



Design for life

THE SMART REGENERATION JOURNEY TO 2030

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CHAPTER THREE

Net zero and climate change

Key points

- Regeneration, as a traditionally high-emissions activity, has to both adapt as a process to be far more environmentally beneficial and adapt the existing built environment to reduce the impact of buildings on global heating and increase resilience to the impacts of climate change.
- Governance architecture such as the National Planning Policy Framework does not go far enough in ensuring that net zero targets are hit and climate change is guarded against, leaving local leaders and partner organisations with the role of stepping up action.
- Taking a whole systems approach to regeneration – where different spatial scales are considered across multiple interdependent networks when calculating the impact of a project on climate goals – is essential to responsible regeneration.
- Sourcing responsible, impact-focused finance using public funding as leverage is crucial to achieving the levels of investment required to scale up the technologies and skills bases required to make regeneration work for net zero.
- Procurement and supply chain management policies must be synchronised across partners in regeneration projects to ensure that negative spillovers are minimised and innovation is incentivised.

3.1 Overview

Regeneration in the age of global heating

Traditionally, urban regeneration has by necessity relied upon processes that are highly polluting, have a poor impact on the local environment, or that engage in unsustainable systems across supply chains. Buildings, for example, are one of the highest emitting sources of greenhouse gases in the UK, accounting for 17 percent of UK GHG emissions as of 2019⁶¹.

But when regeneration actors take heed of the potential for damaging processes to occur and proactively engage in mitigation, there is a significant opportunity for long-lasting and often widespread benefit. Whole-life carbon assessments for buildings, for instance, enable the construction sector to calculate and therefore to target the emissions from every stage of a building's lifecycle, including both embodied and operational emissions – although not yet mandatory in the UK, the practice can help to minimise the carbon footprint of even the largest regeneration programmes.

More widely, local authorities and their partners in urban regeneration have a significant role to play when it comes to the responsible and sustainable development of cities. Literature outlines four dimensions of an integrated approach to sustainable development⁶²: physical, social, economic, and governance. An integrated approach to policy is essential, at the risk of encouraging climate maladaptation, where efforts to improve resilience increase vulnerability by failing to account for the social and political factors that can reinforce existing inequalities rather than ensure climate resilience works for all⁶³.

One of the most pressing issues of urban policy is ensuring climate resilience and promoting development that ensures mitigation, particularly sustainable housing, prioritisation of biodiversity in the public realm, and low-carbon or carbon-neutral construction practices. The 15-minute city concept is an example of the ways that urban planning can meet attempts to ensure socially responsible mitigation – intended to reduce car dependency and improve public health by reducing polluting factors and increasing the number of people cycling or walking.

61 CCC (2020) – [The Sixth Carbon Budget: Buildings](#)

62 Sonia De Gregorio Hurtado (2021) – [Adaptation to Climate Change as a Key Dimension of Urban Regeneration in Europe: The Cases of Copenhagen, Vienna, and Madrid](#)

63 CarbonBrief (2021) – [Why avoiding climate change 'maladaptation' is vital](#)

Likewise, regeneration schemes can encourage climate adaptation through flood risk management, the use of urban green spaces or urban agriculture, and greening the built environment, while remaining in-line with wider urban policies.

In order for the UK to meet its net zero emissions commitments, all urban regeneration must place decarbonisation at the heart of its shared vision and all stakeholders must hold development to the highest standards of environmental sustainability. The overall built environment in the UK accounts for 25 percent of GHG emissions⁶⁴, but there is immense potential for green innovation in urban programmes, particularly where funding for the proliferation of sustainable solutions to climate change can meet the energy of actors understanding of and engaged in combatting the climate emergency.

64 Environmental Audit Committee (2022) – Emissions must be reduced in the construction of buildings if the UK is to meet net zero, MPs warn

Figure 6. Carbon and the built environment



17%:

the proportion of the UK's total emissions that is generated by buildings – with no substantial reductions since 2010⁶⁵



~40%

the percentage of UK carbon emissions are linked to the built environment



~50m tonnes:

the CO2 emissions from construction activity in 2022, over half of which is linked to construction product and materials production



60%:

the proportion of UK waste produced by the construction sector as of 2022⁶⁶



37%:

the percentage of global emissions generated by the buildings and construction sector, the largest emitter of greenhouse gasses worldwide⁶⁷



120,000–
230,000:

the number of jobs that could be created in the construction sector to retrofit and insulate UK housing stock⁶⁸

65 Climate Change Committee (2023) – Progress in reducing UK emissions: 2023 Report to Parliament

66 Government Commercial Function (2022) – Promoting Net Zero Carbon and Sustainability in Construction

67 UN Environment Programme (2023) – Building Materials and the Climate: Constructing a New Future

68 Climate Change Committee (2023) – Progress in reducing UK emissions: 2023 Report to Parliament

Policy context

The national context for net zero and the role of urban regeneration in climate change is defined both by the progression of climate change legislation and general buy-in to climate responsibilities by government actors as well as by the private sector and civil society.

The lion's share of the UK's current climate change policy was established by the Climate Change Act 2008, which set out the country's original targets for decarbonisation, including reaching net-zero emissions by 2050. The CCA also introduced the Climate Change Committee (CCC), an independent organisation that advises government on target setting and reports on progress towards net zero through an established Monitoring Framework. More recent additions or amendments to legislation include the UK Emissions Trading Scheme, which sets emissions limits for high emitting industries, and the UK Carbon Budgets, influenced by recommendations from the CCC, which are five-yearly, legally binding carbon targets aimed towards the net-zero 2050 goal set by the Climate Change Act in 2008. The 7th Carbon Budget will be set in 2025, while the 3rd – which extended to 2022 – will be assessed by the CCC in 2024.

In the context of urban regeneration, tight emissions reduction plans are realised through:

- Carbon-neutral or low-carbon construction practices.
- Use of green materials.
- Environmentally responsible waste management.
- Sustainable supply chains and procurement,
- Emphasis on integrated sustainability through promoting public engagement and social sustainability alongside engaging in economically sustainable practices.

The CCC have stressed the urgency of change in terms of decarbonizing buildings, both residential and non-residential, both through retrofitting and in ensuring sustainable new builds. It also has flagged that the UK's climate targets will require an upskilled workforce and sustainable supply chains, neither of which have scaled up to the extent necessary to achieve net zero within the established time frame. In the past, the CCC have ruled the National Planning Policy Framework to be inadequate for the progression of climate targets but have pushed for a consultation on the introduction of carbon impact assessments for plan-making among potential revisions to the NPPF in order for development to meet the needs of our climate

targets⁶⁹. The process of regeneration, from the first scrutiny of potential to the final stages of implementation and continual maintenance, will by necessity never stray far from considerations of net zero on par with the ambitions of legislation.

Because climate change is a problem that surpasses geopolitical boundaries, the UK is beholden to some internationally recognized conventions framed in order to limit the global temperature rise, most especially the United Nations Framework Convention on Climate Change and the Paris Agreement – the latter includes an internationally agreed target of a 68 percent cut in emissions by 2030, however recent changes to the UK's net zero policies have fostered skepticism as to the likelihood of meeting our nationally determined contributions (NDCs) to cutting emissions⁷⁰. Industry in the UK remains tied to emissions policies, and these will continue to determine the frameworks that drive development in the UK as time passes and 2050's climate goals edge ever nearer.

3.2 Net zero and climate change on the regeneration journey

Scoping

There is a great appetite for sustainable urban models that uphold national net zero policies and the decarbonisation agenda, support integrated services, and encourage a paradigm shift towards public uptake of sustainable practices⁷¹. Cities will be at the heart of the UK's response to climate change, given that more than 80 percent of people in England live in urban areas⁷², the greatest proportion of businesses per population are found in London⁷³, and dense urban populations put a large strain on resources, from infrastructure to water to energy. Risks from climate change for towns and cities include flooding, exacerbated by new development increasing the flow of water into an oversubscribed sewer system; overheating, exacerbated by the urban heat island effect in built-up areas; and extreme weather, which can place pressure on infrastructure and resources to respond to emergency situations. Some urban populations are much more vulnerable to the impacts of climate change, so strategies to shore up resilience must be responsive to a range of diverse vulnerabilities.

In the UK, the example of the 15-minute city model proves both the wealth of possibilities for urban change alongside the potential for rhetoric to obstruct

69 CCC (2023) – [Progress in reducing emissions: 2023 Report to Parliament](#)

70 The Guardian (2023) – [UK likely to miss Paris climate targets by wide margins, analysis shows](#)

71 Zaheer Allam et al. (2022) – [The '15-Minute City' concept can shape a net zero urban future](#)

72 Climate Change Committee (2018) – [Climate change: the future of UK cities](#)

73 House of Commons Library (2022) – [Business statistics](#)

policy decisions and the importance of public engagement in innovative climate solutions⁷⁴. In theory, the model opens up options for residents to access urban amenities within a 15-minute walk or cycle – reducing the geographical space of available, convenient services while limiting the demand for car use. Despite public backlash driven by misinformation⁷⁵, this model shows how spatial strategies and a positive place vision can engage urban spaces in following policy efforts to mitigate climate change to the benefit of public wellbeing. Other urban transformations can include Sustainable Drainage Systems (SuDS) and introducing green and blue infrastructure into built up areas, both of which can improve biodiversity, physical and mental health in local populations, and resilience to climate change.

When deciding upon the best course of action for regeneration, the site context is vital as potential decision pathways may be broad and diverse, along with the potential environmental impact of development. At the scoping stage, the balance between financial viability and the environmental consequences of the project will influence decisions as to the type of development that will achieve the best results – whether that will take the form of brownfield development, which may incur costs from decontaminating polluted land, infilling around existing buildings, or refurbishment, which may be more cost effective and reduce embodied emissions from construction materials than demolishing and constructing new buildings.

In the case of refurbishment, arguments for preserving heritage are often given precedence over arguments concerned with emissions, and where heritage is not seen to be at risk then demolition may take place at the cost of the environment⁷⁶. The construction sector accounts for 35 percent of the UK's waste, and so decision-makers considering the scope of urban regeneration plans must be wary of potential consequences. However, more data and evaluation of the wider costs and benefits of refurbishment are needed, where influencing factors include an under-developed market for retrofit in the UK and a general lack of willingness to invest in refurbishment⁷⁷. Ultimately, considerations about how best to engage urban development with net zero and sustainability must also engage a holistic approach that accounts for potential cost implications, energy performance, and health impacts of regeneration, engaging with residents to ensure that decisions are sympathetic to the requirements of local communities.

74 The Guardian (2024) – [Ministers prioritised driving in England partly due to conspiracy theories](#)

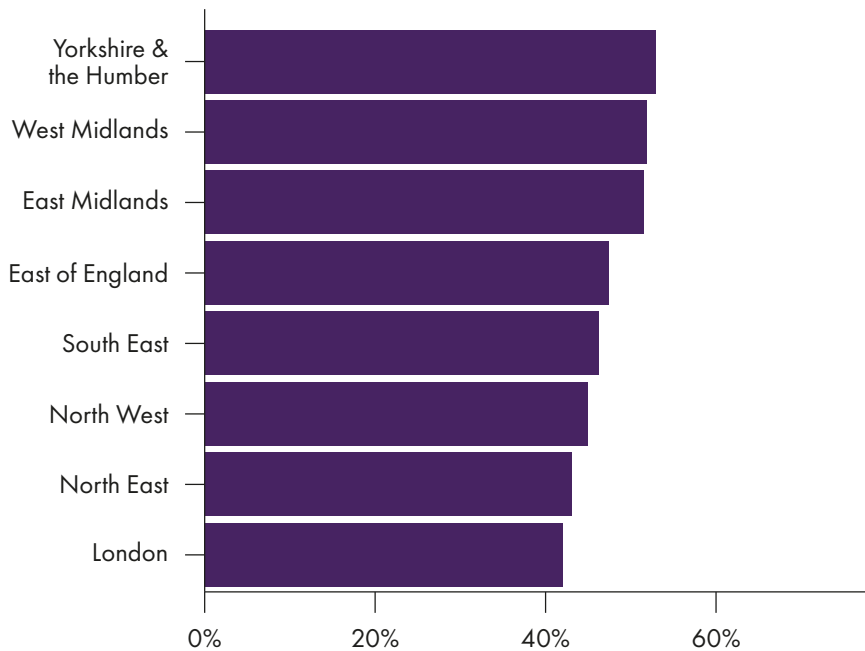
75 The Bureau of Investigative Journalism (2023) – [What is the 15-minute Cities Conspiracy?](#)

76 Hannah Baker et al. (2021) – [Retention not demolition: how heritage thinking can inform carbon reduction](#)

77 Dr Sarah Bell et al. (2014) – [Making Decision on the Demolition or Refurbishment of Social Housing](#)

Figure 7. Retrofit demand in England

Percentage of domestic EPC certificates rated D-G lodged in 2023



Source: DLUHC

Planning

Literature that evidencing the importance of urban planning for net zero is extensive. Conclusions reached include:

- The denser the area, and the closer to the city centre, the lower the transport emissions⁷⁸.
- Planning authorities, underfunded and bereft of capacity, deal with a siloed, discretionary planning system that lacks strategic planning and appropriately resourced public engagement, to the detriment of net zero target delivery and nature restoration⁷⁹.

⁷⁸ Guilherme Rodrigues (2021) – How urban planning is key to net zero: evidence from London

⁷⁹ IPPR (2023) – Planning for net zero and nature: A better, greener planning system that empowers local places

- The Covid-19 pandemic and associated high rates of home and hybrid working models have led to a shift in importance for locally consumed services, so that plan-makers must understand the impacts of an increasing demand for local neighbourhood businesses and the impact on transport emissions and community resilience⁸⁰.
- Approximately 80 percent of the UK's 2050 building stock already exists, emphasising the need for a large-scale retrofit programme to decarbonise the built environment⁸¹ – where in some cities, more than 70 percent of housing stock requires retrofitting⁸².

For local authorities, the Planning and Compulsory Purchase Act 2004, the NPPF, and the Climate Change Act 2008 require that plan-making prioritises carbon reductions, which means that plans should align with the current (sixth) Carbon Budget and its target of an 80 percent cut in emissions by 2035⁸³. The policy environment around climate resilience and local planning is somewhat insufficient, with an emphasis on flood management that fails to extend the country's response to other climate impacts, most notably the heat island effect for urban areas⁸⁴. Both mitigation and resilience should be at the heart of the priorities among local planning authorities.

Urban planning that targets housing decarbonisation utilises instruments from brownfield regeneration, densification of existing built-up areas, and the release of land on the Green Belt – utilising, for example, predeveloped land on city outskirts. Other considerations for planners in net zero planning strategies include geographic disparities, which can contribute to residents' vulnerability to pollution and be an obstacle to economic growth. Thinking at a larger spatial scale can help to mitigate these impacts – regional emissions reduction strategies may reduce inequalities, particularly regarding the poor health impacts of emissions from transport and through decarbonising domestic heating.

The integration of transport and energy systems can play a vital role in optimising how urban networks grow sustainably and mitigate for climate change. Additionally, spatial planning strategies need to consider the impact of planning on carbon emissions, looking to whole-life carbon assessments for new assets, considering how to minimise construction, embodied, and operational carbon emissions. Projects that

80 RTPI (2021) – [Net zero transport: The role of spatial planning and place-based solutions](#)

81 UKGBC (2021) – [Net Zero Whole Life Carbon Roadmap: A Pathway to Net Zero for the UK Built Environment](#)

82 Centre for Cities (2021) – [Net zero: decarbonising the city](#)

83 TCPA (2022) – [local plans and net-zero objectives](#)

84 Localis (2023) – [Climate Resilience in Local Plans: Adaptation and Mitigation in Local Development](#)

can transform the carbon outcomes and sustainability of an urban area include the introduction of green corridors and protected landscapes, which can also improve biodiversity and provide green, healthy public spaces for residents⁸⁵.

Potential remedies against the barriers to planning for net zero will likely include systemic change to the planning system. Given that neither climate change or its impacts can be contained by human geo-political boundaries, devolving additional powers to the local authority level must also allow for cross-regional coordination in terms of decarbonising integrated networks. This should include strategies across sectors, including transport and housing, ensuring that the response to climate change is tailored to unique impacts at the local level whilst acknowledging interdependencies and spillovers.

Financing

There are myriad financial incentives for net zero and decarbonisation in urban development. Such offers include the Social Housing Decarbonisation Fund; VAT reliefs for decarbonisation such as the time-limited zero-rate VAT for the residential installation of Energy Saving Materials; the Public Sector Decarbonisation Scheme, targeting the reduction of emissions from public sector buildings; and, further down the supply chain, the Industrial Energy Transformation Fund, which encourages businesses to cut energy use and emissions by investing in energy efficiency and low carbon technologies.

The Shared Prosperity Fund, towards local investment, can be used by local authorities to encourage the transition to net zero – for example, South Hams District Council has apportioned some of its Shared Prosperity Fund income towards a Decarbonisation Grant from local businesses⁸⁶. Other central government funding schemes exist that target heat networks, electric vehicles, and woodland creation⁸⁷. What is clear, is that despite the apparent energy being directed towards decarbonisation, that the funding environment is fairly fragmented and complex. Criticisms have been levelled at the current state of the government's net zero funding, labelling funding interventions piecemeal and introducing a risk of delay to urgent interventions⁸⁸. Larger scale and consolidated funding options will be the most effective way to encourage public sector action towards net zero.

85 RTPI (2021) – [Net zero transport: The role of spatial planning and place-based solutions](#)

86 South Hams District Council (2024) – [UK Shared Prosperity Fund: Decarbonisation Grant](#)

87 Crown Commercial Service (2023) – [Carbon net zero funding and grants](#)

88 National Infrastructure Commission (2023) – [Infrastructure Progress Review 2023](#)

Beyond the bounds of state-led decarbonisation financing, the private sector finds its own incentives in behavioural stimuli. Reputational incentives, most famously in the form of environmental, social, and governance (ESG) commitments, ensure that many private sector agents seek out opportunities to engage financially with sustainable projects. Many of the largest businesses have made climate commitments to reduce emissions and shift towards renewable energies across sectors, although increasingly 'ESG fatigue' among shareholders may be stinting investment opportunities and compliance with ESG commitments – or, as policy continues to fluctuate in an uncertain political environment, conflicting interests may produce inefficiencies in sustainable investing.

Policy does drive forward private sector investment, both nationally and internationally, where the Paris Agreement and the UN's Sustainable Development Goals can spur investment into sustainable infrastructure⁸⁹. However, there remain some faults that public funding mechanisms can fall into, particularly when timescales for implementation are unrealistic, when schemes are poorly strategised, and capacity and skills for those implementing the scheme are unconsidered⁹⁰. Chris Skidmore MP's Net Zero Review 2023 labelled net zero as the "growth opportunity of the 21st century"⁹¹, but the UK must act urgently to make best use of the opportunities represented by engaging in better planning and a stable policy environment to encourage investment into green infrastructure, supply chains, and construction.

Legislation such as the Future Homes Standard also ensures that development remains sustainable and shows the importance of consistent monitoring for quality, albeit at greater cost to developers who must maintain high standards of materials and design. Local authorities as place leaders should be able to lead the way in terms of high standards, but in the present context of financial constraint, public sector pioneering can only happen where higher spending can be justified – making public sector spending on decarbonisation very much reliant upon political whim. The benefit of both public and private sectors at this stage becoming more involved in sustainable construction practices, is that over time and as sustainable supply chains mature, costs will go down and release more opportunities for scaling up the UK's drive towards net zero.

89 Francesco Lamperti et al. (2019) – *The Green Transition: Public Policy, Finance, and the Role of the State*

90 Public Accounts Committee (2021) – PAC report: Green Homes Grant scheme "underperformed badly"

91 Rt Hon Chris Skidmore MP (2023) – *Mission Zero: Independent Review of Net Zero*

Implementation

The implementation of sustainable construction practices, sustainable procurement, and an emphasis on ensuring a just transition will be core to place-based climate action.

Sustainable construction practices for net zero extend beyond consideration of the operational emissions of constructing buildings. Rather, a whole-life carbon assessment, one which accounts for emissions from the design stages right through to continued operation, pre-occupation of buildings and post-occupation maintenance, and finally to the end-of-life stage of the building, should be undertaken in alignment with an evaluation of the building's energy efficiency. In the UK, neither whole-life carbon assessments nor mitigation of embodied emissions are mandated in legislation, a lack of standards which is certainly stunting the national effort to meet emissions targets⁹². The onus therefore currently falls to place leaders and stakeholders taking initiative to provide best practice in terms of carbon assessments – regulations are urgently needed.

The Future Homes Standard, which will apply only from 2025, asserts energy efficiency standards for new homes and extensions. Arguably, all new developments should already meet these standards, and relying on voluntary adhesion to controlling construction practices weakens the urgency of the response to the climate crisis. However, where good practice is engaged, innovation guides the transformation of the construction sector. Modern Methods of Construction (MMC), for instance, widely taking the form of off-site manufacturing of units for construction, may present solutions to reducing waste and costliness while presenting opportunity for the reduction of whole-life carbon emissions⁹³. However, it must be noted that the wide-scale adoption of MMC is currently fairly unsupported by the National Planning Policy Framework and could be more widely integrated within planning as one tool in the box to ensuring the UK's construction sector is aligned with net zero goals. Off-site manufacturing remains unsought as a mechanism of construction, with time, cost, and quality considerations often landing on more traditional, on-site techniques as the preferred method. Much more research is required to unlock the benefits of modernisation in construction⁹⁴, but technological innovation coupled with assessment, evaluation and analysis of data, and legislating for high-quality

92 Environmental Audit Committee (2022) – [Building to net zero: costing carbon in construction](#)

93 Osborne Clarke (2023) – [Are modern methods of construction in the UK more sustainable?](#)

94 Ali M Saad et al. (2023) – [Examining the Influence of UK Public Clients' Characteristics on Their Own Innovation-Decision towards the Modern Methods of Construction \(MMC\)](#)

buildings will ensure that the UK is, at the least, pointing in the direction of climate-readiness.

Public sector procurement in regeneration must be mindful of the opportunities for sustainable methods of development from a whole-systems perspective and engaging in consideration of whole-life carbon emissions, including not only construction practices, but looking across the supply chain for good environmental practice. Practices of reuse of materials, using sustainable materials, and targeting low-emissions across transport, all support the low-carbon approach to regeneration. The CCC notes, further, that there must also be actions taken to reduce the impacts of climate change on supply chains – for businesses and government to increase supply chain resilience against the cascading risks of climate change under multiple emissions scenarios through mitigation and utilising digital solutions to build capacity⁹⁵. Often, contractors take the risk-averse approach to delivery, and many are therefore unlikely to engage in net-zero construction projects due to the necessity of higher-quality required, meaning that procurement of net zero construction is still something of a challenge for the public sector. It could be hoped that if greater funding were to be injected through public sector means towards scaling the net zero supply chain, then this challenge would be minimised in time, but the present state of public sector financing means that sustainable procurement remains an uphill struggle.

The government's Net Zero strategy has taken measures to ensure that net zero delivery includes energy needs assessments, regulations of emerging technologies, and providing certainty across the private sectors in terms of recruiting and training a green workforce, highlighting the importance of a fair energy transition⁹⁶. A just transition to net zero across the UK will also include comprehensive access to retrofit and funding schemes for home retrofit, enabling community-led renewable energy schemes, which can have the additional advantage of reducing energy bills for residents, and acting against the effects of depreciation of property values among communities not directly advantaged by energy efficient development⁹⁷.

95 CCC (2022) – [Climate risk to UK Supply Chains: The roles of government and business](#)

96 Department for Energy Security & Net Zero (2023) – [Powering Up Britain: Net Zero Growth Plan](#)

97 UKGBC (2021) – [Building a just transition to net zero](#)

3.3 Operational concerns

The table below highlights how the strategic concern of net zero and climate change intersects with key operational concerns for regeneration projects.

| Operational concern | Impact of climate change and the drive to net zero |
|-----------------------------------|---|
| Sustainable design | <ul style="list-style-type: none"> • Investment must be maximised now to avoid far greater costs arising later due to the impacts of climate change • Whole-life assessments and continued monitoring of construction are of paramount importance • Public engagement on the necessity of designing to mitigate climate impacts is essential |
| Decarbonisation | <ul style="list-style-type: none"> • Cross-sectoral integration throughout projects is crucial to ensuring whole-systems mitigation of emissions |
| Property and estates partnerships | <ul style="list-style-type: none"> • Clarity of roles and responsibilities is necessary, clear targets must be built into partnerships from the beginning in as stable a policy environment as possible • When thinking about property assets, it is vital at scoping/planning stages to take a best practice view in terms of climate change, not cutting corners for viability and embracing organisational transformation if there are clear systemic issues at play that prevent climate action, such as procurement practices • Effective collection and utilisation of data ensures high quality decisions around property and land optimisation, but this remains a challenge for resource-strapped local authorities for whom austerity has limited the retention and recruitment of skilled employees |

3.4 Policy recommendations

- There is a clear need to tie in regeneration efforts with the wider requirement for retrofit and climate resilience measures needed by most UK buildings. Government must **create a fund to leverage regeneration capital to invest in energy-proofing local housing stock**. As well as being an investment in energy efficiency and national energy security, this would help make local regeneration a more attractive offer to residents.
- Understanding the entirety of a project's carbon impact is crucial to making a judgement on its efficacy in the age of global heating, therefore **whole life carbon assessments must be made a mandatory requirement of local and subregional development plans**. Similar weight should be given to urban heat islands and other climate resilience measures, as is currently the case for flood resilience.
- Urban densification and 'infilling' can be less economically viable than major developments but are more carbon efficient. **Local and subregional plans should package together urban sites for infill and densification as single investment prospects** to help improve viability.