Historic England

Environmental Audit Committee: Energy Efficiency of Existing Homes Inquiry

Written evidence submitted by Historic England

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Historic England is a non-departmental public body established under the National Heritage Act 1983 and sponsored by the Department for Digital, Culture, Media and Sport (DCMS). We are the Government's statutory adviser on all matters relating to the historic environment in England. We champion and protect England's historic places, providing expert advice to local planning authorities, developers, owners and communities.

Key points

- Historic England supports the need to tackle energy efficiency in existing homes to achieve Net Zero Carbon 2050.
- Historic buildings are durable and adaptable. This is why they have survived. They are culturally, socially, economically and environmentally valuable to society. Assumptions about poor energy performance are often not justified, but there is scope for improvement.
- Historic England wishes to see retrofit of older buildings delivering improved energy performance in a sustainable way that conserves their values and significance.
- We advocate a whole life carbon approach to encourage the most sustainable - solutions for the historic environment in the long term. -
- There are no 'one-size-fits-all' solutions. Diverse building typologies and types of tenure need different pathways to achieve optimum energy performance.
- Traditional and modern construction have different physical characteristics. Many energy efficiency measures for new buildings are not suitable for older ones.

- Fabric improvements are only part of the solution. We believe a 'whole house approach', accompanied by decarbonisation of heat and energy supply, is needed. In many cases, an exclusive focus on 'fabric first' risks imposing sub-optimal solutions.

- Disrepair reduces energy performance of buildings, adversely affecting the comfort and health of occupants and contributing to fuel poverty. Disrepair also diminishes the performance of added energy efficiency measures and increases the risk of unintended consequences. Repair and maintenance should therefore be recognised as an intrinsic part of energy efficiency retrofit.

- EPCs in their present form are not an adequate assessment tool and need to be reformed.

- A lack of consumer confidence and trust has to be overcome. Promoting PAS 2035 and registration/certification requirements for every link in the supply chain would help address this, and should apply to all and not just publicly funded work. In addition, greater financial incentives for investing in energy efficiency measures are needed.

- Repair and energy efficiency retrofit of existing homes should be at the heart of the Covid-19 recovery stimulus strategy. But the capacity (knowledge and skills) of the sector is currently inadequate to meet the volume and pace of work required. Substantial and sustained investment in training and developing trusted local supply chains is needed.

- A clear coordinated road map for achieving Net Zero Carbon 2050 would aid cross-departmental cooperation.

- More empirical data is needed to inform optimum solutions for a variety of building typologies from monitoring and reviewing case study projects.

Opening statements

1) Historic England supports the need to tackle energy efficiency in existing homes to achieve Net Zero Carbon 2050. We have published a range of guidance on this topic, including *Energy Efficiency in Historic Buildings: How to Improve Energy Efficiency* (2018), and *Energy Efficiency and Traditional Homes* (2020).

2) The UK has the oldest housing stock in Europe (Roys et al., 2016). There are nearly 5 million houses of traditional construction in England (built mostly before 1919) that account for 21% of its housing stock. Although not all of these will be considered 'heritage assets' within the planning system, it is known that out of a total of 400,000 listed buildings more than 122,000 are homes built before 1700. Also, it is estimated that there are nearly 2 million dwellings in conservation areas, a figure that is likely to increase with the conversion of non-residential properties.

3) That so many older buildings survive and continue to be used is proof of their durability and adaptability. Building conservation has played an important role in their success. Adapting, upgrading, repairing and maintaining historic buildings so they remain useful and viable makes good sense in social, economic, and environmental terms. (Historic England 2020) For instance, retrofitting pre-1919 residential buildings over a 10-year period could lead to savings of £3.4 billion worth of CO_{2e} reductions by 2050 (Dorpalan 2019). In addition, well-considered improvements enhance the climate resilience of historic buildings and places (Fluck, 2016).

4) Assumptions about the poor performance of buildings of traditional construction are not always justified (Li *et al*, 2015; Agbota *et al*, 2014; Rye and Scott, 2012; Baker, 2011). Even so, the energy use of many traditional buildings can be improved (Rhee-Duverne, Baker, 2015; Newman, 2017). However, it is important to keep in mind, that the physical characteristics of traditional and modern construction are different. Not all energy efficiency measures for new buildings are suitable for older homes. Ill-judged measures can harm occupants' health, cause fabric deterioration, make buildings less comfortable, and increase energy use (de Selincourt, 2018).

5) Historic England wishes to see retrofit of older buildings that delivers improved energy performance sustainably while conserving their cultural, social and economic values. Therefore, Historic England advocates a 'whole house approach', in line with PAS 2035: 2019 *Retrofitting dwellings for improved energy efficiency.* and BS 7913: 2013 *Guide to the conservation of historic buildings*.

6) Historic England has the expertise to keep things standing and useful for centuries. We advocate a whole life carbon approach to encourage the most sustainable decisions for our historic environment in the long term.

7) Historic England shares Government's objective of achieving public value through heritage. We believe that reducing energy use and sustaining heritage values are compatible goals.

Historic buildings are part of the solution, not the problem. They can be a part of growing the economy while helping the UK achieve targets to reduce carbon emissions.

8) We welcome the opportunity to make submissions on the questions below.

Are the Government's targets on residential energy efficiency still appropriate to achieve its ambition to reach net zero emissions by 2050?

9) Current Government targets are based on crude metrics. For instance, Government has stated that all homes must achieve an EPC band C rating by 2035, but in reality some homes can achieve much higher levels of energy efficiency. In others, it will be lower. A more nuanced and flexible approach that considers the range of improvement potential of different residential typologies and the impact of grid decarbonisation would be more useful. *Homes of Today for Tomorrow* (Green *et al*, 2019) explores the potential of the Welsh housing stock to meet 2050 decarbonisation targets and provides a good methodology for identifying pathways to optimal performance.

10) Government's response (September 2019) to the Business, Energy and Industrial Strategy Committee's Energy efficiency: building towards net zero, Twenty-First Report of Session 2017–19, focussed on the need to increase deployment rates and for least-cost decarbonisation. However, previous policies, driven by quantity and not quality of retrofits, often led to poor design and installation and subsequent unintended consequences (Forman 2015). Examples of these are failure of cavity wall insulation (BRE Wales. 2017) and failure of external wall insulation (Heath 2014; de Selincourt 2018). In order for retrofitting to be successful, there should be no 'one-size-fits-all' solutions. Rather, there must be a commitment to improving quality and an acceptance of the need for bespoke solutions.

11) Buildings of traditional construction need special attention. However, PAS 2035:2019 requires only Retrofit Assessors and evaluators, but not the whole retrofit team, to obtain a Level 3 award in energy efficiency and retrofit of traditional buildings. This has been described as a failing (Edwards 2019) that puts undesignated buildings of traditional construction and their occupants at risk.

12) Government's "Simple Energy Advice" website is not well publicised. Guidance provided on solid wall insulation mentions potential problems with insulating old houses, and recommends that homeowners contact an installer for advice. But this advice is unlikely to be impartial. It would be better if homeowners were directed to a qualified Retrofit Coordinator (preferably one without a conflict of interest) in accordance with PAS 2035.

13) There is a limit to what can be achieved by retrofitting individual homes. Decarbonisation of heating and the electricity grid and the development of larger community energy schemes need to be accelerated.

What are the potential risks and opportunities of bringing forward the Government's energy efficiency target?

14) The chief risks are maladaptation and unintended consequences created largely by insufficient capacity in supply chains, which makes it difficult to carry out suitable, good quality retrofit.

15) Maladaptation poses a significant threat to historic and traditionally constructed buildings (Heath, 2014). Well-intentioned but ill-judged solutions can lead to the accumulation of moisture, mould and infestation, and the accelerated decay of the building fabric. Furthermore, maladaptation can threaten the health and comfort of building occupants by creating poor indoor air quality and summer overheating. This in turn can lead to higher energy costs if mechanical cooling becomes necessary. Maladaptation can also lead to higher maintenance and repair costs and depreciation in asset value, and often fails to achieve predicted environmental benefits.

16) Unsuitable improvements can reduce the durability and lifespan of materials, including the existing fabric. This can result in increased frequency of interventions (Menzies, 2011), thereby increasing a building's embodied carbon emissions.

17) The main barriers to increasing the energy efficiency of existing homes are widely accepted to include:

- Complexity – there are no 'one-size-fits-all' solutions.
- Lack of capacity – there are not enough suitably qualified and skilled retrofit coordinators, assessors, designers/specifiers and installers to do all the work needed to meet 2050 targets.
- Finance and value for money – retrofit can be expensive, and consumers don't perceive significant benefits from reductions in energy bills or increased property values.
- Quality and Trust –Lack of consumer confidence in being able to procure good quality and fit for purpose retrofits. Also, homeowners don't want to pay fees for professional advice - they are more likely to approach a tradesperson to give them advice.
- Disruption during retrofit –the inconvenience of having works carried out.

18) Speeding-up the full implementation of the recommendations in Each Home Counts: Review could overcome many of these barriers. But significant investment is needed to build capacity in the supply chain by up-skilling and training initiatives for retrofit coordinators, assessors, designers/specifiers and installers.

19) Low cost, low carbon energy efficiency measures, such as window awnings, shutters, blinds and curtains, may be cheaper, easier to install and less reliant on external expertise. They are also fully reversible (important as we adapt to a changing climate) and can achieve results similar to more costly measures.

20) Building maintenance is important for energy efficiency and climate resilience. However, applying energy efficiency measures to badly maintained homes is pointless. Better maintenance, particularly in the rental sector, will improve overall housing quality, not just energy efficiency.

Should Government targets for energy efficiency be legislated for, and if so, what difference would this make?

21) Ambitious targets are necessary to achieve NZ 2050. However, we believe that legislated targets are undesirable if they do not take proper account of context. Instead, it would be preferable to promote a more nuanced "How low can you go?" approach, taking into account differing building typologies and contexts.

22) Regulations can be difficult to enforce. Incentives and public information are more likely to influence behaviour change.

23) Energy efficiency gains that are not sustainable and mindful of future climate adaptation needs, or effective in reducing whole life carbon will be counter-productive.

How effective is the EPC rating at measuring energy efficiency?

24) EPCs were devised as a compliance tool, but are often used as a retrofit design tool. However, research has demonstrated that actual energy use is often much less (<40%) than the predicted EPC rating. Furthermore, the assessment model used to generate EPCs - Reduced data SAP (RdSAP) - has been shown to predict higher energy demand than the 'full SAP' model used for new buildings (Better Buildings Partnership, 2018). This disadvantages existing buildings disproportionately, particularly older ones.

25) EPCs do not provide complete energy audits of buildings (as recommended for a 'whole house' approach), but focus largely on the running costs of space heating, hot water and lighting. Therefore, the type of fuel used for heating and hot water has a significantly greater

impact on the EPC rating than retrofit measures such as draught-proofing or secondary glazing. It also causes rural properties off the gas grid to score lower, even though they might have access to renewable or lower carbon energy sources.

26) The RdSAP estimate of energy performance is based primarily on the age of the building and general assumptions about old buildings that are not always applicable. Although the RdSAP model can take account of some property variants, in practice this is often not done due to limitations of visual inspection and lack of documentary evidence.

27) Further shortcomings of the current system include:

- Automatic ranking of suggested improvements that prioritises high cost, high risk improvements (e.g. wall insulation) over cost-effective improvements such as secondary glazing or better heating system controls.

- Failure to take account of the state of repair of the building. Remedial works may be needed as part of a package of energy efficiency improvements to ensure they perform satisfactorily.

28) The 10-year validity of EPCs means they do not reflect further retrofit improvements undertaken during this period; thus estimates of possible carbon savings may be based on flawed data. This could be corrected by reducing the validity period.

Are there any alternative methodologies that could be used?

29) There are alternatives, such as the Passivhaus Planning Package (PHPP). But SAP has the advantage of familiarity, being widely used in the industry. The main problem is the RdSAP assessment methodology. For existing dwellings it would be preferable to base assessments more actual rather than modelled energy use. Also, EPCs would be clearer if they gave straightforward energy efficiency and environmental Impact ratings without factoring-in fuel costs.

30) The assessment system should be modified to make it compatible with the 'whole house approach' recommended by PAS 2035. Detailed recommendations are set out in a Historic England research report (2018) *EPCs and the Whole House Approach: A Scoping Study* . The authors of this report (STBA) are currently trialling a 'whole house approach' assessment toolkit on a project in Wales, supported by the BEIS Thermal Efficiency Innovation Fund.

31) In multi-residential buildings, energy use by the landlord/manager (common parts) and the occupants of individual dwellings should be differentiated.

What are the challenges for rural areas?

32) Properties in rural areas are more likely to be older and of traditional construction with a wider range of construction techniques. This can make retrofit solutions more complicated and limited in scope. Low cost relatively high carbon fuel sources such as gas give a higher EPC rating than low carbon technologies like biomass and heat pumps. This makes it more difficult for off-grid properties to achieve higher EPC bands without significant fabric intervention.

How will lack of progress on residential energy efficiency impact the decarbonisation of heat and the associated costs of this?

33) Residential energy efficiency improvement should work alongside heating and grid decarbonisation. Reducing demand, increasing efficiency, avoiding waste and decarbonising energy supplies will all help the UK adapt to the hotter, drier summers and warmer, wetter winters in future.

How can the Government frame a Covid-19 stimulus strategy around improved energy efficiency of homes?

34) Energy efficiency improvements, which include building repair and maintenance, should become a national infrastructure priority.

35) Investment is needed to build local capacity to organise and undertake trusted work, (often by local SMEs with local knowledge). A Government-assisted network could provide local training, technical support, and a system for monitoring and learning from outcomes. Those carrying out retrofit work should be trained and licensed the way electricians and gas installers are, and registered with organisations such as TrustMark, This would ensure that suitable, good quality work is carried out and increase consumer confidence.

36) The preliminary results of the six local supply chain demonstration projects, (funded by BEIS) that will run until March 2021 should be released prior to their completion to inform green recovery plans. Investment in training across the supply chain to ensure that PAS 2035 can be met is critical.

37) Heritage construction skills are green jobs, providing important sustainable employment and training that will be relevant for future as well as current needs.

38) The existing reduced-rate VAT scheme to incentivise energy improvements should be extended (perhaps on a time-limited basis) to include retrofit projects and associated building repairs carried out in accordance with PAS 2035.

39) Any Covid-19 recovery stimulus strategy requires cross-party long-term commitment. Otherwise it is not possible to develop a reputable and stable supply chain, or for assessors, designers and installers to see the commercial benefit in investing in training and building reputation (Forman 2015). The current commitment for spending on energy efficiency until 2028 should be increased and extended.

Is the £5 million Green Home Finance Innovation Fund enough to stimulate the market for and drive action from the banks to encourage owner occupiers to improve the energy efficiency of their homes?

40) Unlikely, but this is a problem of trust and confidence as much as of finance and economics (see para 17).

What policy and/or regulation could supplement it?

41) Building maintenance improves the energy efficiency of existing homes (Whitman et al. 2016). Maintenance may be a better solution than retrofit for historic and buildings of traditional construction. If this is not included in new Government schemes and policies, then potentially unnecessary or unsuitable retrofit measures may be installed to meet funding requirements or in pursuit of numbers.

42) A reduction of VAT on repair and maintenance to existing buildings would encourage on-going maintenance thereby optimising the energy performance of the existing fabric, while also allowing incremental improvements.

Which models in other countries have been successful at stimulating demand for energy efficiency within this market ?

43) The KFW bank in Germany, and effective support by Local Authorities. Energisprong 'retrofit trains' in the Netherlands is another good example of what can be achieved.

What additional policy interventions are needed for social housing, leaseholders, landlords and tenants?

44) More obligations and incentives could be directed towards landlords, who will also have more opportunities to carry out upgrades at scale.

45) Energy use by the landlord and the tenant should be separately predicted, metered and the landlord's transparently reported. The Australian NABERS 'base building' concept shows how this can be done.

How should the proposed Home Upgrade Grant Scheme be delivered to help the fuel poor?

46) Repair and maintenance, as well as thermal upgrades, can both improve housing for tenants and reduce fuel bills. On-going incentives for landlords to undertake regular maintenance would ensure that capital investments in improvements are not wasted by allowing properties to deteriorate again.

Should the new grant scheme supplement ECO in its current form, or should ECO be redesigned?

47) Standards of design and installation with ECO funded work have generally been poor, but the requirement to comply with the new standards PAS 2030/2035:2019 should hopefully raise quality.

Are there examples of where energy efficiency policy has fallen between Government Departments?

48) Some of the key regulatory aspects of improving energy efficiency are split between MHCLG, who have responsibility for Building Regulations (Part L, F and C) and EPCs, and BEIS, who lead on energy policy. Further responsibilities for climate adaptation and resilience fall primarily to DEFRA.

49) Cross-departmental co-ordination would be aided by the existence of a clear and coordinated road map for achieving Net Zero Carbon 2050 in existing buildings. Also desirable would be more people in Government with technical expertise who can report across departments and liaise with outside organisations.

50) Historic England will be happy to assist the Committee by providing further evidence.

References

Agbota, H. (2014), Anticipating the Unintended Consequences of the Decarbonisation of the Historic Built Environment in the UK, *The Historic Environment: Policy & Practice*, Vol. 5, No.2, pp.101-115, DOI: 10.1179/1756750514Z.00000000049

Archimetrics Ltd. 2019. *The SPAB Building Performance Survey: Final Report*. UK: Available at: https://www.spab.org.uk/sites/default/files/documents/MainSociety/Advice/SPAB%20Building%20Performance%20Survey%20Final%20Report%202019-small.pdf

Baker, P (2011); *U-values and Traditional Buildings: In situ Measurements and their Comparisons to Calculated Values;* Historic Scotland; Edinburgh.

Baker, P, Rhee-Duverne (2015) *A Retrofit of a Victorian Terrace House in New Bolsover: A Whole House Thermal Performance Assessment*; Historic England; available at https://research.historicengland.org.uk/Report.aspx?i=15746

Better Buildings Partnership. 2018. *Minimum Energy Efficiency Standards and Heritage Properties: Mitigating risks through the procurement and interpretation of Energy Performance Certificates*. Available at: http://www.betterbuildingspartnership.co.uk/minimum-energy-efficiency-standards-and-heritage-properties-mitigating-risks-through-procurement-and

BRE Wales. 2017. *Post Installation Performance of Cavity Wall & External Wall Insultation*. Available at: https://www.cewales.org.uk/files/3014/7671/0110/Post_Installation_Performance_of_Cavity_Wall__External_Wall_Insulation.pdf

de Selincourt, K. 2018. *When retrofit goes wrong – lessons from Preston*. Available at: http://www.katedeselincourt.co.uk/wp-content/uploads/2018/05/Lessons-from-Preston-when-retrofit-goes-wrong.pdf

Dorpalan, B (2019); *Valuing carbon in pre-1919 residential buildings*; Historic England; available at https://historicengland.org.uk/content/docs/research/valuing-carbon-pre-1919-residential-buildings/

Edwards, J. 2019. New standard for retrofitting UK homes. *Context: Institute of Historic Building Conservation* 161,

Fluck, H. (2016), "*Climate Change Adaptation Report"*, Historic England, available at https://research.historicengland.org.uk/Report.aspx?i=15500.

Forman, T. 2015. *Practice, policy and professional roles: unintended consequences and performance gaps in UK domestic solid wall insulation retrofit projects.* Cardiff University.

Green, E., Lannon, S., Patterson, J., Variale, F. (2019a), *Homes of today for tomorrow: Decarbonising Welsh Housing between 2020 and 2050 Stage 1: Scoping Review*, available at https://orca.cf.ac.uk/115442/3/Homes%20of%20Today%20for%20Tomorrow%20stage%201%20report.pdf

Heath, N, 2014; *External Wall Insulation in Traditional Buildings*; Historic England; available at https://research.historicengland.org.uk/Report.aspx?i=15747

Historic England, 2020; *Heritage Counts 2019 - There's No Place Like Home: Re-use and Recycle to Reduce Carbon*, Historic England; available at https://historicengland.org.uk/content/heritage-counts/pub/2019/hc2019-re-use-recycle-to-reduce-carbon/

Li, F.G.N., Smith, A.Z.P., Biddulph, P., Hamilton, I.G., Lowe, R., Mavrogianni, A., Oikonomou, E., Raslan, R., Stamp, S., Stone, A., Summerfield, A.J., Veitch, D., Gori, V. and Oreszczyn, T. (2015), "Solid-wall Uvalues: heat flux measurements compared with standard assumptions",

Building Research and Information, Vol. 43 No. 2, pp. 238-252, available at: 10.1080/09613218.2014.967977.

Newman, C (2017); *Reducing Energy Use in Traditional Dwellings: Analysis of Four Solid Wall Houses in Reading*; available at https://research.historicengland.org.uk/Report.aspx?i=15562&ru=%2fResults.aspx%3fp%3d1%26n%3d10%26ry%3d2017%26t%3dReducing%2520Energy%26ns%3d1

Roys, M., Nicol, S., Garrett, H. and Margoles, S., (2016). *The full cost of poor housing*, IHS BRE Press, Bracknell.

Rye, C. and Scott, C. (2012), *The SPAB research report 1: the U-value report*, SPAB, London

Webb, A. L. (2017). *Energy retrofits in historic and traditional buildings: A review of problems and methods*; *Renewable and Sustainable Energy Reviews, Vol.77, pp.748-759.* DOI: 10.1016/j.rser.2017.01.145

Whitman, C. J. et al. 2016. *Correlating maintenance, energy efficiency and fuel poverty for traditional buildings in the UK*. Welsh School of Architecture, Cardiff University.