

March 2024

“ green
alliance...

Climate adaptation in UK homes

Energy suppliers' role
in preparing customers





Summary

“

Studies have confirmed the first year long breach of the 1.5°C threshold, highlighted by the Paris Agreement. People in the UK are not well adapted to the changing weather this is causing.”

Climate change impacts are here to stay. From record temperatures and flooding to increased levels of subsidence, worsening air pollution and even the reshaping of our coastlines, we are being faced by climate change effects every day. In this context, political debate is rightly placing an increasing emphasis on mitigation, to limit temperature rises and curb extreme climate impacts.

But we must also focus attention on living with the changes that have already occurred and those which are already baked in over the coming years. Studies of global mean surface temperature have confirmed the first year long breach of the 1.5°C threshold, highlighted as a crucial tipping point by the Paris Agreement.¹ People in the UK are not well adapted to the changing weather this is causing.

Over the coming century, the independent Climate Change Committee (CCC) forecasts higher summer and winter temperatures, wetter winters but drier summers and continuing sea level rise.²

Government action to adapt to these changes has so far been inadequate. In particular, on the major climate risks facing UK homes, there has been too little strategic action. For example, recent changes to building regulations mean housebuilders must consider how to prevent overheating in new homes. But there has been no equivalent move to tackle overheating in existing homes which will still be 80 per cent of the housing stock in 2050.³

Housing is an important frontier for climate adaptation. Behavioural and technological adjustments will help to determine how we experience the changes to come.

Without action, risks to both residents and suppliers will increase. Each year, there are around 2,000 UK heat related deaths. In 2022, the heatwave meant this figure was significantly higher.⁴ As well as threats to life and health and wellbeing, there are productivity and financial challenges associated with climate change that threaten household economic security.

**“
Energy companies
have a responsibility
to their customers
to prepare them for
climate risks.”**

As businesses at the forefront of environmental and social challenges and with a presence in the home, energy companies have a responsibility, and are in a unique position, to prepare their customers for the climate risks ahead. Clearly stating their position on climate mitigation and adaptation could be rewarded with new customers, considering trends in environmental behaviours, from changing diets to modes of travel, demonstrated by some consumers.

There are limitations to what energy suppliers can achieve. Many adaptation technologies are expensive, narrowing the pool of residents who can afford them. And many private and social renters and leaseholders have no power to adapt their homes. These barriers could exacerbate inequalities between wealthier homeowners and those unable to change.

However, energy suppliers have the ability and means to help at two levels:

Household and community

Suppliers should do what they can to support their customers to tackle the risks of overheating and flooding, while providing additional support by expanding local tree planting programmes and integrating climate adaptation advice in their communications.

Policy

Without political support for the necessary adaptations, many energy customers will miss out on the benefits of having a well adapted home. Companies should exercise their influence and persuade the government to address home adaptation as a priority.

1. Introduction

“During the UK summer heatwaves of 2022, excess deaths were six per cent higher than the five year average.”



Climate change is an existential challenge and, increasingly, a focus of the media, politics and business. Discourse in the UK, however, is almost exclusively focused on the action needed to reduce the scale of climate change. Less attention is paid to climate adaptation and how the UK can become more resilient when significant impacts take hold.

Global temperatures have increased by 1.2°C, compared to pre-industrial averages, and current global policy commitments are only estimated to limit average temperature increases to 2.7°C.⁵ In 2023, global temperature records were smashed as 3 to 31 July were the 29 hottest days since records began.⁶ These conditions contributed to devastating wildfires in the Mediterranean, North Africa and the island of Maui.^{7,8} While the UK may not be suffering the same degree of high profile damage from climate change compared to other countries, it is not immune to its effects.

Mean annual temperatures in the UK from 2013 to 2022 were 0.75°C higher than the 1981-2000 average. The first ever temperature over 40°C was recorded in the UK during 2022 and sea levels have risen around by 16.5cm over the past thirty years.^{9,10} Deaths due to overheating have rocketed: during the UK heatwaves of 2022, excess deaths were six per cent (3,271) higher than the five year average.¹¹ The chair of the Adaptation Committee of the Climate Change Committee (CCC) has declared a “lost decade in preparing for and adapting to the known risks of climate change”.¹²

**“
Eighty per cent of the
housing stock that
will exist in 2050 is
standing today but is
poorly prepared for
climate change.”**

Housing will be on the frontline of adaptation challenges. Eighty per cent of the housing stock that will exist in 2050 is standing today but is poorly prepared for climate change. Surveys suggest a significant number of UK homes overheat during the summer. There are few plans in place to deal with surface water flooding, flammable cladding is still commonplace across many parts of the country and increasing numbers of homes will be vulnerable to coastal erosion and rising sea levels.

UK homeowners and tenants will have to undergo changes in their living conditions to become climate resilient. Alongside national and local government measures, the private sector will be crucial in educating the public and rolling out adaptation measures in the home. Energy suppliers particularly could use their existing customer relationships and technical expertise to help residents understand their adaptation needs and make behavioural and technological changes in the home.

In this report, we break down the climate risks where the home is a primary space for adaptation. We discuss the current issues faced by residents in engaging with adaptation before considering OVO's customer base as a case study. We then discuss the risks of delaying action and recommend how energy companies can increase adaptation engagement among their customers and the public more broadly.



2. Climate impacts in the UK

“Average figures do not fully convey the increasing frequency and severity of extreme climate events.”

According to the Climate Change Committee (CCC), and largely irrespective of global emissions trajectories, by 2050, the UK is predicted to have:

- **Warmer and wetter winters:** winters will be one degree warmer and five per cent wetter than 1981-2000.
- **Hotter and drier summers:** summers will be 1.5°C warmer and ten per cent drier than 1981-2000.
- **Continued sea level rise:** sea levels will be around 10-30 cm higher than 1981-2000.¹³

These average figures show the trends the UK is likely to experience in the coming years but they do not fully convey the increasing frequency and severity of extreme climate events and their potentially devastating effects on households.

Using the government’s climate risk assessment and its primary adaptation policy document, the National Adaptation Programme, as well as the CCC’s adaptation progress report, we have set out the primary climate risks to UK housing with a traffic light assessment (see opposite).^{14,15,16}



Risks to the home

Overheating is when the local indoor temperatures are higher than those acceptable for human comfort or for human health. As defined by the Chartered Institution of Building Services Engineers (CIBSE), overheating properties exceed a maximum thermal comfort temperature (defined in relation to mean outdoor temperatures) for more than three per cent of occupied hours. Additional criteria to ensure thermal comfort during sleeping hours also apply.¹⁷

Wildfires are uncontrolled fires that burn in wild vegetation.¹⁸ Usually confined to rural areas. They can, however, encroach upon urban areas and threaten life and property.

Flooding can refer to urban flash or surface flooding, when heavy rains overwhelm drainage systems, or to sea level rise increasing coastal flooding and corresponding erosion where coastal environments are reshaped by changing weather patterns.^{19,20}

Structural challenges to soils such as subsidence, where the earth on which a property stands is sinking, can be affected by changes in soil moisture as a result of climate change.²¹

Water scarcity is where demand for water outstrips supply.²² Although it is less likely to be immediately associated in the UK with threat to life, relative scarcity can take place and compound other climate risks.

Air quality can be affected by high temperatures as ground level ozone concentrations increase and high pressure traps pollutants.²³

Landslides are sudden, high speed movements of soil or aggregate down a slope, often caused by weathering or increased saturation of the earth, which can be exacerbated by extreme weather events and endanger life, property and infrastructure..²⁴

Risk	Frequency	Severity	Total risk
Overheating	Red	Red	Red
Wildfires	Amber	Red	Amber
Flooding	Red	Red	Red
Sea level rise and coastal erosion	Red	Red	Red
Changes in soil moisture leading to structural challenges	Red	Amber	Amber
Water scarcity	Red	Amber	Amber
Poor air quality	Red	Red	Red
Landslides	Amber	Red	Amber

Red, amber, green risks are determined by a) the number of residents who will be affected and b) whether the risk is a serious threat to life or significant financial challenge to recover from. Risks are determined qualitatively due to the relative difficulty in directly comparing elements of risk over the coming century to 2100.

Tackling adaptation risks in the home

Of the major climate risks, overheating, wildfires, flooding, sea level rise and coastal erosion, as well as structural challenges in buildings, can be tackled most directly by making changes to buildings and the behaviour of their residents. The government, alongside businesses with a presence in the home and relevant expertise, such as energy suppliers, are well placed to support adaptation to mitigate against these risks.

This table explores the impacts in more detail, considering the current status of UK housing, potential adaptation measures and current government policy.

Climate impact area	How well is current housing adapted?	Potential community adaptation measures	Potential home adaptation measures	Existing government policy
<p>Overheating</p> <p>(3,271 UK heat related deaths in 2022)²⁵</p>	<p>Current housing is poorly adapted to overheating. 48 per cent of English homes have EPC ratings in bands A-C, 43 per cent in band D, seven per cent in band E and three per cent in bands F and G.²⁶</p> <p>45 per cent of Scottish homes have EPC ratings A-C, 41 per cent band D and 14 per cent in bands E-G.²⁷</p> <p>The 2021 Energy Follow Up Survey (EFUS), found nearly 20 per cent of English homes overheat during the summer.²⁸ Other research suggests 55 per cent of the residential building stock overheats.²⁹</p>	<p>Trees offer significant potential for cooling; increasing urban tree coverage to 30 per cent can reduce mean city temperatures by 0.4°C (with some localised areas benefitting by almost 6°C).³⁰</p> <p>Water environments and green roofs and walls can further help to retain moisture and increase cooling.</p>	<p>Low cost passive cooling (technologies or design features to reduce the temperature of buildings without power consumption) can be retrofitted to buildings (eg shutters, external shading, ventilation, ceiling fans).³¹</p> <p>Insulation helps to regulate temperature in the home so is important in tackling overheating and cold.</p> <p>Air-to-air heat pumps and air conditioning (AC) units provide cooling in the home. Heat pumps are more costly to install, and both will increase energy demand. Solar panels can even have a cooling effect on roofs.</p>	<p>Housebuilders are required to consider overheating resilience in the construction of new homes. However, there is no mechanism for ensuring overheating is considered in existing buildings.^{32,33}</p> <p>The Department for Levelling Up, Housing and Communities (DLUHC) produces a ‘home user guide’ with behavioural advice on “staying cool in hot weather” and how to efficiently use heating and ventilation systems.³⁴</p>
<p>Wildfires</p> <p>(311 total UK fire related deaths 2021-22. Wildfires are responsible for very few direct deaths but the risk is increasing)³⁵</p>	<p>Housing is potentially vulnerable to fire risk despite wildfires infrequently impacting homes directly.</p> <p>A quarter of UK houses are made with timber frames and at least 10,000 buildings in England are still covered in flammable cladding.^{36,37}</p> <p>Most high rise buildings with aluminium composite material (ACM) cladding are unlikely to meet building regulations.</p>	<p>Flammable materials must be removed from public and communal buildings.</p> <p>Early warning systems and evacuation plans should be developed for at risk areas.</p>	<p>Flammable cladding is mostly installed on private and socially rented blocks of flats. The government must urgently work with councils and landlords to remove and replace problematic cladding with suitable alternatives.</p>	<p>The Department for Environment, Food and Rural Affairs (Defra) is developing a wildfire risk programme focused on land management (2023-27) and the Home Office is developing a wildfire strategy and action plan by mid-2024.</p> <p>The Met Office runs a Fire Severity Index as an early warning system of wildfire potential.</p>

Climate impact area	How well is current housing adapted?	Potential community adaptation measures	Potential home adaptation measures	Existing government policy
Flooding (36 deaths as a result of flooding between 2010 and 2020) ³⁸	Housing is poorly prepared for various forms of flooding. 1.8 million people live in areas of significant flood risk, and the estimated number of homes at risk of flooding will rise 40 per cent in 20 years. ³⁹	<p>The proportion of permeable surfaces should be increased in at risk areas through both the choice of building materials and increasing green space, while stormwater harvesting mitigates flooding.</p> <p>As many floods concentrate around poorly maintained infrastructure, it is important that drainage and water infrastructure is built to a high standard and maintained well.</p>	<p>Impermeable surfaces should be directed away from homes, and green roofs and walls can help to reduce water runoff.</p> <p>Floodgates can be installed to reduce the amount of water that affects a home.</p> <p>Plug sockets should be raised to secure power connections in at risk homes, and water resistant render can be installed to protect buildings.</p>	<p>£2 million of government funding supports mapping and modelling for local flood authorities.⁴⁰</p> <p>Local flood authorities manage surface water flood risks on the ground and the Environment Agency provides legal supervision over all forms of flooding.</p>
Sea level rise and coastal erosion	<p>Housing is under threat from sea level rise. The CCC has identified 370,000 homes at risk from sea level rise, and 8,900 properties are in areas at risk from coastal erosion.⁴¹</p> <p>By the 2080s, up to 1.2 million homes in England could be significantly at risk of flooding and 100,000 properties could be at risk from coastal erosion.⁴²</p>	<p>Sea walls and other defences must be constructed in at risk areas, and managed transitions of homes and communities away from the most at risk areas have begun, such as at Happisburgh in Norfolk.⁴³</p> <p>Green spaces act as buffer zones to absorb coastal energy and delay potential damage to buildings and infrastructure.</p>	<p>Modular buildings can protect infrastructure from advancing water. However, without community level response, individual home adaptation to sea level rise will be largely futile.</p>	<p>The government's 'Flood and coastal erosion risk management plan' is a six year investment strategy to protect 336,000 properties at risk from coastal erosion and flooding.⁴⁴</p> <p>An innovation fund of £200 million from 2021-27 has been created to help meet the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy for England.⁴⁵</p>
Soil moisture change, leading to structural damage to buildings	<p>While less dangerous, subsidence affects a significant number of homes, many of which have no adaptation measures in place. 5.76 million properties are exposed to high or medium subsidence risk, growing to 6.64 million in the 2030s and up to 7.65 million in the 2080s.⁴⁶</p>	<p>Mapping to understand the concentrations of clay and other soils will help to determine future asset placement.</p>	<p>Trees should be carefully sited as they alter soil moisture potentially causing structural damage to buildings.</p> <p>Once subsidence has occurred, interventions such as underpinning or resin injections may be needed.^{47,48}</p>	<p>DLUHC has produced guidance on land stability for planning authorities but this does not address the impacts of climate change.</p>

Policy gaps

Climate adaptation policy is a long way behind mitigation policy. There is no strategic vision to improve the heat resilience of existing buildings in the UK; wildfire concerns primarily focus on the natural environment rather than human health; the risk of urban flash flooding is not fully appreciated; and there is no vision for protecting buildings from changes in soil moisture. Even with coastal erosion and flooding, where the government has directed money towards resilience, questions remain as to whether the commitment stands up to the scale of the challenge.

In this context, it is crucial that those with an interest in tackling climate change assert the need for a more strategic approach to adaptation. Energy suppliers can play a unique role in this, as both a service provider with access to customers and as a significant business interest which the government listens to.

**“
There is no vision
to improve heat
resilience of existing
buildings.”**



3. Engaging the public on climate adaptation

“Residents often face prohibitive costs or lack the power to change their homes.”

Due to the limited focus on climate adaptation in government policy and the media, it is likely people are largely unaware of what climate adaptation will mean for them over the coming decades. Energy suppliers can help to increase collective climate adaptation literacy.

UK residents' adaptation journey

Mortgage lenders consider risks in their valuations and climate change impacts can be raised with prospective homeowners, particularly in high risk flood areas. But there is no strategic engagement around home climate adaptation from local or national government or the private sector. People do not yet know the nature of impacts and what risks they face.

Concern about climate change often spikes during high profile events such as floods or heatwaves.⁴⁹ Information on adaptation is dispersed, with some government departments providing advice or relevant bodies issuing guidance, such as the Met Office or the fire service.

Residents often face prohibitive costs or lack power to change their homes if they are private or social renters or leaseholders. Behavioural or low cost changes may have to be the focus for these groups until political action facilitates broader changes to building fabric or technology installation.

Adaptation and equality

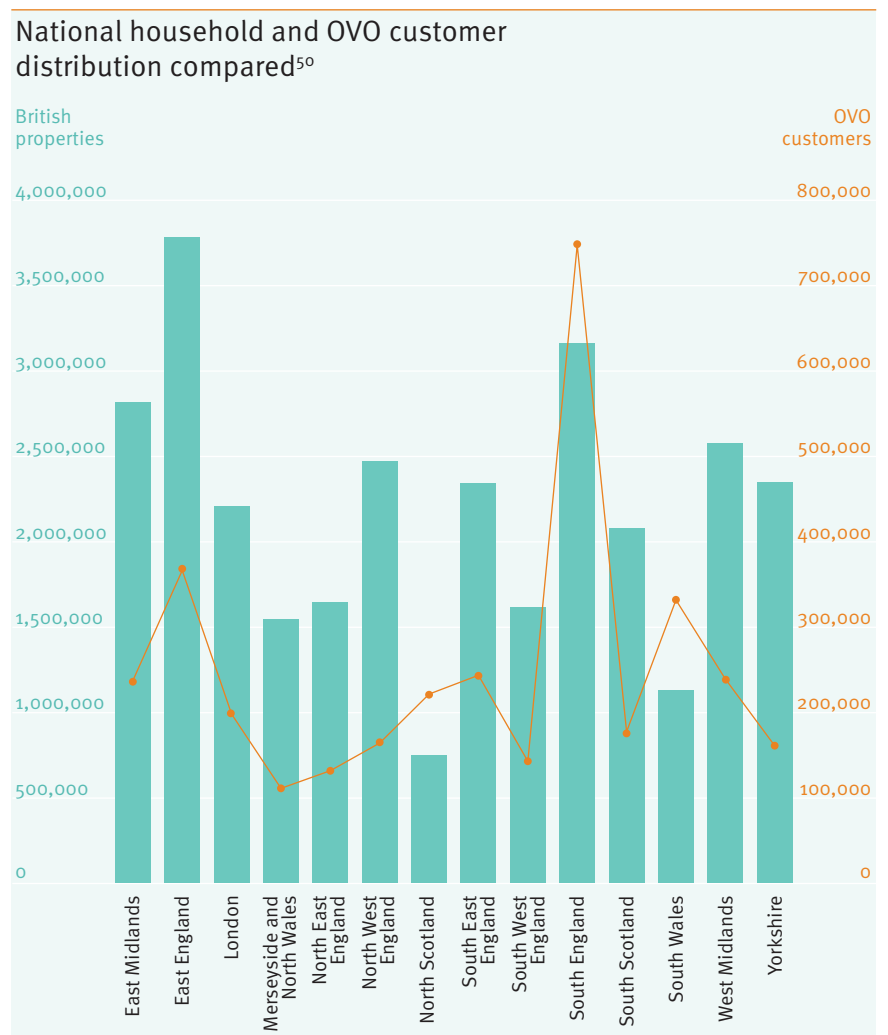
Technologies like AC units, air-to-air heat pumps, waterproof render and floodgates should be rolled out at a far greater rate in the future. Without more financial support for low and middle income households to make significant changes, there will be inequalities in climate resilience between households.

Energy companies' presence in UK homes, and their skills and expertise in the rollout of mitigation technologies, mean they can support residents to adapt. But, to avoid increasing inequalities, those invested in progress must put pressure on the government to provide enabling policy, such as more finance packages for low income households. Suppliers could also lead by directly financing the installation of some technologies, such as AC units or air-to-air heat pumps, for their more vulnerable customers.

4. Climate vulnerability across OVO's customer base

OVO customers

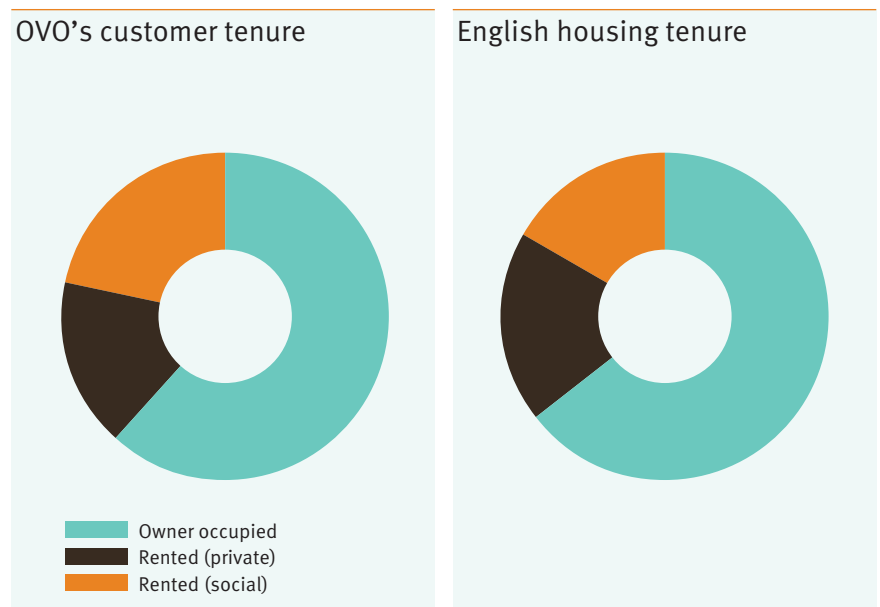
OVO has over four million UK customers of which the graph below shows the majority, by District Network Operator (DNO) region. The graph shows a similar pattern of OVO customers to UK households across a number of regions. There are, however, some outliers as OVO's customer base is not entirely representative of the UK's housing distribution. The most significant number of customers are concentrated in the South of England and there are also noteworthy clusters of customers in South Wales and the North of Scotland. As discussed throughout this report, adaptation challenges are relevant to the whole of the UK but the South of England and London will experience overheating most sharply.



“A third of all OVO customers will be living in the areas most at risk of overheating.”

When those from London, Southern England, and the South East are added together, a third of all OVO customers will be living in some of the areas most at risk of overheating. Of customers in these regions, almost 46 per cent are either social renters, private renters or owners of flats (with limited ability to make adaptations to their buildings). This proportion is roughly equivalent to 540,000 properties most at risk. Despite the high proportion of owner occupiers in the South and South East, the customer distribution is somewhat skewed by London’s relatively low levels of home ownership and high proportion of properties without recorded tenure data.

UK housing is dominated by owner occupier homes. In England, 64 per cent of homes are owner occupied, with around 19 per cent in the private rented sector and 17 per cent in the socially rented sector. There is a similar distribution in Scotland, although social renters are still more numerous than private renters north of the border. OVO’s customer distribution follows a similar pattern. Of those providing suitable data, 62 per cent are owner occupiers, 17 per cent are private renters and 22 per cent are social renters



Tenure can be an indicator of ability to make technological or fabric interventions in homes, from rolling out insulation to fitting a reversible heat pump or a floodgate. Owner occupiers are the most likely group to be able to make these types of intervention, but once flat owners, who are less likely to own their leases, are disregarded, around 56 per cent of OVO customers may be in a position to make technological interventions for climate adaptation (house owner occupiers are significantly lower in London making up on 32 per cent of OVO customers in that region).

In reality, those able to make significant interventions are likely to be far lower for a number of reasons, including prohibitive costs. This indicates that, to make any interventions, energy companies will need to consider both the installation of technology for climate adaptation and the broader customer journey in understanding what can be done and what is affordable.

5. Case study

How different households experience overheating

Shared rental flat, London

Purpose built flats often incorporate large windows to let in plenty of light. During a heatwave, solar radiation is a driver of increased internal temperatures and so large windows are a big contributor to overheating. They also tend not to have shutters and it is unlikely that external shading devices can be fitted to block out the heat.

Flats are overwhelmingly leasehold properties so, even if owner occupied, there is still a relationship to manage with the

freeholder which will complicate the potential for certain external, visual or fabric changes to a property. This can make attempts to fit a heat pump, install shading devices, paint external surfaces and various other potential interventions, almost impossible.

In the rental sector, landlords are not given incentives to improve the energy efficiency of their properties. This leaves flat dwellers struggling to make significant adaptation changes.

Sustained periods of high heat, as experienced in London in 2022, can

have health and wellbeing impacts. While renters tend to be younger, they may still have pre-existing health conditions which can make them vulnerable. Sustained heat exposure can be dangerous for pregnant women, increasing the risk of preterm births. Heat exposure has significant productivity impacts which may be particularly relevant for those whose employers have given up office spaces in favour of remote working. In extreme cases, overheating can lead to heat stress, illness and even death.

For householders in this situation, low or no cost changes to deal with high heat will be important. This can include blocking out sunlight with reflective materials, improving ventilation and switching off electrical devices which give out heat. Ultimately, however, renters will require political change to ensure they can have good standards of insulation in the home and to make the adoption of adaptation technologies easier and cheaper.



Owned detached property in southern England

A heatwave can be experienced very differently by households. Homeowners with sufficient funds could regulate temperature more effectively by making changes to their homes. Insulation can help to prevent large temperature changes, keeping homes warm in winter but cool in summer. Ventilation during cooler periods, particularly overnight, supports internal temperature regulation during heatwaves.

Residents are more likely to have disposable income to invest in an air-to-air heat pump or to purchase AC units to actively regulate temperature. They have the freedom to paint roofs or walls white to increase their albedo effect or install external shading devices or shutters to keep out solar radiation. Living outside a city means they will have access to shaded green spaces which can help regulate temperature and improve wellbeing. Even in towns and cities, wealthier neighbourhoods are more likely to be tree lined or within walking distance of parks.

Homeowners are more likely to be older and so more vulnerable to the high levels of heat increasingly experienced in southern England. Most deaths from heat exposure in the UK are linked to age or pre-existing conditions. However, despite the advantages of taking action, homeowners may still choose not to pay for significant adaptation changes as they can be expensive and if they perceive, despite growing evidence to the contrary, that heatwaves are not a big issue for the UK.



6. Risk of inaction

“There is a potential reputational risk if customers believe their energy supplier is insufficiently engaged in helping with adaptation.”

Risks to residents

The risks associated with the changing climate are numerous. During the 2022 UK heatwave, excess deaths were six per cent higher than the five year average.⁵¹ Typically, there are around 2,000 heat related deaths every year, overwhelmingly among elderly and vulnerable groups.⁵² Moreover, the CCC describes how heat stress can lead to heat exhaustion, disrupted sleep patterns, increased maternal health risks and preterm births, reduced productivity and disruption to normal routines, particularly in health and educational settings.⁵³

Productivity impacts are common across all climate risks, as is the potential for higher financial outlay from significant climate events such as floods, fires, or subsidence. Most often, threats to life from extreme weather events have been seen abroad but with a changing climate and weather events becoming both more numerous and extreme, this threat will increase in Europe and the UK. For example, 209 people died in one flood event in Germany and Belgium in 2021.⁵⁴

Risks to energy suppliers

Risks to suppliers are difficult to quantify. But, as they increasingly engage in climate mitigation and adaptation actions and the government becomes more active on adaptation in future, there is a potential reputational risk if customers believe their energy supplier is insufficiently engaged in helping with adaptation. In the longer run this could threaten business and damage profits.

In contrast, there may be first mover benefits from acting sooner. Three quarters of Britons report that they are concerned about climate change.⁵⁵ For those who take the most direct interest, mitigation and adaptation action will increasingly become something they expect. Many of these potential customers will include evidence of climate action in their buying decisions, as is already being seen in dietary, travel and banking choices. Often, these potential customers will be younger and, therefore, more likely to be regular movers, creating opportunities to grow the customer base.

Systemic risks

“Without strategic national engagement on adaptation, energy demand for cooling will rise significantly increasing pressure on the grid.”

Without strategic national engagement on adaptation, energy demand for cooling will rise significantly, increasing pressure on the grid. A government commissioned study suggests that allowing the market to tackle cooling needs under a high emissions scenario will almost double energy consumption for cooling between 2020 and 2100 to 12TWh. Under the same scenario, a ‘passive first’ approach (building fabric adaptations) could reduce that energy demand by around a third. Rapid mitigation and a passive first cooling approach would mean that energy demand stays relatively flat over the coming century.⁵⁶ Cumulative capital costs of a ‘no intervention’ approach to cooling will reach £60-70 billion by 2050. A passive first approach sees costs total £20-30 billion over the same time period.⁵⁷

In just relying upon active cooling measures such as AC, there also a risk of perpetuating negative feedback whereby measures to tackle warming add to energy demand and emissions, creating additional warming and need for more cooling measures.

Alongside its social and health impacts, flooding poses a significant financial risk across the economy. Increasingly, buildings in certain areas will become uninsurable due to flood risk. This will threaten asset values and increase burdens on the state to underwrite financial risk.



7. Recommendations for energy suppliers

Following a ‘lost decade’ for climate adaptation, decisive action must now be taken to bring it to the forefront. Housing will be vulnerable to a multitude of climate risks and yet will also be where their impacts can be reduced. Energy suppliers are uniquely placed, with their skills in climate mitigation and their presence in UK homes, to

engage customers on an adaptation journey. This can take several forms but will require technology installation and behaviour change, as well as broader policy to target those customers vulnerable to being left behind. Suppliers may wish to consider the following actions to help adapt to climate risks.

Household and community responses to climate risks

Risk	Impact	Action
Overheating	<p>Overheating will be experienced across the whole of the UK.</p> <p>By 2050, summers will be 1.5°C and winters 1°C warmer than 1981-2000.</p> <p>The median likelihood of temperatures exceeding 40°C by 2080 is three times higher in London than the rest of the UK.</p> <p>Urban areas, due to the urban heat island effect, will be affected most on very hot days although some evidence suggests this impact may decrease in the second half of the century.⁵⁸</p> <p>OVO has over a million customers in London, the South East and Southern England. The most vulnerable (without controlling for age or pre-existing conditions) will be 103,304 private and social renters in London.⁵⁹</p>	<p>Expand communications around insulation programmes to highlight its benefits in preventing overheating.</p> <p>Create or expand existing visits to customers’ properties to assess overheating risk. A home health report could be produced which considers the extent to which property characteristics will worsen overheating, with recommendations for further action to mitigate it.</p> <p>Expand training of approved engineers to incorporate installations that prevent overheating.</p> <p>Introduce an energy bill discount scheme for vulnerable households during heatwaves. Suppliers could pay the electricity bills of customers on Universal Credit, and those with pre-existing conditions or in receipt of the state pension, for those days where temperatures reach 30°C or more, to reflect the additional electricity which may be needed for cooling.</p> <p>Pilot the funding of AC or air-to-air heat pump installation for customers with pre-existing conditions, on Universal Credit or who rely on the state pension.</p> <p>Offer two tiers of overheating support to customers:</p> <ol style="list-style-type: none"> free advice focusing on behaviour change to improve thermal comfort, such as keeping windows and curtains closed in the daytime and recommending, where appropriate, the purchase of smaller scale appliances, including portable fans and AC units; larger scale technology installation such as fitting air-to-air heat pumps or connecting AC units to solar panels.

Risk	Impact	Action
Flooding	<p>The CCC notes that sea level rise is largely baked in over the course of the next century, even if net zero is achieved by 2050.</p> <p>The primary coastal risk areas are in the East Midlands and East Anglia but with risks also present in areas of London, the south coast, the South West, Wales and the North West. There are some smaller risk areas in Scotland. For further detail see Climate Central’s data visualisation tools.⁶⁰</p> <p>Urban flash flooding is a threat across urban environments and data for surface flooding is poorly collected, compared to data on coastal and river flood risks. The number of wet days will increase across the whole of the UK but will increase the most on the east coast of Britain. Rainfall intensity, however, will increase most dramatically relative to a 1981-2000 baseline in areas of the South East.</p>	<p>Work with insurers on flood risk to create suitable communications for customers in areas at risk. Communications should outline actions customers can take to prepare for floods and more specific local area risks and how to improve resilience.</p> <p>Build links with flood risk assessors to recommend suitable partners for customers to make suitable home improvements.</p>
Crosscutting	<p>Those on low incomes are less likely to live close to a green space (46 per cent of those with an annual household income under £15,000 compared to 70 per cent of people with an annual household income over £35,000) and are less likely to live on streets which are tree lined (27 per cent compared to 53 per cent).⁶¹</p> <p>2.69 million Britons do not live within a ten minute walk of a green space.⁶²</p> <p>Disparities are also felt along racial lines. Most Black and Minority Ethnic groups are concentrated in cities, increasing exposure to the urban heat island effect.⁶³</p> <p>Approximately, 56 per cent of OVO’s four million customers may be able to make technological interventions for climate adaptation. These would be owner occupiers but may not include those restricted by leasehold agreements.</p>	<p>Engage local authorities in areas of high customer density to offer funding for tree planting in urban areas, especially those with least coverage.</p> <p>Recruit customers and volunteers for tree planting drives.</p> <p>Launch an education campaign around climate adaptation and why customers need to consider it. Produce regularly updated digital communications, shared during climate events such as floods or heatwaves.</p> <p>Incorporate an overview of the climate adaptation services offered into the welcome communications to new customers.</p> <p>Provide information on the need for climate adaptation and adaptation services in physical and phone communications with digitally excluded customers.</p> <p>Develop external communications campaigns highlighting a supplier’s role in tackling adaptation to attract customers concerned about climate change.</p>

Policy responses to climate risks

Focus	Impact	Action
Government	All energy customers will eventually be affected by climate adaptation, particularly if extreme temperatures increase as expected over the coming decades. However, political change is especially needed for private and social renters and leaseholders who are less able to make significant changes to their properties. Forty four per cent of OVO customers fall into this category as the group most in need of political change to move the dial to help them adapt. This group is proportionately highest in London, with 69 per cent of customers being private renters, social renters, flat owners or without tenure information.	<p>Put pressure on the government to bring forward a climate adaptation strategy for UK homes. This should include measurable targets on the proportion of already existing homes resilient to overheating and the number of homes protected against surface flooding. The strategy must include detail on the policy enablers to support the adaptation transition and the ways in which they link to mitigation plans, ie expanded funding packages for households to make changes to their homes, the development of suitable skills within the workforce and climate adaptation education for the public.</p> <p>Alongside an adaptation strategy, instigate a campaign for specific policy change in the following areas:</p> <ol style="list-style-type: none"> mechanisms to tackle overheating in all homes; a strategic approach to tackle inland as well as coastal flooding; ending leasehold arrangements in favour of commonhold ownership so that leaseholders are not subject to the inaction of freeholders.
Data	<p>Reliable data on overheating is not well collected by government and it is difficult to interpret energy customer data to establish where overheating will occur. For OVO, the 22 per cent of customer properties which are flats may be particularly susceptible to overheating due to large windows and poor ventilation but overheating will be experienced by all property and tenure types.</p> <p>OVO has seven per cent of its customers in the East Midlands, a region particularly at risk to coastal flooding. But other areas will also be at risk.</p>	<p>Begin to collect data on customer climate risks to better understand and amend the adaptation services offered and provide quantitative evidence to support government engagement. This could include surveying customers' experiences of overheating and reporting the number of customers in flood risk areas.</p> <p>Share anonymised data with Defra and the CCC's Adaptation Committee about the preparedness of customers to cope with identified climate risks, filling crucial data gaps in important areas of adaptation policy.</p>
Energy system	All OVO customers are reliant on supply from a system that incorporates physical infrastructure and various companies managing different parts of the system.	Begin a dialogue with energy producers, transmission and district network operators around the resilience of energy infrastructure to climate change with a view to discussing appropriate resilience measures with the government.

8. Endnotes

- 1 M Poynting, 8 February 2024, 'World's first year-long breach of key 1.5C warming limit', BBC News.
- 2 Committee on Climate Change (CCC), March 2023, *Progress in adapting to climate change*.
- 3 UK Green Building Council, 'Climate change mitigation'.
- 4 CCC, July 2022, *Risks to health, wellbeing and productivity from overheating in buildings*
- 5 The Climate Action Tracker, 2022, 'The CAT Thermometer'.
- 6 Copernicus Climate Change Service, 8 August 2023, 'July 2023 sees multiple global temperature records broken'
- 7 D Anguiano, 11 August 2023, 'Hawaii wildfires: how did the deadly Maui fire start and what caused it?', *The Guardian*
- 8 F Pappenberger, et al, 19 July 2023, 'European heatwave July 2023', European Centre for Medium-Range Weather Forecasts
- 9 Met Office, 20 September 2022, 'Unprecedented extreme heatwave, July 2022'
- 10 M Kendon et al, 2022, 'State of the UK climate 2021', *International Journal of Climatology*, 42 (Suppl. 1) (S1), 1– 80
- 11 Office for National Statistics (ONS), 2023, 'Excess mortality during heat-periods: 1 June to 31 August 2022'
- 12 Climate Change Committee (CCC), 29 March 2023, 'Climate change has arrived, yet the country is still strikingly unprepared'.
- 13 CCC, March 2023, *Progress in adapting to climate change*
- 14 Department of Environment, Food and Rural Affairs (Defra), July 2023, 'The third National adaptation Programme (NAP3) and the fourth strategy for climate adaptation reporting'
- 15 CCC, March 2023, op cit
- 16 HM Government, January 2022, 'UK climate change risk assessment 2022'
- 17 AECOM, September 2019, *Research into overheating in new homes*, report for Ministry for Housing, Communities and Local Government
- 18 IFRC, 'Wildfires'
- 19 Greater London Authority, 'Surface water flooding'
- 20 Geological Survey Ireland, 'Coastal erosion'
- 21 AXA UK, 'What is subsidence and its signs?'
- 22 U Kumari et al, 2021, *Green technologies for the defluoridation of water*, chapter 8 'Global water challenge and future perspective'
- 23 IQAir, 'How heat waves make air quality worse'
- 24 British Geological Survey, 'Understanding landslides'
- 25 ONS, 2023, op cit
- 26 Department for Levelling Up, Housing and Communities (DHLUC), 15 December 2022, 'English Housing Survey 2021 to 2022: headline report'
- 27 Scottish Government, 1 December 2020, 'Scottish house condition survey: 2019 key findings'
- 28 Department for Business Energy and Industrial Strategy (BEIS), 2021, *Thermal comfort, damp and ventilation, final report: 2017 energy follow up survey*, Building Research Establishment and Loughborough University for BEIS
- 29 Arup, 2022, *Addressing overheating risk in existing UK homes, a report for the Committee on Climate Change*
- 30 T Lungman, et al, 2023, 'Cooling cities through urban green infrastructure: a health impact assessment of European cities', *The Lancet*, 401(10376): 577–589
- 31 H M Taleb, 22 January 2014, 'Using passive cooling strategies to improve thermal performance and reduce energy consumption of residential buildings in U.A.E. buildings', *Frontiers of Architectural Research* Vol 3 Issue 2, 154- 165
- 32 HM Government, 2021, 'The building regulations 2010: overheating'
- 33 The Institute of Engineering and Technology (IET), 2020, *Scaling up retrofit 2050*
- 34 DLUHC, 15 December 2021, 'Home user guide template'
- 35 D Clark, 29 July 2023, 'Number of fire-related fatalities in Great Britain from 1981/82 to 2021/22', Statista
- 36 M Mayouf et al, 6 August 2022, 'Methods of construction to the meet housing crisis in the UK residential sector: a comparative study between timber frame and masonry construction', *Buildings* 12(8), 1,177
- 37 F Mayhew, 14 June 2022, 'Grenfell five years on: cladding scandal still haunts thousands across UK', *Big Issue*
- 38 Morgan Clark, 10 July 2020, 'UK flood statistics & facts about flooding'
- 39 P Box, 'Our homes are not ready for climate change', Local Government Association
- 40 J Foley, 23 November 2022, 'Boosting action on surface water flood risk', Environment Agency
- 41 CCC, October 2018, *Managing the coast in a changing climate*
- 42 Ibid
- 43 C Jones, 31 December 2022, 'Happisburgh: The Norfolk village crumbling into the sea', BBC News
- 44 Environment Agency, 7 June 2022, 'National flood and coastal erosion risk management strategy for England: executive summary'
- 45 Environment Agency, 9 November 2020, 'Flood and coastal innovation programmes'

- 46 Dye & Durham UK, 21 June 2022, 'Climate change: 7.65 million homes could be exposed to subsidence risk by the 2080s', *Today's Conveyancer*
- 47 K Lee, 19 May 2021, 'Six ways to prepare your home for climate change related subsidence', British Geological Survey
- 48 *Home Designer and Architect*, 25 September 2018, 'Underpinning vs resin injection'
- 49 B Mann, 29 July 2022, 'Worries about climate change increase following heatwave', YouGov
- 50 Graph produced using OVO customer data, and the Ordnance Survey Addressbase dataset, both with 2023 data. Note that OVO data only covers those customers who have provided an address.
- 51 ONS, 2023, op cit
- 52 CCC, July 2022, *Risks to health, wellbeing and productivity from overheating in buildings*
- 53 Ibid
- 54 E B Salas, 17 April 2023, 'Largest floods in Europe as of 2021, based on number of fatalities', Statista
- 55 ONS, 5 November 2021, 'Three-quarters of adults in Great Britain worry about climate change'
- 56 AECOM et al, August 2021, *Cooling in the UK*, report for BEIS.
- 57 Ibid
- 58 Y T Eunice Lo, et al, 2020, 'U.K. climate projections: summer daytime and nighttime urban heat island changes in England's major cities', *Journal of Climate*, vol 33 (20), 9,015–9,030
- 59 Calculation based on private and socially rented customer properties in London and an equivalent fraction of the properties without recorded tenure information.
- 60 Climate Central, 'Coastal Risk Screening Tool', available at <https://coastal.climatecentral.org/>
- 61 The Active Wellbeing Society, 2021, *Equity in access to urban 'green spaces'*
- 62 Fields in Trust, 28 May 2020, *CHAMPION: The ten-minute walk and why it's important*
- 63 B Collier, 5 August 2020, 'The race factor in access to green space', The Runnymede Trust

Green Alliance
18th Floor
Millbank Tower
21-24 Millbank
London SW1P 4QP

020 7233 7433
ga@green-alliance.org.uk

www.green-alliance.org.uk
@GreenAllianceUK
blog: www.greenallianceblog.org.uk

Climate adaptation in UK homes

Energy suppliers' role in preparing customers

Authors

Johann Beckford and Helena Bennett

Acknowledgements

With thanks to Kim van Lieshout, Owen Anderson and Adrienne Briggs from OVO for their interest in this subject and feedback on draft work. Additional thanks to Roz Bulleid for her support and guidance throughout. This work was supported by OVO.

Green Alliance

Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

The Green Alliance Trust
Registered charity no 1045395
Company limited by guarantee
(England and Wales) no. 3037633

Published by Green Alliance
March 2024

Designed by Howdy

© Green Alliance, March 2024

The text and original graphics in this work are licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International licence. To view a copy, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>. Any use of this content should credit Green Alliance as the original author and source. Photographic images are subject to separate copyright and are not covered by this licence.

