House of Commons Business, Energy and Industrial Strategy Committee:
Energy Efficiency Inquiry

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The RIBA welcomes this inquiry. We are committed to assisting the Government to improve building standards and deliver improvements on energy efficiency in the built environment.

To better achieve these ends, we recommend that the Government should:

- Confirm energy efficiency as a national infrastructure priority;
- Take a lead on promoting the retrofit of buildings with poor energy efficiency, including setting out a coherent National Retrofit Strategy for all building types.
- Address the significant flaws in procurement practice that result in large gaps between design intent and delivery;
- Promote the use of Post Occupancy Evaluation;
- Make improvements to the Decent Homes Standards and apply this across the public and private sector;
- Adopt more stringent measures on fire safety, including more than one means of escape in new buildings over 18 meters, retrofitting sprinklers in all buildings taller than 18 meters and introduce a mandatory requirement for sprinklers in all new and converted residential buildings.

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Overarching approach

1) Government should make energy efficiency a national infrastructure priority. The UK has among the least energy efficient housing stock in Europe[1]. Despite this, 85% of the total building stock is expected to be still in use by 2050[2]. This has a direct impact on the health of some of the most vulnerable people in society. As well as the Government needing to meet its own commitments on energy efficiency targets, data released by the ONS in 2015 showed there had been an estimated 43,900 excess winter deaths, representing the highest level for 15 years[3].

2) The existing housing stock in the UK is in significant need of retrofit to improve energy efficiency, yet uptake of the available energy efficiency programmes is low due to a lack of understanding about the wider benefits of making homes energy efficient, the disruption retrofit causes to the household, and the disproportionate cost when set against potential fuel bill savings. The Government needs to take a lead in this area and create clear incentives for building owners. Data should be made available in an easy to understand format illustrating cost benefits in the short medium and long term, and with funding being made available to bridge the gulf between aspiration to achieve savings and the ability of building owners to pay. Investment is key and needs to be thought about carefully. The savings in fuel bills cannot be expected to pay for the capital cost of energy efficiency improvements.

3) Historic England estimate that there are around 500,000 listed buildings on the National Heritage List for England (NHLE). A greater number is not listed, but of traditional stock (about 25% of UK building stock). It is a widely held view that older buildings are not energy-efficient and must be radically upgraded in order to improve their performance. In reality, the situation is more complicated, and assumptions about poor performance are not always justified. Old buildings can vary greatly in their energy performance depending how they are constructed and maintained, and many use less energy than some more recently constructed buildings. Still, the energy and carbon performance of most historic buildings can be improved but requires greater care to strike the right balance between benefit and harm. Listed buildings require even greater care as the unintended consequences of getting energy efficiency measures wrong (or doing them badly) can cause serious harm to heritage values and significance, harm to human health and building fabric, as well as failure to achieve the predicted savings or reductions in environmental impact.

   Keeping all this in mind, energy efficiency should still be a national infrastructure policy for traditional buildings as well, with the added caution that this needs to be approached differently, and emphasis needs to be shifted from a building fabric only approach to a whole building approach, including how it is used.

4) The metrics currently used to calculate energy efficiency and CO_2 reduction should be reviewed; learning from other European countries such as Germany and Denmark. kWh/m^2 energy consumption targets should be required to allow direct comparison between design intention and metered energy readings[4]. A fabric energy efficiency metric should be introduced to

[1] https://www.ukace.org/wp-content/uploads/2015/10/ACE-and-EBR-briefing-2015-10-Cold-man-of-Europe-update.pdf
[2] http://cic.org.uk/admin/resources/federation-of-master-builders.pdf
[3] https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/201415provisionaland201314final
[4] https://www.leti.london/copy-of-become-a-supporter

prioritise building fabric improvements. Reporting energy consumption would create consistent targets that do not move due to changing carbon emission generation fuel factors.

5) A clear definition of Zero Carbon is required urgently. The UK Green Building Council last year launched the Advancing Net Zero programme with the aim of transitioning the UK to a net zero carbon built environment. An important target for the programme is to develop an industry-led definition for Net Zero Carbon Buildings[5]. The Government should support the programme in its work on this.

6) Government must also take the opportunity to kick start UK manufacturing of suitable materials required to achieve energy improvements, with a strong emphasis on carbon neutral production, and safe and healthy materials. Providing sufficient investment will be key to achieving success in this.

7) There is increasing evidence that the performance gap between energy calculations for Part L, EPCs and actual building energy consumption is substantial across the built environment. The lack of data severely hampers the ability of the industry to respond to this challenge, and Government to get a clear picture of progress. A move to predicted energy consumption and disclosure of energy consumption is recommended.

8) In relation to insultation and cladding systems, the tragedy at Grenfell Tower in June 2017 revealed that a substantial amount of the country's housing stock is currently unsafe. The RIBA welcomed the announcement last year of the ban on combustible materials in the external walls of high-rise residential buildings and the tightening of rules on testing products and systems rather than relying on desktop studies, both of which the RIBA called for in our response to Dame Hackitt's Independent Review on Building Regulations and Fire Safety. The inclusion of other high-risk buildings such as hospitals, residential accommodation and care homes in the cladding ban is welcome. However, it is vitally important that this is extended to other high-risk buildings currently exempted from the legislation, such as hotels and hostels.

9) There is still more that needs to be done to ensure that buildings are as safe and to avoid a repeat of the tragedy that occurred at Grenfell. Government should introduce a requirement in all new multiple occupancy residential buildings for at least two staircases, offering alternative means of escape, where the top floor is more than 11m above ground level or the top floor is more than three storeys above the ground level storey (as required for commercial buildings). This recommendation reflects the principle already set out in the Approved Documents that alternative means of escape should be provided so occupants are able to turn their backs on a fire whenever it occurs and travel away from it to a final exit or protected escape route leading to a place of safety.

10) The Government should introduce a mandatory requirement for sprinklers/automatic fire suppression systems and addressable central fire alarms in all new and converted residential buildings. This should include requiring retro-fitting of sprinklers / automatic fire suppression systems and centrally addressable fire alarm systems to existing residential buildings above 18m from ground level as “consequential improvements” where a building is subject to 'material alterations.

[5] https://www.ukgbc.org/ukgbc-work/advancing-net-zero/

11) The UK Green Building Council last year launched the Advancing Net Zero programme with the aim of transitioning the UK to a net zero carbon built environment. An important target for the programme is to develop an industry-led definition for Net Zero Carbon Buildings[6]. The Government should support the programme in its work on this.

12) The built environment is responsible for 30% of the UK's direct and indirect carbon emissions[7]. In order to combat climate change, low carbon construction and methods of servicing buildings must be given top priority in order to seek to reduce overall emissions.

13) There is also a need to look at the difference in performance between natural, vapour permeable materials, and synthetic alternatives which tend to trap water in the building fabric and drive up energy demand.

Existing housing stock

14) The UK should build on the National Energy Efficiency Action Plan to set out a coherent National Retrofit Strategy for all building types that aligns existing retrofit policies and other related Government policies and initiatives to ensure they do not contradict each other. It should provide a sound reference point for local authorities to enable them to set up effective local Retrofit Action Plans to accelerate the rate of energy efficiency take-up. The Green Construction Board's 2013 recommendation 7 for a National Existing Buildings Hub should be set up with a set of experts who can provide the technical knowledge to inform a National Retrofit Strategy.

15) The ambition for all homes to be EPC band C by 2035 is very challenging and it is difficult to see how current incentives and legislation will achieve this ambition at the current rate of improvement. This particularly affects households who do not have the funds, but also those who do not have an incentive to make changes. For fuel poor households ECO funding is not incentive enough for the intrusion, disruption and uncertainty caused by retrofit works. Opening up funding to allow related works, such as decoration or maintenance, could incentivise retrofit and improve the quality of installation.

    For households with funds there are similar barriers. There is a large middle tier of homeowners and landlords with no incentive to make home improvements. It does not increase the value of their home, it does not affect their monthly costs over a short enough time period to warrant investment. Tax breaks or incentives affecting building value could be considered to incentivise building owners to act.

16) The piecemeal, measure-by-measure approach encouraged by seeking EPC rating improvements can increase the risk of causing harm to a building, and increase the potential for not achieving any meaningful energy reductions. This affects consumer confidence. A building level retrofit plan, with considered individual measures that are installed at the right time and work together as a whole is crucial for successful energy efficiency works.

17) The Government should ensure that if home owners are making improvements to their homes that they will also be required to make energy efficiency improvements at the same time in a

[7] https://www.theccc.org.uk/publication/2017-report-to-parliament-meeting-carbon-budgets-closing-the-policy-gap/

considered and safe way[8]. This will require changes within Part L of the Building Regulations including:

- Include retrofit improvements as a requirement in the current "Consequential improvements" requirements. It would ensure that home owners offset any home alterations or extensions which would increase a home's energy demand, via extra retrofit measures.
- Require higher standards for energy efficiency in home repairs, alterations, replacements and renovations. This should be done through increasing the energy standards that 'retained thermal elements' (parts of buildings that regulate temperature) have to satisfy.

In addition, making reference to a whole home retrofit plan in line with the recommendations in the forthcoming PAS 2035 is recommended[8].

18) Listed buildings should be encouraged to improve energy efficiency as far as is reasonably practicable without prejudicing the character of the building or increasing the risk of long-term deterioration. A caution should be also included for traditional building stock - modern insulation materials and energy efficiency upgrading techniques are usually incompatible with traditional construction, and more natural materials are required.

19) The Government should undertake a review the Decent Homes Standard and the Housing Health and Safety Rating System (HHSRS) in close consultation with tenants. There are concerns that the current assessment of Category 1 hazards - the point at which a home fails the Decent Home Standard - is too high a threshold before requiring local authorities to take action. In addition, the complexity of the current system for assessing hazards makes it near impossible for tenants to understand whether or not they are in a position to demand immediate action from their landlord.

20) Further consideration should also be given to the assessment of what qualifies a home to have "reasonably modern facilities and services". The fact that the threshold for a home to fail the Decent Homes Standard is cases where renewal works have not been carried out on the bathroom for 40 years and the kitchen for 30 years suggests that the bar is too low and there is urgent need for review. Particularly considering that a home can continue to be deemed as Decent if only one of the above applies.

21) The Government should consult on the practicalities and impacts of introducing a comprehensive VAT rebate scheme for the renovation and consequential improvement of homes with poor energy efficiency.

Private rented sector

22) While there have been improvements to the standard of accommodation in the private rented sector over the past ten years, there are still significant problems that need to be addressed. Over a quarter of homes in the private rented sector don't currently meet the Decent Homes Standard, compared to 13% in the social rented sector. Homes in the private rented sector are

[8] For example by following the recommendations in the forthcoming PAS 2035 Retrofitting Dwellings for Improved Energy Efficiency: Specification and Guidance

also over represented as a proportion of homes with the worst energy efficiency ratings[9]. As well as strengthening the Decent Homes Standard as proposed above, the Government should extend the Decent Homes Standard to the private rented sector.

Non-domestic sector:

23) The Government should mandate actual energy performance disclosure across the nondomestic sector through an extension of Display Energy Certification requirements to the private sector. As referenced above, there is increasing evidence that the performance gap between EPCs and actual performance is substantial across the built environment, with the lack of data severely hampering the ability of the industry to respond to this challenge.

Existing initiatives introduced by Government to drive energy efficiency improvements in the non-domestic sector – such as the Carbon Reduction Commitment Energy Efficiency Scheme, mandating Display Energy Certificates for public sector buildings, and requiring all large organisations to undertake energy audits (buildings and wider energy use) from 2014 through the Energy Efficiency Opportunities Scheme – are not providing the necessary driver for wide-scale adoption of improvements through retrofit.

Display Energy Certificates would promote better energy management. A survey of public sector organisations who have been required to use Display Energy Certificates since 2008, and of private sector organisations who used the certificates on a voluntary basis, revealed Display Energy Certificates are seen as a relatively inexpensive process of information gathering that has a positive impact on knowledge and stimulating change, which can help with negotiating energy management budgets and raise the internal profile of energy consumption.

24) Energy Performance Certificates (EPCs) were originally introduced as a benchmarking and compliance tool. However, they are now being used to drive improvements in the energy efficiency performance of buildings, including the recently introduced minimum energy efficiency standards for the private rented sector. As a result, EPCs are increasingly being used as retrofit design tools - a purpose for which they were not intended and for which they are inadequate when it comes to listed buildings, buildings in conservation areas and of traditional stock. A drive to reach a higher EPC band at any cost risks damage to building fabric, heritage and health.

There are particular concerns relating to the use of EPCs in traditionally-constructed dwellings. There are generalisations in calculations which are not accurate for traditional construction, and lead to poor results (STBA[10] and HE[11]).

The Each Home Counts report recommends a 'Whole House' approach to domestic retrofit, now also promoted by STBA and Historic England. The ensuing (draft) 'Specification for the energy retrofit of domestic buildings' (PAS 2035), which will initially apply to Eco-funded work, takes the same approach. This new industry-led standard includes consideration of moisture risk, ventilation and heritage in addition to a building's energy performance, in order to avoid unintended consequences.

In the longer term, it is becoming increasingly recognised that we need to deliver a sustainable built environment and not just a low carbon one, so a broader assessment is needed which has

[9] https://www.gov.uk/government/statistics/english-housing-survey-2016-energy-efficiency
[10] http://stbauk.org/what-we-do/policy
[11] https://historicengland.org.uk/images-books/publications/eehb-how-to-improve-energy-efficiency/

a wider set of goals. A Whole House assessment recommended in Each Home Counts and used in PAS2035, which covers these other critical factors will mean investing in additional training for assessors, but this is the only way to prevent unintended consequences and it will be more cost-effective in the medium term. It is also much cheaper than having to rectify problems introduced by retrofit carried out with narrow goals - for example insulation which reduces ventilation and leads to damp, mould and poor indoor air quality with associated health problems. Also, every property is different, and this needs to be taken into account. An EPC can, however, inform this wider assessment and contains much of the basic data required.

A new standard for retrofit is required for traditional stock at least. We need to recognise that the whole house approach should supersede EPCs, and that we should decide how to incorporate EPC data within a more robust and useful approach to retrofit. We have an opportunity here to deliver a wide-ranging and much more effective assessment of a building's future sustainability. It is after all a sustainable built environment we need to deliver to future generations, not just one that is cheap to heat. True sustainability in buildings includes health and heritage, and should include water use and sustainable drainage as well.

Lessons to learn:

25) In order to meet the commitments of the Clean Growth Plan to protect businesses and households from high energy costs, we need to ensure that new and retrofitted buildings achieve the reduction in energy demand that they were designed to. The industry has been aware of the performance gap between the designed and as-built performance of buildings for many years, but we have seen a consistent failure to improve and lack of incentive from government to do better. These buildings are locking in higher carbon emissions than they should with no direct consequence for poor performance.

While technological breakthroughs as mentioned in the Plan are hoped to further reduce carbon emissions, it is clear that we are struggling to meet even the current basic regulations and standards in reality. Let alone the uphill struggle that residents and occupants face when trying to use new technologies efficiently in homes and buildings.

The Technology Strategy Board 'Retrofit for the Future' and 'Building Performance Evaluation' funded programmes highlighted the performance gap issues. Since then many professionals have carried out their own post-occupancy evaluations of buildings in-use. While these studies have highlighted many failings in performance and procurement of buildings, they have not sparked a change in the way the industry designs and builds.

The Government should promote the use of post-occupancy evaluations and setting of performance based metrics to ensure buildings are built to the energy efficiency measures they were designed. Australia has a well-documented system for this called NABERS whereby the buildings must achieve a set-performance in-use, as opposed to the UK system where buildings are designed to meet a set performance, but that performance is not checked when the building is complete.

Improving energy efficiency in new and existing stock is not a realistic goal until we know how our buildings are performing currently, what improvements can be achieved and what improvements have been achieved as a result. For this we need performance based metrics and checks following a building's completion.

26) A major contributor to the current gulf between the design intention of new buildings when they

receive planning permission and the quality of what is delivered is down to flaws in the procurement process. Design and Build contracts often lead to the design architect having no further involvement in the project once plans receive planning permission, which significantly reduces the chances of the end product reflecting the design intent.

In addition, value engineering, a term often used to describe the process of reducing design quality to cut costs, removes elements that were important features of the design through the planning process. A survey carried out on behalf of the RIBA found that only one in four people would consider buying a house built in the last 10 years, demonstrating the lack of confidence that people have in the buildings currently being delivered. Design and Build contracts should be reviewed and steps taken to address the risks and shortcomings of this form of procurement, including retention of the design architect throughout a project; at least in a 'design guardian' role.