Yes
~~b. No~~
~~Please explain your reasoning.~~

Having to supply a signed report would also keep the developer "on the hook" for the quality of what has been built. In the event of significant defects which affect energy performance that should have

been identified at the as built assessment, it will also provide a clear evidence base for the energy assessor scheme.

Q62 Do you agree with the proposal to provide the homeowner with the signed standardised compliance report (BREL) and photographic evidence?

a. Yes
~~*b. No*~~
~~*Please explain your reasoning.*~~

Homeowners can be sceptical about the quality of their homes – both new and old. Providing them with these documents will help to improve the reputation of (good) housebuilders and the construction industry, as well as providing peace of mind to the homeowner, and records should problems occur in the future. This also then provides the homeowner with evidence that the developer is claiming a certain level of energy performance. The report must also include an explicit and very visible statement of which version of Part L has been used. This should be required in a format that makes clear where the version used is not the latest by listing all the recent versions and requiring a tickbox – the least recent versions appearing down the list and so making it obvious that the developer has not met the current standards! This will provide an incentive to developers not to try to cheat on the transitional arrangements (see below).

As per our response to Q47, we would recommend this is accompanied with guidance on "what good looks like", as the information could otherwise be confusing or of little use to homeowners.

Q63 Do you agree with the proposal to specify the version of Part L that the home is built to on the EPC?

a. Yes
~~*b. No*~~
~~*Please explain your reasoning.*~~

This is vital information to ensure the householder understands the standard to which their property was built.
It will also provide protection to the contractor if a householder attempts to challenge the thermal properties of the dwelling based on an incorrect assumption of which year of Building Regulations their house has been built to.

Q64 Do you agree Approved Document L should provide a set format for a home user guide in order to inform homeowners how to efficiently operate their dwelling?

a. Yes
~~b. No~~
If yes, please provide your views on what should be included in the guide.

Key items which we think should be included are:

- Clear photographs of how to operate various aspects of the fixed building services.
- Explanation of how the heating is expected to work and be maintained, in simple non-technical language.
- Explanation of how the ventilation is expected to work and be maintained (including replacement parts such as filters), in simple non-technical language.
- How they can use their home as energy efficiently as possible

- Other explanations for systems or functionalities which may be unfamilar to occupants and which are important to deliver building performance, for example automated controls and systems, and how to operate their home in warm and hot weather (e.g. the use of features such as high-level and/or secure openings or thermal mass, if present).

In addition, ideally we would have liked to see the information packs include a meaningful zero carbon transition path, to provide incentives and homeowners to start a zero carbon journey. We acknowledge this would be difficult to include under Part L 2020 since no proposals have been introduced in this consultation, so we would urge MHCLG and BEIS to review options for their introduction as part of EPC requirements at sale and lease, and as part of the expected consultation on Part L for existing buildings.

Building passports could also be introduced in the Future Homes Standard, although we very much hope that the FHS will represent "zero carbon ready" homes and therefore that the passports will not be required – see our recommendations in the Part L & Future Homes section of our response.

MHCLG should engage with the homebuilders and seek advice from experts in the presentation of technical information to lay users to seek to provide user information that is usable and informative. There may be a case for MHCLG to work with the NHBC Foundation to address this topic in greater detail.

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. Yes – where building work has commenced on an individual building within a reasonable period, the transitional arrangements should apply to that building, but not to the buildings on which building work has not commenced
~~b. No – the transitional arrangements should continue to apply to all building work on a development, irrespective of whether or not building work has commenced on individual buildings~~
~~If yes, please suggest a suitable length of time for the reasonable period in which building work should have started.~~
~~If no, please explain your reasoning and provide evidence to support this.~~

We understand that Scotland have similar arrangements and suggest that MHCLG discuss this with colleagues in Scotland.

Q66 Do you foresee any issues that may arise from the proposed 2020 transitional arrangements outlined in this consultation?

a. Yes
~~b. No~~

The length of time needs to be well defined, as do the initial works that count as having "started on site". Without this, less scrupulous develops may just clear land ready to build, and then try and build to the old Part L. There needs to be a time limit on permissions to build to encourage building within a reasonable timeframe.

These transitional measures should also apply retrospectively to developments where no meaningful work has started, even if they have already been approved under the current (or previous) Part L. This is to ensure that consumers benefit from the better standards that the new Part L will bring in, and that the UK benefits from the lower carbon emissions.

Q67 What is your view on the possible transitional arrangements regarding changes to be made in 2025?

As explained at length in our summary, the Future Homes Standard needs to be made available as soon as possible in order to allow leaders to adopt it, driving the development of supply chains and expertise. This would have the additional advantage of helping with transitional arrangements, as project teams would have certainty on the requirements post 2025 and ample time to prepare for it in their designs.

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?

~~a. Yes~~
b. No
Please explain your reasoning and provide evidence to support this.

We do not think the notional building used in the impact assessment should have a gas boiler, as justified at length in our response to the section on Part L and Future Homes.

We are concerned about the reliance on complex and relatively new mechanical systems in the notional building, in particular Waste Water Heat Recovery Systems; while we understand this is not a requirement as such, but a setting of the notional building, this is not technology neutral: it implies that the way to achieve compliance is to use WWHR and sends a signal to industry to turn to mechanical systems, while other solutions may be more appropriate; it will also influence the cost impact assessment, while solutions focused on fabric performance, reducing loads and reducing equipment could result in capital as well as running costs. In the appraisal of options, it is essential to consider a scenario which does not rely on complex systems such as WWHRS, and instead takes advantage (in capital as well as running costs) of reductions in loads. Such scenarios should be developed by MHCLG and publicised to ensure the industry is not provided with misleading signals. Complex systems will be at risk of incorrect installation, inadequate commissioning and a failure to deliver in practice. We should not rely on them when simpler solutions are available. There are low flow shower heads, for example, that can achieve the same energy savings as WWHR at a fraction of the cost. They meet European standards and comply with eco-design requirements

We would also recommend reviewing the following references, which carried out extensive assessments of the costs of achieving net zero carbon:

- Etude, 2019 *Cost of Carbon* study commissioned by a group of local authorities on the technical options and costs of achieving net zero carbon for a range of dwelling types – details available in the submission made by Etude to this consultation, or via CIBSE.
- Passivhaus Trust report, 2019*, Passivhaus Construction Costs*
- CCC, 2019, *UK Housing: Fit for the Future?*

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?
~~*a. Yes*~~
b. No
If no, please explain your reasoning and provide evidence to support this.

We have important concerns:

1 – Dwelling types forming the basis of the assessment

The impact assessment is based on one dwelling type alone, a semi-detached house. Based on NHBC data[10], this is estimated to represent approximately 26% of the current mix of new build homes in the UK, with the remainder split as 30% detached homes, 16% terraced homes, 26% apartments, and 2% bungalows.

We are willing to accept that the performance of a semi-detached home could be taken to represent the average of detached homes, terraced homes and bungalows, and therefore that this single dwelling type would represent approximately 74% of the stock. However, this leaves apartments out. Because of their form, apartments will typically have smaller space heating requirements. It is therefore not appropriate to state that the current Options 1 and 2 would represent 20% or 31% carbon saving overall, when these savings are based on a semi-detached home. By the government's own admission (Impact Assessment, §2.3), Option 2 would actually only equate to 22% for apartments; with the above approximate breakdown, this means that instead of delivering 31% carbon savings, a more realistic figure may be 28.7 (0.74*31 + 0.26 *0.22).

We strongly urge a revisit of the assessment, with a more representative sample, so that more realistic estimates of carbon savings can be made and communicated.

In addition, there should be more variety in the homes assessed, even within the single scenario of a semi-detached home, as there can be significant variations due to building shape, orientation etc.

2 – Design options forming the basis of the assessment

We are concerned that the assessment of Option 2 is based on a technology-driven scenario. This has implications in terms of capital costs and maintenance, and is typically less reliable than simple solutions at providing energy and carbon savings. This could (intentionally or not) send a signal that this is the recommended compliance route; we strongly recommend the development of a fabric-first compliance scenario, to be provided as another illustration of how to achieve this option.

END OF SUBMISSION

Submission by Julie Godefroy,

CIBSE Technical Manager

Please feel free to contact us for additional information at JGodefroy@cibse.org

[10] http://www.nhbc.co.uk/cms/publish/consumer/Media-Centre/Downloads/2017-Annual-Stats.pdf

Appendix 1 – The overall step (20 or 31%) is not ambitious enough: schemes can and do already achieve better

1-1: Through the London Plan, schemes the Greater London Authority regularly achieve a 35% improvement on Part L 2013, which would translate into a 25% improvement on Part L 2020 Option 2 i.e. Option 2 is much less onerous than the current policy and much less onerous than what is already achieved in London.

Evidence of current savings: GLA monitoring reports

Evidence of equivalent saving under Part L 2020: provided by the Greater London Authority, based on analysis carried out by Aecom on a small sample of apartments. This analysis removed the impact of lower emission factors, by comparing Part L 2020 Option 2 to a Part L 2013 baseline with SAP 10.1 emission factors. This did not include the impact of technology factors.

For details, please refer to the GLA submission to this consultation.

1-2: A proportion of the carbon savings for Part L 2020 can be achieved at the same specifications as for Part L 2013, through changes in carbon factors alone

Evidence provided by Hoare Lea, on a sample apartment with air source heat pumps (with SAP10, as iSAP was not available at the time)

The boiler efficiency was assumed to be 88%. The air source heat pump efficiency was assumed to be 204, except in the scenario where it provides all the demand ("100% ASHP"), where its efficiency was assumed to be 150.

Performance under Part L 2013				**Performance under Part L 2020**		
Target	**Actual**	**% on Part L 2013**		**Target**	**Actual**	**% on Part L 2020**
SAP 2012 TER	SAP 2012 DER			SAP 10 TER	SAP 10 DER	
30.49	24.17	20.73		27.96	10.85	61.20
20.81	18.74	9.95		18.55	10.63	42.70
20.81	18.63	10.48		18.55	12.06	34.98
20.81	18.53	10.96		18.55	13.50	27.25
20.81	18.37	11.73		18.55	15.65	15.66

This shows that the same apartment, through changes in carbon factors rather than improvements to building performance itself, can show higher improvements against Part L 2020 than against Part L 2013. This illustrates that the Part L 2020 "step" is therefore not actually that onerous in itself, on building performance. It is also useful to note that the carbon emissions of the notional building have not, either, been reduced by the 20-31% range, but much less (around 10%).

Appendix 2 - Part L 2013 and 2020 notional building fabric and minimum fabric requirements vs Passivhaus

2020 minimum requirements show some improvement compared to 2013, but still with substantial margin compared to “world class” standards; they are also far from being as good as the 2013 notional building fabric specifications.

The 2020 notional building fabric specifications in Option 1 would be close to world-class levels specifications, except for airtightness which is substantially higher.

Building shape efficiency is not addressed.

<table>
<tr><td rowspan="3">Building specification</td><td rowspan="3"></td><td colspan="3">Notional building</td><td colspan="2">Minimum fabric requirements</td><td colspan="3">For comparison</td></tr>
<tr><td>Part L 2013</td><td colspan="2">Proposed Part L 2020</td><td>Part L 2013</td><td>Proposed Part L 2020</td><td rowspan="2">Passivhaus - as illustration of “world class fabric standards”
(except for air tightness, these are typical rather than set required values, as the standard is expressed as overall primary energy and heating demand limit)</td><td colspan="2">Zero Carbon Hub specifications for meeting the “full FEES” scenario[11]</td></tr>
<tr><td></td><td>option 1</td><td>option 2</td><td></td><td></td><td>Detached house</td><td>Semi-detached / end-terrace house</td></tr>
<tr><td colspan="2">Building shape and exposed surfaces</td><td colspan="3">Same as actual</td><td colspan="2">No requirement</td><td rowspan="3">No requirement, but all affecting primary energy and heating demand limits</td><td colspan="2" rowspan="3">No requirement, but all affecting FEES</td></tr>
<tr><td colspan="2">Orientation</td><td colspan="3">Same as actual</td><td colspan="2">No requirement</td></tr>
<tr><td colspan="2">Openings (glazed) areas</td><td colspan="3">Limited to 25% of the floor area</td><td colspan="2">No requirement</td></tr>
<tr><td rowspan="2">U-values
(W/m^2.K)</td><td>Walls</td><td>0.18</td><td>0.15</td><td>0.18</td><td>0.30</td><td>0.26</td><td>≤ 0.15</td><td>0.15-0.20</td><td>0.18-0.20</td></tr>
<tr><td>Party walls</td><td>0</td><td>0</td><td>0</td><td>0.20</td><td>0.2</td><td>-</td><td>-</td><td>0</td></tr>
</table>

[11] http://www.zerocarbonhub.org/sites/default/files/resources/reports/Fabric_Standards_for_2013-Worked_Examples_and_Fabric_Specification.pdf accessed 26th January 2020

	Floor	0.13	0.11	0.13	0.25	0.28	≤ 0.15	0.13-0.18	
	Roof	0.13	0.11	0.11	0.20	0.16	≤ 0.15	0.13-0.16	
	Windows	1.4	0.8	1.2	2.00	1.60	≤ 0.8	0.8-1.2	1.2-1.4
	Doors	1.0	1.0	1.0	2.00	1.60	-	1.0	
Airtightness ($m^3/hr.m^2$ at 50Pa)		5	5	5	10	8	approx. 0.5-1 (≤ 0.6 air changes/ hr @ n50)	5.1-5.2	4.8-5.0
Thermal bridging		# 0.05 $W/m^2.K$	option 1 psi values in Table R2 of SAP 10.1	option 2 psi values in Table R2 of SAP 10.1	???	???	"Thermal bridge free"	0.025-0.04	0.04

Appendix 3 - Consequence of the notional building having a gas boiler, minimum fabric requirements which are not onerous enough, and removing the FEES: it is possible for dwellings to comply with Part L 2020 with worse fabric performance and higher energy consumption (as predicted in SAP), than required to comply with Part L 2013

3.1 – Evidence provided by London Energy Transformation Initiative (LETI): Testing of a terraced house under the consultation iSAP tool, and SAP for Part L 2013:

Testing carried out using the consultation iSAP tool has demonstrated that the same terrace house that would have failed Part L 2013, due to poor fabric, would pass the carbon and primary energy targets under Part L 2020:

- *A home can pass Option 1 with a 48% CO_2 reduction (with a primary energy pass) using the following fabric standards and a heat pump.* ***This would have failed Part L 2013 FEES****:*
  - *Wall - 0.26*
  - *Roof - 0.16*
  - *Floor - 0.18*
  - *Window/door - 1.6*
  - *Air perm - 5*
  - *Thermal bridging - Default*
  - *MVHR*
- *A home can pass Option 2 with a 41% CO_2 reduction (with a primary energy pass) using the following fabric standards and a heat pump.* ***This would have also failed Part L 2013 FEES****:*
  - *Wall - 0.21*
  - *Roof - 0.14*
  - *Floor - 0.16*
  - *Window/door - 1.4*

- *Air perm - 3*
- *Thermal bridging - Default*
- *MVHR*

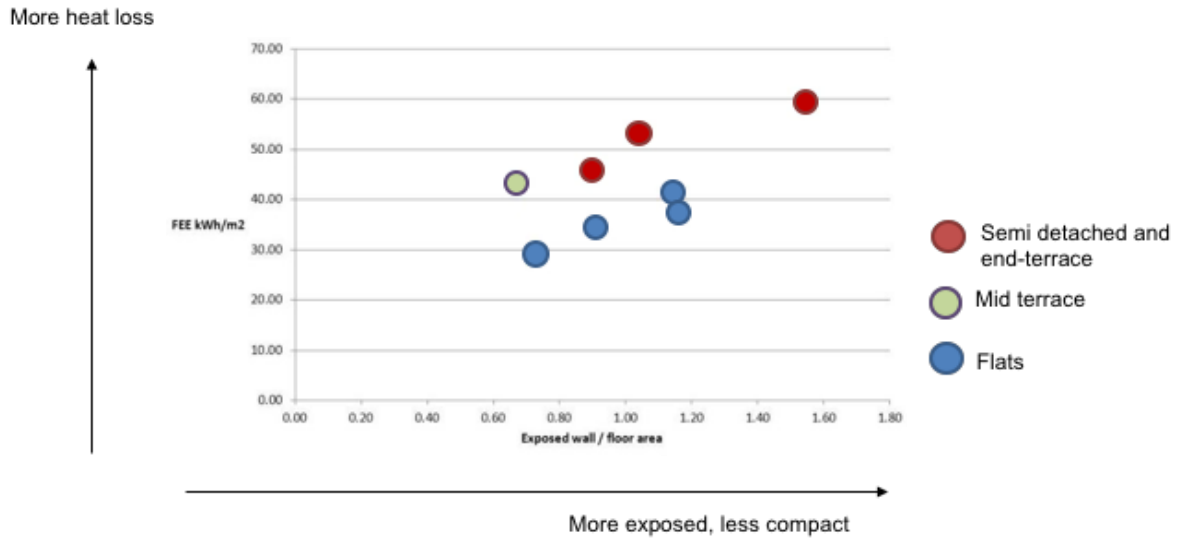
3.2 Evidence provided by Greengauge for the West of England Local Authorities
Based on modelling of one semi-detached house, and one mid-floor flat:

“The Part L 2020 standard could allow worse fabric than is currently allowed under Part L 2013, since the FHS consultation proposes to remove the TFEE.

Modelling the minimum fabric standards proposed for the 2020 standard resulted in the modelled dwellings failing the Part L 2013 TFEE by 46% (semi-detached house) and 51% (mid-floor flat), while meeting the proposed Part L 2020 requirements, through the use of heat pumps.”

Appendix 4 - How FEES can encourage efficient dwelling form

Performance against FEES of dwellings of the same fabric specifications, but different exposure (carried out under Part L 2010, but the principles remain the same under Part L 2013):



On the contrary, an unintended consequence of the notional building approach is that a building with a shape leading to HIGHER total heat loss can perform better against Part L

Appendix 5 – The approach needs to change: there is a very poor relationship between EPC ratings and actual energy consumption

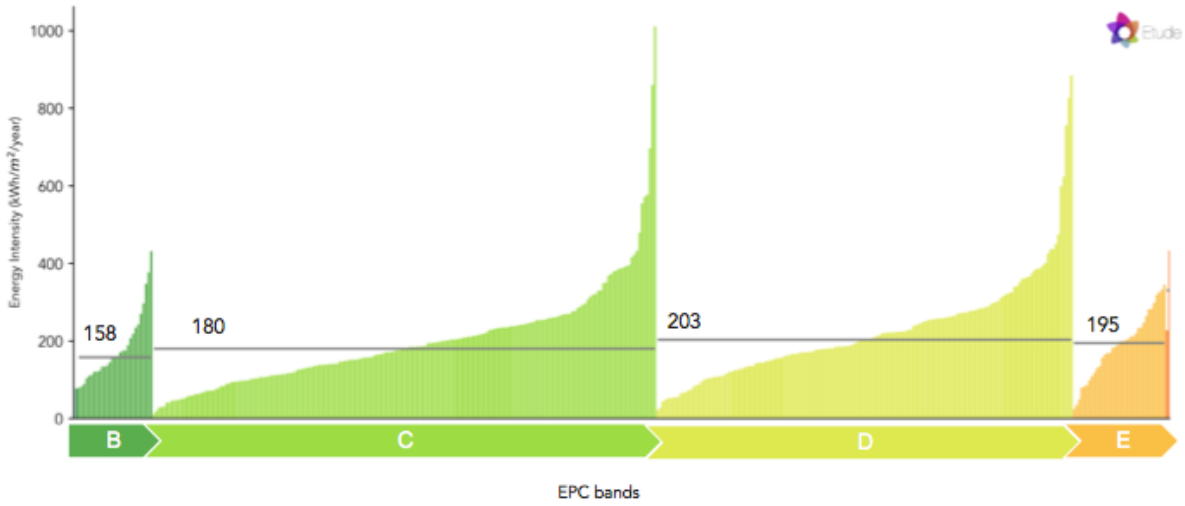


Figure 2: Illustration of disconnect between EPC bands and actual energy consumption in the domestic sector: Energy intensity of 410 homes across a local authority in England, by ECP rating. Each bar represents a single dwelling's energy intensity over the course of a year (credit: Etude)

Appendix 6: Comparison of space heating demand under Options 1 and 2 with Passivhaus

Evidence provided by Etude

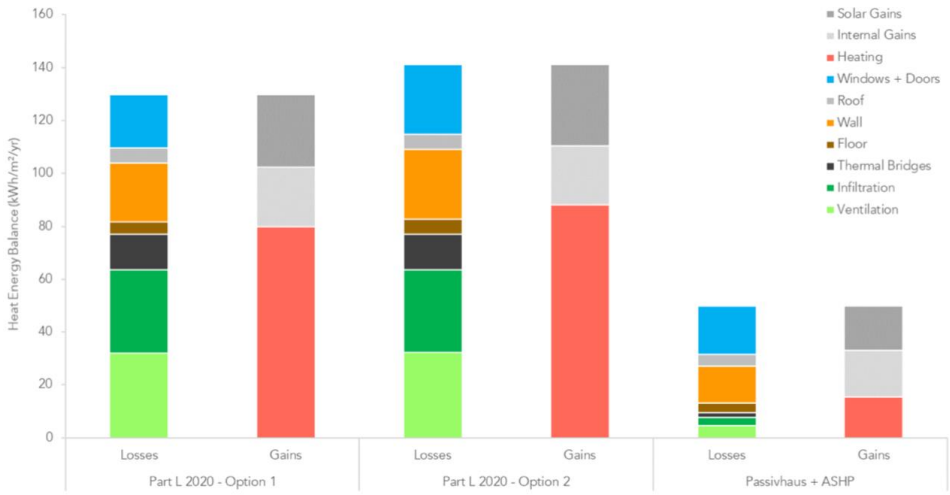


Figure 1 - Results of Etude PHPP modelling for a typical semi-detached dwelling: Space heat demand must be lower to deliver net zero carbon homes.

This shows that airtightness and ventilation losses represent a significant proportion of heating demand, and the key areas where improvements would deliver energy and carbon savings