



Welsh Building Regulations Part L & F

Stage 2A Consultation

Submission from CIBSE

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THE RESPONDENT

The Chartered Institution of Building Services Engineers (CIBSE)

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CONSULTATION RESPONSE

Chapter 2. Part L Standards for Existing Dwellings

Question 1: Do you agree with the proposed minimum fabric standards for extensions as set out in Table 4.1?

Yes, most seem reasonable; however, because retrofit is complex, expensive and disruptive (and expends embodied carbon) we need as much as possible to ensure that when works happen, they are future proofed for net zero carbon. We therefore recommend to review the potential for some requirements to be tightened (e.g. wall values, rather than 0.18 for houses and 0.21 for flats).

Question 2: Do you agree with the proposed minimum energy efficiency standards for windows and doors as set out in Table 10.1?

Yes, with caveats as per response to question 1.

Question 3: Do you agree with the proposed minimum standards for (i) a non-exempt conservatory or porch (paragraph 10.29) and (ii) thermal separation for a conservatory or porch so as to be exempt from the energy efficiency requirements as provided in Section 10 (paragraph 10.28)?

No response

Question 4: Do you agree with the proposed minimum standards for retained thermal elements for conversions as set out in Table 11.1 and the additional guidance to help address potential moisture risks?

Yes on minimum standards.

We agree with the reference to PAS 2035 and moisture risk assessment. We assume the additional guidance to help address moisture risks the consultation is referring to is notes 4, 5 and 6 of Table 11.1, in which case here are our comments:

- *“4 Where existing wall cavities are partially insulated, they are exempt from meeting the maximum U-value in column (a). The air gap on the cold side of the existing insulation should not be compromised through the application of additional insulation (unless expert advice is sought) as this may present a moisture risk”*: we agree, this seems a safe approach. However, one way to encourage improved performance where appropriate while still keeping the same protections could be to flip the requirement e.g. “in the case of partially insulated cavities, seek expert advice on whether it is possible to ...”
“5 Where internal wall insulation is intended, the maximum U-value in column (a) should be achieved. The wall should be assessed to ensure it is suitable for insulating by this method, which should include a moisture risk assessment “. We agree, this seems reasonable. We recommended adding “and thermal bridging assessment”, as these . are very difficult to avoid with internal wall insulation and can cause condensation risk in addition to heat loss
“6 If a wall is suitable for the application of external wall insulation, the maximum U-value in column (a) should be achieved provided suitable specifications have been followed, such as those published by SWIGA (Solid Wall Insulation Guarantee Agency): External wall insulation specification for weathering and thermal bridge control. A wall may be suitable to receive external wall insulation if it is of solid construction or has fully filled and insulated cavities”. We recommend a more comprehensive assessment, possibly by reference to PAS 2030/5. This should include factors such as the current state of repair (including humidity content) and exposure to wind-driven rain. *“Cavity walls that are uninsulated or partially insulated should be assumed as not suitable for the application of external wall insulation (unless expert advice is sought).”* This seems a safe approach however, as per note 4, one way to encourage improved performance where appropriate while still keeping the same protections could be to flip the requirement e.g. “in the case of partially insulated cavities, seek expert advice on whether it is possible to ...”.

We also recommend reference to BS5250, at least in situation where expert advice is recommended.

We would also recommend clarifying the guidance which currently states “*Where the suitability of an element needs to be assessed prior to the application of insulation, or where it is recommended that expert advice be sought ...*”: What are these occasions? Is it intended that notes 4, 5 and 6 of Table

11.1 define suitability and occasions when expert advice should be sought? Clearer wording would be useful here.

Question 5: Do you agree with the suggested knowledge/qualifications proposed for renovations, conversions or material change of use given in Section 11, where the suitability of an element needs to be assessed prior to the application of insulation, or where it is recommended that expert advice be sought?

Yes. We would add that a retrofit coordinator and the use of PAS 2035 would also be useful in other occasions to avoid unintended consequences, improve quality, and promote a thorough options appraisal and whole-house approach. However, we are mindful that supply chains are still limited. We recommend consideration of options e.g. at least adding as requirement in occasions when consequential improvements are currently required, i.e. at least relatively substantial projects.

Question 6: Do you agree with the removal of Appendix C from the current Approved Document?

No response

Question 7: Do you agree with the introduction of 'Boiler Plus' in Section 6

Yes, with the caveat that switching to non-fossil fuel heating systems should be encouraged, rather than assuming gas boilers will be replaced by gas boilers, albeit potentially more efficient ones.

We would also refer to the response provided by HHIC to this consultation, which makes important points about boilers which are not combination boilers, and the definition of load compensation.

Question 8: Do you agree with the minimum standards for building services in Sections 5 and 6?

Mostly yes, but with caveats:

- Section 5.4 "replaced equipment should not be worse than the replaced fixed building service": this section should also mention the NOx emissions
- Paragraphs 5.7 and 6.42 " In most circumstances this means that the heating / cooling appliance should not be sized for more than 120 per cent of the design heating load". This seems high and arbitrary. What is the justification for this?
- Exhaust Air Heat Pumps should be mentioned with the heat pump section

Question 9: Do you agree with the proposal that when a space heating system is installed or replaced in an existing home, the system should be sized to allow the space heating system to operate at a flow temperature of 55°C or lower where feasible in Section 5?

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 new installations of direct electric heating should be discouraged, in favour of wet heating systems which offer more flexibility for future options.

Of course the capacity to operate at these flow temperatures should not compromise essential issues such as the ability to deal with legionella risk, especially when storage is present or may be in the future (as will often be desirable with heat pumps).

Question 10: Do you propose any other future-proofing measure(s)?

In addition to space heating, future proofing needs to consider domestic hot water, and ideally storage (i.e. space) requirements.

Question 11: Do you agree with the proposed changes to consequential improvements in Section 12?

No. We agree with the principle that substantial works to a dwelling should warrant additional improvement works to its energy or carbon performance. However, we do not think the approach to consequential improvement is appropriate, certainly not in all cases:

- It can be gamed, so that works that were going to be done anyway are seen to count towards it, removing the need for additional measures
- More importantly, it promotes an elemental “shopping list” approach. When works are substantial enough to trigger the need for consequential improvements, building performance should be assessed as a whole, including a whole dwelling calculation and target energy and carbon performance. The rate of improving the performance of the housing stock is far from sufficient, and opportunities such as substantial works often only happen every 15-20 years. If we are to meet our net zero target by 2050, it is therefore essential that we capture all opportunities as soon as they arise. Furthermore, consequential improvements do not promote a whole house approach nor consideration of inter-relationships between elements and the consideration of other consequences such as air quality and overheating, as is promoted for example by PAS 2035 (e.g. the matrix of interfaces).

Question 12: Do you agree with the proposed approach for Self-Regulated Devices as in Section 5?

Broadly yes, but with caveats:

- There is room for interpretation by Member States when implementing Article 8 of the amended Directive, including what “self regulating devices” mean and what types of device would qualify. The European Commission has produced a guidance document (COMMISSION RECOMMENDATION (EU) 2019/1019 of 7 June 2019 on building modernisation). Section 2.3.3 (p20) stresses the difference between a “self-regulating device” and a “regulating device” (which might be manually regulated) and emphasises the latter doesn’t comply. It is important to keep this distinction and avoid ambiguity.
- The above guidance also refers to “Technical, economic and functional feasibility” in 2.3.4 as it is expected there should be a method for arriving at the decision objectively, not just leaving it to the casual opinion of the installer.
- Notwithstanding the above, we agree with the principle that where a heat generator is replaced in an existing building, it must be accompanied by regulating (“self” or manual) devices in each room or heating zone. However, 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.

In addition, going further from this requirement (and possibly for later revisions rather than this one), it would be useful to consider the introduction of peak demand management requirements as heating will be progressively electrified e.g. to encourage strategies such as storage and smart controls.

Question 13: Do you agree with the proposed new standards for Building Automation and Control Systems (BACS) and On-Site Electricity Generation as in Section 6?

Yes. We also very much support the fact that commissioning of controls systems and on site generation is explicitly mentioned in the draft AD.

Question 14: Do you agree with the proposed approach to mandate for the assessment and provision of information for Technical Building Systems as in Section 9?

Yes in principle.

Question 15: Do you agree with the proposed approach to change from the ‘equivalent carbon target approach’ to the “equivalent primary energy target approach’ in Section 13 to provide design flexibility?

No.

We do not recommend using a **Primary Energy for targeting**, for the following reasons:

- Primary energy does not align with the government’s decarbonisation objectives because gas is lower in primary energy content than electricity. There is a serious potential for perverse (and utterly predictable) outcomes counter to the overall policy objectives.
- In addition, and we think this is a very important point, primary energy means little to consumers and most non-specialists, therefore not helping awareness, engagement and ownership of actual energy use.
- Primary energy relies on conversion factors, which themselves change, making direct comparisons between buildings and year-on-year more difficult and further hindering consumer understanding.

The introduction of primary energy is driven by the EPBD, but Brexit clearly creates an opportunity to revisit this.

As part of a project team led by Etude¹, CIBSE recently submitted a report to BEIS on the future of SAP/RdSAP, which included the review of energy methodologies and regulations across the world and which makes a number of recommendations for SAP/RdSAP and its regulatory environment, including Building Regulations. This is very relevant to the topic of metrics (and many others in this consultation) and we would be very happy to discuss this with the Welsh Building Regulations and SAP teams.

We would add that a number of metrics are available to track and improve building performance, and that all are important to some extent for at least one of the important policy objectives related to the building stock. Typically, no single metric can achieve all goals, and a combination is needed, as illustrated below. This is why, on balance, we recommend a combination of total energy use and carbon emissions; this could be supplemented by a metric related to fabric efficiency (e.g. space heating demand, heat transfer coefficient), particularly as reducing heating energy use is typically the main target and opportunity in home energy improvement works.

Space heating demand as the advantages of a track record (through Passivhaus) and of representing the end performance outcome. Heat Transfer Coefficient has the advantage of being verifiable in use (this is significant advantage), however as it is expressed “per Kelvin” (i.e. per difference between inside and outside), the end outcome in terms of heating energy demand will vary depending on the climate.

	Would the metric incentivise...				
Metric ↓	reduction of carbon emissions?	reduction of energy use?	low-carbon heat?	demand reduction / management ?	engagement with consumers?
Carbon [kgCO ₂ /m ² /yr]	✓	~	✓	X	~

¹ Also including Elementa, Levitt Bernstein Architects, WSP, Clarion Housing Group and UCL.

Energy use (at the meter) [kWh/m ² /yr]	~	✓	X	~	✓
Primary energy use [kWh _{prim} /m ² /yr]	X	~	X	~	X
Peak demand [kW/m ²]	X	~	X	✓	~

Chapter 3. Part F Changes for Existing Dwellings

In general, we query the principle that “*When work is carried out on an existing building, the rest of the building should not be made less satisfactory in relation to Part F requirements than before the work was carried out.*” (§ 3.2 of the consultation document with a similar statement in §3.1 of the Approved Document). There will be many situations where ventilation pre-works is not satisfactory, so this principle is no guarantee that basic ventilation is provided and the health of occupants is protected. We recommend that this be seriously examined and that requirements to deliver appropriate ventilation, regardless of how it was before, be introduced at least for a certain scale of projects e.g. the type that currently require consequential improvements in Part L

We would also note, as we have in the past, that ventilation is only a component of achieving good air quality. At least in the case of substantial works to existing homes (e.g. where they trigger consequential improvements, or where whole house mechanical ventilation is installed), further consideration should be given to air quality, including outdoor pollutants. There would be situations where, if mechanical ventilation is installed, the home would benefit from also having filters installed.

We have also commented in several questions on occurrences where ventilation for the home as a whole should be considered, not just through the provision of trickle ventilators.

Question 16: Do you agree with the proposed approach for ventilation provisions when installing energy efficiency measures as in Section 3?

No. We very much agree with the intent in the proposal to ensure that ventilation is appropriate after the works. However, we have concern about a number of aspects:

- **The reliance on assumptions about airtightness:** this could be a significant under- or over-estimate, with consequences on energy use and air quality. Just as new homes are tested for airtightness (and now every single home, not a sample), existing homes should be tested much more often in the context of works affecting energy efficiency and ventilation. This has now been made easier and cheaper with the approval of the low-pressure testing

methodology, so we strongly recommend a revisit of the proposals to include testing before and after the works, in order to inform the works and check ventilation provision is adequate after the works. This should at the very least be the case for works which are significant enough to trigger consequential improvements in Part L, but potentially should be considered in other cases too. This will benefit performance against both Part L and Part F, and must be seen as an important step to put the housing stock on track towards low-carbon healthy buildings, with decisions informed by sound data.

- **The reliance on the “divide by 20” rule**, both to estimate current airtightness and the effect of improvement measures. CIBSE are aware that this rule has been queried. Given the importance of the issue for the health of residents, we urge a research programme (together with MHCLG) to inform Part L and SAP in Wales and across the UK.
- **The reliance on the installation of background ventilators in replacement windows:** trickle vents rely on inhabitants knowing about them and knowing when and how to use them, otherwise they will affect energy performance and air quality. In addition, they potentially lock the home into a higher-energy solution, since they are often a weak point in the airtightness layer (even when closed) and can therefore prevent very good airtightness from being achieved in the future. This is even more of a concern given the points above, which mean that background ventilators may be installed when they are insufficient (if actual airtightness is lower than the assumed average) or when they are not needed and result in additional energy use (if actual airtightness is higher than the assumed average). Ventilation provision should be examined on the basis of more accurate information about the room and the home, and the need and feasibility of whole house options should be examined.

Question 17: Do you agree with the proposal in Section 3 to include additional ventilation when replacing existing windows which either have no background ventilators, or where the size of the background ventilators in the existing window is not known?

We agree with the intent to ensure that new windows do not affect air quality, but note our concerns in Question 16 about the overall approach.

Question 18: Do you agree with the changes proposed in Section 3 for ventilation provisions when adding a new habitable room (not including a conservatory) to an existing dwelling?

We agree with the intent to ensure that new habitable rooms are well ventilated and that their addition does not affect the ventilation of adjacent rooms, but note our concerns in Question 16 about the overall approach. A whole house approach and the consideration of a range of options is all the more relevant here, as depending on the layout, a background ventilator between rooms and in the new room may not be sufficient to ensure appropriate ventilation to the existing room. Again, adding a room should be considered substantial enough works to warrant a more thorough appraisal of airtightness and of ventilation options.

Question 19: Do you agree with the changes proposed in Section 3 for ventilation provisions when Refurbishing a kitchen or a bathroom?

For this situation and ventilation in kitchens and bathrooms in general, we recommend a stronger recommendation than currently for **controlling for humidity** (the draft currently states “*Controls based on humidity sensors may be installed in moisture-generating rooms (e.g. kitchen or bathroom) but should not be used for sanitary accommodation, where odour is the main pollutant.*” §1.31). Controlling for humidity will reduce reliance on inhabitants who may not know how / when to use the fan; in addition, automatic fan controls in bathrooms are commonly linked to light switches, which is only appropriate in enclosed bathrooms but unfortunately also commonly installed in bathrooms which do have natural light and where the fan is therefore not turned on when it should, because lighting isn't.

Question 20: Do you agree with the proposal that mechanical ventilation (including both continuous and intermittent ventilation) should be tested when installed in existing homes?

Yes; this is essential to check that ventilation provision is as intended. However, in many situations (e.g. as a minimum, works substantial enough to trigger consequential improvements) this should go hand in hand with airtightness testing, to check not only that ventilation is as intended but also that it is appropriate for that dwelling, not for a dwelling of assumed airtightness based on average data – see response to Question 16.

Chapter 4. Part L Changes for Non- Domestic Buildings

Question 21: Do you agree with the proposed approach for Self-Regulated Devices as in section 11 (approved document L2A) and section 15 (approved document L2B)?

Question 22: Do you agree with the proposed specifications for Building Automation and Control Systems (BACS) as in section 11 (approved document L2A) and section 15 (approved document L2B)?

Question 23: Do you agree with the proposed new standards for Building Automation and Control Systems (BACS) and On-Site Electricity Generation as in section 11 (approved document L2A) and section 15 (approved document L2B)?

Question 24: Do you agree with the proposed approach to mandate for the assessment and provision of information for Technical Building Systems as in section 7 (Approved document L2A) and section 14 (Approved Document L2B)?

Chapter 5. Mitigation of Overheating risk in New Dwellings

Question 25: Do you agree with the proposal to focus both on flats and on houses which do not have two or more parallel aspects to facilitate cross-ventilation?

No. We agree that these are particularly high-risk, but other factors may be at play which put other dwelling types at risk. In addition, rooms within a dwelling may be at risk of overheating even if, on average, the home isn't, and this may cause a risk to the health of inhabitants e.g. bedrooms on a top floor. Guidance should be provided for a range of situations, not just houses without cross-ventilation or flats.

Question 26: Do you agree with the proposal to have both a simplified approach which provides prescriptive guidance and an approach based on dynamic thermal analysis to provide greater flexibility?

Yes, in principle, however this will of course rely on the detail in order to find a balance:

- The simplified method must be robust enough to mitigate against overheating risk but flexible enough that dynamic modelling isn't required in a large majority of cases, which could place a high burden on small housebuilders.
- The simplified method needs to be tested so that, by being robust for overheating risk mitigation, it does not inadvertently have undesirable effects, such as over-limiting beneficial solar gains and daylight. Despite its limitations, this is an advantage of the current approach (SAP Appendix P), as it directly links to the energy methodology where solar gains and (to a limited extent at least) daylight provision are assessed. In particular, as all the scenarios under the Simplified Method currently only allow for glazing proportions at or below 20% of the floor area for single aspect dwellings, the implications on daylight really must be understood since this is also a really important parameter for health and wellbeing; this will also very much limit winter solar gains which would be beneficial.

The proposed new method is a significant change which warrants careful analysis. CIBSE are examining the detailed proposals under this consultation as well as those for England, published more recently by MHCLG. We will carry out some analysis on a few housing types and provide a full response to both consultation documents (AD S for Wales and for England) together, in the coming weeks.

Question 27: Do you agree with the prescriptive guidance for the simplified approach which aims to both control solar gains and provide ventilation to remove heat from the home??

We agree in principle that key parameters are solar gains and ventilation, but we will be carrying out more more analysis. See also response to Question 26.

An initial comment is that we caution against the statement "*it will be the responsibility of the design team to ensure that adequate daylight levels are still achieved if maximum glazing areas are used*". There is evidence that this is not the case for portions of the market; the statement that "*larger windows are a selling point*" may be true, but the reality is that many people are not in a position to have much influence on this, and they will prioritise other factors such as affordability and location near work and a school. Daylight is an essential factor for health and wellbeing, and is currently unregulated. As noted in our response to Question 26, we will be carrying out some testing of the simplified method proposed by MHCLG, to better understand the implications.

Question 28: Do you agree with the guidance provided for the dynamic thermal analysis?

Yes in principle, however we are unclear about the actual criteria for compliance: the guidance refers to TM59, but then states "*Active measures such as air-conditioning should only be considered where it has been demonstrated that all reasonable passive measures have been applied first*" (§1.15). Does this imply that compliance with TM59 criteria would not be required? Or that it could be shown assuming air conditioning? The TM59 methodology is designed for use where there is no air

conditioning, assuming an adaptive comfort approach. For dwellings which are air conditioned, it recommends alternative criteria. In addition, allowing air conditioning for compliance could put occupants at risk of fuel poverty, and obviously has energy and carbon implications. **We urge clarification and a rethink**, if this is what is intended. If active air conditioning is needed, the criteria for showing that passive design means have been maximised must be defined, and air conditioning should be shown to be only for a limited number of hours, or to be linked to very specific conditions such as security or high noise levels, or show not to be required under less-occupied profiles (e.g. at least not required for a profile such as a working couple/family away during the day). Note the current proposals for England state "The building should be constructed to meet the requirement for overheating without the need for mechanical cooling (air-conditioning)." We very much query why, in Wales, a similar approach could not be adopted (particularly given the climate and the reduced risk of dwellings exposed to high urban heat island and noise effects).

We agree that internal blinds should not be assumed when assessing compliance, as they will often not be installed, or may be omitted or replaced by occupants.

Other than this, as stated in Question 27, we will be carrying out a more detailed analysis alongside those for England and will provide a more detailed response to both.

Question 29: Do you agree with the proposed knowledge required for undertaking the dynamic thermal modelling?

Requiring a Level 5 modeller seems reasonable, although level 4 may be considered for individual homes – we would be happy to discuss this and provide more information through our certification and modelling experts.

Question 30: Do you agree with the proposal for demonstrating that all reasonable passive measures have been applied before including active measures? If not, explain your reasoning and suggest alternative guidance.

Yes in principle, but this depends on the important caveat of whether air conditioning can be allowed to demonstrate compliance, as per Question 28.

Question 31: Do you agree that issues of external noise and air pollution, which may affect the use of mitigation measures (e.g. opening windows) are sufficiently addressed through the Planning system?

We are not familiar enough with recent feedback on the planning system in Wales and how much it addresses these issues, however we make these points of principle:

There should in any case be clearer guidance on when and how the planning assessments on noise and air quality should be taken into account in the regulatory assessment of overheating. The current 3 short paragraphs of loose statements do not in our view constitute sufficient guidance.

Enforcement also needs to be thought about: what will Building Control officers need to check? What if an assessment at the planning stage was not carried out properly, or not translated into planning condition: whose responsibility is it to ensure the overheating risk mitigation still gives appropriate consideration to air quality and noise ??

Question 32: Do you agree that existing Parts of the Building Regulation are sufficient to address safety and security concerns due to the use of openable windows to control for overheating?

We are not familiar enough with the details of these requirements but stress that, overall, the feedback we receive is that many issues relate not to the requirements themselves but their interpretation and enforcement (e.g. on the issue of window restrictors).

Chapter 6. Transitional Arrangements

Question 33: Do you agree that the transitional arrangements for the energy efficiency changes in 2021 should not apply to individual buildings where work has not started within 2 years of the coming into force date of the 2021 Part L and Part S amendments – resulting in those buildings having to be built to the new energy efficiency standard?

Yes

Question 34: The Impact Assessment makes an estimate of the impact of the individual proposals. Do you think these provide a fair assessment of the costs and benefits?

The impact assessment includes so little detail that it is difficult to comment. For example, on the overheating assessment, the assessed impact includes a large additional sum for capital and replacement costs, but without any detail. One could very well imagine scenarios where, because dwellings will have reduced areas of glazing, they could cost less to build. It is not possible to comment currently, with this level of information.