

Written evidence submitted by Shade the UK**UK Parliament Environmental Audit Committee****Call for Evidence - Heat resilience and sustainable cooling****Shade the UK**

Shade the UK is dedicated to adapting the built environment and public spaces to protect the vulnerable against a changing climate. We believe that everyone has the right to live, work, and play in places that are safe, comfortable, and sustainable, regardless of their income, age, or health status. We also believe that this is not just a matter of individual well-being, but of social justice and human rights. As climate change exacerbates existing inequalities and vulnerabilities, it is our responsibility to ensure that those who are most at risk are not left behind.

The long-term impact we aim to deliver is that:

- Everyone in the UK will have the knowledge and tools to deal with heatwaves and protect themselves (and others).
- UK buildings are no longer dangerously overheating.
- We have equitable access to safe green spaces for all to participate in and enjoy.
- There are NO deaths of vulnerable people in the UK from overheating and in fact they're thriving.

Key Elements of STUK's Response

Shade the UK welcomes the opportunity to respond to the Environmental Audit Committee inquiry on heat resilience and sustainable cooling.

The risks to health and wellbeing of communities from climate hazards, and specifically heat are grave, with numerous studies around the world confirming increased mortality and morbidity linked to heatwaves. Socially disadvantaged communities are the worst affected; having fewer resources and suffering from poorer health to start with, they experience compounded vulnerability to heat and the other climate-related hazards.

The recently published NAP3 is largely inadequate in its ambition and provides no appropriate nor timely response to the urgent need of adapting to a rapidly changing climate. It also ignores the social dimensions of vulnerability and has no plans in place to support the most vulnerable communities. By doing so, It misses a great opportunity to deliver just and sustainable development, climate justice, and a better quality of life for a large population of the country; therefore, for us all. It instead reinforces existing structural inequalities and by leaving the most vulnerable communities unsupported, adversely affects their health and livelihoods.

We identify the following key actions the Government can take to support the most vulnerable to not only better adapt to heat and other climate hazards, but be empowered to thrive:

- **The national housing retrofit strategy and/or local retrofit housing strategies should give clear action & funding priority** to the homes of disadvantaged communities. Retrofit of housing needs to become an urgent priority, with the national strategy including clear targets, priorities and a framework to monitor outcomes.
- **Put in place a requirement for Local Authorities to undertake Vulnerability Mapping to identify vulnerable communities, neighbourhoods & buildings**, and develop priority resilience action plans in consultation with communities
- The **UK Shared Prosperity Fund** (a £2.6 billion fund that empowers local authorities to fund interventions based on local need) should also **prioritise funding for strategic interventions in deprived neighbourhoods, based on local needs' assessments and engagement with communities.**
- **Secure additional government funding** to support the work of local authorities, education & healthcare providers, social care services and community organisations in deprived areas and neighbourhoods (the Social Index of Deprivation and Local Authorities Local Needs' Assessments can be used to identify areas of deprivation).
- **Take decisive steps to explore and actively support (including through policies and regulations) alternative sustainable finance mechanisms** made available to local authorities and local/community stakeholders & service providers that improve their capacity to manage capital/impact investment flows. The Government can consult with innovators in this field (e.g. [The TransCap Initiative](#)).
- **Ensure Local Authorities develop Adverse Weather Action & Emergency Response Plans based on community engagement** and in collaboration with emergency services, healthcare providers, social services, and community organisations.

- Create the policy framework and other enabling mechanisms to support decentralised, **community power networks with priority given to disadvantaged areas**. The recently launched Community Energy Fund should give priority and extra support to projects in disadvantaged communities
- Have an **extreme weather response unit** that has the necessary equipment and resources to deal with responding to extreme weather conditions locally. It is possible to utilise such existing bodies as the Red Cross UK.
- **Ensure that heritage does not inhibit progress** in climate resilience projects and/or retrofitting of existing buildings.
- Deliver national and support the delivery of local **Education and Awareness programmes** on risks, vulnerabilities and adaptive actions. Establish national and local **early warning systems and communication** that reaches vulnerable groups.
- **Create inclusive local governance structures & Empower communities..** A paradigm shift is needed in how local governance and local authorities engage, consult and provide room to these communities to be heard and participate in decision-making that affects their lives.
- **Plan and take action to uphold the structural root causes that create social vulnerability and inequality**, and deliver improved livelihoods, equitable and fair access to resources and income.

We don't believe that a dedicated Heat Resilience Strategy would give an appropriate response to adaptation and community resilience. As the root causes of vulnerability (to all climate hazards and all other environmental and socio-economic stressors) are common, so are the solutions: ensuring fair, equitable access of communities to critical services, assets and decision-making power.

These assets are physical (e.g. quality of buildings and the wider built environment, sustainable transport infrastructure); **natural** (parks and green spaces, biodiverse, healthy ecosystems); and **social** (including healthcare, education, community infrastructure, local governance & decision-making power, income and employment).

Thus the UK would need a '**Resilience Vision**' first and foremost that places equity and thriving communities and nature at its core, and a 'Resilience Strategy' that encompasses the dimensions of physical, natural and social assets and promotes **holistic, bottom-up, context-specific solutions based on local needs, community engagement and truly collaborative approaches across sectors and actors.**

Local governance institutions (Local Authorities), community organisations, groups and community services providers (education, healthcare, social care, emergency services etc), communities themselves are best placed to develop local resilience strategies, deliver and

manage resilience action plans, monitor and evaluate outcomes. The Government has a key role to play in enabling the work of these local actors through regulations and policy frameworks, secure funding and provide alternative sustainable finance and impact investment models, sharing of risk and responsibility.

The current framework of collaboration between Government and Local Authorities is deemed ineffective in the context of the climate emergency and the need to respond successfully, swiftly and in a coordinated way to the multiple crises. **A paradigm shift is needed towards effective and truly collaborative approaches and frameworks of working between central and local governance, and between Local Authorities themselves.** The Government should, therefore, seek to engage with Local Authorities to understand their needs and co-develop the support and collaboration mechanisms to enable them to deliver on the adaptation challenge that will allow their communities to thrive.

The Government should by no means promote low GWP air conditioning as a primary solution as this might cause the industry and occupants to overlook simpler, passive solutions in buildings and neighbourhoods that are effective, economical, inherently sustainable and have the capacity to deliver multiple co-benefits for society. **Clear priority should be given to the implementation of passive measures to deliver heat resilience in our building stock, before resorting to active cooling solutions.**

Our detailed response can be found in the pages that follow.

- What evidence exists on the relationship between heat and human health (mortality and morbidity), and which communities are worst affected?

Numerous studies around the world and the UK confirm the adverse impacts of heat exposure on human health, and the increased mortality and morbidity linked to heatwaves (for indicative studies see References [1], [2] & [3]).

Socially disadvantaged communities are the worst affected; having fewer resources and suffering from poorer health to start with, they experience compounded vulnerability to heat and the other climate-related hazards (for indicative studies see References [4] & [5]). **The elderly, people with certain pre-existing health conditions, young children, pregnant women, people living in isolation and people working outdoors are also high risk groups.**

There is a lack of specific evidence in the UK on why and where exactly deaths occur to enable fixes to be carried out on making sure thermal conditions are appropriate. I.e. is it the hospitals / hospices themselves that are underperforming or is it the care homes or social housing? Shade the UK know anecdotally from discussions with vulnerable people that they are living in buildings that get above 40 degC during heat waves. Shade the UK know from talking to people linked to the NHS that air conditioning often fails when temperatures are too high and vulnerable people in wards are underprotected.

In cities, the link between deprivation, exposure and vulnerability to heat is spatially engrained and has been extensively documented across the world (a recent BBC study for the UK can be found in Reference [6]). Socially deprived communities live in poor quality, poorly ventilated, overcrowded housing blocks and in neighbourhoods that lack accessible, safe and high quality green and public spaces, whilst air pollution and noise are more prevalent compared to other areas.

As a result, the urban heat island effect is more pronounced in these neighbourhoods, homes are at greater risk from overheating due to poor design and passive cooling through opening windows is ineffective and problematic. Limited incomes severely affect access to the use of energy-consuming equipment at home (fans or mechanical cooling systems), as well as options to get to cool public spaces during hot days. Other vital community infrastructure (healthcare, education, community centres etc) is also lacking or is under-resourced, meaning these communities also suffer from limited access to services and resources that could otherwise improve their individual and collective resilience to heat.

Effectively supporting the most vulnerable against climate-related hazards (including heat) thus requires an intersectional approach and strategies that address structural inequalities associated with poverty, race and place; ensure equitable access to quality physical, natural & social assets across neighbourhoods, empower communities and support them to thrive.

- How can sustainable cooling solutions and adaptation strategies be implemented in such a way as to minimise overheating, reduce energy consumption and prevent overloading of the electricity grid during peak demand?

It is paramount that a holistic, systems-thinking approach is adopted in developing a plan of climate resilience interventions for the built environment, and one that captures all resources (human, natural, social, cultural, institutional, financial, manufactured), dimensions (building, neighbourhood, city) and the complex web of their interconnections.

Such an approach has greater potential to deliver optimised outcomes and address multiple objectives: in this case improving heat resilience whilst reducing energy use and avoiding overloading of the electricity grid.

We identify the following three pillars of built environment strategies as key in improving the adaptive capacity of communities whilst not adversely affecting energy use, the resilience of the national power grid nor its potential to decarbonise:

- **Performance-based retrofit of the existing housing/building stock that prioritises passive design measures.**

The Cooling Hierarchy, together with the Energy Hierarchy will need to be adopted; both giving priority to location-specific, fabric-first approaches that minimise reliance on energy-consuming systems to deliver healthy & comfortable indoors across the seasons.

A national housing retrofit strategy undertaken at scale and speed in coming years is essential to deliver critical outcomes for communities and ensure the UK's climate commitments are met.

Critical outcomes for communities include: improved health & wellbeing; greater adaptive capacity to climate change; low operational costs and alleviation of fuel poverty; economic stimulus and growth.

Passive design measures that reduce overheating risks include external movable shading elements or other building-integrated shading elements that block solar gains, reduced glazing areas in high-risk orientations, generous openable areas that deliver natural, cross-ventilation in habitable rooms.

- **Strategic interventions within neighbourhoods that improve environmental conditions and ensure equitable access of communities to critical resources: sustainable transport, quality green public spaces and social infrastructure (public buildings, community centres, education, health & care services).**

An effective network of sustainable transport (public, active, shared mobility), reduces reliance on car travel, cost of travel and improves on noise and air quality conditions of the neighbourhood. Quiet, clean air neighbourhoods mean we can rely more on opening windows to achieve passive cooling indoors. Less pollution and active travel improves health & wellbeing; locations well-served by public transport improve mobility for low income, vulnerable groups, with multiple societal benefits.

Safe, accessible, well-maintained and biodiverse green spaces & street trees make the microclimate cooler, reducing the intensity of the heat island effect. Buildings nearby are thus more effectively cooled through opening windows. Public gardens and parks with trees offer shade and become a place of cool refuge during hot days; they are also the places where communities come together & meet, relax, play and do sport throughout the year. They offer habitat, flood risk protection and places to grow food. They are vital for the communities' sense of place, health & wellbeing and support interaction and social connections. Heat resilience in cities is inconceivable without a close-knit network of quality green/blue infrastructure.

Access for all to quality community infrastructure and education, health and social care services is also paramount to support the adaptive capacity and resourcefulness of communities. It is also paramount to deliver a fairer society, and support the livelihoods and thriving of those most affected by structural inequalities.

In the most practical terms, public buildings like schools, libraries, recreation/fitness and community centres can serve as 'cool spaces' during days of extreme heat. Well-resourced health & social care services support health & wellbeing, save lives during heat emergencies and can take proactive measures to support the most vulnerable. This infrastructure has also a key role to play in communities' preparedness through education and awareness, and offering space for community empowerment and collective action.

Shift towards decentralised power generation & storage: the case for community power networks

Maintaining the current model of centralised electricity power generation and distribution through a national grid is inherently less resilient to cope with stresses, including shifts in loads and damage from natural disasters and more resource-consuming to run, upgrade and alter. Overall, the risk of experiencing severe disruptions that affect larger populations for longer are greater. Centralised generation is also harder, more time- and resource-intensive to decarbonise. What is more, the current system cannot sufficiently guarantee low energy prices, leaving the most vulnerable exposed to fuel poverty.

In the context of the climate emergency, and in order to deliver climate justice and just transition to a green economy, it is imperative to consider shifting towards decentralised generation & localised power networks predominantly managed by the community. Community owned, decentralised, 100% renewable power networks will reduce stress on the national grid, support a just transition, ensure fair access to resources, alleviate fuel poverty and boost local productivity and growth.

Only a few days ago the government announced a £10m Community Energy Fund to open in early Autumn 2023 to support the growth of community energy in England over the next two years. This is a welcomed move that needs to be reinforced to ensure roll-out in urban areas, with priority given to deprived neighbourhoods.

- What actions can be taken to protect those most vulnerable to the impacts of extreme heat?

Community resilience to heat and other climate hazards is intertwined, inseparable to fair, equitable access to: quality housing, critical community infrastructure, social assets and resources that improve livelihoods and communities' decision-making power and this should transpire resilience strategies and actions.

We identify the following key actions the Government can take to support the most vulnerable to not only better adapt to heat and other climate hazards, but be empowered and thrive:

- **The national housing retrofit strategy and/or local retrofit housing strategies should give clear action & funding priority** to the homes of disadvantaged communities. Local Authorities, in collaboration with local communities and other local stakeholders are best placed to identify priority projects and neighbourhoods (Vulnerability Mapping can be an effective tool to this end, see below)
- **Put in place a requirement for Local Authorities to undertake Vulnerability Mapping to identify vulnerable communities, neighbourhoods & buildings**, and develop priority resilience action plans to retrofit buildings, improve assets at neighbourhood scale (physical, natural, social) and/or move people to spaces that don't overheat. Resilience Action Plans should be developed in consultation with communities and other relevant local actors.
- The **UK Shared Prosperity Fund** (a £2.6 billion fund that empowers local authorities to fund interventions based on local need) should also **prioritise funding for strategic interventions in deprived neighbourhoods, based on local needs' assessments & vulnerability mapping**, that improve environmental conditions and deliver critical new or improve existing infrastructure to support communities' resilience (sustainable transport, quality green public spaces and social infrastructure such as public buildings, community centres, education, health & care services). It is important to

include the communities in co-developing resilience strategies, so funding criteria should include the requirement for appropriate community engagement and collaborative approaches between local governance and community stakeholders.

- **Secure additional government funding** to support the work of local authorities, education & healthcare providers, social care services and community organisations in deprived areas and neighbourhoods (the Social Index of Deprivation and Local Authorities Local Needs' Assessments can be used to identify areas of deprivation). The work of these community-based actors is crucial to actively support the most vulnerable and respond in conditions of emergency, however in deprived neighbourhoods their services suffer from lack of human, financial and technical resources.
- **Take decisive steps to explore and actively support (including through policies and regulations) alternative sustainable finance mechanisms** made available to local authorities and local/community stakeholders & service providers that improve their capacity to manage capital/impact investment flows. Ensure equitable access to these mechanisms for local actors working in disadvantaged communities.
- **Ensure Local Authorities develop Adverse Weather Action & Emergency Response Plans based on community engagement** and in collaboration with emergency services, healthcare providers, social services, and community organisations. The Action Plans should have dedicated strategies & actions in place to support vulnerable people and communities in a coordinated manner and should capture all climate hazards and extreme events that threaten the area (e.g. response to extreme cold weather, storms, floods).
- Have an **extreme weather response unit** that has the necessary equipment and resources to deal with responding to extreme weather conditions locally. It is possible to utilise such existing bodies as the Red Cross UK.
- **Ensure that heritage does not inhibit progress** in climate resilience projects and/or retrofitting of existing buildings.
- Create the policy framework and other enabling mechanisms to support decentralised, **community power networks with priority given to disadvantaged areas & communities**. Take steps for the rapid deployment of community energy projects through the Community Energy Fund, giving priority and extra support to disadvantaged communities
- Deliver national and support the delivery of local **Education and Awareness programmes** on risks, vulnerabilities and adaptive actions. Establish national and local **early warning systems and communication** that reaches vulnerable groups. Both the above elements need to be inclusive and culturally-sensitive.
- **Create inclusive local governance structures & Empower communities**. Socially disadvantaged and minority groups are also the ones amongst society having the poorest representation in local and national authorities, and suffer from least access to governance structures, institutions of power and decision-making. A paradigm shift is needed in how local governance and local authorities engage, consult and provide room to these communities to be heard and participate in decision-making that affects their lives. All

communities, but more so socially vulnerable communities, should be given a central role in co-developing the vision for their neighbourhoods and allowed to have a fair share of ownership of resources. Community engagement and inclusive, collaborative approaches need to become the new norm, and the Government has a role to play in signalling and enabling this shift.

- **Plan and take action to uphold the structural root causes that create social vulnerability and inequality**, and deliver improved livelihoods, equitable and fair access to resources and income.
- To what extent do the Government's Climate Change Risk Assessment and National Adaptation Programme (as well as other related strategies such as the Net Zero Strategy and Heat and Buildings Strategy) identify and address the risks from extreme heat? (Note: The third NAP, covering the five-year period from 2023-2028, is expected to be published in the summer of 2023)

STUK endorses the view expressed by many other organisations, public stakeholders and experts that the third NAP is largely inadequate in its ambition and provides no appropriate nor timely response to the urgent need of adapting to a rapidly changing climate.

It is missing a clearly articulated vision and accompanying intended outcomes, and lacks a solid plan of action and the framework to monitor and evaluate the success of its delivery. It lacks the holistic approach and systems-thinking required to deliver optimum outcomes and the cross-cutting benefits of adaptation. Actions are piecemeal, narrow in their reach and largely insufficient.

Regarding the built environment specifically, the NAP includes no clear plans and timelines to deliver and fund the extensive retrofit of the existing housing stock that is required, nor plans to improve the resilience of our neighbourhoods and cities.

The NAP also fails to acknowledge the direct link between vulnerability to climate hazards (including heat) and social inequality. Failing to acknowledge social inequalities as a key compound of vulnerability to climate change, has severe implications for both the effectiveness and justice of the adaptation response.

By not putting priority in delivering positive outcomes for the most vulnerable communities, the NAP reinforces existing structural inequalities and by leaving these communities unsupported, adversely affects their health and livelihoods.

It misses a great opportunity to deliver just and sustainable development, climate justice, and a better quality of life for a large population of the country, therefore for us all.

This is in sharp contrast to the *Second Scottish Climate Change Adaptation Programme 2019-2024* which adopts a human-rights-based approach, and places climate justice and the support to vulnerable communities at its core.

In further detail, we identify the following serious shortcomings in consideration of the the NAP's proposals for 'Health, communities, and the built environment' (Chapter 4), which is most relevant to STUK's work:

- There is no acknowledgment of the relationship between increased vulnerability to climate hazards and social deprivation/inequality. The only vulnerable "members of the population" explicitly mentioned in the Chapter are people with disabilities and older people (par. 4.2.1). Failing to acknowledge structural inequalities as a key compound of vulnerability to climate change has severe implications for the effectiveness of our adaptation response. If not developed to bring systemic changes and prioritise positive outcomes for the most vulnerable communities, adaptation plans will exacerbate inequality, fuel poverty and miss the opportunity to deliver sustainable development, climate justice and a better quality of life for all.
- There is no real evidence based approach on finding out who and where the most vulnerable people are in the UK susceptible to ill health and deaths from heat waves.
- This failing transpires throughout the 'Action' sections of Chapter 4. Giving priority to the most vulnerable communities and tending to the most deprived neighbourhoods of our cities is nowhere to be found in the plan.
- There is no solid action plan to deliver retrofits of existing housing stock (thereby nor of poor quality housing where vulnerable communities live) in the NAP's timeframe (2023-2028). This is substantial time lost in a state of urgency that demands both the decarbonisation of the UK's existing housing stock and improving its resilience to climate hazards, most importantly against overheating risks.
- In the absence of solid planned actions and projects, the NAP places emphasis on developing and disseminating critical information on climate risks that will help citizens (bullet point 1 in 4.2.3), local authorities and communities take action to protect themselves (bullet point 4 in 4.3.3) and further research on issues already extensively studied, for which the building industry has a good level of understanding and insight. We would welcome a different approach where Government Departments have the responsibility to collaborate with the building industry to collate the abundant body of knowledge that already exists and which addresses most of the current research questions and consolidate them into the much needed strategies and action plans. We would also welcome a paradigm shift to the production of knowledge, that of learning whilst experimenting and doing. Urban experiments and trials have the capacity to provide answers and solutions to local-specific problems and needs and have long been applied in urban planning and urban resilience. More support is needed for such experiments and projects unfolding in real-world situations, rather than desktop research and modelling by experts.

- Does the current planning framework do enough to encourage heat resilience measures such as cooling shelters, water bodies, green infrastructure and shading to be integrated into urban planning? Where such measures are incorporated, how accessible and successful are they?

The scale of the adaptation challenge the built environment is and will be increasingly facing cannot be addressed through measures implemented in new developments and masterplans alone, more so in the case of UK cities, where the vast majority of the urban fabric is already built.

So whilst there might be policies in the NPPF and regional/local planning policies that are in the right direction, implementing heat or more broadly climate resilience measures in pockets of new developments is ineffective and insufficient.

What is more, the in-use performance of interventions is rarely monitored and there is thus very limited understanding of real-world outcomes and how these relate to design intentions. In the cases where this is done, monitoring does not capture elements relating to social value (e.g. equitable access) and lessons learned are not shared with others. **The absence of frameworks for in-use monitoring & evaluation, and the absence of knowledge feedback mechanisms is a missed opportunity that needs to be addressed.**

Critical to the success of interventions that aim to build the climate resilience of neighbourhoods and communities is the engagement in the process of the communities themselves, to co-develop a context-specific vision, principles and intended outcomes, suited to their needs. **The current planning framework does not place enough emphasis on the importance of community engagement and truly inclusive, collaborative, participatory approaches in urban planning. A paradigm shift is needed to empower communities and build inclusive, democratic models of local governance and decision-making.**

We also consider that the current framework does not place enough emphasis on equitable access to infrastructure and **does not give priority on improving the living conditions and neighbourhoods of vulnerable communities**, nor does it adequately protect them from displacement due to new development.

What is more, **currently prevailing housing delivery mechanisms have failed to secure quality homes for the most vulnerable communities and at the scale and pace needed to cover demand.** Affordable housing delivered through private ventures especially when in separate blocks to private market units is in most cases sub-standard, exacerbating exposure and vulnerability of residents to heat and other indoor environmental stressors.

There is thus an urgent need for the planning framework to acknowledge and address the systemic barriers behind the limited housing supply of the past decades and the crisis of housing affordability. All communities across the UK are adversely affected, but disproportionately more, the most vulnerable.

Alternative models for development and ownership that empower vulnerable communities and support **community-led development and housing co-operatives should be explored and actively supported.**

- What can be done to protect the UK's existing public and private sector housing stock from the impacts of extreme heat while ensuring that homes are sufficiently warm in the winter months?

Our key proposals are:

- **The deployment of extensive housing retrofit programmes that adopt fabric-first, passive design approaches that are appropriate for both objectives;**
- **Extending the responsibility of the construction supply chain to in-use performance, utilising post occupancy evaluation (POE) methods to validate the quality of the indoor environment in-use.**

Our detailed response can be found below:

There is an **urgent need for the deployment of housing retrofit at scale** to deliver on multiple outcomes: stay on track for decarbonisation; reduce energy consumption and alleviate fuel poverty; improve the health & being and the adaptive capacity of communities against climate change.

The design measures needed to achieve the two objectives are not contradictory to one another: the **fabric-first approach and priority to passive design in retrofit is appropriate to deliver both a warm home in winter and one that does not overheat in the summer.** Whole-house retrofits that combine the Cooling and the Energy Hierarchy and prioritise passive design, are best placed to deliver on the objectives of improved comfort and health across the seasons, alleviate fuel poverty and decarbonise the housing stock.

Beyond building-integrated elements, communities' resilience and livelihoods will benefit from neighbourhood-scale and context-specific interventions that address local needs, improve environmental conditions and provide fair access to critical community infrastructure (see our response to Question #2).

We would also advocate for the extension of responsibility of the construction supply chain (developers/contractors/designers) beyond handover: in-use performance related to energy use, health & comfort should be monitored and evaluated using Post Occupancy Evaluation (POE) methods during the first year(s) in occupation. Where performance is poor and presents risks to the health & wellbeing of residents, the supply chain would need to rectify any issues and/or provide compensation to

residents. Rewarding mechanisms for monitoring and validating good in-use performance can also be put in place to incentivise developers and contractors (e.g. loans with better terms, reduced taxation, award of government contracts). This would bring a paradigm shift with ripple effects across the industry: there would now be more incentives to close the performance gap, monitor in-use performance, and deliver better outcomes.

- Does the Government's Future Homes Standard adequately consider overheating in homes? If not, what additional elements should it include?

Our key proposals for elements to be added in Overheating Regulations Part O include:

- **Introduction of an obligation for in-use performance monitoring and Post Occupancy Evaluation (POE), with data shared across the industry, relevant government bodies and research institutions, to improve regulations, design approaches and tools.**
- **Introduction of a requirement to deliver education, awareness and training programmes for residents on adaptive behaviours at home during hot weather.**
- **Future-proofing dwellings with low-tech, low-energy measures.**
- **Introducing additional safeguards and measures to support vulnerable residents.**

Our detailed response can be found below:

The consultation version of the Future Homes Standard issued in 2019 included a plan to introduce new overheating regulations for new homes. These new regulations have since come into force, comprising Part O of the Building Regulations. Guidance to comply with this regulation is provided in Approved Document O - Overheating which took effect on 15 June 2022.

The introduction of this regulation is definitely in the right direction and will encourage overheating risk mitigation measures to be considered from the onset of design in new residential developments.

However, there is definite opportunity for improvements. We identify the following additional elements as critical to ensure the effectiveness of Part O in delivering healthy & comfortable indoor environments supporting residents' adaptive capacity:

- **Introduction of an obligation for in-use performance monitoring and Post Occupancy Evaluation (POE), with data shared across the industry,**

relevant government bodies and research institutions, to improve regulations, design approaches and tools.

At the moment, compliance with Part O is achieved either through the adoption of certain prescriptive design standards (relating to glazing ratios, openable free areas etc) or predictive dynamic thermal modelling in line with CIBSE TM59 standard. This modelling is built on certain assumptions (including future weather, occupancy and internal gains) and simplifications and thus predictions carry inherent uncertainty.

What we find in practice is that many of the homes that comply with Part O are found to overheat in occupation - not only under conditions of extreme hot weather and heatwaves, but under summer temperatures considered within the normal range for the period (or even during winter). In the industry, this issue has long been identified and termed 'the performance gap', i.e. the discrepancy between design-stage predicted performance and performance in-use. The performance gap is not only identified in terms of summer thermal comfort, but also in operational energy use.

The performance gap, if not addressed, carries multiple risks:

- Not meeting the required levels of decarbonisation of the new housing stock and not addressing fuel poverty for the most vulnerable.
- The building industry is not held accountable for substandard performance, transferring the responsibility to residents and landlords to address any issues on their own resources. For vulnerable communities this is extremely detrimental and exacerbates inequality.
- Opportunities for continuous improvement, collaboration and knowledge sharing are lost at such a critical time. As long as the building industry's work and responsibility stay restricted to design and construction, with no connection to real-world outcomes, our understanding of how buildings and spaces actually perform and the interrelationships with human, social and cultural dimensions remain limited. Without realising, the building industry runs the risk of delivering poor and unethical outcomes. Introducing methods and tools that enable transparency & accountability over outcomes, thus becomes a safeguard for the industry to deliver on its existential purpose and mission.

To address these shortcomings, in-use performance needs to be monitored & evaluated through Post Occupancy Evaluation (POE) methods. POE data can then be used to verify & improve models, and share lessons learned across the industry leading to continuous improvements of design & construction approaches and Regulations.

The POE should capture other critical aspects of new homes' performance together with summer thermal comfort, such as air quality, noise, and energy-use and can be undertaken in a sample of high risk homes and high risk

location developments (we note that RIBA advocate for POE in their response to call for evidence by the Department of Business, Energy and Industrial Strategy: Review of net zero). As an all-encompassing tool to improve future designs, the requirement for POE can form part of the Future Homes Standard, rather than Part O Overheating Regulations alone. POE data could be collected centrally to inform the research work of relevant Government bodies (like MHCLG) and lead to further improvements of Regulations and Adaptation Plans applicable to the building scale.

- Introduction of a requirement to deliver **education, awareness and training programmes for residents** on adaptive behaviour during hot weather.

Occupant behaviour is a critical determinant of overheating risk, something that is confirmed in numerous studies across the world (see also Chapter 6 'Addressing overheating risks - Existing housing and lessons learnt from other countries' in MHCLG's 'Research into overheating in new homes' Phase 1 report). It is therefore crucial for education, awareness and training programmes to be delivered to residents on how they can best adapt their behaviour whilst at home and how they can make best use of their home's passive cooling features during periods of hot weather. These programmes would need to be inclusive and mindful of the different residents' profiles (physical & mental, cultural, social). The responsibility for such training can lie with developers at handover and be part of a wider training programme on other features of the home or part of Soft Landings.

- **Future-proofing dwellings** with low-tech, low-energy solutions and exploiting synergies between mechanical ventilation systems and opening windows.

The climate is changing faster than scientists anticipated. It's reasonable to expect that quite soon, passive design solutions will not suffice to maintain healthy conditions indoors, but there is probably a spectrum of low-tech and low-energy design measures that can help deliver summer comfort before we need to resort to active cooling systems. These options are largely absent from current Overheating Regulations and we believe they are worth being explored, studied and introduced in the guidance. Some examples of these options are:

- Mandatory requirement at high risk locations to design & install necessary elements that allow the future-retrofit of external shutters for solar control across openings. These elements should not restrict shutter options to specific products in the market, but should allow simple, even DIY solutions to be applied. By taking this proactive and flexible approach, retrofit of shutters will be low-cost so that even low income residents can afford them and can happen at a time that responds to the specific needs and risk profiles of residents.
- Making allowances for ceiling-mounted fans in bedrooms, especially in rooms with single-sided ventilation.

- Low-energy options for dehumidification of incoming air through the mechanical ventilation system in hot, humid weather
- Installing automatic controls for mechanical ventilation that help save energy (CO₂, humidity & temperature sensors) and activate purge summer-by-pass mode. This will be particularly beneficial to reinforce night-time cooling, even in unoccupied rooms, if air changes achieved through openable windows do not suffice.
- Design the location of mechanical ventilation supply & exhaust grilles to reinforce a breeze through the home
- Consider the options of mechanical cooling and design for easy future retrofit of such systems.

- **Introducing additional safeguards and measures to support vulnerable residents.**

Overheating Regulations can include a more ambitious set of performance standards and provisions of hard and soft measures applicable to affordable housing. Installing external shutters and low-energy equipment like ceiling-mounted fans can become mandatory for these units to provide longer-term resilience at no cost for tenants.

- What role might reversible heat pumps (which can act as both heating and cooling systems) and other emerging technological solutions, such as the development of smart materials, play in meeting future cooling demands?
- How can cleaner refrigerants with low or zero global warming potentials support the UK's cooling needs while contributing to the national emission reduction targets?

Others are better placed to respond to the above technical questions. However, we would like to reiterate that **clear priority should be given to the implementation of passive design measures to deliver heat resilience in our building stock, before resorting to active cooling solutions.** Active cooling via heat pumps that use refrigerants, no matter how low GWP these can be, will still represent solutions that are high in embodied & operational carbon, more energy intensive and thus expensive to run, demanding in raw materials resources and rare materials that will increase the demand on the national grid which will in turn mean more transformers, cables & primary energy sources spent to cover the demand. The government should by no means promote low GWP air conditioning as a primary solution as this might cause the industry and occupants to overlook simpler, passive solutions in buildings and neighbourhoods that are effective, economical, inherently sustainable and have the capacity to deliver multiple co-benefits for society.

- How effectively is the Government working across departments and with local authorities to ensure a coordinated approach is taken to heat resilience?

The current framework of collaboration between Government and Local Authorities is deemed ineffective in the context of the climate emergency and the need to respond successfully, swiftly and in a coordinated way to the multiple crises.

Local Authorities' work on adaptation varies widely with most of them working in silos; the Government also seems to not sufficiently consult with Local Authorities on issues of adaptation.

A paradigm shift is needed towards effective and truly collaborative approaches and frameworks of working between central and local governance, and between Local Authorities themselves. Whilst adaptation is location-specific, there are solutions and interventions that could deliver positive and similar results across contexts and there is extreme value in sharing learning and resources at a time when resources might be scarce and time is running out.

The Government should seek to engage with Local Authorities to understand their needs and co-develop the support and collaboration mechanisms to enable them to deliver on the adaptation challenge that will allow their communities to thrive.

- Does the UK need a dedicated Heat Resilience Strategy? What lessons can be learned from other nations when it comes to national strategies for heat resilience?

Developing a dedicated Heat Resilience strategy is in the wrong direction and carries significant risks of:

- Resulting in a fragmented, largely ineffective response, wasting valuable resources and time, and missing great opportunities to deliver multiple, mutually reinforcing outcomes;
- Maintaining current siloes and promoting generic top-down solutions;
- Create a misleading framework and narrative that heat as a risk and resilience to heat can be addressed in isolation to other climate hazards, social inequality and the wider socio-economic circumstances in the country.

Instead, a holistic, systems-thinking and outcomes-based approach needs to be adopted to support our communities' resilience under an all-encompassing lens, where resilience to climate hazards and resilience against socio-economic stressors is treated as inseparable, as it truly is.

Such a holistic resilience strategy is only possible if positioned within the context of a wider clearly articulated vision for our future, centred around thriving nature and communities, social equity, climate justice, inclusive and just sustainable development that leaves no one behind.

The root causes of vulnerability to environmental and socio-economic stressors that we are already and will be increasingly facing in the future are common. The

solutions to reduce vulnerability and improve resilience are also common: ensuring fair, equitable access of communities to critical services and assets.

These assets are physical (e.g. quality of buildings and the wider built environment, sustainable transport infrastructure); natural (parks and green spaces, biodiverse, healthy ecosystems); and social (including healthcare, education, community infrastructure, local governance & decision-making power, income and employment).

Thus we need a ‘Resilience Vision’ first and foremost that places equity and thriving communities and nature at its core, and a ‘Resilience Strategy’ that encompasses the dimensions of physical, natural and social assets, that promotes holistic, bottom-up, context-specific solutions based on local needs, community engagement and truly collaborative approaches across sectors and actors. The NAP3 could have been this Strategy; as it unfortunately isn’t, something new will need to be developed in its place.

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