LONDONASSEMBLY

June 2026

Planning and Regeneration Committee

This document contains the written evidence received by the Committee in response to its Call for Evidence, which formed part of its investigation into whether London's homes are ready for a heatwave.

Calls for Evidence are open to anyone to respond to. In March 2026 the Committee published a number of questions related to its investigation, which can be found on page 3. The Call for Evidence was open from 6 March to 1 May 2026.

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Age UK London's submission to the London Assembly Planning and Regeneration Committee's call for Evidence: Are London's homes ready for a heatwave?

1b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Overheating disproportionately impacts older people, with people aged 65 and over likely accounting for four in five of heat-related deaths[1].

The body's ability to regulate body temperature worsens with age. Older people are more likely to have chronic medical conditions, such as cardiovascular and respiratory conditions, so their health is more likely to be impacted by a heatwave as they are less able to regulate their body temperature. Prescription medication can also make it harder for the body to cool itself, or can lead to dehydration, such as diuretic medication[2]. Heatwaves can also lead to a higher risk of falls amongst older people due to fatigue from warm weather. Bone fractures from falls can have a significant impact on older people[3], affecting quality of life and health outcomes[4].

People from minoritised ethnic backgrounds, and low-income households, are also at heightened risk during a heatwave. With London being the UK's fastest ageing city[5], and many older Londoners being from minority ethnic backgrounds and/or living in financial hardship, overheating amongst older Londoners must be addressed.

Older people tend to spend the majority of their time inside their homes, so the risk of overheating depends heavily on the design and conditions of the buildings they live in. Whilst the UK has the poorest insulated housing stock in Europe, offering little protection against extreme heat, people living in particular dwellings are at higher risk of overheating. For example, top floor flats have a high exposure to sun, whilst ground-floor dwellings often have restricted options for opening their windows due to security concerns[6]. Older people are also more likely to be living in properties built between 45 and 80 years ago, which are amongst those most likely to overheat[7]. Care homes are also at particularly high risk of overheating, with acute staff shortages and significant under-funding[8].

1c. How is the risk of overheating different in London than in other parts of the UK?

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[1] Extreme summer heat could lead to more than 5,000 deaths | Centre for Ageing Better
[2] Hot Weather Safety for Older Adults | National Institute on Aging
[3] Heading for a fall | Centre for Ageing Better
[4] Falls, World Health Organisation
[5] Ageing in the fast and slow land | Resolution Foundation
[6] Turning-up-the-heat-Learning-from-the-summer-2022-heatwaves-in-England-to-inform-UK-policy-on-extreme-heat.pdf
[7] Extreme summer heat could lead to more than 5,000 deaths | Centre for Ageing Better
[8] Nearly 10,000 care homes in heatwave hot spots | Friends of the Earth

It is well known that London and the Southeast is particularly high risk of suffering from overheating[9]. Cities experience an added risk due to the urban heat island[10]. As previously mentioned, London is the fastest ageing major city in the UK and so the need to address overheating risk in London is essential to protecting the health and wellbeing of older Londoners.

2a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

Greater support is needed for people to make improvements to their home which might lower the risk of harm from a heatwave and make property better suited to cope with extreme temperatures.

The Centre for Ageing Better are calling for the government to develop a strategy to make all homes warm and safe, to provide a service called a Good Home Hub. These hubs would provide information and support on home repairs and adaptations, including finding trusted tradespeople and identifying work needed, alongside how to finance repairs and improve energy efficiency. A similar model could be introduced across London, as part of the London Plan, to ensure homes are better equipped to handle both cooler and warmer temperatures.

The London Plan needs to better account for the process of circulating information to residents during heatwaves. Many older residents do not have digital access, meaning text and email alerts often do not reach these people. Practical information and resources need to be disseminated, particularly targeting at-risk households, without being alarmist or causing more worry.

Consultations with local Voluntary and Community Sector Organisations, including local Age UKs, are needed to understand how best to disseminate information and support older Londoners. The London Plan also needs to include information about how improvements will be made to better map and connect older people to the social and community infrastructure before, during and after extreme weather events. For example, understanding how information will be spread across older Londoners about using local cool spaces in the community[11].

Ideally, the London Plans needs to include or refer to an explicit heat resilience plan. Initiatives currently aimed at increasing the energy efficiency of homes do not also factor in summer thermal performance.

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[9] Turning-up-the-heat-Learning-from-the-summer-2022-heatwaves-in-England-to-inform-UK-policy-on-extreme-heat.pdf

[10] Heatwaves and Health: The ARCADE Project Tackling the Silent Threat of Overheating Homes - Oxford Brookes University

[11] Healthy-Ageing-in-a-Changing-Climate.pdf

2f. Are there examples of cities which have adopted strategies to tackle heat risk which London can learn from?

Keep Bristol Cool Framework – the city's cool spaces initiative establishing a network of accessible, safe and welcoming public spaces that can offer relief during high temperatures. More information here: SB_Adaptation Story_Bristol_IMAGINE Adaptation_FINAL.pdf

Urban green spaces as cooling solutions in Barcelona. More information here: Nature-based climate shelters? Exploring urban green spaces as cooling solutions for older adults in a warming city - ScienceDirect

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Elodie Pinn, Age UK London, April 2026

Contact: John McGeachy, jmcgeachy@ageuklondon.org.uk

Call for evidence: Are London's homes ready for a heatwave?

Contact: planningpolicy@befirst.london

The below sets out the response from Be First, on behalf of the London Borough of Barking and Dagenham (LBBD), on the key questions set out as part of the London Assembly Planning and Regeneration Committee's Call for Evidence: Are London's homes ready for a heatwave?

1) Are London's homes able to cope with current and projected future overheating risks (in 20–30 years' time)?

London's housing stock is not yet adequately prepared for current overheating risks, or the risk of future projected intense and frequent heat events. While recent policy improvements have strengthened standards for new homes, homes resilient to current and future heat risk form a minority of the current stock of homes.

With the introduction of Part O, homes built since June 2022 and aligning with London Plan guidance for homes to be dual aspect, are much better equipped to cope with current overheating risks. In particular, those located outside of the greatest Urban Heat Island effect of the inner city and benefiting from cooling effects of trees and other green infrastructure are well placed to cope with current and future heat risks.

Further policy and regulatory changes could help to improve the preparedness of new development to manage the risk of overheating. Currently, only major developments are required to use future weather files, to encourage consideration of future heat risk and subsequent building in of resilience. However, implementation of mitigations are not mandated, except where there is such local policy in place. Requiring the consideration of future weather files and implementation of mitigation measures in all new major development will support the development of more resilient housing.

Importantly, as the majority of London's housing stock pre-dates these regulations, risks of overheating will intensify as the climate continues to warm. A wide scale programme of retrofit, prioritising measures including external shading, improved glazing, ventilation enhancements and improved integration of green infrastructure would likely be required to reduce this vulnerability.

2) What measures (e.g. shading, dual aspect, air conditioning, retrofit) should new and existing homes in London incorporate to be "heat-proofed" against current and projected future overheating risks? What barriers exist to implementing these measures?

Passive cooling measures including shading, dual aspect and retrofit, in addition to solar control glazing, incorporation of green infrastructure, carefully designed insulation (avoiding thermal bridging and ensuring adequate ventilation), tempered air to mechanical ventilation systems and other methods of heat proofing should be employed where appropriate. Passive methods should be maximised as far as possible before incorporating air conditioning as a last resort, to minimise energy demand and resulting carbon emissions that contribute to further climate change.

Cost of systems, additional material, accommodating dual aspect into layouts, visual condition and daylighting and are some of the factors that may be considered barriers to implementation. Other major barriers are the lack of legislation and policy for futureproofing new and existing homes to manage overheating risk, in addition to the availability of funding, skills and supply chains to deliver the required scale of retrofit at present

3) Are existing planning and building regulations sufficient to ensure these measures are consistently delivered in practice? What else is needed?

4) As indicated in response to Q1, planning and building regulations should be successful in ensuring measures are delivered to new homes built to current and future building regulations, however they are unlikely sufficient to adequately reduce risk of overheating against future climate change scenarios. A strengthening of policy and legislation to not only require the application of future weather files but implement measures to mitigate the risks indicated is needed, in addition to guidance and support for existing dwellings.

5) Does a focus on making homes warm in winter risk homes that are too hot in summer?

While essential that sufficient levels of ventilation are maintained when insulating homes, where this is done effectively, higher levels of insulation should also help protect homes from heat in summer.

Balance is needed when designing for beneficial solar gains in winter. Providing solar transmittance of glazing is considered for both winter and summer scenarios, with shading incorporated to protect from high angle summer sun (e.g. horizontal overhangs, deep window reveals and tree planting), homes can be designed to adapt to the seasons.

At a House for Artists in Barking for example, deep walkways that allow sunlight to reach far into apartments in winter while shading windows in summer, combined with natural cross ventilation, open plan dual aspect apartments with large openings and high thermal mass, meant that when outside temperatures reached 39°C in 2022, residents reported comfortable internal temperatures of 26°C without cooling.

6) Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

Yes. Prioritising passive design measures to reduce overheating, and treating air conditioning as a last resort, aligns with the urgent need to reduce carbon emissions and prevent worsening of the Urban Heat Island effect, due to the hot air they emit, which further compounds the issue. Air conditioning still remains available to developments that are unable to adequately mitigate overheating risk through passive measures alone.

7) What is the impact of building typology on London's urban heat island effect, and how should this be addressed in future?

Dense, high-rise developments with extensive areas of hardstanding, narrow street canyons and areas of insufficient green space significantly contribute to London's Heat Island Effect, causing poor airflow, absorbing and trapping heat, contributing to areas of elevated temperatures and overheating; and leading to the discomfort and risks to health of residents.

This can partly be addressed through mixed density housing, use of lighter colour materials to increase solar reflectance, wider streets with shade from street trees, and green roofs to support evapotranspiration and reduce surface temperatures.

Chartered Institute of Housing and Sustainability Research Institute, University of East London, joint response to the London Assembly Planning and Regeneration Committee call for evidence: are London's homes ready for a heatwave?

Introduction

1.1. This is a joint response to the London Assembly Planning and Regeneration Committee's call for evidence on 'are London's homes ready for a heatwave?' by the Chartered Institute of Housing (CIH)[1] and Dr Mehri Khosravi, Energy and Carbon Senior Research Fellow at the Sustainability Research Institute (SRI), University of East London (UEL).[2]

1.2. CIH and the SRI have been collaborating on research and policy work on overheating for the past two years, and we are pleased to have had the opportunity to give oral evidence to the Committee on this important topic.[3] In this written response, we expand on some of the points we made in oral evidence, and provide additional evidence where appropriate in response to the Committee's specific questions.

1.3. In addition to this detailed written submission, we have also produced a shorter policy briefing that summarises our key points and recommendations. This briefing has been submitted to the Committee alongside this document.

Responses to call for evidence questions

What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

2.1. Indoor overheating in the UK has increased substantially over the past decade, with London following a similar pattern. Survey evidence shows that the proportion of households reporting heat discomfort rose from around 20 per cent in 2011 to approximately 80 per cent during the 2022 heatwave, when temperatures exceeded 40°C for the first time.[4]

2.2. In 2025, the hottest year on record, 85 per cent of residents reported experiencing indoor overheating, with 86 per cent reported specifically in London.[5] Overheating is also affecting key public buildings. Evidence indicates that 93 per cent of schools in London report overheating as a significant issue.[6] This demonstrates that overheating is no longer an occasional extreme event but is becoming a recurring seasonal risk for London's housing stock.

2.3. The Met Office has suggested that temperatures of up to 45°C may now be possible in London, meaning that the frequency, duration, and intensity of overheating events are likely to increase further.[7] In London, these risks are amplified by the urban heat island effect, which raises ambient temperatures above those in surrounding regions.

How does overheating affect different demographics, including tenure of housing, age, disability and gender?

3.1. Overheating risk is not evenly distributed across the population and is shaped more strongly by social and demographic factors than by dwelling type alone.

3.2. Our research shows relatively limited variation in reported overheating across dwelling typologies. Across all housing types, reported overheating levels exceed 80 per cent (e.g. flats 88 per cent, detached houses 88 per cent, semi-detached 88 per cent, terraces 87 per cent, bungalows 85 per cent), consistent with earlier findings from the EFUS 2011 study.[8] This suggests that building type alone is not the primary driver of overheating risk.

3.3. In contrast, demographic characteristics play a significant role. Age is the most important factor influencing vulnerability. Older adults account for over 90 per cent of excess mortality during heat events, and care homes experience the highest proportional increases in mortality.[9] This is partly due to lower risk perception, reduced adoption of protective behaviours, and lower exposure to heat risk communication, particularly among digitally excluded populations.

3.4. Tenure also influences vulnerability, as renters, particularly those in the private rented sector, often have limited ability to implement adaptive measures, such as installing shading or improving ventilation. Lower-income households similarly face financial barriers to adopting cooling strategies.[10]

3.5. Therefore, overheating vulnerability is both social and behavioural, not purely related to the design and/or construction of homes. This highlights the importance of targeted interventions, particularly through inclusive heat risk communication and support for vulnerable groups.

How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

4.1. Our research has suggested that even when overheating mitigation strategies are incorporated during the design stage, there can be a gap between the modelled performance of the home at design stage and the actual performance of the home once constructed and occupied.

4.2. However, post-construction checks - which are usually termed Post Occupancy Evaluation (POE) - are not mandatory, and are infrequently undertaken or enforced by building control. As a result, there is effectively no formal post-construction verification process or enforcement for overheating, leaving significant performance gaps between design intent and real-world outcomes.

4.3. For Part O to effectively mitigate overheating, not only does it need to be strengthened (see below), but building control teams must be adequately resourced to conduct post-construction checks on the effectiveness of ventilation and thermal strategies.[11]

How is the risk of overheating different in London than in other parts of the UK?

5.1. Overheating risk in London is significantly higher than in many other parts of the UK, driven by a combination of climatic and urban factors. Evidence suggests that the prevalence of overheating in Greater London dwellings is at least two times higher than in some other regions.[12]

5.2. This is partly due to regional climate differences, as the South East of England generally experiences warmer summer temperatures compared to other parts of the UK.[13] However, the urban heat island (UHI) effect is a key distinguishing factor in London. Higher building densities, limited green space, and heat-retaining materials lead to higher ambient temperatures, particularly at night, compared to surrounding rural or suburban areas.

5.3. This means more adaptation measures are especially needed in the south of England, including London, to improve thermal comfort.

Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

6.1. Yes, it is undoubtable that homes are being built now which are vulnerable to overheating. There are two primary factors contributing to this in London: Part O of the Building Regulations; and permitted development rights. Below, we deal with each in turn.

Part.O.of.the.Building.Regulations

6.2. Firstly, Part O of the Building Regulations came into force in England on 15 June 2022, and aims to prevent overheating in new homes. However, our research shows that even homes built to be compliant with Part O can be vulnerable to overheating.[14]

6.3. To give one example outside of London, the housing association Midland Heart developed 12 homes to cutting edge energy efficiency and quality standards, as part of its Project 80. The homes were designed and built to be compliant with Part O, as well as the anticipated Future Homes Standard. An independent evaluation demonstrated that residents who moved into the homes reported exceptional thermal comfort in winter. However, in summer, residents “reported.that.the.sun_facing.sides.of.the. buildings.were.extremely.hot?and.the.windows.and.mechanical.ventilation.systems.

were.not.sufficiently.capable.of.removing.the.temperature.gains." One resident also told the evaluation that their home was excessively hot during the summer heatwave of 2022, with temperatures outside around 30ºC. This example shows that new homes with very low running costs and otherwise delivering outstanding outcomes for residents can be susceptible to overheating even if built to Part O.[15]

6.4. Our research[16] has identified the following issues with Part O that should be addressed.

6.4.1. Currently, the main modelling tool used to assess compliance with Part O, the Chartered Institute of Building Services Engineers' (CIBSE) TM59, allows homes to 'pass' using the mildest climate scenario, known as DSY1.[17] It therefore fails to ensure homes are resilient to the more extreme heat events represented by other climate scenarios (which are defined as DSY2 and DSY3). In other words, this means that the homes that are being built to Part O today will likely fail to keep their occupants safe from the extreme heat that we will increasingly see in London in the future.

6.4.2. There is limited coordination between Part O and other parts of the Building Regulations, such Part B for fire, Part L for energy efficiency, and Part F for ventilation. This fragmented approach leads to conflicting requirements (e.g., enhanced measures for fire safety can exacerbate overheating; ventilation standards may conflict with noise/security).

6.4.3. While Part O applies to some institutional residential facilities such as care homes, it is not sufficient to adequately protect people who live in them, who are often older or more vulnerable to higher temperatures. These settings are especially prone to overheating due to poor building design, including inadequate shading, inefficient ventilation, and heating systems left in operation during the summer months. Research has shown that in some London care settings, indoor temperatures regularly exceed 30°C during daytime hours, significantly higher than the temperature at which higher mortality risk is generally observed in the population (25°C).[18]

6.4.4. Finally, for retrofits of heat adaptation measures to achieve their intended outcomes and keep people safe in hot weather, improvements to standards are essential. Part O of the Building Regulations does not currently apply to retrofit work undertaken to existing homes, and the relevant retrofit standards – specifically PAS2030:2023 and PAS2035 – are not mandatory for retrofits undertaken outside of government funded capital programmes.[19] Our research – and research undertaken by others – has shown that the best solution to this problem is extending Part O to the retrofit of existing homes.[20] There is already precedent for this; Part L of the Building Regulations was initially introduced in 1995 for new buildings and later revised in 2005 to include existing dwellings where works are carried out in homes over 25 m^2.[21]

6.5. While the UK government has recently published the outcome of its call for evidence on Part O,[22] and has committed to holding a further technical review, the urgency of tackling overheating in London warrants an approach to overheating standards that is specific to the capital. This has historically been recognised; London has set its own overheating policy since 2008, prior to the introduction of Part O. However, the UK government is currently consulting on a new National Planning Policy Framework (NPPF), and is proposing to explicitly prevent Strategic Authorities and Local Planning Authorities from going beyond national building regulations in all but two areas: accessibility and water efficiency.

6.6. CIH has proposed an alternative approach to PM13, one that has been echoed in the Mayor of London's own response to the consultation, which would allow Strategic Authorities to introduce tighter standards on overheating than the national minimum standard (i.e. the current Part O).[23] In practice, this would allow policymakers in London to introduce an improved, enhanced overheating standard with an accelerated timeline. This would be complex, but the Mayor of London's response to the NPPF consultation is correct to say that setting a standard at the London level is necessary and can still provide consistency for developers looking to build homes in the capital.[24] We therefore recommend that the Committee supports the Mayor's arguments on this matter, which, if successful, would be more likely to lead to the construction of new homes in London that are more likely to protect their occupants from extreme heat in the future.

Material.change.of.use.and.permitted.development.rights

6.7. Secondly, the continued creation of homes through permitted development rights and the wider conversion of non-domestic premises to domestic homes (usually referred to as Material Change of Use or MCU) is a significant problem that requires urgent action. Statistics indicate that there have been 65,940 net additions of homes in London through MCU since the government started collecting data in 2006.[25] There are no national whole-dwelling energy efficiency standards applied to these homes, and Part O of the Building Regulations was not applied to them either following its introduction in 2022.

6.8. This creates avoidable and harmful overheating risks. For example, research published by University College London in May 2023 on the health and wellbeing impacts of homes created through permitted development in London highlighted several issues related to overheating. Research participants reported their homes overheating in the summer to the extent that they could not work.[26] Other research supports this view. In February 2024, research published by the Town and Country Planning Association (TCPA) found that thermal comfort in homes created through MCU is not adequately addressed through current planning policy and regulations, with the non-application of Part O a key reason.[27] An academic review also found evidence that single aspect homes or flats, which are frequently created through MCU, have a higher risk of overheating.[28] Some studies have also looked at individual examples in London, such as the creation of new homes at New Horizons Court in Brentford, which was previously the head office of Sky TV. This study noted that most of the flats created through this conversion were single aspect, with minimum access to daylight, poor ventilation, and low energy efficiency.[29]

6.9. CIH believes that evidence on the negative health and wellbeing impacts of homes created with permitted development rights is strong enough to warrant its discontinuation as a way of creating homes. If the use of permitted development rights continues, a stronger Part O must be applied to all types of conversion classified as residential development in Regulation 5 of the Building Regulations 2010.

What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

7.1. There are two significant changes we would like to see made to the London Plan and wider strategic policymaking in London, especially the forthcoming London Heat Plan.

7.2. Firstly, a significant change that could be made to the London Plan is to give overheating risk - and climate adaptation more broadly - much greater strategic priority.

7.3. Currently, heat risk is effectively siloed in Policy SI4. Climate adaptation is mentioned only in Policy GG6(B), where it is treated in the context of increasing efficiency and resilience, rather than as a strategic priority in its own right. We would recommend the creation of a new GG policy, potentially termed GG7, titled 'Delivering climate adaptation and resilience'. This would elevate the strategic importance of climate resilience and heat resilience in the London Plan.

7.4. Within GG7, climate adaptation and resilience should be defined in a specific way. Namely, we recommend that a new GG7 should make a specific reference to the Climate Change Committee's (CCC) advice on UK adaptation objectives. This means that it should refer to the CCC's advice that adaptation policy should prepare the country for the weather extremes that will be experienced if global warming levels reach 2°C above preindustrial levels by 2050.[30] A new policy GG7, in other words, should require that specific regard is given to whether development proposals are sufficient to minimise vulnerability to the impacts of warming of a minimum of 2°C above preindustrial levels.

7.5. Moreover, the CCC has emphasised that 2°C above preindustrial levels is the minimum level of warming that adaptation policy should consider. Many new homes built in London in the coming years will still be occupied in 2100, and the CCC has been clear that 'reaching 4°C above preindustrial levels by the end-of-century cannot yet be ruled out and should be considered as part of effective adaptation planning.'[31] At a strategic level, the London Plan needs to make sure that all new developments have a level of resilience to the most drastic future climate scenarios. We would therefore recommend that wording in a new Policy GG7 should stipulate that development proposals in London should consider the current and potential impacts of global warming of between 2°C and 4°C above preindustrial levels over the lifetime of the scheme, and incorporate measures to minimise these impacts.

7.6. Secondly, alongside strengthening planning policy via the London Plan, the London Heat Plan should also explicitly recognise the role of behavioural adaptation and heat risk communication in managing overheating risk. Current policy is heavily focused on building performance, but evidence shows that how residents use buildings is equally critical in shaping overheating outcomes.

7.7. Incorporating requirements or guidance on heat risk communication and occupant behaviour, for example, through local authority engagement, or integration with public health strategies, would help ensure that buildings are not only designed to be heat-resilient, but are also used in ways that reduce exposure and health risks.[32]

7.8. This is particularly important given that behavioural interventions can be implemented more rapidly, providing immediate reductions in heat-related health risks while longer-term structural adaptations to buildings are delivered.

Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

8.1. The current stance of the London Plan, particularly Policy SI4 and its cooling hierarchy, remains necessary. The principle of prioritising passive cooling measures, with air conditioning used only as a last resort, is well aligned with existing research and best practice.[33]

8.2. Evidence shows that heat-resilient homes should be designed through a combination of passive design strategies (e.g. shading, ventilation, orientation) alongside supporting occupant adaptive behaviours.[34] This approach helps minimise energy demand and avoids long-term reliance on mechanical cooling.

8.3. However, there is a growing risk that, in practice, air conditioning is increasingly being adopted as a default solution, particularly in high-density urban areas such as London, where approximately 32 per cent of households report owning air conditioning, around three times higher than in several other UK regions.[35] Without stronger implementation and enforcement of the cooling hierarchy, this could lead to increased electricity demand, higher carbon emissions, and additional pressure on energy infrastructure.

What should developers do to ensure that the homes constructed today will be heat resilient?

9.1. As noted above, the design and construction of homes in London should follow good practice in passive design strategies, especially in relation to shading, ventilation, and building orientation. Design strategies should also emphasise the use of intermediary shaded spaces at the indoor/outdoor interface (e.g. balconies), courtyards, shaded walkways, light coloured and high albedo surfaces, and reduced glazing apertures.[36]

9.2. For example, evidence from the UK government's Warm Homes Plan[37] shows that combining external shading with night-time ventilation can eliminate overheating risk in some homes, reducing indoor temperatures by 11-18°C. Even relatively simple interventions, such as internal blinds, can reduce temperatures by 9-13°C, at a cost of approximately £300–£2,500, depending on the type and installation. Surfaces with reflective paint can also mitigate high temperatures, even during heatwaves, although they require frequent cleaning to maintain their effectiveness.[38]

9.3. In addition, consideration should be given to technologies that can provide decarbonised heating and cooling. Specifically, evidence shows that air-to-air heat pumps can provide low-carbon heating and cooling, and they may be particularly appropriate for retrofit in London because they are suitable for flats, can contribute to grid balancing, and deliver app-based temperature management and the ability to pre-heat or pre-cool a home to residents.[39] We would encourage the Committee to work with the GLA to explore whether air-to-air heat pumps can be deployed at scale in London in the future.

What support should be made available to homeowners and tenants to better manage overheating risk?

10.1. There are three groups of support that should be made available to manage and mitigate overheating risk: retrofitting support; support with summer energy costs; and improved heat risk communication. We deal with each in turn.

Retrofitting.support

10.2. The UK government has recently announced several welcome policies as part of its Warm Homes Plan.[40] These policies, when developed and implemented, should lay the foundations for retrofitting heat adaptation measures into existing homes, both in

London and nationwide. In particular, the government's proposed design of the Home Energy Model (HEM) will overcome one of the most longstanding barriers to installing heat adaptation measures in homes, which is the inability of the current method of assessing energy performance, the Standard Assessment Procedure (SAP), to recognise retrofit measures that reduce solar gain and space cooling demand.[41] Because SAP dictates the measures that are deliverable through government retrofit programmes, this has meant that heat adaptation measures have been automatically excluded from previous schemes, such as the Social Housing Decarbonisation Fund.[42]

10.3. Once the new HEM is in place, the government should be able to deliver its commitment, made in the Warm Homes Plan, to integrating heat adaptation measures into existing capital programmes. Practically, this is likely to see measures such as shutters, blinds, and other technologies associated with reducing space cooling demand become eligible for delivery in homes through these capital programmes. From 2030, we therefore might therefore see home retrofits installing multiple measures to decarbonise heat and provide cooling services in one intervention, minimising disruption for the resident.

10.4. CIH has previously recommended that to be successful, the integration of heat adaptation measures into existing capital programmes should be piloted, so that lessons can be learned for delivery at scale. Due to London's unique vulnerability to extreme heat, and the already-established city-wide delivery vehicle Warmer Homes London, we would recommend that policymakers in London seek to engage with the UK government to deliver a city-wide pilot of this approach in the capital, perhaps beginning in 2027 or 2028. This would immediately begin to improve the heat resilience of London's existing homes, begin to build a supply chain for the installation of shutters, blinds, and other similar measures at scale, and provide a blueprint that could be refined and delivered beyond London.

Support.with.summer.energy.costs

10.5. As have noted elsewhere in this response, the installation of air conditioning and other forms of cooling (e.g. air-to-air heat pumps) are playing a growing role in building heat resilience in London's homes. This raises an important question connected to energy and social justice: that of the affordability of energy, and how to support people on lower household incomes to afford the cost of running these systems when they need to in very hot weather.

10.6. In England, there is longstanding policy on fuel poverty. According to the Warm Homes and Energy Conservation Act (2000), "a.person.is.to.be.regarded.as.living›in.fuel. poverty".if.he.is.a.member.of.a.household.living.on.a.lower.income.in.a.home.which. cannot.be.kept.warm.at.reasonable.cost."[43] Fuel poverty is usually considered to be driven by three factors: energy prices, the energy efficiency of the home, and low household incomes, and this is recognised in the latest fuel poverty strategy for England.[44] However, energy prices and household incomes both shape the affordability of running air conditioning units and air-to-air heat pumps.[45] This means we need to give serious consideration to developing policy interventions that will support Londoners with the costs of running these systems during heatwaves, when they will most be needed.

10.7. Specifically, we feel that policymakers in London should begin the process of developing a Hot Weather Payment, the design of which should mirror the current the design of the Cold Weather Payment, with some improvements. Currently, the Cold Weather Payment is a UK government intervention that provides a payment to eligible households in England, Wales, and Northern Ireland if the average temperature in their area is recorded as, or forecast to be, 0°C or below over 7 consecutive days. Eligible households receive £25 for each seven-day period of very cold weather between 1 November 2025 and 31 March 2026.[46]

10.8. The design of a Hot Weather Payment could mirror this design. For example, eligible households could receive a £25 payment for each period of very hot weather between 1 June and 30 September each year. The trigger for this payment could be based on temperature, like the Cold Weather Payment, or based on the heat-health alert system: payments could be trigged if an amber or red heat-health alert is issued by the Met Office. The objective of this policy would be to prevent or reduce heat-related morbidity and mortality by supporting low-income households in London to run air conditioning units or air-to-air heat pumps during extremely hot weather, when they might otherwise be unable to do so.

10.9. The policy would likely require some other adjustments to be successful. One of the most significant flaws with the current Cold Weather Payment system is that payments are made to households retrospectively, after the cold weather period has passed. Any Hot Weather Payment system would need to make payments in advance of a heatwave; essentially, as soon as the relevant trigger is met. It would also need an eligibility criterion that targets those most vulnerable to heat-related mortality and morbidity during heatwaves, such as those groups described earlier in this response. This would necessarily involve going beyond means-tested benefits as an eligibility marker, and potentially involve the sharing of health data between the NHS and local government in London. Consideration would also need to be given to ensuring those who use electricity prepayment meters (PPMs) can stay on supply during very hot weather, as self-disconnection from electricity supply would mean they are unable to run air conditioning units or any plug-in cooling technologies in their home.[47]

10.10. In sum, we believe the development of a Hot Weather Payment should be seen as a priority in London. It is something that London policymakers could develop and implement in the capital. Doing so would extend a wider trend of London policymakers developing and implementing progressive policies to support vulnerable people in the capital without waiting for the UK government to do the same, such as the delivery of free school meals to all primary school children in London.

Improving.heat.risk.communication

10.11. Alongside structural and financial support, strengthening heat risk communication is one of the most immediate ways to reduce overheating-related harm. Evidence shows that a significant proportion of heat-related mortality occurs not only due to exposure, but also due to gaps in awareness, risk perception, and protective behaviour.

10.12. Current heat risk communication in England is primarily delivered through the Heat Health Alert (HHA) system. However, there are important limitations. Around 25 per cent of the London population is not effectively reached by these alerts, with digitally excluded, older, and lower-income groups disproportionately affected. In addition, evidence suggests that most heat-related mortality occurs during 'yellow' alert periods, indicating that existing warnings may lack sufficient behavioural salience to trigger protective action.

10.13. To address these gaps, London policymakers should prioritise the development of a more behaviourally informed and locally delivered heat risk communication strategy. Key actions could include:

- Improving the clarity and salience of heat alerts, particularly at yellow and amber levels, to better prompt protective behaviours.
- Expanding communication channels beyond digital platforms, including community networks, local authorities, health and social care providers.
- Targeting vulnerable populations, including older adults, people with health conditions, and low-income households, through tailored and accessible messaging.
- Integrating heat risk communication into local public health and housing services, ensuring consistent messaging and support during heat events.

10.14. These measures could deliver rapid reductions in heat-related illness and mortality, particularly during moderate heat events where current responses are weakest. Importantly, they can be implemented at the Greater London Authority and borough level, without requiring national regulatory change.

10.15. Strengthening heat risk communication should therefore be seen as a critical complement to longer-term building adaptation, enabling London to reduce risk in the near term while structural improvements are delivered.[48]

Are there examples of cites which have adopted strategies to tackle heat risk which London can learn from?

11.1. Researchers have previously paired cities based on their current climate and their future expected 2050 climate. One study has described this "as.if.every.major.city.- . London?.Moscow?.Stockholm.- .were.on.a.slow_moving.giant.conveyor.belt?.transporting. them.deeper.and.deeper.towards.the.sub_tropics".[49] In this analysis, London's climate in 2050 will be most analogous to Barcelona, and it is therefore useful to look towards strategies in Spain as examples that London could learn from.[50]

11.2. As noted in our response to the previous question, improved heat risk communication is vital for managing overheating risk. In Barcelona, one example of innovation in this area is the CoolToRise project, which carried out an educational campaign with targeted support, primarily through workshops and other forms of citizen engagement. Workshops were partly focused on sharing advice on how to stay safe during very hot weather, especially for people with heat-related vulnerabilities or health conditions. Across Barcelona and other southern European cities that took part in the project, 8,361 people were directly supported to enhance their own knowledge of how to cope with extreme heat, and 381 third sector professionals were trained to deliver advice on heat resilience in communities. Replicating forms of engagement such as these, that seek to provide advice in and with communities and which are facilitated by trusted intermediaries such as charities and community groups, could therefore provide a means of helping vulnerable people in London to stay safe in hot weather.[51]

11.3. There are also examples from elsewhere in Spain on how homes can be built or retrofitted to be more resilient to extreme heat. For example, one project in Zaragoza constructed several blocks of flats to 'bioclimatic' design principles, incorporating on-site renewable energy and the use of an Energy Services Company (ESCO) model. The finalised development provided sustainable heating and cooling, as well as significant energy savings for residents.[52] A second initiative in Getafe has worked with local communities to target cooling solutions in homes and communities, such as the installation of shading, façade insulation, and green infrastructures.[53] Applying the approaches of these kinds of project, and learning from their challenges, could provide affordable, scalable solutions for reducing overheating risks in London.

Ends. References in endnote format follow below.

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[2] See www.uel.ac.uk/our-research/sustainability-research-institute-sri
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[17] DSY refers to Design Summer Year, a weather file used as a climate input for building simulation software. At its simplest, DSY1 depicts a moderately hot year; DSY2 and DSY3 depict more extreme conditions, respectively an intense year and a long year. As stated in a research report by Loughborough University, prepared for DESNZ: "The.intense.year.contains.a.warm.spell.with.a.duration.similar.to.that.of. the.moderate.year.but.of.higher.intensity¡.The.long.year.contains.a.warm.spell.with.a.greater.duration.and. intensity.of.that.of.the.moderate.year?but.its.intensity.is.lower.than.that.of.the.intense.year." See: DESNZ (2024) DEEP Report 6.01: Improved Weather Files for Building Simulation, p.5. See also CIBSE (nd) Weather Data.
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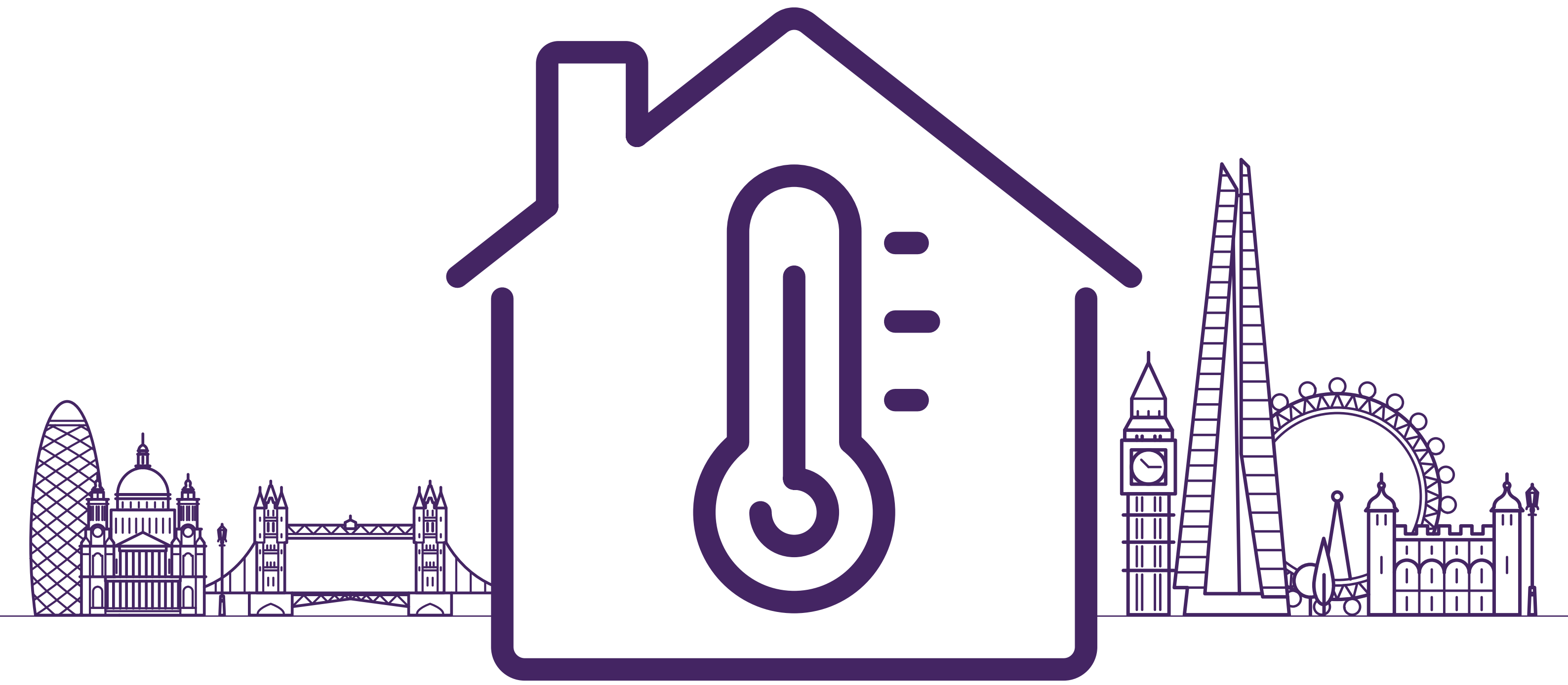
A STRATEGY TO REDUCE THE RISK OF OVERHEATING IN LONDON'S HOMES



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Executive summary

London is experiencing rapidly increasing indoor overheating, with over 85 per cent of residents reporting heat discomfort in 2025. Climate projections show that temperatures of up to 45°C may now be possible, indicating that overheating is shifting from an episodic event to a recurring seasonal risk. Evidence also suggests that in dense urban environments such as London, neither passive nor active cooling alone may be sufficient to prevent extreme overheating under future climate conditions.

Addressing this challenge requires systemic adaptation across three levels: urban-scale measures such as green infrastructure to reduce the urban heat island (UHI) effect; building-level adaptations including passive design and retrofit; and behavioural adaptation through effective heat risk communication and public preparedness.

While building retrofit and adaptation are essential for long-term resilience, it takes time to deliver significant improvements in heat resilience. In the near term, policies to strengthen heat risk communication and preparedness should also be used to reduce heat-related illness and mortality.

This brief therefore recommends a dual-track strategy: strengthening heat risk communication in the short term, while simultaneously taking steps to improve building standards and accelerate the retrofit of homes, to develop long-term heat resilience[3].

Why this matters for London policymakers

London faces a growing risk of indoor overheating as climate change intensifies heatwaves and the UHI effect. While long-term building adaptation is essential, many of the most vulnerable residents live in existing homes where improvements could take time. Strengthening heat risk communication, supporting passive cooling measures, and prioritising urban cooling strategies offer immediate opportunities for the mayor and London boroughs to reduce heat-related illness and mortality.

1. Overheating in London: The current situation and its implications

1.1. The current situation

Indoor overheating in the UK has increased substantially over the past decade. Survey evidence shows that the proportion of households reporting heat discomfort rose from 20 per cent in 2011 to around 80 per cent during the 2022 heatwave, when temperatures exceeded 40°C in London for the first time.[4]

Recent survey data suggests that this trend is continuing. In 2025, the hottest year on record, between 85 per cent and 87 per cent of residents reported experiencing indoor overheating, with 86 per cent reported specifically in London.[5] Overheating is also affecting key public buildings. For example, evidence indicates that 93 per cent of schools in London report overheating as a significant issue.[6]

These trends indicate that overheating is no longer an occasional extreme event but an emerging seasonal risk for London's built environment. Climate projections further reinforce this concern, with the Climate Change Committee noting that global warming of 4°C above preindustrial levels cannot be ruled out.[7] The Met Office has warned that temperatures of 45°C may now be possible in the current climate.[8] In dense urban areas such as London, the UHI effect is likely to intensify exposure to extreme heat.

1.2. Implications for London

1.2.1. Rising air conditioning adoptions and pressure on energy systems

Air conditioning (AC) adoption has increased substantially in recent years. Nationally, ownership has risen from three per cent in 2011 to around 23 per cent in 2023, reflecting a growing shift from passive to mechanical cooling in domestic settings.[9] If this trajectory continues, it is likely to significantly increase summer electricity demand and peak load pressures on the national grid. For example, in 2023, National Grid requested that the Ratcliffe-on-Soar coal plant be placed on standby after high temperatures increased electricity demand. These impacts can be exacerbated by users' choice of cheaper, lower-efficiency AC products.[10] Concerningly, these products could become the default solution to cooling homes, with other solutions overlooked.

This trend is particularly pronounced in London, where approximately 32 per cent of households report AC ownership, around three times higher than in several other UK regions.[11] Without proactive intervention, London risks becoming increasingly reliant on mechanical cooling, potentially locking the city into a high-carbon cooling pathway and placing additional strain on energy infrastructure during heat events.

The London Plan's Policy SI4: Managing Heat Risk already recognises this challenge through its 'cooling hierarchy', which requires developments to prioritise passive and low-energy cooling strategies before considering mechanical cooling, with AC used only as a last resort.[12] Strengthening the implementation of this hierarchy will therefore be critical to prevent unnecessary reliance on AC and to ensure that passive design measures are prioritised in both new developments and retrofit strategies.

Overall, this evidence highlights the importance of prioritising passive cooling, retrofit solutions, and behavioural adaptation to reduce long-term reliance on energy-intensive cooling technologies.

1.2.2. Heat mortality and NHS pressures

Heat-health risks are not evenly distributed. Mortality data shows that the most vulnerable individuals are people over the age of 65; this age group accounts for 95 per cent of all deaths. Care homes also experience the largest proportional increases in mortality during heatwaves.[13]

Evidence shows that a large proportion of heat-related deaths occur during 'yellow' Heat Health Alert periods.[14] This suggests that moderate heat events may be particularly dangerous, especially when protective behaviours are not widely adopted.

Current heat risk communication systems also show important gaps. Our research[15] indicates that:

- 30 per cent of the population is not exposed to Heat Health Alerts.
- In London, approximately one quarter of residents (around 2.2–2.3 million people) are not effectively reached by heat risk communication.
- Digitally excluded, older and low-income residents are disproportionately affected by these communication gaps.
- Yellow and amber alerts currently lack sufficient behavioural salience to trigger widespread protective action.

As a result, heat-related mortality is driven not only by temperature intensity but also by gaps in communication, preparedness and behavioural response, especially among those who are most vulnerable to the health impacts of extreme heat.

2. The policy challenge

Recent sector evidence reinforces the scale of the challenge. The 2025 Climate Resilience Roadmap by the UK Green Building Council highlights that in some high-density urban locations, including London, neither passive nor active cooling alone may be sufficient to prevent extreme overheating under future climate conditions.[16]

This finding underscores the need for systemic adaptation strategies that combine improvements in building design with behavioural responses to heat risk. However, these two adaptation pathways operate on very different timelines.

2.1. Building adaptation: Retrofit and regulation

Building-level or structural measures remain essential for long-term climate resilience, but they face several implementation barriers:

- Retrofitting buildings requires a mature supply chain and can be slow to reach scale. Integrating heat adaptation measures into current government retrofit programmes will therefore take time.
- Weaknesses and enforcement gaps remain within Part O of the Building Regulations. However, Building Regulation reform often requires multi-level governance coordination and transition periods, to avoid disruption.
- Current regulation has a limited short-term impact on existing homes, where most vulnerability exists.

As a result, while these changes are essential in the medium- and long-term and should be actioned now, their implementation is unlikely to be able to take place fast enough to deliver rapid reductions in heat-related health risks.

2.2. Behavioural adaptation: Heat risk communication

Behavioural adaptation, particularly through improved heat risk communication, offers faster opportunities to reduce risk. It can:

- Be implemented at the Greater London Authority (GLA) level.
- Have an immediate impact on public health outcomes across London.

However, current systems have several limitations,[18] especially:

- Yellow and amber Heat Health Alerts are not accompanied by strong enough advice on how people can stay safe in hot weather.
- Heat warnings do not effectively reach around a quarter of the population in London.

Strengthening behaviourally informed risk communication, therefore, represents one of the most immediate opportunities to reduce heat-related health impacts in London.

3. Policy recommendations

Our findings indicate that reducing the risk of overheating requires both building adaptation and behavioural change. Regulation alone will not be sufficient to address the scale of the challenge. This brief, therefore, proposes two priority areas for action at the London level.

3.1. Strengthen regional heat risk communication

While building adaptations are essential for long-term resilience to extreme heat, they cannot be implemented fast enough to immediately reduce heat-related mortality and morbidity. In contrast, heat risk communication can deliver more immediate reductions in heat-related harm and can be strengthened through regional leadership.

Policymakers in London should:

- Ensure yellow and amber Heat Health Alerts are accompanied with improved advice on the actions people should take to stay safe during periods of extremely hot weather.
- Expand communication channels to reach digitally excluded and vulnerable populations.
- Work with local authorities, health services and community organisations to deliver targeted heat preparedness messaging and support.
- Improve monitoring and evaluation of the reach and effectiveness of Heat Health Alerts.

Overall, these measures could significantly improve public awareness and protective behaviours during heat events.

3.2. Strengthen home adaptation and enforcement

Alongside communication measures, London should also prioritise improvements to retrofit and construction practices. Three areas require particular attention.

3.2.1. Continue to prioritise passive cooling measures

Passive cooling measures can substantially reduce indoor temperatures without increasing energy demand.[19] Evidence from the UK government's Warm Homes Plan shows that combining external shading with night-time ventilation can eliminate overheating risk in some homes, reducing indoor temperatures by 11–18°C.[20] Even relatively simple interventions, such as internal blinds, can reduce temperatures by 9–13°C, at a cost of approximately £300–£2,500, depending on the type and installation. Surfaces with reflective paint can also maintain average temperatures of 7°C and below, even during heatwaves.[21]

However, opportunities to implement effective passive measures are often missed when overheating is not considered at the early design and planning stage. In addition, renters and low-income residents often lack the agency or resources to undertake building improvements themselves.[22]

Policymakers in London could support wider adoption of passive cooling by:

- Reaffirming the strategic importance of climate adaptation and the cooling hierarchy in the London Plan and associated planning guidance, especially the importance of external shading and passive overheating mitigation.
- Developing funding schemes that support low-cost cooling interventions in homes across London. This could be achieved by working with the UK government to pilot the integration of cooling measures into pre-existing fuel poverty retrofit schemes in London, as announced in the Warm Homes Plan.
- Working with boroughs to prioritise passive cooling measures in local communities, including expanding green and blue spaces to reduce ambient temperatures.
- Advocating for the application of Part O of the Building Regulations to retrofits at the national level, similarly to how Part L was launched in 1995 and subsequently applied to most retrofits in 2005.[23]
- Exploring the use of air-to-air heat pumps as an alternative to air conditioning. Air-to-air heat pumps provide low-carbon heating and cooling, are particularly suitable for flats, and can contribute to grid rebalancing.[24]
- Learning from examples of heat resilience in hotter climates, especially from Spain and other southern European countries.[25]

3.2.2. Seek stronger regulatory powers for London to strengthen overheating standards

Part O of the Building Regulations, introduced in 2022 to address the risk of overheating in new homes, represents an important step forward. However, the approach taken in Part O is not sufficient to ensure that new homes in London are resilient to extreme heat. Its key drawbacks[26] include:

- The main modelling tool used to assess compliance with Part O, the Chartered Institute of Building Services Engineers' (CIBSE) TM59, allows homes to 'pass' using the mildest climate scenario, known as DSY1. It therefore fails to ensure homes are resilient to more significant warming scenarios (which are defined as DSY2 and DSY3).
- There is limited coordination between Part O and other parts of the Building Regulations, which leads to conflicting requirements and unhelpful trade-offs between standards.
- While Part O applies to some institutional residential facilities such as care homes, it is not sufficient to adequately protect people who live in them, who are often older or more vulnerable to higher temperatures.[27]

The latest draft of the National Planning Policy Framework (NPPF) specifically prohibits local planning authorities (LPAs) and strategic authorities from setting standards already covered in the Building Regulations, with two exceptions (accessibility and water efficiency). If this policy is taken forward, policymakers in London will not be able to set tighter overheating standards for new homes, despite evidence suggesting this is particularly necessary due to the UHI effect.[28]

Policymakers in London should advocate for the draft NPPF to be amended to allow strategic authorities to set tighter overheating standards. This would enable London to impose and enforce overheating regulations that are more suited to future temperature extremes in the capital, and which address the specific limitations highlighted above.

3.2.3. Improve the implementation of Part O of the Building Regulations and wider good practice

Lastly, as well as its inherent weaknesses, compliance and enforcement with Part O remains inconsistent.

Policymakers in London could strengthen compliance and enforcement by:

- Supporting the capacity of individual London boroughs to monitor and enforce the Building Regulations, including especially undertaking more consistent Post Occupancy Evaluations (POE) of new homes in London.
- Promoting good practice guidance for new developments that prioritises heat mitigation and resilience.
- Working with developers and housing providers to improve real world compliance with Part O requirements.

4. Conclusions

Addressing the overheating challenge requires a multi-level adaptation strategy, combining urban cooling through green infrastructure, building-level improvements through passive design and retrofit, and behavioural adaptation through strengthened heat risk communication.

In the short term, strengthening heat risk communication and preparedness can reduce mortality and support residents in taking protective actions during heat events. In the longer term, improving building standards, strengthening enforcement, and accelerating retrofit of existing homes will be essential to ensure that London's built environment is resilient to future climate conditions.

While some regulatory changes require national action, the Mayor of London and the Greater London Authority have important levers through regional coordination, planning policy, and public communication. By combining immediate behavioural interventions with longer-term measures to adapt London's homes, the risk of overheating and protect vulnerable residents as extreme heat becomes more frequent.

Strengthening heat risk communication now, while starting to accelerate passive cooling and retrofit measures, offers the most effective pathway to reduce heat-related harm in London's homes.

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[8]Met Office (2025) Met Office report details rising likelihood of UK hot days.

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[19]See the evidence produced by the UNEP Cool Coalition.

[20]DESNZ (2026) Warm Homes Plan.

[21]Sen, S. and Khazanovich, L. (2021) Limited application of reflective surfaces can mitigate urban heat pollution, Nature Communications; Xiao, S. et al. (2023) Experiments on the Thermal Performance and Service Life of Three High-Albedo Roof Materials in Nanjing, China, Journal of Applied Meteorology and Climatology.

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[23]Halai, S. et al. (2026) Delivering heat-resilient housing in England: Reflections on the role of overheating building regulations in a warming climate, Energy Policy.

[24]See Brookes, G. (2026) Energy efficient homes aren't a winter-only problem; Nesta (2026) Air-to-air heat pumps: a low-carbon solution for UK homes.

[25]See for example this overview of Getafe's approach to addressing energy poverty and heatwaves for more information, and this overview of the Renaissance project in Zaragoza.

[26]Khosravi, M. et al. (2026) From Building Codes to Behaviour: Strengthening Extreme Heat Adaptation Policy in the United Kingdom, Energy Research and Social Science.

[27]Khosravi, M. et al. (2026) From Building Codes to Behaviour: Strengthening Extreme Heat Adaptation Policy in the United Kingdom, Energy Research and Social Science.

[28]For further detail, see CIH (2026) CIH responds to the National Planning Policy Framework consultation (December 2025); Mayor of London (2026) Proposed reforms to the National Planning Policy Framework and other changes to the planning system: Response from the Mayor of London.

Are London's homes ready for a heatwave?

Call for evidence response

May 2026

citizens advice

About us

We can all face problems that seem complicated or intimidating. At Citizens Advice we believe no one should have to face these problems without good quality, independent advice. We give people the knowledge and the confidence they need to find their way forward - whoever they are, and whatever their problem.

We provide support in approximately 2,500 locations across England and Wales with over 18,000 volunteers and 8,650 staff.

Through our advocacy work we aim to improve the policies and practices that affect people's lives. No one else sees so many people with so many different kinds of problems, and that gives us a unique insight into the challenges people are facing today.

As the statutory consumer watchdog for the energy and post industries we have an important role to play in shining a spotlight on the problems consumers encounter, providing solutions to these problems and ensuring their voices are heard when important decisions are made about the future of these essential markets.

Response

Priorities to address the negative impacts of overheating in England and Wales:

1. Future fuel poverty and retrofit programmes should incorporate measures to prevent and mitigate overheating, alongside improving energy efficiency and winter warmth.
2. Across all energy home upgrades, tailored advice should be available across the full consumer journey - before, during, and after installation.
3. To reduce the impact of overheating on consumers connected to heat networks, the Heat Network Technical Assurance Scheme (HNTAS) must deliver improvements to network efficiency.

Citizens Advice welcomes the London Assembly's investigation into whether London's homes are prepared for extreme heat events. This response draws on insights from our network of local offices, consumer service,[1] and externally commissioned research.[2]

Our findings show the importance of connecting overheating policy within the ecosystem with wider energy efficiency and retrofit programmes. This includes the Government's future locally-delivered fuel poverty scheme and the recently consulted-on heat network technical standards.

We are ready to work with the Greater London Authority (GLA), the London Assembly and partners to ensure that consumer experience of overheating is reflected in policy design. Practical solutions that improve comfort, health, and affordability in homes are essential.

We are currently building a new Regional Energy team to ensure that consumers benefit from energy markets and systems, no matter where they live. We will work with regional stakeholders to understand how differences in energy policy, planning and practice impact consumers and share areas of best practice, as well as highlight areas of friction

[1] We provide support across approximately 2,500 locations in England and Wales, supported by over 18,000 volunteers and 8,650 staff. Our Consumer Service operates throughout England and Wales, helping consumers who are experiencing problems with goods or services through phone, email, and webchat.

[2] Unless otherwise stated quantitative findings are from a nationally representative survey conducted by Opinium of 4,000 UK adults (August 2025), with a boost sample of 500 racially minoritised participants. The survey explored experiences of extreme heat and home comfort.

in policy design or implementation. We look forward to working with the London Assembly and Greater London Authority as we develop this work.

1a. Current and future overheating risk in London

Our research indicates that a substantial proportion of London households are already experiencing difficulty maintaining safe and comfortable indoor temperatures during hot weather, with clear evidence that overheating is becoming a systemic housing issue rather than an occasional discomfort.

In summer 2025, **36%** of London residents reported difficulty keeping their homes cool, compared with **34%** nationally.[3] This is broadly comparable to the **30%** of respondents in London who reported difficulty keeping their homes warm in winter, highlighting that maintaining thermal comfort is now a year-round challenge for many households.

Looking ahead, concern about overheating is rising. **45%** of London residents say they are very or fairly concerned about their homes overheating over the next five years, compared with **38%** nationally. This shows increasing awareness of risk and an expectation that overheating will worsen without intervention.

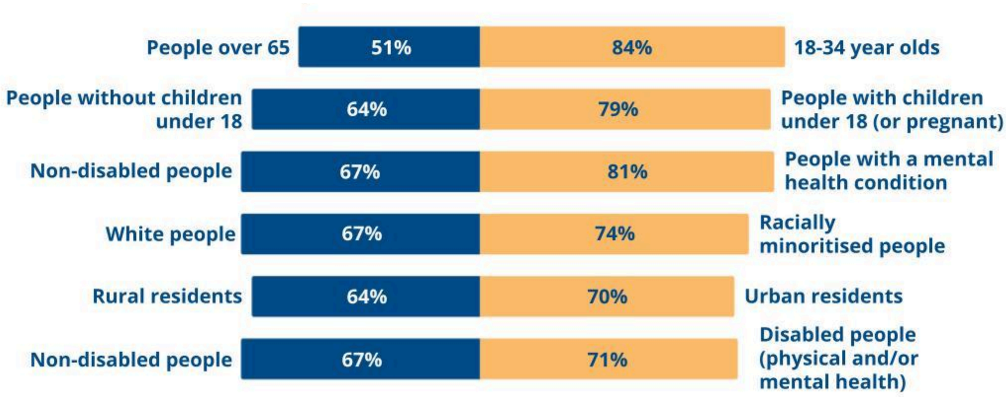
As set out in our response to question 1b, these impacts are not evenly distributed. They are shaped by housing tenure, building type and condition, as well as demographic factors including age, disability, and gender. This reinforces the need for targeted policy responses that reflect differing exposure and ability to adapt.

1b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Our national polling found that the majority **(68%)** reported that they or someone in their household experienced at least one negative impact from overheating in their home during summer 2025. The most commonly reported impacts across all participants included difficulty sleeping **(47%)**, inability to relax comfortably at home **(18%)**, increased stress **(14%)**, and higher energy bills associated with efforts to cool homes **(13%)**, including the use of fans and air-conditioning. However, our research suggests that the impacts of overheating are not experienced evenly across the population and are shaped by both housing conditions and social factors.

[3] Base sizes = Base: All respondents = (4000), London = 520 (13%). **.**

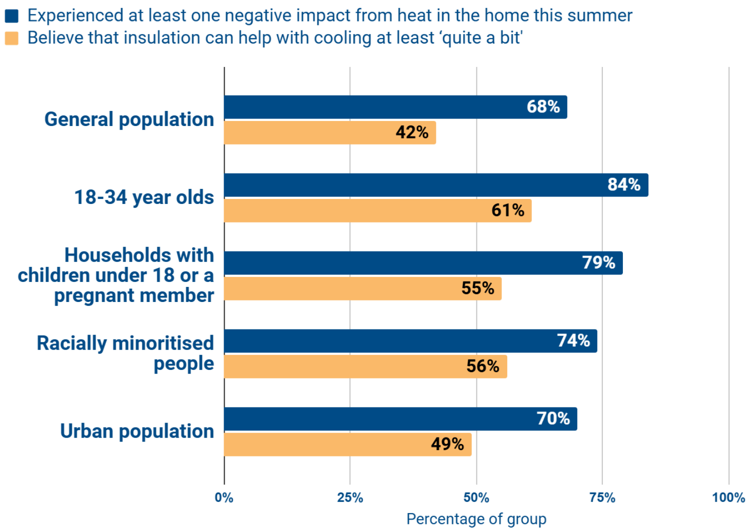
Percentage of groups reporting at least one negative impact of heat summer 2025[4] . ***Base: All respondents (n=4,000). Polling conducted August 2025.***



Public health evidence consistently indicates that very young and older people are especially vulnerable to the most severe health effects of overheating.[5] However, our research, which focused on self-reported day-to-day impacts in the home such as difficulty sleeping, suggests that these broader effects are not confined to defined vulnerable age groups. For example, younger adults aged 18–34 were disproportionately likely to report at least one negative impact from overheating in the home **(84%)**.

Our polling also found that many of the groups most affected by overheating - including racially minoritised groups, younger adults, households with children and urban residents - were more likely to be aware of the potential cooling benefits associated with retrofit measures. This may reflect greater exposure to high indoor temperatures and a heightened awareness of the need for adaptation measures.

The percentage of demographic groups who've experienced negative impacts of heat in the home, and the percentage who believe that insulation can help with cooling



[4] Question explored impacts in the home such as difficulty sleeping, increased energy bills and not being able to relax at home.
[5] National Institute for Health and Care Research (2022) Hot weather health warnings are not getting through to people at risk

This indicates that impact, awareness, and vulnerability do not always overlap in predictable ways, and highlights the importance of understanding both lived experience and adaptive capacity when designing policy responses.

Overheating risk can also vary by heating system type. In our role as the statutory consumer advocate for heat network consumers[6], we have examined the specific overheating risks they face.

Heat Networks and Overheating*

Heat networks supply heat from a central source via insulated pipes carrying hot water. They operate either as communal systems serving multiple homes within a building or as district networks linking multiple buildings. There are around 14,000 heat networks in the UK, with the highest concentration in London, where nearly half (46%) of surveyed consumers in 2022 lived.[7]

Residents of heat networks typically have no choice of supplier and limited control over system operation, including within their own homes.

Overheating is a particular issue for heat network households. Most live in high-rise buildings, which are more exposed to solar gain and the urban heat island effect. In addition, many networks are inefficient, with Government estimates suggesting 65% have heat losses above 200W per dwelling and 45% above 400W. This excess heat can be released into communal areas - and in some cases dwellings - via pipework and building fabric. Because systems often operate continuously to ensure hot water supply, residents have limited ability to regulate internal temperatures or prevent unwanted heat gains.

This can create significant overheating risk during hot weather, when system-related heat combines with elevated external temperatures. The issue is particularly acute in London. For example, one local authority reports average gas consumption of around 19,000 kWh per property on heat networks, compared with around 7,500 kWh for a typical UK flat.

[6] Citizens Advice (2025), On a heat network? Citizens Advice can help

[7] Department for Business, Energy and Industrial Strategy (2023) Heat network consumer and operator survey (2022)
<The survey took place between 22 March and 12 July 2022. It was carried out using a mixed-mode (online and postal questionnaires), self-completion approach. It compared domestic consumers on heat networks (2,244 responses) with a statistically matched sample of domestic consumers in properties with no heat network (1,733 responses)>

Qualitative evidence reinforces these findings. In our 2025 research with heat network consumers, respondents described severe summer overheating impacts:

One participant in this research told us:[8]

"In the summer it actually is unbearably hot in these flats because of the way the heating system is set up. So we have hot water pipes that supply the flat that are just hot all the time. And our hot water tank upstairs, which is a massive, huge hot water tank, is just red hot all the time unless you turn all of the hot water to the property off. So a recurrent issue for all the people who live here is that in the summer it's like really unbearably hot in these flats. Some people bring their mattresses down to sleep downstairs because upstairs is too hot. We've had to buy an air conditioning unit that we run basically every night in the summer because it's really horrible to be in the flats."

Key Recommendation

It is vital for heat network consumers in London that the Government's proposed technical standards, the Heat Network Technical Assurance Scheme (HNTAS), delivers on its promise of improving heat network efficiency. As we stated in our response this will have a direct impact on reducing consumer bills, wasted carbon, and overheating. It is important that the costs are balanced fairly, and that the standards are not watered down otherwise this opportunity risks being missed.

Exposure to overheating is shaped by a combination of housing conditions, demographic factors, and access to adaptation measures and financial resources. Future policy responses should therefore consider both those most vulnerable to its effects and those least able to mitigate them, ensuring that support is targeted towards households facing the greatest risk.

Section 2: How should we be tackling overheating?

2a. Is the London Plan's stance on air conditioning still appropriate?

The current emphasis in Policy SI4 on avoiding reliance on air conditioning remains appropriate from both an energy and environmental perspective, given the risks of increased electricity demand and emissions. Our 2025 polling found that over half of London residents **(56%)** reported that hot weather had cost their household money, including through purchasing cooling equipment and increased electricity use, while

[8] Taken from transcript from The Social Agency's research for Citizens Advice: The Social Agency, Understanding the experiences of heat network consumers, May 2025

18% reported noticeably higher energy bills as a result of trying to keep their homes cool.

This reliance on mechanical cooling is already becoming more common in London, with research indicating that the city has seen one of the highest increases in mechanical cooling demand globally over the past four decades.[9] Stronger implementation of the cooling hierarchy, through the prioritisation of passive measures, will therefore be critical to prevent unnecessary reliance on air conditioning.

While passive measures should continue to form the foundation of overheating mitigation, we recognise that they may not always be sufficient on their own to deliver safe, and comfortable homes. In some circumstances, particularly for vulnerable households or in buildings where overheating cannot be adequately mitigated through passive design alone, low-energy active cooling solutions may also be required. In these cases, policymakers should actively explore the use of highly efficient, low-carbon technologies, including air-to-air heat pumps, which may offer a more efficient alternative to standalone air conditioning units while also supporting wider decarbonisation objectives.[10]

Strengthening the evidence base across London would support more targeted decision-making within the planning system and retrofit programmes, ensuring that interventions under the London Plan's cooling hierarchy are appropriately matched to risk and context, and avoiding unnecessary or inefficient measures in lower-risk settings. Without a clearer, shared understanding across the GLA, boroughs, and building owners of both building performance and occupant needs, there is a risk that households will default to inefficient and costly cooling devices. This could lead to higher household energy bills, increased emissions, and avoidable pressure on the wider electricity system.

2c. What support should be available to households?

Our evidence suggests that consumer understanding of overheating and its mitigation remains uneven. While **64%** of consumers recognise that energy efficiency measures help keep homes warmer "at least quite a bit", we found that fewer than half **(42%)** understand that these same measures can help keep homes cool in summer. This indicates a need to reframe energy efficiency advice so that it explicitly communicates year-round thermal comfort benefits.

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[9] Imperial (2023) London has the fastest increase in cooling demand in the world, shows new model

[10] Energy Savings Trust (n.d) Heating systems Air-to-air heat pumps

Retrofit and energy efficiency improvements should therefore be positioned not solely as winter heating interventions, but as part of a broader package to improve resilience to both cold and hot weather. **Across all energy home upgrades tailored advice should be available across the full consumer journey - before, during, and after installation.** This is particularly important where effective outcomes depend on behaviour change, such as the use of cross-ventilation, shading, and other passive cooling strategies.

However, advice alone will not be sufficient. Many renters and low-income households lack the financial resources, tenure security, or physical ability to make meaningful changes to their homes. This limits their capacity to reduce overheating risk and can increase reliance on short-term, inefficient coping strategies. Without targeted support, the benefits of adaptation are likely to be unevenly distributed, reinforcing existing inequalities.

To address this, **passive cooling measures should be more explicitly integrated into existing and future funding and retrofit schemes.** The Greater London Authority could work with the central government to pilot this approach, including through future fuel poverty schemes and low-interest retrofit loan schemes. This would ensure that households can access practical interventions such as shading, ventilation improvements, solar control measures, and other low-regret adaptations that reduce overheating risk.

Conclusion

Many of the issues identified in this response reflect national policy challenges, but London is uniquely placed to lead on overheating resilience due to the scale, density, and diversity of its housing stock. Action in London can therefore help inform wider national approaches to heat resilience, retrofit, and consumer protection in a changing climate.

An effective response will require a more integrated approach to retrofit and adaptation. Policy, funding streams, and delivery programmes should be aligned around whole-home outcomes, ensuring that energy efficiency, decarbonisation, and overheating are addressed together rather than in isolation. This would help avoid fragmented interventions and ensure households receive coordinated improvements that reduce energy costs, improve comfort, and strengthen resilience.

Citizens Advice is ready to work with the Greater London Authority and wider partners to ensure consumer experience informs policy design and delivery, and to support practical interventions that improve health, comfort, and affordability in London's homes.

For further information, please contact: Tilly Prestridge [tilly.prestridge@citizensadvice.org.uk] and Ioan Williams [Ioan.williams@citizensadvice.org.uk]

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Response to the London Assembly Planning and Regeneration Committee

Call for Evidence – Are London's Homes Ready for a Heatwave?

Submission by Cypren Edmunds

Chair, Straw Building UK (SBUK)

Associate, Sustainable Traditional Buildings Alliance (STBA)

Executive Summary

London's housing stock is not adequately prepared for increasingly frequent and intense heatwaves. Overheating is now an existing housing-quality and public-health issue, particularly acute in central London boroughs, single-aspect flats, and top-storey homes.

While London Plan Policy SI 4 and Approved Document O have improved awareness of overheating risk, the regulatory framework must now move beyond narrow compliance modelling toward a stronger focus on:

- existing homes
- future climate conditions
- thermal buffering
- post-occupancy performance
- moisture-safe retrofit

This submission argues for a strengthened passive-first approach, drawing on Straw Building UK (SBUK) technical evidence regarding thermal buffering and phase shift, alongside Sustainable Traditional Buildings Alliance (STBA) research developed with University College London regarding moisture-safe retrofit and whole-building performance.

London has an opportunity to align overheating resilience, embodied carbon reduction, retrofit, and housing quality into a coherent long-term strategy.

1.a Current and Future Overheating Risk

Direct answer

London's homes are significantly underprepared for current and future heatwave conditions, with overheating risk increasing due to climate change and the Urban Heat Island effect.

Supporting evidence

- Approximately one fifth of UK homes already overheat during summer.
- The Urban Heat Island effect can create temperature differences of up to 7°C between central London and surrounding areas.
- Heat-related deaths are projected to treble by 2050 without adaptation measures.
- Boroughs such as Hackney, Tower Hamlets, and Islington are particularly vulnerable due to urban density and housing form.

Practical policy recommendations

- Establish a London-wide residential overheating risk metric.
- Require borough-level heat-risk action plans.
- Treat overheating as a core housing-quality issue rather than solely an emergency-planning issue.

1.b Demographic Vulnerabilities

Direct answer

Overheating disproportionately impacts clinically and socially vulnerable groups who often lack the ability to adapt their internal environments.

Supporting evidence

- High-risk groups include older people, children under five, pregnant people, and individuals with underlying health conditions.
- Tenants in social and private rented housing often lack the authority or financial ability to install external shading or improve ventilation.
- Vulnerable households are frequently concentrated in flats and top-storey dwellings where overheating risk is already highest.

Practical policy recommendations

- Integrate overheating vulnerability screening into housing management systems.
- Grant tenants stronger rights to install non-damaging mitigations such as external blinds and shutters.
- Prioritise overheating resilience within social housing retrofit programmes.

1.c Policy and Regulatory Frameworks

Direct answer

The current framework is insufficient because it focuses primarily on new-build compliance while leaving most existing homes outside meaningful protection.

Supporting evidence

- Approved Document O does not currently apply to office-to-residential conversions or major refurbishments.
- Current overheating assessment approaches remain heavily reliant on present-day weather assumptions.
- STBA’s guidance Retrofit Materials and Moisture Permeability, developed with University College London, demonstrates that moisture-closed retrofit systems can inhibit drying and damage traditional building fabric.

Practical policy recommendations

- Extend overheating assessment requirements to major refurbishments and conversions.

- Require future-weather modelling using 2050 climate files.
- Mandate post-occupancy overheating evaluation for major residential schemes.
- Integrate moisture-safe retrofit principles into London retrofit guidance.

1.d Impact of Building Typology and Density

Direct answer

Building typology, particularly single-aspect flats and highly glazed developments, is a primary determinant of overheating risk.

Supporting evidence

- Single-aspect flats are among the most difficult dwelling types to maintain within safe thermal limits through passive means alone.
- Many dense urban developments combine excessive glazing, restricted cross-ventilation, and limited thermal buffering.
- SBUK technical guidance identifies thermal buffering and phase shift as critical for delaying heat transfer through the building envelope.

Practical policy recommendations

- Introduce a stronger policy presumption against single-aspect dwellings unless robust passive cooling can be demonstrated.
- Require stronger passive cooling justification for high-risk typologies.
- Encourage high-phase-shift building envelopes within planning guidance.
- Expand urban greening and cool-surface strategies within dense developments.

1.e London-Specific Factors

Direct answer

London faces overheating conditions that are materially different from most other UK cities due to the combined effects of density, the Urban Heat Island effect, and a high concentration of flats.

Supporting evidence

- Central London frequently experiences elevated night-time temperatures that prevent effective cooling.
- Dense urban areas often lack sufficient shading and ambient cooling infrastructure.
- European cities routinely use external shutters, façade shading, and solar-control strategies that remain comparatively underused in London.

Practical policy recommendations

- Introduce London-specific overheating compliance margins.
- Use London-specific future-weather assumptions for major schemes.
- Expand ambient cooling strategies through urban greening and shaded public realm.

- Normalise external solar-control measures within London planning policy.

1.f Built Environment Shortfalls

Direct answer

London continues to deliver homes that are likely to require active cooling in future because passive-first design principles are not consistently enforced.

Supporting evidence

- Many developments rely excessively on internal blinds and occupant-controlled ventilation, which are insufficient during prolonged heat events.
- Relatively recent housing stock continues to report overheating problems.
- SBUK's Environmental Product Declaration (EPD) for straw as insulation material demonstrates measurable thermal performance and carbon-storage characteristics.
- Commercial compressed straw systems also demonstrate substantial thermal buffering and phase-shift performance, helping stabilise internal temperatures during periods of extreme heat.

Practical policy recommendations

- Mandate external moveable shading on high-risk façades.
- Introduce a summer-performance sign-off within building control.
- Encourage the use of high-phase-shift bio-based building systems within London housing delivery.

2.a Improving the London Plan

Direct answer

The London Plan already provides a strong strategic foundation through Policy SI 4 and the cooling hierarchy. However, the implementation framework and associated guidance now need to be strengthened to respond to future heat conditions.

Supporting evidence

- London Plan Policy SI 4 and the GLA Energy Assessment Guidance establish a clear passive-first approach through dynamic overheating modelling.
- Important gaps remain around future-weather resilience, retrofit, external shading expectations, and post-occupancy verification.
- STBA research developed with University College London demonstrates that overheating, moisture behaviour, and retrofit performance must be treated as interconnected whole-building issues.

Practical policy recommendations

- Strengthen the implementation guidance associated with Policy SI 4.
- Require future-climate overheating testing for major schemes.
- Mandate stronger external shading expectations for high-risk façades.
- Introduce post-occupancy overheating monitoring requirements.

- Support vapour-open and moisture-safe retrofit systems within London retrofit guidance.

2.c Developer and Designer Responsibilities

Direct answer

Developers and designers should treat thermal buffering, phase shift, and summer comfort as core design requirements rather than secondary compliance issues.

Supporting evidence

- SBUK technical guidance identifies straw-plus-natural-plaster wall systems as capable of providing significant thermal buffering that dampens rapid internal temperature changes.
- Commercial straw panel systems demonstrate phase-shift performance exceeding 20 hours in some configurations.
- This significantly reduces overheating risk compared with lightweight systems that depend heavily on occupant-controlled ventilation.

Practical policy recommendations

- Require a Summer Comfort Strategy for major residential schemes.
- Encourage the use of natural plasters such as lime and clay.
- Integrate thermal lag and phase-shift assessment into planning review.
- Promote passive-first design through procurement frameworks.

2.d Support for Homeowners and Tenants

Direct answer

London requires a retrofit support system focused on passive cooling, moisture-safe improvement, and long-term thermal resilience.

Supporting evidence

- Most of London's future housing stock already exists.
- The STBA Responsible Retrofit Guidance Wheel demonstrates that retrofit interventions are interdependent and must be considered holistically.
- Poorly designed retrofit can increase moisture risk, reduce summer comfort, and damage traditional (heritage) building fabric.

Practical policy recommendations

- Establish a London Overheating Retrofit Fund.
- Support shading, secure ventilation, cool roofs, and bio-based insulation.
- Create borough-level retrofit advisory hubs trained in moisture-safe retrofit.
- Improve access to guidance for traditional and pre-1920 buildings.

2.e Best Practice Examples

Direct answer

European precedent demonstrates that high-density housing can remain thermally resilient when passive cooling measures and high-performance building envelopes are integrated from the outset.

Supporting evidence

- Cities across France and Germany routinely integrate:
  - external shutters
  - deep balconies
  - façade shading
  - solar-control systems
  - passive ventilation strategies
- These approaches remain comparatively underused within much of London’s housing stock.
- Bio-based construction systems increasingly demonstrate that high-performance thermal buffering can be combined with dense urban housing.

Practical policy recommendations

- Establish a London repository of monitored overheating case studies.
- Require post-occupancy summer monitoring for GLA-funded schemes.
- Promote passive cooling and external shading as standard urban housing design principles.
- Expand London guidance on façade shading and thermal buffering strategies.

2.f Tall and Dense Bio-based Precedent

Direct answer

The EcoCocon project in Malmö (Hyllie) provides a significant technical precedent for tall, dense, and heat-resilient bio-based housing.

Supporting evidence

- The project combines a cross-laminated timber (CLT) structural system with prefabricated straw-based external wall panels.
- The wall assembly incorporates clay plaster, compressed straw, wood fibre board, and vapour-open external finishes.
- Published technical information identifies substantial phase-shift performance and low operational energy demand.
- The wall configuration is REI 120 fire-tested, demonstrating that bio-based systems can operate within dense urban housing contexts.

Practical policy recommendations

- Establish a London demonstrator programme for dense bio-based housing.
- Update procurement frameworks to recognise prefabricated straw-timber systems.
- Integrate bio-based high-rise research into London housing innovation programmes.

- Use Malmö as a technical precedent for future London pilot projects.

Final Position

London's overheating challenge must be addressed as a building-system question.

Passive-first, moisture-safe, and thermally buffered systems are essential if London is to avoid locking future generations into increasingly uncomfortable and energy-intensive homes.

Without intervention, overheating risk will increasingly intersect with energy poverty as households become more reliant on active cooling.

Straw-based systems should therefore be treated not as experimental alternatives, but as credible high-performance components of a future heat-resilience strategy.

Likewise, retrofit policy must recognise that overheating, moisture behaviour, indoor air quality, and embodied carbon are interconnected building-system issues.

London now has an opportunity to align climate adaptation, retrofit, and housing quality into a coherent long-term approach capable of responding to future heat conditions while improving public health, energy resilience, and building performance.

Annexe A - Key References

London Assembly and Greater London Authority

- London Assembly Planning and Regeneration Committee – Are London's homes ready for a heatwave?
- Greater London Authority – London Plan Policy SI 4: Managing Heat Risk
- Greater London Authority – Energy Assessment Guidance (June 2022)

Overheating standards and modelling

- Approved Document O: Overheating
- CIBSE TM59: Design methodology for the assessment of overheating risk in homes

Straw Building UK and sector evidence

- Straw Building UK – Environmental Product Declaration (EPD) for Straw as Insulation Material
- Direct PDF – Straw as Insulation Material EPD

- Straw Building Technical Guide

Sustainable Traditional Buildings Alliance evidence

- STBA and UCL – Retrofit Materials and Moisture Permeability (2025)
- STBA Responsible Retrofit Guidance Wheel

International precedents

- EcoCocon – Malmö / Hyllie project

London Assembly Planning & Regeneration Committee

Are London's homes ready for a heatwave?

My name is Dr Jon Winder and I am submitting evidence on behalf of the Melting Metropolis project. We are a team of academic researchers, creative practitioners and local communities exploring lived experiences of heat and health in London, New York and Paris since 1945. The project is based at the University of Liverpool and Queens College in New York and has been funded by the Wellcome Trust. Our evidence is based on oral history interviews, ethnographic observation and archival research across our three case study cities.

1b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

1. **Londoners are living with dangerous and unequal exposure to urban heat.** Our research shows that everyone is affected by extreme heat but that its consequences are felt unequally. Wealthier Londoners have long found it easier to cope when the temperature rises, while everyone else has relied on their ingenuity and access to public services (including parks, swimming pools and ponds) to cope in the heat.
2. **Today, extreme heat interacts with Londoners' physical and mental health in complex ways that change over time.** People who loved hot weather in the past now struggle to cope as they age and/or are affected by health conditions. We heard from Londoners that extreme heat makes managing medical conditions significantly harder, including depression, diabetes, migraines, multiple sclerosis and postural tachycardia syndrome (PoTS).
3. **Homes are focal points for heat vulnerability.** Heat adaptation policy must go beyond cool spaces and tree planting. It needs to address existing housing and the conditions that make some Londoners far more exposed than others. It is often the chronic stress associated with living in a consistently overheating home (rather than ad-hoc heatwaves) that exacerbates existing physical health conditions and causes new mental health issues. Mobility issues often leave people trapped in their overheating homes.
4. **People who live in leasehold or rented homes often struggle the most to adapt their buildings to heat.** Freeholders and landlords are often dismissive and unsympathetic about the problems of overheating. We heard from one tenant who was told to see a doctor when they contacted their landlord about persistent overheating in their home.

1d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

Our research shows that building aspect and design often have a significant impact on overheating. For example, in several buildings we found that people living in south facing, single aspect flats had major problems with overheating, while those living in the same block in north facing homes had far fewer problems with heat. Our research has also shown that people living in any building type close to illegal waste sites that catch fire during the summer suffer during periods of hot weather.

2d. What support should be made available to homeowners and tenants to better manage overheating risk?

Many Londoners are already at the limit of their personal resilience. Strategies that solely rely on action by individuals trying to cope are failing the people who need support most. Policymakers must address the causes of heat vulnerability.

1. **Provide direct and tailored support for people already living in homes that dangerously overheat.** This should include financial support for the most affected households to adapt the worse affected homes. This should cover both the one-off costs of cooling infrastructure and ongoing energy costs associated with its operation.

2. **Londoners' everyday experiences must inform efforts to address heat vulnerability.** Geographical or statistical modelling alone will not identify overheating homes as the problem can vary from one side of a building or a street to another. Greater regulation may be necessary. For example, New York has legislation that sets minimum and maximum indoor temperatures that landlords must deliver.

3. **Remove policy and practice barriers to heat adaptation.** This could include a review of planning and conservation rules that make it difficult to adapt existing buildings to heat. Public and private landlords need to be more aware, more sympathetic and better able to protect their tenants from overheating.

4. **Bring cool to the people who need it most**, rather than expecting people to travel to cool spaces. This could involve direct, tailored support for social housing tenants with low mobility living in homes that overheat. There is currently no evidence that cooling centres are effective at managing heat risk. In Paris, care settings must provide at least one air-conditioned room.

5. **Be wary of focusing adaptation measures on supposedly vulnerable groups** as this may create the false impression that extreme heat is a marginal issue. All Londoners are affected by extreme heat, but existing inequalities mean that some need more support to cope than others.

6. **Heat risk communication needs to be developed with communities to ensure it is not patronising.** Many Londoners, including the most vulnerable, already have tried and tested methods for keeping cool. Climate breakdown now intersects with structural issues – such as disinterested landlords, dismissive freeholders, restrictive planning policies, economic and social inequality - that need to be addressed.

MAYOR OF LONDON

To: James Small-Edwards AM
Chair of the Planning and Regeneration Committee
London Assembly
Via email only: c/o David.Hirst@london.gov.uk

20 April 2026

Dear Assembly Member Small-Edwards,

Thank you for your letter of 18 March 2026, informing us that the Planning and Regeneration Committee has begun an investigation into overheating in London's homes.

Following your invitation, we have set out our response to the Committee's Call for Evidence and the specific questions raised in your letter in the attached Annex.

The overheating of London's homes presents a growing threat. It cuts across the Mayor's work on Planning, Regeneration, Housing, Health and Environment. We also recognise that the GLA is not solely responsible for the management of overheating risk in London's homes.

Overheating is fundamentally a social justice issue, with the impacts felt disproportionately by those most vulnerable to heat risk, including older and younger people and those with pre-existing health conditions, as well as low-income households. The scale of impacts is also determined by where Londoners live, with those living in high-density or high-rise flats with limited ventilation at greatest risk. This is evident specifically in boroughs such as Islington, Hackney, and Tower Hamlets.

We need to work in partnership with other stakeholders to tackle this issue. It is only by us working in a co-ordinated and collaborative way with key partners that we can tackle the risk of overheating, protect Londoners and safeguard critical infrastructure.

If there is any further information that Committee would like further to what is set out in the Annex, please do let us know.

Kind regards,

Mete Coban MBE
Deputy Mayor of London for Environment and Energy

Jules Pipe CBE
Deputy Mayor, Planning, Regeneration and the Fire Service

City Hall, Kamal Chunchie Way, London E16 1ZE
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Annex: London Assembly - Call for Evidence: Are London's homes ready for a heatwave?

1. What is the overheating risk currently facing London's homes and how is this risk evolving?

a. What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

An Arup report commissioned by the Climate Change Committee, *Overheating Homes: Why UK Homes Are Becoming Dangerously Hot,* 2022, noted that up to 90 per cent of UK homes are at risk of overheating if the average UK temperature rises by just two degrees Celsius.

Eurocell applied a weighting system based on average temperatures and, by using the findings in Arup's 2022 report, they found that A-C rated homes are 1.5 times more likely to overheat, and that up to 67.9 per cent of homes in London are at a high risk of overheating.

We also know that overheating is not limited to specific types of housing (*University of East London, 2025*). Whether people live in a detached house or a flat, households are now struggling with summer heat - particularly in London, the Southeast, and the

Northwest. Lower-income households, especially those in rental properties, are more than twice as likely to report regular overheating; and we know that London has a high proportion of households in the private rented sector.

b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

There are two forms of heat risk, each with different mechanisms, populations at risk, and routes for intervention: classic (passive) heat risk and exertional heat risk. Distinguishing between them is important as they require different approaches for reducing harm.

Classic heat stroke is by far the most common cause of heat-related premature mortality and ill-health. Classic heat stroke is where the body is unable to regulate the response to heat, even without significant physical activity, and is primarily associated with older age and existing physical and mental health conditions. Exertional heat risk occurs when internal heat production from physical activity overwhelms the body's cooling capacity, particularly in hot or humid conditions. It can occur even in younger, otherwise healthy people.

- *Demographics:* Evidence on the distribution of heat-health impacts in the population and their association with risk factors, such as age and tenure, relate to classic heat exposure, as this constitutes most of the population level impacts. Risk factors for 'heat harms' include age, gender, long-term physical and mental health conditions, pregnancy, housing characteristics and tenure, occupational heat risk, homelessness and socio-economic factors.
- *Tenure Of housing*: Tenure is not directly associated with increased heat risk but affects who lives in high-risk dwellings and their level of adaptive capacity, namely ability to modify the homes and access to cooling and responsiveness of the landlord. A review of inequalities in heat risk for London concluded that heat adaptation policies should consider all tenancies to avoid widening inequalities. The findings can be found here*: Systemic inequalities in heat risk for greater London - ScienceDirect*
- *Age*: Most heat-related excess deaths in England are in those aged 65+ years. Whilst heat risk is strongly correlated with older age, there is evidence that younger adults in London

have a disproportionate level of risk, with Londoners aged 45-65 years having the same risk of dying during hot weather as those aged 65+ years.

- *Disability*: Routine datasets do not consistently record disability status, so direct evidence on heat risk for people with disabilities is limited; however, we can deduce through proxy indicators (for example, reliance on care, prevalence of chronic health conditions and adaptive capacity), that this group are at higher risk from heat-harms.
- *Gender*: There is some evidence that female sex is independently associated with increased risk of death on hot days.

Other Risk Factors of note:

Mental health: There is evidence that people with a severe mental illness are at significantly higher risk of premature death during hot weather. There is also evidence that people with common mental health conditions, such as depression or anxiety, are also at higher risk. This increased sensitivity to heat is likely due to several factors, including medication, lack of adaptive capacity and social isolation.

Homelessness and rough sleeping: An analysis of hospital admissions in London reported that people sleeping rough were significantly more likely to be admitted as temperatures rise, even below traditional heatwave thresholds. People who are homeless or sleeping rough also have other heat-sensitive risk factors: poor baseline health status, mental health conditions and substance misuse, and social isolation amplify their heat risk. The analysis came from the London School of Hygiene & Tropical Medicine.

c. How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

New developments in London must design to a modelling methodology created by the Chartered Institute of Building Services Engineers (CIBSE). For non-domestic buildings they must comply with Technical Memorandum TM52, and for domestic buildings they must comply with TM59. This was introduced for the London Plan in 2016. TM59 was subsequently adopted by national government and included in Building Regulations (Part O), introduced in 2021 and which came into force in 2022. Part O only regulates new build domestic buildings.

Both Part O and the London Plan promote the use of low energy measures to reduce overheating first before considering air conditioning – this can reduce the extent of air conditioning required, its energy usage and therefore bills for residents.

The TM59 methodology requires design teams to show internal comfort can be achieved through passive measures such as building fabric, window design, window openings and natural ventilation, all using standardised assumptions. In addition to the TM59 methodology, Part O sets additional limitations on when windows which can be opened and their size (to protect from security risk), and the use of green infrastructure and other shading devices not connected to the home.

Part O requires homes to be designed to a reference warm summer in 2020 (called a DSY1 weather file). The London Plan requires modelling for different heat events including a reference summer (DSY1), a long but milder heat event (DSY2), and a short but high temperature heat event (DSY3). Neither Part O nor the London Plan require modelling or design for future rising temperatures. The GLA pushes for this, where it can, with Developers.

Both Part O and the London Plan recognise the complex trade-offs in building design. For overheating, for example, smaller windows can reduce incoming heat and large, inward opening windows can let in cool air and include external shading. However, design must balance incoming daylight, with safety to protect from falls as well as security. Window openings may also be limited by areas which are noisy and polluted.

Ideally, homes should be designed to consider these trade-offs for each location and minimise overheating risk before designing for air conditioning.

d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

During hot weather, direct sunlight and heat is absorbed by artificial surfaces including roads, buildings, and structures. When outdoor temperatures reduce, these artificial surfaces release heat, keeping urban areas warmer than rural areas.

Different typologies will contribute to this, based on the materials they use and the colours of the materials. Black surfaces, for example, will absorb more heat from the sun, whereas light surfaces will reflect more heat. Buildings that use air conditioning, or heat pumps, which deliver cooling may also contribute to the urban heat island effect since they release heat and contribute to warmer external temperatures.

By ensuring buildings are designed to reduce the urban heat island effect through reducing artificial surfaces such as concrete and increasing green and blue measures which are comparatively cooler, we can manage the impact and deliver lower carbon, more affordable and more equitable solutions for Londoners. This in turn can reduce overheating risk and the urban heat island effect in London.

e. How is the risk of overheating different in London than in other parts of the UK?

The Arup report (2022), referenced above shows the risk of overheating in homes by region (see page 7 for more information):

- The Midlands & Wales: Face a moderate risk under current conditions.
- Northern England & Scotland: Face limited; low-risk conditions compared to the South.
- The Southeast: High-density, well-insulated homes in suburban London and the Southeast share similar high-risk profiles due to the same climate impacts. The risk is particularly high in the south of England, with London being the hottest spot in the country. This is supported by *analysis of the English Housing Survey*, conducted by the Resolution Foundation in 2023, also which also found that homes in London have a higher risk of overheating.

f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

Please see response to question 1 (c) above.

2. How should we be tackling overheating?

a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

N/A

b. Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

The approach taken in Policy SI 4 in the London Plan is to mitigate overheating risk using passive measures first, before considering any active measures. This is the same approach taken to reduce energy consumption for heating, where homes are designed to reduce heat loss first, reducing heating and ultimately the cost of energy bills to the consumer for winter comfort.

As with overheating and cooling design, Policy SI 4 first aims to reduce heat build-up using measures such as reflective materials, external shading, considering window design with orientation and providing ventilation to remove heat. For homes which are still too hot (because of trade-offs associated with daylight, pollution and noise, mentioned in the previous response), active cooling can be used. However, the aim of implementing passive measures is to reduce cooling loads and to deliver comfort in a sustainable and affordable way for residents.

The current stance on air conditioning does not limit its use; it aims to reduce the amount required to be used through good design.

c. What should developers do to ensure that the homes constructed today will be heat resilient?

Please see response to question 1 (c) above.

d. What support should be made available to homeowners and tenants to better manage overheating risk?

Warmer Homes London (WHL) is a new organisation jointly created and funded by the Mayor of London and London Councils. It is helping to make Londoners' homes greener, healthier and more affordable. Over three years WHL will deliver quality retrofit to c12,000 homes in social, private rented and low-income owner occupier sectors.

For the first time, this retrofit programme will include measures to help homes adapt to climate change including heat risk. The government has committed to incorporating passive cooling measures into capital funded schemes which focus on improving the homes of fuel poor consumers and social housing.

WHL has committed to a pilot project to install adaptation measures alongside wider retrofit work to support long-term resilience and healthier outcomes. We will be awarding the London Borough of Newham a grant of £50k to deliver a cross-cutting pilot to install climate resilience measures, such as window shutters and awnings onto homes as part of the borough's WHL work. If successful in reducing the risk of overheating in these homes, we will promote these measure to other partners through WHL.

Homeowners and tenants are also able to access advice on overheating risk in their homes through organisations such their borough Council for Voluntary Services, Citizen Advice Bureaus and local Age Concern organisations.

e. Are there developments in London that manage heat risk well?

We have been advised by our officers of the following examples:

- A residential mid-rise building developed in White City is an exemplar of new build homes with roller shutters which blocks incoming heat from the sun (the largest cause of heat build-up in homes). Heat from the sun accounts for 90 per cent of all heat build-up in a home, so blocking that can reduce a lot of overheating risk.
- The ArtHouse in Kings Cross is designed to prevent summertime overheating while still maintaining high levels of daylight with moveable solar shading on external facades. Apartments also have mechanical ventilation to remove build-up of warm air, in additional to natural ventilation.
- A single low-rise home in Camden, uses Passivhaus principals and external shading to reduce incoming heat from the sun. It has insulated automatic shutters with windows which open inwards to accommodate external shading and shutters.
- London Southbank University uses an ambient loop heat network. This is a heat network where the water circulates at much lower temperatures. They get their heat from sustainable heat sources such as waste heat and ground source The water is used with an internal water source heat pump which can deliver heating and cooling. This delivers both low carbon heating and cooling to commercial and residential buildings.

Upcoming Developments

- A student residential building in Kennington has been designed and built to reduce window sizes and include shading to reduce incoming sunlight and heat deliver affordable comfort.
- An ambient loop heat network is delivering heating and cooling to homes and commercial buildings in Camden. The network utilises ambient loop heat from ground source, water source and waste heat which can deliver heating and cooling to homes and commercial buildings.

f. Are there examples of cities which have adopted strategies to tackle heat risk which London can learn from?

The C40 Cities 'Cool Cities Network' has produced case examples of cities which have adopted strategies to tackle heat risk which London can learn from. These can be found at this link:

https://www.c40knowledgehub.org/s/article/Communicating-Heat-Risk?language=en_US

The GLA has been an active member of the Cool Cities Network for many years, and we are committed to learning from best practice. Drawing on international experience, we have learnt from Miami City's approach to engaging residents in the development of its cool spaces, while insights from the Boston Heat Plan have helped to inform the development of a heat risk action plan for London.

In 2025, London joined the C40 Cool Cities Accelerator, committing to protecting residents from extreme heat through urgent, short-term actions and long-term urban design changes. This membership aligns with recommendations to manage increasing heat risks, such as those identified in the London Climate Resilience Review. Our membership will also help to facilitate learning from cities facing similar challenges around the world.

The Mayor is co-chair of C40 Cities with Mayor of Freetown Yvonne Aki-Sawyerr.

Additional questions set out in your letter of 18 March 2026:

(a) Can you share details of the London Expert Heat Group, including its membership, terms of reference and recent (since July 2025) meeting minutes?

Between16-19 July 2022, London faced an unprecedented Level 4 Heatwave. On 19 July 2022, Kenley Airfield in Greater London recorded a minimum temperature of 25.8°C. This was not the daytime high, but rather a new highest daily minimum temperature (hottest night) ever recorded in the UK and England.

Following this event, officers at the GLA set up two workshops to bring London's stakeholders together to explore how better to work together on extreme heat events and overheating/cooling, in collaboration with Bloomberg Associates. As a result of these workshops, the GLA established the London Expert Heat Group, which sought to establish a long-term plan for managing overheating risk and cooling in London and to influence national policy.

The London Expert Heat Group

Membership

- Candice Howarth, Grantham Research Institute on Climate Change and the Environment, London School of Economics
- Jim Clark, Zurich Insurance plc
- Bob Ward, Grantham Research Institute on Climate Change and the Environment, London School of Economics
- Chit Chong, Peabody Group
- Lauren Rose, Harper, Peabody Group
- Richard Ellis, Peabody Group
- Victoria Jeffrey, London Borough of Sutton
- Andy Love, Shade UK
- Annette Figueiredo, GLA (Chair)

The first meeting of the London Expert Heat Group took place on 25 April 2023. The subsequent meetings were held on 25 May 2023, 1 August 2023, and 7 November 2023. Since it was anticipated that the work of the Group would be picked up by the London Climate Resilience Review, the London Expert Heat Group ceased to exist shortly after they met with the Review team on 31 August 2023. A formal Terms of Reference was not agreed by the group.

The GLA's current work on heat risk is now being taken forward including with input from external stakeholders such as members of the London Expert Heat Group.

(b) Can you please provide the minutes of Mayoral Delivery Board (MDB) meetings in which progress updates were discussed relating to overheating, specifically in connection with the mayor's mandates on improving London's housing stock and delivering a greener, more climate-resilient London?

The Mayoral Delivery Board agendas are not published. The progress updates are noted rather than discussed. The minutes can be found at the link below:

https://www.london.gov.uk/moderngovmb/ieListMeetings.aspx?CommitteeId=491 .

References to 'overheating' and 'resilience' can be found in delegated decisions in the minutes, (links provided below):

- ADD2783 Adapting existing homes to extreme heat – proof of concept pilot in Chobham Manor. Minutes here, page 3: *Printed minutes Monday 29-Sep-2025 11.00 Mayoral Delivery Board.pdf*.
- ADD2828 Retrofit for resilience pilot. Minutes here, page 4: *Printed minutes Monday 23-Mar-2026 11.00 Mayoral Delivery Board.pdf*

(c) Can you confirm the publication timeline for the London Heat Risk Action Plan?

The first Heat Risk Action Plan for London is expected to be published this summer.

Consultation on London Assembly Investigation: Are London's Homes Ready for a Heatwave?

G15 Residents' Group Response

April 2026

The G15 Residents' Group (G15RG) represents residents across G15 housing associations. This consultation response is based on the views from this diverse group of residents and representative of the 850,000 the G15 landlord's house.

Lead G15RG member name: Pamela Newman

Response from: G15 Residents' Group

Contact email: enquiries@G15Residents.co.uk

Introduction

The G15 Residents' Group (G15RG) represents residents living in homes provided by London's largest housing associations, collectively housing 1 in 10 Londoners. Our responses draw directly on lived experience across mixed tenures and reflect resident priorities regarding housing quality, safety and long-term resilience and our previous GLA and housing related consultation responses.

We welcome the London Assembly's investigation into whether London's homes are prepared for extreme heat—an issue residents across our group have repeatedly raised in previous consultations, particularly regarding dual-aspect windows, ventilation, daylight, overcrowded internal layouts, building quality, and overheating risks.

1. Overheating is already a lived reality for London residents

Across G15RG discussions, residents consistently report that many newer homes—especially single-aspect, poorly ventilated, and tightly designed units—overheat even in moderate summer conditions, let alone during severe heatwaves.

Residents have emphasised in previous responses that:

- Poor ventilation and inadequate daylight increase overheating and worsen air quality.
- Heat especially affects children, older people, disabled residents and those with respiratory conditions, who are already vulnerable.
- Latent design flaws often only appear after residents move in, creating avoidable long-term risks.

These issues mean London's homes are not currently fit for the scale and frequency of heatwaves we now face.

2. Design standards must not be weakened—heat resilience depends on them

In our recent response to the London Housing Plan, residents opposed weakening design standards that directly affect heat resilience—such as dual-aspect windows and dwellings-per-core ratios.

Residents were clear that:

- Dual-aspect should remain the preferred and expected standard because it improves ventilation and mitigates overheating.
- Poor daylight and poor ventilation increase overheating risk, especially during heatwaves.
- Crowded internal layouts trap warm air and worsen thermal discomfort.

We strongly urge the London Assembly to ensure that heat mitigation and climate resilience are embedded into all design decisions, and that no changes are made to planning guidance that would dilute residents' long-term safety.

3. Homes must be designed with climatic reality in mind—not just viability

Residents repeatedly stress that design decisions driven purely by viability (e.g., reduced dual-aspect, higher dwellings per core) will worsen overheating risk and burden future generations with unfixable building defects.

Our consultation feedback shows residents prefer:

- Fewer, better homes over accelerated delivery that sacrifices safety or comfort.
- Evidence-based design flexibility, not blanket relaxations that lead to poor thermal performance.

The Assembly should ensure heat-resilient design is non-negotiable, especially in affordable and social homes.

4. Heatwaves disproportionately impact residents with protected characteristics

Our past consultation responses emphasised the significant equality implications tied to overheating:

- Children, disabled residents, older residents and neurodivergent residents are disproportionately affected.
- Poor ventilation and excess heat increase respiratory issues and worsen existing health conditions.
- Poorly designed communal areas become unsafe and inaccessible during heat events.

We recommend that the Assembly mandate:

- Stronger Equality Impact Assessments for overheating risks
- Mandatory resident-informed design checks, especially for vulnerable groups
- Specific overheating protections in all new London housing guidance

5. Retrofitting existing homes is as urgent as designing better new homes

Residents in older blocks—especially those built with poor ventilation or sealed-window configurations—report severe overheating.

Residents want:

- Retrofitting programmes that prioritise insulation, shading, cross-ventilation, and safe mechanical cooling
- Clear timelines and funding mechanisms similar to the Building Safety Fund but focused on heat mitigation (as BSF delays were widely experienced)

We urge the Assembly to treat heat-resilience retrofit with the same seriousness as building safety remediation.

6. Resident voice must be embedded in heatwave-resilience policy

As we argued in multiple G15RG consultations, residents must be included early and meaningfully in decision-making about homes and building standards.

Residents repeatedly stated that:

- Early engagement prevents unlivable homes being designed.
- Resident priorities differ sharply from developer priorities.
- Equality and health impacts are often missed by technical models alone.

We recommend the Assembly establish a London Resident Heat Resilience Panel, similar to our proposed involvement in housing delivery monitoring.

7. Recommendations to the London Assembly

We urge the Assembly to:

- Require dual-aspect or verified equivalent ventilation performance in new homes
- Introduce mandatory overheating modelling for all tenures
- Establish a GLA-funded overheating retrofit programme
- Embed residents with lived experience into all heat-resilience policymaking
- Strengthen equality analysis and protect vulnerable residents
- Ensure no design standard is diluted in ways that worsen thermal risks
- Mandate transparent reporting on overheating-related complaints

Conclusion

London is not yet prepared for the scale of heatwaves ahead.
Residents are already experiencing homes that are too hot, poorly ventilated, and designed without adequate climate resilience.

We urge the London Assembly to adopt a safety-first, resident-centred and equality-driven approach so that every home in London—new or existing—can remain safe, healthy and liveable during extreme heat.

Signed, G15 Residents' Group
April 2026

Response to Call for Evidence: Are London's homes ready for a heatwave?

Data for homes which are vulnerable to excess heat is hard to find and isn't tracked reliably.

H&F's Private Sector Housing Standards team noted the deregulated nature of the sector meant that Local Authorities don't tend to collect such information as part of business as usual.

Retrieving information relating to excess heat problems reported by renters in the private rented sector can be difficult as the database used relies on users to tag a case based on a range of options. Often these are added by call centre staff, who are not specialists and therefore tend to categorise most cases as "Disrepair", or "Public Health", or "Filthy/Verminous."

Furthermore, the current database does not allow for more granular detail. If a resident has raised two or more problems simultaneously, the system cannot record both. As an example, if a tenant complains about "Excess Heat" and "Electrical," the case might be categorised as "Electrical" rather than "Excess Heat". Or it may be categorised as "Disrepair", or "Public Health", or "Filthy/Verminous".

A specific database problem is that the code used for such issues is "Excess Cold/Heat". This is due to the high number of Excess Cold cases and much lower recorded Excess Heat cases. A Senior Private Sector Housing Officer noted, anecdotally, that they have heard very little mention by colleagues of Excess Heat cases within the borough. They did also mention, however, that newly built properties appear to be the most common origin of Excess Heat problems, and the area of discussion across some Environmental Health Officers in London.

A further issue with collecting the data is that residents may not mention – or may be unaware that they have the right to mention – other problems at the time that the record is created.

A similar issue has arisen in H&F's Council Housing. Information about overheating is often anecdotal or fragmented across teams. An officer in the Housing Repairs contact centre felt overheating was not at all on the radar, noting the only related work in the past was giving fans to residents who raised issues with opening their windows. One resident had raised a Stage 1 complaint about the windows causing both excess cold and overheating during hotter weather.

H&F has been offering retrofit works to Council tenants as part of the Social Housing Decarbonisation Fund programme from National Government. Two notable learnings from this which may impact the council's ability to upgrade homes to mitigate the effects of heatwaves are:

- Residents are hesitant about having insulation retrofit works as homes already overheat.
    - This suggests a need to engage residents to help them understand how retrofitting their homes can help for both heatwaves during summer and extreme cold during winter. Most effective engagement focusses on the cost-savings and quality of life for residents.
- There is a need for sensors to build a strong evidence base due to the lack of in-home/ ambient heat data.
    - We are undertaking a trial of sensors with Octopus energy, however take-up depends on resident approval, which limits the impact and it doesn't necessarily focus on indoor heat.

H&F lacks the capacity and budget for gathering, monitoring, and analysing data in addition to carrying out interventions. Furthermore, there is a lack of technical expertise and clarity on overheating as a risk, especially compared to more prominent issues such as damp and mould.

We also lack skills/ capabilities to gather data and analyse it robustly. For example, we can put temperature monitors in but don't have the know-how to evaluate the source of the overheating (e.g. solar gains through windows or walls? Lack of ventilation? Internal sources e.g. exposed pipework, plant or neighbours?).

Heat risk for homes within Hammersmith & Fulham, 2024 Climate Risk Assessment:

Table 1 – H&F Council's climate risk register based on likelihood (L) and impact (I) to reach a risk (R) score

Sector	Heatwaves and temperature increase			Surface water flooding			Drought, water scarcity and subsidence			High winds and storms			Overall average sector risk
	L	I	R	L	I	R	L	I	R	L	I	R	
Public health and health services	5	4	**20**	4	4	**16**	4	3	**12**	3	3	**9**	**14**
Public housing and residences	5	5	**25**	4	5	**20**	4	3	**12**	3	3	**9**	**17**
Infrastructure services	5	5	**25**	4	4	**16**	4	2	**8**	3	3	**9**	**15**
Community facilities and services	5	3	**15**	4	3	**12**	4	2	**8**	3	3	**9**	**11**
Natural assets and ecology	5	3	**15**	4	3	**12**	4	3	**12**	3	3	**9**	**12**
Businesses and industry	5	2	**10**	4	3	**12**	4	2	**8**	3	2	**6**	**9**
Overall average risk by hazard			**18**			**15**			**10**			**9**	

Risk score	**Key**		**Action**
16-25		Red	High risk, immediate management action is required.
11-15		Amber	Medium risk, review controls for appropriateness and effectiveness.
1-10		Green	Low risk, monitor and if escalates quickly check controls.

Table 1 is a summary of the climate risk assessment undertaken by AtkinsRealis for the borough of Hammersmith & Fulham. It clearly shows that Public housing and residences is the highest average risk across all sectors, especially so for heatwaves and temperature increases.

H&F is responsible for a number of residences across the borough including council managed housing, sheltered housing for those aged 60 and above. In H&F there is approximately an equal amount of social housing, owner occupied and privately rented housing (third of housing stock each)[1].

Climate change will impact on housing and residents, changing indoor conditions and impacting on building fabric and structures through higher temperatures, more intense rainfall and flooding, and extreme events. Housing and residences will be impacted by

[1] 1 - Appendix A - Housing Strategy 2021 V2.5 Appendix B - Homebuy Allocations Scheme.pdf (lbhf.gov.uk)

increasing temperature leading to overheating in residences, resulting in increased illness and deaths.

Council housing properties at risk of overheating have been modelled by overheating specialists using a crude measure of overheating risk, based on the tendency of a property to have a high internal temperature in hot weather[2]. There are a number of council managed housing across the borough with a high temperature threshold (≤23.5°C) (Figure 3-9). It should be noted that this result should be treated as indicative, as there are gaps with the housing stock data and it is a crude measure of overheating.

Average land surface temperature and the locality of council estates have also been reviewed, highlighting numerous council estates within areas of historically high temperatures (Figure 3-10). Notably, council estates to the south of the borough in Fulham including Clem Atlee and Aintree estates.

Figure 3-1 - Council housing properties at overheating risk defined by modelled temperature thresholds of internal temperature[3].

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[2] Parity Projects | What is overheating risk and how is it calculated? (tawk.help)

[3] Data supplied by LBHF

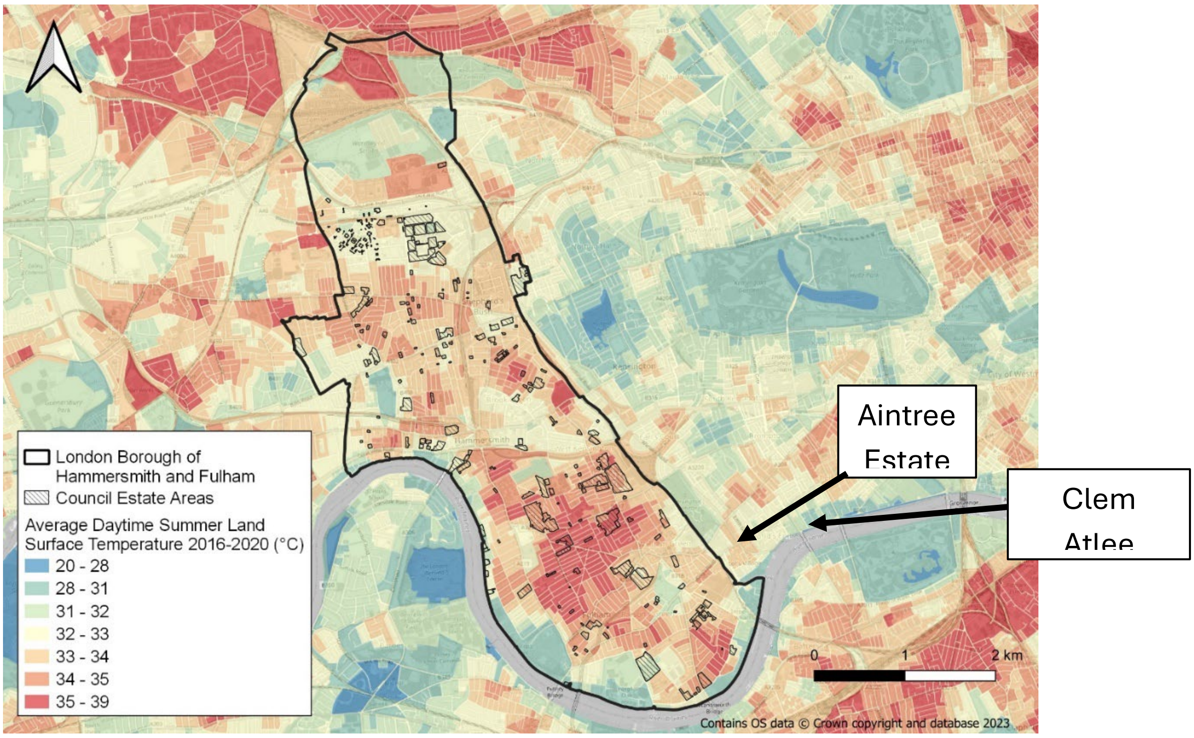

Figure 3-2 - Council estates[4] and average summer land surface temperature[5] for H&F.

[4] Data supplied by LBHF
[5] Major Summer Heat Spots using Landsat-8 Thermal Satellite data - London Datastore

London Assembly Call for Evidence:

Are London's homes ready for a heatwave?

Response from Islington Council

1. <u>What is the overheating risk currently facing London's homes and how is this risk evolving?</u>

1.a. What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

- It is difficult to calculate an exact proportion, but the number of homes at risk of overheating in London is already significant and is likely to increase as the climate continues to warm and heatwaves become more common.
- The risk will continue to rise unless design changes are embedded as early as possible in the design process of new buildings, particularly through effective shading, natural ventilation, glazing design, orientation and material choices. Also, unless overheating is treated as seriously as other key planning considerations (e.g. daylight/sunlight, accessibility or energy performance).
- The risk could be assessed by analysing how many homes fall into the typologies known to overheat most (e.g. single aspect flats, buildings with large amounts of glazing and top floor homes). Building age is also a useful indicator. Newer homes (post-1990) often have high insulation, airtightness and large glazing areas that increase overheating risk, while older properties can also be vulnerable due to poor insulation and significant heat gains through roofs, especially where lofts have been converted. This data could be overlayed with current heat risk mapping (to assess current risk) and future climate projections (to identify where external heat risk will intensify over time).

1.b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Overheating and heatwaves do not affect all residents equally. Public health evidence indicates that risk is shaped by;

(1) **physiological vulnerability** (age, frailty, disability and long-term conditions),

(2) **ability to take protective action** (including cognitive impairment, mental health and social support), and

(3) **exposure**, which is strongly influenced by housing quality and socioeconomic factors.

Age and frailty: Older adults, particularly those with physical or cognitive frailty or high dependency, are consistently identified as the group at highest risk of severe health impacts during heat events. This aligns with local mortality patterns: during heatwave periods in **2023**, excess deaths were significantly higher among people aged **70+**, while deaths decreased for people aged under 70 relative to five-year averages. Nationally, older age groups also experience the highest heat-related mortality rates.

Disability and long-term conditions: People living with severe cardiovascular, respiratory or renal disease are at high risk because heat places additional stress on organ systems. People with dementia and Alzheimer's may face heightened vulnerability due to cognitive impairment and reduced ability to recognise risk and respond; locally, in **2022 heatwave periods**, excess deaths from dementia and Alzheimer's increased substantially relative to previous years (noting small numbers).

Mental health and substance dependency: People with severe mental illness and/or substance dependency are also at elevated risk. Evidence suggests risk is increased by impaired thermoregulation, medication effects (including psychiatric medications and some substances), and reduced capacity to take preventive action (for example, modifying routines, hydration, ventilation, or seeking help).

Tenure, housing conditions, and socioeconomic factors: While the attached evidence is primarily health-focused (rather than tenure-specific), it highlights key "risk amplifiers" that are strongly correlated with tenure and housing circumstances:

- **Low income and deprivation** reduce ability to adapt (e.g., purchasing fans, shading, or paying for additional energy use) and can increase exposure.
- **Poor quality housing** (including overheating-prone homes and limited ability to maintain comfortable indoor temperatures) increases risk.
- **Social isolation and living alone** reduce the likelihood of receiving support during heat events and can delay help-seeking.

In practice, these factors can intersect. Those most at risk overall are likely to be isolated older adults living in the community with under-diagnosed or untreated illness, particularly where housing quality is poor and resources to adapt are limited.

Gender: The attached sources do not provide specific gender-differentiated findings. However, the evidence base indicates that demographic risk is strongly driven by age, frailty, underlying health conditions, mental health, and socioeconomic and housing factors. Where gender differences exist, they are likely to interact with these determinants (e.g., living alone in older age, caring responsibilities, and differential exposure), and should be considered in local targeting and outreach.

1.c. How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

- London Plan Policy SI4 requires developments to follow the cooling hierarchy, and the supporting text notes that thermal modelling can be provided. However, the policy does not require modelling for all schemes. Islington's Local Plan Policy S6 goes further by requiring all developments to follow the cooling hierarchy and detailed thermal modelling for all major developments.

Islington retrofit case example – Harvist Estate

As part of the Harvist Estate retrofit programme, Islington Council has undertaken dynamic thermal modelling of four existing 19-storey residential towers to better understand overheating risk. Although thermal modelling is not currently required under Building Regulations for existing buildings, the modelling identified that approximately 18% of dwellings were at risk of overheating.

The findings have informed the retrofit design approach, with work currently being developed at RIBA Stage 3. The focus has been on identifying passive measures to reduce overheating risk where possible, while aiming to avoid significantly reducing glazing or residents' outlook.

Mechanical solutions, including MVHR, have been explored, but the project team has recognised that their effectiveness would depend heavily on changes in resident behaviour and understanding. This highlights the importance of considering usability and post-occupancy outcomes alongside technical performance when addressing overheating through retrofit.

The project team, including architects, MEP and sustainability engineers, have expressed interest in sharing learning and contributing to wider knowledge exchange on managing overheating risk in retrofit and high-rise residential buildings.

- In practice, thermal modelling is often used to justify mechanical cooling rather than to drive better passive design. It is also frequently undertaken too late in the design process to make meaningful changes to the building design and is often missing from major planning application submissions.
- Thermal modelling should be required for all major developments and any minor schemes proposing air conditioning, to ensure both residential and commercial buildings are properly assessed for overheating risk.
- The cooling hierarchy is also often not applied rigorously. Applicants often claim that passive measures have been exhausted but provide limited evidence to demonstrate this. The hierarchy identifies potential measures to reduce overheating, but on its own it does not ensure that homes will be resilient, particularly without thermal modelling.

1.d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

- Highly glazed buildings with large glass facades (office or residential) absorb a large amount of heat and are at greatest risk of overheating. They also often require mechanical or active cooling which contributes to the urban head island effect.
- Single-aspect flats are also at particular risk of overheating due to a lack of opportunity for cross-ventilation.
- Large commercial buildings, such as offices, life-science facilities and data centres, often have extensive plant and air conditioning systems that release waste heat into the surrounding environment, again contributing to the urban heat island effect.

- Any development with large areas of hard landscaping (e.g. paving, tarmac etc) also contribute to the urban heat island effect, as these surfaces absorb and store large amounts of solar heat during the day and release it slowly at night.

1.e. How is the risk of overheating different in London than in other parts of the UK?

No response

1.f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

- Yes - in short, homes are being built today that will be vulnerable to overheating. There are a number of factors that contribute to this, including gaps in planning policy (Local Planning Policy and the London Plan).

- The London Plan requires major developments to follow the cooling hierarchy, and supporting text indicates that thermal modelling may be provided. Islington's Local Plan goes further by requiring TM59 and/or TM52 thermal modelling for all major developments, which helps identify overheating risk at design stage. However, in practice thermal modelling is often used to justify mechanical cooling rather than to drive better passive design. Modelling is also frequently undertaken too late in the design process to influence fundamental decisions such as orientation, glazing ratios or cross ventilation.

- A significant proportion of new homes in Islington come forward through minor developments (e.g. small infill schemes, mansard roof extensions and conversions to flats). These typologies are often at high risk of overheating, particularly if they are single aspect units, with constrained layouts, yet current Islington Local Plan policy means we cannot require thermal modelling for minor schemes which propose AC.
It is also important to note that minor schemes have very limited scope to change their orientation or overall form. As a result, the most meaningful interventions are measures such as external shading, optimised glazing design, secure ventilation and reducing internal heat gains. Strengthened policy could help ensure these measures are properly considered before AC is proposed.

<u>2. How should we be tackling overheating?</u>

2.a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

- Require all development proposals (not just major development) to demonstrate how they will reduce the potential for internal overheating in line with the cooling hierarchy. Also, strengthen expectations around the cooling hierarchy by requiring applicants to maximise passive measures, justify any shortfalls and meet clear thresholds before mechanical ventilation and AC is considered. Islington's Local Plan Policy S6 already reflects this approach by removing active cooling from the final stage of the hierarchy, emphasising that AC must only ever be used as a genuine last resort. Level 5 of the cooling hierarchy listed in Policy S6 also specifies that mechanical ventilation should be "low energy". The London Plan could also specify that these systems should minimise heat rejection to the surrounding environment.

- Require dynamic thermal modelling for all new homes proposing AC, including minor developments and infill schemes, against current and future climate scenarios. Islington's Local Plan (Policy S6, Part D) already requires all major developments to include internal temperature modelling under projected increased future summer temperatures, but overheating risk is not limited to major developments. A proportionate/ simplified modelling route could be introduced for smaller projects proposing AC to avoid viability issues while still addressing heat risk. The modelling should be required at pre-application stage, as well as application stage, to ensure that shading, ventilation, glazing ratios, orientation, façade design and material choices are embedded as early as possible.
- The London Plan could also introduce overheating performance targets, in the same way it sets carbon reduction targets.
- There could also be a post-occupation reporting requirement to monitor overheating issues. This would help build an evidence base on how buildings perform in practice and which cooling measures are most effective.
- Provide more practical guidance on shading, including external devices, building design (to enable self-shading), consideration of high-density sites, as well as retrofit options for existing and historic buildings.
- Also, more guidance on material choices, particularly for roofs and other exposed surfaces. For example, where green roofs are not feasible, cooling roof materials with high reflectance should be encouraged.
- Additional guidance is needed on cooling historic buildings in particular. Boroughs such as Islington have a large number of heritage buildings, and while modern buildings often face the greatest overheating risk, it is still essential to consider how passive cooling can be sensitively integrated into historic fabric. Many historic buildings traditionally used awnings, external shutters and other forms of external shading. There should be clear encouragement to reintroduce such features where appropriate. Good examples of existing guidance include Historic England's Study of Architectural Measures to Reduce Overheating and Kensington & Chelsea's Householders' Guide to External Solar Shading.
- Strengthen requirements for nature-based cooling, including green roofs and walls, increased tree canopy, shaded courtyards and reduced hard landscaping.

2.b. Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

- There is a view that, as London warms, passive measures alone may not always be sufficient to efficiently cool homes, and a combination of passive design and AC may be needed. If homes are not designed to stay cool, residents will turn to portable AC units or inefficient fans, resulting in higher energy use and poorer outcomes than a planned, integrated approach. However, despite this, the London Plan is right to maintain a strong presumption against AC as a first resort, as allowing it too readily would undermine the cooling hierarchy.

- Large-scale AC installation would significantly increase waste heat discharged into streets and courtyards, intensifying the urban heat island effect and creating a feedback loop.
- The current stance could be strengthened by:
    - Requiring applicants to demonstrate that all passive measures have been maximised before AC is considered;
    - Placing greater emphasis on external shading, which remains underused in London; and
    - Encouraging design approaches inspired by Mediterranean and Middle Eastern architecture, where shading, cross-ventilation, and thermal mass are integral to building performance.
- The London Plan currently says that if active cooling systems, such as AC systems, are unavoidable, these should be designed to reuse the waste heat they produce. Further guidance should be provided on systems which reuse the waste heat they produce, as well as on lower carbon mechanical ventilation and AC options, such as air-to-air heat pumps.
- Also, more guidance could be provided on the types of existing buildings for which AC may be appropriate. While AC is typically accepted in commercial and office buildings, there are situations where a more flexible approach is justified (e.g. in care homes for older people). In these cases, the London Plan could set out criteria for when AC may be acceptable.
- Islington has also seen a noticeable rise in householder applications to retrofit AC into flats and homes, a trend echoed anecdotally by other London boroughs. Currently, if applicants claim to have followed the cooling hierarchy, these proposals are difficult to resist, even where the cumulative impact of widespread retrofitted AC is a concern. Stronger policy guidance would help manage this growing pressure and avoid a gradual, unplanned shift toward routine AC installation across London's housing stock.

2.c What should developers do to ensure that the homes constructed today will be heat resilient?

- Embed passive cooling from the earliest design stages. Prioritise self-shading through building form (e.g. balconies, recessed windows and overhangs) and use effective external shading devices (e.g. louvres, brise-soleil, external blinds, shutters and vertical fins).
- Optimise massing, orientation, glazing ratios and façade design to minimise solar gain. Orientation may be constrained on tight urban sites, but should be improved wherever possible.
- Optimise size and position windows to balance daylight and heat control.
- Balconies and window recesses are often put forward as the main shading solutions. However, they should not be relied on alone. Balconies give limited shading on east/west façades (due to the sun's low angle in the morning and evening) and none to top floor glazing. South-facing glazing benefits from horizontal shading (e.g. louvres,

overhangs and balconies above). East/west elevations benefit from vertical shading (e.g. deep recesses and vertical fins). Movable shading is preferred, allowing occupants to adapt to changing conditions.

- Design for natural and cross-ventilation. Provide dual-aspect homes where possible, avoid single-aspect, west-facing units, ensure internal layouts allow airflow and include secure night time ventilation options (e.g. external shutters).
- Integrate greening and nature-based cooling e.g. planting trees and vegetation, incorporating green roofs and walls, designing shaded courtyards and limiting hard landscaping.
- Reduce internal heat gains through specifying energy efficient building services and appliances (e.g. low energy LED lighting, locating plant rooms and hot water cylinders away from living spaces, ensuring communal heating systems do not cause corridor overheating etc).

2.d What support should be made available to homeowners and tenants to better manage overheating risk?

Support for residents should combine,

(1) practical, accessible advice and outreach during heat events,

(2) targeted support for those at highest health risk, and

(3) measures that improve access to cooler environments and strengthen local preparedness.

Evidence from behavioural science also suggests that simply publishing generic “common sense” advice is not sufficient; interventions should be designed to overcome known barriers to protective behaviour.

A. Provide heat-health advice in formats and channels that reach vulnerable residents

Evidence indicates that vulnerable groups often prefer **offline and accessible formats** and benefit from **trusted messengers**. Support should therefore include:

- printed materials (e.g., leaflets, posters, fridge magnets) with clear actions for keeping homes cooler and staying well;
- proactive, in-person outreach via trusted services (e.g., adult social care, community/voluntary sector partners, housing staff);
- accessible versions (large print, easy read, and translation where needed).

B. Design communications around behaviour change—not just awareness

A key barrier is that many people have **low belief in the effectiveness** or value of heat-adaptive behaviours, and many vulnerable people **do not identify themselves as vulnerable**, meaning targeted messaging may not "land" as intended. Support should:

- clearly explain *why* specific behaviours help (to build confidence and motivation);
- communicate severity and health relevance (countering the perception that heat is only "pleasant weather");
- use broad "anyone can be at risk" framing alongside clear signposting of priority risk groups.

C. Strengthen support for high-risk groups through services and networks

Given evidence of disproportionate impacts among older adults (especially 70+), people with frailty, severe long-term conditions, dementia, severe mental illness, and substance dependency, support should include:

- proactive checks and advice via care and support networks (including community settings, supported accommodation, and relevant health/social care pathways);
- clear escalation routes and guidance for carers and professionals (what to do when symptoms of heat illness appear).

D. Improve access to cooler environments during heat events

Alongside home-based advice, residents benefit from being able to access **cooler public spaces** (particularly when indoor temperatures are unsafe). Support should therefore include maintaining and promoting a network of publicly accessible cool spaces, with clear information on locations and opening times, and targeted signposting for those most at risk.

E. Use local learning from recent heat events to target support

Local mortality evidence from heatwave periods (e.g., elevated excess deaths among older residents and in specific settings) underscores the importance of focusing support on those at highest risk, and using local surveillance/insight to refine targeting, outreach, and service readiness year-on-year.

2.e. Are there developments in London that manage heat risk well?

- Kings Cross Gasholders development includes movable external shutters that allow residents to adjust shading and ventilation in response to changing weather conditions.

2.f. Are there examples of cites which have adopted strategies to tackle heat risk which London can learn from?

- **Medellin, Colombia -** Green Corridors program has lowered city temperature by up to 2-3°C by planting a network of trees and vegetation across the city. Has reduced the urban heat island effect, boosted biodiversity and improved air quality.

- **Seoul, South Korea -** Installation of shade canopies in busy public areas, created Urban Wind Path Forests to channel cool mountain air into the city, and uses smart water spraying systems to lower street temperatures during extreme heat.

- **Athens, Greece -** Appointed one of the world's first Chief Heat Officers and developed a city wide heat resilience plan focused on both immediate heatwave relief and long term cooling. Measures include creating shaded routes through tree planting and new pergolas, using cool materials and reflective pavements, and delivering "cool" public spaces across the city.

- **Los Angeles, USA -** Requires cool roof materials for most new residential developments.

- It is likely that greening and tree planting will make the biggest difference in London, the city already has significant green spaces, but increasing shade and evapotranspiration through trees and vegetation will be critical. This is challenging in dense inner London areas, but targeted planting, pocket parks and green corridors can still deliver meaningful cooling.

- Shade canopies, as used in Seoul and Athens, offer adaptable solutions for constrained urban areas where tree planting is limited.

London Assembly Planning and Regeneration Committee Call For Evidence: Are London's homes ready for a heatwave?

Overview

As a Mayoral Development Corporation, London Legacy Development Corporation (LLDC) has primary evidence related to overheating of homes, learnings associated with that experience, and updated standards and methodologies based on that learning. The following evidence submission considers some of the Committee's key questions and gives an overview of our experience on Queen Elizabeth Olympic Park.

Response

Last year, LLDC launched its Framework for Inclusive Growth which places health and wellbeing at the centre of its activity. This is particularly important for successful placemaking, where neighbourhoods and homes directly impact people's health and the broader health of the city. It also reflects a commitment to creating a sustainable and resilient habitat – one where neighbourhoods are designed around both current and future community need. In parallel, the Park's role as an innovation district supports this ambition by providing an environment to test, scale, and adopt new solutions that improve outcomes for Londoners.

LLDC has a Climate Action Strategy which identifies climate resilience as a key consideration. Since its inception, LLDC has consistently treated climate resilience as a core requirement in the delivery of new homes. Indeed, ensuring that developments are designed and built to withstand a changing climate is embedded in LLDC's business-as-usual approach.

Like the wider built environment sector, LLDC has identified two key factors contributing to an increased risk of overheating:

1. Design and construction methodologies developed in the early part of the 21st century, shaped by 20th century-challenges and a focus on keeping dwellings warm in winter. This, compounded by a market-driven architectural preference for large (often full-height) windows, has increased solar gains in dwellings.

2. Climate change has already exceeded earlier temperature projections. Weather data used for the planning of climate resilient homes traditionally relied on forecasts for the 2030s, yet many of those conditions have been experienced sooner than expected.

LLDC was an early adopter – relative to the wider built environment sector – in recognising the importance of design in reducing overheating risk, including the use of updated climate and weather data.

As one of London's Great Estates, LLDC's long-term perspective enables evaluation and learning from completed developments. Key evidence drawn from LLDC's experience is summarised below:

- LLDC has undertaken post-occupancy evaluation (POE) for the first 1,182 homes delivered at Queen Elizabeth Olympic Park and has made it a landowner requirement for POE to be undertaken on future developments. Feedback from residents on daylight levels and winter warmth was especially positive, but concerns about summer overheating highlighted the need to improve shading and ventilation to enhance comfort and wellbeing indoors during warmer months. Additionally, there was strong evidence that dual aspect homes overheat significantly less than single aspect homes. These insights are already being used to inform current and future developments. Evidence from the pilot study can be found here, while findings and recommendations from the full POE study will be published in June 2026, which we look forward to sharing with the Committee.

- Application of learning includes the development and implementation of higher design and construction standards. This includes wider built environment sector best practice, using CIBSE (Chartered Institution of Building Services Engineers) methodologies to better test compliance with Building Regulations Part O. It also includes the development and application of LLDC's own standards for sustainable development.

- Central to this is LLDC's Design Guide 'Preparing for a 1.5ºC future', which sets out LLDC's vision and aspirations for the built environment within the context of the climate emergency. It provides pragmatic guidance for delivering exemplar developments aligned with a 1.5ºC Paris Agreement future and includes a dedicated section on minimising overheating.

- Pudding Mill Lane is likely to be the first completed development that complies with the updated Building Regulations Part O and CIBSE methodologies. As such, it won't be until after completion in 2029 that LLDC will be able to commence a POE study and assess the impact of these enhanced measures. However, the strong, modelled hypothesis is that they will result in a significant reduction in overheating risk. Despite these improvements, longer-term weather projections continue to show the risk of overheating – a challenge common across the built environment sector.

- In the POE findings, residents highlighted the amenity value of green space. Research shows that trees play a critical role in cooling the urban environment, with direct benefits for reducing heat exposure in and around homes. However, other evidence indicates that, if poorly selected or incorrectly located, trees can in some cases contribute to higher night-time temperatures. For this reason, LLDC monitors the type, location and number of trees planted across its neighbourhoods to ensure that their cooling benefits are effectively realised for residents.

- Following the POE, LLDC is now undertaking a GLA-funded pilot at Chobham Manor to test the viability and effectiveness of retrofitting solar shading to apartment buildings. Though the pilot has yet to be implemented, early assessment indicates a range of challenges associated with retrofitting solar shading devices, including technical feasibility, financial viability, planning and legal (ownership and maintenance). The study will monitor temperature and humidity of homes over two summers (2026 and 2027) and will also review the effectiveness of resident-led adaptations such as air conditioning and internal blinds.

LLDC shares its learnings across the GLA Group – including through the Homes for Londoners collaboration programme - and with its external development partners. It also embeds these insights into clear, tangible standards and requirements for its development partners.

We look forward to discussing these learnings with the Committee and hope the results of our POE study will be further useful evidence.

Are London's homes ready for a heatwave?

May 2026

About L&Q

L&Q is one of the leading housing associations in the country. We house around 250,000 people, mainly from across London, the South East and North West of England. Our vision is that everyone deserves a quality home that gives them the chance to live a good life. We have launched our new five year corporate strategy. It sets out how we'll continue prioritising investment, and improvement in homes and services, to deliver better outcomes for residents.

Over the past 5 years, our previous strategy delivered significant progress including:

- Launching a £3 billion, 15-year major works investment programme that will make sure every resident's home is safe, decent and more energy efficient.

- Implementing a new localised housing management approach that has put 30% more frontline colleagues in local neighbourhoods.

- Improving the quality and responsiveness of our repairs service through a change programme which has already delivered a 20% increase in first-time fix on day-to-day repairs.

- We're also developing new systems and ways of working to improve how we manage our data and information, and how we communicate with residents, particularly vulnerable residents who may need different types of support

However, we are operating in a very challenging economic environment, with rising interest rates, inflated costs and capped rents putting pressure on our ability to spend. We have committed to investing significant sums to bring our homes and services in line with changing regulatory standards, and the decisions we make are centred around safeguarding that investment.

Executive Summary

L&Q welcomes the London Assembly's focus on reducing overheating risk. Rising temperatures are impacting London's homes and addressing this is of critical importance given the risk that overheating, and particularly increased humidity, poses to the health and safety of Londoners.

We emphasise to the London Assembly the importance of passive design hierarchies, including implementing shading and adjusting orientations, to address overheating risk without compromising on energy and sustainability standards. Green spaces are also essential for managing overheating risk, however, they require careful management, which may increase costs on estate services and residents through service charges. Relief or grant funding will also be essential as social housing providers are already facing significant cost pressures in meeting existing design regulations, as well as complying with wider regulatory requirements, including Biodiversity Net Gain (BNG) regulations, and delivering urgently needed affordable housing.

We advocate for cooperation and knowledge sharing between housing providers and with Londoners to manage overheating risk. L&Q have previously collaborated with others in the housing sector to produce protocols on several issues in London's housing stock, including mould and damp management - the same should be done to manage overheating. We recommend the London Assembly facilitate an overheating working group to encourage collaboration and knowledge sharing. We are also a key stakeholder in the London Legacy Development Corporation's (LLDC) work to inform heat risk retrofit works at Chobham Manor in Stratford, London. The £180,000 revenue grant awarded to the LLDC by the GLA in September 2025 will help households undertake heat risk retrofit works using bespoke, technical guidance.[1] Effective partnership is vital in creating shared processes and solutions to tackle this new and increasing risk and we would welcome further support and funding for heat risk retrofit works.

We encourage continued retrofit of insulation to ensure homes stay warm in the winter. Research shows improving thermal insulation to keep heat in in the winter can help to mitigate against overheating as it slows heat transfer and can help to prevent excess temperatures.[2] Our residents also pair overheating issues with concerns about colder homes during the winter months. We would stress, though, that retrofit insulation can lead to overheating issues if it is completed poorly, without considering ventilation or spatial design. Overheating risk should be built in at the planning stage through thoughtful design when retrofitting buildings. We would recommend greater coordination between planning and building regulations to avoid contradictory policy requirements which may exacerbate temperature issues.

1 ADD2783 Adapting existing homes to extreme heat - proof of concept pilot in Chobham Manor | London City Hall
2 Are overheating homes really a disaster waiting to happen? | Saint-Gobain

Response

Question 1: What is the overheating risk currently facing London's homes and how is this risk evolving?

Part A: What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

It is difficult to estimate an exact proportion of homes in London at risk of overheating, however, we understand it to be significant. Reports suggest over 80% of UK households experience overheating during the summer months and further research has shown that London's temperature is rising 5 degrees Celsius faster than the UK average.[3] London's high density and the urban heat island effect contribute to this faster rise in temperature and the city's vulnerability to overheating.

In attempting to understand this risk, L&Q have collected data on the average temperature of properties with working heat sensors from December 2024-February 2025 and from June-July 2025. The sensors, initially installed to assess underheating following damp and mould reports, measure the Humidex (humidity index) band of a property. Humidex is a scale that combines temperature and humidity into a single number to reflect how hot it feels to the average person. A score of 40 or above suggests residents would experience serious discomfort, with increased risk of heat exhaustion and heat stroke, as well as high health risks, especially for the elderly, young children and people with heart or respiratory conditions.

Of the 8860 properties with active sensors, 1478 showed activity in the Humidex band 42 (16.68%). When reference to bathroom (shower room, wet room, en suite etc.) is removed, this leaves 474 properties with activity in the Humidex band 42 (5.35%). Of the 1478 properties, 635 spent 24 hours or more in Humidex band 42 between June and July 2025. While the data includes only a sample of L&Q's total stock, it indicates that overheating poses a health risk in a significant proportion of London's homes.

Climate change is bringing more extreme weather events, including higher temperatures and heatwaves. It is expected that temperatures of 28 degrees Celsius are likely to become the norm in London in the coming decades.[4] This would increase the proportion of homes at risk of overheating if no further measures were taken.

Please also see our response to Part C for more information.

Part B: How does overheating affect different demographics, including tenure of housing, age, disability and gender?

The Energy Follow Up Survey (EFUS) collected temperature data from 750 homes between autumn 2017 and spring 2019. The English Housing Survey (EHS) also provides data on overheating from its survey of over 2,600 households. The resultant data showed homes in the social sector had a higher prevalence of overheating in the living room (26%) and main bedroom (29%), compared with private sector homes (13% and 17% respectively).[5] A 2023 report by the Resolution Foundation also found that

[3] Inside Housing - Insight - As we focus on warm homes, do we risk homes that are too warm?
[4] Overheated homes: why UK housing is dangerously unprepared for impact of climate crisis | Environment | The Guardian
[5] Risks to health, wellbeing and productivity from overheating in buildings July 2022

two-thirds of social-renting households had the highest risk of overheating.[6] However, 259,300 housing association households self-reported overheating in 2023 according to the National Housing Federation. This represents 10.5% of homes reporting overheating, the lowest proportion of any tenure.[7] Overheating risk thus disproportionately impacts homes in the social housing sector, though there are discrepancies between homes managed by housing associations and other socially-rented homes.

The demographic make-up of social housing impacts who is most vulnerable to this higher overheating risk. The EFUS and EHS data showed overheating risk was more common in homes with a pensioner present (24%), than in those without (11%).[8] Furthermore, disabled people are three times more likely to live in social housing than those without a disability, and residents are more likely to be from an ethnic minority background.[9]

Part C: How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

L&Q undertake an overheating assessment by examining the noise levels and air context at new development sites. This information is then used to inform ventilation and overheating strategies, which must respond to noise and air site constraints and manage potential contradictions between the two. For example, if a site is noisy and the windows in a home would need to remain closed to achieve acceptable noise levels, the overheating strategy would need to be calculated based on the windows remaining closed (reducing ventilation and airflow).

When generating an initial cost plan for a new scheme, L&Q expects to budget for 50% of the units to have mechanical cooling. Mechanical cooling uses machinery to provide localised cooling, reducing the peak temperature of a room by 4-5 degrees Celsius. It will not create fully air-conditioned homes as it does not offer precise temperature control, but it can provide more comfortable temperatures. Whilst there is currently minimal data on the success of mechanical cooling due to the newness of the measure, this design position theoretically means that 50% of new build units would remain vulnerable to overheating as specified under Part O of the building regulations. L&Q does strive to reduce this proportion, though it is not always possible due to budgetary constraints.

We also measure PSI and U values, which are used in RIBA Stage 3 and Standard Assessment Procedure (SAP) assessments to ensure we comply with Part O and Part L of the Building Regulations. PSI values measure heat loss at junctions, such as thermal bridging between walls and floors. Reducing PSI values minimises cold spots and can improve SAP ratings. U values measure heat loss through components, including walls, roofs and floors, with lower values indicating better insulation.

Industry standard data is used at the preconstruction stage (RIBA Stage 3) to assume PSI and U values for overheating assessments, however these are proving to be unrealistic when detailed calculations are completed during RIBA Stage 4. Enhancements to improve U values may increase the risk of overheating, as heat could become trapped inside the home if appropriate ventilation is not also

6 Its getting hot in here, Resolution Foundation (August 2023)
7 National Housing Federation - Overheating in homes: why we're launching a cross-sector campaign
8 Risks to health, wellbeing and productivity from overheating in buildings July 2022
9 Households living below a Minimum Income Standard: 2008–2024, Joseph Rowntree Foundation (February 2026); National Housing Federation - What does the data tell us about equality, diversity and inclusion in the social housing sector?

considered and included. To mitigate this risk, we may introduce additional measures into the design, to prevent overheating, such as mechanical cooling and triple glazing. However, this could lead to significant increases in construction costs, if the 50% provision of mechanical cooling needs to be raised to meet overheating requirements.

We are currently developing a scheme of 259 apartments in Plumstead where we have encountered these issues with unrealistic PSI and U values, carried forward from the preconstruction stage. To manage risk here, we may add cooling coils to the mechanical ventilation with heat recovery (MVHR) system – a system which reduces heating and cooling demand by providing energy-efficient ventilation. Feedback from our supply chain and consultants suggests this is an increasingly prominent issue in inner-city sites.

Whilst we dedicate significant time to ensuring that overheating risk in new developments is calculated thoroughly, this does not necessarily lead to heat-resilient homes. Anecdotal evidence from residents and news outlets suggests homes are too hot. One news report describes residents' complaints about high temperatures during summer in new build shared ownership homes with large windows.[10] The Climate Change Committee's July 2022 report on overheating also emphasised overheating risk due to specific features of new build properties, including large plate glass windows and converted office blocks with large windows.[11] We have also recorded 13 complaints from London residents about overheating between October 2023 and March 2026. These highlighted how poor ventilation was causing overheating homes during the summer months and frequently mentioned concerns that these same issues would lead to excessive cold in the winter months. With the implementation of phase two of Awaab's Law in October 2026, we expect to see a rise in overheating complaints.

As noted in our response to Part A, the risk of overheating is highly likely to increase and, given that Londoners are already reporting concerns, current assessments of households impacted appear insufficient. We would stress, however, that at a time of acute viability challenges in delivering new homes in London, any increased requirements to assess or mitigate overheating should be matched by funding commitments to ensure schemes remain financially viable.

Part D: How do different building typologies contribute differently to the urban heat island effect and overheating in London?

Green space is less prevalent in London, with 61.1% of homes having a private garden, compared to 86.6% nationally. 10.1% of London's homes have no outdoor space.[12] Green spaces can mitigate the urban heat island effect by providing shading and evapotranspiration, where plants release moisture, helping to cool the air. Homes in London are also smaller and more densely concentrated, with average floorspace per dwelling 80.7m^2 versus 90.4m^2 across the rest of England.[13] Smaller homes are more at risk of overheating, with limited airflow and closer proximity to internal heat sources, contributing to increased temperatures inside the home.

Part E: How is the risk of overheating different in London than in other parts of the UK?

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[10] 'It was 30 degrees inside the flat': London's new-build heatwave nightmare | The Standard
[11] Risks to health, wellbeing and productivity from overheating in buildings July 2022
[12] English Housing Survey, 2022/23 Headline report annex table 1.7
[13] Greater London Authority, 2023, Housing in London

Whilst there is a large variety of homes which are vulnerable to overheating, high-rise flats may be more at risk. These buildings often have less shade from trees with top flats most at risk from rising heat. London's building typology is heavily flat-centric. The capital has four times as many homes in high-rise buildings compared to the English average and 50.2% of the homes built in London since 2002 have been flats in high-rise buildings.[14] A higher proportion of London homes may be at risk of overheating if this building trend continues.

Developments in London are also subject to additional requirements, beyond the Building Regulations, through the London Plan. The carbon and energy performance requirements call for a minimum 35% on-site carbon reduction beyond Part L of the Building Regulations. Additional 50% improvement targets may also be encouraged under the Plan. Whilst we understand that these requirements support net-zero ambitions, the improved façade performance can increase the risk of overheating if ventilation and spatial design elements are not considered.

Part F: Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc.)?

L&Q strives to follow the prescribed regulations and guidance regarding overheating, completing a time-intensive process to manage the risk of overheating in new build homes. However, we understand that the current guidelines may not be enough to manage increasing risks. Part O of the building regulations are reasonably new thus there is little to no data demonstrating whether they are being implemented effectively or have reduced overheating in practice. Further time is required to allow new schemes to be completed to assess this fully.

When developing new homes, L&Q considers multiple details, including daylight and sunlight requirements, Part O of the Building Regulations, and energy and sustainability requirements. Building regulations encourage a passive design hierarchy, recommending designs which meet daylight and overheating requirements without resorting to mechanical processes. Passive cooling measures include shading to block direct sunlight, orientations to reduce high-angle summer sun and shapes which reduce the total exterior surface area exposed to direct sunlight. Cross-ventilation is also important to help cool air inside during drops in temperature at night. It is our view that passive cooling measures should continue to be prioritised over mechanical measures, such as air conditioning, as these are carbon-intensive and contradict energy and sustainability requirements. Mechanical measures should therefore only be used where passive measures would not be viable.

There are, however, viability issues which can prevent passive design measures from removing overheating risk. Primarily, these measures are expensive, particularly when balancing overheating risk with other requirements. Solar shading, for instance, creates design complexities and can be difficult to install. Moreover, typical window suppliers do not often offer it as it is not a legal requirement. There is also a risk that solar shading would not comply with building regulations post-Grenfell, which aim to keep facades as simple as possible. Therefore, at L&Q, we often manage overheating by adapting window sizes. Notably, there are limitations to the extent this can reduce overheating without compromising on daylight requirements. We are ultimately concerned that without additional funding, social and affordable

[14] London has four times the national average of high-rise homes, London Assembly analysis shows | London City Hall

housing providers will be unable to tackle overheating risk through these passive design measures whilst still complying with the necessary building safety regulations.

Question 2: How should we be tackling overheating?

Part A: What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

The final Homes for London package, confirmed in March 2026, loosened density-constraining rules to encourage housebuilding. The package withdraws Standard C4.1 from the Housing Design Standards London Plan Guidance 2023, which encouraged new homes to be dual aspect. This means new homes will no longer need to have windows or openings on at least two different walls. L&Q's priority is building homes and we welcome the removal of the dual aspect requirement which can constrain the viability of new schemes. However, we recognise the need to maximise dual aspect where possible to encourage ventilation and reduce overheating risk.

Part B: Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

We support the current stance on air conditioning and emphasise that it should be used as a last resort. Air conditioning has a high upfront and on-going cost and could leave Londoners vulnerable to energy price spikes. Localised mechanical cooling, by comparison, has a fixed cost for residents as there is a cap on how cool it can make a property. Air conditioning is also carbon-intensive, contributes to the urban heat island effect and could counteract net zero emissions targets. We continue to advocate for passive cooling measures to reduce the risk of overheating though stress that additional funding may be required to ensure these measures can be introduced effectively.

Part C: What should developers do to ensure that the homes constructed today will be heat resilient?

It is our view that the primary action developers can take is to comply with the current regulations and continue to implement passive cooling measures. Thoughtful design can reduce the risk of overheating without needing to resort to energy-intensive mechanical measures. We would advocate, though, for increased funding and partnership working to ensure passive cooling measures can be implemented effectively without compromising on building safety or daylight requirements.

L&Q is also currently constructing 75 homes across three sites in the London Borough of Merton which adopt Passivhaus standards. The standards focus on embedding fundamentals such as orientation, layout and window sizes into the planning process and encourage air tightness, high fabric performance and shading. Despite the schemes not originally being designed to achieve this standard, it has proved an interesting exercise to assess how design can be adjusted to improve homes.

As Passivhaus becomes more mainstream and is applied to larger developments from inception, we expect to see a subtle shift in architecture. For example, building forms may seek to achieve efficient form factors through simplified buildings, window openings may change shape, full height windows may become less common, and window sizes are likely to reduce in size. New forms of shading may also be incorporated, through balconies, Brise Soliel or shutters.

We encourage developments that are easy and intuitive for Londoners to use. This may require the use of more advanced MVHR systems and design approaches that encourage regular airing of homes, reflecting established German development practices.

Part D: What support should be made available to homeowners and tenants to better manage overheating risk?

There are a wide range of measures which can be implemented to support homeowners and tenants. Depending on the nature of the problem, this could range from information leaflets highlighting that blinds and curtains should remain closed on sunny days, to retrofit works such as glazing and shading. We would welcome support from the London Assembly and the Mayor of London to ensure that funding is available for retrofit works where necessary. We would also encourage the London Assembly to explore a business case for increasing tree cover and green spaces on estates and public land whilst managing the perceived increased cost of maintenance for providers and residents via service charges.

We appreciate existing pilot projects for heat risk retrofit works, such as that being carried out by the London Legacy Development Corporation (LLDC) at Chobham Manor. Of the £180,000 grant awarded by the GLA, £120,000 has been allocated to support around 24 households from a mix of housing types and tenures to undertake heat risk retrofit works in line with technical guidance - with those who have the least capacity to adapt their homes given greater support. This funding is a key step in ensuring London's homes are heat resilient and highlights how Londoners can be supported to better manage overheating risk. We advocate for schemes such as this to become more widespread throughout London.

L&Q provide warm home facilities across London inside community centres during periods of cold weather. We advocate for the dual-use of such facilities as cooling centres to support homeowners and tenants during heatwaves. These could operate in a similar way to Paris's 'cool islands', whereby over 800 public spaces are opened to ensure people can stay cool during high temperatures.[15]

Part E: Are there developments in London that manage heat risk well?

As noted in our response to Question 1, Part F, Part O of the Building Regulations are reasonably new thus there is little to no data demonstrating whether they are being implemented effectively or have reduced overheating in practice. L&Q is continuing to build homes under these regulations and we are confident that this will have a positive impact, though further time is required to assess whether new developments manage heat risk well.

Part F: Are there examples of cities which have adopted strategies to tackle heat risk which London can learn from?

Solar shading, such as external canopies and shutters, is popular in several European cities. This is effective at managing overheating risk by reducing direct sunlight. We believe it would be beneficial for London to accept the cost of this passive cooling measure to mitigate overheating. Additional grant funding would be an important step to ensure it can be implemented effectively and safely in both new-build and existing homes as housing providers' finances are already stretched.

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[15] Cities100: Paris is using blue and green infrastructure to tackle city heat

Barcelona provides a strong model for reframing the discourse around overheating risk. The city has adopted a "resilience by design" approach, embedding climate resilience into the design process rather than treating it as an add-on.[16] London could adopt this holistic approach to managing the risk, paired with clearer language that adequately highlights the risks facing Londoners and their homes.

[16] European cities step up as record heatwaves highlight urgent need for climate adaptation - Energy Cities

London Assembly Planning and Regeneration Committee Inquiry: Are London's homes ready for a heatwave?

Met Office Submission, May 2026

Introduction

The Met Office is the UK's National Meteorological Service (NMS), a Public Sector Research Establishment (PSRE), and an Executive Agency of the Department for Science, Innovation and Technology (DSIT). We are a category 2 responder (under the Civil Contingencies Act), and are responsible for monitoring and predicting the weather and for delivering the National Severe Weather Warning Service (NSWWS), which helps protect lives, property, and infrastructure.

In addition to our operational forecasting role, we are home to the Met Office Hadley Centre for Climate Science and Services, a world-leading centre for climate research. The Hadley Centre provides robust, policy-relevant climate advice to the UK Government and international partners, supporting evidence-based decision-making on climate resilience, adaptation and mitigation.

It is in this capacity that we submit evidence to the London Assembly in support of its inquiry into the impacts of rising temperatures on London homes.

The Met Office monitors heat by utilising a combination of forecasting, impact-based warning systems, and collaborative planning with public health agencies to mitigate risks to life and infrastructure. As climate change makes heatwaves more frequent and intense, the Met Office have introduced specific warnings and communications to warn the public and the resilience community.

Key resources for monitoring and managing extreme heat which are issued by the Met Office and that could inform this Call for Evidence include:

- Extreme Heat National Severe Weather Warning: Introduced in 2021, these warnings (Amber, Red) are issued based on the expected impact of the heat, such as disruption to transport, power failures, or dangers to health, rather than just reaching a certain temperature.
- UKHSA Weather-Health Alert Service: Issued by the UK Health Security Agency (UKHSA) and supported by Met Office forecast data, these alerts are aimed at health and social care sectors to protect vulnerable populations. These align with the national weather warnings and range from yellow to red, with red indicating a danger to life even among the healthy population.
- National and Local Resilience: Met Office observations, forecasts and warnings play a major role in cross-government risk assessment and the plans which guide planning and response to extreme heat, both at national and local level.
- Public Advice: The Met Office provides actionable advice to the public, such as closing curtains, keeping hydrated, and avoiding travel during peak, to reduce heat-related health issues.
- Data and Research: The Met Office uses advanced modelling, including "urban street canyon" modelling (UCanWBGT), to better predict how cities trap heat. They also use observational data from the public to enhance local insights. For longer term decisions involving climate variability and change, the latest UK Climate Projections (UKCP18) provides the most up to date and comprehensive data sets, which can be accessed in a number of ways, including through the Met Office Climate Data Portal, or through the Local Authority Climate Service (LACS).
- UK Climate Change Risk Assessment (CCRA): There is a statutory requirement in the UK to update its climate change risk assessment every five years. The most recent report (CCRA4) – due to be published in May 2026 - contains an independent assessment of risk delivered by a consortium led by the Met Office and covers sectors including the built environment.
- Spatial climate risk assessment frameworks: The Met Office have developed a novel framework involving the application and extension of the CLIMADA open-source climate risk assessment platform, combining spatially consistent information on hazards and the exposure and vulnerability of at-risk systems, to better inform climate risk management, as well as related planning and decision-making. This approach has already been applied to schools and prisons in England (in partnership with DfE and MoJ), and could be used to assess overheating risk in homes in any given region of interest (e.g. London).

More details are laid out in our response below.

Met Office

Questions

1. What is the overheating risk currently facing London's homes and how is this risk evolving?
    a. What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?
    b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?
    c. How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?
    d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?
    e. How is the risk of overheating different in London than in other parts of the UK?
    f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

Response:

Overview

The latest Intergovernmental Panel on Climate Change (IPCC) AR6 WGII assessment[1] finds that extreme heat events in all regions have resulted in human mortality and morbidity. The UK's Third Climate Change Risk Assessment Technical Report (CCRA3)[2], supports this finding within the UK, stating that 'the risk of acute mortality increases at high temperatures'. Human-induced warming has led to a rise in global mean temperatures resulting in the increased intensity and frequency of extreme heat events and all regions currently experience at least 10 additional days per year when thermal deaths are expected to occur.[3] The UK may see an average of 15 million days of outdoor work lost to heat-stress in a 2°C warmer world, potentially representing more than £1.5 billion in economic losses. These impacts are greater if warming reaches 4°C[4]. The CCRA4 report, due to be published in May 2026 will build on this research.

Each year a report on the UK State of the Climate is published in order to highlight how the UK's weather and climate have changed compared to historical averages. The reports use scientific observations from the UK land weather station network and the HadUK-Grid dataset. These reports have highlighted that that we are experiencing higher maximum temperatures and longer warm spells in recent years. Over recent decades, temperature extremes have increased, becoming more frequent and more intense. For example, the hottest summer days have warmed around twice as much as average summer days in some UK areas when comparing the latest decade to 1961-1990, and the most recent decade 2015–2024 has been 0.41°C warmer than 1991–2020 and 1.24°C warmer than 1961–1990.

South East England has seen some of the most significant changes, with warm spells increasing from around 6 days in length (during 1961-90) to over 18 days per year on average during 2008-2017.

A scientific study by the Met Office into the Summer 2018 heatwave in the UK showed that the likelihood of the UK experiencing a summer as hot or hotter than 2018 is a little over 1 in 10, and was made up to 30 times more likely to occur because of the higher concentration of carbon dioxide (a greenhouse gas) in the atmosphere, than before the industrial revolution . As greenhouse gas concentrations increase heatwaves of similar intensity are projected to become even more frequent, perhaps occurring as regularly as every other year by the 2050s. The Earth's surface temperature has risen by 1°C since the pre-industrial period (1850-1900) and UK temperatures have risen by a similar amount.

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[1] IPCC (2022): Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, et al, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.

[2] Kovats, S. and Brisley, R. (2021) 'Health, communities and the built environment. In: The Third UK Climate Change Risk Assessment Technical Report' [Betts, R.A., Haward, A.B., Pearson, K.V. (eds.)]. Prepared for the Climate Change Committee, London

[3] Nikolaos Christidis, Dann Mitchell, Peter A. Stott (2019) "Anthropogenic climate change and heat effects on health", International Journal of Climatology 39 (12) pp. 4751-4768 https://doi.org/10.1002/joc.6104

[4] Laura C. Dawkins et al, (2023) 'Assessing climate risk using ensembles: A novel framework for applying and extending open-source climate risk assessment platforms' Climate Risk Management, Vol. 40, 100510, https://www.sciencedirect.com/science/article/pii/S2212096323000360. (https://www.sciencedirect.com/science/article/pii/S2212096323000360)

The 2022 UK summer heatwave, marked a milestone in UK climate history, with 40.3°C being recorded for the first time in the UK at Coningsby in Lincolnshire (19 July 2022),and new national records set in Wales (18 July 2022) and Scotland (19 July). The extreme temperatures were recorded as the UK was impacted by an unprecedented heatwave, with the previous UK temperature record of 38.7ºC provisionally met or exceeded at 46 stations, from Kent to North Yorkshire and from Suffolk to Warwickshire, including 40.2°C being recorded in St James's Park in London.

Future extreme heat events

Climate attribution[5] is a scientific technique that can be used to quantify the role of climate change in the probability or intensity of an extreme event, or to quantify the role of climate change in the scale of impacts from an extreme event. This technique increases the confidence of the link between the localised heat waves and climate change, which gives in turn increases confidence in projections of future heatwaves.

Several Met Office attribution studies have calculated the role of climate change in UK and European heat extremes, all finding that notable recent heatwaves are more likely or more intense due to climate change.

UNSEEN

A study led by Dr Gillian Kay in 2025 detailed the increasing chance of summer temperatures exceeding 40°C. The approach taken in the study, called UNSEEN, used a global climate model to create a large set of plausible climate outcomes in the current climate. This allowed for an assessment of the current risk and how extremes have changed over the last few decades. It was found that the chance of exceeding 40°C has been rapidly increasing, and it is now over 20 times more likely than it was in the 1960s. It was estimated that there is a 50-50 chance of seeing a 40°C day again in the next 12 years.[6]

Effect of anthropogenic warming on health relevant thermal extremes

A Met Office led study[7] to quantify the human influence on high-temperature-induced stress and on mortality. This was done through studying two indices: High Risk Warming (HRW) and High Risk Days (HRD), which describe the intensity and frequency, respectively, of thermal-death-related warming. The study compares the HRW and HRD over a historic period covering the 20th century, and also analyses the indices in projections of future climate under climate change.

The study revealed that the intensity and frequency of thermal-death-related warming in Central England has risen at a decadal rate of 0.1°C and 1.7 days, respectively, since the beginning of the 20th century. Globally, results show temperatures have already increased by 1.39°C (compared to pre-industrial levels). The total amount of warming by end of this century - based on current global policy commitments - is expected to be between 2.5°C and 3°C[8]. Furthermore, this increase in global warming levels are expected to lead to a large increase in the number of days of dangerously high temps projected to occur over land areas.

Whilst it is beyond the scope of this research to specify projected mortality figures, it does provide projections of the regional intensity and frequency of future warming to enable Governments and policymakers to mitigate thermal deaths through the planning and implementation of effective adaptation strategies. For housing in London specifically, these strategies could be applied to existing housing stock as well as informing the planning and design of new housing infrastructure in order to mitigate thermal deaths.

[5] Attributing extreme weather to climate change https://www.metoffice.gov.uk/research/climate/understanding-climate/attributing-extreme-weather-to-climate-change

[6] Rapidly increasing chance of record UK summer temperatures, Dr Gillian Kay et al, June 2025, Rapidly increasing chance of record UK summer temperatures - Kay - 2025 - Weather - Wiley Online Library

[7] Nikolaos Christidis, Dann Mitchell, Peter A. Stott (2019) "Anthropogenic climate change and heat effects on health", International Journal of Climatology 39 (12) pp. 4751-4768 https://doi.org/10.1002/joc.6104

[8] https://www.unep.org/resources/emissions-gap-report-2025

Met Office

Climate variability affecting mortality

A study within the UK Climate Resilience Programme[9] developed a suite of new datasets and statistical models of regional mortality, attributed to extreme temperatures[10]. By combining up-to-date mortality, hospital admissions and weather and climate data, they provide an estimate of how climate variability has affected mortality in the past and how it could potentially change into the future. Results, using the UK Climate Projections to assess future changes to UK mortality associated with the changing climate,[11] show that temperature attributed mortality in the UK is strongly linked to changes in global mean temperature, particularly in summer. When global mean temperature exceeds 2°C above pre-industrial levels, the number of deaths due to hot weather accelerates rapidly, without significant climate and social adaptation measures. The difference between a 3°C and 4°C world is stark, with an estimated 1181 additional summer deaths per year in a 3°C world (compared to current day) and 4183 additional summer deaths in a 4°C world.[12]

In addition to the studies referenced above, the Met Office is developing capability to deliver attribution studies as a climate service. This means that information from attribution studies will be more readily available to be used as part of communications during, or shortly after, extreme events. For example, during the extreme heat event of July 2022, climate attribution statistics were included in part of the weather warning communications to highlight the unprecedented nature of the heat for the UK. This was used alongside specific advice to help the public take action to stay safe. The Met Office is also leading the development of a global attribution service with three other Met Services (Royal Netherlands Meteorological Institute, Germany's National Meteorological Service and Met Norway) and funded by the Copernicus Climate Change Service. It is currently in its development phase.

2. How should we be tackling overheating?
    a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?
    b. Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?
    c. What should developers do to ensure that the homes constructed today will be heat resilient?
    d. What support should be made available to homeowners and tenants to better manage overheating risk?
    e. Are there developments in London that manage heat risk well?
    f. Are there examples of cities which have adopted strategies to tackle heat risk which London can learn from?

Overview

One of the first steps needed to reduce the impacts of extreme heat is understanding where extreme heat is more likely to occur and how this is likely to change in the future. Once the future climate risks and impacts are understood, communicating these to decision makers, and ensuring that they have access to robust evidence of climate risks at both national and local levels and over different timescales, will be key to supporting planning and preparedness for protecting vulnerable populations from the impacts of extreme heat. The Met Office have been exploring how our existing and emerging capabilities could support both the planning for, and response to, extreme heat events in the UK. We work at all levels: directly with Government, providing publicly available national services and supporting local authorities. In addition, the Met Office are conducting research that could support the expansion of these services in the future. In all these activities, partnership is vital for representing the transdisciplinary nature of extreme heat.

[9]Programme jointly led by the Met Office and UKRI with the study undertaken by the University of Reading https://www.ukclimateresilience.org/projects/addressing-the-resilience-needs-of-the-uk-health-sector-climate-service-pilots/

[10] Available through the Environmental Public Health Surveillance System portal https://www.gov.uk/government/publications/environmental-public-health-surveillance-system/environmental-public-health-surveillance-system-ephss and the CEDA archive https://catalogue.ceda.ac.uk/uuid/d15196fa0aec4cf4b489f62f866a1a72

[11] https://iopscience.iop.org/article/10.1088/1748-9326/ac50d5#:~:text=Global%20warming%20levels%20beyond%20around,%25)%20by%206%20%C2%B0C;

[12] https://www.ukclimateresilience.org/wp-content/uploads/2020/06/Pilot_Service_for_Health_Sector_summary_V1.pdf

Some examples are outlined below, from services for responding to current weather conditions to long-term climate services and research to support future decision making. In addition to these however, it is becoming increasingly evident that there is a need to take a systems view to responding to heat. For example, in instances when schools may reach a threshold for heat (see section on spatial climate risk assessment frameworks below) triggering actions such as sending children home, in some cases children may be returning to a worst situation if their homes are not adequately designed to deal with high temperatures.

UK Climate Projections

The UK Climate Projections[13] (UKCP) are a set of publicly available tools and data produced by the Met Office for the Department for Environment, Food and Rural Affairs and, originally, the Department for Business, Energy and Industrial Strategy. It provides the most comprehensive picture yet of our current climate and how the climate could change over the next century, including where extreme heat is more likely to occur. Government, businesses and individuals can use this data to inform decisions about responding to the changes in the UK climate. UKCP provides many innovative approaches to climate projection, including the use of "convection-permitting" models[14] to better simulate the present-day climate, provide credible climate information at hourly timescales and improving the ability to project the effects of extreme events at local scale. It has more than 15000 users.

Improving access to weather and climate data and intelligence

There is strong evidence of a demand for more easily accessible weather and climate data and intelligence. For instance, the Met Office Climate Data Portal and Local Authority Climate Service (LACS) , has a growing number of users (together more than 50,000) and there is evidence of application in building climate awareness, use in climate risk assessment, and it is starting to be used in adaptation planning. LACS, supported by Defra and part of the Met Office Climate Data Portal, is designed to support decision-making and adaptation planning in Local Authorities, providing them with crucial information on climate change in their area. For example, to reduce emissions and to coordinate climate action at a local level, Local Authorities need access to area specific information for their local communities and the services that they provide. Over 21,000 Climate Reports have been generated since the initial launch, and include detailed information on climate change in the selected Local Authority at different warming levels and consider potential impacts as well as future climate risks. The tool visualises climate challenges, explores climate projections and communicates a climate story specific to local areas. This service can now be provided at Borough scale and therefore can provide projections around heat over different timescales and locations in order to inform the design and planning of new housing stock in London.

A further example is in the utility of combining multi-hazard data as done through the Natural Hazard Partnership Daily Hazard Assessment (>2000 daily recipients) where data for nine hazards is aggregated to provide a one stop shop for the resilience community. Providing broader access of sector relevant data tailored to particular types of user is likely to contribute towards better long-term resilience and planning.

Spatial climate risk assessment frameworks

Currently, in many instances, risk associated with extreme heat is assessed based on regional 'weather files'[15]. These are not spatially consistent[16], meaning often only one weather file is used per region to represent every location in the region (e.g. weather conditions at Heathrow Airport have historically been used to represent all the Greater London region). This approach doesn't always capture the local climate (i.e. temperatures are likely to be warmer in central London compared to Heathrow Airport due to the urban heat island effect).

To effectively consider climate risk from extreme heat across multiple locations, it is important to access climate information that is relevant to each geographical location. This helps climate risk to be understood in a spatially consistent way and supports local decision makers to understand location-specific impacts to vulnerable demographics in their communities. One approach for quantifying climate risk in a spatially consistent way is to use a form of quantitative risk assessment framework, for instance using an approach known as a catastrophe model in the

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[13] UK Climate Projections www.metoffice.gov.uk/research/approach/collaboration/ukcp/index

[14] Future Climate for Africa: "What are convection-permitting models?"https://futureclimateafrica.org/news/what-are-convection-permitting-models-and-how-can-they-improve-understanding-of-extreme-weather-in-africa/

[15]Mylona. A (2017) "The use of UKCP09 to produce weather files for building simulation" Building Services Engineering Research and Technology Vol.33 (1) pp 51-62 https://doi.org/10.1177/0143624411428951

[16] Meaning that the risk varies across locations in line with the spatial variability in the hazard (i.e. capturing urban heat islands) and allows for the impact of a given extreme heat event at different locations to be assessed in a consistent way.

insurance sector. The use of this type of climate risk assessment could be expanded further to increase support to the most vulnerable during, and in advance of, periods of extreme heat.

The Met Office is exploring how representation of climate information could be more accurate and support more targeted risk assessments and adaptation measures. As part of the UK Climate Resilience Programme, the Met Office have developed a novel framework involving the application and extension of the CLIMADA open-source climate risk assessment platform[17]. This framework combines spatially consistent information on hazards and the exposure and vulnerability of at-risk systems. The framework can be applied to any region, hazard or risk metric of interest (provided suitable data is available). As a case study, the team used this approach to show that the UK may see an average of 15 million days of outdoor work lost to heat-stress in a 2°C warmer world, potentially representing more than £1.5 billion in economic losses. These impacts are greater if warming reaches 4°C. This new methodology can be used to better inform climate risk management, as well as related planning and decision-making.

Following this initial application, the Met Office worked with the Department for Education (DfE) and University College London (UCL), to apply this approach to explore current and future overheating risk in schools in England[18] (Dawkins et al., 2024). The results of this study indicate that the most at-risk schools could experience up to 15 school days of internal temperature in excess of 35 °C in an average year if the climate warms to 2 °C above pre-industrial. This work has been since extended to implement higher resolution climate projections, more detailed school building model information, and an additional assessment to the risk to 'loss of learning'. This was subsequently used in DfE's national climate risk assessment for education delivery, and has had a substantial influence on government policy for DfE.

This approach was then adapted for the Ministry of Justice (MoJ) to assess overheating in prisons in England and Wales, using building specific archetypes and thermal outdoor-indoor temperature modelling based on temperature sensor data collected by Oxford Brookes University (paper under review). The Met Office are now in discussions with the Department of Health and Social Care about extending this to assess overheating risk in Hospitals in England.

With suitable funding, this spatially consistent risk assessment approach has the potential to be translated to assess overheating risk in homes in any given region of interest (e.g. London), provided suitable data is available on the location and thermal response of homes.

The Met Office is currently working to extend this framework to include the assessment of robust place-based adaptation decision-making, funded by the Maximising UK Adaptation to Climate Change (MACC) Programme. The Met Office are also supporting other research projects under MACC, including ARCADE and ATTENUATE (both of which have case studies focused on overheating in homes in regions of London). For this the Met Office are providing climate science and services expertise and cutting-edge weather and climate datasets, enabling new transdisciplinary knowledge for UK climate adaptation.

Crowd-Grid

Met Office scientists have built a new dataset that provides a snapshot of the temperatures experienced in the UK in recent years (2013-2024). This new dataset, called Crowd-Grid, leverages quality-controlled public observations to improve our understanding of the local detail in heatwaves and cold spells, and how it varies across urban and rural areas. This improved understanding can then inform decisions aimed at reducing the impact on the UK population of future heatwave events, for example.

This new dataset has been designed to complement the longstanding HadUK-Grid, which will continue to be informed solely by data collected from official Met Office weather stations with calibrated sensors that meet strict national and international standards. Whereas HadUK-Grid is ideal for monitoring long-term changes in climate, Crowd-Grid provides greater spatial detail to offer insight into the temperatures people are already experiencing in everyday life, including on streets and near buildings.

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[17] Laura C. Dawkins et al, (2023) 'Assessing climate risk using ensembles: A novel framework for applying and extending open-source climate risk assessment platforms' Climate Risk Management, Vol. 40, 100510, https://www.sciencedirect.com/science/article/pii/S2212096323000360.

[18] Laura C. Dawkins et al, (2024) 'Quantifying overheating risk in English schools: A spatially coherent climate risk assessment' Climate Risk Management, Vol. 44, 100602, https://www.sciencedirect.com/science/article/pii/S2212096324000196?via%3Dihub .

These spatial details may be valuable for local authorities and others who are making decisions about how to adapt to recent and future climate change, including housing developers and planning departments in London Boroughs. The Crowd-Grid team has also created Recent Heat Packs that provide information about the temperatures experienced recently in each local authority area. These Recent Heat Packs complement existing information available via the LACS (see above), which provides local authorities with easy access to tailored information on climate change to support local adaptation planning.

Embedding current weather and future climate information into standards and regulation

Many existing standards for e.g. structural design and buildings, do not adequately take account of current envelope of extreme weather or future climate conditions. Many regulators do not comprehensively include climate change routinely in their regulation. As a step toward improving standards, the Met Office is currently exploring how climate change might be included in standards with organisations such as the British Standards Institute (BSI), the World Meteorological Organisation (WMO), to ensure the standards are based on high-quality climate change information.

Health Protection Research Unit

The National Institute of Health Research-funded Health Protection Research Unit in Environmental Change and Health provides research to support decision making relating to the impacts and responses to environmental change that affect human health, including heat. Funded by the National Institute of Health Research since 2020 (for five years), the Unit is led by the London School of Hygiene and Tropical Medicine, in partnership with UKHSA, the Met Office and University College London. The Unit's research on heat aims to examine variations in heat risk to health over time and spatially, behavioural insights and risk communication relating to extreme hot weather events and the health impacts of droughts. The Unit also researches the direct impact of heat on populations and healthcare resources, and indirectly impacts on the built environments (e.g. impacts on indoor living conditions).

Met Office

Department for Environment Food & Rural Affairs

Climate Report for London

Generated on: 14/04/2026

Introduction

This Climate Report provides high level, non-technical summaries of climate change projections for a local authority area. It uses scientific research to provide robust climate information to help decision makers plan for the future, enabling local authorities to become more resilient to climate change.

Each local authority experiences its own unique challenges from climate change. For example, urban areas are affected by the urban heat island effect resulting in higher urban temperatures compared with rural surroundings, whereas low-lying coastal areas may be at greater risk of flooding from rising sea levels.

What affects the region's weather?

London is located within the Southern England climate region. The types of weather that Southern England experiences across a year include:

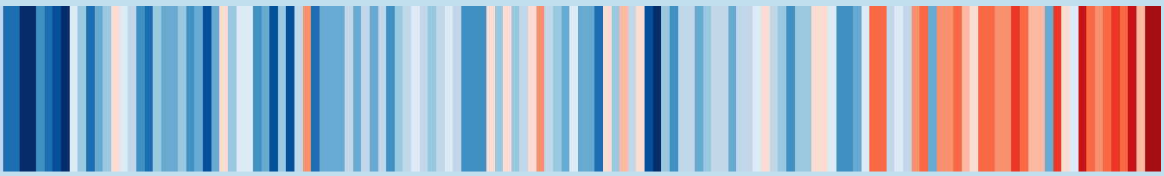
Continental Europe brings cold spells in winter and hot, humid weather in summer to Southern England. Coastal areas experience sea breezes, which result in lower maximum summer temperatures and milder winter temperatures, compared to inland.

Southern England experiences high summer temperatures. London's average daily maximum temperature for July is 23.7°C - the highest in the UK. The Urban Heat Island effect also contributes.

Southern England is also furthest away from the paths of Atlantic depressions which bring cloud, wind and rain. Coastal areas may experience greatest rainfall in autumn and early winter whilst inland areas may also experience high rainfall in summer, due to convective showers.

The sunniest locations within mainland UK are found within Southern England. At some coastal locations, average annual sunshine hours exceed 1800 hours.

How has the climate changed in Southern England?



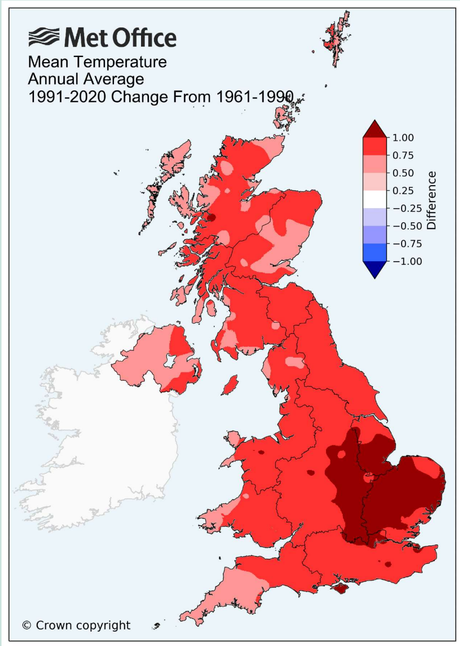
Temperature Difference (°C)
Data: HadUK-Grid
Concept: Ed Hawkins

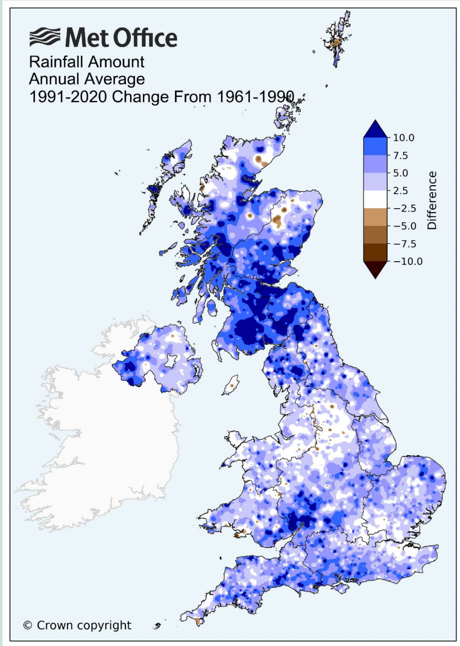
London is located within the Southern England climate region, where temperatures have increased (1884-2023), with many of the hottest years occurring in the last few decades

Climate Change in the UK

Observed changes

How have temperature and rainfall changed across the UK? These maps show changes in annual mean temperature (left) and rainfall (right) from 1991-2020 compared to a baseline period of 1961-1990. Temperatures have risen in all areas across the UK. Whilst some areas have become drier, more areas have become wetter. Some places that have become wetter over the year as a whole have also become drier in summer.





Impacts

Urban, rural and coastal regions across the UK are already experiencing the impacts of climate change. The negative impacts of climate change may include:

Heat
Increased energy demand for summer cooling

Sea Level Rise
Increased risk of coastal flooding

Heavy Rainfall
Increased risk of river and surface water flooding

Health
Increased risk to health from heat stress

Drought
Risk to water supplies from drought

Drainage
Increased disruption to urban drainage systems

Transport
Increased disruption to transport due to heat e.g. rail buckling

Environment
Increased risk to biodiversity (plants and animals)

Energy
Infrastructure such as gas pipes are at high risk from flooding events

Future headlines

The climate is already changing, and we are already seeing impacts. But how might the UK's climate change in the future? The amount of future climate change will depend on how much greenhouse gas the world emits. However, even in the most optimistic scenario we are locked in to some further climate change.

There is an increased chance of **warmer, wetter winters and hotter, drier summers.**

Although the trend is for drier summers in the future, there may be increases in the intensity of heavy summer rainfall events.

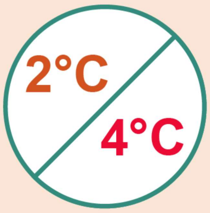
Hot summers are expected to become more common. By 2050, every other summer may be as hot as the record breaking summer of 2018.

Sea level will continue to rise in the 21st century even if greenhouse gas emissions are reduced rapidly.

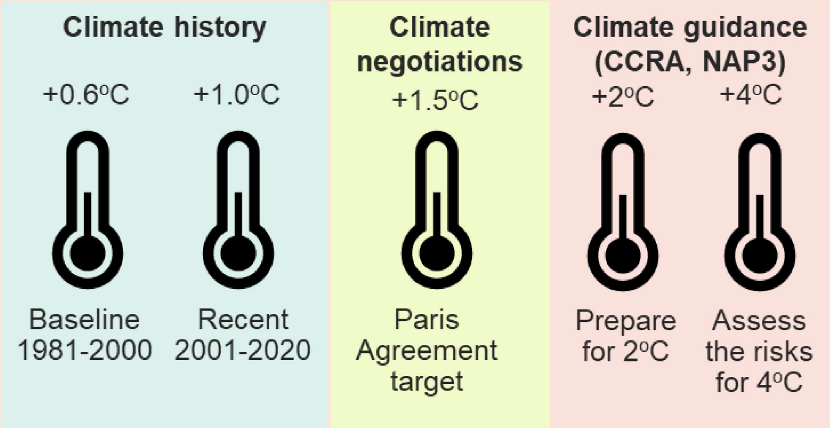
Local changes in the global context

Global Warming Levels

Global Warming Levels (GWLs) are a simple way to represent climate change at the global scale, which then drives local changes. They allow us to explore different strands of climate hazard information consistently. Relative to the pre-industrial baseline (1850-1900), central estimates for current global warming are 1.34 - 1.41°C.



Independent guidance, adopted by the UK government for the Climate Change Risk Assessment (CCRA) and 3rd National Adaptation Plan (NAP3), is to prepare for a 2°C rise in global temperature, whilst assessing the risks for 4°C.

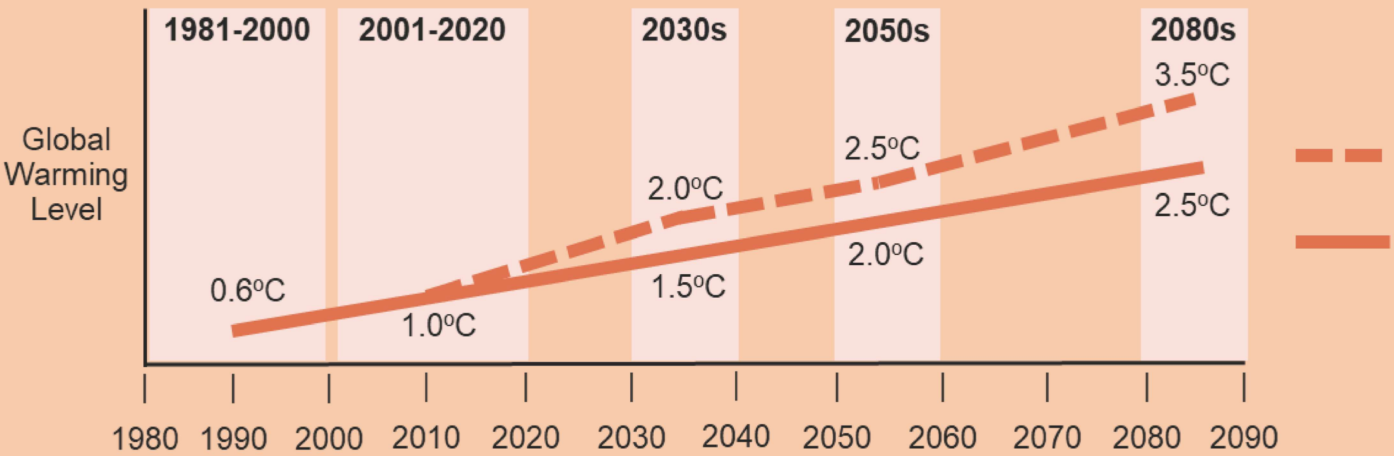


The Paris Agreement says that we must limit global warming to well below 2°C, whilst aiming for 1.5°C.

Limiting warming to below 1.5°C above pre-industrial levels will require bigger emission reductions than currently pledged by nations around the world. Current emission reduction pledges, made as part of nationally determined contributions, are likely to lead to warming above 2°C.

Timing of changes

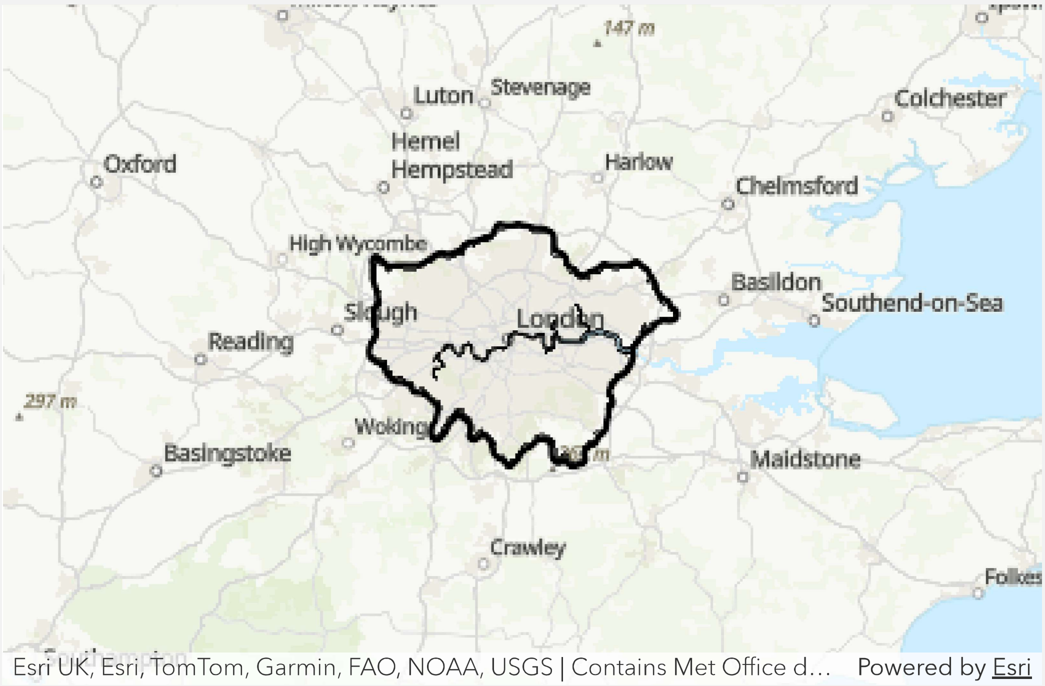
The time when a particular GWL is reached will depend on future global emissions and the sensitivity of the climate system. The two futures present Central and High estimates of global warming over the 21st century. Both are consistent with current-policy global emissions reductions. They have been selected by the Climate Change Committee (CCC) for exploration for the fourth Climate Change Risk Assessment (CCRA4). These futures show the times when particular GWLs may be reached; 4°C may be reached by the end of the century under the High GWL future, but has a low likelihood. The uncertainty in these futures increases over the course of the 21st century.



Local climate changes

The table shows projected **changes in climate** for the Local Authority area for a number of Global Warming Levels (GWLs). In each case there is a central projection (the Median) and an uncertainty range (the Lower and Upper values are the 10th and 90th percentiles). Changes are relative to 1981-2000.

The underlying science is explained in the Scientific Detail (QR Code).



The map shows the Local Authority area.

		0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	TEMPERATURE	°C	°C	°C change	°C change	°C change
	Summer Maximum Temperature	30.3 29.7 to 30.8	32.2 30.4 to 33.8	+2.4 +1.2 to +3.7	+3.3 +1.9 to +4.7	+7.0 +6.0 to +8.3
	Summer Average Temperature	17.2 17.1 to 17.3	18.3 17.8 to 18.9	+1.4 +0.9 to +2.2	+2.2 +1.0 to +2.7	+4.6 +3.8 to +5.2
	Winter Average Temperature	5.1 5.0 to 5.2	5.7 5.3 to 6.2	+0.9 +0.4 to +1.5	+1.3 +0.6 to +1.8	+2.9 +2.0 to +3.5
	Winter Minimum Temperature	-6.0 -6.5 to -5.5	-4.9 -5.6 to -3.8	+1.6 +0.5 to +2.2	+1.7 +1.2 to +2.6	+3.8 +2.9 to +4.3
	Annual Average Temperature	10.9 10.8 to 10.9	11.7 11.3 to 12.1	+1.2 +0.7 to +1.5	+1.7 +1.0 to +2.0	+3.6 +3.0 to +4.1
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	1.54 1.49 to 1.57	1.56 1.19 to 1.71	-5 -21 to +10	-8 -28 to +1	-37 -58 to -23
	Winter Precipitation Rate	1.76 1.72 to 1.80	1.82 1.67 to 2.13	+5 -14 to +25	+14 -3 to +28	+26 +8 to +44

Local climate indicators

The table shows projected **climate indicators** for the Local Authority area for a number of Global Warming Levels. For each these are annual totals: a central projection (the Median) and an uncertainty range (the Lower and Upper values are the 10th and 90th percentiles). See also the Scientific Detail (QR Code).

Indicator	0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
Summer Days* Daily maximum temperature > 25°C	22 (21 to 23)	34 (29 to 43)	38 (32 to 47)	47 (33 to 53)	81 (75 to 97)
High daytime temperatures with health impacts for vulnerable people at risk of hospital admission or death. Transport disruption – e.g. track buckling on railways. Can also indicate periods of increased water demand.					
Hot Summer Days* Daily maximum temperature > 30°C	2 (2 to 2)	5 (3 to 9)	6 (4 to 12)	10 (5 to 14)	29 (23 to 39)
Increased heat related illnesses, hospital admissions or death. Further transport disruption – e.g. track buckling on railways, road melt. Overhead power lines become less efficient.					
Extreme Summer Days* Daily maximum temperature > 35°C	0 (0 to 0)	0 (0 to 2)	0 (0 to 2)	0 (0 to 2)	6 (2 to 8)
Increased heat related illnesses, hospital admissions or death affecting not just the vulnerable. Further transport disruption – e.g. track buckling on railways, road melt.					
Tropical Nights Daily minimum temperature > 20°C	0 (0 to 0)	1 (0 to 2)	1 (0 to 1)	1 (0 to 3)	9 (4 to 12)
Health impact due to high night-time temperatures with potential for heat stress. Vulnerable people at increased risk of hospital admission or death.					
Frost Days Daily minimum temperature < 0°C	35 (34 to 36)	28 (23 to 32)	24 (19 to 30)	20 (15 to 25)	7 (5 to 11)
Cold weather disruption due to higher than normal chance of ice and snow.					
Icing Days Daily maximum temperature < 0°C	2 (1 to 2)	1 (0 to 2)	1 (0 to 1)	1 (0 to 2)	0 (0 to 0)
More extreme than frost days, so more severe cold weather impacts.					
Growing Degree Days+ Daily mean temperature: °C > 5.5°C	2,179 (2,166 to 2,203)	2,424 (2,346 to 2,559)	2,513 (2,449 to 2,614)	2,696 (2,483 to 2,772)	3,285 (3,116 to 3,462)
Energy available for plant growth over a year. This is not a measure of season length.					
Heating Degree Days+ Daily mean temperature: °C < 15.5°C	2,001 (1,985 to 2,027)	1,826 (1,751 to 1,946)	1,719 (1,668 to 1,878)	1,627 (1,557 to 1,783)	1,235 (1,156 to 1,394)
Indicator of energy demand for heating.					
Cooling Degree Days+ Daily mean temperature: °C > 22°C	42 (40 to 44)	70 (58 to 96)	79 (61 to 112)	105 (71 to 129)	228 (192 to 283)
Indicator of energy demand for cooling.					

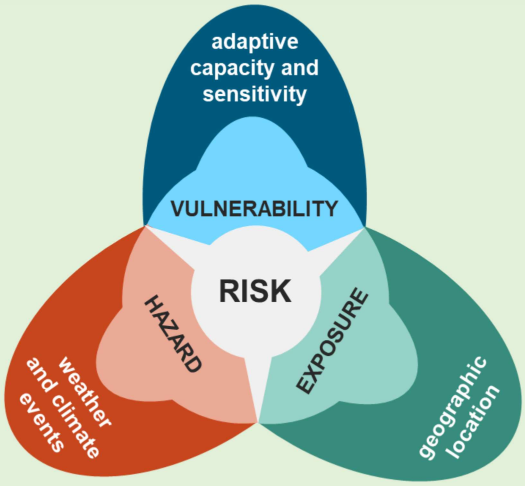
* Summer days above the stated temperature thresholds can occur at any time of year

+ Degree Days are not a number of days, but the number of degrees the daily average temperature exceeds the threshold, each day, added up over a year.

How to use the local climate projections

We are all at different points on our climate risk and adaptation journey. These projections may be used to build awareness, contribute to a risk assessment, or inform adaptation planning or reporting.

Climate risk



Understanding the risks that climate change poses to your community, organisation or business is the first step to taking action. The **RISKS** from a changing climate and the potential for resultant impacts, depend on three factors:

HAZARD: weather and climate events which may have adverse effects. Their occurrence, duration and intensity may change due to climate change.

EXPOSURE: the location of people, property and other resources, relative to a hazard.

VULNERABILITY: the likelihood of the exposed people, property or resources suffering adverse effects from the hazard. Vulnerability is reduced by the capacity of people and places to adapt or respond to the hazard.

Selection of hazard values

The information in this report may be used to assess some of the climate and weather HAZARDS your local area may face, within a risk assessment procedure. It provides climate information for a range of Global Warming Levels (GWLs). The median and an uncertainty range is provided for each climate variable. A key step is to identify which you need for your risk assessment. The **SIMPLE** approach follows independent guidance, adopted by the UK government for the Climate Change Risk Assessment (CCRA) and 3rd National Adaptation Plan (NAP3). The **ARP** approach aligns with guidance for the local authority Adaptation Reporting Power pilot. In the **CUSTOM** approach you decide on the basis of your risk appetite and the relevant time horizon.

SIMPLE approach

Follow the guidance to prepare for a 2°C rise in global temperature, whilst assessing the risks for 4°C.

Use the Median value as a central estimate, and the Lower and Upper values as an uncertainty range.

ARP approach

For present day (near term): 1.5°C
For mid-century (medium term): 2°C
For end-century (long term): 2°C
For end-century (long term): 4°C

Use the Median value as a central estimate, and the Lower and Upper values as an uncertainty range.

CUSTOM approach

1. Select the climate hazard
choose a row in the tables (p5-6)

2. Select the climate future
choose Central if you have a normal risk appetite, or High if you have a low risk appetite (graph p4)

3. Select the time horizon
select 2030s, 2050s or 2080s (right) and read GWL from the graph (p4)

4. Select the statistic
for Central future use the Median, for High future use the most extreme value (Upper or Lower)

Read the value from the tables (p5-6).
The values for the 2.5°C and 3.5°C GWLs are at climatedataportal.metoffice.gov.uk

TIME HORIZON

The **2030s** represents the near future.

The **2050s** informs long-term resilience targets; it represents the end of the period of 'inevitable' climate change and rises in many hazards, regardless of global greenhouse emissions over the next few decades.

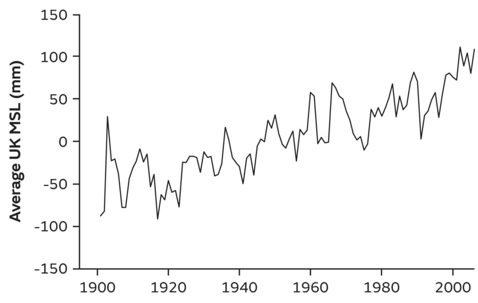
The **2080s** represents possible further climate change beyond the middle of the century, notably for long-lived assets.

Sea Level Rise

Around the UK

Sea level rise (SLR) is the primary way that coastal flood risk is expected to change in the UK in the future. Over the past 30 years, the UK sea level has been rising by 3.0-5.2mm per year, compared with 1.5mm per year in the 1990s.

Past and present emissions mean that sea levels will continue to rise. The amount of sea level rise depends on the location around the UK and increases with higher emissions scenarios.



London

Although we do not provide local information, London may still be affected by sea level rise. For example, people and services in the Local Authority area may depend on vital infrastructure on the coast. The table provides sea level rise information for several locations around the UK coastline. The science behind these sea level projections can be found in the Scientific Detail (QR code).

	2030s		2050s		2080s	
	Central (m)	High (m)	Central (m)	High (m)	Central (m)	High (m)
Belfast	0.11	0.19	0.18	0.36	0.54	0.74
Cardiff	0.17	0.26	0.28	0.46	0.68	0.89
Edinburgh	0.09	0.18	0.17	0.34	0.50	0.70
Holyhead	0.13	0.22	0.23	0.41	0.60	0.80
Hull	0.17	0.25	0.28	0.46	0.68	0.88
Inverness	0.11	0.19	0.19	0.36	0.53	0.73
London	0.18	0.26	0.29	0.47	0.69	0.90
Newlyn	0.19	0.28	0.31	0.49	0.73	0.94

Projections are provided for a central future (RCP4.5, 50th percentile) and a high-impact future (RCP8.5, 95th percentile) to provide a range at different future time periods.

If your local area is indirectly impacted by sea level rise from a neighbouring coastal area, please review the sea level rise information for that Local Authority.

CUSTOM approach

1. Select the climate future
choose Central if you have a normal risk appetite, or High if you have a low risk appetite

2. Select the time horizon
2030s or 2050s or 2080s

Read the value from the figure.

Impacts


Flooding of coastal infrastructure and services


Saltwater intrusion of aquifers and agricultural land


Flooding of coastal communities and buildings

Take action

Who is this for?

This Climate Report is intended to be useful to a wide range of people and organisations in the UK:

- **Local Authority officers** with service responsibilities who need information on how climate change is affecting their area

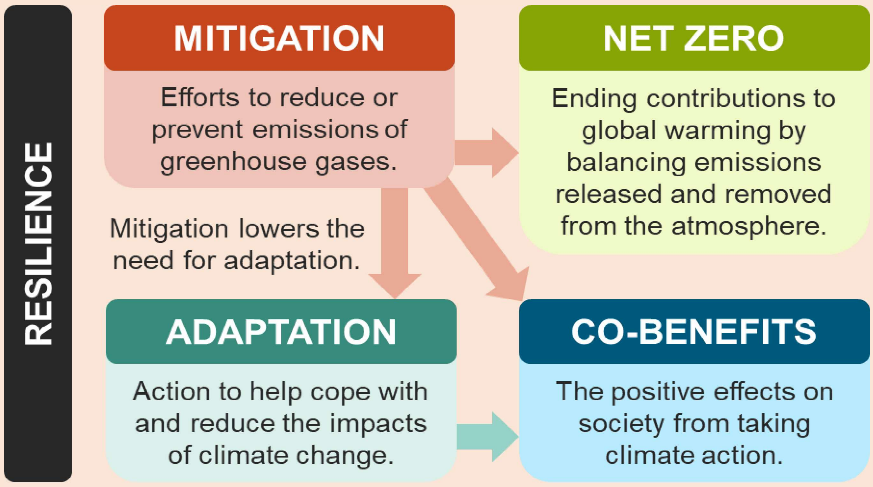
- **Councillors** who need briefings on how climate change may affect their Local Authority area

- **The public** who need to understand how climate change may affect their neighbourhood, business or organisation

- **Leaders** who need a summary of climate change to share with stakeholders and the public when raising awareness

#GetClimateReady

Tackling climate change will require both mitigation and adaptation. **Mitigation** reduces our carbon emissions with the goal of reaching **Net Zero**. **Adaptation** prepares us for the impacts of climate changes to which we are already committed.



You may be a concerned citizen, or have public influence or be responsible for multi-million pound budgets.

You can play a part in protecting our planet from the worst impacts of climate change and in adapting our lives to protect ourselves from the impacts that we will see. Let's get ready for tomorrow. **#GetClimateReady**

More information

The Local Authority Climate Service community site has more information.

The Met Office welcomes feedback on this service.

The Local Authority Climate Service team invites you to contact us at: lacs@metoffice.gov.uk. This is a Beta service.

This work has been supported by Defra as part of the commitments set out within the Third National Adaptation Programme.

Version 2.0

Call for Evidence: Are London's homes ready for a heatwave?

NHF response

1 May 2026

Introduction

The National Housing Federation (NHF) is the voice of England's housing associations. Our members provide homes for around six million people and are driven by a social purpose: providing good quality housing that people can afford. They are not-for-profit organisations, reinvesting income into new homes and services.

We know that overheating in London homes is an unfolding public health crisis, with temperatures rapidly rising to levels our housing is not designed to cope with. We are committed to leading the sector on heat resilience and working with our members to build a better understanding of heat risk and the potential impacts on residents and homes.

Housing associations in London are already making progress on heat resilience, for example by integrating adaptation measures into the design stages of new developments, introducing cooling measures such as shading and ventilation into retrofit programmes and developing organisational overheating strategies. Despite this progress, we know there is still much more work that will need to be done.

We are pleased that the London Assembly Planning and Regeneration Committee is investigating the impact of overheating on London's homes and residents and we look forward to supporting the committee with this heat resilience work going forwards.

Registered office: Lion Court, 25 Procter St, Holborn, London WC1V 6NY
020 7067 1010 | housing.org.uk | National Housing Federation Limited, trading as National Housing Federation. A company with limited liability. Registered in England No. 302132

Questions

Overheating risk

What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

According to 2023 English Housing Survey (EHS) data, 11.6% of London's housing association households experienced overheating in 2023, slightly higher than the national average of housing association homes. However, other survey evidence suggests much larger proportions of overheating in homes. For example, a study led by the University of East London (UEL) found that 80% of UK households suffered overheating in 2022.

These figures are only going to increase as the climate changes further. Modelling by Arup predicts that 90% of existing UK homes will overheat if global temperatures rise by 2°C. We are on track to reach this point by 2050, with the possibility of individual years exceeding 2°C as early as 2029, unless global emissions drop considerably.

At 2°C of global warming, the South East of England will see summer temperatures between 3°C and 4°C higher than the present day. These increases will be even higher in urban areas, due to the Urban Heat Island (UHI) effect. The Royal Meteorological Society claims that cities the size of London experience the UHI effect so strongly that temperatures of up to 10°C higher can be produced. Higher building densities, large amounts of heat-retaining materials and limited green space leads to higher ambient temperatures, especially at night.

Housing associations that have conducted comprehensive climate risk assessments consistently identify overheating as a severe risk for the majority of their urban homes over the coming decades. A recent risk assessment carried out by a large national housing association with homes in London showed that 100% of their homes are at high risk of heat stress across three different Intergovernmental Panel on Climate Change (IPCC) climate warming scenarios.

How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Overheating vulnerability is social and behavioural. Overheating is most likely to result in severe health implications for vulnerable groups, including babies and young children, those suffering from long-term health conditions and older people. Those with mobility issues are less likely to be able to use mitigation strategies like opening or closing windows to ventilate or shade their homes. Older people may also have lower exposure to communications about heat risk, health impacts and adaptive behaviours, especially if they do not have access to digital devices. This means they may be less likely to understand and adopt protective behaviours.

For these reasons, some housing associations have already built extreme weather into business continuity plans for their care homes and homes for older people. Some have conducted major works to improve ventilation and heating systems, including introducing better control systems per flat, as well as establishing communal cooling rooms equipped with air conditioning.

Socially disadvantaged groups are also more susceptible to overheating. Our analysis of 2023 EHS data found that 22% of overcrowded households in one-bedroom homes reported overheating, compared to 12% of total homes in England. It also showed that 16.5% of lone parents with dependent children reported overheating in housing association homes, significantly above the average for the sector (10.5%).

Low-income households are less likely to be able to afford electric fans and air conditioning, or other cooling measures like shutters if living in a rental property. This highlights the importance of targeted interventions, particularly through inclusive heat risk communication and support for vulnerable groups.

According to 2023 EHS data, housing association homes had the lowest reported overheating of any tenure, making up 10.5% of housing association homes, although in London, rates were slightly higher than the regional average.

How do different building typologies contribute differently to the urban heat island effect and overheating in London?

The design of homes makes a significant difference to overheating in London. **Recent studies** have shown that certain archetypes are more prone to overheating, including modern, highly insulated top-floor flats, single-aspect flats, and overglazed buildings. These properties often have limited capacity for natural cross-ventilation and experience high solar gains.

These findings are reflected in reports from housing association staff and residents. Risk assessments conducted by larger housing associations have identified single-aspect flats above three storeys as particularly prone to overheating. Staff and resident reports have raised concerns about overheating in new builds with excessive glazing. Reports have also highlighted that building blocks with communal heating are more prone to overheating as they get a build-up of heat from features like pipes and radiators, with no means of escaping. Similarly, poorly fitted heat networks have led to overheating incidents.

Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this?

It is likely that there are homes being built now which are vulnerable to overheating. Part O of the Building Regulations, which came into force in England on 15 June 2022 is relatively new and there is limited evidence on its effectiveness so far. **Recent research** has shown that even homes built to be compliant with Part O can be vulnerable to overheating.

Compliance of Part O is assessed using the mildest climate scenarios, meaning that homes built to this standard today are unlikely to keep their occupants safe from the more extreme heat we can expect in the future. There is also limited coordination between Part O and other parts of the Building Regulations, which can lead to conflicting requirements. One housing association found overheating mitigation measures such as ventilation for new build properties difficult to balance with other constraints, namely noise concerns, which demonstrates this conflict in practice. More data on the implementation and efficacy of current standards will be vital in planning ahead.

We support the Chartered Institute of Housing (CIH) and Sustainability Research Institute's (SRI) assertion that while the UK government recently published the outcome of its call for evidence on Part O, and has committed to holding a further technical review, the urgency of tackling overheating in London may warrant a comprehensive, region-specific approach to overheating standards going forwards.

Tackling overheating

What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

We would welcome more clarity on the planning expectations for heat resilience in London homes. The plan states that development proposals should minimise adverse impacts on the urban heat island, but without any specified heat resilience standards, exact expectations for developers may not be clear. More clarification and guidance on the means of assessing and measuring heat resilience in homes would help ensure consistency and resilient outcomes across the region. This would also help establish a more standardised approach to overheating adaptation in existing homes, which is duly needed considering the absence of an equivalent to Part O of the Building Regulations for existing homes.

We are concerned with the relaxation of dual aspect requirements in the recent package of support for housebuilding in London. While we recognise the vital need to speed up delivery in the capital, stipulations for dual aspect design are a key solution for mitigating overheating in new builds and were an important feature in previous London Plan Guidance. Single-aspect dwellings are significantly more likely to overheat and are more difficult to ventilate naturally. This means they may be reliant on costly retrofits or energy-intensive active cooling systems to minimise risk in future. The next London Plan should recognise these tensions and promote the building of dual aspect homes where possible.

We would welcome more emphasis in the next London Plan on future climate scenarios and the importance of developing homes for the climate they will experience over their design life. Homes built according to current climate scenarios may not be resilient in a couple of decades time. Given the Climate Change Committee's advice that adaptation policy should at minimum prepare the country for weather extremes that will be experienced if global warming levels reach 2^{o}C above preindustrial levels, development proposals should be required to mitigate risk based on this climate scenario at minimum.

We support CIH and SRI's proposal to create a new Good Growth policy on delivering climate adaptation and resilience, to give climate and heat resilience more strategic importance in the London Plan. The effective siloing of heat risk in Policy SI4 undermines the importance of heat adaptation in providing safe and resilient homes for Londoners.

Is the London Plan's current stance on air conditioning still appropriate?

The London Plan's current stance on air conditioning, namely Policy S14 and the cooling hierarchy, remains appropriate. As air conditioning systems are a very resource-intensive form of active cooling and emit large amounts of heat into surrounding areas, they should only be used as a last resort. Passive design strategies (e.g. shading, orientation, ventilation) should always be prioritised as they do not conflict with energy and sustainability requirements or run the risk of increasing occupants' energy bills. Passive ventilation also has benefits for indoor air quality, which is especially important in London given the high levels of air pollution.

In addition to passive building adaptation measures, focus should also be on encouraging adaptive resident behaviours, which is critical in shaping overheating outcomes, especially in England where we do not currently have a sensible culture of heat.

If air conditioning systems are necessary, for example in care homes, they should ideally be designed to reuse the waste heat they produce, to avoid contributing to the urban heat island effect.

What should developers do to ensure that the homes constructed today will be heat resilient?

Developers must consider all overheating issues at the design stage and ensure they are building resilience in accordance with future climate scenarios. Developers should also think beyond the contained home to incorporate nature-based solutions at the community level, including introducing trees for natural cooling and shading. This has numerous other benefits for occupants, including removing air pollution and creating greener, more vibrant places to live.

Some housing associations have already established good practice for building heat resilient homes. This includes ensuring that they do not exceed the maximum glazing areas set out in the 2021 Building Regulations (Amendment) edition, in addition to providing such mitigations as lower g-value glazing, external shutters with ventilation louvres, external overhangs, awnings and effective cross-ventilation where possible, which significantly help to lower peak temperatures.

In compliance with Approved Document O of the Building Regulations, developers must ensure that all provisions are taken to limit unwanted solar gains and provide adequate means to remove heat from a building. This might include solar reflective paint, phase-change materials, earth-air heat exchangers and evaporative cooling.

What support should be made available to homeowners and tenants to better manage overheating risk?

Support for residents

To help social housing residents better manage overheating risk, communication on the risks and impacts of excessive heat should be strengthened. **Evidence indicates** that a significant proportion of heat-related mortality occurs because of critical gaps in public awareness, risk perception and adoption of protective behaviours, rather than direct heat exposure. The **British Red Cross** has warned that a cultural shift on heatwave action is required, after finding that more than a third of people in the UK do not consider heatwaves an immediate risk.

A targeted and behaviourally informed heat risk communication and education campaign should be a key feature of London's heat risk strategy, led by the Greater London Authority. It should prioritise those most at risk, including low-income households, older adults and people with health conditions, through tailored and accessible communication strategies. This might include better link-up with local public health and housing providers such as housing associations, who should be seen as key partners for this awareness-raising work. It should also include expanding beyond digital communication methods, to target those without digital skills or access to digital devices. Advice should focus around the simplest, most cost-effective means to protect against extreme heat in the home. It should also provide signposting to local services and cool spaces in the area.

London policymakers should ensure that there is a network of cool spaces in London that can be used in the event of a heatwave. Lessons can be taken from France, where local authorities often extend the opening hours of public libraries and designate them as 'cool islands'.

Support for housing associations

For social landlords, the primary barrier in implementing overheating mitigation measures is financial. Housing associations are operating in a particularly constrained environment, with many recent regulatory changes putting pressure on finite resources. Grant funding would better enable social landlords in London to carry out vital heat resilience work.

Housing associations are concerned that as temperatures increase, they will regularly have to relocate residents from overheating homes, resulting in distress and inconvenience for the resident, as well as significant costs for the landlord. Clear London Plan Guidance for landlords would be useful to set more consistent expectations for the support they should offer to residents if their homes experience dangerously hot temperatures.

We welcomed the UK government's recent announcements on heat resilience as part of its Warm Homes Plan. These policy announcements, once implemented, will enable overheating adaptation measures to be incorporated into government retrofit programmes targeting low-income households, which is a significant step in building the resilience of the social housing sector. The expansion of the Boiler Upgrade Scheme to include air-to-air heat pumps, which offer low-carbon heating and cooling solutions, is another welcome support measure that benefits both climate mitigation and adaptation outcomes.

London Assembly - Planning and Regeneration Committee

Call for Evidence - Are London's homes ready for a heatwave?

https://www.london.gov.uk/who-we-are/what-london-assembly-does/london-assembly-work/london-assembly-current-investigations/are-londons-homes-ready-heatwave

The UK Passivhaus Trust response 01.05.26

Consultation Question 1(d)

d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

Passivhaus certified buildings are likely to be less susceptible to overheating and offer better summer comfort than standard buildings.*

Passivhaus design addresses summer comfort in numerous ways. As a comfort-driven approach, the Passivhaus standard includes a summer overheating criterion which requires that internal temperatures do not exceed 25ºC for more than 10% of the year. In practice, many Passivhaus designers often aim for a reduced target of 5% or less.

The summer comfort assessment in PHPP (Passive House Planning Package) is dependent on the assumptions that are made during the modelling process. It is important to ensure that the result remains robust when those assumptions vary, for example as occupant behaviour changes, or as the climate warms.

The Passivhaus Standard includes detailed guidance covering design strategies to reduce risk, limitations, and constraints that may have an impact, key indicators of the likelihood of risk, and a series of stress tests to demonstrate robustness. Summer comfort stress testing is an integral part of PHPP. In addition, Passivhaus certification requires written documentation of the strategy for thermal comfort in summer, signed by the building owner.

**It is important to acknowledge that early Passivhaus projects in the UK did, in some instances, experience summer comfort issues due to incorrect design assumptions and limited early guidance. These experiences contributed to significant improvements in the Passive House Planning Package (PHPP), certification processes, and UK-specific guidance developed by the Passivhaus Trust and others. In 2022, the stress testing element of the Passivhaus Trust's overheating PHPP plug-in was integrated into the new iteration of PHPP10. This evolution reflects the strength of the Passivhaus approach: a performance-based methodology that responds to operational evidence, continuously refining tools and standards. Far from claiming perfection, it is a system that learns and improves over time to deliver consistently high levels of comfort, including in summer conditions.*

Building typologies that might contribute to overheating in London include:

- Highly glazed buildings increase the risk of overheating, and also have a high likelihood and demand for active cooling.
- Older buildings lacking insulation, particularly in the roof, are at risk of overheating and a 'night time radiator' effect in the bedrooms from the roof.

Consultation Question 1(f)

f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

It is often assumed that because Passivhaus buildings are well-insulated and airtight they are more likely to overheat. However, this is not the case as Passivhaus works using building physics similar to that of a thermos flask. In winter, the aim is to retain heat, in summer, the Passivhaus envelope helps keep the cool inside. This is one of the reasons why Passivhaus is becoming more popular in southern Europe, as a solution for resilient cooling and heatwave protection.

Dr Wolfgang Feist, founder of the Passivhaus Institut, commented:

"The background is physics: Heat flows from hot side to cold side. In winter, from inside to outside. In summer, from outside to inside. In both cases, insulation reduces heat flow and maintains the desired temperatures for the occupants. In both cases, a small amount of energy (heating in winter / cooling in summer) may be required to keep temperatures as comfortable as possible."

Two recent academic studies back this up:

- Thermal insulation impact on overheating vulnerability reduction in Mediterranean dwellings:
- How do energy efficiency measures affect the risk of summertime overheating and cold discomfort? Evidence from English homes

Instead of looking at insulation, we should look at the effect of large glazing ratios and gains from services and appliances on overheating.

Glazing: If the amount of heat that is entering the building (gains) exceeds the amount that is being dissipated by either passive or active cooling (losses), then the internal temperature will start to rise and, if not addressed, an overheating situation will arise. However, if losses are matched to the gains, then the building remains in balance. In most temperate climates, the primary overheating driver is typically solar energy transmitted through glazing.

Internal gains: Internal gains from appliances and hot water storage can also be a significant contributor to overheating, particularly in multi-residential or non-domestic buildings. The Passivhaus standard's primary energy requirement means that designs manage and model internal gains within PHPP to avoid wasting energy and to minimise overheating risk. Regarding internal gains, it is worth considering the potential overheating impact of district heat networks on homes and buildings. Unlagged HIUs, high temperature pipes etc can all contribute to overheating.

Consultation Question 2(a)

a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

- Passivhaus certified buildings should be encouraged more within the London Plan. This could be achieved by adopting the recent proposal that the London Plan should increase the proportion of carbon savings needed on site through energy efficiency measures, to reduce demand on the electricity grid. If absolute metrics are used to measure this, delivering to the Passivhaus standard should be an easy way for projects to achieve these savings. The Passivhaus Standard includes detailed guidance covering design strategies to reduce risk, limitations, and constraints that may have an impact, key indicators of the likelihood of risk, and a series of stress tests to demonstrate robustness. Summer comfort stress testing is an integral part of

PHPP. In addition, Passivhaus certification requires written documentation of the strategy for thermal comfort in summer, signed by the building owner.

- Communal district heat networks can potentially increase the risk of overheating. Even when done well, there are inevitably heat gains from the internal circulation with communal heating. Passivhaus buildings can achieve the carbon, energy and affordability goals of the London Plan without the need for communal heating. Another way to reduce the overheating risk in London would be to state within the London Plan that Certified Passivhaus projects are automatically exempt from having to connect to heat networks.
- In addressing overheating specifically, it is important that policy supports a balanced, design-led approach. This should follow a clear hierarchy that prioritises fabric efficiency, shading, and passive design measures first, while recognising that a combination of strategies may be required to ensure comfort in all dwellings – see response to '2(b)' below. Natural ventilation strategies, such as appropriately sized openings, should be considered alongside other key requirements, including purge ventilation, daylight, views, and acoustic performance. However, it is important not to assume that increasing ventilation alone is sufficient in all cases, particularly in dense urban environments or under future climate scenarios. In some cases, a limited and carefully considered use of active cooling may be appropriate as part of a wider overheating mitigation strategy. Where required, this should be highly efficient, low-carbon, and justified, through a robust overheating risk assessment, with passive measures exhausted first.

Consultation Question 2(b)

b. Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

The Passivhaus Trust considers that the overall intent of Policy SI4 remains appropriate. The emphasis on avoiding reliance on mechanical cooling and following a clear cooling hierarchy is well aligned with the principles of fabric first design and with the Passivhaus approach to summer comfort.

The Cooling Hierarchy, which includes reducing internal gains, limiting solar gains, supporting passive ventilation, and only then considering mechanical cooling closely reflects the Passivhaus methodology. However, it is important that this hierarchy is understood as a sequence of design considerations rather than a requirement to avoid active cooling altogether, where it may be beneficial or necessary.

There is growing recognition that, in some contexts, particularly in dense urban housing or under future climate conditions, very low energy active cooling may form an appropriate part of a wider overheating strategy. This can include highly efficient systems with very low energy demand used in combination with passive design measures to ensure comfort. Such approaches should not be seen as undermining SI4 but as a complementary evolution where passive measures alone may not be sufficient.

The requirement for Dynamic Thermal Modelling using CIBSE TM59 remains a useful compliance framework but some limitations and unintended consequences should be recognised. In particular, concerns have been raised that assumptions within TM59 such as very high internal gains and high occupancy levels may not always reflect realistic operational conditions. In some cases, this may influence design decisions towards increased glazing or ventilation areas even where other factors such as solar control or overheating resilience may be more effective.

Similarly, assumptions about window opening behaviour may not fully reflect occupant behaviour during extreme weather conditions where comfort thresholds can limit the effectiveness of increased ventilation alone. It is also important to note that where outdoor temperatures consistently exceed comfort thresholds, natural ventilation, regardless of opening size, has limited capacity to maintain acceptable indoor conditions.

There is, therefore, a case for further refinement of overheating assessment methodologies to ensure they support balanced design outcomes and avoid unintended optimisation towards a single strategy.

The Passive House Planning Package (PHPP) framework remains valuable but should continue to evolve alongside improved understanding of building performance occupant behaviour and climate adaptation.

More broadly, the experience of Passivhaus projects in the UK has demonstrated that while early designs sometimes experienced summer comfort issues due to limited assumptions or modelling approaches subsequent refinements to PHPP certification criteria and guidance from the Passivhaus community have significantly improved outcomes. This reflects an evidence-led approach that continuously adapts to operational experience rather than assuming fixed perfection.

Finally, it is important to recognise that cooling hierarchy approaches are most effective when interpreted as cumulative rather than exclusive. Passive measures remain essential, but in some cases they need to be complemented by low energy active cooling solutions to deliver safe comfortable and resilient buildings. Where used, these systems should be efficient quiet and designed to work in synergy with fabric performance for example, through tempering of supply air or low energy radiant approaches rather than high energy space cooling alone.

Consultation Question 2(c)

c. What should developers do to ensure that the homes constructed today will be heat resilient?

Passivhaus design addresses summer comfort in numerous ways.

As a comfort-driven approach, the Passivhaus standard includes a summer overheating criterion which requires that internal temperatures do not exceed 25ºC for more than 10% of the year. In practice, many Passivhaus designers often aim for a reduced target of 5% or less.

The summer comfort assessment in PHPP (Passive House Planning Package) is dependent on the assumptions that are made during the modelling process. It is important to ensure that the result remains robust when those assumptions vary, for example as occupant behaviour changes, or as the climate warms.

The Passivhaus Standard includes detailed guidance covering design strategies to reduce risk, limitations, and constraints that may have an impact, key indicators of the likelihood of risk, and a series of stress tests to demonstrate robustness. Summer comfort stress testing is an integral part of PHPP. In addition, Passivhaus certification requires written documentation of the strategy for thermal comfort in summer, signed by the building owner.

A warming climate: As global temperatures rise, a cautious and consistent method of assessing the risk of summer overheating is needed to ensure that Passivhaus buildings remain comfortable both today and in a warming climate. The climate data used in PHPP (Passivhaus Planning Package) modelling is historic but allows for easy testing with increased summer temperatures to account for our warming climate.

Marion Baeli, Principal - Sustainability Transformation, 10 Design has commented:

"While Passivhaus is better known for reducing energy bills and keeping homes warm in winter, its performance in extreme heat is just as impressive, if not more critical in our warming climate. In summer, the goal flips: we're no longer retaining heat, we're retaining coolth. If your windows are shaded and you manage solar gain, your home acts like a thermos, keeping indoor temperatures stable even during extreme external heat. During a 40°C+ heatwaves, we've kept our home at a steady, comfortable 26°C, without air conditioning!"

Passivhaus design strategies for summer comfort

<u>i) Optimising solar gains to avoid overheating</u>

Building orientation & glazing

Building orientation should be optimised as far as possible to benefit from the opportunity of solar gains in the winter without the risk of too much gain in the summer. The ideal situation is a north-south orientation for primary façades, with daylight-optimised glazing on the north façade and somewhere between 15 and 25% glazing on the south façade. It is also recommended that glazing is adjusted by solar exposure as well, with different window sizes being accepted on an elevation.

External shading

External shading systems are highly effective in reducing solar gain. The simplest solutions are systems which are fixed and require no movement or occupant action to be effective. These types of systems include brise soleil and overhangs. In situations where fixed shading is not appropriate, deployable shading such as shutters, blinds or awnings are all effective.

Internal shading

Where external shading is not feasible, internal shading can be considered. However, this method is far less effective than external shading. External shading can reduce solar gain by between 80 and 100%. In contrast, even the most effective internal shading will only reduce solar gain by a maximum of 40% and in most cases it will be considerably less than this.

Glazing g-value

A lower glazing g-value will reduce the amount of solar gain. However, this will reduce both winter and summer gains and so the reduction in overheating risk achieved will need to be balanced against the lower winter gains. A lower g-value will also reduce the level of daylighting throughout the year and have an impact on the quality of the views. For individual homes g-values are often the maximum possible, however, using lower g-value glazing in specific locations where there is a particular risk of overheating can be an effective strategy.

<u>ii) Reduce or minimise internal heat gains</u>

Design of domestic hot water (DHW) systems

One of the primary contributors to overheating is often the domestic hot water system. This is particularly true in multi-residential buildings where there can be long lengths of hot water pipes. In a typical UK dwelling more than half the energy used for hot water can be attributed to wild heat losses within the building. To reduce hot water losses, a number of strategies can be employed. PHPP includes modelling of hot water systems and gives designers feedback on how efficient designs are. Passivhaus also supports quality control in delivery, to ensure the systems perform as designed.

Appliances

There will also be many other devices, including clothes dryers, refrigerators, freezers, dehumidifiers, ovens, computers, printers, within the building that generate heat. Appliances, especially those that are always on, can have a significant impact on overheating risk and so need to be carefully considered and modelled in PHPP.

<u>iii) Maximise passive cooling potential</u>

Once gains have been minimised, there are several design strategies which can be adopted to maximise the ability of the building to achieve effective passive cooling. In the UK's climate, we can typically expect to be able use cooler air from outside to help cool the building if overheating has started to occur. Even during warm summer days, nighttime temperatures usually drop to 15–20 °C, and 'tropical nights'—when it stays above 20 °C—are still rare, for now. Thus, moving cooler outside air through the building, particularly at night, is a primary cooling mechanism.

Window ventilation

Moving cooler outside air through the building is primarily achieved by opening windows. Thus, the building's windows are critical factors in achieving sufficient passive cooling.

Cross-ventilation

The amount of air flow that is achieved by cross-ventilation (i.e. air flow from a window on one façade, through the building to a different window on a different façade) is significantly higher than the air flow achieved, even through multiple windows, on a single façade. Thus, cross ventilation should be included in the design wherever possible.

Overnight ventilation

Overnight ventilation is likely to be the most effective in achieving cooling as this is when the outside air will be at its coldest. However, night-time ventilation is also when there are the most significant limitations on window ventilation – e.g. noise, security (particularly if unoccupied), drafts, insects and closed internal doors. The windows, and the associated openable areas, that can realistically be used for overnight ventilation should be clearly identified as part of the design and reduction factors applied where ventilation is likely to be compromised.

Mechanical ventilation

The MVHR (mechanical ventilation with heat recovery) systems within a Passivhaus building can help with reducing overheating risk. The summer bypass mode will ensure that when the outside air is cooler than the internal setpoint, and the internal temperature is too high, cooler external air is brought directly into the building, without being heated by the outgoing warmer internal air.

In situations where window opening is not possible, or likely to compromised by noise, pollution or security, the MVHR may need to provide all the passive cooling required to address overheating risk, and must be sized accordingly.

An MVHR with a ‘bypass cooling boost’ function has been found to work well in such situations. When the air temperature outside is higher than inside, and uncomfortably warm, the MVHR can revert to ‘recovery mode’ and reject most of the incoming heat into the exhaust air, maintaining comfort indoors for longer. MVHR technical design that enable this to work include: Good summer bypass logic; Units which actively prevent air going through the heat exchanger, rather than just providing an alternative route as well as allowing air to go through the heat exchanger; Allowing the option to boost ventilation rates; Acoustic design of the system to avoid disturbing occupants when the system is operating in this mode.

In Passivhaus buildings the airtight envelope (combined with MVHR) also minimises the escape of heat via infiltration and exfiltration via fabric leaks and vents, while maintaining the required flow of fresh air. By analogy, when outside temperatures are uncomfortably high and exceed the indoor temperature, the Passivhaus airtight envelope combined with MVHR minimises the ingress of uncomfortably warm air and the loss of more comfortably cool air.

iv) Active cooling

Active cooling has long been part of Passivhaus design in warmer climates but is still a relatively new consideration for the UK. Ordinarily, in the UK's cool temperate climate, the Passivhaus Standard has been able to deliver summer comfort through the passive cooling methods and strategies outlined above.

However, as temperatures rise due to global heating, we expect to see more active cooling solutions needed, to address summer heatwaves and ensure summer comfort. The Passivhaus Trust is currently exploring how these tried and tested Passivhaus active cooling measures can be deployed in the UK. The Passivhaus standard is used worldwide so already has an energy efficiency criterion for cooling demand and calculates this in PHPP.

Examples of London Passivhaus projects designed with active cooling include:

- Battersea student accommodation
- Gurnell social housing,Ealing
- Proposed Barratt London Low-E homes

For Passivhaus standard homes and buildings, the cooling load is minimised, making it easier to deliver cooling discreetly, eg via a small unit. Cooling can also be delivered in a Passivhaus via a wet heating system (single dwelling or communal ASHP) so there is flexibility about active cooling building services options. This approach has been used in Passivhaus with underfloor heating/cooling and ASHPs, and is also possible on ambient loops. Compact units that need no outside plant, can also provide cooling.

Even where active cooling is not deemed 'necessary', under for example CIBSE TM59, the London Assembly should be mindful of the increasing frequency with which building occupants will retrofit active cooling. Passivhaus buildings that have a low cooling load will be kept comfortable with smaller and less intrusive plant, lower energy use, and less rejected heat.

PHT Guidance: Summer Comfort Statement

PHT Guidance: Keeping Cool: Avoiding Summer Overheating

PHT on-demand course Keeping Cool: avoiding overheating risks

Consultation Question 2(d)

d. What support should be made available to homeowners and tenants to better manage overheating risk?

If window, cross-ventilation and overnight ventilation strategies have been designed to be part of a Passivhaus building's summer comfort strategy, then the building occupants/ facilities managers would need to be educated as to how to undertake this. Such guidance should be made available as part of the building handover.

The Passivhaus Trust provides guidance on occupant handover in Chapter 10 of its 'How to build a Passivhaus' publication.

Consultation Question 2(e)

e. Are there developments in London that manage heat risk well?

The Passivhaus Trust is currently collating POE data on Passivhaus buildings in London (and elsewhere in the UK and Europe) to provide evidence of summer comfort performance. The London Assembly's call for evidence has identified a gap in POE data that we are now actively working on addressing. We can supply the London Assembly with more monitoring data on request (including two largescale residential projects we are aware of that are currently being monitored), but the data collected to date includes:

1. **Harris Academy, Sutton (Passivhaus certified secondary school)**

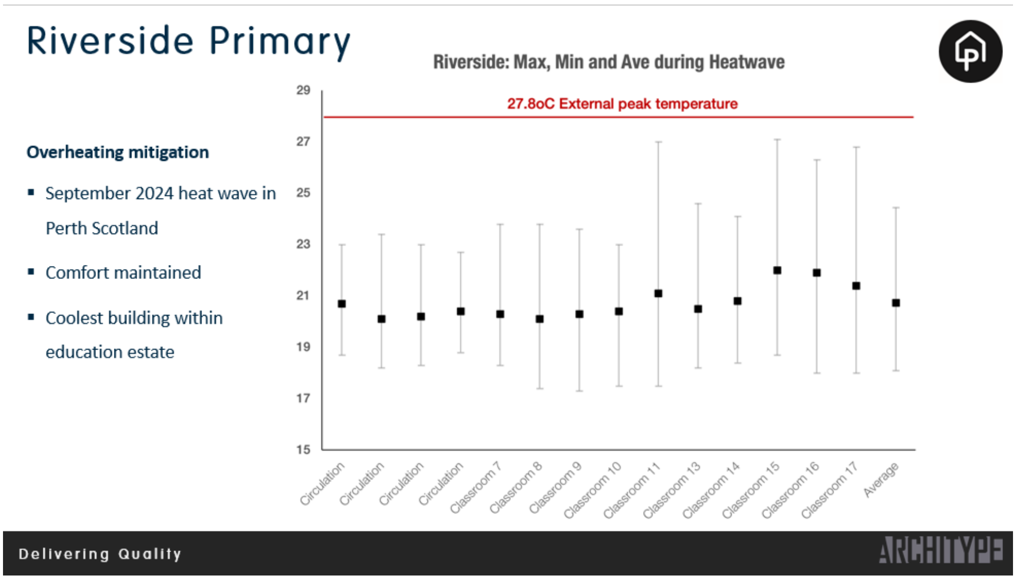
Internal temperatures monitored for 2 years *"For the most part, despite heatwaves or very low outdoor temperatures, comfort levels are well maintained year round".*

Page 102 Measuring Mass Timber report, March 2025

2. **Riverside Primary School. Perth, Scotland (Passivhaus Primary School)**

"Indoor air quality monitoring and internal temperature monitoring have also shown fantastic results for the school, also outperforming the performance data for typical schools. During a particularly hot weather period in September 2024 with an external peak temperature of almost 28C, Riverside's average building temperature internally was 22C, demonstrating the resilience of Passivhaus design for overheating and future climate resilience."

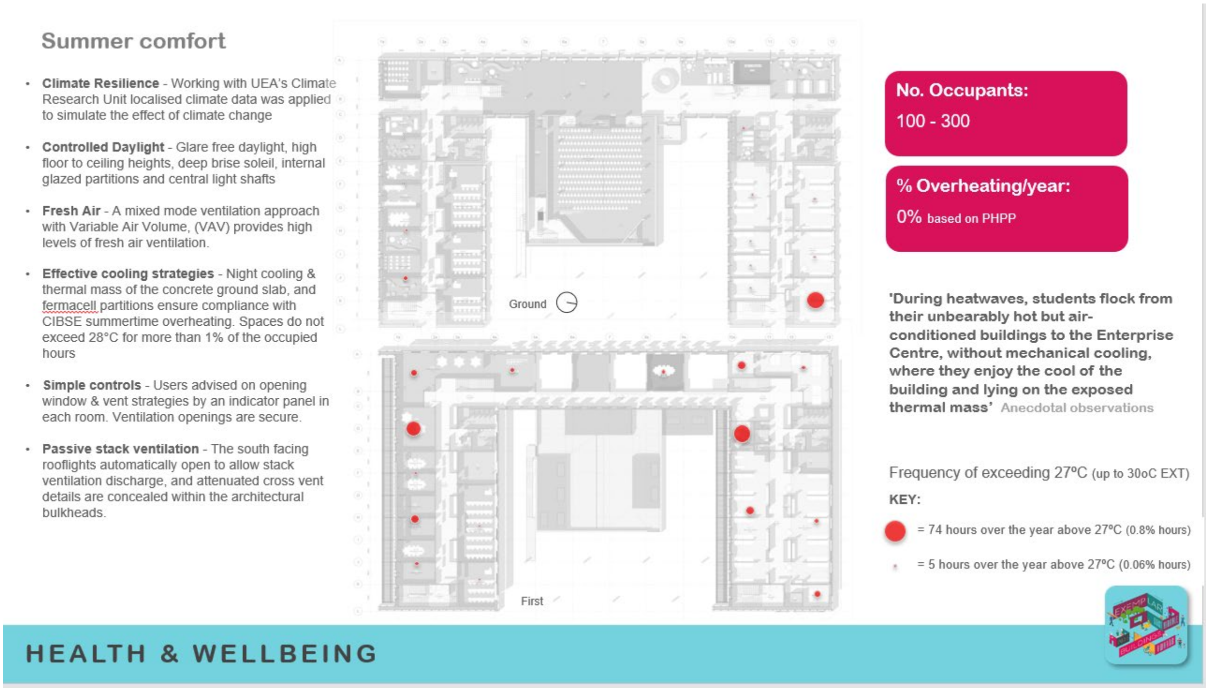
https://projectscot.com/2025/07/landmark-scottish-passivhaus-school-is-outperforming-targets/



3. **Enterprise Centre, University of East Anglia (Passivhaus university building)**

https://www.passivhaustrust.org.uk/projects/detail/?cId=87

'During heatwaves, students flock from their unbearably hot but air-conditioned buildings to the Enterprise Centre, without mechanical cooling, where they enjoy the cool of the building and lying on the exposed thermal mass' Anecdotal observations



4. **Agar Grove Phase 1A, Camden (Passivhaus social housing)**

"At the time Phase 1A was being designed, there was no specific methodology on how to analyse overheating in housing, so Max Fordham created a strategy to appraise the risk and ensure the design could adapt. Modelling was carried out using the Islington 2030 DSY from the Prometheus probabilistic weather data website. The results were compared against CIBSE TM52's adaptive overheating criteria.

The modelling determined that living rooms would not overheat providing the windows could be opened during occupied hours. On noisier façades, large openings flush heat from the spaces quickly, preventing the need for windows to remain open *for long. Control of overheating was also helped by the majority of apartments being dual aspect, allowing the cross-flow of air. In addition, external balconies have been integrated into the design to help control solar gain. 'In mid-summer, the balconies block out the high sun, but heat from lower-angle sunlight can enter the dwellings in winter,' says Clemence. It is a solution that enables the flats to enjoy high levels of natural light while avoiding overheating."*

https://www.cibsejournal.com/case-studies/agar-grove-performance-assured/

5. **Passivhaus homes in the Mediterranean: Portugal, Spain & Greece**

2019 article in Passive House

https://passivehouseaccelerator.com/articles/keep-cool-and-carry-on-passivhaus-cooling-experiences-in-warm-climates

2022 article:

https://praxis-rb.com/en/passivhaus-in-the-mediterranean-strategies-for-keeping-cool-in-a-passivhaus-on-the-beach/

Passipedia:

https://passipedia.org/examples/residential_buildings/single_-_family_houses/southern_europe/palau_passive_house_barcelona_spain

We are currently awaiting information from the Greek Passivhaus Association, with some additional monitoring data, which we will forward.

Response to Call for Evidence

Are London's homes ready for a heatwave?

London's homes are not consistently able to cope with current overheating risk. Without action, this gap will widen significantly over the next 20-30 years as heatwaves become more frequent, intense and longer lasting.

For Peabody, overheating is already a live resident safety and operational issue. Our response is based on experience during recent heat events, portfolio-level climate risk modelling, and a detailed overheating risk assessment across residents' homes. This work helps us to identify which homes are most at risk, why that risk occurs, and where intervention is most needed.

Our response focuses on three linked issues:

- physical risk to residents and homes
- operational risk to services, staff and business continuity
- transition risk from changing policy, regulatory and financial requirements.

2. Executive summary

Overheating is already a serious and growing issue across homes in London. Recent heat events have seen record temperatures, requiring all homes, including relatively new developments, to operate outside the conditions they were originally designed for. Our internal overheating assessment shows that risk is concentrated in London, particularly in higher-density flatted developments. At Peabody, we are already taking action to understand and address this risk. This includes portfolio-level climate modelling, detailed overheating risk assessments, and targeted interventions in higher-risk homes and schemes.

However, despite this work, overheating remains a significant and increasing challenge. Overheating affects residents unevenly, with the greatest impact falling on people with the least ability to adapt, including older people, disabled residents, residents with health conditions, families with young children, and people living in supported or sheltered housing.

Different homes overheat for different reasons. Older homes can be affected by solar gain, poor shading, single glazing, poorly insulated roofs and limited night-time ventilation. Modern new-build homes can also overheat where high internal or solar gains are not matched by effective ventilation, shading and heat removal. Risk is often higher in single-aspect flats, homes with restricted window openings, poorly performing ventilation systems, and buildings affected by heat losses from communal heat network pipework. This is not an issue confined to one age or type of housing. It reflects a wider failure to design, retrofit and manage homes for year-round thermal comfort.

The current policy framework still focuses too heavily on new build. Part O and the London Plan cooling hierarchy have improved expectations for new homes, but there remains limited policy, funding and regulatory support for existing homes. This is where the majority of overheating risk sits, and where the scale of adaptation need is greatest.

The London Plan's current approach to air conditioning is broadly right, but it is too rigid in practice. The passive-first hierarchy remains important because it helps reduce energy use, running costs for residents and long-term costs for landlords. However, passive measures will not be enough in every home or setting. In some supported and sheltered housing, targeted active cooling may be needed to keep residents safe.

Retrofit and decarbonisation policy must also account for overheating. Energy-efficiency works that improve winter warmth can worsen summer overheating if they are not designed alongside shading, ventilation and heat removal measures. Policy should move towards whole-year thermal comfort, rather than treating winter warmth and summer heat as separate issues.

Social landlords need a clearer framework for managing overheating in existing homes. Residents also need consistent, practical and trusted advice before and during heat events. The challenge is not a lack of solutions. It is that policy, funding and delivery have not kept pace with the speed of climate change or the level of risk in London's existing homes.

3. Physical risk: to residents and homes

Overheating risk varies significantly across homes. The drivers are different by typology, but in most cases relate to a combination of solar gain, internal heat gains, limited ventilation, and constraints on adaptation.

3.1 Risks by building typology

Victorian and Edwardian blocks, terraces and converted houses

- Large areas of unshaded south- and west-facing glazing, often single-glazed or early replacement double glazing.
- Top-floor flats beneath uninsulated or poorly insulated roofs, which regularly record significantly higher internal temperatures than lower floors.
- Solid brick construction, which can retain heat where night-time ventilation is limited, particularly in subdivided properties.
- Conservation and listed-building constraints, which limit the installation of external shading, shutters or roof treatments.
- Dense street layouts and limited outdoor space, reducing access to cooler external environments during peak heat.

Post-war and 1960s–80s mid- and high-rise blocks

- Curtain-wall glazing and large exposed façades with limited external shading.
- Concrete construction, which can retain and re-radiate heat where night-time purge ventilation is constrained, particularly in single-aspect flats.
- Single-aspect layouts with limited opportunity for cross-ventilation.
- Safety-restricted window openings, often reducing the effective area available for night-time cooling.
- Poorly insulated communal heating and hot water systems, particularly domestic hot water distribution pipework operating year-round, contributing to internal heat gains in corridors and flats.

New-build high-density developments (post-2015)

- High levels of insulation and airtightness, which improve energy efficiency but can increase overheating risk where ventilation and heat removal are not effective.
- Single-aspect, deep-plan dwellings, often driven by site constraints and viability.

- Mechanical ventilation with heat recovery (MVHR) systems where design, installation or commissioning does not deliver effective summer bypass or adequate ventilation rates for hot weather.
- Communal heat network systems, particularly domestic hot water distribution pipework, adding background heat gains to internal spaces.
- Restricted-opening windows or acoustic constraints on busy roads, limiting residents' ability to ventilate their homes.
- Glazed atria, winter gardens and internal amenity spaces that become unusable in summer.
- Hard landscaping and limited tree canopy, which increase local ambient temperatures and contribute to the urban heat island (UHI) effect.

Our internal overheating analysis reflects these patterns. The highest-risk homes are flats, particularly middle and upper floors, often in newer-build developments, often in central and inner London, and often affected by limited ventilation and internal heat gains. Lower-risk homes are more likely to be houses or lower-density stock with better ventilation and lower exposure to urban heat.

3.2 Risks to residents with low adaptive capacity

Overheating does not affect all residents equally. National evidence, including from the Climate Change Committee and UKHSA, shows that certain groups are significantly more vulnerable to heat. In our homes, the highest exposure often coincides with the lowest ability to respond. This creates a compounded risk where building performance and resident vulnerability reinforce each other. Several groups are consistently at higher risk:

- Older residents in sheltered and extra-care schemes. Many live with cardiovascular or respiratory conditions and take medication that affects thermoregulation or hydration. Reduced mobility and a lower sensitivity to heat mean risks can escalate quickly. Residents are often reluctant to leave their homes during heat events, even where communal space is available.
- Residents in supported housing. People with learning disabilities, autism, severe mental illness or dementia may not recognise symptoms of heat stress or may be unable to manage their environment effectively. This includes operating blinds, windows or ventilation systems. In some settings, staffing is not continuous, increasing risk during overnight periods.
- Residents with disabilities. Residents with limited mobility may be unable to open high-level windows, move to cooler rooms or access communal spaces. Adapted homes, particularly those with wet rooms, can also experience higher humidity, increasing discomfort and health risk during hot weather.
- Families with babies and young children. Infants are less able to regulate body temperature and rely entirely on carers to manage their environment. During heatwaves, residents report sustained sleep disruption and increased concern about indoor temperatures, particularly in top-floor flats.
- Low-income households. Many residents cannot afford to purchase cooling equipment or to run fans continuously. Cooling demand is additional to winter heating costs, not a substitute. Fixed or low incomes limit the ability to adapt, while existing energy affordability pressures increase the risk of under-cooling.
- Residents in temporary or decant accommodation. These residents are often placed in lower-performing housing and have limited ability to refuse or relocate. This reduces both control and resilience during heat events.

Socioeconomic factors further compound risk. 38% of our residents have household incomes below £20,000, and 70% report not being able to cope with an unexpected cost of £850 (Peabody Index, April 2025). This directly affects their ability to respond to heat, whether through behavioural changes, equipment use or relocation.

We assess overheating risk by combining exposure (location and heat intensity), sensitivity (building characteristics and resident profile), and adaptive capacity (ability to respond). This helps us identify not just which homes are at risk, but which residents are most at risk in practice.

3.3 The compound effect with other hazards

Overheating does not occur in isolation. In practice, it interacts with other housing, health and environmental risks, often making them worse and harder to manage. We see several consistent interaction effects

- Air quality. Homes on busy roads face a direct trade-off between ventilation and exposure to pollution. During hot weather, residents may avoid opening windows due to air quality concerns, increasing internal temperatures.
- Damp and mould. Attempts to cool homes using evaporative methods, such as wet towels or low-cost cooling devices, can increase internal humidity. In homes already prone to damp, this can worsen conditions and increase the risk of mould growth.
- Fuel poverty. Cooling demand is additional to winter heating demand. For low-income households, this creates year-round energy pressure. Residents may under-use fans or other cooling measures due to cost, increasing health risk during heat events.
- Fire safety. We regularly observe fire doors being propped open to increase airflow during hot weather. This directly conflicts with fire safety requirements and creates additional risk in higher-risk buildings.
- Mental health and wellbeing. Sustained high indoor temperatures disrupt sleep, reduce comfort and increase stress. In supported housing settings, this can lead to deterioration in mental health and behaviours that challenge, increasing demand on staff and services.

Overheating also sits within a wider climate risk context. Our modelling shows that heat stress is the most significant risk to residents across our portfolio, while hazards such as flooding and subsidence present significant long-term risks to buildings. This reinforces the need to address overheating as part of a broader, multi-hazard climate resilience strategy.

4. Transition and operational risks to our organisation

4.1 Transition risks

The policy, regulatory and funding landscape is evolving quickly. For a large social landlord, this creates a set of specific transition risks where requirements are changing faster than systems and funding can adapt.

- Retrofit and overheating risk. Our retrofit programme, aligned to PAS 2035 and driven by national funding and EPC targets, prioritises insulation and airtightness to improve winter performance. Without integrated overheating assessment at design stage (for example TM59), there is a risk that these works increase summer overheating. This reflects a wider policy gap, where retrofit funding and regulation are not yet fully aligned with overheating risk in existing homes.

- Regulatory expectations. Recent changes, including the Social Housing (Regulation) Act 2023 and Awaab's Law, have established a clear direction of travel: landlords are expected to manage hazards in the home. It is likely that overheating will be treated with similar weight to damp and mould. We support this direction, but a clear and workable standard, alongside a funded delivery pathway, will be essential.
- Building safety interactions. Measures that support cooling, such as increased window opening, cross-ventilation or external shading, can interact with building safety and fire safety requirements, particularly in higher-risk buildings. There is a need for clearer guidance that treats overheating mitigation as part of a safe and compliant building strategy.
- Planning and policy uncertainty. Long-term investment decisions rely on clarity. At present, there is uncertainty around how the London Plan, Part O and future overheating standards will apply to both new and existing homes. This creates risk for developers and landlords planning schemes with 30-to-60-year lifespans.
- Financial risk. Homes that overheat can become harder to let, more likely to generate complaints and more exposed to disrepair claims. Over time, this creates a risk of assets becoming less viable without intervention.
- Energy and infrastructure constraints. Increased use of active cooling, including reversible heat pumps, raises questions about electricity demand, affordability and local grid capacity, particularly in dense inner-London areas.

4.2 Operational risks

- Staff health and safety. Repairs operatives, housing officers and care staff are exposed to heat during their work. Prolonged heat events require changes to working patterns and can affect productivity and service delivery.
- Service continuity in sheltered and supported housing. Communal spaces in sheltered and supported schemes must remain safe and usable. In some older schemes, these spaces become too hot to use during heat events, reducing access to meals, social contact and welfare support.
- Increased demand on services. Heatwaves drive higher contact volumes, including repair requests, complaints and welfare concerns, placing additional pressure on already stretched services.
- Plant and equipment performance. Lifts, access systems, lighting, pumps and building services can be affected by high temperatures. Failures during heat events can compound safety risks and disrupt services.
- Resident experience and complaints. Overheating is already a source of complaints and dissatisfaction. As temperatures rise, this is likely to increase, alongside expectations that landlords will act.
- Competing investment priorities. Overheating adaptation competes directly with other major investment pressures, including building safety, damp and mould, decarbonisation and new supply. Without clearer policy direction and funding alignment, it will be difficult to address overheating at scale.
- Supply chain and delivery capacity. Contractor availability, material lead times for cooling and shading products, and specialist retrofit capacity are all constrained during and after heat events, slowing delivery of mitigation measures.
- Regulatory and legal exposure. Overheating increases exposure to complaints, Ombudsman findings, and potential enforcement under HHSRS and environmental health legislation, creating both financial and reputational risk.

5. Responses to the Committee's specific questions

We have responded to the questions most relevant to our role as a social housing provider.

Q1a. What proportion of homes are currently at risk of overheating?

Based on our internal modelling and thermal comfort analysis, we estimate that around 7% of our London homes already experience significant overheating under current climate conditions, assessed against CIBSE TM59 criteria. Looking ahead, the risk increases sharply. By 2060, under a high emissions scenario, we estimate that (under RCP 8.5) up to 93% of homes could experience overheating without further adaptation.

Overheating risk is not evenly distributed. It is most prevalent in flatted developments, particularly in newer-build homes and higher-density schemes. Risk is higher in:

- middle and upper-floor homes
- well-insulated homes with high internal and solar heat gains and limited ventilation
- homes connected to communal heat network systems
- homes with large areas of glazing or restricted window openings
- homes located in central and inner London, where the urban heat island effect is strongest

Q1b. How does overheating affect different demographics, including tenure?

Overheating disproportionately affects social housing residents, because exposure to heat risk is closely linked to income, health and housing conditions. Many residents have limited ability to adapt. This includes people who cannot afford cooling equipment or increased energy use, and those who cannot easily relocate or change their living conditions. Residents with the least ability to adapt are overrepresented in social housing, including older people, disabled residents and people with long-term health conditions. These residents are more susceptible to heat-related illness and less able to manage their environment during heat events. In practice, this means that overheating is both a housing issue and a public health and inequality issue. The residents most affected are often those with the least capacity to respond.

Q1c. How is the risk of overheating currently assessed in new developments? Is this sufficient?

Part O of the Building Regulations (2022) and the London Plan cooling hierarchy have improved how overheating is considered in new development. However, they are not yet sufficient to ensure good performance in practice. We see three main gaps:

- Use of the simplified method. Across the sector, schemes can pass the simplified Part O method while still overheating in practice. This is particularly the case in single-aspect flats, especially those facing south or west, where ventilation is constrained by noise or air quality.

- Inconsistent use and application of dynamic modelling. Dynamic thermal modelling (TM52/TM59) is not consistently applied across the sector. Where it is used, assumptions about window opening behaviour, internal heat gains and climate data can be optimistic. We recommend consistent use of dynamic modelling with future weather files aligned to UK climate projections (e.g. UKCP), rather than reliance on historic data.

- No equivalent framework for existing homes or major retrofit. There is currently no comparable requirement for assessing overheating risk in existing homes. This is a significant gap, given that most of the housing that will exist in 2050 has already been built. Major retrofit programmes, including insulation and decarbonisation works, should trigger a formal overheating assessment.

Q1d. How do different building typologies contribute differently to UHI and overheating?

Different building types contribute to overheating in different ways, but the underlying drivers are consistent: solar gain, internal heat gains, limited ventilation, and the surrounding urban environment.

Victorian and Edwardian homes are more likely to overheat due to unshaded glazing, poorly insulated roofs and limited night-time ventilation, particularly in subdivided properties.

Post-war and mid- to high-rise blocks can retain and re-radiate heat, particularly where ventilation is constrained. This is often combined with single-aspect layouts, curtain-wall glazing and heat gains from communal systems.

Modern high-density developments can also contribute to overheating where design and layout limit ventilation, increase solar and internal heat gains, and concentrate waste heat from building systems. Hard landscaping and limited tree cover further increase local temperatures.

At a city scale, these factors contribute to the urban heat island effect. Taller, denser development can intensify this effect where heat gains, ventilation and green infrastructure are not effectively balanced through design.

Q1f. Are homes being built now which will be vulnerable to overheating?

Yes. This is a clear and immediate issue.

Through our own development pipeline and Section 106 acquisitions, we see homes being completed today that are vulnerable to overheating under current conditions, and more so under future climate scenarios. These homes are not failing because of a single design issue, but because of a combination of factors, including:

- single-aspect layouts, often driven by site constraints and viability
- restricted window openings, particularly in higher-rise homes or on busy roads
- mechanical ventilation with heat recovery (MVHR) systems where performance does not meet summer ventilation requirements
- heat gains from communal systems, particularly domestic hot water distribution pipework.

Current regulations and planning policy have improved design expectations, but they do not yet consistently prevent these outcomes in practice. As a result, the long-term risk and cost of managing overheating is likely to fall on landlords and residents.

Our internal analysis identifies newer-build flatted developments as a particular area of risk in some cases. This reinforces the need to focus not just on compliance at design stage, but on real-world performance over time.

Q2a. What changes would you like to see made to the London Plan?

The London Plan should place greater emphasis on real-world performance and on existing homes, where the majority of overheating risk sits. Our recommendations:

- Integrate overheating into retrofit policy. Major refurbishment, including insulation, roofing and decarbonisation works, should trigger a formal overheating risk assessment, reflecting the approach already taken for new build under Part O.

- Strengthen the cooling hierarchy in practice. Require dynamic thermal modelling (TM52/TM59) for all major residential developments, using future weather files aligned to UK climate projections, with results submitted as part of the planning process.

- Set clearer expectations for future climate performance. Require schemes to demonstrate performance under future climate conditions, including extreme heat scenarios, rather than relying on historic data.

- Address single-aspect design. Introduce a stronger presumption against single-aspect homes facing south or west without effective mitigation, particularly in higher-density and affordable housing schemes.

- Embed cooling in the public realm. Set clearer, measurable expectations for tree canopy, shading, permeable surfaces and green infrastructure at both development and borough level.

- Address heat from communal systems. Strengthen requirements for insulation and performance of communal heat networks, including monitoring of internal heat gains in corridors and risers.

- Consider vulnerability in planning decisions. Prioritise better-performing, well-oriented sites for uses with higher vulnerability to heat, including sheltered housing, supported housing and early years settings.

Overall, the London Plan should move from a focus on design-stage compliance to ensuring that homes perform safely in practice.

Q2b. Is the London Plan's current stance on air conditioning (Policy SI 4) still appropriate?

The principle of the current policy remains sound. A passive-first approach is important to minimise energy use, reduce costs for residents and avoid contributing to the UHI effect. However, the current approach is too rigid in practice. In some settings, particularly in supported and sheltered housing, passive measures alone are not sufficient to maintain safe internal temperatures. A more flexible approach is needed. We would recommend:

- retaining the passive-first hierarchy

- allowing targeted use of active cooling where:

    - passive measures have been fully explored

    - residents are particularly vulnerable to heat

    - post-occupancy evidence shows that homes do not meet TM59 standards

- prioritising reversible heat pumps over standalone air conditioning systems, recognising their role in both heating and cooling

- ensuring that active cooling is appropriately sized, energy-efficient and, where feasible, supported by on-site renewables

- avoiding systems that expel heat directly into confined external spaces, where this would worsen local overheating.

A more nuanced approach would allow safe outcomes for residents while maintaining the overall intent of the policy.

Q2c. What should developers do to ensure homes are heat resilient?

Developers need to design for how homes will perform in practice, not just how they perform at design stage. Key actions:

- Use dynamic thermal modelling early in design. Commission TM59 modelling from RIBA Stage 2, using future weather files, and use the results to inform layout and design decisions.

- Design for effective ventilation and heat removal. Prioritise dual-aspect layouts and avoid deep-plan single-aspect homes where possible. Ensure sufficient openable window area and usable ventilation strategies.

- Manage solar gain through design. Use external shading, balconies, deep reveals and façade design to reduce direct solar gain, rather than relying on internal measures.

- Ensure building services perform in summer. Specify MVHR systems that deliver effective summer bypass and adequate ventilation rates for hot weather, and design communal systems to minimise internal heat gains.

- Design for real-world use. Ensure windows, shading and controls can be easily used by residents, including older and disabled people, and that night-time ventilation is safe and practical.

- Integrate green infrastructure. Provide tree canopy, planting, green roofs and permeable surfaces to reduce local temperatures and improve external comfort.

- Commit to post-occupancy evaluation. Monitor performance after completion and use this to inform future design.

Q2d. What support should be made available to homeowners and tenants?

Support needs to reflect the reality that overheating is already affecting residents and that many have limited ability to respond without assistance.

We would recommend:

- Dedicated funding for cooling and whole-year comfort. Current funding frameworks focus on heating and energy efficiency. There is no equivalent support for cooling or for integrated thermal comfort. A dedicated or expanded funding stream is needed, particularly for social housing.

- Clear and consistent advice for residents. Residents need simple, practical guidance on how to keep homes cool, recognise heat stress and respond safely. This should be consistent across the GLA, boroughs, the NHS and social landlords, and accessible to a wide range of residents.

- A coordinated network of cool spaces. Publicly accessible, well-advertised cool spaces should be available during heat events, including libraries, community centres and places of worship. Social landlords can support this through their own communal spaces where appropriate.

- Support with energy costs. Cooling is increasingly a necessity for some households, not a luxury. Financial support mechanisms should recognise the additional cost of cooling for residents.

- Regulatory clarity. A clear and proportionate standard is needed for overheating in existing homes, similar in approach to damp and mould under Awaab's Law, including expectations on landlords and routes for residents to raise concerns.

Q2e. Are there developments in London that manage heat risk well?

There are examples of schemes that manage overheating risk effectively. These typically combine:

- dual-aspect design and shallow plan layouts
- external shading and façade design that limits solar gain
- generous tree canopy and green infrastructure
- green roofs and well-designed external spaces
- well-performing ventilation systems with effective summer operation

We are able to provide case studies from our own portfolio and from across the sector and would be happy to support the Committee with further detail or site visits. For example, we would be happy to show how dynamic external shading was utilised on one of our new developments in W12.

Q2f. Are there examples of cities London can learn from?

Several cities have taken a more coordinated approach to managing heat risk, particularly by treating it as a public health and social equity issue.

Examples include:

- Paris, through its programme of "cool islands" and extended access to public spaces during heat events
- Barcelona, through its network of climate shelters in public buildings
- Medellín, through large-scale investment in green corridors
- Vienna, through integration of urban cooling measures into social housing and public realm design

Common themes across these cities include:

- recognising heat as a public health issue, not just a building performance issue
- investing in green infrastructure at scale
- providing accessible cool spaces for residents
- coordinating responses across housing, health and local government system

6. Key asks of the Mayor and the Committee

In summary, we ask the Committee and the Mayor to:

- Publish the London Heat Plan at pace, with specific sections addressing social housing, supported and sheltered settings, and temporary accommodation.
- Support a pan-London communications and welfare response during heat health alerts, leveraging the reach of social landlords, primary care, community and faith organisations.
- Revise the London Plan cooling hierarchy and Policy SI 4 to retain the passive-first principle while explicitly permitting reversible heat pumps and other active cooling in clinically or developmentally vulnerable settings, and in homes where TM59 criteria cannot otherwise be met.
- Require TM59 dynamic modelling with future weather files for all major residential schemes and major refurbishments, with publication of results.
- Invest in the public realm – trees, green roofs, SuDS, cool spaces – at borough scale, recognising the disproportionate UHI exposure of inner-London social housing residents.
- Work with government to establish a clear regulatory standard for overheating in existing homes, analogous to the damp and mould regime under Awaab’s Law, with a realistic funded pathway.
- Integrate overheating into the decarbonisation/retrofit funding regime, so that social landlords are funded to deliver whole-year thermal comfort, not just winter performance.
- Convene a standing forum between the GLA and other relevant bodies (e.g., UKHSA, the Regulator of Social Housing, the BSR, London Councils) and the social housing sector to coordinate policy, regulation and funding on overheating.
- Support better monitoring and evidence, including temperature sensors and post-occupancy data, to ensure interventions are based on real-world performance.

We will be supporting the Committee’s work through forthcoming oral evidence from our Director of Design. We would also be happy to host a Committee visit to show both the challenges and examples of good practice in residents’ homes, or by providing additional material on specific topics (for example, scheme-level case studies, communal heat-network performance data, resident engagement materials, or our internal overheating risk model).

We thank the Committee for prioritising this issue. The homes and residents most affected by overheating are, by and large, those with the lowest voice and the least capacity to adapt. A clear, funded, coordinated response from the Mayor, the GLA and central government will protect residents and reduce avoidable harm.

London Assembly: Planning and Regeneration Committee
Call for Evidence April 2026: Are London's homes ready for a heatwave?

Response of Kevin J Lomas[1], BSC, PhD, DSc, Eur. Eng., FCIBSE

26 April 2026

About this response

UK academics are at the leading edge of international research into overheating in buildings. Research teams led by Prof Lomas (the respondent) first published evidence of overheating in UK homes in 2014. Since then, c40 refereed journal papers and conference articles about overheating in buildings have been published. Colleagues that contributed to the projects described herein include Prof D. Allinson, Dr M. Li, Dr S. Watson, Dr B. Roberts and Dr P. Drury, all were Loughborough University (address below).

In responding to the London Assembly call for evidence, it is impossible to provide a comprehensive synthesis of the vast volume of international knowledge about overheating on buildings that has been accumulated. Instead, therefore, the evidence from recent significant UK research projects is summarised to provide insights very relevant to the first group of questions in the Call for Evidence.

Throughout this response, references are given to substantiate the answers provided to the questions and to direct readers to related, relevant work. The respondent is content to provide copies of all these publications and provide further information should this be required.

Evidence on which the response to questions is based

This response draws together the relevant findings from two projects, each of which involved the analysis of new primary data sets. Together, these provide the clearest and most succinct evidence we have of the actual, measured summertime temperatures, and thus overheating, in London, and English, homes.

Project 1: Analysis of the temperatures measured in the living rooms and main bedroom[2] of 720 English homes collected as part of the 2017 Energy Follow-up Survey (EFUS) to the English Housing Survey. Meta data enabled an investigation of the impact of dwelling typology and occupancy on overheating. The EFUS project was funded by the Department for Business, Energy and Industrial Strategy (BEIS) and led by the Building Research Establishment. The project reports can be found at [1] but the summertime temperature analysis is most succinctly reported in [2], with the underlying statistical analysis at [3].

Project 2: Further analysis of the EFUS2017 data included a systematic literature review and more detailed analyses to reveal the full impact of dwelling type and energy efficiency measures on the prevalence of overheating. The work was funded by the Department for Energy Security and Net Zero (DESNZ). Project reports can be found at [4], but a succinct interpretation of the findings and their implications is in [5].

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[2] Throughout this response, all references to bedroom(s) mean the main bedroom(s) as identified by the householder.

The EFUS2017 data provides the most reliable and compelling insights we have of the prevalence of overheating in the English housing stock and enables comparison with the housing stock in the London Government Office Region.

- The sample of EFUS homes is statistically representative of all the homes in England[3],
- Each home is linked to weather data from the nearest Met Office station,
- Half-hourly temperatures were measured in the living room and main bedroom (and up to three other spaces),
- A survey of the physical characteristics of each home and the socio-economic status of the household was undertaken, and
- Occupants' thermal comfort perceptions were recorded.

Fortuitously, temperature data were collected during the summer of 2018 which, at the time, was England's hottest ever summer since 1884 [6], it included four heatwaves. The Met Office noted that the 2018 "*summer temperatures could be normal by the 2050s"* [7]. The data therefore gives us a 'glimpse of the future'. (The recent summer of 2025 surpassed 2018 to become the warmest on record [8]).

There are many publication that report on overheating in buildings based on calculations made by models, especially dynamic thermal models (DTMs). Extreme caution is, however, needed when interpreting the overheating predictions, especially predictions for existing, occupied homes. Recent work [9] has demonstrated that predicted and measured temperatures differ substantially and so too can the results produced by different models and modellers. This is because indoor temperatures are very dependent on the local microclimate, occupant behaviour (e.g. the operation of windows for ventilation), the achieved ventilation rates, the fine details of the site and building shading, and a plethora of other factors. These critical features have substantial impact on indoor summertime temperatures and yet they are largely unknown for existing, occupied buildings and if they are known, are hard to model reliably. The way a model represents the thermal flows in the building and the way modellers interpret the geometry, construction, potential air flows etc, also have a large impact on indoor temperature predictions.

Responding to the questions

In responding to each question, all the relevant occupancy and dwelling characteristics that were investigated are listed. However, only results that are significant at the 1% level ($p<0.01$) are tabulated except where a result speaks directly to the question asked and then results significant at the 5% level ($p<0.05$)are also tabulated. Non-significant results are, of course, also pertinent and these are also discussed. The discussion also seeks to explain why some factors are significant and some not and if, and how, the results conform with expectations. The implications for the heat mitigation of London homes are drawn out.

1. What is the overheating risk currently facing London's homes and how is this risk evolving?

Whether a home is, or is not deemed to be overheated depends, of course, on the weather during the period of measurement, but also, and importantly, on the definition of overheating - and definitions have changed over time and differ from one analysis to the next. Care has therefore to be taken when comparing absolute numbers (and percentages) of overheated homes, especially when results are drawn from different sources. The overheating criteria used in the two projects described above are given in the Appendix.

[3] Each dwelling representing between 4,000 and 225,000 similar homes.

The criterion used to define overheating in living rooms is essentially the same for both projects – Criterion a of TM59(2017) [10]. In Project 1, TM59(2017) Criterion b produce implausibly high estimates of the prevalence of overheating in bedrooms and so the same criterion that was used for living rooms was also adopted for bedrooms. In Project 2, the new UK bedroom overheating criterion [11] was used, this criterion is incorporated in the revised version of TM59(2026) [12].

Q1a. What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

The EFUS analysis (Project 1) provided insights relevant to this question.

In England as a whole, during the period May to September in 2018, 3.6 million living rooms (15% of the stock) and 4.6 million main bedrooms (19% of the stock) overheated.

At the Government Office Region (GOR) level, the percentage of living rooms overheated in London, 28%, (636,000 homes) was greater (by number and percentage) than in any of the other English GORs. There was *significantly more* overheating (p<0.01) in the London region than in the other eight regions combined (13%). In the London region, 32% of the main bedrooms overheated (668,000 homes), which was significantly more (p<0.05) than in the other regions combined (17%).

That the prevalence of overheating should be significantly greater in London than on other parts of England is not surprising. The South East is in the hottest part of the UK and London is subject to a strong urban heat island effect, has a relatively high proportion of medium and high-rise apartment buildings and is densely populated. Thus, there are relatively more people, who are subjected to the city's higher outdoor temperatures, living in a dwelling type, flats, that is more prone overheating (see below).

Uniquely, urban and suburban parts of London are classes as at high risk of overheating in Approved Document Part O, to the 2021 Building Regulations [14] all other parts of the UK except, maybe, parts of central Manchester[4], are classed as at moderate risk of overheating.

Q1b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

The EFUS analysis (Project 1 above) provides extensive information about the association between the incidence of living room and bedroom overheating and housing tenure and the composition of English households, see Table 1[5]. It does not provide information related specifically to gender.

Tenure of housing, the size of households and the ages of household members had a *significant impact* on the risk of living in an overheated home.

1. Households experiencing deprivation, i.e. had no household members in employment or living in social housing or had a household income below that of 40% of the population, were roughly twice as likely to live in a home with an overheated living room and bedroom than other households.
2. Larger households, i.e. with three or more members or which fully occupy their home, were twice as likely to experience overheated bedrooms.

[4] ADO lists five post codes in Manchester but is equivocal saying that these 'may also have elevated night-time temperatures'.

[5] Two significant results for bedrooms are not shown in Table 1 as they essentially yield the same conclusions about the impact of occupants' age and the presence of children as the tabulated values, see [3] for these results.

3. Households with at least one child, or an older members (age over 65), were twice as likely to living in a home with an overheated living room or bedroom.

Table 1: Household composition: characteristics for which there was a significant difference in the prevalence of overheating

Category	Characteristic	Living rooms	Bedroom
Tenure	Social housing	26%	*29%*
	Private home	13%	*16%*
Employment	No household member employed	24%	
	At least one household member employed	11%	
Income	Lower two income quintiles	22%	*24%*
	Upper three income quintiles	10%	*15%*
Occupancy density	Home fully occupied		22%
	Home under occupied		11%
Size of household	More than two people in household		30%
	One[a] or two[b] people in household		15%[a] 12%[b]
Age of household members	At least one household member over 65	24%	
	No household members over 65	11%	
Presence of children	At least one child in household		30%
	No children in household		15%

All results are significant at the 1% level except those in *italics* which are significant at the 5% level. Blank cells indicate any differences were not significant at either level. Lower and upper confidence intervals and results of significance tests are here [3]. For detailed description of each characteristic see [15].

These results might be expected for the following reasons. Less affluent households tend to occupy social housing which is more likely to be a flat in a medium or high rise building – a dwelling type prone to overheating (see below). Such housing is more likely to be located in a built-up area with less greenery, which can lead to a hotter local micro-climate. Noisy and polluted locations, as well as concerns about security, can deter people from opening windows, which limits summer ventilation cooling.

Families with children, people out of work and older people are more likely to be at home during the day and so be exposed to the higher daytime indoor temperatures. Homes which are fully occupied and/or have more household members generate more internal heat, which exacerbates overheating risk.

Children and older people are more susceptible to heat[6], especially as older age is often associated with illness and disability. Older people may also be less able, both cognitively and physically, to operate windows for ventilation and effectively operate shading devices. They may also be unable to 'escape the heat' by moving outdoor during hot weather.

Compared to the long-term baseline, the excess heat-related deaths during the four heat waves of 2018 were *significantly higher* in the London Government Office Region (GOR) but, save for two minor exceptions, not in any of the other eight GORs [16]. These excess deaths occurred during the last three heatwaves amongst London residents aged over 65. There was no significant increase in excess deaths in London (or England as a whole) amongst those aged under 65. In London, across all

[6] Their home may, may not be particularly prone to overheating but the threshold temperature that defines overheating is 1K lower for homes occupied by young, elderly, ill and disabled people.

four heatwaves, there were 429 excess deaths amongst those over 65 compared to 863 such deaths in England as a whole.

Q1c. How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

The risk of overheating in new homes must now be assessed against the requirements of Approved Document Part O (ADO) of the Building Regulations 2021 for England [14], and similar documents for Wales [17] and Scotland [18]. The Building Regulation states that "*Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes … to - (a) limit unwanted solar gains in summer; (b) provide an adequate means to remove heat from the indoor environment".*

To comply with this regulation, dwellings must meet *either* the requirements of the simplified method described in ADO *or* be shown not to overheat using a dynamic thermal model (DTM) which is operated in line with the guidance in CIBSE TM59(2017) [16].

Because London considered is considered to be the area of England at high risk of overheating, the ADO simplified method places limits on the southwards facing window areas, the size of ventilation openings and the need for external shading are more 'onerous' than for other areas of England.

A new version of TM59 has recently been written (the respondent was the Executive Editor) and will be published in 2026. The new version of TM59 seek to prescribe more tightly than previously the way in which DTMs must be used, e.g. the modelling of the home and its construction, the way that windows and other ventilation devices must be assumed to operate, each room's internal heat gains, etc. Living room overheating is assessed against the established overheating criterion [12, 13] but the new criterion b [11] is used to define overheating in bedrooms (definitions are in the Appendix to this document).

The adoption of TM59(2026) within future revisions ADO would go a long way towards ensuring that new London homes are resilient to overheating. There are, however, some, hopefully useful, points that might be made. It should be stressed that these are the personal views of the respondent.

1. **Ceiling fans** provide a substantial cooling effect during hot weather. Such fans are used throughout the world, their cooling effect in warm weather is well documented, e.g. in British Standards [19], and guidelines for their design, installation and use exist [20]. Ceiling fans are promoted in TM59(2026) and they are an excellent, low energy (<20 Watts) retrofit measure for existing homes.

   Recent modelling work using the TM59(2026) methodology showed that the installation of ceiling fans in a new Cat.II semi-detached house in London reduced the living room temperatures and delayed overheating to the second half of this century [21].

   It is regrettable that the current Building Regulations (and ADO) do not mention ceiling fans as a permitted passive heat mitigation measure[7]. Discussion with others suggest that this is because ceiling fans do not *limit unwanted solar gains* or address *adequate heat removal.*

   It is the respondents view that guidance in relation to existing and new London homes should promote the benefits of ceiling fans. This would also stave off the drift towards the installation of air conditioning.

[7] The reference to fans in the ADO relates to mechanical extract or whole-house (e.g. MVHR) ventilation fans.

2. **Resilience to future climatic warming** of new London homes would be enhanced if ADO adopts weather files (for use by DTMs) that represent the climate of the near future, not least as the 'life-expectancy' of new homes can be many decades. Files representing the current and future weather in London and 27 other UK areas have been created by the CIBSE for use in association with TM59(2026). The respondent recommends the adoption of weather files that represent the weather expected in the 2050s for overheating assessments.

3. **The heat sensitivity of home occupants** has a marked impact on their tolerance of elevated temperatures. ADO overheating assessments are most likely to be made assuming that homes are occupied by 'health' people (Cat.II)[8]. The equivalent documents to ADO for Wales and Scotland presume that all homes may be occupied by people who are elderly, fragile or heat sensitive Cat.I). Such dwellings would include care homes, sheltered accommodation, etc. The overheating criteria applicable to such homes use a lower temperature threshold to define overheating, see Appendix.

   In London, designs for new Cat.II homes that comply with ADO may not provide adequate overheating protection for (Cat.I). Heat mitigation of Cat.I homes using only passive measures (i.e. without mechanical cooling or air-conditioning) could be challenging. However, research has shown that the use of ceiling fans can effectively eliminate overheating in Cat.I homes up to the 2050s [21].

   Guidance for the design of new London homes could consider whether Cat.I or Cat.II requirements should be adopted. The adoption of Cat.I temperature thresholds would provide great protection from overheating in severe heatwaves but it could have implications for design costs, may require the operation of ceiling fans for, or by elderly and fragile people, and risks provoking the uptake of air-conditioning.

4. The London **urban heat island** and other micro-climatic effects are not captured in the new CIBSE weather files. Local temperatures could therefore be higher than those given in the weather files used by DTMs - especially at night and in heavily built-up areas of London.

   Urban greening can help reduce the effect of the UHI on local temperatures and may also confer health and well-being benefits, reducing air-borne pollution, providing outdoor leisure space and improving the aesthetics of the urban realm.

   The respondent's view is that planting and urban greening should be encouraged. However, amelioration of overheating in existing and new homes must focus on the most effective measures, and these relate to the typology of the buildings themselves (see below).

5. **Dynamic thermal models** have been shown to be poor predictors of the internal temperatures measured in existing homes. More problematic, in an ADO compliance context, is that different modellers and models also produce markedly different results for the same, well defined and unoccupied home e.g.[9]. Problems arise due to different interpretations of the home design specification, different approaches to modelling the geometry and construction, different ways of modelling ventilation rates and solar gain, mistakes made when inputting data to models and errors in interpreting the model outputs, etc.

   Whilst TM59(2026) seeks to prescribe how homes should be modelled, this does not account for errors made by modellers or the differences in the theoretical basis underlying each model. In

[8] ADO itself does not specify the Category to use, but both are defined in TM59(2026).

contrast, assessments of energy demands to demonstrate Approved Document Part L compliance, requires all modellers to be trained and that they use the same underlying SAP model[9].

It is the respondents view that much more should be done to assure the replicability of the results produced by different DTMs and different modellers. Given the enhanced importance of overheating assessments, the current guidance offered in CIBSE Application Manual AM11 of 2015 [22] is perhaps inadequate. There is also no established approach to evaluating the skills and knowledge of those that use DSMs and for their continued training and certification. Although perhaps not a matter specific to London homes, it is the respondents view that these issues require attention.

Q1d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

This response relates to the question of how dwelling typology influences the likelihood of overheating and *not* the part of the question concerned with how building typology affects the urban heat island (UHI).

The EFUS analysis (Project 1) examined the influence on overheating prevalence of:

- Typology - flat or house,
- Location - rural or urban,
- Age band of the home,
- Gross floor area,
- Mode of heating,
- Insulation levels in roof and walls, and
- Overall energy efficiency (SAP rating).

The further analysis of the EFUS data (Project 2) looked more deeply into the question of whether there might be a relationship between overheating and the energy efficiency of homes, examining the influence of:

- Flat floor level and entry level,
- Glazing, full or partially double glazed,
- Solid or cavity wall construction,
- Cavity wall insulation,
- Loft insulation thickness, and
- Overall energy efficiency (SAP rating).

Importantly, Project 2 examined these factors separately for flats and houses.

The results in Table 2 are provided only for those characteristics for which there was a significant difference in the prevalence of overheating.

[9] The introduction of the new, open source Home Energy Model (HEM) with an overheating wrapper, may drive improved inter-model reproducibility, either because all overheating assessments are made using this model or all other models are made to produce the same results as the HEM.

Table 2: Dwelling typology: characteristics for which there was a significant difference in the prevalence of overheating

Category	Characteristic	Living rooms	Bedroom
Original EFUS analysis (Project 1)			
Dwelling type	Flat (all floor levels)	30%	
	House (detached, semi-, terrace or bungalow)	12%	
Dwelling floor area	Less than $50m^2$	35%	
	Greater than $50m^2$	7% to 16%	
Further EFUS analysis (Project 2)			
Flat entry level	Above ground level	*27%*	51%
	Ground or basement level	*2%*	11%
Flat floor level	Top floor	27%	
	Not top floor	2%	

All results are significant at the 1% level except those in *italics* which are significant at the 5% level. Blank cells indicate any differences were not significant at either level. Lower and upper confidence intervals and results of significance tests are given in [3]. Detailed descriptions of each characteristic are in [15].

The following conclusions could be drawn.

1. Approximately 30% of all flats in England had overheated living rooms, this was significantly higher than for the living rooms of houses - by a factor 2.5. However, the prevalence of overheating in the bedrooms of flats (16%) was not significantly different to that in the bedrooms of houses (19%). Detached and semi-detached houses had the lowest prevalence of living room overheating (10%).
2. Flats entered above ground level were ten times more likely to have overheated living rooms (27%) than flats entered on the ground floor or below (2%).
3. More than half of the bedrooms in above ground flats, 51%, were overheated compared to 11% of ground floor, or basement flats.
4. Top floor flats are more likely to have overheated living rooms, by a factor of five, than flats on lower floors.
5. Small homes, i.e. with a floor area less than $50m^2$, are significantly more likely to have overheated living rooms than larger homes (size categories 50-69, 70-89, 90-109, $110m^2$ or more). The prevalence of overheating was four times greater in small homes (floor area $<50m^2$) than in large homes (floor area $>110m^2$).
6. The age of a home had no significant influence on the prevalence of overheating in either bedrooms or living rooms.
7. Whether a home was located in an urban or rural area had no significant impact on the prevalence of overheating in either room.

Concerning energy efficiency measures[10]:

8. There was *no significant difference* in the prevalence of overheating for any of the energy efficiency measures examined.
9. The overall energy efficiency of a home did not affect the likelihood of summertime overheating.

[10] Project 2 analysis.

10. In houses, loft insulation (over 150mm in this study) significantly reduced the frequency of occurrence of high bedroom temperatures.
11. Internal wall insulation can cause higher room temperatures but this can be overcome with effective ventilation and daytime shading.

Importantly, the work also shown that insulation measures have the desired effect - in cool weather they significantly increase living room and bedroom temperatures.

These results align with established knowledge - that the likelihood of overheating is primarily influenced by: the dwelling typology; the glazed area; orientation and solar shading; the provision of ventilation (e.g. through operable windows); and the operation of the windows and shading devices.

The important new observation is that neither insulation levels nor the overall energy efficiency of homes are important factors driving summertime overheating in existing homes – which is contrary to oft-cited, but erroneous claims to the contrary.

Confusion arises partly because:

a. higher energy efficiency standards are often found in newer homes and these may also have larger glazed areas and perhaps more restricted window ventilation, and
b. the overall energy efficiency of homes is strongly linked to their typology.

Regarding point b, Project 1, concluded that the prevalence of overheating was significantly greater in very efficient homes (Energy Efficiency Rating Bands A to C) than in less efficient homes (EER bands D to F). However, Project 2 showed that this was because the higher Energy Efficiency Rating bands contained a much higher proportion of flats than the lower efficiency bands. It was the typology, i.e. being a flat not a house, and *not* the insulation levels, that was associated with higher indoor temperatures.

Studies of homes built to very high energy efficiency standards, e.g. Passive house levels, sometime report summertime overheating. It is the current respondent's contention that this is primarily due to large areas of glazing and inadequate summer shading and ventilation and not the insulation levels per-se. But more diligent investigation of this issue is required.

There are clear thermo-physical reasons why the living rooms of flats overheat more than the living rooms of house. The living rooms of houses tend to be on the ground floor and so windows are shaded by the surrounding environment, they are also more likely to have a thermally heavyweight, ground-connected floor. Flats on the ground floor benefit in a similar way but those on upper floors do not. Flats on the top floor are particularly exposed to solar gain and also suffer from conducted heat through the roof above. Modern flats are also likely to have higher levels of glazing than houses, increasing solar heat gains.

Compared to houses, flats, especially small flats, are more likely to have single-sided ventilation which limits the flow of air through the home. They are also more likely to have multiple occupancy and so privacy concerns will preclude leaving bedroom doors open at night to enable cross-ventilation. For safety reasons, flats on the upper floors of buildings may have window opening restrictors which curtail the provision of adequate ventilation. In tall buildings, internal heat from lower floors, may rise to the flats at higher levels.

In extreme cases, it can be dangerous to inhabit flats on the upper floors of buildings during hot weather. Dangerously high temperatures were recorded in the upper floor bedrooms of flats in

North London built using off-site construction methods, the bedrooms on floors one and two did not overheat [23].

Flats do, however, offer greater opportunities to mitigate summer heat than houses, especially new flats. There is greater freedom for design innovation, for example: using overhangs, balconies, sliding shutters, occupant-operated shutters, inter-pane blinds etc. to provide shading; or adopting window systems, with side-vents and noise-attenuating openings to provide adequate, safe and secure, ventilation. Flats in many cities, especially in central Europe incorporate such features, and there is some excellent and inspiring design guidance available (e.g. as listed in TM59,2026).

Retrofitting of the external envelope of flats can be challenging and expensive. But there is scope for reconfiguring windows and improving ventilation within pre-existing wall apertures. Low-cost, self-help measures such as ceiling fans, window film, external awnings, etc need to be promoted.

Q1e. How is the risk of overheating different in London than in other parts of the UK?

The response to question 1a and other questions above relate to this question.

Q1f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

This response attends to the first question, the factors that contribute to overheating are discussed in the answers to previous questions.

Recent work using dynamic thermal models (DTMs), which was undertaken to support the revision of TM59, sheds light on this question [21, 25].

The results indicated that without heat mitigation measures, both a single bed apartment with single-sided ventilation and a typical semi-detached home would not pass an ADO (2021) overheating assessment even when using the new CIBSE London weather data for the present day (2020s). It would seem that 'business as usual' design, even in today's London climate, results in overheating.

With heat mitigation measures that align with those recommended by the ADO simplified method for London, overheating using 2020's weather data is obviated. In fact, whilst it is challenging, overheating even using a 2050s weather file can be prevented, especially if ceiling fans are installed in living spaces.

Concluding remarks

There is strong empirical evidence that enables the questions posed by the London Assembly to be answered with confidence.

More generally, adopting the guidance in the new version of CIBSE TM59(2026) would go a long way to removing the current and future risk of overheating in existing and new London homes. The challenge is to ensure that the guidance is followed, not just to secure planning approval, but so that the heat-mitigating features of designs are followed through to the as-built home. This includes the provision of guidance to household to help them use the heat-mitigating features effectively.

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Appendix: Definitions of overheating

The overheating results reported above are based on established UK overheating criteria but they differed between Project 1 and Project 2.

In Project 1, overheating in living rooms was defined as in CIBSE TM59 [10 and 12]:

> *The number of occupied hours for which ΔT is greater than or equal to one degree (K) between 1st May and 30th September inclusive shall not be more than 3 percent of the occupied hours during this period.*

In this definition *ΔT* is the difference between the operative temperature measured in the living room and adaptive temperature threshold for that day of measurement. This temperature threshold increases linearly with the running mean of the outside air temperature as defined in CIBSE TM52 [13] and elsewhere. For Project 1, the temperature threshold for Cat I homes was used for homes with at least one occupant who was heat sensitive (elderly, fragile or heat-sensitive), for all other homes the Cat.II threshold, which is 1K higher, was used. It was assumed that living rooms were occupied for 15 hours, from 07:00 to 22:00, and was the same on weekdays and weekends.

The prevailing TM59(2017) bedroom criterion [13] was found to produce 'extraordinarily high, and implausible' [2] estimates of bedroom overheating so in Project 1 bedroom overheating was also defined using the above criterion. Bedrooms were assumed to be occupied for the nine hours from 22:00 to 07:00.

In Project 2, living room overheating was defined using the same criterion and assumed hours of occupancy as in Project 1 (above). The analysis was however undertaken for a range of temperature thresholds, including those for Cat. I, Cat.II and Cat.III homes. The results are reported above using the Cat.II temperature threshold for all homes[11].

For bedrooms, overheating was defined using the new bedroom overheating criterion [5] which aims to assure thermal comfort when people are asleep. This new criterion is incorporated in TM59(2026) [12]. This criterion limits the number of nights for which the *mean* night-time operative temperature exceeds the relevant night-time operative temperature threshold, T_n.

> *The number of nights for which the mean operative temperature during hours of sleep exceeds T_n, between 1st May and 30th September inclusive shall not be more than N nights during this period.*

For the results reported here, the hours of sleep were assumed to be from 22:00 to 07:00. Analysis was undertaken for a range of temperature thresholds, T_n. Results are reported here for a mean night time threshold of 27°C which is applicable for non-heat sensitive individuals (Cat.II). (The threshold for Cat.I homes is 26°C.) The main bedroom was defined as overheated if $N>7$, i.e., there were more than seven nights with a mean bedroom temperature over 27°C. This is higher than the *N*-value likely to be used in TM59(2026).

[11] To remove the confounding influence of occupant heat sensitivity when examining the effect of energy efficiency measures on overheating.

SHADE THE UK

London Assembly Planning and Regeneration Committee

Are London’s homes ready for a heatwave?

Written supporting evidence

01 May 2026

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James Small-Edwards

Sent via email

01 May 2026

Dear James

Thank you for the invitation to attend the London Assembly's Planning and Regeneration Committee meeting on 10 March 2026 to provide verbal evidence to inform the investigation into 'Are London's homes ready for a heatwave?'.

I have reviewed and edited the transcript of my verbal evidence. Assuming my edits are accepted, I am happy with it as a record of my views, and those of Shade the UK.

As requested during the meeting, and in your follow up letter, please find below written supporting evidence on the following topics:

- clarification on overheating definitions and the methodology for calculating excess deaths;
- examples of new-build homes (which are potentially more ready for a heatwave than others); and
- the impact of materials used in tall commercial buildings on the local micro-climate, including work by the City of London Corporation and London academics.

I hope this summary of relevant information and links is useful for you and the other Committee members.

Best wishes
Polly

Polly Turton
Head of Climate Action and Public Health
Shade the UK

Clarification on overheating definitions and the methodology for calculating excess deaths

Overheating definitions

In general, the term 'overheating' refers to discomfort to building occupants caused by the accumulation of warmth within a building. It is a growing problem in the UK due to climate change, the urban heat island effect, increasing use of electronic equipment, and building design features such as orientation, large amounts of glazing, airtightness and single aspect rooms.

Yet overheating is subjective - the point at which 'hot' becomes 'too hot' will vary from person to person and depend upon a variety of factors. Whilst this means that not all occupants will be satisfied all the time and that, in a heatwave, it may still be very warm in a naturally ventilated dwelling, there should be a reasonable limit set on how much warmer a dwelling can be inside than outside.

However, there should also be a standard that precludes the worst levels of overheating and enables designers to find cost effective options to limit overheating risk whilst also delivering all the other aspects occupants look for in their homes. Given this, the Chartered Institution of Building Services Engineers (CIBSE) have defined a number of thresholds relating to overheating for different spaces within homes, and for different residential building types. A summary of these thresholds is provided below. More details can be found in:

- CIBSE TM59: Design methodology for the assessment of overheating risk in homes (2017). Standardises the assessment methodology for limiting overheating risk in new and refurbished homes.
- CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings (2013). Describes the principles of thermal comfort and defines overheating criteria for assessments.
- CIBSE Guide A: Environmental design (2015, updated 2021). Includes advice regarding sleep quality (that may be compromised at temperatures above 24°C), and recommends that peak bedroom temperatures should not exceed an absolute threshold of 26°C.

4.2 Homes which are predominantly naturally ventilated	a) For living rooms, kitchens and bedrooms: the number of hours during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 percent of occupied hours. b) For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10pm to 7am shall not exceed 26°C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail).
4.3 Homes which are predominantly mechanically ventilated	For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26°C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).
4.4. Homes with vulnerable occupants	Care homes and accommodation for vulnerable occupants, which are predominantly naturally ventilated, should use criteria (a) and (b) from section 4.2 above but should assume Type I occupancy (see CIBSE TM52 (2013) for description). If they are predominantly mechanically ventilated, the fixed temperature method should be used, see section 4.3.
4.5 Communal corridors	Whilst there is no mandatory target to meet, if an operative temperature of 28°C is exceeded for more than 3% of the total annual hours, then this should be identified as a significant risk within the report.

As part of the Building Regulations amendments in 2021, new statutory guidance to support compliance with Part O of the Building Regulations was published within Approved Document O. Although only new dwellings are required to comply with the requirements of Part O (i.e. overheating mitigation), Approved Document O (2021) provides guidance on strategies for reducing overheating risk that can potentially be applied to existing and new dwellings. Approved Document O also sets out two assessment methodologies for demonstrating compliance: a Simplified method and a more detailed Dynamic thermal modelling, with the latter referring to CIBSE TM59. The document and associated frequently asked questions are at the following link.

https://www.gov.uk/government/publications/overheating-approved-document-o

Additional information and context is provided in this article / CPD module 'CPD 10 2024: Understanding overheating in homes' (9 August 2024) in 'Building' magazine.

https://www.building.co.uk/cpd/cpd-10-2024-understanding-overheating-in-homes/5130773.article

Methodology for calculating heat-related excess deaths

The main methodology for calculating excess heat-related deaths is that developed by the UK Health and Security Agency (UKSHA). A summary of this methodology is provided below:

- Heat episodes are identified whenever the mean Central England Temperature (CET) reaches at least 20°C. One day either side is also included.
- The number of observed heat-associated deaths is calculated by comparing daily deaths during a heat episode with daily deaths in 14-day baseline periods, before and after the heat episode. Because of random variation in daily deaths not related to heat, there is uncertainty in whether all excess deaths during a heat episode can be attributed to heat. The uncertainty is represented by the 95% confidence intervals shown in brackets after each estimate. Reported numbers are considered to be significant if the 95% confidence intervals (shown in brackets after each estimate) do not overlap with zero.
- The modelled estimate for heat-associated deaths is calculated using a statistical model of the temperature-mortality relationship in England over the previous 5 years. The model estimates the relative risk of mortality for any given temperature above the median summer temperature. This risk is applied to the actual temperatures observed in the summer of the year under review, to generate a prediction of the expected number of deaths for the temperature and time of year on each heat episode day.

Please see the following link for further details.
https://www.gov.uk/government/statistics/heat-mortality-monitoring-report-england-2025/heat-mortality-monitoring-report-england-2025#Datasources

Additional detail about the latest heat-related excess deaths for the UK and London (2025) specifically is provided in the links below:

https://www.gov.uk/government/statistics/heat-mortality-monitoring-report-england-2025/heat-mortality-monitoring-report-england-2025

https://www.lse.ac.uk/granthaminstitute/news/uk-health-security-agency-figures-for-heat-related-deaths-that-occurred-in-england-in-summer-2025/

Examples of new-build homes (which are potentially more ready for a heatwave than others)

Please note that these examples do not constitute an exhaustive list of good practice examples of new-build London homes designed for hot weather. Rather they are intended as a reference point for what good looks like, and could look like, in London in the context of designing thermally comfortable, healthy and safe new homes, in primarily passive ways.

Please also note that the Royal Institute of British Architects (RIBA) London Awards now ask for a mandatory sustainability statement to be submitted for all entries, including data about energy, water, carbon and biodiversity. However, there is no equivalent requirement for how thermal comfort and cooling equity have been integrated into designs for new homes. Therefore, it is not as easy as it should be to identify examples of good practice of new-build London homes designed for hot weather. The Committee may wish to consider pushing for such a requirement in the sustainability criteria for next year's RIBA London Awards. Please see links below for more information about the RIBA Awards.

https://www.riba.org/news/seventy-two-projects-shortlisted-for-riba-london-awards-2026/

https://www.riba.org/explore/awards/awards-processes/uk-awards-sustainability/

Shading for housing: design guide for a changing climate
I would like to signpost the Committee towards the London- and UK-based case studies of external shading for housing contained within this guide commissioned by the Good Homes Alliance and the British Blind and Shutter Association.

Shading for housing: design guide for a changing climate (2023)	• Goldsmith Street, Norwich (Mikhail Riches), p.12 • Villa Caroisla, London (Nick Baker Architects), p.13 • Hampshire Passivhaus (Ruth Butler Architects), p.14 • Colby Lodge, London (Pollard Thomas Edwards), p.15 • Hanham Hall, South Gloucestershire (HTA), p.16 • Oxbourn House, London (Fletcher Priest Architects), p.17 • Camden Passive House, London (Bere Architects), p.19 • Central Somers Town, London (Adam Khan Architects), p.21 • Jolles House, London (Pollard Thomas Edwards), p.25 • Beechwood Village, Basildon, (Pollard Thomas Edwards), p.26	https://kb.goodhomes.org.uk/wp-content/uploads/2023/11/Shading-for-housing-Design-guide_FINAL.pdf

I would also like to signpost the Committee towards new-build homes in London designed by other architectural practices, for example Mae Architects and Maccreanor Lavington, which take a primarily passive design approach to ensuring thermal comfort for occupants.

Mae Architects

Ravensbourne Estate, Lewisham		https://www.mae.co.uk/projects/ravensbourne-estate
Agar Grove Estate – Hazelbury Way and Agar Grove, Camden		https://www.mae.co.uk/projects/agar-grove-estate
West Kentish Town Estate, Camden		https://www.mae.co.uk/projects/west-kentish-town

Maccreanor Lavington

1 and 2 MacFarlane Place, Hammersmith and Fulham, London	 	https://www.ribaj.com/buildings/macfarlane-place-maccreanor-lavington-peabody-affordable-housing-white-city-london https://www.bdonline.co.uk/news/in-pictures-maccreanor-lavington-completes-142-affordable-homes-at-white-city/5137456.article https://www.maccreanorlavington.com/work/detail/television-centre-plots-h1-h2-macfarlane-place/ https://www.architectsjournal.co.uk/specification/shutters-are-the-future-maccreanor-lavingtons-white-city-housing

The impact of materials used in tall commercial buildings on the local micro-climate, including work by the City of London Corporation and London academics.

a) The impact of materials used in buildings on local microclimates

The following links from the 'Designing Buildings' website provide a good overview of the definitions of albedo, and related terms such as solar gain, thermal admittance and thermal mass.

https://www.designingbuildings.co.uk/wiki/Albedo_in_the_built_environment

https://www.designingbuildings.co.uk/wiki/Solar_gain_in_buildings

https://www.designingbuildings.co.uk/wiki/Thermal_admittance_of_building_materials

https://www.designingbuildings.co.uk/wiki/Thermal_mass_in_buildings

There are also some useful descriptions and definitions of relevant term in the Zero Carbon Hub Overheating Evidence Review at link below.

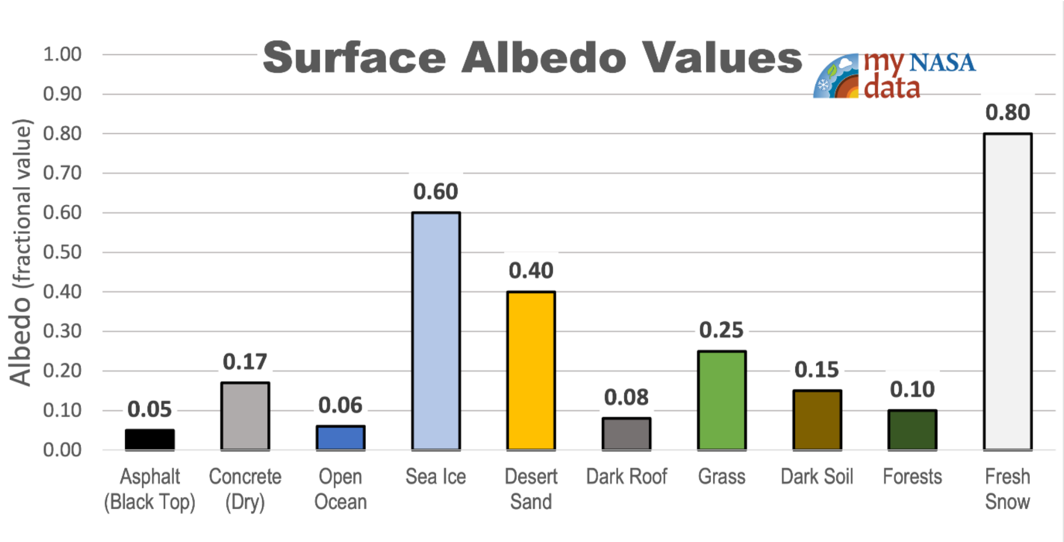
https://kb.goodhomes.org.uk/wp-content/uploads/2020/05/ZCH-OverheatingEvidenceReview.pdf

This link provides a good overview of how the urban heat island effect affects cities, including London.

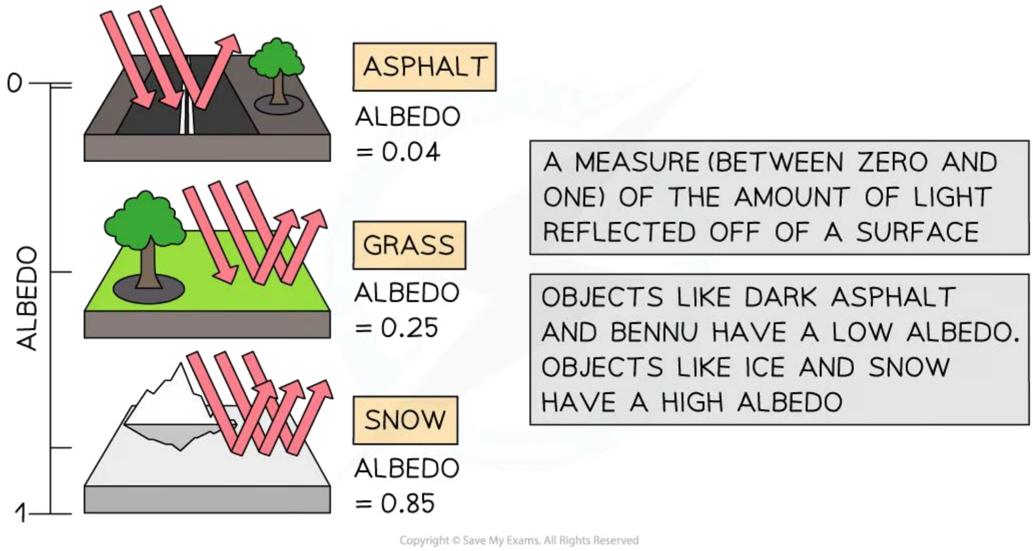
https://ukgbc.org/news/how-the-urban-heat-island-effect-makes-cities-vulnerable-to-climate-change/

b) Understanding the albedo of different materials

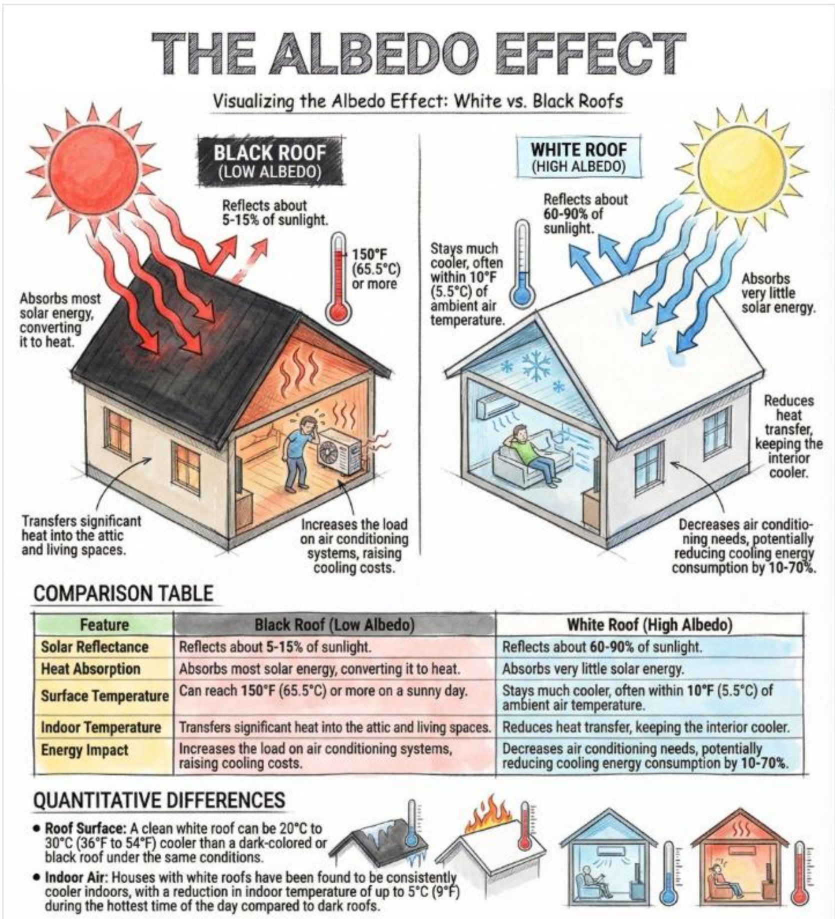
The following diagrams provide a good visual representation of the different albedo values of typical materials present in cities, including London. They are presented here as potential examples to illustrate the Committee's final report, or any future iterations of planning and design guidance for London.



Surface Albedo Values Bar Chart.
Source: My NASA Data https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/AlbedoSort_barchart_0.png
(N.B. Earths' average albedo = ~0.31
Source: NASA https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/Bar%20Graph.png)



Three Examples of Albedo Values for Familiar Surface Materials.
Source: https://www.savemyexams.com/dp/physics/ib/23/sl/revision-notes/the-particulate-nature-of-matter/greenhouse-effect/albedo-and-emissivity/



The Albedo Effect.
Source: https://papniarch.ac.in/

c) Work by the City of London Corporation and London-based academics

The City of London Corporation is one of the only local planning authorities in London which has developed planning and design guidelines in relation to thermal comfort, as a specific component of urban microclimate. This is primarily due to the unique characteristics of 'the square mile', and the height and density of buildings within it. However, it is suggested that there is scope for future iterations of planning and design guidance for London as a whole to require similar, proportionate thermal comfort analysis for new developments in other London boroughs.

https://www.cityoflondon.gov.uk/services/planning/planning-application-requirements/microclimate-guidelines

The following links provide a good overview of the work of Dr Julie Futcher, an architect and academic, whose area of expertise is how the built form and materials used for buildings and spaces contributes to the microclimate of the City of London.

https://www.iop.org/events/city-london-urban-climate-walking-tour

https://www.tottenhamclouds.org.uk/urban-climate-walks.html

Thank you!

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SHADE THE UK

Call for Evidence: Are London's Homes Ready for a Heatwave?

Evidence Submission:
Reframing Overheating Risk in London's Homes as a Climate Infrastructure Issue

Submitted to: Scrutiny@london.gov.uk | London Assembly Planning and Regeneration Committee

Submitted by:
The North Atlantic Urban Climate Action Group
A network of independent urban climate academics and practitioners working across urban climate science, architecture, engineering and environmental design

Dr Julie Futcher ARB RIBA MIntP (corresponding author | julie@climate22.com)
Chartered Architect; Independent Consultant & Researcher | Associate Lecturer CSM
Chair, RIBA London Climate Special Interest Group. She is an independent consultant and researcher specialising in climate-responsive urbanism. Her work focuses on the relationship between density, urban morphology and microclimatic performance. She was commissioned by DLUHC/MHCLG to develop research on urban climate and built form, including how different urban geometries shape solar exposure, airflow, heat exchange and overheating risk. She is also co-curator of the Urban Climate Walks initiative, established in 2014, which translates complex urban climate science into place-based learning and has been delivered in over a dozen cities worldwide.

Prof. Rohinton Emmanuel
Professor of Sustainable Design & Construction | Glasgow Caledonian University
Director of the Research Centre for Built Environment Asset Management. He is a former Secretary of the International Association for Urban Climate and a member of the World Meteorological Organization Expert Team on Urban and Building Climatology. His work has made a major contribution to climate-sensitive urban design, including through *An Urban Approach to Climate Sensitive Design* and *Urban Climate Challenges in the Tropics*.

Prof. Zhiwen (Vincent) Luo
Professor of Architectural & Urban Science | Welsh School of Architecture, Cardiff University
Professor of Architectural and Urban Science at the Welsh School of Architecture, Cardiff University. He is a Board Member and Award Committee Chair of the International Association for Urban Climate. His research, including the studies cited in this submission, focuses on urban microclimate, building energy performance, ventilation, inter-building radiative exchange and the interaction between dense urban form and indoor overheating risk.

Prof. Gerald Mills
Professor of Urban Climatology | School of Geography, University College Dublin
A leading international scholar in the field of urban climate science. He is co-author of *Urban Climates*, a former President of the International Association for Urban Climate, and a recipient of the Luke Howard Award for lifetime contribution to urban climate science. His research combines modelling and field measurement to understand how urban form influences local climate, and he has led global efforts to improve urban landscape data for climate modelling, planning and design. He is a Review Editor for the IPCC Special Report on Cities and Climate Change, prepared in support of the IPCC Seventh Assessment Report.

Executive Summary

This submission responds to the London Assembly Planning and Regeneration Committee's Call for Evidence on 'Are London's Homes Ready for a Heatwave?' It argues that overheating in London's homes cannot be fully understood, assessed or managed through a narrow focus on individual dwellings, isolated retrofit, building fabric or services alone. Overheating is a lived urban climate issue: it is produced through the interaction between climate change, housing characteristics, urban form, surface conditions, vegetation, water, airflow, heat storage, night-time cooling and social vulnerability.

The central argument is that London's homes are not exposed to heat in isolation. A dwelling can overheat for many reasons, including its fabric, glazing, orientation, ventilation, occupancy and internal heat gains. In urban settings, however, that risk is also shaped by the wider landscape in which the dwelling is located. Street, block and building geometry; density, height and spacing; enclosure, symmetry and orientation; sky view; surface materials; vegetation; water; land use; and exposure to anthropogenic heat and pollution all influence the local climate conditions acting on homes.

These conditions vary significantly across London. Overheating risk differs between neighbourhoods, streets, blocks, open and enclosed spaces, façades, floor levels and dwellings within the same building. It also changes across the day and night, across seasons and over the duration of a heat event. This means that two homes with similar construction, glazing or internal layouts may experience very different levels of risk depending on their position within the wider urban canopy.

A particular concern is night-time recovery. Where sky view is restricted, enclosure is high and airflow is constrained, the urban canopy can cool more slowly after sunset. This reduces the capacity of homes, streets and neighbourhoods to release heat overnight and can allow heat stress to accumulate over successive days. Night-time cooling should therefore be treated as a core component of London's heat resilience, not as a secondary technical detail.

The submission argues that architecture and urban form should be understood as critical urban climate infrastructure. Buildings do not simply contain indoor conditions; they actively shape the outdoor environmental conditions in which homes sit. Built form influences solar exposure, shade, airflow, moisture, heat storage, heat release and the capacity for cooling. It also affects the abiotic conditions that support biotic systems, including residents, vegetation and wider ecological networks.

Current approaches to overheating assessment remain too focused on dwelling or building-scale compliance. They often do not sufficiently account for surrounding morphology, cumulative neighbourhood-scale heat effects, sky view, airflow, surface behaviour, vegetation, water, changing urban form or future heat conditions. This risks underestimating where overheating will occur, who will be most affected, and which homes may become increasingly vulnerable over time.

The submission therefore recommends that London adopt a more integrated urban climate framework for assessing and managing overheating risk. This should connect building-scale overheating with street, block, neighbourhood and city-scale conditions. It should support finer-grained mapping, earlier design-stage assessment, stronger planning accountability, better targeted household support, and clearer links between housing, public health, planning, urban design, landscape, drainage, ecology, energy, finance and insurance.

Overheating is also a matter of long-term value and risk governance. If known heat risks are not properly accounted for, London may create homes and neighbourhoods that are costly to cool, difficult to retrofit, less insurable, more energy dependent and potentially vulnerable to future stranding. The question is therefore not only whether London's homes are ready for a heatwave, but whether London's housing, planning, development, energy, finance and insurance systems are ready to recognise overheating as a spatial, temporal and urban climate risk, and to act at the scale at which that risk is produced, experienced and capable of being reduced.

Structure of the Response

This submission is organised in three layers.

First, the opening sections establish the framing for the evidence. They set out why overheating in London's homes should be understood not only as a dwelling-level or building-performance issue, but as a lived urban climate issue shaped by the relationship between homes, built form, local urban climate conditions and social vulnerability. This includes the introduction, the explanation of the Committee's questions, the framing of the evidence, Figure 1, and the key principles that guide the response.

Second, the submission responds directly to the formal Call for Evidence in two parts.

Part 1: Understanding the nature of overheating risk in London's homes

This addresses the scale and distribution of overheating risk, who is most affected, how risk is currently assessed, how housing typology and local urban conditions shape exposure, how London differs from other parts of the UK, and whether homes being built now are likely to remain resilient under future heat.

Part 2: Responding to overheating risk

This addresses how overheating should be tackled in practice, including changes to policy, planning, development, retrofit, cooling strategy, household support and wider professional practice.

Third, the submission concludes by drawing together the implications for policy, planning, design, development, infrastructure, finance and insurance, and includes supporting references and an appendix clarifying why the urban heat island intensity distinction matters.

The two main parts should be read together. The overlap between answers reflects the interconnected nature of overheating risk itself, shaped by relationships between homes, built form, local urban climate conditions, social vulnerability and the systems used to assess and manage them.

Introduction: Reframing Overheating Risk in London's Homes

This submission responds to the London Assembly Planning and Regeneration Committee's call for evidence on 'Are London's Homes Ready for a Heatwave?' It addresses how overheating will affect London's housing stock, and how Londoners will experience that risk in the short and long term as the climate changes.

The material accompanying the Call for Evidence makes clear that overheating is already recognised as a serious and growing issue. Extreme heat is increasing; around one fifth of UK homes already overheat in summer; central London boroughs, with higher proportions of flats, face greater risks than outer boroughs with more houses; and heat-related deaths may treble by 2050 without further adaptation. The Call for Evidence also notes that London's Urban Heat Island can add several degrees of warming relative to surrounding non-urban and rural areas.

This concern sits within a developing GLA evidence base, including the London Climate Resilience Review, Roofs Designed to Cool, and the Properties Vulnerable to Heat Impact Report, each reflecting growing institutional recognition of overheating as a significant and growing risk. The development of a Heat Plan for London further signals the need for a more joined-up framework for assessing, managing and reducing heat risk across London's housing stock.

This submission argues that any framework for assessing overheating in London's homes must move beyond the individual dwelling to account for the local urban climate conditions through which risk is produced, intensified, reduced and experienced. These conditions shape the lived climate of homes, streets and neighbourhoods, and are determined by the relationship between each dwelling and the wider urban landscape in which it sits.

Overheating is not simply the result of hotter weather acting on individual buildings, nor should it be understood only as a problem of insulation, glazing, ventilation or air conditioning (Lomas and Porritt 2017), or one that can be solved by green infrastructure alone (Lu et al 2025). It is also shaped by the spatial and temporal conditions produced by the surrounding urban landscape (Emmanuel 2021; Emmanuel 2024).

These conditions arise from the physical and spatial properties of the urban landscape: street, block and building geometry, density, height and spacing, street scale symmetry and orientation, surface materials, vegetation and water, both above and below ground. What matters is not only the presence of these elements, but their position and relationship within the wider urban landscape: how buildings, streets, open and enclosed spaces, façades, floor levels and dwellings are arranged in relation to one another (Mills 2023).

Together, these factors influence abiotic processes and conditions, including solar exposure, shade, airflow, buoyancy-driven air movement, heat storage and the capacity of the urban fabric to cool, particularly overnight. The thermal environment is further modified by land use and the corresponding anthropogenic outputs of heat and pollution from industrial, commercial and residential activity (Fan and Sailor, 2005; Sailor, 2011). These factors vary across the city and interact with the background climate in ways that intensify or reduce overheating risk (Han et al., 2024; Rahmani et al., 2025).

This is especially important in dense urban settings. Where sky view is limited [*1], enclosure is high, and airflow is constrained, the urban canopy cools more slowly after sunset. This reduced rates of night-time cooling promotes heat to accumulate over successive days. As a result, overheating risk is shaped not only by how much heat enters a dwelling, but by how heat is released across the neighbouring environment (Ren et al., 2025). A view of sky is an important parameter in determining the capacity of the urban fabric to lose heat over time.

These relationships are well established in urban climate research, particularly in work on the surface energy balance, street canyons, urban morphology and the urban canopy layer (Grimmond et al 2010; Oke et al., 2017; Stewart and Mills, 2021) [*2] and are directly relevant to understanding overheating risk in London's homes.

*1 Sky View Factor (SVF): the proportion of sky visible from a given point, usually expressed as a value between 0 and 1. An SVF of 1 indicates an unobstructed view of the sky, while an SVF closer to 0 indicates that the sky is largely obstructed by surrounding buildings, trees or other urban elements. In urban climate studies, SVF is important because it affects solar access, shading and longwave radiative cooling, particularly at night. Lower SVF generally reduces the ability of streets, surfaces and buildings to release stored heat to the sky, contributing to slower night-time cooling and reduced thermal recovery

*2 The urban canopy layer is the near-ground atmospheric layer extending from the surface to approximately the mean height of surrounding buildings and vegetation. It is the layer within which most human activity takes place and in which local climate

However, this knowledge is still not fully integrated into built environment design, planning and development practice (Hebbert and MacKillop, 2013; Nazarian et al., 2024). Recent microclimate research reinforces this point. Xie et al. demonstrate that surrounding buildings can materially affect natural ventilation potential, building energy performance and indoor overheating through wind pressure effects, density-related ventilation constraints and inter-building longwave radiative exchanges (Xie et al., 2022; Xie et al., 2023a; Xie et al., 2023b). This evidence is directly relevant to London, where many overheating assessments still give insufficient attention to the local urban setting in which a dwelling is located.

Spatial and temporal dimensions

These urban climate effects are found to be spatial and temporal in nature.

Spatially, conditions vary across the city and between neighbourhoods, buildings, streets, blocks, open and enclosed spaces, they also vary horizontally and vertically through the urban canopy: between cooler and warmer districts, from one side of a street to another, between exposed and shaded façades, between floor levels, and between dwellings within the same building. As a result, homes in the same neighbourhood, street or building may experience markedly different levels of solar exposure, ventilation, heat retention and thermal recovery.

These differences are produced by both the direct and cumulative effects of urban form and function across the urban landscape, and not by individual building properties alone. Built form is recognised to shape overheating risk beyond the individual dwelling, and the thermal conditions experienced inside a home are influenced by the urban landscape in which it sits (Futcher 2013). These effects are reciprocal: the surrounding urban landscape shapes the thermal conditions experienced within each dwelling, while the collective properties of those dwellings, their geometry, mass, surface characteristics and heat output, contribute in turn to the urban climate conditions experienced across the street, block and neighbourhood.

Temporally, these effects change across the day and night, across seasons, and over the duration of a heat event. During the day, the length of daylight hours influences the period over which buildings, streets and surfaces receive solar energy and accumulate heat. At night, the length of the cooling period determines how much received heat can be released before the next day begins. This balance between daytime heating and rates of night-time cooling is critical.

These energy-balance effects are not only relevant to building occupants' health and wellbeing. They also shape the abiotic conditions that determine whether the biotic (living) systems, including the wider ecological networks, can establish, function, recover and endure in urban environments (Zhao at al 2024; Futcher, 2026), which in turn impact on building energy needs (Luo et al 2025; Futcher et al 2017).

Architecture as urban climate infrastructure

Understanding where and when these effects occur is essential to managing overheating risk at the scale at which it is produced and experienced: across homes, buildings, streets, blocks, neighbourhoods and the wider city. It underpins the central argument of this submission: overheating should not be understood only as a climate-change issue, or as a question of housing typology, but as a lived urban climate issue shaped by the relationship between homes and the conditions around them. Architecture and built form are, in this sense, critical urban climate infrastructure, they do not simply accommodate environmental conditions but actively shape the local conditions through which overheating risk is produced, intensified, reduced or redistributed.

In this submission each question is answered so that it can be read independently and as part of the document, while recognising that the same underlying relationships between built form, local urban climate conditions, indoor overheating and unequal vulnerability recur across the evidence. These relationships and their relevance to the questions is illustrated in Figure 1.

> ***Note:*** *Urban climate science has developed across climatology, geography, meteorology, environmental physics, urban studies, architecture and environmental design. It encompasses research on different forms of urban heat, surface, canopy-layer, boundary-layer and subsurface, along with their timing, vertical and horizontal structure, and*

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conditions, temperature, airflow, humidity and solar exposure, are most directly shaped by surrounding built form and land cover.

the roles of urban morphology, surface energy balance, street-canyon geometry, airflow, ventilation, land cover, vegetation, water and anthropogenic heat. Much of this knowledge has not yet been fully integrated into conventional housing, planning and building-performance frameworks, creating a translation gap between urban climate science and the methods commonly used to assess overheating risk in practice.

This submission does not attempt a full technical account of urban heat mechanisms. Instead, it draws on that body of knowledge, and particularly on Urban Climates *by T. R. Oke, G. Mills, A. Christen and J. F. Voogt (2017), which explains how cities modify the atmosphere through the interaction of urban form, materials, infrastructure, vegetation, water and human activity across multiple spatial scales, to clarify how overheating risk in London's homes is shaped by the relationship between climate change, built form, local urban climate conditions and lived experience.*

The Questions

A central concern of this submission is that current approaches treat overheating at the scale of the individual building or dwelling, often against broad climate assumptions rather than the local-scale urban climate conditions (CIBSE TM59 2017). This risks underestimating the cumulative, neighbourhood-scale and future dimensions of heat risk, particularly where local climate conditions and social vulnerability interact (Heaviside *et al.*,2021); Ferranti *et al.*, 2023)

To address this gap, this submission adopts a broader urban climate framing, connecting dwelling-level risk with neighbouring buildings, streets and neighbourhoods, and with the longer timescales relevant to climate adaptation (Mills 2025).

This framing also shapes the structure of the response. The Committee's inquiry combines six public-facing headline questions with a formal Call for Evidence organised around two principal questions and related sub-questions. This submission responds to the Call while treating the headline questions as connected issues: the uneven distribution of overheating risk, the measures needed to reduce it, the adequacy of planning and regulation, the relationship between winter warmth and summer overheating, the role of air conditioning, and the impact of building typology on London's urban heat island effect.

These issues are interdependent. Definitions of overheating shape methods of assessment; methods of assessment shape which homes and households are identified as vulnerable; and definitions of vulnerability shape the policy, planning, retrofit, development and support measures that follow. The submission therefore develops a connected response across the two parts of the Call for Evidence.

Framing the Evidence: Linking Overheating Risk, Urban Form and Policy Response

The questions framed in the Call make clear that the Committee recognises that overheating is not simply a question of dwelling performance, that it is shaped by the wider relationships between housing, urban form, landscape, infrastructure, governance and lived experience under warming conditions. This submission builds on that recognition, bringing specialist expertise in urban climate science and built environment practice to bear on the Committee's questions, drawing on existing knowledge and understanding to show the interconnections and interdependencies between overheating risk, urban form, and the conditions in which London's homes are placed, and what these mean for policy and practice.

A good example of where this wider framing matters is the question of building typology and its relationship to urban heat island (UHI). Both the public-facing headline question A6 and the formal sub-question 1-d (Table 1) ask how different building typologies contribute to London's UHI [*3]. This submission extends that framing to consider the fuller, reciprocal relationship between buildings and local urban climate conditions, how the spatial setting shapes solar exposure, airflow and rates of night-time cooling, and what that means for how overheating risk is assessed, managed and reduced in practice.

In doing so, it is important to note that urban climate research findings require careful interpretation. Characterising London's overheating effects in terms of a single temperature differential, risks oversimplifying conditions that vary significantly by location, urban form, time of day, season and the duration of heat events. Urban warmth is also not uniformly negative; it can reduce heating demand in winter and moderate cold-weather exposure. What matters for overheating risk is not urban warmth in aggregate, but the specific local conditions that built form produces and modifies at street, block and neighbourhood scale, conditions that vary across homes, buildings, streets, neighbourhoods and the wider city, across different times of day, seasons and heat-event durations, and that fall unevenly across households and communities depending on their exposure, sensitivity and adaptive capacity.

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*3 The urban heat island should not be treated as a simple background temperature uplift. It is a dynamic, multi-scalar and locally variable set of heat-related effects, expressed differently at the surface, within the urban canopy and above the city. Its intensity, timing and spatial pattern are shaped by interacting factors including urban morphology, density, symmetry, orientation, surface cover, vegetation, water, anthropogenic heat and background weather conditions. These factors influence solar exposure, airflow, surface behaviour, heat storage, night-time retention and recovery, with effects that vary across the day and night, by season, and during prolonged heat events.

Without this wider framing, overheating cannot be managed effectively if buildings continue to be treated as isolated units of performance. London risks missing the scale at which that risk is produced, experienced and most effectively addressed, and failing to recognise overheating as a fundamental question of urban climate resilience rather than a technical building issue. What is needed is a more **urban climate-informed spatial practice**: one that understands and assesses overheating risk at the scale at which it is produced and experienced, and that recognises the active role of architecture, urban form and urban landscape in shaping the conditions to which Londoners are exposed.

Table 1: List of Questions in the Call for Evidence

The public-facing investigation: headline questions,

Q1: establish **the problem and unevenness of risk -** Are London's homes able to cope with current and projected future overheating risks (in 20–30 years' time)?

Q2: **explain what should be done -** What measures (e.g. shading, dual aspect, air conditioning, retrofit) should new and existing homes in London incorporate to be "heat-proofed" against current and projected future overheating risks? What barriers exist to implementing these measures

Q3: **explain why current systems are not delivering enough -** Are existing planning and building regulations sufficient to ensure these measures are consistently delivered in practice? What else is needed?

Q4: **explain the winter/summer integration issue -** Does a focus on making homes warm in winter risk homes that are too hot in summer?

Q5: **explain why AC should not become the default -** Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

Q6: explain why typology and built form are central to the whole issue - What is the impact of building typology on London's urban heat island effect, and how should this be addressed in future?

Formal Call for Evidence: sub-questions Part 1

1. What is the overheating risk currently facing London's homes and how is this risk evolving?

1-a) What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

1-b) How does overheating affect different demographics, including tenure of housing, age, disability and gender?

1-c) How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

1-d) How do different building typologies contribute differently to the urban heat island effect and overheating in London?

1-e) How is the risk of overheating different in London than in other parts of the UK?

1-f) Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

Formal Call for Evidence: sub-questions Part 2

2. How should we be tackling overheating?

2-a) What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

2-b) Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

2-c) What should developers do to ensure that the homes constructed today will be heat resilient?

2-d) What support should be made available to homeowners and tenants to better manage overheating risk?

2-e) Are there developments in London that manage heat risk well?

2-f) Are there examples of cites which have adopted strategies to tackle heat risk which London can learn from?

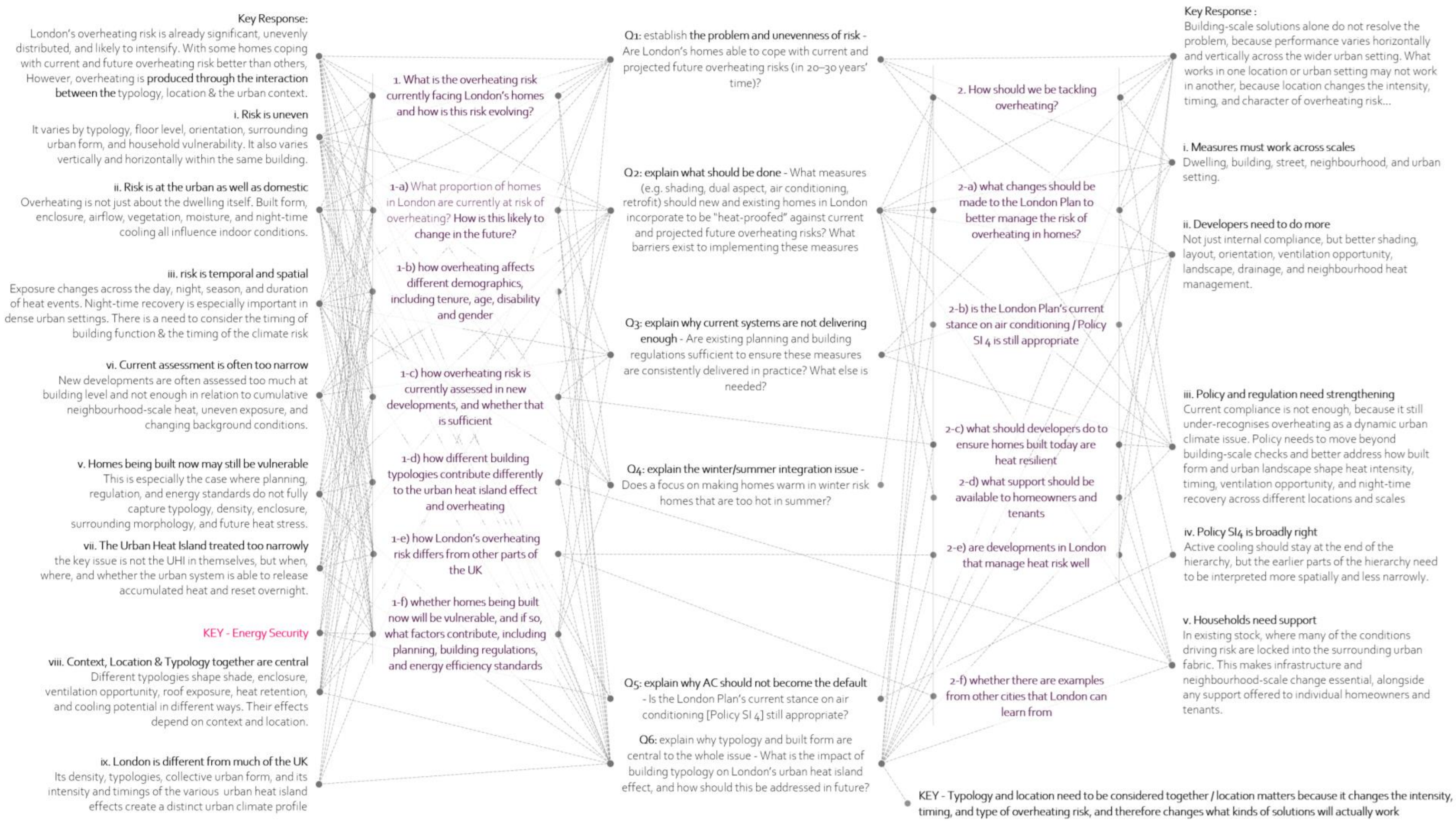

Figure 1 is a **map of interdependencies** in the response to the *Call for Evidence*. It shows how the different questions, themes, and findings connect across scales, from individual dwellings to the wider urban context, and sets out the **approach used to structure and answer the evidence call**. Overall, it highlights that overheating should be understood as a **linked, system-wide issue** rather than a standalone building problem.

Urban Form, Local Climate and Overheating Risk

The evidence base accompanying the Call for Evidence establishes that overheating is a serious and growing risk for London's homes. This submission does not restate that evidence but builds on it, addressing a dimension that current assessment frameworks have not yet fully captured: how overheating risk is produced, intensified and experienced through the interaction between climate change and the local urban conditions in which London's homes are placed.

The critical issue is how wider climate change interacts with London's urban form, its housing types, street geometry, location within the urban fabric, surface cover, vegetation, water, airflow, sky view and capacity for night-time cooling. These local urban climate conditions shape heat risk around, between and within homes, and help explain why overheating cannot be treated as a uniform London-wide condition or addressed through dwelling-level measures alone.

A technical note on the urban heat island effect and its intensity is provided in Appendix 1.

Key Principles: Architecture, Urban Form and Overheating Risk

The following principles set out the basis for this submission's response to the Committee's questions. They clarify how overheating risk is understood throughout the evidence. The central point is that overheating cannot be assessed only as a matter of hotter weather, building fabric or individual dwelling performance. It is produced through the interaction between climate change, urban form, surface conditions, vegetation, water, airflow, heat storage and social vulnerability across space and time. These principles support a more spatially informed approach to overheating risk, one that recognises buildings, streets, blocks and neighbourhoods as active parts of the urban climate system.

Architecture as urban climate infrastructure

Buildings and urban form do not simply accommodate environmental conditions; they actively shape them. Through their physical and spatial properties, they influence local abiotic and biotic processes across a range of scales, including solar exposure, airflow and rates of night-time cooling.

Understanding Urban Heat

- Urban heat is dynamic and weather-dependent, not a static background uplift. It emerges through interacting relationships between solar exposure, cloud cover, wind, built form, surface cover, vegetation and anthropogenic heat. Materials matter, but airflow restriction, reduced sky view and the timing of heat storage and release are equally important drivers.
- Urban heat is spatial and temporal. Conditions vary between neighbourhoods, streets, blocks, open spaces, enclosed spaces, floor levels, façades and dwellings. They also change across the day and night, across seasons and over the duration of heat events.

Density, Form and Morphology

- Density metrics alone do not explain overheating risk. The climatic effects of density depend on how built form is arranged: building height and spacing, enclosure, street width, stacking, clustering, orientation, and the relationship between built form, open space, vegetation and water.
- The climatic effects of density are uneven and context specific. Dense urban form can provide shade and reduce solar exposure in some situations, but it can also increase heat storage, restrict airflow and buoyancy-driven air movement, slow night-time cooling and increase cumulative heat exposure where enclosure and heat retention are high.
- Housing performance cannot be separated from its urban setting. A dwelling's overheating risk is shaped not only by its own design, but by its position within the wider urban canopy: its location within the city, floor level, orientation, surrounding massing, exposure to prevailing conditions, and relationship to nearby open space, vegetation and water.

Risk, Typology and Exposure

- Overheating risk is shaped by more than fabric and services alone. Solar exposure, shading, airflow and ventilation opportunity, thermal storage and nigh-time cooling, vegetation, hydrology, and the wider urban morphology all affect the conditions acting on a home.
- Overheating risk is unevenly distributed across urban space and building form. Conditions vary between upper and lower levels, shaded and exposed façades, enclosed courtyards and open streets, single-aspect and dual-aspect homes, and areas with different levels of permeability, planting, water retention and surrounding density.
- Typology should be understood as a climatic question. Higher-risk dwelling types are often identified, but the climatic reasons for that risk are not always fully understood. The issue is not only heat gain. It is also the capacity to lose heat. Where sky view is limited, airflow is restricted and night-time cooling is reduced, heat is retained for longer. Typologies that do not account for both heat gain and heat loss cannot be considered climate responsive.
- Surface properties matter, but their effects depend on urban setting. Material type, colour, reflectivity, thermal capacity and permeability all influence climatic behaviour, but identical materials can produce different outcomes depending on surrounding urban form, levels of solar exposure, airflow, shading, moisture availability and rates of heat loss.

Assessment, Adaptation and Policy

- Current assessment approaches can be too narrow. Dwelling-only modelling, generic weather-file adjustments, static material assumptions and simplified overheating checks may not fully capture surrounding morphology, sky view, airflow, cumulative heat storage, night-time recovery or neighbourhood-scale effects.
- Reliance on powered cooling raises questions of resilience and equity. Homes should be capable of maintaining safer conditions through passive means as well as active systems, particularly when systems fail, power is disrupted, or households cannot afford to run cooling technologies.
- Adaptation must balance multiple risks. Homes should not be optimised for heat in ways that increase exposure to cold, damp, rain, poor winter performance or poor air quality. A resilient housing response must work across changing and sometimes competing conditions.
- Policy needs to move beyond building-scale compliance. Overheating should be addressed as both a building-scale and urban-scale issue, including the cumulative climatic effects of density, typology, landscape, hydrology and surrounding urban form

Implications for London

These principles are particularly important in London. The Committee's own evidence identifies central London boroughs, with their higher proportion of flats, as facing greater overheating risk, flags building typology as a factor in urban heat effects, and questions whether current planning and regulatory approaches are sufficient. These are not separate concerns; they are connected expressions of the same problem.

The performance of an individual dwelling cannot be understood in isolation from its urban setting and the cumulative thermal behaviour of the wider urban fabric. In dense parts of London, some existing and emerging typologies may sustain elevated night-time temperatures, restrict ventilation opportunities and create uneven solar exposure in ways that current assessment approaches do not fully capture.

The issue is not simply whether homes can be heat-proofed through add-on measures, but whether the wider spatial, hydrological and urban conditions are being designed to reduce heat risk from the outset. Current policy still tends to address building-scale overheating in isolation from wider urban climate processes, encouraging a narrow technical response in which compliance is demonstrated at dwelling scale while cumulative urban effects go unaddressed.

As the principles above make clear, London's homes are not adequately prepared for future heat risk while overheating continues to be treated as a matter of indoor specification, isolated retrofit or material assumptions alone. What is needed is a more urban climate-informed spatial practice, one that recognises the active role of architecture, urban form and urban landscape in producing the conditions to which Londoners are exposed, and that assesses and manages overheating risk at the scale at which it is produced and experienced.

Part 1: Understanding the nature of overheating risk

This section addresses the nature of overheating risk in London's homes: how risk is distributed, how it is changing, who is most affected, how it is assessed, and how typology, urban form and local urban conditions shape exposure and vulnerability.

The central point is that overheating is not a uniform or purely indoor problem. It is spatially uneven, temporally dynamic, and shaped by the relationship between homes, buildings, streets, neighbourhoods and the wider urban environment.

Q1 What is the overheating risk currently facing London's homes and how is this risk evolving?

Overheating is not simply an indoor issue. It is an indoor-outdoor condition, produced through the relationship between the dwelling and its wider urban setting. The physical properties of the surrounding urban landscape, its building and urban geometry, height and spacing, symmetry and orientation, surface materials, vegetation and water above and below ground, combine with spatial conditions of enclosure, exposure and the position and relationship of buildings, streets, blocks, open and enclosed spaces, façades and floor levels within the urban canopy to determine the abiotic processes acting on any individual dwelling: how much solar energy it receives, how effectively air can move around and through it through both wind-driven and buoyancy-driven movement, how much heat is retained in the surrounding fabric, and whether night-time cooling can occur. These abiotic conditions in turn shape biotic outcomes, the health and wellbeing of residents and the functioning of wider ecological networks that also help regulate urban heat.

Density and typology are the primary means through which urban form controls these conditions, and both are climatic questions as much as design ones. Dense urban form can provide useful shade in some situations, but in others it stores heat, restricts airflow, reduces sky view and prevents night-time recovery. Typology is not currently understood in these terms, but it should be. A typology that does not fully account for how heat is gained, stored, released and dissipated across its wider urban setting cannot be considered climate-responsive, and a home that meets dwelling-level compliance requirements may still be vulnerable if the surrounding urban conditions work against it. This is the risk of compliance without resilience. Developments that manage heat risk well are those that optimise solar access, airflow and rates of heat transfer to support effective night-time cooling, treating these not as technical add-ons but as fundamental design conditions.

London's homes are already facing a significant overheating risk, and this risk is likely to intensify over the next 20 to 30 years as heat events become more frequent, intense and prolonged. The call for evidence establishes the scale of the problem. What it does not yet fully capture is what that risk means in spatial terms, how it varies across London's neighbourhoods, streets, blocks and buildings depending on the urban conditions in which each dwelling sits.

At the urban scale, the overheating effects associated with London's dense urban fabric are well documented. But these effects should not be understood as a simple, uniform temperature uplift across the city. The same background conditions can produce very different overheating outcomes depending on how urban form shapes solar exposure, ventilation, heat storage and night-time cooling at street, block and dwelling scale. Overheating risk is experienced locally, and it is unevenly distributed. Some homes, households and neighbourhoods are more exposed and less able to cope than others. The key issue is therefore not simply whether London's homes overheat, but which homes overheat, where, when, and under what urban conditions.

That risk is also being shaped by London's own urban morphology. At street, block and neighbourhood scale, buildings, streets, open spaces, ground conditions, drainage and subsurface hydrology, water and vegetation all influence how heat is received, stored and released. These surrounding spaces are not passive backdrops; they are part of the climate system acting on the dwelling. Their capacity to retain moisture, support evapotranspiration and allow thermal dissipation is as important as their physical form.

Overheating risk must therefore be understood spatially and temporally. It varies vertically and horizontally across buildings, streets and neighbourhoods, between cooler and warmer districts, from one side of a street to another, between exposed and shaded façades, between floor levels, and between dwellings within the same building, and changes across the day, night, season and duration of heat events. Identical dwellings may perform very differently depending on their location within London, their position within a building, and the surrounding urban morphology.

Night-time recovery is especially critical. Where buildings and hard surfaces store heat during the day, sky view is limited, longwave heat loss is restricted and heat is retained within street canyons, the urban canopy cools slowly after sunset. Homes that cannot cool at night may become unsafe even if they are tolerable during the day. Night-time cooling, sky view, ventilation and surface heat storage are therefore not secondary technical details, they are part of London's heat resilience infrastructure.

Without a more urban climate-informed spatial practice, one that recognises overheating as a dynamic indoor-outdoor, building-scale and urban-scale issue, current methods are likely to understate cumulative, neighbourhood-scale and future heat risk. The Committee's investigation creates an important opportunity to move beyond overheating as a housing condition alone, and to examine the wider urban conditions that produce, amplify or reduce that risk.

1-a) What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

A substantial proportion of London's homes are already at risk of overheating, and this proportion is likely to increase as heat events become more frequent, intense and prolonged. However, this cannot be judged by a London-wide percentage or temperature projection alone. The more important question is which homes are already close to their limit, and which will become vulnerable as future heat acts on London's largely fixed housing stock, infrastructure and urban form.

Existing evidence, including London's Climate Risk Map, helps identify broad areas where heat exposure and social vulnerability coincide. However, it does not yet provide the fine-grained dwelling, façade, floor-level or neighbourhood diagnosis needed to understand how overheating risk is shaped by urban form, exposure, airflow, night-time cooling, infrastructure and access to resources.

Opening Position

The key issue is not simply how many homes are currently at risk, but how that number will change as climate conditions intensify. Homes that are marginal today may become routinely vulnerable by 2050 and increasingly unsafe by 2100 if the physical and social systems around them do not adapt.

Core Concepts

- Future overheating risk depends on more than projected temperatures. It depends on whether homes, buildings, streets and neighbourhoods have enough flexibility to absorb, reduce and recover from heat.
- Risk is shaped by the relationship between temperature, infrastructure and resources: how hot it gets, how long heat lasts, whether nights cool down, whether buildings and streets can release heat, and whether residents have the means to respond.
- The same heat event can produce very different outcomes depending on floor level, aspect, orientation, shading, ventilation opportunity, surrounding massing, sky view, airflow, surface heat storage, vegetation, water, permeability and access to cooler spaces.
- Future risk will also depend on who occupies London's homes, under what tenure conditions, and with what ability to adapt as heat risk increases.

Key Considerations

- A precise figure for the proportion of London homes at risk does not yet exist at the level needed for effective intervention.
- The future risk is not simply that more homes will be exposed to higher temperatures, but that existing vulnerabilities will be amplified.
- The critical threshold is night-time recovery. Where homes and surrounding urban fabric cannot cool between hot days, heat accumulates and risk increases over successive events.
- London's housing stock and urban form are long-lived. Decisions made now about density, enclosure, orientation, surfaces, vegetation, water and ground conditions will shape overheating risk for decades.
- Without more integrated planning, London risks a form of environmental drift: fragmented measures may offer partial improvement, while underlying urban conditions continue to lock in heat exposure and unequal resilience.

Policy / practice implication

- London needs finer-grained overheating risk assessment at neighbourhood, street, building and dwelling scale.
- Assessment should link future temperature conditions with urban form, building condition, night-time cooling potential, infrastructure capacity and household resources.
- This would allow London to identify not only how many homes are exposed to heat, but which homes are likely to become vulnerable over time, which households are least able to cope, and where intervention should be prioritised.
- The central policy question is therefore not only what proportion of homes are currently at risk, but whether London is designing enough flexibility into its housing, urban form and support systems to keep people safe under future heat conditions.

1-b) How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Overheating does not affect all Londoners equally. It is already well understood that young children, older people, pregnant people, disabled people and those with underlying health conditions are more vulnerable to heat stress, dehydration and hospitalisation. Tenure, income (fuel poverty) and care responsibilities also affect whether households can avoid, manage or recover from overheating.

The additional point made here is that these vulnerabilities should not be assessed separately from housing typology, tenure and location within London's wider urban climate framework. The highest risks are likely to occur where vulnerable households live in heat-prone dwelling types, under tenure conditions that limit adaptation, and in neighbourhoods where urban form, exposure, poor ventilation and limited night-time cooling intensify heat stress.

Opening Position

The key issue is not only which demographic groups are vulnerable, but where they live, what type of homes they occupy, what control they have over those homes, and whether their wider urban setting increases or reduces overheating risk.

Core Concepts

- Overheating risk is produced through the interaction between people, housing and urban conditions.
- Tenure affects control: renters, leaseholders and some social housing tenants may face barriers to installing shading, improving ventilation, adapting windows or using cooling systems.
- Typology affects exposure: upper-floor flats, single-aspect homes, highly glazed dwellings, poorly shaded façades and homes in enclosed or poorly ventilated settings may be more difficult to keep cool.
- Location matters: the same dwelling type may perform differently depending on its position within London's wider urban fabric, including density, street geometry, sky view, airflow, vegetation, water and night-time cooling potential.
- Demographic risk therefore depends on the overlap between household vulnerability, housing type, tenure control and urban setting.

Key Considerations

- Risk is greatest where these factors coincide: a vulnerable resident, in a heat-prone dwelling type, with limited tenure control, in an exposed or poorly cooling urban setting.
- Demographic vulnerability can therefore be amplified by housing inequality and urban morphology. It is not only who someone is, but the physical and legal conditions in which they live.
- Night-time recovery is especially important. Where homes remain hot overnight, residents have less opportunity to recover between hot days.
- Future risk may deepen if vulnerable households remain concentrated in typologies and locations that lack the flexibility to cope with more frequent, intense and prolonged heat events.

Policy / practice implication

- Policy should identify where vulnerable groups coincide with high-risk homes and high-risk urban conditions, rather than treating vulnerability as a separate social category.
- Support should prioritise households with limited control over adaptation, especially where heat-prone typologies and poor night-time cooling make overheating difficult to manage.

1-c) How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

Current assessment tends to treat overheating too narrowly, too statically, and too much as a building-scale problem, rather than as a dynamic indoor/outdoor issue shaped by urban form, surrounding morphology, vegetation, hydrology, moisture, and the wider local climate conditions that buildings themselves help produce and redistribute. The Assembly's call for evidence explicitly asks whether current assessment is sufficient to ensure resilience, which reflects the fact that this remains unresolved in practice.

Opening Position

The problem is not that overheating is ignored in new development, but that it is still too often assessed through narrow compliance exercises that do not fully capture how heat risk is produced across buildings, streets, neighbourhoods, and time.

Core concepts

- Current assessment has improved visibility, but it does not yet provide a sufficient basis for ensuring long-term heat resilience [*4].
- Architecture functions as critical urban climate infrastructure. Buildings and urban form do not simply accommodate environmental conditions; they actively produce and redistribute them.
- Overheating is produced through the indoor/outdoor relationship. Indoor heat risk cannot be understood separately from the outdoor environmental conditions created by surrounding built form, surfaces, vegetation, hydrology, and urban landscape.
- Current methods are often too static, too unit- or metric-led, and too focused on the individual unit or building, rather than on cumulative and neighbourhood-scale conditions.
- Risk is spatial, temporal, vertical, horizontal, and scalar. It varies across levels, façades, streets, neighbourhoods, times of day, seasons, and heat-event duration.
- Built form modifies abiotic conditions, including solar access, airflow, moisture, and water movement, which in turn shape both human thermal exposure and the viability of vegetation and ecological systems.

Key Considerations

- Building-level assessment may miss wider urban effects, including how surrounding massing, street geometry, open space and surface materials shape heat exposure.
- Static calculations may underplay the dynamic behaviour of heat, including daytime heat build-up, delayed heat release, warm nights and the failure of night-time recovery during prolonged events.
- Density is often assessed numerically rather than climatically. Its effects depend on height, spacing, enclosure, orientation, airflow, sky view and the relationship between built form and open space.

[*4] Urban climate resilience has been framed through four complementary strategies addressing environmental and climate emergencies in cities:

1. Urban Shock-Proofing: strengthening infrastructure and critical systems to withstand immediate climate shocks.
2. Community Disaster Resilience: enhancing community capacity to prepare for and recover from climate-related events.
3. Resilient Community Development: addressing socio-political vulnerability and promoting equity within interconnected urban systems.
4. Resilience Planning: embedding long-term adaptation into urban development, recognising environmental interdependencies.

Collectively, these strategies define resilience not only as the capacity to withstand disturbance, but as an integrated approach to managing the relationship between urban environments and the wider climate system.

Within this broader context, architecture plays a critical, though not always explicitly articulated, role. The spatial structure of the city regulates solar access, airflow, heat distribution and water movement. In this sense, built form operates as urban climate infrastructure, mediating the abiotic conditions that shape everyday thermal experience, ecological viability and long-term exposure.

Making this infrastructural role more explicit strengthens the integration of urban climate research within architectural practice, positioning spatial design as an active component of climate resilience rather than a backdrop to it.

- Ventilation or cooling opportunities may be assumed, but may not work in practice because of noise, pollution, security, poor layout, single-aspect design or constrained urban form.
- Vegetation, water, permeability and drainage are often treated as separate landscape or infrastructure issues, rather than as part of the same heat-resilience system.
- Overheating is often tested too late, rather than shaping early decisions on massing, orientation, layout, façade exposure, landscape and drainage.

Policy / practice implication

- Current assessment is not sufficient if resilience means keeping homes safe, usable and adaptable under future heat conditions.
- Assessment should move beyond dwelling-level compliance to consider neighbourhood, street, building and dwelling-scale risk.
- Overheating should be treated as an early design parameter, not a late-stage compliance check.

1-d) How do different building typologies contribute differently to the urban heat island effect and overheating in London?

Different building typologies contribute differently to London's urban heat island effects and dwelling-level overheating, but their impact cannot be understood by typology alone. The same housing form may perform very differently depending on where it is located in the city, what surrounds it, and how it interacts with local urban climate conditions.

A terrace, mansion block, courtyard block, slab block, tower or perimeter block will not have the same climatic effect in central London, an outer borough, a riverside location, a dense commercial district, a green suburban setting, or an area with limited vegetation and poor night-time cooling. Typology must therefore be assessed in relation to location, surrounding morphology, background heat conditions, prevailing airflow, surface cover, vegetation, water and open space.

Opening Position

The key issue is not whether one typology is inherently better or worse, but how each form behaves in its specific urban location. Typology is a climatic question because it determines how heat, air, shade, solar exposure and night-time cooling are distributed across dwellings, buildings, streets and neighbourhoods.

Core Concepts

- Typology is context-dependent, not inherently resilient or risky. Its climatic effect depends on where it sits in London's urban fabric and how it interacts with density, street geometry, sky view, airflow, vegetation, water, open space and background heat conditions.
- Typology controls the spatial distribution of heat. Different forms produce different patterns of solar exposure, mutual shading, enclosure, airflow restriction, surface heating, heat storage and delayed release on its neighbours.
- Typology redistributes risk across scales. Its effects are felt vertically between floors and façades, horizontally across streets and courtyards, and cumulatively across blocks and neighbourhoods.
- Typology has a temporal effect. Its performance changes between day and night, across seasons and over the duration of heat events, especially where daytime shading is accompanied by slower rates of night-time cooling.

Key Considerations

- Upper-floor flats, roof-level dwellings, single-aspect homes, highly glazed façades and enclosed courtyards may be higher risk where solar exposure is high and ventilation or night-time cooling is limited.
- The same typology may therefore increase, reduce or redistribute overheating risk depending on its location, arrangement and relationship to the wider urban fabric.
- Dense or enclosed forms can provide shade, but may also reduce sky view, restrict airflow, increase heat storage and delay night-time cooling.
- More open forms may support airflow and heat release, but can increase solar exposure if shading, landscape and surface conditions are poorly designed.
- Typology also affects whether vegetation and ecosystems can function effectively, by shaping shade, soil moisture, permeability, drainage, evapotranspiration and ecological cooling.

Policy / practice implication

- Building typology should be assessed in relation to its location within London's wider urban climate framework, not treated as a fixed housing category.
- Planning should examine how each typology interacts with surrounding morphology, density, airflow, sky view, vegetation, water, open space and night-time cooling potential.
- Assessment should consider both the effects on residents within the development and the effects on neighbouring buildings, streets, courtyards and open spaces.
- The aim should not be to rank typologies as good or bad, but to understand which forms intensify, reduce or redistribute overheating risk in particular locations, under particular conditions, and over time.

1-e) How is the risk of overheating different in London than in other parts of the UK?

Overheating risk in London differs from much of the rest of the UK because it is shaped by the interaction between climate change and a large, dense, complex and sprawling urban morphology. The difference is not simply that London can be warmer. It is that London's urban form can intensify, prolong and redistribute heat across homes, buildings, streets and neighbourhoods.

The Assembly material also notes that London's urban heat island can add several degrees of warming relative to surrounding areas. However, as set out in Appendix 1, UHI intensity is a relative measure, not an absolute measure of overheating risk. It depends on what urban and reference locations are being compared, whether air or surface temperature is being measured, and the weather conditions under which the difference develops. Overheating risk in homes therefore cannot be treated as a single London-wide temperature uplift. It depends on the local conditions that shape heat exposure and recovery: density, morphology, airflow, vegetation, water, surface cover, sky view, housing type and night-time cooling potential.

Opening Position

The key difference is that London's overheating risk is more strongly shaped by cumulative city scale urban climate effects. Heat is not only experienced within individual homes; but is redistributed across the wider urban fabric in which those homes sit.

Core Concepts

- London's risk is not only climatic, but morphological. Conditions vary between inner and outer London, dense and open neighbourhoods, upper and lower floors, exposed and shaded façades, and areas with different levels of vegetation, water and open space.
- The urban heat island should be understood dynamically. The important issue is not only how much warmer London is than surrounding areas, but where heat is retained, when it is released, and whether places can cool overnight.
- The indoor/outdoor relationship is especially important in London. Indoor overheating is often shaped by outdoor conditions created by surrounding buildings, streets, surfaces and landscape.
- The same dwelling type may perform differently in London than elsewhere in the UK because of surrounding density, background heat conditions, airflow, enclosure and access to cooling resources.

Key Considerations

- Dense and enclosed areas may provide shade, but can also restrict airflow, reduce sky view, store heat and slow rates of night-time cooling.
- Flats, upper-floor dwellings, single-aspect homes and highly exposed façades are more common in London than in many other parts of the UK, increasing the importance of typology and location.
- Vegetation, water, permeability and drainage are especially important in London because they help regulate shade, evapotranspiration, and thermal dissipation with significant benefits to other ecological networks
- As heat events become more frequent, intense and prolonged, areas already affected by strong enclosure, hard surfaces, weak vegetation, restricted airflow and poor night-time cooling are likely to become increasingly vulnerable.

Policy / practice implication

- London cannot rely on generic national overheating assumptions alone. Its risk profile requires assessment at neighbourhood, street, building and dwelling scale.
- Policy and assessment should treat view of sky as a key overheating parameter. Where sky view is restricted by enclosure, height, spacing or surrounding massing, longwave heat loss is reduced and night-time cooling can be delayed, increasing overheating risk in homes and surrounding streets.
- Surface urban heat effects should also be considered. Roofs, walls, streets and pavements absorb, store and release heat differently depending on material, exposure, permeability, moisture and shading. Where hard, dry, impervious surfaces dominate, surface heating can increase local heat stress and delay cooling.

- The priority should be to identify where London's urban form amplifies heat risk, where it supports cooling and recovery, and where intervention is needed to prevent existing vulnerabilities becoming locked in as the climate warms.

1-f) Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

Some homes being built now are likely to be vulnerable to overheating, particularly where compliance is achieved at dwelling or building scale without fully accounting for location, current and future surrounding morphology, future heat conditions, energy affordability, infrastructure capacity and the ability of occupants to adapt.

The issue is not simply whether a new home passes an overheating assessment at design stage. Homes built today may remain in use for 100 + years. They therefore need enough adaptive capacity to remain safe, usable, affordable, insurable and upgradable under uncertain future scenarios. Without this, technically compliant homes may become future stranded assets: difficult to keep cool, costly to operate, expensive to retrofit, or less viable as safe long-term housing.

Opening Position

The key issue is not whether new homes meet current standards, but whether they are being designed with enough flexibility to adapt as climate conditions, surrounding urban form, household needs, tenure patterns, energy costs, insurance expectations and retrofit standards change.

Core concepts

- Location, morphology and materials shape future risk, but surrounding conditions may also change. Similar buildings may perform differently depending on where they sit in the city, surrounding density, enclosure, sky view, airflow, surface heat storage, vegetation, water, permeability and night-time cooling potential. These conditions are not fixed: neighbouring buildings, landscapes and infrastructure may be modified, intensified or retrofitted over time.
- Long-term resilience depends on adaptive capacity, not fixed compliance alone. New homes should be capable of being adjusted over time as climate conditions, surrounding morphology, household needs, tenure patterns, energy costs, insurance expectations and retrofit standards change.
- Overheating is a future asset-risk issue. Homes that rely on fragile assumptions about cheap energy, active cooling, occupant control, stable surroundings or later retrofit may become increasingly costly, uncomfortable, difficult to insure or expensive to adapt.

Points to include

- Vulnerability is more likely where solar exposure is high, shading is weak, glazing is poorly controlled, ventilation is constrained, surface heat storage is high and night-time recovery is limited.
- Higher-risk conditions may occur in upper-floor flats, roof-level dwellings, single-aspect homes, highly glazed homes and dense or enclosed settings where sky view, airflow, vegetation, permeability and heat release are restricted.
- Surface properties matter [*5],. Roofs, walls, streets and paved areas absorb, store and release heat differently depending on material, exposure, moisture, shading, permeability, ageing, maintenance and surrounding form.

[*5] Context - Beyond CO_2e: Materials, Microclimate, and the Long Tail of Carbon

As embodied carbon accounting has matured, material choices have become more visible, comparable, and actionable within design and procurement processes. This has been a necessary and productive shift. However, as with CO_2e metrics more broadly, the growing reliance on static material carbon figures is beginning to reveal a critical limitation.

Materials are typically assessed at the point of extraction, manufacture, and delivery. Yet once in place, they continue to act dynamically, interacting with solar radiation, air movement, moisture, and human occupation over daily, seasonal, and long-term cycles. These in-use climatic behaviours strongly influence local comfort, building operation, and energy demand, but sit largely outside embodied and operational carbon accounting frameworks.

This creates a growing disconnect between how materials are evaluated and how they actually perform as part of a dynamic urban climate system.

The Issue

Embodied carbon metrics work precisely because they stabilise complexity. They make material impacts legible, comparable, and decision-ready at the point of specification. However, this necessary simplification also flattens material behaviour over time and space. In reality, materials act as climatic interfaces:

- Winter-led energy performance can contribute where fabric efficiency is not balanced with summer solar control, purge ventilation, shading, material behaviour and heat dissipation.
- Resilience can be lost through value engineering, delivery-stage changes, poor maintenance, or the removal of landscape, shading, ventilation, water-management or material-performance measures after approval.

Policy / practice implication

- New homes should be assessed for long-term adaptive capacity, not only present-day compliance.
- Planning and regulation should test whether homes can remain habitable under hotter summers, warmer nights, prolonged heat events, energy insecurity, changing household needs, future retrofit pressures and changing surrounding urban conditions.
- Assessment should account for location, typology, surrounding morphology, sky view, airflow, material and surface behaviour, vegetation, water, drainage, ventilation in practice and night-time recovery.
- Overheating should be treated as a long-term asset-risk issue. Homes built without sufficient adaptive capacity may create future stranded assets, locking residents, landlords, lenders, insurers and public bodies into avoidable retrofit, affordability and resilience pressures.

- Regulating heat absorption, storage, and release
- Shaping radiant conditions and glare
- Influencing airflow, stagnation, and cooling
- Mediating moisture, permeability, and drying
- Affecting how people occupy and adapt spaces

These effects are relational and context-dependent, shaped by orientation, urban geometry, enclosure, adjacency, and exposure. As a result, the same material can support climate resilience in one setting while undermining it in another, even when its embodied carbon profile remains unchanged.

Why This Matters

Material choices lock in long-term climatic effects at site and neighbourhood scale. These effects influence:

- Local microclimate conditions
- Patterns of building use and adaptation
- Energy demand and operational performance
- Long-term comfort, health, and equity outcomes

Yet these feedback loops are rarely made explicit within material selection or carbon accounting processes. As a result, decisions optimised for carbon reduction at specification stage may inadvertently amplify overheating risk, reduce ventilation effectiveness, or shift energy demand elsewhere over time.

This is where the gap between what is measured and what is experienced becomes most apparent, and where carbon, while essential, becomes insufficient on its own for understanding material performance in use.

Part 2: Addressing overheating risk

This second section addresses the Committee's questions on how overheating risk should be tackled in practice. It considers what should change in policy, design, regulation, and support, from the London Plan and the role of air conditioning to developer responsibilities, household adaptation, and lessons from better practice elsewhere. Read together, these questions show that responding to overheating is not simply a matter of adding technical fixes to individual homes. It requires a more integrated approach that addresses the interaction between buildings, urban form, landscape, hydrology, infrastructure, and the practical ability of households and institutions to cope with heat.

Q2. How should we be tackling overheating?

Overheating should be tackled as a dynamic urban climate issue, produced through the interaction between the physical and spatial properties of the urban landscape, their influence on abiotic and biotic processes, and the background climate conditions that shape them.

A resilient response requires measures operating across multiple scales, from the dwelling to the building, street, neighbourhood and wider urban setting. Homes cannot be understood in isolation from the outdoor climate conditions in which they sit. Indoor overheating is partly produced by the surrounding urban environment, and this exposure is set to intensify as the climate changes. Buildings and urban form actively shape and redistribute solar radiation, airflow and moisture, and are the fundamental control of night-time cooling. Overheating must therefore be tackled as both an indoor and an outdoor issue.

Priority should be given to reducing heat risk at source and to improving access to naturally available environmental resources and cooling opportunities before reliance on powered systems. In practice, this includes designing for sky view, shade, airflow, surface properties, vegetation and hydrology, and managing outdoor climate conditions in ways that reduce indoor heat stress before technical correction is required. The issue is not whether active systems are ever needed, but whether they are being used to compensate for heat risk that has already been designed in. The London Plan currently uses a cooling hierarchy intended to reduce overheating and reliance on air conditioning, describing passive measures as including urban trees, green roofs, shading and permeable paving.

Measures must also respond to the fact that overheating risk is spatial, temporal, and unevenly distributed. It varies vertically and horizontally across buildings, streets, and neighbourhoods, and changes across the day, night, season, and duration of heat events. Night-time recovery is especially important in dense urban settings, where heat stored in surfaces and fabric is released slowly after sunset, restricting cooling through the night. This means that the same measure will not perform equally in all locations or for all homes. Effective responses depend on where risk occurs, when it occurs, and how it relates to surrounding urban morphology, household vulnerability and adaptive capacity.

A number of interdependent factors therefore need to be addressed together: building height, density and enclosure; symmetry, orientation, and façade exposure; surface properties, vegetation, hydrology and drainage; and location relative to prevailing conditions and the wider urban fabric. Density is a climatic issue as well as a numerical one. In some situations it may provide beneficial shade; in others it may trap heat, restrict airflow, slow cooling and increase cumulative heat burden. Vegetation, water and moisture should not be treated as secondary additions, but as part of the same abiotic and biotic system through which urban heat is moderated or intensified.

Overheating should be tackled through a more climate-literate approach that recognises heat risk as a dynamic indoor/outdoor, building-scale/urban-scale, and abiotic/biotic issue. This requires moving beyond narrow compliance exercises, isolated retrofit and simplified assumptions about materials or cooling technology alone, toward a more integrated response linking housing, urban design, landscape, drainage, ecology and public health. The Assembly's questions — what measures homes should incorporate, what barriers exist, whether planning and building regulations are sufficient, whether winter warmth risks summer overheating, and whether the London Plan's stance on air conditioning remains appropriate — each require answers that operate at this wider scale. The Committee's investigation creates an important opportunity to establish that framing, and to ensure that the measures, regulations and policies that follow are adequate to the scale of the problem.

2-a) What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

The key change needed is for the London Plan to move from recognising overheating as a wider urban issue to making that recognition operational through clearer spatial requirements, assessment methods and accountability. The Call already recognises that overheating extends beyond individual dwellings, including the role of building typology, planning, regulation and London's urban heat island. The London Plan should now require development to show how it manages heat risk across the dwelling, building, street, neighbourhood and surrounding urban context.

This does not require a wholly new policy direction. The London Plan should retain its commitment to minimising overheating and reducing reliance on air conditioning. However, the existing framework needs to be interpreted more explicitly through the physical and spatial properties of the urban landscape: building and street geometry, density, height and spacing, orientation, enclosure, surface characteristics, vegetation, water, permeability, airflow, shade and night-time cooling

Opening Position

The key change would be to strengthen accountability. Development should demonstrate not only that it protects its own residents from overheating, but that it does not worsen heat risk for neighbouring homes, streets, courtyards, open spaces or future occupants.

Core concepts

- The London Plan should make the Call's wider framing operational by requiring assessment of how development shapes heat risk beyond the individual dwelling or building.
- Architecture functions as critical urban climate infrastructure. Buildings and urban form do not simply accommodate heat risk; they actively shape and redistribute solar exposure, airflow, shade, surface heating and night-time cooling across homes, streets and neighbourhoods.
- The cooling hierarchy should be retained but interpreted through the physical and spatial properties of the urban landscape. Reducing heat entering a building depends not only on the dwelling or façade, but on surrounding geometry, density, orientation, enclosure, surface characteristics, vegetation, water, permeability, airflow and shade.
- Density should be assessed climatically, not only numerically. Height, spacing, enclosure, sky view, airflow, open space and surface exposure all affect heat retention, ventilation opportunity and night-time recovery.
- The priority should be to improve access to naturally available cooling opportunities, including shade, airflow, moisture, vegetation, water retention and thermal release, before reliance on powered cooling.

Key Considerations

- Stronger attention is needed to cumulative heat effects, including how new development changes solar access, airflow, enclosure, surface heating and night-time cooling for neighbouring buildings and spaces.
- Night-time recovery should be given explicit weight, especially where enclosure, restricted sky view, limited airflow and surface heat storage slow cooling after sunset.
- Vegetation, hydrology, permeability and drainage should be treated as part of London's heat-resilience infrastructure, not as separate or secondary landscape matters.
- Surface urban heat effects should be considered more clearly. Roofs, walls, streets and paved areas absorb, store and release heat depending on material, exposure, moisture, shading, ageing and maintenance.
- The Plan should recognise that identical buildings may perform differently depending on their location within London, surrounding morphology, background heat conditions and exposure to prevailing airflow.
- The language of "passive measures" should be broadened. The issue is whether schemes provide real, usable access to cooling resources in practice, not whether mitigation measures appear in principle.

Policy / practice implication

- The London Plan should require development to account for its heat impacts beyond the red line boundary, including effects on neighbouring homes, streets, courtyards, public realm and open spaces.
- Overheating should shape early decisions on layout, density, massing, orientation, section, landscape, drainage and surface strategy, rather than being treated as a late-stage compliance issue.
- The Plan should embed long-term adaptive capacity, ensuring that homes and neighbourhoods can respond to hotter summers, warmer nights, prolonged heat events, energy insecurity and changing household needs.
- In practice, this means treating built form, landscape, water and surface conditions as shared climate infrastructure, with clearer responsibility for how each development contributes to, reduces or redistributes heat risk

2-b) Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

> Managing heat risk
>
> A) Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.
>
> B) Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:
>
> 1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
>
> 2) minimise internal heat generation through energy efficient design
>
> 3) manage the heat within the building through exposed internal thermal mass and high ceilings
>
> 4) provide passive ventilation
>
> 5) provide mechanical ventilation
>
> 6) provide active cooling systems.

Policy SI 4 is right to place active cooling at the end of the hierarchy, but the earlier stages of that hierarchy are still too often interpreted narrowly at the scale of the individual building. Reducing heat entering a building is not simply a question of façade design or internal specification; it also depends on surrounding built form, street geometry, vegetation, hydrology, local airflow, and the wider outdoor conditions that shape how heat is gained, trapped, and released over time.

The next step is therefore not to replace the hierarchy, but to deepen it through a more climate-literate understanding of urban form, timing, cumulative effects, and the interaction between indoor and outdoor conditions.

2-c) What should developers do to ensure that the homes constructed today will be heat resilient?

Developers should address overheating **at the earliest stages of site appraisal, feasibility, layout, massing and landscape strategy**, before dwelling layouts, façades and technical systems are fixed. Heat resilience cannot be added reliably at the end of the design process if the scheme has already locked in excessive solar exposure, poor airflow, weak night-time recovery, limited vegetation, impermeable surfaces or constrained opportunities for adaptation.

Homes constructed today will remain in use for decades, so resilience needs to be designed into the relationship between the dwelling, the building, the surrounding urban form and future climate conditions from the outset. The task is not only to protect individual homes from overheating, but to avoid creating urban conditions that intensify heat risk for residents, neighbouring buildings, streets, courtyards and open spaces.

Opening Position

The key issue is timing. Developers should treat overheating as a form-making and site-planning issue from the earliest stage, not as a technical check after density, massing, orientation, layout and landscape decisions have already been made.

Core concepts

- Developers should evidence the climatic effects of their design decisions. Density, massing, orientation, section, landscape, materials and drainage should be tested for their impact on heat exposure, airflow, shade, moisture and night-time recovery, both within the scheme and beyond its boundary.
- Risk is not uniform across a scheme. Roof-level, upper-floor, lower-floor, single-aspect and enclosed dwellings face different combinations of solar exposure, ventilation constraint and night-time recovery.
- Density must be designed climatically. Height, spacing, enclosure, orientation, stacking, clustering, sky view and open space all affect whether heat is trapped, dispersed or released.
- • Heat resilience must be cumulative. A development should be assessed not only unit by unit, but by the combined effect of its form, surfaces, landscape and infrastructure across the wider area.

Key Considerations

- Layout, massing, section, density and orientation should be used to avoid locking in excessive solar gain, strong enclosure, poor airflow and weak night-time recovery.
- Repeated arrangements can reproduce repeated risk. Uniform orientation, repeated façade exposure and identical enclosure conditions may lock in the same overheating problems across many homes.
- Surface properties and materials should be assessed in context. Roofs, walls, streets and paved areas absorb, store and release heat differently depending on exposure, moisture, shading, permeability, ageing, maintenance and surrounding form.
- Vegetation, hydrology, drainage and water retention should be integrated from the outset, because they shape shade, evapotranspiration, moisture availability, permeability, ecological performance and thermal recovery.
- Active cooling may sometimes be necessary, but it should not become the default correction for overheating risk created by poor layout, excessive exposure, weak ventilation opportunity or inadequate landscape and water design. Dependence on powered cooling raises questions of energy security, affordability and resilience during peak demand or system disruption

Policy / practice implication

- Developers should demonstrate heat resilience across the dwelling, building, street and neighbourhood setting, including whether the scheme improves or worsens heat conditions for neighbouring homes, streets, courtyards and open spaces.
- Heat resilience should be assessed at the earliest stage, before decisions on density, massing, orientation, section, façade exposure, landscape, drainage and surface strategy are fixed.
- Homes should be designed with enough adaptive capacity to remain safe during hotter summers, warmer nights and prolonged heat events, without relying on fragile assumptions about cheap, secure or uninterrupted energy.

2-d) What support should be made available to homeowners and tenants to better manage overheating risk?

Support for homeowners and tenants cannot be generic. Overheating risk varies according to both the household and the dwelling: age, health, disability, income, tenure and care responsibilities shape people's ability to respond, while floor level, orientation, surrounding morphology, shade, airflow and sky exposure shape the physical risk itself.

The same advice will not work equally for a top-floor flat with high solar exposure, a lower-floor dwelling in a deeply enclosed block, or a home with limited airflow and poor night-time cooling. Each faces a different form of overheating risk, at different times of day, and requires different support.

Opening Position

The key issue is not simply what support is available, but whether it is targeted to the social and physical conditions that make overheating difficult to manage in practice at that location.

Core Concepts

- Overheating risk is not socially neutral. The same physical conditions can have very different consequences depending on age, health, disability, income, tenure and practical ability to respond.
- Advice alone is not enough where households cannot afford adaptations, do not control the building fabric, or cannot use cooling opportunities in practice.
- Support should reflect dwelling-specific risk, including floor level, orientation, surrounding form, shade, airflow, sky exposure and night-time cooling potential.

Key Considerations

- Guidance should be tailored to the specific conditions of the dwelling, not applied uniformly across very different urban settings.
- Financial support should prioritise lower-income households and residents whose homes have limited passive cooling capacity.
- Tenure matters. Many households cannot make changes without landlord consent, so landlord guidance and policy support are essential.
- Vulnerable residents need targeted support where physiological risk is compounded by high solar exposure, poor airflow, low sky view or surrounding enclosure.
- Where homes cannot maintain safe overnight conditions, households need access to genuinely usable recovery spaces within realistic reach, not provision that exists only in principle.
- Where active cooling is unavoidable, support should prioritise affordable, low-energy solutions that households can actually run, and that do not place additional demand on an already stressed grid during prolonged heat.

Policy / Practice Implications

- London should move beyond general heat advice towards support linked to household vulnerability and dwelling-specific overheating risk.
- Safe overnight recovery should be treated as a practical requirement during prolonged heat, not simply as personal advice to "keep cool".
- Active cooling should remain a last resort, not a substitute for improving shade, ventilation opportunities, passive cooling capacity and local urban climate conditions

2-e) Are there developments in London that manage heat risk well?

Many developments in London manage overheating risk better than others, but this cannot be judged solely by whether they meet formal overheating requirements, include visible mitigation measures, or sit within a less dense or more open setting. Nor can it be judged by typology alone. For example, a low-rise terraced form with cross-ventilation opportunities, gardens and tree-lined streets may perform well in one part of London and less well in another, depending on surrounding urban morphology, exposure and prevailing conditions.

The more important question is therefore why a development performs well within its specific urban context: how it limits heat gain, supports ventilation opportunities and enables night-time cooling, without transferring overheating risk to neighbouring buildings, streets or open spaces. A scheme may appear effective in principle yet perform poorly if its location, surrounding morphology or exposure do not support these outcomes, or if improvements for its own residents increase heat burden elsewhere.

Opening Position

The key issue is not simply whether a development includes recognised overheating measures, but whether it creates indoor and outdoor conditions that remain usable, comfortable and more resilient in practice, and whether it does so without transferring overheating risk to neighbouring buildings, streets or open spaces.

Core Concepts

- Good heat-risk management is defined by how multiple measures work together across the dwelling, building, street, neighbourhood, and the wider urban setting, not by building performance alone. These measures vary in character and relative importance depending on location.
- Overheating should be judged through the indoor/outdoor relationship. The same typology may perform well in one urban setting and poorly in another, depending on surrounding morphology, prevailing conditions, enclosure, and prevailing conditions.
- Developments that manage heat risk well are likely to optimise solar access, airflow and rates of heat transfer to optimise night-time cooling

Key Considerations

- Better-performing developments are likely to address density, symmetry, and orientation carefully, so that heat is not unnecessarily trapped through excessive enclosure, poor airflow, or cumulative solar and thermal exposure.
- The question is not whether dense development is inherently problematic or open development automatically good, but whether the spatial arrangement, both horizontally and vertically, in its specific location, supports shade, ventilation, and night-time recovery. Vegetation and water, both above and below ground, are part of that same climate system and should be treated as infrastructure, not as separate or secondary landscape features.
- A climate resilient development manages outside climate conditions to reduce indoor heat stress cost-effectively and support wider environmental quality. This includes consideration to surface properties, noise, air quality and anthropogenic emissions.
- A development that depends on active cooling to correct heat risk and ventilation should not be treated as a strong model of resilience.

Policy / practice implication

- Answering this question well requires better post-occupancy evaluation across different typologies, locations, and urban settings, so that actual lived performance, rather than compliance at design stage, becomes the basis for identifying and sharing good practice.

2-f) Are there examples of cites which have adopted strategies to tackle heat risk which London can learn from?

London can learn from cities that treat heat as a joined-up issue of urban form, landscape, emergency planning, public health, and access to cooling in practice. Paris, Barcelona, Singapore, Phoenix, and Melbourne have all developed coordinated heat strategies combining citywide cooling networks, urban greening, wind corridor planning, canopy targets, street design, and public health response.

These are useful reference points, but their lessons are not easily transferable. Each city operates within a different climate, morphology, governance structure, and cultural context, and strategies developed for lower-latitude cities cannot simply be adopted elsewhere without careful interpretation.

A critical difference is the nocturnal cooling window. At lower latitudes, longer summer nights provide more time for heat dissipation and recovery. London's higher latitude means its summer nights are shorter, and the background climate is fundamentally different from cities such as Singapore or Phoenix. This matters when drawing lessons from international examples: strategies designed for hotter, drier, or more consistently warm climates may prioritise active cooling and shade from intense solar radiation in ways that are less relevant to London's temperate conditions. London's climate still offers meaningful nocturnal cooling opportunity, but only where urban form, vegetation, and hydrology allow it to occur. Melbourne, at a broadly comparable latitude and with a similar temperate climate, is in this sense a more directly relevant reference point than cities at lower latitudes.

The transferability of international lessons therefore depends on understanding not just what other cities have done, but whether the underlying climate conditions that make those strategies work are present in London. The most transferable lesson across all these examples is that heat should be treated as a city-wide strategic issue, with responses calibrated to the specific climate, morphology, and urban conditions of the city in question, not imported wholesale from contexts where the problem, and the opportunity to address it, are fundamentally different.

Closing Remarks

Taken together, the evidence set out in this submission suggests that overheating in London's homes cannot be fully understood, assessed or managed through a narrow focus on individual dwellings, isolated retrofit, or simplified assumptions about building fabric services and climate alone. The central issue is not only whether homes get too hot, but how overheating risk is produced, intensified, distributed and experienced across buildings, streets, neighbourhoods and the wider urban fabric. In London, this risk is already significant, unevenly distributed and likely to intensify as heat events become more frequent, more intense and longer lasting.

This submission has argued that overheating is a lived urban climate issue, not only a building-performance issue. A dwelling can overheat for many reasons, including its fabric, glazing, orientation, ventilation, occupancy and internal heat gains. In urban settings, however, overheating risk is also shaped by the wider landscape in which the dwelling is located. The street, block, neighbourhood and urban canopy around it influence its exposure, ventilation potential, capacity to lose heat and ability to recover overnight. Two homes with similar construction, glazing or internal layouts may therefore experience very different levels of risk depending on their orientation, floor level, surrounding massing, degree of enclosure, sky view, access to airflow, proximity to vegetation or water, and exposure to anthropogenic heat and pollution.

For this reason, architecture and urban form should be understood as critical urban climate infrastructure. Buildings do not simply contain indoor conditions; they actively shape the outdoor environmental conditions in which homes sit. Street, block and building geometry; density, height and spacing; symmetry and orientation; surface materials; vegetation, water and land use all influence solar exposure, shade, airflow, moisture, heat storage, heat release and night-time recovery. What matters is not only the presence of these elements, but their position and relationship within the wider urban canopy.

This also means that overheating risk is spatial and temporal. Conditions vary across the city, between neighbourhoods, blocks, streets and open or enclosed spaces. They also vary horizontally and vertically through the urban canopy: between cooler and warmer districts, from one side of a street to another, between exposed and shaded façades, between floor levels, and between dwellings within the same building. They change across the day and night, across seasons, and over the duration of a heat event. Particular attention should therefore be given to night-time recovery, because the ability of homes, streets and neighbourhoods to cool after sunset is critical to health, comfort and resilience during prolonged heat.

These conditions are also both abiotic and biotic. The abiotic processes include solar exposure, shade, airflow, buoyancy-driven air movement, heat storage, radiative heat loss, moisture and rates of cooling. These in turn shape the conditions within which biotic systems, including people, vegetation and wider ecological networks, can function, recover and endure. Overheating is therefore not only a risk to building occupants; it also affects the wider environmental systems on which urban cooling, resilience and liveability depend.

The implications for policy and practice are clear. London needs to move beyond narrow compliance approaches that assess overheating primarily at the scale of the individual unit or building. A stronger framework is needed, one that connects housing, planning, urban design, landscape, drainage, ecology, public health, energy and household support. Such a framework should give greater weight to neighbourhood-scale and cumulative heat effects, recognise the limits of current assessment methods, improve access to naturally available cooling opportunities before reliance on powered cooling, and treat building typology and density as climatic questions rather than neutral matters of yield or form.

This is also a question of risk governance and long-term value. Overheating is a known and foreseeable hazard. If it is not properly accounted for in planning, design, retrofit, housing management and investment decisions, it has implications not only for health and wellbeing, but also for asset performance, insurability, energy demand, secure energy supply and the potential creation of stranded assets. Homes and neighbourhoods that cannot remain habitable during prolonged heat, or that depend increasingly on mechanical cooling in conditions of rising demand and grid stress, may carry risks that are currently underestimated by existing assessment, valuation and finance systems.

Measures such as shading, ventilation, retrofit, green infrastructure, cool surfaces, planning controls, tenant support and public health advice will be more effective if they are informed by the local urban conditions that shape risk in practice. Developments that manage heat risk well are likely to be those that optimise solar access, airflow, surface exposure, moisture, heat transfer and night-time cooling across the street, block and neighbourhood scale. Generic guidance will not be sufficient where overheating is highly specific to location, form, exposure, vulnerability and time.

The central recommendation of this submission is therefore that London's approach to overheating should move beyond a dwelling-by-dwelling model and adopt an urban climate framework for assessment, planning and intervention. This framework should connect building-scale overheating risk with street, block, neighbourhood and city-scale conditions. It should support better mapping of risk, more targeted adaptation, more climate-responsive planning decisions, and clearer accountability across housing, public health, planning, design, development, infrastructure, finance and insurance.

The question, therefore, is not only whether London's homes are ready for a heatwave. It is whether London's housing, planning, development, energy, finance and insurance systems are ready to recognise overheating as a spatial, temporal and urban climate risk, and to act at the scale at which that risk is actually produced, experienced and capable of being reduced.

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Appendix 1 Why the Urban Heat Island Distinction Matters

The urban heat island (UHI) refers to the characteristic urban temperature effect produced by differences between urban and non-urban landscapes in surface cover, geometry, airflow, energy exchange and human activity. UHI intensity is the measured magnitude of that effect, expressed as the temperature difference between an urban location and a selected background or reference location [*6].

UHI intensity is a relative measure, it describes how different a location is from the reference site, not how hot it is in absolute terms. The same urban location can produce different intensity values depending on whether the reference site is an open field, park, airport, rural edge or vegetated area.

It is also important to specify what kind of temperature is being compared. A canopy-level UHI is based on near-surface air temperature below roof level, between buildings, directly relevant to thermal comfort, heat stress, ventilation and building cooling demand. A surface UHI is based on the temperature of roofs, walls, streets and pavements, important for understanding heat storage and release, but not a direct measure of overheating risk within homes.

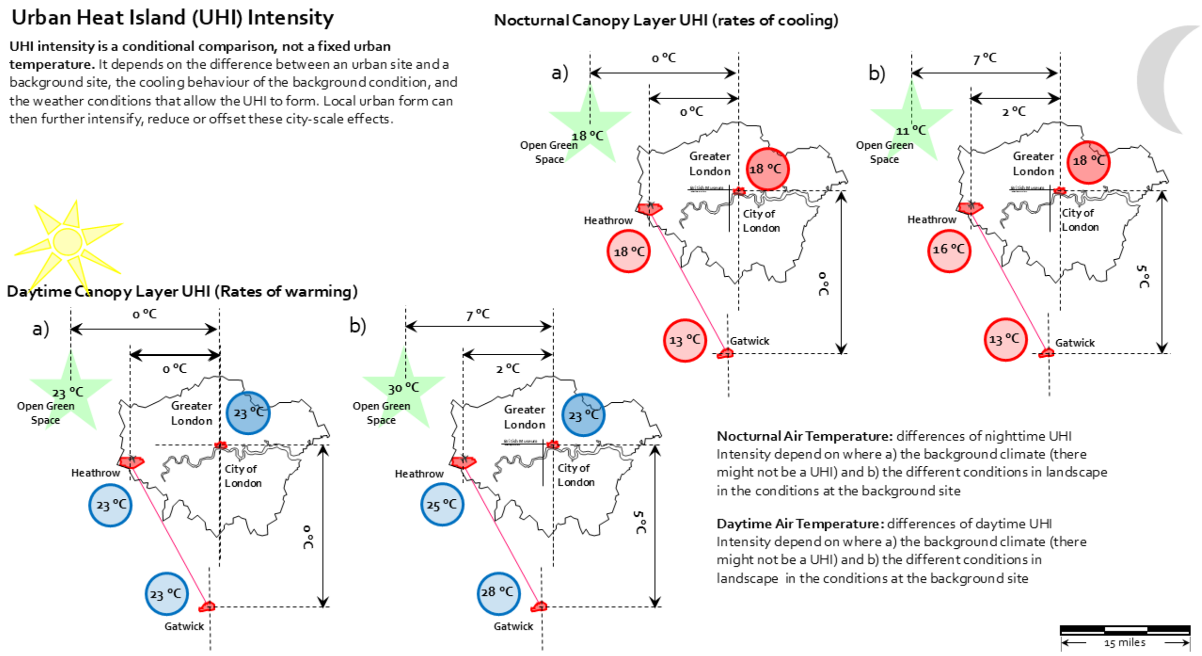

Figure 1: UHI intensity is the difference between an urban temperature and a background or reference condition, not a measure of absolute urban heat. The calculated intensity depends on the character and cooling behaviour of the reference site, and on the meteorological conditions that allow the UHI to form: clear skies, low wind speeds, dry conditions and sufficient hours after sunset. At local scale, urban form, surface cover, vegetation, sky view, airflow and heat storage may further intensify, reduce or offset the effect.

Under clear, calm and dry night-time conditions, open reference sites may lose heat rapidly through longwave radiative cooling. Dense urban areas cool more slowly because enclosure, reduced sky view, lower wind speeds and anthropogenic heat constrain night-time cooling (Figure 1). A high UHI intensity may therefore reflect the rapid cooling of the reference site as much as warmer urban conditions. The nocturnal canopy-level UHI is most clearly expressed during clear, calm, dry periods, after sufficient time since sunset for the temperature difference to develop.

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*6 The urban heat island should not be treated as a simple background temperature uplift. It is a dynamic, multi-scalar and locally variable set of heat-related effects, expressed differently at the surface, within the urban canopy and above the city. Its intensity, timing and spatial pattern are shaped by interacting factors including urban morphology, density, symmetry, orientation, surface cover, vegetation, water, anthropogenic heat and background weather conditions. These factors influence solar exposure, airflow, surface behaviour, heat storage, night-time retention and recovery, with effects that vary across the day and night, by season, and during prolonged heat events.

Local conditions, density, built form, surface cover, vegetation, water, sky view, airflow, materials and land use, may intensify, reduce or offset any city-scale effect. Local Climate Zones (LCZs) (Stewart & Oke, 2012) address this by characterising urban and non-urban areas according to their physical and functional properties, providing a clearer basis for translating background climate data into meaningful local conditions.

The implication is direct. Overheating risk in homes depends on localised conditions, solar exposure, shade, airflow, surface cover, heat storage, heat release, sky view and night-time recovery, that vary between neighbourhoods, streets, blocks, floor levels and individual dwellings, and change across the day, night, season and duration of a heat event. Treating overheating as a uniform London-wide condition risks missing exactly the variation that determines who is most at risk and where.

Call for Evidence: Are London's Homes Ready for a Heatwave?

Position Letter submitted to the London Assembly Planning and Regeneration Committee
Submitted to: Scrutiny@london.gov.uk

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Dear Members of the Planning and Regeneration Committee,

London's Morphology as Active Climate Infrastructure

We welcome the London Assembly Planning and Regeneration Committee's investigation into whether London's homes are ready for a heatwave. The Call for Evidence rightly recognises that overheating is shaped by more than individual dwelling performance, including through its references to the urban heat island effect, building typology, planning, regulation and passive cooling.

This position letter accompanies our evidence submission and sets out its central argument: overheating in London's homes cannot be understood as a dwelling-level problem alone. It is shaped by the arrangement of buildings, streets and open spaces; by the materials, vegetation and water within them; and by the solar exposure, sky view, airflow and ventilation opportunities they create. Buildings and urban form do not simply accommodate environmental conditions. They actively shape how heat is received, stored, released and redistributed across dwellings, streets, blocks and neighbourhoods. In this sense, built form functions as active urban climate infrastructure.

This distinction matters because overheating risk is not uniform across London. It varies by location, typology, floor level, orientation, façade exposure, surrounding massing, enclosure, vegetation, water, surface cover, airflow and night-time cooling potential. Two dwellings with similar construction or internal layouts may experience materially different levels of overheating risk because of where they sit within the wider urban fabric.

The issue is especially important in dense urban settings. Where sky view is limited, enclosure is high and airflow is constrained, the urban canopy can cool more slowly after sunset. Heat received and stored during the day may not be fully released overnight, reducing the recovery period needed to limit cumulative heat stress. During prolonged heat events, this can allow morning temperatures to begin from an elevated baseline, increasing risk over successive days.

For this reason, overheating should be understood as both a spatial and temporal issue. It varies horizontally across neighbourhoods, streets, blocks, open spaces and enclosed spaces, and vertically between ground-level spaces, upper floors, roof levels and different dwellings within the same building. It also changes across the day and night, across seasons, and over the duration of a heat event.

Current policy and assessment approaches still tend to focus too narrowly on individual buildings, building fabric, services or late-stage compliance. The London Plan's cooling hierarchy is broadly right in principle, particularly in resisting air conditioning as the default response. However, the earlier stages of that hierarchy need to be interpreted more explicitly through urban form. Reducing heat entering a building is not only a matter of glazing, shading or insulation. It also depends on surrounding geometry, street width, height and spacing, sky view, vegetation, hydrology, surface behaviour, airflow and the wider outdoor conditions that determine how heat is gained, trapped and released.

Our submission therefore argues that London needs a more urban climate-informed approach to overheating risk. This means assessing heat risk at the scale at which it is produced and experienced: across homes, buildings, streets, blocks, neighbourhoods and the wider city. It also means treating density and typology as climatic questions, not only as matters of housing delivery, urban character or development yield.

In practical terms, this requires:

- assessing overheating in relation to surrounding urban morphology, not only individual dwellings;
- giving greater weight to sky view, airflow, enclosure, surface conditions, vegetation, water and night-time recovery;
- considering cumulative heat effects beyond the red line boundary of individual developments;
- testing overheating implications earlier in design, before massing, orientation, layout, landscape and drainage decisions are fixed;
- ensuring that homes are resilient under future heat conditions, not only compliant under current assessment assumptions;
- recognising overheating as a long-term health, infrastructure, energy, insurance and asset-risk issue.

The Mayor's *London Climate Resilience Review* and the development of a Heat Plan for London signal an important shift towards a more coordinated response. The key question is whether that response will treat overheating primarily as a matter of building performance and emergency preparedness, or whether it will also recognise the role of built form and urban morphology in shaping the local climate conditions that determine exposure, vulnerability and resilience in the first place.

The question before the Committee is therefore not only whether London's homes are ready for a heatwave. It is whether London is ready to recognise its built form as the climate infrastructure that it is.

We would welcome the opportunity to provide further evidence, present to the Committee, or discuss how urban morphology and built form can be more explicitly recognised within planning, housing, retrofit and heat-resilience policy.

Yours sincerely,

Dr Julie Futcher | Prof. Rohinton Emmanuel | Prof. Zhiwen (Vincent) Luo | Prof. Gerald Mills

The North Atlantic Urban Climate Action Group
A network of independent urban climate academics and practitioners

Written evidence in response to the London Assembly's Call for Evidence
Are London's homes ready for a heatwave?

submitted by University College London, Oxford Brookes University, London School of Hygiene and Tropical Medicine, University of Leeds and Oxfordshire County Council

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1. What is the overheating risk currently facing London's homes and how is this risk evolving?

a. What proportion of homes in London are currently at risk of overheating? How is this likely to change in the future?

Overheating is already a significant and widespread risk in London's housing stock, affecting both existing homes and newer, energy efficient developments:

- During the 2003 heatwave, internal temperatures in London homes exceeded 25 °C for over 90%, and 28 °C for up to 80% of the time, with heat often retained overnight (Gupta et al., 2019).
- A meta-analysis of data on UK newbuild housing, including London homes, found that 57% of bedrooms and 75% of living rooms were classified as overheated under CIBSE static criteria (McGill et al., 2017).
- Based on nationally representative data collected in 2017-2018 as part of the Energy Follow Up Survey (EFUS), Lomas and Li (2023) demonstrated that 20% of households in England reported overheating. Indoor monitoring found that 50% of homes in London had bedrooms that failed the CIBSE Technical Memorandum (TM) 59 overheating criterion, 2.5 times higher than in the rest of England.
- Monitoring of London care homes in 2019 indicated that over 85% of summer hours exceeded 26°C in a modern facility, and 59% of bedroom temperatures exceeded this in an older building (Tsoulou et al., 2023).
- A modelling study (Ferguson et al., 2023) estimated that, if no retrofit takes place by the 2030s, the majority of UK dwellings will fail current nighttime overheating criteria. Dwellings with less attachment (bungalows, detached properties) are on average cooler, exceeding overheating thresholds for a lower percent of annual nighttime hours. Flats and mid-terrace houses were warmer, with more hours above the indoor overheating thresholds, which is particularly relevant for cities such as London (Figure 1).

The proportion of homes at risk is expected to increase substantially with further climate change (Arup, 2022), due to:

- rising external temperatures,
- increased frequency and duration of heatwaves,
- urban heat island effects, and
- highly insulated and airtight building designs.

Gasparrini et al. (2022) found that the rate of heat related mortality in London is higher than in the rest of England by a factor of around 2. Simpson et al. (2024, 2025) estimated that a substantial proportion of heat related mortality could be attributed to the London urban heat island effect (38% in the July 2022 heatwave, 50% in June-August 2018).

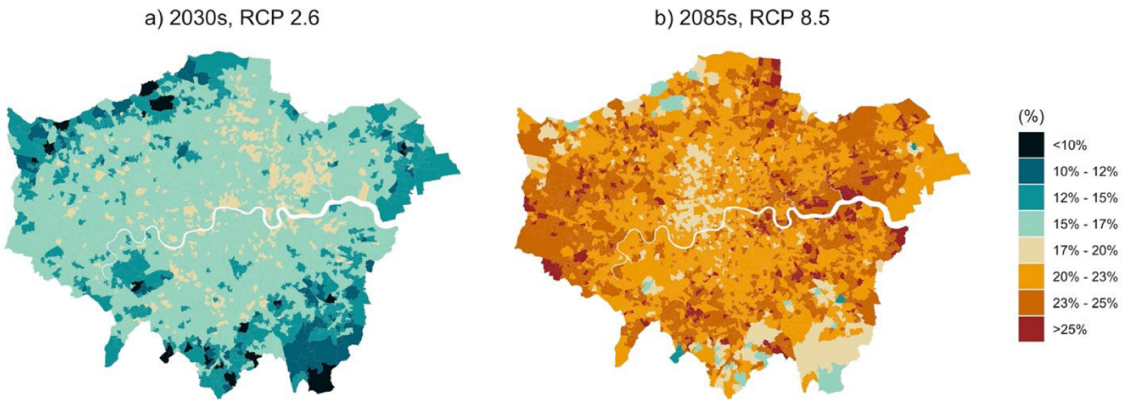


Figure 1. The mean percent of annual nighttime hours the nighttime bedroom temperature exceeded 26°C, aggregated by London Lower layer Super Output Areas (LSOA), in a) the 2030s time horizon under Representative Concentration Pathway (RCP) 2.6 and b) the 2085s time horizon under RCP 8.5 (Source: Ferguson et al., 2023)

b. How does overheating affect different demographics, including tenure of housing, age, disability and gender?

Overheating risk in London is unequally distributed and disproportionately affects already vulnerable groups. Without targeted intervention, heat exposure will exacerbate existing health and social inequalities.

Age

Older people are at significantly higher risk from overheating due to physiological, behavioural and social factors:

- Ferguson et al. (2023) found that English dwellings in areas with a greater number of older people (over 65 years old) overheated *less* than those in areas with fewer older people. However, areas with a greater proportion of older individuals still experienced high indoor temperatures during summer for a significant amount of time. Households with young children below 5 years old also experienced significant overheating risk (Figure 2). This is concerning given the heightened vulnerability of these age groups to high summertime temperatures.
- EFUS analysis, on the other hand, found that younger households (based on the age of the household reference person) were more likely to report overheating, but older households were more likely to experience higher temperatures, which may be explained by older people being less aware of overheating (Lomas et al., 2021).
- Older individuals often underestimate heat risk and may not take appropriate protective action (Abrahamson et al., 2009; Wolf et al., 2010).

- At the population level, the health of older people is far more affected by heat than that of younger people due to increased exposure and sensitivity (Ormandy and Ezratty, 2016).
- Ageing reduces the body's ability to regulate temperature, increasing susceptibility to heat related illness and mortality (Kenny et al., 2010; Åström et al., 2011). Evidence shows that older residents may only perceive discomfort at temperatures above 32 °C, compared to approximately 29 °C for younger individuals (Gupta et al., 2021a).
- Reduced mobility, social isolation and time spent indoors further increase exposure and decrease adaptive capacity (Ormandy and Ezratty, 2016).
- The move to increased care at home (CQC, 2025) may result in more vulnerable people being in their own homes during periods of heat.

Older people should, therefore, be considered a priority for targeted heat resilience measures, particularly in housing and care settings.

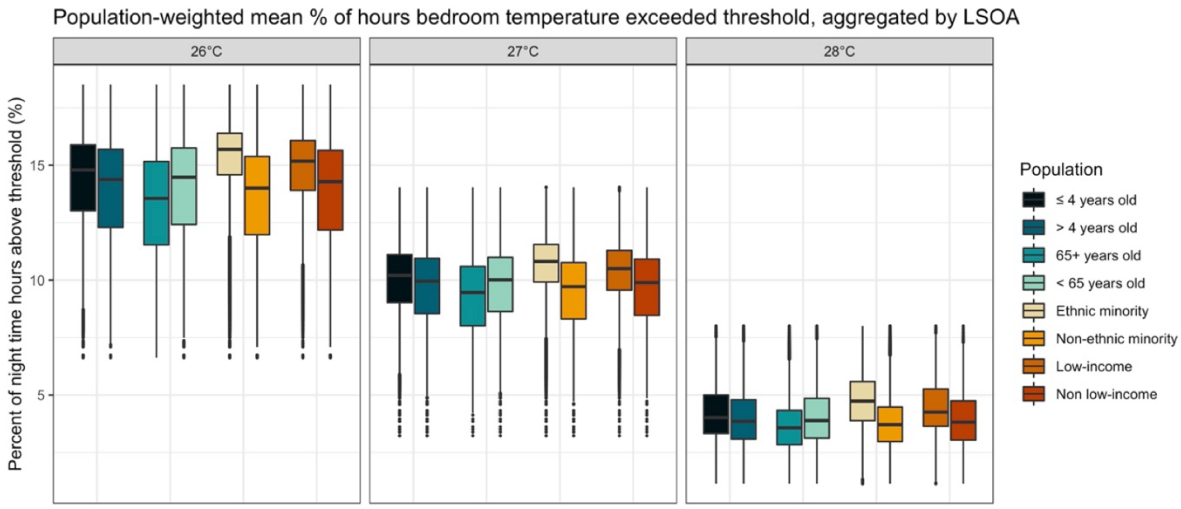


Figure 2. The percent of annual nighttime hours the bedroom temperature exceeded indoor threshold of 26°C, 27°C and 28°C, aggregated by English LSOAs and weighted for the different population groups in the 2030s time horizon under RCP 2.6 (Source: Ferguson et al., 2023)

Tenure and income

Overheating risk is strongly linked to housing tenure and income inequality:

- Lomas et al. (2021) found strong evidence from the nationally representative EFUS data collected in 2017-2018 that overheating is more prevalent among households in lower income quintiles, in smaller homes, and in flats (compared to houses). There is also strong evidence that overheating is more prevalent in rented homes, and especially social renters, although this may be partly explained by a higher proportion of these homes being flats. Households with children present were more likely to report overheating.

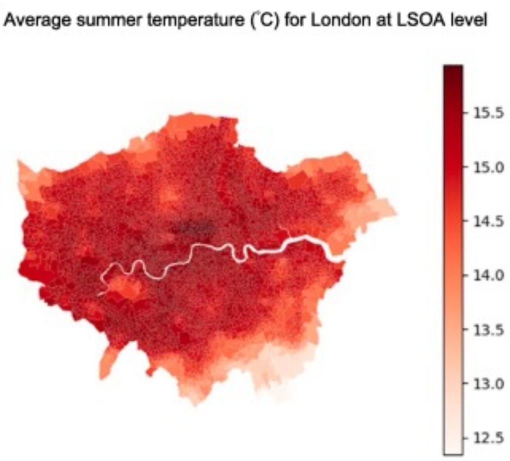
- Around 50% of monitored social housing dwellings have been shown to overheat during heatwaves (Zahiri and Gupta, 2023).
- Social renters are disproportionately represented in lower income groups, limiting their ability to adopt active cooling measures.
- A national study from 2019 also identified an association between means tested or certain disability benefits with higher summertime indoor temperatures (Petrou et al., 2019).
- Modelling by Ferguson et al. (2023) demonstrated that dwellings in England in areas with a higher percentage of lower income households may overall spend a greater amount of annual nighttime hours above overheating thresholds (Figure 2). Differences were greatest for ethnic minorities versus non-ethnic minorities.

Addressing overheating in London thus requires targeted support for social housing and low income households, including retrofit and financial assistance.

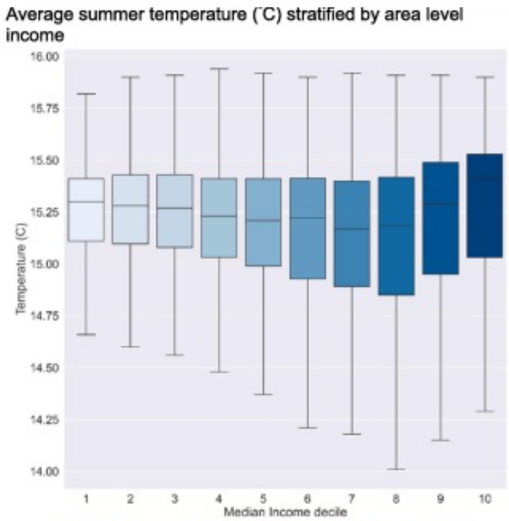
Disability and health conditions

Disability and health conditions have significant impacts on heat vulnerability and exposure:

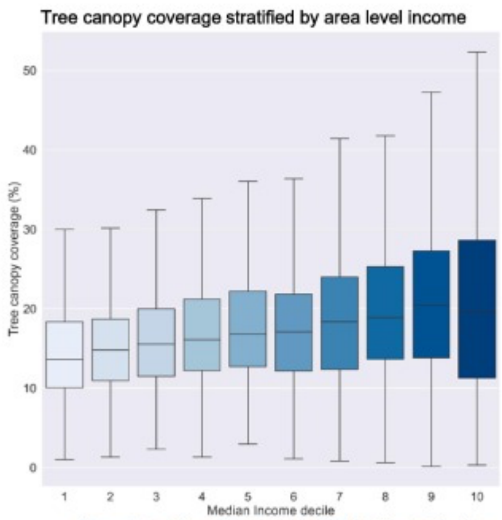
- Chronic health conditions, including cardiovascular and respiratory disease, diabetes and obesity, substantially increase heat related health risks (Gasparrini et al., 2012).
- People with dementia may be unable to recognise or respond to heat risk, increasing vulnerability (Gupta et al., 2021a).
- Disabilities and physical impairments can limit the ability to operate windows, shading, or ventilation systems, requiring design adaptations and support.
- Bedbound individuals experience prolonged exposure to overheating, particularly in bedrooms, which are often the hottest spaces (Tsoulou et al., 2023; Oikonomou et al., 2026).
- A study by Cole et al. (2024) found inequalities for heat risk in London across indicators relating to exposure, sensitivity, adaptive capacity and resulting vulnerability. This includes inequalities in urban greening and access to greenspace, physical and mental health and access to communication and support (Figure 2).
- Other vulnerable groups that can also be at heightened risk of heat illness, include people living alone, people in care homes, and people experiencing insecure housing.



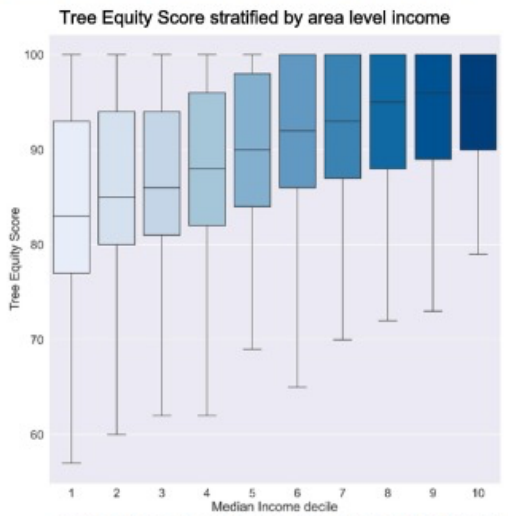
a: A map of the Greater London Authority showing the average daily maximum temperature across the summer of 2018 in degrees Celsius. Darker areas indicate hotter average temperature and can be seen in the inner city.



b: The box plots represent the average temperature for LSOAs within each decile of income, with income increasing from left to right.. In general area income increases outdoor temperature exposure decreases, with a reversal in the highest income deciles.



c: The extent of the canopy across each LSOA stratified by income decile using the curio canopy data for London. Income increases from left to right.



d: The tree equity score as calculated for each LSOA stratified by income decile. Income increases from left to right and high scores show greater tree equity.

Figure 2. Plots describing the distribution of heat exposure indicators spatially and across area level income in Greater London (Source: Cole et al., 2024)

In summary, overheating is a public health and equity issue. The most affected groups, older people, low income households, and those with health conditions, are also those least able to adapt to higher temperatures. These groups require integrated building, care, and public health interventions.

c. How is the risk of overheating currently assessed in new developments? Is this sufficient to ensure London's homes are resilient?

Nationally, overheating risk in new homes is typically assessed using Building Regulations Approved Document O (Part O), effective since June 2022. This utilises a modelling methodology based on CIBSE TM59. There are no national regulations to assess existing homes, or non-domestic buildings. For London, the London Plan introduced overheating modelling in 2016 prior to its introduction in Part O (MoL, 2016). It requires developments to show they meet the TM59 methodology for domestic buildings, and TM52 methodology for non-domestic buildings. TM59 and TM52 set assumptions for how buildings should be modelled against a standardised set of assumptions to show it can reduce the risk of overheating. However, there are important limitations:

- As raised by the analysis of interviews with practitioners by Halai et al., (2026), Part O does not currently require analysis with future weather files, which means that homes constructed now are not necessarily suitable for preventing overheating in the future climate. Assessments are often not stress-tested against more extreme and/or future climate scenarios, e.g. Design Summer Years 2/3 (DSY2/DSY3) or 2050/80s weather files. The London Plan 2021 does require developments to model to DSY2/DSY3 for the 2020s, going beyond Part O requirements, however it still does not require modelling for future weather files (GLA, 2016).
- Overheating is assessed in Part O in isolation from other regulations, such as Part L (energy), Part F (ventilation), Part K (protection from falling, collision and impact) and Part B (fire safety). They are also developed in isolation of specific design challenges in London, particularly polluted and dense developments. This leads to conflicting design requirements across both national and local policy (Halai et al., 2026).
- For example, the glazing areas (which should be minimised) and opening areas (which should be maximised) are constrained by Part K and Part F of the Building Regulations, in addition to local planning requirements which maximise daylight and views out and manage pollution (Halai et al., 2025). This leads to large window glazing areas which let in a large amount of light, and also solar gains leading to overheating.
- Furthermore, in Halai et al. (2026), practitioners identified that the main way that overheating is assessed in new developments is through dynamic modelling software such as IES VE, TAS, and DesignBuilder to test compliance with the CIBSE TM59 standard and Part O. Some interviewees suggested that the assumptions built into these software packages, and the assumptions driven by Part O, make it difficult to implement passive cooling solutions effectively. Some suggested that this was pushing new developments towards including active cooling by default, which does not appear to match the stated intention of Part O to prioritise passive cooling. Some interviewees suggested that more flexible assumptions could help with this.
- Part O sets prescriptive window opening requirements which are not realistic and reflective of how residents use their homes and windows (Halai et al., 2026). This can be significant, since Cui et al. (2025) showed

that the outcomes of compliance modelling are highly sensitive to the standardised window control assumptions.
- There is limited Post Occupancy Evaluation (POE) evidence to demonstrate real world performance (Halai et al., 2026). The most notable POE including overheating was commissioned by the London Legacy Development Corporation (LLDC) (Buro Happold, 2025). A survey of Chobham Manor residents found that summertime overheating was a dominant concern, (reporting only 33% occupant satisfaction with summer temperatures, and bedroom temperatures above 26 °C for 3% of the year compared to the target of 1%.). This was attributed to the fact that the scheme was built to high energy efficiency standards but before Part O of the Building Regulations was introduced.

As a result, current approaches are not yet sufficient to ensure long term heat resilience. It should also be noted that the current National Planning Policy Framework (NPPF) consultation (MHCLG, 2025) proposes to remove powers from local authorities to set regional building standards, in addition to national building regulations. This means that the additional risk of overheating for buildings in London cannot be managed through the London Plan. It also removes the strides London has made in testing and establishing TM59 as an assessment methodology before it was adopted by the national government for the Part O of the Building Regulations.

d. How do different building typologies contribute differently to the urban heat island effect and overheating in London?

Urban form and building typology play a critical role in both the urban heat island (UHI) effect and indoor overheating risk.

London is composed of a variety of urban morphologies and thermal/radiative properties which can be classified into different Local Climate Zones (LCZ), a land use and land cover classification that supports urban climate studies in the identification of urban environments with specific characteristics that are expected to influence the local climate (Stewart and Oke, 2012). Urban materials such as concrete, asphalt, and paving absorb and retain heat more than natural surfaces, leading to elevated daytime temperatures and slow nighttime cooling. This drives persistently higher temperatures across dense urban areas. High density developments, particularly in central London, exacerbate the urban heat island through limited green space, reduced air movement, and high thermal mass. Through long term measurements obtained via crowdsourced weather data, it has been shown that more densely built areas of London tend to be warmer on average than more sparsely built areas (Brousse et al., 2022). Parks also tend to be cooler on average. This has been further demonstrated through local measurement campaigns in east London where built up areas deprived of green or blue interventions appeared to be warmer on average (Brousse et al., 2025). The distance to large neighbouring parks also seemed to play a role. Besides, heat accumulated in warmer parts of the city (like the centre of London) could cause warmer suburban areas by being advected downwind during adequate conditions (Brousse et al., 2022). It is important to note that there is a critical weather and climate data scarcity in most deprived areas of England and Wales (Brousse et al., 2024a), preventing knowledge accumulation in places that could benefit the most from it.

There is plenty of evidence on the impact of building typology on indoor overheating risk. Evidence from London highlights that overheating risk is strongly linked to building form, orientation, glazing ratios, and ventilation strategy (Arup, 2022; Arup 2024). Certain housing typologies are particularly at risk:

- Flats are at a higher risk of indoor overheating than houses (Lomas et al., 2021; Petrou et al., 2019). The risk is higher for single aspect flats (Petrou et al., 2018) and high-rise flats (Lomas et al., 2021). This could be partly attributed to the fact that flats, especially single aspect units, have limited opportunities for cross ventilation.
- Top floor dwellings are more exposed to solar gains and roof heat transfer.
- Highly insulated and airtight buildings, while energy efficient in winter, can trap internal heat gains in summer, if not designed and operated appropriately.

Reducing overheating, therefore, requires integrated urban and building scale interventions, including greening, shading, and improved design standards.

e. How is the risk of overheating different in London than in other parts of the UK?

London faces a significantly higher overheating risk than most other parts of the UK due to a combination of climatic, urban, and sociodemographic factors:

- The urban heat island effect increases nighttime temperatures by several degrees compared to surrounding rural areas. The temperature anomalies induced by London's urban heat island have been considered steady over the past decades, independently of increased temperatures induced by climate changes; it is also located in the south-east of England which experiences the largest temperature increases in the UK (Basset et al., 2020; 2021).
- London is warmer on average than the rest of the south-east of England by 1.0 °C to 1.5 °C according to measurements recorded between 2015 and 2020 (Brousse et al., 2022). According to some modelling studies, this could be reduced by a maximum of 1.2 °C during extremely hot summer days through the deployment of cool roofs on all buildings (Brousse et al., 2024b).

- London has a higher proportion of flats and high-density housing, which are more prone to overheating.
- Limited access to green space and urban cooling infrastructure exacerbates local heat exposure.
- The capital also has a higher concentration of vulnerable populations, including older residents and those in social housing.
- London developments are in more dense, urban areas and, therefore, subject to additional design requirements including managing pollution and noise which limit window openings and passive solutions. This creates a complex set of design requirements.
- The dense housing in London with limited roof space also means that use of solutions, such as solar panels, to deliver low carbon, renewable energy for active cooling, where required, is more challenging. Low rise dwellings in other parts of the country can capitalise on roof space which can generate energy while active cooling is needed. This means residents in London are more likely to spend more on active cooling costs compared to others across the country, in addition to being exposed to higher risks.

As a result, overheating in London is both a climate risk and a public health inequality issue, requiring targeted and place-specific policy responses (Arup, 2022).

f. Are homes being built now which will be vulnerable to overheating? If so, which factors contribute to this (planning, building regulations, energy efficiency standards, etc)?

Yes. Evidence suggests that new homes are still being delivered with significant overheating risk, despite the introduction of Building Regulations Part O (Khosravi et al., 2026). Interviews with practitioners by Halai et al. (2026) presented a consensus that Part O was welcome and needed to drive forward design against overheating risk, but interviewees identified issues with its implementation. Key overheating risk contributing factors include:

- Fragmented regulatory framework: Part O (overheating), Part L (energy), Part F (ventilation), Part K (protection from falling, collision and impact) and Part B (fire safety) are developed and implemented in silos, leading to conflicting design requirements across national and local policy (Halai et al., 2026). Interviewees identified a difficulty in setting glazing areas and designing in a way that meets daylighting, energy efficiency, overheating, and noise requirements with design trade-offs between them. Daylight was considered a priority over overheating, which led to homes that were at higher risk of overheating (Halai et al., 2025).

- Late-stage consideration of overheating: Overheating is often addressed too late in the design process, limiting effective mitigation.
- Inflexible modelling assumptions: Several interviewees in Halai et al. (2026) suggested that they saw the assumptions from Part O as being inflexible, and some of them as being unrealistic. In particular, they highlighted the way window opening is treated in Part O, and how passive cooling solutions are implemented in modelling software, such as IES VE.
- Inadequate climate scenarios: Current assessments are not consistently tested against future climate scenarios (Halai et al., 2026). This risks underestimation of future overheating because buildings are not necessarily being tested against the climate they will be subject to through their operational lifespan.
- Performance gap: There is a lack of POE studies, meaning real world performance is not well understood.
- Unintended consequences of energy efficiency: Highly insulated and airtight homes, while reducing winter energy demand, may increase overheating risk, if cooling measures are not prioritised. Notably, if such homes require more active engagement from residents, e.g. in terms of opening windows or using shading systems, it is likely that the most vulnerable residents may be less likely to be able to optimally do this, resulting in high indoor temperature exposures.

Overall, current approaches are not sufficient to guarantee heat resilience, and there is a clear need for:

- better integration across regulations,
- stronger use of future climate data, and
- mandatory monitoring of in-use performance.

2. How should we be tackling overheating?

a. What changes would you like to see made to the London Plan to better manage the risk of overheating in homes?

The London Plan should adopt a more robust, evidence-led and futureproofed approach to overheating risk. Key priorities include:

- Requiring overheating assessments to use future climate scenarios, rather than relying on current weather files (Gupta et al., 2013; Gupta et al., 2015).
- Mandating POE to verify actual building performance and close the performance gap (Halai et al., 2026). This can be included within the current ‘Be Seen’ requirement for the London Plan, Policy SI 2.

- Require all buildings to show how glazing areas have been minimised. This can be achieved by setting maximum glazing facade areas for buildings.
- Require all buildings to use external shading, and where this is not possible, ensure facades are designed to allow for future installation.
- Strengthening the requirement for passive-first design, minimising reliance on active cooling (Gupta and Gregg, 2020).
- This should be supported by cost benefit analyses. For example, Ibbetson et al. (2025) demonstrated that passive cooling interventions have the potential to be cost effective in reducing heat related risks to residents across a range of care home types.
- Embedding urban greening and shading strategies to reduce both building-level overheating and the urban heat island effect.
- Improve integration between local planning requirements for daylight, pollution, noise, views out, overheating, energy efficiency to create a clear hierarchy of design requirements, and determine the order in which they should be prioritised to deliver safe, healthy and comfortable homes. Systems approaches could be adopted to support such integration and identify important interdependencies.

Without these changes, there is a risk that developments will meet policy requirements but fail to deliver real-world heat resilience.

b. Is the London Plan's current stance on air conditioning [Policy SI 4] still appropriate?

The cooling hierarchy in Policy SI 4 remains appropriate, in principle: it aims to prioritise passive design measures first before using active cooling, such as air conditioning. This is more sustainable and equitable since it limits the use of air conditioning loads, reducing energy requirements for residents and occupants. There is also merit in prioritising passive measures, from the perspective of occupants' comfort and health. However, its effectiveness is currently constrained and better implementation of these principles is needed:

- There is a need for clearer technical guidance to support implementation. This should draw attention to overheating risk and design requirements, in conjunction with energy efficiency and carbon mitigation measures to ensure design guidance is not conflicting.
- Overheating mitigation strategies should be tested against extreme climate scenarios to ensure future resilience (Gupta et al., 2013).
- The technical guidance should require developers and designers to show that passive design principles are considered and included within the design to reduce glazing areas, maximise external shading and maximise openable windows. Clear justification on why these measures are not included must be given for buildings that do not adopt any passive measures.

- Compliance should be supported by empirical evidence, including monitoring and building performance evaluation; this can be done through the mechanisms in place via Policy SI 2.
- Without these improvements, there is a risk of formal compliance without effective outcomes.

Some further risks and opportunities of air conditioning include:

- It is still appropriate to try to avoid and reduce use of air conditioning in the densest areas of London. Air conditioning waste heat is likely to make a bigger difference where buildings are closer together and taller, but is likely to make little difference in low density areas (Brousse et al., 2024a, Xie et al., 2024). Even in relatively dense mid-rise areas, the overall effect on heat balance of the atmosphere at the kilometer scale is not very strong (Xie et al., 2024). The main concern is the densest areas in the centre of London (Brousse et al., 2024a) and local microclimatic effects where, for example, waste heat from a large floor area is exhausted into a narrow street.
- As argued in Simpson et al. (2026), in the near future, it may be the case that the energy and greenhouse gas emission impacts of air conditioning become less important, as the electricity supply comes wholly from renewables for an increasing proportion of the year in line with the Government's Clean Power 2030 plan. To avoid fossil fuel generated electricity use, shifting air conditioning use to the middle of the day when solar electricity is most available may be just as effective as avoiding its use entirely.
- There is evidence from case study modelling that recirculating air conditioning systems (the most commonly used type of air conditioning) can impact indoor air quality, with the maximum and direction of this impact depending on the filter efficiency (Petrou et al., 2025).
- Global evidence from cooling-intensive cities reveal the risk of over-adaptation if air conditioners / isothermal comfort strategies are relied on to cope with heat, where occupants may need to adapt to cold indoors (Murtagh et al., 2022).
- Targeted (zonal) cooling strategies, focusing on high-risk rooms (e.g. bedrooms) or vulnerable occupants, can significantly reduce energy demand compared to whole-dwelling cooling and may offer a more proportionate and equitable approach (Oikonomou et al., 2026).

c. What should developers do to ensure that the homes constructed today will be heat resilient?

Developers should adopt a passive-first, climate resilient design approach, prioritising measures that reduce overheating risk without increasing energy demand. Key measures include:

- Reducing glazing ratios to manage solar gains. The easiest and most effective way to do this, while still maintaining daylight and views out is by not using full length windows. Half height windows ensure more personal security, let in daylight and allow views out, while halving the amount of incoming solar gains and therefore heat risk.

- Installation of external shading devices (e.g. louvres, shutters, brise-soleil), which are significantly more effective than internal blinds (Gupta and Gregg, 2020; Williams et al., 2013).
- Use of solar reflective materials to reduce solar heat gains and local heat build-up (Gupta and Gregg, 2012; Gupta and Gregg, 2013).
- Optimising glazing design, including low g-value glazing (Gupta et al., 2015).
- Designing dwellings with dual aspects to enable cross-ventilation (Gupta et al., 2017).
- Providing adequate and secure ventilation that can be used at night, particularly in bedrooms and spaces occupied by vulnerable residents (Gupta et al., 2021a; Oikonomou et al., 2026). The allowance for nighttime ventilation at given conditions in Part O considerably lowers the modelled overheating risk compared to TM59. To translate this modelling assumption to reality, homes and neighbourhoods need to be designed in a way to allow and encourage natural ventilation through window opening, particularly in bedrooms at night (Cui et al., 2025). This requires better masterplan design to manage pollution, noise control, security and safety to ensure windows are safe and comfortable for residents to open.
- Reducing internal heat gains from services and appliances (Gupta and Gregg, 2013), in particular, minimising the heat loss of hot water pipes in the occupied and communal areas.
- Using probabilistic climate modelling to assess future overheating risk (Gupta et al., 2013; Gupta et al., 2015).
- Where passive measures are insufficient, considering targeted active cooling, e.g. reversible heat pumps (Oikonomou et al., 2026; Zahiri and Gupta, 2023). This must be designed into the building from the outset since retrofitting these systems is challenging.

It is critical that all these overheating measures are considered alongside energy efficiency and decarbonisation of heat. Without consideration of comfort in both the winter and summer season, this can exacerbate issues within the building, either further increasing overheating risk, or creating condensation and mould issues.

d. What support should be made available to homeowners and tenants to better manage overheating risk?

Overheating mitigation requires both behavioural and physical interventions, supported by clear guidance and policy.

For occupants:

- Provision of clear guidance on adaptive behaviours, including window use and shading strategies (Gupta and Gregg, 2020).
- Development of simple home user guides explaining the operation of ventilation and heating systems (Gupta and Kapsali, 2016).
- Training for occupants using complex systems, such as Mechanical Ventilation with Heat Recovery (MVHR) (Gupta and Kapsali, 2016).
- Awareness of internal heat gains and how to minimise them (Gupta et al., 2017; Gupta and Gregg, 2013).

For homeowners:

- Access to independent advice on effective retrofit measures.
- Prioritisation of passive interventions, including external shading and reflective materials (Gupta and Gregg, 2012; Gupta and Gregg, 2013), alongside operational strategies (Oikonomou et al., 2026), as effective overheating mitigation depends on both building design and occupant behaviour, e.g. optimised ventilation practices.
- Consideration of external insulation over internal insulation to preserve thermal mass and reduce overheating risk (Gupta and Gregg, 2013).
- Use of smart sensors and monitoring to identify overheating risk (Zahiri and Gupta, 2023).

Policy support:

- Financial incentives (e.g. grants and subsidies) to support adaptation measures (Williams et al., 2013).
- Support for glazing and external shading manufacturers to ensure they develop products for both windows and external shading that meet broader Building Regulations (Part B fire regulations, for example, and Part K safety from falls). Having products that comply with other parts of the regulations will ensure products are available for homeowners to assess at a competitive price and support their use and installation (Halai et al., 2025).
- Clear allocation of responsibilities between landlords and tenants (Gupta et al., 2017).

e. Are there developments in London that manage heat risk well?

There is currently limited publicly available evidence demonstrating the in-use performance of developments designed to mitigate overheating, including those compliant with Part O. However, some examples of residential buildings include:

MacFarlane Place[1] in White City and the Arthouse[2] development in Kings Cross.

f. Are there examples of cities which have adopted strategies to tackle heat risk which London can learn from?

Seville, Spain is working to retrofit buildings to be more energy efficient in hot summer months and using passive solutions such as planting more trees and sail shading to reduce the urban heat island (Figure 3).[3]

Figure 3. Awnings mounted on streets in Seville's shopping district[4]

In Phoenix, Arizona and Los Angeles, California, Cool Pavement Programs are being used to reduce urban heat and reduce long term road maintenance needs and costs (Figure 4).[5,6]

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[1] https://www.ribaj.com/buildings/macfarlane-place-maccreanor-lavington-peabody-affordable-housing-white-city-london/
[2] https://www.taylormaxwell.co.uk/projects/arthouse
[3] https://eu-mayors.ec.europa.eu/en/Action-for-Outdoor-Environment-Adaptation-in-Seville
[4] https://monocle.com/affairs/urbanism/seville-summer-heat-management/
[5] https://www.phoenix.gov/administration/departments/streets/initiatives/pavement-maintenance/cool-pavement-program.html
[6] https://www.weforum.org/stories/2019/08/los-angeles_climate-change_urban-heat_reflective-asphalt/

Temperature monitoring in Phoenix, Arizona showed differences between reflective pavements and baseline were lowest before sunrise, with differences ranging from 0.9 to 1.6 °C cooler on the reflective pavements across all neighbourhoods tested (Schneider et al., 2023).

Figure 4. Resurfacing with reflective pavement in Phoenix[7]

There are also examples of national strategies to tackle heat risk. In Germany, funding is available for heat protection measures. The Federal Funding Program for Efficient Buildings - Individual Measures (BEG EM) offers a 15% subsidy for building envelope improvements when part of an energy efficient renovation, including roller shutters, external venetian blinds and textile shading systems. A further 5% bonus is available when an individual renovation roadmap is submitted. This funding aims to enhance energy efficiency and protection against summer heat in existing buildings, supporting a more sustainable, climate friendly and cost efficient building stock.[8]

[7] https://www.phoenix.gov/administration/departments/streets/initiatives/pavement-maintenance/cool-pavement-program.html
[8] https://www.bafa.de/DE/Energie/Effiziente_Gebaeude/effiziente_gebaeude_node.html

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City of Westminster

London Assembly Call for Evidence:

Are London's homes ready for a heatwave?

Extreme heat events are becoming increasingly more intense, frequent and longer in London and the UK.

In response, the London Assembly Planning and Regeneration Committee is investigating whether London's homes are ready for a heatwave and have requested a call for evidence. This document is Westminster City Council's response to some of the key questions asked by the London Assembly.

Contents

Introduction

Westminster City Council (WCC) commissioned ARUP to conduct a Climate Risk and Vulnerability Assessment of the borough. The assessment included primary research with community and industry stakeholders, as well as utilising secondary data and research such as climate risk modelling and mapping. A key conclusion of the assessment was that extreme heat is a significant climate risks impacting the City of Westminster now and increasingly into the future.

London suffers from a notable urban heat island, with central areas experiencing summertime temperatures 4.5°C degrees hotter than the surrounding green belt[1]. In Westminster, the challenge is even greater due to its historic, high-density buildings, many of which were never designed to withstand extreme heat. Factors such as overcrowding, building type, and barriers to opening windows, such as noise, air pollution and safety concerns, further increase vulnerability. Westminster's unique built environment adds another layer of complexity. With over 11,000 listed buildings and 78% of the city designated as conservation areas, the highest of any UK local authority, retrofitting for climate resilience is complicated by the need to preserve historic character[2].

In response, WCC launched London's first council-wide heat resilience strategy in 2025, the Cool Neighbourhoods Strategy. This document outlines the Council's high-level and cross-cutting vision, pillars and objectives to build a more just, equitable, and heat-resilient city, while protecting the health and safety of all people who live, work and visit Westminster. Many WCC teams are supporting the ambitions of this strategy by delivering on-the-ground processes, projects and outputs for heat resilience. The responses listed in this document have been prepared by many of these teams.

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Question 1: Are London's homes able to cope with current and projected future overheating risks (in 20–30 years' time)?

Response 1A

Submitted by: Climate Resilience, Parks and Green Spaces Team.

Homes in Westminster are already being impacted by extreme heat, and this consequently increases health and wellbeing risk to occupants. In developing the Cool Neighbourhoods Strategy, WCC delivered multiple public engagement and co-production initiatives to understand the lived experience of residents during extreme heat events. This included:

- A focus group with a diverse make-up of 25 residents. They shared their experiences during multiple climate hazards and reoccurring feedback was that the community felt particularly ill-prepared for heat. Extreme heat was already having real impacts on the lives of residents, yet they felt unable to address it, unlike cold, rain and storms. Refer to evidence item A for real quotes from residents about their experiences during extreme heat that particularly pertains to housing. Any quotes referencing a specific time are in reference to the July 2022 heatwaves.
- A full-day co-production session with a select group of 37 participants that represented demographics particularly vulnerable to the impacts of extreme heat. Two-way dialogue between officers and residents uncovered many valuable insights which informed the Cool Neighbourhoods Strategy. There were consistent key themes identified by all residents and housing was one of these. Residents overwhelmingly noted that inadequate housing was causing them health impacts and stress during heat events, with particular concern for elderly and young family members.

Additionally, Westminster City Council has access to Parity Projects data, which is now a part of Cotality which has an 'overheating' rating for domestic properties. Utilising this data, Westminster has thousands of domestic properties which are already 'medium' or 'high' status for their 'T Threshold' overheating rating, with totals listed in evidence item B.

This quantitative data is supported by lived experience feedback WCC receives from residents whether that's during targeted engagement sessions (mentioned previously) or housing feedback directly provided to Council officers or Councillors via formal email or complaints processes. Private housing complaints are dealt with our environmental health team, with more information supplied in 'Response 1C'.

Evidence item A:

"I couldn't be at home. We're in a third floor flat, so we're essentially in the roof space and our flat is south facing, so the sun is in the living room all day. And it was so hot on those two days* that we just had to pack up and go be out of house because it was just suffocating."

"I bet that's probably when it was nice to be in the basement because I was in the attic roasting my life away. I felt like I was in the oven, like a chicken."

"My son's school didn't have air-con and they would come out sweating. Literally sweating from school. Their face is completely red. And I was thinking, how did they even learn?"

"There's more bickering, there's more arguing. It's not healthy to be living in these high stressful situations. Extreme weather causes extreme stress on people."

"[we need to know] how to prepare ourselves, what we should do, where to go, who to call, the emergency services available."

"I don't think we're very well prepared for heat and that showed last time we had heat before, people were doing snap responses... going to Argos and buying fans, but they didn't know the basics of keep your blinds down... keep the heat out of your house, rather than try to drive it out."

Evidence item B:
The below table is the summary of domestic properties (individual flats, houses etc.) that have a 'medium' or 'high' T-Threshold rating, signifying overheating risk.

Overheating rating type	Number of properties in Westminster
High	5,414
Medium	24,511
Grand Total	29,925

Response 1B

Submitted by: WCC Energy Efficiency Enforcement Officer (MEES Enforcement)

Many Westminster homes that are assessed from a MEES enforcement perspective are unlikely to cope with current or future overheating risks, particularly as compliance activity has historically focused on improving energy efficiency without equal consideration of summer thermal comfort.

MEES-driven works (such as increased insulation and airtightness) can reduce heat loss but may contribute to summertime heat gains, particularly in single-aspect and densely located properties. This is particularly the case as funding for MEES-driven works often does not allow for thermal comfort outcomes such as ventilation or passive cooling measures. This is already an issue in private-owned (Response 1C) and social housing in Westminster and with temperatures continuing to rise over the coming decades, this presents a growing risk within the private rented sector, particularly where minimum EPC compliance is treated as a standalone target rather than part of a balanced, climate-resilient housing standard.

Response 1C

Submitted by: Private Sector Housing – Environmental Health

Excess heat is one of the 29 Hazards that is assessed for via the Housing Health and Safety Rating System (HHSRS) under the Housing Act 2004. As a team we respond to complaints from tenants in the private sector which includes those living in Registered Provider accommodation. Evidence item D shows a breakdown the number of complaints Westminster has received which include references to excess heat within the flats. Whilst these numbers are relatively low – there is an increase in the last 2 years to the number of cases – but also these complaints are very difficult to respond to and are often in blocks. As such the number of residents we assist with excess heat cases are higher than shown in evidence item D. An example of this is a case in Soho – a block which has both social tenants and shared ownership tenant owners' flats (15 in total). This building is one of the 2024/25 complaints listed in evidence item D. There are 40 residents living in this building alone which experienced internal temperatures in excess of 38 degrees in bedrooms and living spaces at night. Comparing this against the World Health Organisations' recommended maximum sleeping temperature of 18 degrees shows the scale of the issue experienced. In this particular case, we have investigated fully, including working with the Building Research Establishment and by conducting thermos-dynamic modelling to assist us in formulating a schedule of works to bring about change to the conditions within these flats. This modelling was invaluable as it has enabled us to model different retrofit scenarios to analyse the impact of interventions on the health and wellbeing of residents, without having to pay for the solutions and risk maladaptation.

It's also worth noting that this is only for complaints that we receive and therefore, issues that we reactively address. During extreme heat periods (such as the July 2022 heatwaves) there are known vulnerable properties to the Council's environmental health team, in which the team provide proactive contact and support to prepare for these periods. This may be why there was less-than-expected complaints in the 2022/23 financial year.

Evidence item D:

The table below lists the number of overheating-related complaints from private sector tenants, received to Westminster City Council. Category 1 hazards are severe hazards likely to cause more serious harm to occupants in which WCC is legally required to take formal action, and category 2 hazards are less severe and, legally, it is optional for WCC to take action.

Financial year	Category 1	Category 2	Total
2020/21	0	2	2
2021/22	1	1	2
2022/23	0	0	0
2023/24	0	0	0
2024/25	1	4	5
2025/26	3	8	11
Total	5	15	20

Question 2: What measures should new and existing homes in London incorporate to be "heat-proofed" against current and projected future overheating risks? What barriers exist to implementing these measures?

Response 2A

Submitted by: Climate Resilience, Parks and Green Spaces Team

Westminster's densely developed built environment and heritage character means that most of the city's homes that will be lived in for future decades have already been built. Therefore, enabling solutions through retrofit is a larger focus for WCC, opposed to new builds. However, the high proportion of heritage listings and conservation areas in Westminster creates a two-pronged barrier for retrofit (among others):

a) The straight-forward barriers of national and local planning laws and restrictions that limit retrofit options, and
b) These leading to an overly risk-adverse perception from residents that nothing can be done on their properties to retrofit. However, residents are often unaware that this is not the case in many instances. WCC's planners experience this when dealing with planning applications.

To reduce these barriers and assist private property owners and tenants, WCC has developed a Retrofit How-To Guide: Weather-Ready Homes which includes planning guidance as well as retrofit and behavioural advice to assist property decision-makers in retrofitting their homes to be more resilient to climate hazards such as heatwaves, flooding, storm and drought. WCC commissioned Love Design Studio and The Environmental Design Studio to provide technical input and content for the retrofit solutions and advice. The document, linked in evidence item I, includes 29 retrofit measures for existing homes that can help 'heat-proof' a home, noting that these are mostly passive and do not include air-conditioning.

Evidence item F:
View Retrofit How-To Guide: Weather-ready homes document here:
https://www.westminster.gov.uk/sites/default/files/media/documents/weather-ready-homes-retrofit-how-to-guide.pdf

Refer to 'Section 3: Climate Resilience Measures', pages 27-45 which includes tables that list 29 different retrofit measures by areas of the home, all signposted with a 'H' in the 'Hazard' column for heat resilience initiatives.

Response 2B

Submitted by: WCC Energy Efficiency Enforcement Officer (MEES Enforcement)

From a MEES enforcement perspective, homes need to move beyond EPC-driven fabric efficiency measures and incorporate balanced, passive overheating controls such as effective ventilation, solar shading, and dwelling layouts that enable heat dissipation. However, implementation is constrained by EPC limitations, landlord compliance behaviour, cost considerations, and physical constraints in flatted and historic private-rented-sector stock, particularly in central London boroughs such as Westminster.

Question 3: Are existing planning and building regulations sufficient to ensure these measures are consistently delivered in practice? What else is needed?

Response 3A

Submitted by: WCC Planning Team

No, it is not sufficient. The cooling hierarchy should operate as a quantitative test, not a narrative one. Applicants should be required to demonstrate, against a passive-first baseline (with no active cooling) and using both current and future weather files, how each step of the hierarchy reduces overheating risk, peak cooling load and annual cooling energy demand. Where active cooling is genuinely justified, policy should go further and establish a hierarchy within active cooling itself, favouring systems that minimise carbon emissions, refrigerant impacts, grid peak demand. This could include, where feasible, the prioritisation of heat-recovery-led solutions, then highly efficient reversible heat pumps using ultra-low-GWP or natural refrigerants where safely possible, and zoned demand-controlled systems ahead of whole-dwelling or whole-building cooling. In the longer term, policy should also move towards explicit cooling load and cooling demand targets expressed in kWh/m2.yr, like heating demand.

Considering that Building Regulations generally set the lowest acceptable standard nationally, these should be designed to promote better outcomes where possible. For instance, the role of local plans and contexts should be to enable place-based outcomes that are at a higher standard than the building regulations baseline. Considering this, recently proposed revisions to the National Planning Policy Framework (NPPF) is concerning as it prevents local planning authorities from setting higher standards than ones already set nationally (e.g. by Building Regs). If adopted, this could be enormously limiting for lots of considerations, including environmental. For example, one of the '12 key policy changes', it proposes:

> "6. Streamlining local standards. We want to promote certainty for applicants and speed up local plan production by limiting quantitative standards in development plans to only those specific issues where local variation is justified. We also want to limit duplication of matters which are covered by the Building Regulations – other than where there is the existing ability to use 'optional technical standards'."

It's likely that this proposal has come from the Written Ministerial Statement which related to local plans requiring higher energy performance standards than Building Regulations, but it could affect much wider range of issues. Furthermore, regarding climate adaptation, there are locally-specific contexts which may allow for local planning authorities to require greater standards (more intense urban heat islands, flood risk etc.). However, without the ability to set high standards, there is no regulatory power to deliver high-quality, safe housing for better health and climate outcomes.

Evidence item G:

See Westminster City Council's response to proposed changes to the NPPF, which specifically refers to overheating on page 2, on the site Council responses to planning consultations: https://www.westminster.gov.uk/planning-building-control-and-environmental-regulations/planning-policy/emerging-policies-and-consultations/council-responses-planning-policy-consultations

Response 3B

Submitted by: WCC Environment Delivery Team

While important, planning and building regulations are not sufficient on their own to ensure consistent delivery at the scale required, with some reasons mentioned in Response 3A. Many measures that influence overheating do not require planning permission or building control approval, limiting the ability of regulation alone to influence delivery. In addition, regulations do not in themselves generate the engagement, investment or behavioural change required to deliver action at scale.

Planning and building regulations therefore need to sit within a broader, systems-level approach to improving housing quality. This approach should be resident-centric, focussing on increasing awareness and understanding, stimulating demand and making the 'customer-journey' as accessible and friction-free as possible for residents and homeowners seeking to improve their homes.

Through deep, place-based co-design of holistic home retrofit in Queens Park we learned that residents experience their homes as integrated systems. Thermal comfort is just one element of a wider housing quality picture that also includes damp and mould, indoor air quality, safety, repairs and maintenance, affordability of energy bills and overall comfort, health and wellbeing. Programmes that centre and deliver improvements for interconnected local needs rather than single technologies or narrow outcomes are more likely to result in real action and deliver multiple benefits efficiently.

By adopting integrated place-based approaches alongside regulation, interventions can more effectively support London's climate resilience objectives alongside net zero, air quality, health and economic objectives.

Evidence item H:
Deep, place-based co-design of holistic home retrofit in Queens Park Avenues:
www.westminster.gov.uk/healthy-homes

'Healthy Homes Guide' co-designed by residents and architects to assist with holistic, whole-of-home retrofit improvements for environment and health outcomes:
https://healthyhomes.commonplace.is/en-GB/proposals/healthy-homes-guide

Question 4: Does a focus on making homes warm in winter risk homes that are too hot in summer?

Response 4A

Submitted by: WCC Energy Efficiency Enforcement Officer (MEES Enforcement)

Focusing on making homes warm in winter through MEES-driven energy efficiency measures does not in itself increase the risk of summertime overheating. Evidence shows (evidence item I) that typical measures used to improve EPC ratings raise winter temperatures without increasing overheating under current climate conditions. However, indoor temperatures rise in line with outdoor temperatures regardless of energy efficiency, meaning that while MEES effectively reduces cold-related risk, it does not protect against summer heat. Overheating already affects homes in Westminster, particularly flats and bedrooms, due mainly to dwelling type and location rather than winter efficiency measures. From a Local Authority perspective, this highlights that MEES remains appropriate for addressing cold homes, but additional regulatory or design measures are needed to manage overheating risks as the climate warms.

Evidence item I:
The effect of energy efficiency measures on summertime overheating in English homes:
Summary:
https://assets.publishing.service.gov.uk/media/6723b01d59832068128c1e24/energy-follow-up-survey-summary.pdf