



REDUCING
HOUSING
INEQUALITIES

National report on the regulatory system of environmental and energy policies: United Kingdom

An extract from Deliverable 3.2, *'National reports on the regulatory system of environmental and energy policies'*, of the ReHousIn project

August 2025

FOREWORD

This report is an extract from Deliverable 3.2, ‘National report on the regulatory system of environmental and energy policies’, of the ReHousIn project, which examines the economic mechanisms, norms, and institutional and contextual factors that shape the Environmental and Energy Policies (EEPs) in nine European countries.

The full version of the deliverable is available [here](#).

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The ReHousIn project aims to spark innovative policy solutions towards inclusionary and quality housing. To achieve this, it investigates the complex relationship between green transition initiatives and housing inequalities in European urban and rural contexts, and develops innovative policy recommendations for better and context-sensitive integration between environmentally sustainable interventions and socially inclusive housing.

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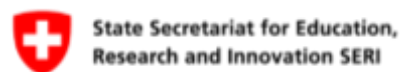


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NATIONAL REPORT ON THE REGULATORY SYSTEM OF EEPs – THE UNITED KINGDOM

1 Executive summary

This report details the legislative and governance frameworks for retrofitting, Nature-based solutions (NBS), and densification in the UK. The key message is that the UK central government uses legislative and public funding mechanisms primarily to catalyse and enable market delivery of its retrofit, NBS and densification strategies. This centres on the belief that markets can and should deliver where public needs are identified, if government can set the right context for markets to flourish. But where private markets are relied on to provide the capital required for service delivery, these will also need to be commercially viable, with trade-offs for equity and public benefit.

Chapter 4 outlines the legislative and governance frameworks for retrofitting. The main challenge here is that domestic energy improvements are not being rolled out at the pace required to meet the UK's climate obligations. It seems likely that this is because the UK government has prioritised small scale demand-side incentives intended to catalyse productivity in the supply-side. However, the retrofitting sector is likely to require significant levels of public investment to become a fully functional industry. One impact is that while government focusses on small scale demand-side schemes, the cost of retrofit installation remains extremely high. Meanwhile, funding schemes reproduce underlying housing inequalities: houses with disrepair, damp or mould are excluded, narrow eligibility excludes other households in need, and market-led schemes prioritise cost-efficiency over quality.

Chapter 5 outlines the legislative and governance frameworks for NBS. Biodiversity requirements for all development and regeneration became effective from 2024, meaning that both small and major new development must ensure a minimum of 10% biodiversity net gain, ideally on site, in order to secure planning permission. Delivery of NBS through housing development means NBS are likely to be delivered in line with the private sector values of the UK real estate sector, viewing nature as asset for the enhancement of real estate value. Additional costs may also lead developers to question viability and reduce affordable housing delivery. At the same time, local authorities are required to develop Local Nature Recovery Strategies, to set the framework for developers to make their proposals for NBS delivery. Local authorities must negotiate with the private sector over the specific nature of NBS provision, in conditions of reduced capacity. This may lead to developers pursuing a limited range of NBS and further inequalities being entrenched due to the uneven capacities of local authorities.

Chapter 6 outlines the legislative and governance frameworks for densification. On the face of it, housing densification in the UK can be considered part of the central government's low-carbon strategy. However, looking at the history of densification in the UK shows it has deeper roots, and emerged very separately to the green agenda. Within the mechanisms for housing delivery that have been established as part of the UK housing (and planning) system,

regeneration and densification are processes through which housing provision – and the land underlying housing provision – have become privatised and re-commodified. Provision of social housing on these sites relies on cross-subsidy from private tenure owner occupied or rental homes, which has been found to result in a net decline in social homes. This form of urban development can radically increase housing inequalities in the affected areas.

2 Introduction and Methodology

This report details the legislative and governance frameworks for retrofitting, NBS and densification in the UK. As noted above, the UK is made up of four countries: England, Scotland, Wales and Northern Ireland, with some competencies of the UK government applying only to England. While the administrative and legislative frameworks for green initiatives like retrofitting, NBS and densification are complex and often involve overlap between the UK government and the devolved administrations, these are broadly areas in which UK national strategy applies to the English territory. Each of the devolved administrations have separate frameworks and institutions for these initiatives, and an analysis of each one would require that four separate national frameworks were detailed in turn. Since the local case studies for this project are located in England, we have focussed on the English case. Nevertheless the ‘West Lothian Question’ (detailed above) means the governance frameworks for England are often determined by the UK central government. Therefore when unpacking governance mechanisms at the national-scale, we usually refer to UK level policy frameworks. Desk-based policy analysis at this level was conducted through analysis of central government strategy, legislative and consultation documents, sourced from the websites of central government departments such as the Department for Energy Security and Net-Zero, the Department for Environment, Food and Rural Affairs, and the Ministry of Housing, Communities and Local Government.

A few governance competencies are completely devolved to England, for example Homes England is ‘the housing and regeneration agency’ for England, and provides the finance for social and affordable housing in England. (In the devolved administrations this role is occupied by the Scottish Housing Regulator, the Northern Ireland Housing Executive, and the Welsh Government). In cases like this, we refer to English level policy frameworks throughout this report.

All areas in England are provided local services by at least (usually) one local authority. Regional authorities are not common throughout the UK, but the GLA is a significant example of this tier of government, setting out the spatial development strategy for London and providing additional support to the Greater London Boroughs. Desk-based policy analysis at this local and regional level was conducted through analysis of local authority and GLA strategy, legislative and consultation documents, sourced from the websites of various local authorities and the GLA. This policy analysis was supplemented by 5 interviews (see Table 1 below) and a ‘Policy Lab’ workshop, with attendees from national, regional and local government as well as housing providers, development companies and NGOs. The purpose of these workshops was to present our hypotheses about the impacts of retrofit, NBS and densification implementation in England on housing affordability and access, and to seek on-the-ground expertise about how these initiatives work in practice.

Institution type	Role	Date of interview
Local authority arms length management organisation	Sustainability Associate	28/5/2025
Local authority climate team	Climate Action Officer	28/5/2025
Housing association	Senior Repairs & Maintenance Surveyor (responsible for affordable housing retrofit programme)	18/06/2025
Housing association	Project Director for new housing development	8/7/2025
Local authority planning team	Development Management Planning Officer	16/07/2025

Table UK1. Competences of ecological transitions and housing policies as organized at different governance levels

The report also draws on academic and grey literature, particularly for a deeper understanding of how the markets for retrofitting, NBS and densification work in the UK, and for assessing their constraints and likely impacts for housing inequalities. One limitation of the review of this literature is that it has been non-systematic; relying largely on the authors' professional judgement for selection of studies and reports, rather than defining a methodology for the selection of literature. The limitations of this approach were mitigated by the authors by consulting key academic informants prior to review (one leading academic working in each of the three areas of retrofitting, NBS and densification) to guide the review process and ensure a broad range of literature has been consulted.

3 General Governance System

The UK Office For National Statistics (ONS) have estimated the UK population at mid-year 2023 to be 68,265,200. This can be divided into the population of England (57,690,30), Scotland (5,490,100), Wales (3,164,400) and Northern Ireland (1,920,400).

The United Kingdom (UK) is made up of four countries: England, Scotland, Wales and Northern Ireland (NI). The UK has its own legislature (UK Parliament) and executive (UK Government). The 'devolved administrations' (Scotland, Wales and NI) also have their own legislatures (Scottish Parliament, National Assembly for Wales, and National Ireland Assembly), and their own executives (Scottish Government, Welsh Government, and Northern Ireland Executive).

There is no separate legislature or executive for England. This creates a political issue around what gets called the West Lothian Question or the English Question, concerning whether members of Parliament (MPs) from the devolved administrations (who sit in the UK Parliament) should be able to vote on matters that affect only England, while these same matters are reserved for the devolved administrations to vote on separately, without being impacted by votes from MP's representing other parts of the UK. Devolution also means that there can be different political parties in power in each of the four countries of the UK. These different parties

are then able to set a different political agenda for that administration, supported by the Civil Service (which supports the Scottish Government, the Welsh Government and the UK Government; the Northern Ireland Executive is supported by a separate Northern Ireland Civil Service).

This governance architecture means that the administrative and legislative frameworks for specific policy areas can be quite complex, with not only multi-level governance to consider (central, regional and local tiers of government and the governance ecosystems surrounding them) but also separate-yet-overlapping central administrations with distinct political landscapes. When it comes to analysing specific policy spheres at the national level, it is worth bearing in mind that the powers of UK legislation do not always apply equally to all four countries within the UK, particularly in policy areas which are devolved to Scotland, Wales or NI. Some areas of the UK government’s work apply largely to England, meaning for example that some statistics produced by the UK government are for England only.

The following powers are devolved to the devolved administrations: local government (including planning); agriculture, forestry and fisheries; transport; health and social care; education and training; justice and policing; sports and the arts, some taxation, and some social security elements. The following powers are reserved to the UK administration: defence; foreign affairs; immigration; trade policy; constitution; and most aspects of broadcasting. Energy policy is not a devolved power, but the devolved administrations can have a significant impact on those aspects of energy policy that are manifested through the built environment, due to devolved planning powers.

Sub-national government in the UK is divided into three levels: civil parishes, local authorities and regional authorities. Not all areas have all three levels of government. Civil parishes exist mostly in rural areas, with locally elected parish councils being responsible for the maintenance of public spaces and facilities.

At least one local authority provides local services to all areas in the UK: these are either single-tier areas, where one single borough council or unitary authority provides services relating to planning and housing as well as education, transport, and waste management; or two-tier areas where local authority services are divided between a district council and a county council.

Regional authorities are not common throughout the UK, but are used to provide additional services to some larger areas, for example the Greater London Authority (GLA) which is supported by the Mayoral Assembly, and which creates and maintains London-wide strategies such as the London Plan. Other areas (such as Greater Manchester) have created combined authorities which do not replace the local authorities in question but which have additional powers, including the ability to receive separate funding and to directly elect a combined authority mayor, for joint strategic functions.

	Housing	Housing retrofitting	NBS	Densification
National level	Sets national policies and laws	Sets national policies and laws	Sets national policies and laws	Sets national policies and laws

	for the entire country (Department for Housing, Communities and Local Government, DHCLG). E.g. setting affordable rent levels.	for the entire country (Department for Energy Security and Net-Zero, DESNZ) E.g. setting minimum EPC standards.	for the entire country (Department for Environment, Food and Rural Affairs, DEFRA) E.g. Biodiversity Net-Gain legislation.	for the entire country (Department for Housing, Communities and Local Government, DHCLG) E.g. creation of the National Planning Policy Framework (NPPF), and Estate Regeneration National Strategy.
Regional authorities	Provide some additional services and funds within some larger areas (e.g. Greater Manchester and Greater London Authority (GLA)), often implemented through the local authorities in these areas.	The GLA provides some additional services and funds to help local authorities in London make the best use of nationally available funds.	Provide some additional services and guidance (e.g. GLA: Urban Greening for Biodiversity Net Gain: A Design Guide).	Providing funds for non-profit sector to purchase land for densification. In the case of London, creation of the London Plan, setting strategic planning priorities for London, e.g. Opportunity Areas.
Local authorities	Responsible for providing public housing services. Including (but not limited to): planning for housing development, negotiation of planning gain for public housing delivery through Section 106 agreements with private developers, maintaining housing registers for public housing allocation.	Responsible for providing public services. Including (but not limited to): coordinating retrofit of all local authority owned housing, application to centrally coordinated funds for public housing retrofit.	Responsible for providing public services. Including (but not limited to): drafting local strategies including Green and Blue Infrastructure Strategies or Local Nature Recovery Strategies, for the coordination of NBS delivery by private developers in the borough.	Responsible for providing public services. Including (but not limited to): planning for housing development, working in partnership with private and non-profit sector for the delivery of housing.

Table UK2. Competences of ecological transitions and housing policies as organized at different governance levels

4 Housing retrofitting

4.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

The main driver of retrofitting policy in the UK is the legally binding climate obligations made by the UK as part of the Paris Agreement and subsequent commitments. The UK's Nationally Determined Contribution (NDC) towards these efforts is a commitment to reducing greenhouse gas emissions by at least 68% by 2030 (compared with 1990 levels), and to reach net zero by 2050.

Of the nearly 28 million residential dwellings in the UK, over 65% were constructed before the 1970s (Camarasa et al 2018). The construction of new dwellings has declined steadily since then, meaning that the building stock in the UK is some of the oldest, and least energy efficient, in Europe. Within the UK, homes account for the second largest sector (after transport) in terms of energy use (18% of carbon emissions), requiring significant retrofit measures. The UK Climate Change Committee (UK CCC) has stated that in order to achieve the UK's climate obligations, the rate of residential retrofits must increase to 500,000 each year by 2025, and to one million per year by 2030 (Paillet 2024).

However, the UK is significantly 'off track' with regard to retrofit, according to the UK CCC, who in their recent Progress Report to Parliament (UK CCC 2024) stated that energy efficiency measure installations in homes „are moving in the wrong direction compared to the scale-up that is required. They fell in 2023 and were already significantly off track in 2022“.

1995: Home Energy Conservation Act (HECA)

Local authorities were required to produce a strategy for the improvement of residential energy efficiency in their area by 30% in the next 10-15 years, including consideration of the private as well as public housing stock in their areas (Preece et al 2023).

2008: Climate Change Act

The UK's 2008 Climate Change Act set out domestic targets for carbon emissions reduction, standing separately to EU law on carbon emissions. The Act set targets to reduce emissions to 35% below 1990 levels across all sectors by 2020, and 80% below 1990 levels by 2050. As part of the act, the independent UK CCC was established, to set the UK's carbon emissions reductions budgets (five year targets) and to design the strategies that would allow these budgets to be met. The UK CCC also makes an evaluation of all national policies in the UK to assess whether these are aligned with current budgets and to suggest amendments. As part of this role, the UK CCC maintains a position on retrofit activity within the UK, for example stating that residential retrofits would need to increase to a rate of 500,000 per year by 2025, and one million per year by 2030, to meet the UK's net zero target (RICS 2024).

2010: Retrofitting emerges as a policy priority, with announcement of the 2012 Green Deal

In September 2010, the government made a statement in advance of launching its 'Green Deal', which would 'radically overhaul the energy efficiency of homes and small businesses'. This included the suggestion that retrofitting measures could catalyse £7 billion of Green Deal private sector investment per year and create up to a quarter of a million jobs by 2030 (DECC 2010 A).

In December 2010 the Department for Energy and Climate Change published a summary of the government's proposals (DECC 2010 B) to allow landlords, tenants and homeowners to pay for retrofit measures (listed in total) through savings in their energy bills.

2011: Energy Act

This Act set out the legislation that underpinned the Green Deal, one of several publicly funded schemes providing funding for the retrofit of the UK's housing, outlined in the section on implementation below. The legislation also required all landlords to make energy efficiency improvements to their properties as requested by their tenants by 2016, and to improve the least efficient properties to a minimum of energy efficiency rating of E before rental, by 2018 (Camarasa et al 2018).

2012: Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK

In 2012, the UK Government launched its Energy Efficiency Strategy (updated in 2013). It frames energy efficiency measures as a driver of economic growth. This document provides the strategic context for the Green Deal and the Energy Company Obligation (ECO) scheme, both outlined below.

2017: UK CCC Report to Parliament

In 2017, the UK CCC outlined the extent of retrofits required for the UK to meet its energy efficiency targets, in a report to parliament (UK CCC 2017): all (practicable) lofts (8.4 million) would need to be insulated by 2022; all (practicable) cavity walls (6.2 million) would need to be insulated by 2030; 2 million solid walls would need to be insulated by 2030; 2.5 million heat pumps would need to be installed by 2030, and around 3 million homes would need to be connected to low-carbon heat networks (UK CCC 2017)

2017: The UK's Clean Growth Strategy

This strategy set out energy and carbon emission reduction policies. Key policies and proposals for improving the energy efficiency of homes included retrofitting as many homes as possible across the UK to have an Energy Performance Certificate (EPC) band C by 2035 (Camarasa et al 2018) using, for example, investment to support the Energy Company Obligation (ECO) Scheme.

2021: UK Net Zero Strategy: Build Back Greener

The 2021 'Long-Term Low-Emission Development Strategy' outlines the government's proposals for supporting retrofit in the private rented sector, owner occupied homes, and social rented housing (HM Government 2021), including strengthening Minimum Energy Efficiency Standards to EPC band C by 2028 in the PRS, and providing £800 million additional funding

to the Social Housing Decarbonisation Fund (SHDF) over 2022/23 to 2024/25. The setting of minimum EPC standards in effect legislates for compulsory retrofitting of homes to reach the required energy performance standards.

2024: UK CCC Progress Report to Parliament

In its 2024 Progress Report to Parliament, the UK CCC (2024) identified the UK as being significantly off track, in relation to other European countries, in terms of annual heat pump installations in homes (which would require a 'considerable scale-up' to meet targets), and in terms of other energy efficiency measure installations in homes, which „are moving in the wrong direction compared to the scale-up that is required. They fell in 2023 and were already significantly off track in 2022“.

2025: New Labour government's Warm Homes Plan

The concrete measures to be implemented by the new government are not certain, although the Labour government's 2024 election manifesto September 2024 Warm Homes Plan press release indicated that the government would look into

The Warm homes plan strengthens existing Minimum Energy Efficiency Standards from EPC band E to EPC band C in the private rented and social rented sector, This will apply to new tenancies by 2028, and all tenancies by 2030. This places the responsibility on landlords, including private landlords, corporate landlords, local authorities and other social housing providers to retrofit all rental properties. The strategy also replaces the existing Home Upgrade Grant (HUG) scheme with the Warm Homes: Local Grant, and has rebranded the Social Housing Decarbonisation Fund (SHDF) as the Warm Homes: Social Housing Fund. There is a suggestion that the eligibility for application to the Warm Homes: Local Grant scheme would now be area based, rather than individually means tested, helping to retrofit the UK's residential dwellings at greater scale than means tested schemes.

Position of the country with EU's policies on retrofitting

During the 1990s, the rise of climate policies globally but also driven by EU regulation, helped to kick-start the creation of residential energy efficiency schemes (see section X below).

More recently, the 2009 EU Renewable Energy Directive (EC 2009) set a target to decarbonise end-use sectors such as transport, heating and cooling and industry, by increasing the share of renewable energy to 20% in 2020, with the highest shares expected to be reached in the power sector, and an aspiration to achieve 45% by 2030. As a member of the EU in 2009, the UK Renewable Energy Strategy was published in 2009, and the EU legislation transposed into UK law, through The Promotion of the Use of Energy from Renewable Sources Regulations, and the 2011 Renewable Transport Fuel Obligations (Amendment) Order. The Renewable Energy Directive was renewed in 2023 after the UK left the EU, meaning this has not been transposed into UK law.

The 2009 EU Ecodesign Directive established a framework for the setting of ecodesign requirements for 28 specific energy-related products which, in relation to retrofit, include boilers, windows, and insulation materials. This legislation was aimed at building into these

products, at the design stage, obligations to reduce energy consumption, thereby aiding the EU's overall energy efficiency targets. While the UK's transposition of EU ecodesign requirements stayed the same immediately after exit from the EU, The 2019 Ecodesign for Energy-RElated Products and Energy Information (Amendment) (EU Exit) Regulations ensured that ecodesign requirements already in force or scheduled to apply before the point of exit would continue to apply to products placed on the UK market before or following exit, until the legislation was replaced.

The 2012 EU Energy Efficiency Directive set out the EU's ambitions to encourage the uptake of energy efficiency measures within the EU, setting an energy efficiency target of saving 20% of the Union's primary energy consumption by 2020 compared to 2007 baseline projections, and of making further energy efficiency improvements after 2020 (EC 2012). This document established a framework for the implementation of proposals that had been introduced in the 2011 Energy Efficiency Plan, and was transposed into UK law through various regulations, such as the 2014 Energy Efficiency (Building Renovation and Reporting) Regulations 2014, requiring the Secretary of State for Energy and Climate Change to fulfill certain reporting requirements, including the submission of a longterm renovation strategy to the EC, submission of reports on meeting energy efficiency targets, submission of a National Energy Efficiency Action Plan every three years, and, crucially for understanding the current retrofit in the UK, to link financial support for energy efficiency of buildings to targeted or achieved energy savings. As with the Renewable Energy Directive, the Energy Efficiency Directive was renewed in 2023, with the UK no longer aligned with EU policy.

The policy transition away from alignment with EU law was managed during the UK's 'EU exit', through statutory instruments such as the Renewable Energy, Energy Efficiency and Motor Fuel Emissions (Miscellaneous Amendments) (EU Exit) Regulations (UK Department for Business, Energy and Industrial Strategy 2021). This set out amendments to the EU-derived legislation, ensuring that it would continue to operate effectively until replaced. For example, these amendments removed references to EU law and EU institutions, and removed obligations to submit energy efficiency plans and reports to the Commission after 2020. They did not, however, change the substantive nature of the legislation.

The 2024 EU Directive on Energy Performance of Buildings contributes to overall energy and climate goals by setting out a strategy for the building stock specifically, and sets out the aim to achieve a fully decarbonised building stock by 2050. Since this legislation was passed after the UK's exit from the EU, it has not been transposed into UK law.

All EU regulations were transposed into UK law, until the transposition deadlines for EU regulations stretched beyond the date that the UK left the EU (January 2020). This is illustrated in the table below.

EU Package / framework	Relevant Directives	Relevant UK Transposition
2001: EU Sustainable Development Strategy (updated in 2005)	2002 EU Energy Performance of Buildings Directive (EPBD)	<p>Introduced Energy Performance Certificates (EPCs) for homes and buildings.</p> <p>Also led to the introduction of Display Energy Certificates and air conditioning inspections.</p> <p>This directive was later recast in 2010 (Directive 2010/31/EU), and those updates were also transposed into UK law before Brexit.</p>
2009: EU 2020 Climate and Energy Package	2009 EU Renewable Energy Directive (EC 2009)	<i>The Promotion of the Use of Energy from Renewable Sources Regulations</i>
	2009 EU Ecodesign Directive	<i>The 2019 Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations</i> (These ensured that ecodesign requirements remained in force after Brexit.)
	2012 EU Energy Efficiency Directive (EC 2012)	<i>The Energy Efficiency (Building Renovation and Reporting) Regulations 2014</i>
2014 EU 2030 Climate and Energy Framework 2018: EU 2050 Long-Term Strategy "A Clean Planet for All" 2018: EU Clean Energy for All Europeans Package.	2018 Renewable Energy Directive	<p>No. Transposition deadlines after the UK left the EU. As a result, these were not transposed into UK law.</p> <p>The UK had already transposed earlier versions of related directives (from the 2009 and 2012 packages) and set its own legally binding climate targets via the Climate Change Act 2008 and subsequent carbon budgets, which aligned with or exceeded EU ambition.</p>
	2018 Renewable Energy Directive	
2019: EU Green Deal	2023 Renewable Energy Directive	<p>No. Following Brexit, the UK is no longer bound by EU legislation.</p> <p>The UK has independently committed to achieving net-zero greenhouse gas emissions by 2050, as enshrined in the Climate Change Act 2008 (2050 Target Amendment) Order 2019.</p>
	2023 Energy Efficiency Directive	
	2024 Directive on Energy Performance of Buildings	

Table UK3. Transposition of EU regulations to the UK national level

4.2 The implementation process

Laws and regulations

Energy performance standards for rented homes are used to compel landlords to make energy efficiency upgrades to their rental properties in order to be licenced to put them on the market for rent. The Energy Act of 2011 required landlords to make energy efficiency improvements requested by their tenants, and to improve the energy efficiency rating of their properties to Energy Performance Certificate (EPC) band 'E' before rental. This could be improved by the new 2024 government's Warm Homes Plan, which aims to consult on proposals for both private and social rented properties to be brought up to EPC band C by 2030 (currently, social rented homes have no minimum energy efficiency standard at all). Owner occupiers do not require an EPC until they sell their home or place it on the market for private rent.

While new building standards are not strictly relevant to retrofitting, they dovetail with retrofitting in terms of the UK's efforts to make the overall building stock more energy efficient. National buildings standards were first introduced in the Building Regulations of 1965, functional performance standards introduced in the Building Act of 1984, and revisions to these standards made in 2010, 2013 and 2016. Currently, Energy Performance Certificates are required for the construction and/or sale of a building, using a Standard Assessment Procedure (SAP) methodology to determine the energy efficiency of the property (it's SAP rating) based on factors such as construction materials, heating and ventilation, and insulation and glazing. After consultation running 2019-2022, the Future Homes Standard (later the Future Homes and Building Standard) proposed new standards for energy efficiency of new homes, meaning homes would need to be built with low carbon heating solutions such as heat pumps. The previous government intended this legislation to come into effect in 2025, and the new Labour government have stressed commitment to energy efficiency standards, but the exact outcome seems unclear at this point.

Financial support

Schemes providing public funding to support the retrofit of the UK's housing stock are the backbone of the retrofitting strategy. These are not simply intended to increase the number of homes with retrofit measures, and are not sufficient to achieve retrofit at scale; they are also intended to catalyse innovation in retrofit supply chains and boost productivity and capacity in the construction industry, to kick-start genuine market delivery of retrofit. However, this has had limited results. These schemes fall into four categories and are outlined in turn below:

- A. Supplier obligation schemes: programmes requiring energy suppliers to offer retrofit efficiency improvements to customers most in need.
- B. Pay as you Save (PAYS): programmes allowing consumers to apply for loans to cover the cost of retrofitting their own properties, repaid through savings to energy bills.
- C. Publicly funded schemes for owner occupiers and the PRS.
- D. Publicly funded schemes for social housing providers.

Supplier obligation schemes

As Rosenow (2012) explains, the premise of supplier obligation schemes is that: „central government imposes an energy savings target on large energy suppliers (gas and electricity) that has to be achieved at the customer end“. Energy suppliers usually charge a levy to all their customers, spreading the cost of any measures they provide, usually to more fuel-poor customers or living in those properties most in need of upgrading (e.g. EPC rating of D or lower).

These schemes are not only intended to increase the number of homes with retrofit measures; they are also intended to help build up the supply-side of the retrofit market (numbers of contractors and technological development), by encouraging demand. However, by spreading the cost of installations, this artificially lowers consumers' expectations around the cost of retrofit. Measures are often provided at very low or no cost, and consumers more broadly are left unwilling to pay for these measures at market cost. While many of these schemes have been successful in terms of retrofitting the expected numbers of homes, this has not encouraged the demand for retrofit more broadly; therefore neither has it boosted the supply side of the market beyond that needed to meet the specific obligations of each scheme.

Date	Scheme	Supplier obligation scheme details
1994-2002	Energy Efficiency Standards of Performance (EESOP)	<p>From 2000, all licensed energy suppliers with at least 50,000 domestic customers were required to deliver energy efficiency measures to domestic households (Preece et al 2023). Suppliers asked to focus on the 'disadvantaged' (Grubb et al 2015). EESoP ran from 1994 to 1998; EESoP 2 ran from 1998 to 2000; EESoP 3, ran from 1998 2000 to 2002 (Rosenow 2012). Jointly developed/managed by Ofgem (initially the Office of Electricity Regulation (OFFER) and the Energy Saving Trust. Funded through a levy of £1 per customer bill year, rising to £1.20 in 2002 (Preece et al 2023). The most common measure delivered was insulation, given its cost efficiency and ability to save customers money. Around 3 million households benefited from EESoP1, with savings of around £120 over the lifetime of the measures (Preece et al 2023).</p>
2002-2008	Energy Efficiency Commitment (EEC)	<p>In 2002, the EESoP scheme was renamed the Energy Efficiency Commitment (EEC). EEC 1 ran from 2002 to 2005; EEC 2 from 2005 to 2008 (Rosenow 2012).</p> <p>Funded through a levy on household bills, with the measures securing a household saving of £9 for every £1 spent by energy suppliers (Preece et al 2023).</p> <p>Preece et al (2023) express doubts about whether this scheme had any 'pump-priming' potential within the retrofit market: suppliers had to offer insulation at a considerable discount to encourage uptake, and without these financial incentives, it seemed doubtful to some that consumers would continue making energy efficient choices (Preece et al 2023).</p>

<p>2008-2012</p>	<p>Carbon Emissions Reduction Target (CERT) Program</p>	<p>In 2008, EEC was renamed the Carbon Emissions Reduction Target (CERT).</p> <p>This was the largest supplier obligation programme thus far, creating an estimated energy saving of more than £2bn annually (Grubb et al 2015).</p> <p>Funded by a customer levy, estimated at £24 per year for each fuel (Preece et al 2023).</p> <p>As with previous supplier obligation schemes, there are doubts as to whether these interventions were economically sustainable without financial support, or had the capacity to kick-start market-based activity in the absence of financial mechanisms based in legislation. Insulation was often offered free or cash incentives provided to incentivise those in priority groups; (Preece et al 2023) note concerns amongst stakeholders that this left a legacy of customer expectation that such measures should be provided free or at a very low cost.</p>
<p>2009-2012</p>	<p>Community Energy Saving Programme (CESP)</p>	<p>CERT was complemented by the CESP area-based scheme which focussed supplier obligation-based provision of retrofit measures on the most deprived areas, in order to focus efforts on vulnerable households and communities. Preece et al (2023) note that area-based schemes can bring significant benefits in terms of take-up and cost-effective delivery, with local authorities taking on a central role in building awareness of the scheme.</p>
<p>2012-ongoing</p>	<p>ECO scheme</p>	<p>Launched on 1st January 2013, replacing previous supplier obligation schemes.</p> <p>Suppliers could install improvements directly themselves, through contracted installers, or through a brokerage platform (Preece et al 2023).</p> <p>The ECO scheme and its subsequent iterations (ECO 1-3) lead to 1.4 million homes being improved between 2013-2016, with the most common measures being cavity wall insulation. Preece et al (2023) note that the scheme has failed to develop a market for solid wall insulation, partly because of the focus on these cheaper measures.</p>
<p>2022-2024</p>	<p>ECO4</p>	<p>At an estimated cost of £4 billion over 4 years, the scheme specifically aims to support households on the lowest incomes, with eligibility determined by receipt of means tested benefits (Preece et al 2023).</p> <p>ECO4 ,Flex' is a parallel programme which is also designed to target households on low incomes, but not in receipt of benefits (Preece et al 2023).</p>
<p>2023-2026</p>	<p>The Great British Insulation Scheme (previously ECO+)</p>	<p>Running in parallel to the other ECO supplier obligation schemes, this programme is intended to be taken up by customers who do not currently benefit from any other government support to upgrade their homes, but are living in the least energy efficient homes (EPC band G-D), either in receipt of certain state benefits, or in lower Council Tax bands (Preece et al 2023). Rather than a ,whole house' approach, the scheme offers single insulation measures.</p>

Table UK4. Supplier obligation schemes.

Pay as you Save schemes (PAYS)

The PAYS mechanism was developed specifically for the launch of the 'Green Deal' in 2012, under the premise that households should pay for their own home energy efficiency retrofits, rather than all energy consumers contributing through levies, as with supplier obligation schemes (Preece 2023). This mechanism allows individual households to finance the installation of retrofit measures by applying for a 'Green Deal Loan', which would then be repaid on the basis of money saved on energy bills (Camarasa et al 2018). The Green Deal was also intended to incentivise private rental tenants to take on the costs of retrofit, as they would benefit from reduced energy bills, rather than landlords (who had been targeted by supplier obligation schemes) who were slow to apply for schemes that did not benefit them directly (Rosenow and Eyre 2016).

Ultimately the PAYS mechanism of the Green Deal failed to incentivise a critical mass of consumers. While savings on energy bills were, in principle, great enough to cover the costs of the loans required to pay for retrofit measures at the market rate, the scheme has been criticised as having a poor understanding of consumer behaviour. Consumers are not always economically 'rational' actors, and the fact that their costs would be covered was not enough to incentivise the time and effort required for retrofit uptake (Rosenow and Eyre 2016). While in 2011 the Department for Energy and Climate Change (DECC) estimated the Green Deal would result in 14 million domestic retrofits (Rosenow and Eyre 2016), take up was in fact 'dismal' (Grubb et al 2015), with only 6,000 homes being retrofitted each year, and a total of 15,000 at its completion). The Green Deal Loan Programme was discontinued in 2015 (Camarasa et al 2018).

Date	Scheme	PAYS scheme details
2012-2015	Green Deal	The scheme cost government £240m, but was assessed by the National Audit Office as failing to generate additional energy savings, and not value for money. Preece et al (2023) cite 'lasting damage to the retrofit sector due to loss of momentum'. The scheme failed to incentivise uptake and retrofit measures fell dramatically (loft insulation by 90%, cavity wall insulation by 62%, and solid wall insulation by 57%, in 2015 compared to 2012).

Table UK5. PAYS schemes.

Publicly funded schemes for owner occupiers and the PRS

As with supplier obligation schemes, publicly funded schemes are not simply intended to fund retrofit measures, but rather as a demand-side incentive to 'set the right conditions' for the retrofit supply chain to grow, encouraging the construction sector to increase activity to meet demand. As with supplier obligation schemes, these demand-side measures have failed to boost productivity and innovation at scale in the retrofit market. While many schemes have been successful in and of themselves in increasing retrofit installations to the tune of the funding provided, they have not aided any great shift in the numbers of retrofits required to meet the UK's carbon reduction targets by 2050.

Date	Scheme	Scheme details
1991-2000	Home Energy Efficiency Scheme	A scheme for improving the energy efficiency of private tenure households in receipt of certain benefits, through provision of insulation and central heating grants (Preece et al 2023). Around £75m was spent in grants annually to low-income families and pensioners (Preece et al 2023).
2000-2013	Warm front	Replacing the Home Energy Efficiency Scheme, this scheme was intended to benefit private tenure households in receipt of certain benefits, and suffering from fuel poverty (Preece et al 2023). The scheme was overseen by the Department for Energy and Climate Change (DECC). Public expenditure was around £3.4bn, and afforded 2.3m households assistance between 2000-2013 (Preece et al 2023).
2014-2022	Domestic Renewable Heat Incentive (DRHI)	Incentives were offered to owner occupiers, landlords with properties in the PRS, and social housing providers (all households), to promote the use of renewable heat sources in domestic properties. Households that installed a renewable heating system would then apply to the scheme to receive quarterly payments as an additional incentive. The total funding offered by the scheme was £1.5 billion, with the scheme supporting 110,830 low-carbon heating system installations (Preece et al 2023).
2020-2021	Green Homes Grant	The scheme allowed home owners and landlords in the PRS to apply for vouchers towards the cost of installing energy efficiency measures, including low-carbon heating systems. While £1.5 billion was allocated to this scheme, only £314 million was issued. This underperformance led to the scheme being withdrawn. 47,500 homes received assistance, rather than the proposed 600,000 (Preece et al 2023).
2020-2023	Green Homes Grant (local authority scheme)	This scheme extended the support to home owners and landlords in the PRS, for energy efficiency measures to be installed in low income homes, delivering funding via local authorities. Around 70,000 measures were installed before the end of 2023 (Preece et al 2023).
2022-2025	Home Upgrade Grant (HUG)	Local authorities could apply for funding to coordinate the delivery of energy efficiency measures in the homes of owner occupiers and for landlords in the PRS, intended to improve EPC ratings to a band C, and with a total of £950 million provided until 2025 (Preece et al 2023).
2022-2025	Boiler Upgrade Scheme (BUS)	Installers of heat pumps and biomass boilers could apply on behalf of consumers (owner occupiers and landlords in the PRS) for capital grant, contributing to the costs of installation. Consumers would receive between £5-6,000 off the costs of installation, but could only apply for this funding through MSC certified contractors, with the value of the grant taken off the final installation bill. 21,438 measures had been installed up to 2023 (Preece et al 2023).

Table UK6. Public funding for owner occupiers and the PRS.

Publicly funded schemes for social housing

The SHDF makes central government grant available to bidders (local authorities and housing associations) for retrofitting their social housing stock. As with all schemes listed in this section, the scheme is not only intended to increase the number of retrofit installations to the tune of the funding provided; it is also intended to develop the supply-side of the retrofit sector: „creating the conditions for growth in the retrofit supply chain capacity and capabilities, boosting productivity and innovation in the construction sector“ (Great Yarmouth 2024). Applications can be made by individual registered providers of social housing (local authorities or housing associations), or consortia of providers working together, and require that a minimum of 100 social homes at EPC band D-G will be improved.

The funding available through the SHDF is not nearly enough to retrofit the social housing stock at scale. Housing providers are asked to bid against each other for funding to retrofit relatively small proportions of their housing stock, with some applicants receiving no funding at all (although the Warm Homes: Social Housing Fund has claimed that all applications meeting minimum requirements should receive some funding). The task of retrofitting all social housing would require either large-scale central government grant, or a way for local authorities to recoup the high cost of installations, which is impossible in straightforward accounting terms since retrofits secure no financial gains for landlords. The scale of social housing retrofit roll-out through the SHDF is indicative of the UK government’s approach to retrofit throughout its schemes, which is to boost the supply-side of the market through small demand-side props, in an effort to kick-start the UK retrofit market in earnest, something which is yet to be seen.

Date	Scheme	Scheme details
2019-ongoing	Social Housing Decarbonisation Fund (SHDF) (now Warm Homes: Social Housing Fund)	<p>A total of £3.8 billion over 10 years is proposed by the Government; as of 2023 just over £1billion had been committed (Preece et al 2023)</p> <p>2020: Social Housing Decarbonisation Fund Demonstrator (£61 million)</p> <p>2021: Wave 1 (£179 million offered to 69 projects)</p> <p>2022: Wave 2.1 (£778 million offered to 107 projects, with £1.1billion additional match funding from applicants)</p> <p>2023: Wave 2.2 (£75 million offered to 42 projects, with £139 million additional match funding from applicants)</p>

Table UK7. Public funding for social housing

Other public interventions

There are some local-authority and Greater London Authority (GLA) led schemes which provide assistance, funding, or good practice guides for retrofit. Some examples are provided below:

Scheme	Details
Cambridge council's Action on Energy	Provides funding and information.
Cambridge City Council Net-zero retrofit pilot	Pilot project is underway on Ross Street and Coldham's Grove to retrofit 50 council homes in line with the very latest in sustainable design.
Southend-on-Sea City Council's retrofit eco home	Serves as an educational resource, showcasing effective technologies and practical applications for South Essex Homes residents and partners.
GLA Social Housing Retrofit Accelerator	Provides help to London Boroughs with applications to the SHDF
GLA's Net Zero Accelerators	Provides support and enabling services (examples of innovation, knowledge transfer, data and delivery)
GLA Mayor's Warmer Homes Programme (launched 2018)	Provided £14.5m funding towards heating and insulation improvements to homes in or at risk of fuel poverty improving 4,505 homes by April 2023; provided £2,600,000 additional funding the financial year 2023-24.
GLA Warmer Homes Advice Service (launched 2018)	Providing support to over 21,500 households by March 2023; continued for 2023-24.
London Community Energy Fund (LCEF)	Provides support to get community energy projects up and running faster (schools, places of worship, leisure centres and other community buildings).
GLA "London Power" The Mayor's Energy Company	A public-private partnership between the GLA and Octopus Energy, founded by the Mayor of London. Supplying Energy to those living in London.

Table UK8. Current Local and regional government schemes

4.3 Size and role of the market

Major characteristics of the market framework of retrofitting

The UK CCC has stated that in order to achieve the UK's climate obligations, the rate of residential retrofits must increase to 500,000 each year by 2025, and to one million per year by 2030. This number therefore represents to the UK government its demand-side targets for installations in the retrofit 'market' (whether these are financed and coordinated through public or private mechanisms).

It is clear there is a significant shortfall in the numbers of retrofitted homes, when compared with these targets (Camarasa et al 2018, UK CCC 2024) (the extent of actual numbers of retrofits is difficult to establish, not least because 'retrofit' encompasses various measures, with some homes benefitting from insulation, but not low-carbon heat pumps or biomass boilers, and many homes that are not retrofitted to net zero standard).

The challenge the UK government has seized on, in trying to upscale the number of retrofits across the UK, is incentivising greater uptake on this demand-side of the market, hoping that this will catalyse innovation in the construction industry to meet demand more widely. Other

than the Green Deal, which was completely unsuccessful, all schemes listed above involve coordinating either public grant or private finance for small-scale retrofit roll-out projects, in an attempt to boost market-based provision at a far greater scale.

However, research exists which suggests that retrofit installations simply cost too much for sustainable market demand to emerge without the kinds of financial assistance these schemes provide for consumers (Preece et al 2023, Ellison 2024). Eco Experts recently found that while UK consumers have a high-degree of awareness of low-carbon technology, the huge cost of retrofit installations is preventing widespread adoption. Retrofit measures like solar, battery and heat pump installation can cost between £20,000 and £30,000, with additional costs for double-glazing, cavity wall, solid wall, and loft insulation. This significantly limits the size of the demand-side of the market ('effective demand'). Outside of a government scheme, uptake is likely to be limited to those significant income or capital resources.

This means the 'pump-priming' approach of the UK government, when setting the framework for a retrofit market, is likely to be unsuccessful.

It is worth also considering the supply-side of the market, to understand this problem. Part of the problem of high costs in the retrofitting market is the undersupply of skilled contractors and installers, and the fragmented nature of the construction industry more broadly. A shortfall of skilled construction professionals (Springford 2023, BCIS 2024, Colemans 2024) is compounded by the need for an increase of labour to meet the retrofitting goals outlined by the UK CCC. There is a retrofitting "skill crisis" (Ashden, n.d.) with the Construction Leadership Council (PwC 2022) estimating that the UK will need 500,000 new professionals within construction and retrofit. Currently, only 1,000 trained retrofit co-ordinators are able to oversee the management and design of retrofit measures where 50,000 are needed; 3,000 heating engineers are trained to install heat pumps, where 60,000 are needed (Ashden, n.d.).

As with the organisation of the energy industry, most engineers and installers are self-employed, single-director companies, who are then subcontracted by larger firms, connecting them to consumers. Some installers work independently, connecting to consumers through installer-lead cooperatives. These self-employed installers are likely to have transitioned from previous positions as electricians, gas engineers, or other roles in the construction industry; a transition that can imply significant risk to those individuals' incomes. These factors combine to create incredibly high costs on the supply-side of the retrofit market.

In short, the construction industry will likely need significant levels of public investment, and improved coordination to address the high costs of retrofits. The UK government's approach thus far is to use (demand-side) market-based mechanisms where there isn't yet a sustainable and well-coordinated (supply-side) market. Camarasa et al (2018) also suggest that the complexity and inconsistent funding of government programmes have caused uncertainty and an inability to plan in the sector, causing firms to go out of business. From the perspective of supply-side stakeholders, these authors suggest that the UK government should instead provide extensive professional education, tailored policies, and standardisation of refurbishment solutions. This sector is likely to require significant input from government if it is to become a fully functional industry.

This would stand on top of further subsidies and tax incentives to encourage innovation on the supply-side, and uptake on the demand-side. Add to this the fact that energy consumers have been shown not to respond to ‘rational’ economic incentives (Rosenow and Eyre 2016). This all stands counter to the “the traditional ‘neoclassical’ assumption ... that if energy efficiency saves money, markets would deliver it” (Grubb et al 2015).

How dominant are purely market-based interventions in the retrofitting market?

As noted above, supply-chains are relatively fragmented and effective demand relatively low in the retrofit market, meaning purely market-based mechanisms are a small segment of the market. This notwithstanding, some purely market-based interventions exist. These also rely on market intermediaries (see institutional section below) to connect installers and customers.

Some private business models are emerging that leverage the value uplift that retrofitting affords private home ownership, in order to cover retrofit costs. For example, residential developers are able to buy up homes with poor energy standards, renovate and then sell those homes on at higher prices. Nevertheless, since private developers and corporate landlords in the UK are largely involved in building new buildings (rather than buying and retrofitting older properties), they have a relatively minor involvement with market-based interventions in the retrofitting market.

4.4 The multilevel governance process

The most direct relationship between central and local government is in the coordination of the SHDF. Applicants must co-fund at least 50% of installation costs. There have been controversies around the multilevel governance and coordination of this scheme, since some successful applicants were unable to deliver their retrofit plans at the scale initially expected, or match the funding due to budget constraints, and had to return their allocated funds (this meant that much of the funding allocated through Wave 2 of the scheme was ‘recycled’ from Wave 1, rather than being new funding in earnest (Riding 2024a). The inability of some local authorities to deliver on their SHDF proposals has been reframed by some as the central government ‘responsibility dumping’ its climate obligation strategy to the local level, asking local authorities with stretched resources and capacity to apply to a competitive fund in order to implement central government targets, without support in terms of design, monitoring or accountability. Some councils, such as Islington, have managed to secure this support by engaging consultants, for example to investigate how best to get their social housing stock to net zero by 2030 (Evans et al 2023). Nevertheless, uneven capacity and levels of in-house expertise will mean that local authority actions are likely to be uneven with greater success in better resourced areas.

Many local authorities have developed their own climate strategies, for example Islington’s *Vision 2030: Building a Net Zero Carbon Islington by 2030* (London borough of Islington, 2020a). In this plan, local authority priorities include retrofitting all domestic buildings (not only social homes) to an average level of EPC B (2020–2030). Local authorities clearly need to consider the private housing stock within their climate plans, but addressing this in a strategic

way is likely to be difficult. Additionally, and as the Islington plan points out, 'Our housing retrofit programme alone demands funding which we can't raise':

„The council will need the government to make significant and ongoing funding available in order to deliver our ambition for Islington. For instance, the cost of retrofitting the council's housing stock to become both energy efficient and zero carbon is in excess of what the council can afford within existing resources. This also applies to private housing and social housing provided by other organisations. Funding needs to be made available on a consistent, ongoing basis, with reasonable time given for applications to be processed and funds spent; this will enable the development of high quality proposals, provide stability and security for the delivery industry and reduce costs.“ (London borough of Islington, 2020a)

Vision 2030 also includes a plan to seek funding for skills development programmes in fields like retrofitting, for local residents. But coordination of these actions requires input from higher tiers of government. The role currently played by local authorities therefore seems to highlight a gap in directives and support from central government.

At local authority level, housing officers and the regeneration team often sit separately from teams concerned with retrofits, which might exist as part of the property maintenance team. This could create a disconnect between the departments responsible for retrofit and regeneration, where synergies might allow for better coordination of retrofit policy.

Central Government have been accused of 'flip-flopping' and creating an uncertain environment for retrofit professionals. For example, a recently proposed ban on installing new gas boilers (intended to encourage the predictable uptake of heat pumps, and certainty for industry) has been withdrawn in early 2025 (Horton 2025).

In the UK case, the Greater London Authority (GLA) is an important case of intermediate regional government. The role of the GLA is to support the London Boroughs through additional funds and technical support, but cannot diverge greatly from the national context due to the market conditions leading to high retrofit costs. The GLA's support is detailed in table 5. Some of these schemes, including the GLA's Net Zero Accelerators which offers advice, training knowledge sharing and finance advice to London-based organisations including local authorities and social housing providers, was launched using £950,000 funding for a 'Retrofit London' programme', to create a suite of programmes for advice provision and technical support. The GLA successfully bid for £12,006,000 from the Home Upgrade Grant 2 scheme (from DESNZ) for use in London in 2023-24 and 2024-25. The GLA can therefore best be understood as significant enabler of local authorities within the governance and funding frameworks set by central government. Beyond the £14.5 Warmer Homes Programme for homes in or at risk of fuel poverty, the GLA has not been able to offer significant public funding towards retrofit rollout.

Key actors and institutions

Institution type	Name	role
Local and regional governments	Local authorities (numerous)	Design local climate strategies, considering the entire building stock within the local area. Implement the SHDF, as well as other public measures locally. Apply for funding from central government for skills-upgrading and retrofit roll out measures and demonstrator projects. Provide support to energy suppliers in delivery of supplier obligation schemes.
	GLA	Provides some funding for retrofit rollout (£14.5 Warmer Homes Programme for homes in or at risk of fuel poverty), also provides programmes offering advice and technical support to local authorities and social housing providers.
Central Government	Department for Energy and Climate Change (2010-2016) Department of Business, Energy and Industrial Strategy (2016-2023) Department for Energy Security and Net-Zero (2023-present)	Design of UK policy strategy relating to retrofit; coordinates retrofit schemes of the UK government.
	UK Parliament Energy Security and Net Zero Committee	This committee scrutinises the policy, spending and administration of the Department for Energy Security and Net Zero and its public bodies, including Ofgem and the Committee on Climate change. Builds evidence bases, e.g. through enquiries such as the 'Heating our homes' (UK Parliament 2023), which looked into issues of energy efficiency (including insulation), heat pumps and other technologies, as well as infrastructure problems surrounding delivering warm homes and the need to ensure that there is a skilled workforce when needed. Holds one-off sessions and events e.g. 'Retrofitting our homes for a net zero future', (UK Parliament 2024)
	UK CCC (arms length / independent organisation)	The UK CCC set the budgets and design strategies to achieve the UK's climate obligations. Evaluates central government policies and identifies where shortfalls in policy need to be addressed (Camarasa et al 2018), for example holding the government to account on the rate of retrofit nationwide.
Energy Suppliers	Various	Implement supplier obligation schemes. Suppliers can coordinate the roll-out of retrofit measures for customers in a number of ways: by contacting installers directly; by subsidising 'do it yourself' measures; by liaising with other

		<p>managing agents (e.g. local authorities and supermarkets who then subcontract individual installers); or by creating their own insulation businesses to deliver retrofit measures themselves (e.g. British Gas).</p> <p>Energy suppliers are able to offer retrofit assistance to individuals who do not qualify for the ECO scheme (or alternatives) outlined above. This could be through the provision of funding, or by helping self-funding households with information and links to professionals.</p>
Financial	Green Finance Institute	<p>Financial intermediaries such as the Green Finance Institute exist to analyse barriers to investment, develop financial instruments and channel public, private and philanthropic investment into 'real economy outcomes', targeting commercial returns. Their 'Coalition for the Energy Efficiency of Buildings' advocates for measures such as area-based financing, and a new National Investment Bank „to co-create new investable asset classes and channel both public and private capital towards defined net-zero outcomes“ (GFI n.d.).</p>
	Banks	<p>Some banks offer preferential rates for the purchase of well-retrofitted homes, or cash incentives (e.g. a £20,000 5-year interest-free loan for green upgrades is available from Nationwide (Nationwide, 2024)). These measures are relatively recent and small scale.</p>
	Equity release council	<p>Retrofit mortgage: A mortgage that provides funding to enhance the energy efficiency and reduce the carbon footprint of a residential property.</p> <p>The Equity Release Council (ERC 2024) has unveiled new guidance for member firms to consider when launching retrofit lifetime mortgages</p>
Interest groups	The UK Green Building Council (UKGBC)	<p>The UKGBC is an interest group concerned with the sustainability of the built environment. They produce recommendations to government, with some level of influence.</p>

Table UK9. Key institutions involved in the policy cycle for retrofitting

Accelerators and other market-based institutions and initiatives

A proliferation of small-scale organisations exist to help catalise the retrofit market, for example RetrofitWorks, an installer-led cooperative who link consumers with installers, or People Powered Retrofit, an organisation providing consumers and installers with advice and support to plan, procure and deliver retrofit projects. These organisations are unlikely to have an impact on the structure of the industry, but aid coordination within the segment of the market currently supported by effective demand.

Name	Purpose
Free Energy Grants	Consumer / household advice and liaison
RetrofitWorks	Links individual consumers with installers. Installer-led coop
People Powered Retrofit	Provides consumers and installers with advice and support to plan, procure and deliver retrofit projects.
Cosy Homes Oxfordshire	Provides individual consumers with information e.g. to make a "draft retrofit plan"
OpenEcoHomes in Cambridge	An initiative to support home owners by visiting other homes, with support from Cambridge City Council and local businesses.
Nesta's visit a heat pump service	Delivering a service to help people learn about heat pumps in real-world settings.

Table UK10. Current Market-based institutions involved in retrofitting

4.5 Achievements, assessments, and challenges

The main challenge highlighted above is that retrofits are not being rolled out at the pace required in order to meet the UK's climate obligations. It seems likely that this is because the UK government has used a 'pump priming' approach to its retrofit policy, using small scale demand-side incentives to catalise innovation in the construction industry and boost productivity in the supply-side of the market. Meanwhile supply-side blockages are not properly addressed, and subsidy for the currently prohibitive cost of retrofit interventions is not forthcoming at scale. Policy

One impact of this on inequalities is that while government focusses its efforts on small scale demand-side schemes, the cost of retrofit installation for the population more broadly remains extremely high. Houses continue to be constructed, renovated and improved without consistent policies or standards, kicking the cost of retrofit down the road. Since only those with considerable disposable income will be able to afford retrofit measures without assistance, and to benefit from reduced energy bills, middle- and low-income earners, particularly those who do not qualify for assistance elsewhere, will face a choice between the relatively high cost of installation or more energy inefficient homes and higher energy bills.

There is some indication that good-quality retrofits can increase house values. Camarasa et al (2018) observes that house prices can vary by 5-10% based on their Energy Performance Certificate (EPC) rating, and cites a Department of Business, Energy and Industrial Strategy (BEIS) 2013 report estimating that retrofits could increase property values by an average of 14%. This means that those who have been able to afford retrofit installation could benefit further from house price rises, locking certain groups out of these homes. This effect is likely to be marginal, however. Retrofit is more likely to drive house price rises for already affluent households who can afford comprehensive, architect-led retrofits with high-quality materials and installation, but the number of these self-funded 'whole house' retrofits remains very low. Grant schemes, which tend to fund less holistic retrofits, have a more limited effect.

In terms of spatial inequalities, the UK's approach to retrofit has so far been geographically fragmented, with retrofit uptake (beyond funding for social housing retrofits) depending on

individual's own inclinations to follow up on the available government schemes or fund their own projects. However, the new 2024 government have indicated that the eligibility for application to the Warm Homes: Local Grant scheme will now be partially area-based, rather than individually means tested, helping to achieve greater scale. This could open an avenue for whole streets or local areas to benefit from retrofit improvements and, if house prices are affected, to lock certain groups out of these areas. Nevertheless, the deployment of area-based schemes remains extremely limited, and house price effects are not yet proven for the less holistic retrofits available through such schemes.

A further potential spatial inequality could be created by 'retrofit mortgages' allowing individuals to access equity in their homes to fund retrofit projects. Since property values vary across the UK, regional differences could be created between individual's capacity to retrofit their homes. Those living in London, where house values are highest, may be able to access adequate finance, whereas those living elsewhere (particularly in the North) where house values are lower may find that retrofit installation and certification could exceed the level of equity they can access from their homes. However, green mortgages remain a nascent market and mainly function as loyalty schemes for lenders to retain existing borrowers. The interest rate and total borrowing cost of green mortgages are not the lowest on the market, so the incentive for homeowners to switch mortgage providers for a green mortgage is relatively weak.

Therefore, retrofit policy and roll-out could (but cannot yet be shown to) produce inequalities through the mechanism of house prices or affordability. Nevertheless, and as supported by our Policy Lab workshops (see Table 11 below), the way that publicly funded retrofit schemes are designed in the UK can reproduce inequalities relating to housing quality. Publicly funded retrofit schemes such as supplier obligation schemes often exclude housing with disrepair, damp, and mould, locking out households living in the worst conditions and those most in need. Market-led support schemes also prioritise cost efficiency over quality and appropriateness, and have led to damp and mould being worsened through poor ventilation. The bottom line is that these schemes are not extensive enough to contribute the quantity or quality of retrofits required within the UK.

With regard to social housing, since local authorities and housing associations must match-fund their funds from the SHDF, there is the potential for rising rents within the social housing sector. For example, in a recent rent review meeting held at Blackpool council, members of the local authority cabinet discussed the need to ensure the Housing Revenue Account (a ring-fenced financial account used by local authorities in the UK to manage all income and expenditure related to their landlord functions for council-owned or social housing) would remain financially secure, "alongside measures to decarbonize our stock":

„In terms of climate change the 2024/25 capital programme includes an additional £500,000 to enable all remaining properties to achieve a minimum energy efficiency level of SAP C. There is currently no significant external funding to support this work, and decarbonisation of the whole stock is estimated to cost in the region of £80-90 million on the best available information.“ (Blackpool Council 2024)

The report concludes with a recommendation "That rents for all Housing Revenue account properties are increased by 7.7% in 2024/25 to maintain the health and future viability of the

Housing Revenue Account in line with official guidance“. While rent reviews are not uncommon and may not be caused solely by spending on the council’s SHDF programme, the clear link between energy efficiency measures and rents in social homes illustrated in this report suggests this question is worth investigating.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Potential for rising rents within the social housing sector	Although this may be offset by lower energy bills.
The cost of private retrofit installation for the broader population remains extremely high	<p>The costs of retrofit including more complex insulation measures, heat pumps, ventilation, and solar panels – and ‘whole house’ approaches which combine these measures – remain prohibitively expensive for most of the population, despite the universal heat pump subsidy and targeted grants for retrofit.</p> <p>Despite government subsidies and grants, retrofit remains financially inaccessible to most households, with middle-income households ineligible for most support but unable to self-fund improvements.</p>
Good-quality retrofits can increase house values, and could lock certain groups out of retrofitted homes	This effect is likely to be marginal. There is limited evidence that retrofit grant schemes are driving house price rises. This is truer for affluent households who can afford comprehensive, architect-led retrofits with high-quality materials and installation. The number of self-funded ‘whole house’ retrofits remains very low. Grant schemes, which tend to fund less holistic retrofits, have a more limited effect.
Area-based schemes (where whole streets or local areas can benefit from retrofit improvements) could lock certain groups out of these areas, if house prices are affected.	Potentially. Area-based schemes tend to take a more comprehensive approach and improving multiple properties may magnify the effect on house prices. However, the deployment of area-based schemes remains extremely limited. The upcoming national Warm Homes: Local Grant scheme, which introduces area-based eligibility criteria, should provide more insight into the effects of area-based schemes on house prices.
Those living in London, where house values are highest, may be more able to access retrofit mortgages.	However, green mortgages remain a nascent market and mainly function as loyalty schemes for lenders to retain existing borrowers. The interest rate and total borrowing cost of green mortgages are not the lowest on the market, so the incentive for homeowners to switch mortgage providers for a green mortgage is relatively weak.

<p>Supplier Obligation Schemes can lead to low-quality retrofits</p>	<p>Energy supplier obligation schemes for lower-income households often result in retrofits which are partial, poorly installed, and driven by cost-efficiency rather than quality, while affluent homeowners can procure comprehensive architect-led retrofits.</p>
<p>Those living in poor-quality housing are excluded by current retrofit policy</p>	<p>Current retrofit policies systematically exclude properties with the most severe housing deficiencies (disrepair, damp, mould), leaving households in the poorest housing conditions without effective support.</p>
<p>While retrofit policy is not yet reproducing housing market inequalities at scale (e.g. inequalities relating to affordability or house prices), it is reproducing inequalities in housing provision (e.g. inequalities relating to access to certain types of housing, or locking individuals into certain tenures, types or qualities of housing, including those with poor energy standards).</p>	<p>Retrofit policies exclude housing with disrepair, damp, and mould, locking households living in the worst conditions out of support schemes.</p> <p>The narrow and complex eligibility requirements of retrofit support schemes exclude many households in need.</p> <p>The universal support scheme (for heat pumps) only covers half the cost of installation, so more affluent households benefit disproportionately.</p> <p>Market-led support schemes prioritise cost efficiency over quality and appropriateness – with sometimes hazardous consequences – and provide little agency for households over the measures installed.</p>

Table 11 . Summary table

5 Nature-Based Solutions

5.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

2018: 25 Year Environment Plan

The Policy paper *A Green Future: Our 25 Year Plan to Improve the Environment* (DEFRA 2018) sets out the British agenda for environmental protection and improvement post-Brexit. This was the foundation for UK legislation departing from EU legislation, and set the framework for the UK environmental legislation that would follow. This includes the biodiversity net-gain legislation detailed below, which would become the UK's flagship NBS policy. This would require developers contribute a minimum 10% biodiversity net-gain for each new development, and ask local authorities to negotiate the location and type of NBS. The text points to early,

as-yet-undeveloped thinking around this, for example on p79: “As we build more homes, preserving and creating green spaces in towns is more important than ever. Local authorities and developers need to take account of all the benefits when deciding how much land to allocate as green space“.

2021: Environment Act

The UK 2021 Environment Act is the current legislative basis for all nature recovery and biodiversity net gain in the UK. The act establishes the twin mechanisms of biodiversity net gain law, and the production of local nature recovery strategies by local authorities, which are the central pillars of NBS policy in the UK.

Biodiversity net gain law outlines the responsibility of the private sector to deliver on NBS, stating that all planning permission granted under the Town and Country Planning Act 1990 will be subject to a condition for biodiversity net gain that must be met before the development commences. Before any construction, developers must measure the existing biodiversity values of each site, and present a plan to show how at least 10% gain in biodiversity value will be achieved.

Local nature recovery strategies are, in part, the mechanism by which the public sector can engage with private sector delivery of NBS. The 2021 Act states that all local authorities must have a nature recovery strategy in place. Much like local development plans, local nature recovery strategies are plans designed by the local authority, setting out their vision for the area. This includes the context, specific requirements and biodiversity conditions that must be acknowledged by the private sector when applying for planning permission for new development.

2023: Environmental Improvement Plan

The 2023 Environmental Improvement Plan is a scheduled update of the 2018 25 Year Environment Plan: “Where the 25YEP set out the framework and vision, this document sets out the plan to deliver”. The ‘apex goal’ of the policy is ‘improving nature’, which is achieved through various initiatives. Landscape Recovery Projects, and a ‘Nature Recovery Network’ of new protected areas, are likely to be rural and/or remote. In terms of urban nature, the plan reinforces the commitment to implement the 2021 Environment act: „including rolling out Local Nature Recovery Strategies to identify areas to create and restore habitat, and Biodiversity Net Gain to enhance the built environment”. The plan also proposes an updated Green Finance Strategy, setting out “a goal to raise at least £500 million per year of private finance into nature’s recovery by 2027 and more than £1 billion by 2030”.

Position of the country with EU’s policies on NBS

From the 1970s onwards, the UK’s environmental protection policy clearly benefitted from the UK’s membership of the EU. Environmental groups, often marginalised at the national level in Britain, worked in alliance with the EU Commission to expand the EU’s competence in biodiversity policy, and thereby ‘outflank’ the UK government to ensure environmental protections were in place (Fairbass and Jordan, 2021)

Since leaving the EU, the UK has been 'ahead' of the EU in approving legislation that enforces nature recovery and biodiversity net gain, passing the Environment Act in 2021, several years before the EU parliament approved the 2024 Nature Recovery Directive.

This may have been because the UK faced a crisis after leaving the EU, at which point EU legislation would remain in place until it was replaced at the UK level. Given the profound uncertainty created by the UK's internal politics post-referendum, there was a concern that environmental safeguards would fail with only the undermined legacy EU law underpinning environmental protection. This placed an imperative on the UK to pass legislation including for the protection of the environment.

2024 Nature Restoration Directive

The EU's Nature Restoration Directive was approved by the European Parliament in February 2024. The overall aim is to contribute to achieving the EU's climate mitigation and climate adaptation objectives, through recovering biodiversity in a long-term and sustained way, partly using NBS strategies.

In some senses, the definition of NBS in the UK and the EU are similar. Nature-based solutions are defined in this text as

„solutions that are inspired and supported by nature, that are cost-effective, and that simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions need to therefore benefit biodiversity and support the delivery of a range of ecosystem services.“ (EU 2024: 10).

As well as rural-based NBS, such as restoring wetlands and peatlands and promoting sustainably managed forests and farmland, the directive exemplifies NBS with initiatives such as developing urban green spaces and installing green roofs and green walls in the design of buildings (EU 2024: 11, 28).

While in the UK context there is an emphasis on 'biodiversity', in the EU context, there is an emphasis on 'ecosystems'. A central target of the directive is to ensure that, by 2030, at least 30% of degraded ecosystems are under effective restoration' (EU 2024: 3), including urban ecosystems. This is determined as Member States having put in place restoration measures that are necessary to improve to good condition at least 30 % of all habitat types considered to be not in good condition (EU 2024: 63). The directive stresses the need for 'increasing urban green space' as a major aspect of improving the health of urban ecosystems.

With their different emphases on 'biodiversity' and 'ecosystems', it is relatively complex to determine the UK's natural protection legislation compares to the EU agenda and approach. When drilling down into the implementation, there are some differences between the approach of the EU 2024 directive and the UK 2021 Act, particularly with regard to biodiversity restoration and/or gain in urban areas. Article 8 of the 2024 EU directive (*Restoration of urban ecosystems, p78*) states that Member States shall ensure that there is *no net loss* in the total

national area of urban green space and of urban tree canopy. There is no such stipulation in the UK, but the requirement for a 10% biodiversity *net gain* to be made under any new development means UK legislation could be seen as stronger in enforcing the restoration of nature in urban environments.

The EU 2025 directive supplements this with a requirement that from 2031 onwards, Member States shall achieve an *increasing trend* in the total national area of urban green space, (including through the integration of urban green space into buildings and infrastructure), although the exact increase is not stipulated at this point.

As well as legislation for the protection and improvement of nature, both the EU 2025 directive and the UK 2021 Act include plans to improve plan making. At the EU level, this will be implemented through the creation of national restoration plans, to be reviewed by 2032 and 2042. This target (Target 1 of the directive) ‘ensure[s] that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes’ (EU 2024: 3). This is equivalent to the creation of local nature recovery strategies under the 2021 Act in the UK, albeit at the national, rather than local level.

How the EU and UK approaches compare is not straightforward, not least since gains in *biodiversity* and increases in *green spaces* or in *habitat types* are not straightforwardly comparable. Some feel that the UK’s biodiversity clauses are more stringent than those implemented in the EU. On the other hand, Gravey and Jordan (2023) characterise British environmental policy-making after Brexit as a new form of governance, ‘disengaged’ from the EU environmental rule book, and testing new forms of implementation (e.g. ‘more top-down’). They argue that without a better understanding of the causal mechanisms through which this new form of governance shapes outcomes, “the outcomes may not become clear for many years.”

All EU regulations were transposed into UK law, until the transposition deadlines for EU regulations stretched beyond the date that the UK left the EU (January 2020). This is illustrated in the table below.

EU Package / framework	Relevant Directives	Relevant UK Transposition / equivalent
1992 EU commitments to international Convention on Biological Diversity (CBD).		2004 UK Biodiversity Action Plan (UK BAP) formed part of the UK’s national obligations towards EU commitments
2006 EU Biodiversity Action Plan	Habitats Directive (92/43/EEC) Nitrates Directive (91/676/EEC) Birds Directive (2009/147/EC, originally 79/409/EEC)	All specific directives were transposed into UK law. The Action Plan itself is not transposable law, but objectives informed creation of subsequent UK biodiversity policy frameworks and updates, ensuring coordination with

	<p>Water Framework Directive (2000/60/EC)</p> <p>Environmental Impact Assessment Directive (85/337/EEC, amended by 2014/52/EU)</p>	EU and global biodiversity objectives.
2011 EU Biodiversity Strategy to 2020	Did not introduce new directives but built on and strengthened earlier biodiversity policies	The Strategy itself is not transposable legislation, but objectives informed creation of the 2012 UK Post-2010 Biodiversity Framework
2013 EU Strategy on Adaptation to Climate Change	Did not introduce new directives but built on and strengthened earlier biodiversity policies	The Strategy itself is not transposable legislation, but informed the 2013 UK government's National Adaptation Programme (NAP) for 2013–2018
2020 EU Biodiversity Strategy for 2030	Did not introduce new directives but built on and strengthened earlier biodiversity policies	<p>Not transposed into UK law, since it was adopted after the UK left the EU</p> <p>The equivalent UK legislation is the 2025 UK National Biodiversity Strategy and Action Plan (NBSAP) for 2030</p>
2021 EU Strategy on Adaptation to Climate Change	Did not introduce new directives but led to the creation of new commitments including the Nature Restoration Law (2024/1991), a regulation aiming to restore at least 20% of the EU's land and sea areas by 2030, with binding restoration targets for specific habitats and species.	<p>Not transposed into UK law, since it was adopted after the UK left the EU.</p> <p>The equivalent UK legislation is the Environment Act 2021.</p>
2019: EU Green Deal	2024 EU Nature Restoration Directive	<p>Not transposed into UK law, since it was adopted after the UK left the EU</p> <p>The equivalent UK legislation is the Environment Act 2021.</p>

Table 12. Transposition of EU regulations to the UK national level

5.2 The implementation process

As noted by the UK House of Lords Inquiry into Nature-based solutions for climate change, The UK government's focus for NBS has been „mostly on large-scale land sparing approaches, such as large-scale tree planting and peatland restoration“ (UK Parliament 2021). The funding mechanisms associated with these kinds of interventions, largely focussing on landscapes like farmland, grassland and woodland, without residential development, are unlikely to have an impact on housing inequalities beyond the fact that the UK has focused most NBS funding streams towards areas without housing.

NBS strategy in areas with housing development receive very little government funding, but are guided by two legislative frameworks. Firstly, the 2024 Biodiversity net-gain legislation requires all new housing development (of every tenure) to provide a 10% net-gain in on-site biodiversity (delivered through NBS provision). This means that NBS are provided through all new housing development, and are the responsibility of private, public and non-profit housing providers and developers. Secondly, all local authorities are required under the Environment Act 2021 to draw up Local Nature Recovery Strategies, which will guide the provision of NBS by housing providers in local areas, according to Biodiversity net-gain law.

Biodiversity net gain

Biodiversity requirements for all development and regeneration became effective from 12th February 2024, meaning that the majority of major new planning development will require an element of NBS. From 2nd April 2024, small developments were also asked to delivery on biodiversity requirements. The law states that developers must ensure a minimum 10% net gain in biodiversity (based on a pre-development assessment of the land they are developing), in order to secure planning permission.

One goal of this legislation is to deliver positive outcomes for nature, and ,leave the environment in a better state than it was found (The Environment Agency, 2024). A further goal is to encourage developers to chose areas for redevelopment that are already lacking in biodiversity, since a net-gain requirement of +10% is far harder to achieve in biodiversity hotspots. The goal is thus also to guide development into areas with the least nature value, keeping new housing away from green spaces.

While biodiversity net-gain is site-based and therefore incremental, it is mandated by the 2021 Environment Act, and therefore is a powerful tool for enforcing the delivery of NBS in the UK, providing clarity to developers about their obligations, and grounding NBS delivery in local authorities' local nature recovery strategies.

Local nature recovery strategies

There is currently no comprehensive landscape planning instrument in England and Wales (although there is for Scotland). This means there currently exists no high-level coordination as to conservation efforts, landscape management or NBS at the national scale. Local nature recovery strategies may go some way to plugging this gap, since they should be drafted by every local authority, and will eventually cover the whole of England. Nevertheless, while preparation and delivery will be supported by central government, these strategies are locally-

led, and must be designed and implemented by the local authorities themselves (although the Greater London Authority (GLA) is presently drafting a London-wide nature recovery strategy and will subsequently provide guidance to all London Boroughs).

The purpose of these plans is to identify local priorities and map out proposals for specific actions to provide environmental benefits in each area. For example, key elements to be included in the strategies, as set out in the central government guidance (DEFRA 2023) are a statement of biodiversity priorities and a local habitat map, as well as mapping “opportunities for the use of NBS for wider environmental issues like flooding, climate change mitigation and adaptation, or poor water quality” (UKGBC 2023 A). These plans will therefore set the local vision and framework against which developers will need to make their proposals for NBS delivery, as part of the binding new biodiversity net gain requirements.

The mitigation hierarchy

Biodiversity net gain is underpinned by the ‘mitigation hierarchy, as set out in the National Planning Policy Framework (NPPF) (UKGBC 2023 B).

This provides a sequence of four approaches to addressing potential damage to biodiversity from development. ‘Avoidance’ of damage is the approach that should be prioritised in all planning applications, before ‘minimisation’ and ‘mitigation’ measures are considered, and finally ‘compensation’ or offsetting of any damage.

Before development can take place, developers must provide evidence within a Biodiversity Net Gain Plan, outlining evidence of the steps taken to avoid and/or minimise adverse impacts to biodiversity. Proposals must provide strong rationale and evidence for forgoing avoidance and mitigation measures (on-site NBS, delivered as part of new development), in order to justify offsetting or compensating for any damage off-site (off-site NBS, delivered elsewhere, and usually in rural locations). The rationale for offsetting or compensating for damage to biodiversity, rather than avoiding, minimising and mitigating it, cannot include considerations of financial cost (UKGBC 2023 B).

Off-site NBS delivery as part of developers biodiversity net gain obligations will also be directed by local authorities’ Local Nature Recovery Strategies. Where NBS for biodiversity net gain cannot be achieved on-site after consulting the mitigation hierarchy, off-site opportunities should be identified, giving priority to local enhancements (UKGBC 2023 B). Compensation or offsetting through NBS delivery outside of the local area will be given a ‘multiplier’ of 0.5, meaning that developers will need to contribute greater biodiversity value off-site, than those who deliver on-side NBS in new developments.

Financial support

There exist several grant schemes for NBS that are open to applicants. These tend to have a rural focus, concentrating on landscapes and habitats such as farmland, grassland and woodland. Since there is no housing development permissible on farmland, grassland or woodland, and these kinds of landscapes tend to be large stretches of natural environment without residential developments, these funds are not relevant to this study’s focus on housing and housing inequalities.

Name	Institution	Details	Urban or rural focus
Nature-based Solutions for Climate programme : Habitat creation grant	Natural England, Environment Agency, Forestry Commission, Board of Trustees of the Royal Botanic Gardens Kew, Department for Environment, Food & Rural Affairs, Department for Business, Energy & Industrial Strategy and Department for Energy Security and Net Zero	Offers one-off grants to partnership-led pilot projects. Projects must achieve habitat creation and restoration at a landscape scale - an area of at least 500 hectares in size. Date: 2022	Rural farmland, grassland and woodland
Nature-based Solutions for Climate Change at the Landscape Scale	Natural England with the Environment Agency, the Forestry Commission and Royal Botanic Gardens Kew at Wakehurst, Kew's wild botanic garden in Sussex.	2021: £12.5m pilot programme to test approaches for creating and restoring species rich habitats 2022: one-off grant offering a small number of projects a share of £5m funding to pilot these approaches. The habitats prioritised for this research programme include those found within a mixed land-use system typical of the English countryside. This includes grassland, scrub, hedgerows and woodland though other habitats may still be eligible for funding.	Rural farmland, grassland and woodland
Environmental Land Management schemes	Department for Environment, Food and Rural Affairs (DEFRA)	The SFI (Sustainable Farming Incentive) will pay Farmers are paid to adopt and maintain sustainable farming practices that can protect and enhance the natural environment alongside food production, and also support farm productivity CSHT (Countryside Stewardship Higher Tier) provides financial incentives for farmers to look after and improve the environment. The Higher Tier agreements will be bespoke, developed with the input of Natural England or Forestry Commission advice. Landscape Recovery will pay landowners or managers who want to take a more radical and large-scale approach to producing environmental and climate outcomes through land use change and habitat and ecosystem restoration.	Rural farmland, grassland and woodland

Nature for Climate Fund		Provides £750 million up to 2025 of public funding for tree planting and peatland restoration. This will be the main source of funding for tree planting and for peatland restoration until 2025, when it will be replaced by ELMs. The policy is set out in the England Trees and Peat Action Plan 2021-24	Rural farmland, grassland and woodland
Natural Environment Investment Readiness Fund		This offers grants of £10,000–£100,000 to support environmental projects in England. These projects would support research that enables a market-based approach to restoring nature. It will be replaced by the £30 million Big Nature Impact Fund.	Rural farmland, grassland and woodland

Table UK13. Grant schemes for NBS.

Other public interventions

Several public-private partnership initiatives and other public interventions have been geared towards the use of NBS in the UK; again, these tend to have a remote rural focus, and are therefore not pertinent to this study.

Name	Institutions	Details	Urban or rural focus
Nature Returns Programme	Natural England in partnership with the Environment Agency, Forestry Commission, RBG Kew at Wakehurst and six Local Partnership Projects. Co-sponsored by Defra and DESNZ	£17m programme to build the evidence for nature-based solutions to climate change and biodiversity loss. Six local partnership projects have been established to pilot nature-based solutions for climate change, through the creation of habitats. These are located across England from Plymouth to Northumberland. 628 ha of species rich habitats and 9 km of hedgerow have been created at these local partnership sites. The habitats have been selected as those with the potential contribute to the uptake and storage of carbon but for which the evidence base is poor, including biodiverse grasslands, wetland mosaics, scrub, semi-natural woodland and hedgerows.	Rural farmland, grassland and woodland
UK Inter-Agency Group	Membership of the IACCG includes: Natural England,	The Inter-Agency Climate Change Group (IACCG) will showcase 12 projects on Nature-based Solutions from across the UK at its stand at the	Rural farmland, grassland

	Natural Resources Wales, NatureScot, Northern Ireland Environment Agency, Joint Nature Conservation Committee (JNCC), Environment Agency, Scottish Forestry, Scottish Environment Protection Agency (SEPA), Forestry Commission, Forestry England.	UN Climate Change Conference in Glasgow. To showcases some of the very best examples of projects on Nature-based Solutions from across the four countries of the UK	and woodland
The Nature Recovery Network	DEFRA	The Nature Recovery Network is a growing national network of wildlife-rich places, stretching from our cities to countryside, mountains to coast. It is supported by green and blue spaces that buffer and connect these wildlife-rich sites.	Rural farmland, grassland and woodland

Table UK14. Other public interventions for NBS

EU funded projects

Name	Details of the project	UK case	Case specifics
CLEVER Cities	A European-funded project that trialled working with local citizens to 'co-design' the regeneration of urban areas to make them greener and healthier. London was chosen as one of three lead cities along with Hamburg and Milan.	The London project was a partnership between the Mayor of London, Peabody, Groundwork London and Social Finance.	CLEVER Cities Thamesmead: The project used 'nature-based solutions' to address local urban challenges in Thamesmead, South East London. This meant using landscape, planting and nature to help regenerate an area to provide environmental, social and economic benefits. It included traditional features like parks and green spaces, as well as 'urban greening' like rain gardens and street trees.

Table UK15. EU funded projects for NBS

5.3 Size and role of the market

Major characteristics of the market framework of NBS

The UK government are encouraging private investment in environmental improvement, through their 'green finance strategy (HM Government 2023 A).

To encourage 'a step-change in levels of investment', the Green Finance Strategy represents the governments efforts to '[equip] the market with the information and tools necessary to drive

the transition'. This includes publishing a 'nature markets framework' explaining that markets will be developed to attract investment into natural capital. This framework explains that the introduction of compliance markets in England for biodiversity net gain will allow developers to buy units from habitat creation projects to meet their obligations to mitigate the environmental impacts of development and contribute to the recovery of nature'.

This market is central to developers' ability to compensate for, or offset, NBS provision as part of their biodiversity requirements. Where developers do not provide NBS on site, they will be able to tap into the market for off-site NBS provision, by investing in land and NBS in other areas.

This growing market for biodiversity offsetting is, in some quarters, seen to be contributing to the financialisation of land, since landowners may start to view their land as a source of new income. Some view the market as relatively uncoordinated, since there is as yet no coordinated system of landscape planning across England. Without a comprehensive landscape plan, offsetting investments may be made according to market principles (i.e. developers may make their investment decisions according to the simplest and most straightforward options available, and landowners may participate in this market by selecting the highest bidder able to capture those investments, rather than offsetting investments being coordinated according to carefully designed parameters about where biodiversity compensation might achieve its best results in terms of social and biodiversity value).

How dominant are purely market-based interventions?

The UK government has placed great stock in protecting and restoring nature through market mechanisms. The UK's flagship NBS policy, the biodiversity net-gain requirement, is one that works through setting the right framework for market provision, rather than a state-led provision of NBS or the protection of nature. Very much like S106 (of the Planning and Compulsory Purchase Act 2004 – the UK's flagship affordable housing delivery policy whereby a proportion of all newly developed housing provided by private developers must be 'affordable', rather than affordable housing being provided on its own terms, directly through the public sector and separate from housebuilding by private developers) the biodiversity net-gain policy is dependent on the work of private developers, requiring the provision of NBS to be incorporated as a condition of operating within this market, rather than NBS provisions being made on its own terms, in the basis of the public interest, through public sector actions.

The requirement that local authorities develop local nature recovery strategies should go some way to correcting the lack of a comprehensive landscape planning instrument in England and Wales. While this instrument does not provide a strategic landscape plan to align NBS provision across the country, these plans should provide the public sector with some level of control, determining how the provision of NBS in local areas (through policies such as biodiversity net-gain) can be more aligned with their own local plans and policies. At the same time, without the benefit of an overarching national strategic plan for NBS, this could place a lot of responsibility at the door of local authorities, not least corraling and negotiating with the private sector over the specific nature of NBS provision. Local authorities may well need to establish their own frameworks for monitoring, assessments and indicators, both in order to design comprehensive plans and requirements for NBS provision that is fitting to the specific

needs of their local area and population, and in order to enforce those plans and monitor their results as actioned by the private sector. This could require developing a new layer of expertise at a time when many local authorities are underfunded and facing resource and capacity constraints. We may find that there is uneven capacity across different local authorities depending on the pre-existing inequalities and capacity constraints within different areas. Some local authorities may be more willing, or able, to finance external consultants for the development of their own policy frameworks for plan making. Others may be more willing, or able, to work with private developers in ways that ensure the public interest is best served by NBS provision through private development. It may be interesting to investigate, at the interview stage, whether the different capacity constraints of local authorities in different parts of the country could have implications for how NBS is rolled out in practice, through interactions with the developers engaged in these processes. A further question is how different local authorities are able to modify and mediate the specific ways that NBS provision within privately coordinated housebuilding might impact housing access and affordability for local populations.

5.4 The multilevel governance process

The House of Lords Science and Technology Committee holds the government to account on its policies relating to science and technology, principally through undertaking enquiries, such as the 2021 inquiry into Nature-based solutions for climate change (UK Parliament 2021). This process allows interest groups to feed into the policy making process, by calling for written and oral evidence from national and local experts. The Inquiry then uses this evidence to interrogate the government’s policies for NBS, including the Local Nature Recovery Strategies.

Evidence to this enquiry was provided by the following interest groups:

Interest group name
Scottish Forestry
IUCN UK Peatland Programme
UK Centre for Ecology and Hydrology
Nature Programmes, Green Finance Institute
Finance Earth
Country Land and Business Association (CLA)
Science and Nature, National Trust
Scotland’s Rural College (SRUC)
Climate Change, Natural England
Forest Services, Forestry Commission
Environment Agency
National Farmers Union (NFU)
Marine Management Organisation (MMO)
Royal Society for the Protection of Birds (RSPB)
Nature and Climate Change, NatureScot
Scottish Forestry
Blue Marine Foundation
Bright Blue
British Ecological Society (BES)
Climate Solutions Exchange
UK Centre for Ecology and Hydrology
Food, Farming and Countryside Commission
Finance Earth

Forest Canopy Foundation
Game and Wildlife Conservation Trust
Landscape Decisions Programme Network
MyOcean Resources Limited
National Association for Areas of Outstanding Natural Beauty (NAAONB)
Soil Association
Society for Applied Microbiology (SfAM)
Sustainable Soils Alliance
Wilder Carbon Ltd
Wildfowl and Wetlands Trust
The Wildlife Trusts
WWF

Table UK16. Interest groups providing evidence to the 2021 Parliamentary inquiry into Nature-based solutions for climate change

This inquiry identified challenges relating to the implementation of Local Nature Recovery Strategies (UK Parliament 2021), and a response from the UK Government (DEFRA 2021), as follows:

Recommendations made by Parliament	Government response
<p>We recommend that the Government follows the recommendations from the Committee on Climate Change in setting targets for nature-based solutions. Where it does not do so, it should provide an evidence-based explanation as to why not, and how it can still reach net zero. It should define terms in its pledges where definitions are contested; this applies particularly to the term “protected”.</p>	<p>We are introducing legally binding long-term environmental targets under the Environment Act, which will drive action by successive governments to protect and enhance our natural world. These targets will cover nature-based solutions, including creating or restoring in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels and increasing woodland cover from 14.5% to 17.5% of total land area in England by 2050.</p>
<p>We recommend that the Government establishes ambitious skills and training programmes for land managers, authorities developing Local Nature Recovery Strategies and public delivery bodies. Training in surveying, monitoring and verifying, carbon accountancy, forestry, ecology, and planning and carrying out naturebased solutions needs to be expanded urgently. The Department for Education and the Department for Business Energy and Industrial Strategy must allocate some of their funding to this effort to make schemes accessible to land managers and provide sufficient skilled personnel to meet targets</p>	<ul style="list-style-type: none"> • To ensure that responsible authorities are ready for Local Nature Recovery Strategy rollout, we will provide materials, resources, and specialist advice from Defra ALBs. • Natural England is scoping the potential to create an Environmental School of Excellence both to develop in-house capability, standards and professionalisation, and to support the wider sector to deliver local nature-based solutions
<p>We recommend that the Government provides additional support as a matter of urgency for land managers, in the form of a dedicated advisory service, to help them engage with Environmental Land Management Schemes. The advisory service should be delivered in collaboration with public delivery bodies and should help land managers through the application process. It should help farms to identify the most</p>	<p>We want the environmental land management schemes to be user friendly, and easy to access and engage with, so that advice can focus on where it will really add value. The Future Farming Resilience Fund has been developed to provide free business support to farmers and land managers during the agricultural transition. ALB advisers will also provide free support to</p>

<p>appropriate actions to take, the support they need and can expect, and the likely environmental impact of their actions.</p>	<p>encourage good engagement and ensure high quality agreements.</p> <p>We are exploring through our tests and trials and detailed policy design work the likely need for advice in these schemes, how best it could be delivered, and who is best placed to provide it.</p>
<p>We recommend that the Government develops an overall land use strategy. This should outline how nature-based solutions will contribute to net zero emissions, how they will be integrated with other policies and how trade-offs in land use will be managed. The Government needs to describe how the UK's land can deliver the multiple services demanded of it without offshoring emissions. The Government should work with large landowners, including land and marine managers such as the Ministry of Defence and the Crown Estate, to achieve its objectives.</p>	<p>Meeting our climate targets will require careful consideration about the way we use our land, considering tree planting, peatland restoration and biomass production. We are also exploring other demands on land to meet governments commitments on biodiversity and nature recovery, climate adaptation, housing and infrastructure, and food security. Defra is currently conducting spatially explicit analysis bringing together social, physical, economic, and ecological evidence to assess the level and type of changes indicated by government commitments. This analysis will help to support multifunctional land uses and inform our approach to managing trade-offs. This approach and the need for a land use strategy will be kept under review as the work progresses this year.</p>

Table UK17. Recommendations presented by the 2021 Parliamentary inquiry into Nature-based solutions for climate change, and response from government

With regard to the built environment (rather than remote rural areas) NBS policy in the UK amounts to the biodiversity net gain requirements placed on developers, and the requirement for all councils to have a Local Nature Recovery Strategy in place, providing a strategy for developers' biodiversity net gain contributions.

Thus, the UK's NBS policy is effectively a national framework, coordinated by local authorities, and delivered by the market. This requires that local authorities develop or acquire skills in measuring the performance of different NBS, in prioritising interventions, in how NBS benefit different groups of people differently, in creating and using indicators, and in understanding and communicating the various and multiple benefits of different NBS to developers and to the public. Developing these skills requires capacity at a time when local authorities are under resourced and lack in-house expertise, and there is a risk that this type of multi-level policy coordination could amount to 'responsibility dumping' by the national government onto local authorities, without clear guidance and additional resources. The House of Lords Inquiry into Nature-based solutions for climate change recognised the need for "ambitious skills and training programmes for [...] authorities developing Local Nature Recovery Strategies" (UK Parliament 2021), to which the government have responded that they are providing "materials, resources, and specialist advice from Defra ALBs" (DEFRA 2021). Some feel that local authorities have more questions than answers, indicating a fragmentation of policy between the national and the local level.

Nevertheless, in advance of the Local Nature Recovery Strategies which local authorities are mandated to have in place in 2024, there already exist many local authority frameworks, strategies and initiatives for NBS, including town hall and community plans, both in place and

under construction (see e.g. Massini et al 2021 for the London Borough of Hackney, or London Borough of Islington 2020b). Thus while some feel the NBS policy is poorly coordinated at the UK scale, the reality is that some areas have plans and policies in place that have allowed them to hit the ground running with the new requirements. The degree to which this varies across the UK may depend on resourcing, local politics, and the mix of professionals working at each authority. This also opens a space for consultancies to assist local authorities with developing metrics for NBS and biodiversity measurement, with designing monitoring frameworks, with measuring and mapping benefits, and assessing the potential for scaling up, for example.

Additionally, local authorities are supported by Natural England, a non-departmental public body designed to advise the government on the natural environment in England. Natural England provide authorities with access to evidence and technical information notes, as well as launching the Responsible Authority Network, a ‘forum for enhancing capability and capacity within and across [authorities] to assist in preparing high-quality LNRs’, and recruiting Nature Recovery leads to support plan delivery, as outlined in their letter to chief planners (Natural England 2024).

Authorities may also be supported by a tier of regional government where one exists (e.g. the GLA in the case of London). The GLA have developed various initiatives, including a policy inventory to create a more holistic understanding of NBS and green infrastructure and the London green infrastructure framework (currently under construction), as well as pre-existing frameworks such as the London Environment Strategy and the All London Green Grid (ALGG), a policy framework to promote the design and delivery of green infrastructure across London.

Key actors and institutions

Institution type	Name	role
Local and regional governments	Numerous	Local authorities are responsible for designing and implementing the new Local Nature Recovery Strategies, often supported by a range of consultants.
Central Government	Department for the Environment, Food and Rural Affairs (DEFRA)	DEFRA are responsible for all biodiversity legislation, and mandating the requirement for Local Nature Recovery Strategies. They are also the department responsible for sponsoring Natural England, the Environment Agency, and the Joint Nature Conservation Committee.
	Natural England (non-departmental public body)	Natural England provides advice to central government, and supports local authorities. It is responsible for ensuring that England's natural environment, including its land, flora and fauna, freshwater and marine environments, geology and soils, are protected and improved.
	The Environment Agency (non-departmental public body)	The Environment Agency is concerned with ‘creating better places for people and wildlife’. The development of biodiversity net gain policy and guidance has been a collaborative effort

		between DEFRA, Natural England, the Forestry Commission and the Environment Agency.
	Joint Nature Conservation Committee (JNCC) (non-departmental public body)	JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation. The Committee monitors biodiversity, evaluates options and provide advice to ensure that the natural environment is protected in an effective way.
	UK Inter-Agency Climate Change Group (IACCG)	The UK Inter-Agency Climate Change Group (IACCG) brings together representatives from the UK environmental agencies. Membership of the IACCG includes: <ul style="list-style-type: none"> • Natural England • Natural Resources Wales • NatureScot • Northern Ireland Environment Agency • Joint Nature Conservation Committee (JNCC) • Environment Agency • Scottish Forestry • Scottish Environment Protection Agency (SEPA) • Forestry Commission • Forestry England
Experts, interest groups and NGOs		There exists a myriad ecosystem of of NGOs, often working with local authorities. These are almost countless but some examples are given here: <ul style="list-style-type: none"> • Parks for London works with landowners and managers to protect and improve London's green infrastructure. • The Nature-based Solutions Initiative are an interdisciplinary team based at the University of Oxford seeking to shape policy and practice on nature-based solutions, producing case studies, guidelines, research, reports and other resources. • Thames21 is the voice for London's waterways, working with communities to improve rivers and canals for people and wildlife. They have a programme on urban wetlands, and champion the use of natural flood management and sustainable urban drainage systems, which are sub-categories of NBS.

Table UK18. Key institutions involved in the policy cycle for NBS

5.5 Achievements, assessments, and challenges

Nature is viewed as an asset in the UK real estate sector, and as something that enhances real estate value (Juntti and Ozsezer-Kurnuc 2023). A significant category of impact for NBS

is the value of residential properties, and therefore the potential for green gentrification in neighbourhoods benefitting from NBS interventions.

Where developers design their Biodiversity Net Gain Plans with enhancing property values in mind, they may pursue a limited range of NBS, which may not provide the greatest natural or social value in newly developed areas. There currently exist no metrics of social value for NBS (Juntti et al 2025), making it difficult for authorities to negotiate these benefits for local residents. In particular, solutions may be chosen which deliver limited community value, or which benefit certain privileged groups and types of use, over others (Juntti et al 2025). Choices around location may also channel economic, social and environmental benefits into the most expensive and desirable areas of mixed-tenure developments, stratifying communities and entrenching inequalities.

Additionally, BNG requirements increase the delivery and maintenance costs associated with new housing development. Against the backdrop of polycrises increasing the costs of construction, and stagnating house values, developers may seek to offset costs by negotiating down their planning gain contributions (for social homes) through viability assessment negotiations with local authorities. For registered providers of social homes who cannot make such viability negotiations, this makes the delivery of affordable housing schemes more challenging. This could produce an unequal playing field between different kinds of housing providers, in terms of their ability to negotiate rising costs.

The uneven nature of local authorities' capacity to design and deliver Local Nature Recovery Strategies may also be significant. This is the tool through which authorities can corral natural and social value from private developers' biodiversity net gain contributions, according to the public interest. Where local authorities are well placed to seek the support of consultancies and design effective strategies, they may be able to lessen the extent of green gentrification. That being said, authorities depend on the finance made available from private development for their provision of social housing and other community goods. This feature of the UK housing system may disincentivise authorities from negotiating with developers over the type and location of NBS delivery, so that communities benefit from the biodiversity value that is protected by law.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Coordinating biodiversity net-gain (BNG) contributions for new development (a legal	BNG requirements increase their delivery and maintenance costs, and means getting a deliverable affordable housing scheme to work is harder.

<p>requirement in the UK) both on- and off-site is a recent addition to affordable housing providers' costs – with the potential to affect affordable housing delivery.</p>	<p>In some urban areas BNG contributions for new development will be particularly expensive, where the urban area is dense or doesn't have the infrastructure required for NBS (e.g. filtration, soil, space).</p> <p>The new BNG regulations have increased the number and range of consultancies that housing providers (both social housing providers and private developers) need to pay, which also raises the costs associated with housing development.</p> <p>Additionally, on sites developed by private developers, rising costs associated with BNG contributions could lead to reduced numbers of social homes in new developments, as private developers and housebuilders seek to offset costs by negotiating down their planning gain contributions (for social homes) through viability assessment negotiations with local authorities.</p>
<p>Where developers design their BNG Plans with enhancing property values in mind, they may pursue a limited range of nature-based solutions (NBS), which may not provide the greatest natural or social value in newly developed areas.</p>	<p>Additionally, bigger private developers may be able to reduce their BNG contributions on account of rising costs.</p> <p>Since affordable housing providers are more regulated than private developers, they are less able to circumvent their BNG requirements. This could produce an unequal playing field between different kinds of housing providers, in terms of their ability to negotiate rising costs.</p>
<p>Choices around location may also channel economic, social and environmental benefits into the most expensive and desirable areas of mixed-tenure developments, entrenching inequalities.</p>	<p>Biodiversity-rich sites may be less likely to be allocated for social homes, because they will be unviable for social housing providers.</p>
<p>The different capacity constraints of local authorities could have implications for how NBS are rolled out in practice, through interactions with the developers engaged in these processes.</p>	<p>Local authorities have inconsistent capacities, and also are given responsibility for how Local Nature Recovery Strategies and BNG contributions should be coordinated in practice, leading to inconsistencies, complexities and additional costs for housing providers.</p> <p>A multi-level governance 'disconnect' was noted between central government and local authorities. While central government has established BNG requirements for new development and some guidance, it falls to local authorities to say how this should work in practice. This disconnect often manifests in the use of external consultancies to manage the</p>

	relationship between central and local government. This can result in inconsistencies in the approaches of different local authorities, which also exacerbates the complexity, and additional costs, faced by housing providers (both private developers and social housing providers) working across multiple authorities.
Potential for green gentrification in areas identified for large-scale redevelopment	Regeneration projects which leverage nature to improve social value, quality of life, inward investment, tourism, or reputation could lead to green gentrification, particularly if these require the demolition and removal of existing homes to make space for nature-based solutions and nature-focused landscape architecture. Funding from Homes England for the construction of new social housing will be crucial to mitigating inequalities.

Table UK19. Summary table

6 Densification

6.1 The policy cycle: emergence of the issue and policy decisions

Emergence of the issue in national policymaking

On the face of it, housing densification in the UK can be considered part of the central government's low-carbon strategy. Densification has come to be understood as a way to encourage less carbon intensive lifestyles, reducing car dependency and domestic emissions (Quinio and Rodrigues 2021). Threads of the green agenda can be found in the UK Government's discussions around denser, mixed-use or 'walkable' neighbourhoods. For example, the UK Environmental Improvement Plan 2023 included the commitment „that everyone should live within 15 minutes walk of a green or blue space.“ (HM Government 2023 C). This is resonant of the '15 minute city' concept, which aims to tackle both the climate crisis and urban sprawl through the creation of dense, mixed-use urban neighbourhoods (Moreno 2016: The 15-Minute City: A Solution to Saving Our Time and Our Planet).

In recent years, the UK government's rhetoric around inner-city densification and new urban extensions has also been framed in these terms. Policies like the relaxation of planning rules to allow for the conversion of industrial sites and retail spaces into homes in city centres have been framed as part of a plan to create denser, 'walkable', livable communities. In July 2023, then Secretary of State for Levelling up, Michael Gove, said that government would be “unequivocally, unapologetically and intensively concentrating our biggest efforts [to increase housing numbers] in the hearts of our cities". (BBC 2023). This went hand in hand with the recommendation that “local planning authorities are not expected to review the Green Belt to

deliver housing” (Michael Gove, quoted in CPRE 2022), and represented discourses around prioritising nature and environmental concerns.

However, looking at the history of densification in the UK shows it has deeper roots, and emerged very separately to the green agenda. Neither is there a significant EU dimension to densification in the UK; densification policy within the UK has its own very distinct historical context. The foundation to UK densification strategy is found in the 1955 Green Belt Circular (Circular 42/55) of the Ministry of Housing and Local Government, prior to the UK joining the EU. This policy outlines five key purposes, amongst which are to check the unrestricted sprawl of built-up areas, and to assist in urban regeneration by encouraging the recycling of brownfield urban land. While this does not reference densification directly, the policy of recycling inner-city brownfield land and restricting urban sprawl is in effect, in a context of rising populations, a policy for urban densification, prioritised in UK planning policy from the 1950s onwards. This policy guided densification in the UK until the early 2000s, when the pressure for increased housing development in the UK became particularly acute, and led the New Labour government to strengthen urban intensification policy through strategies like the Sustainable Communities Plan (see below). Thus, densification has been consistently prioritised in the UK and sits largely outside the influence of EU intervention, as well as sitting outside of sustainability concerns.

Many of the areas currently being densified in the capital were demarcated in the 2004 London Plan as Opportunity Areas (OAs), which defines London's key locations with potential for substantial provision of new jobs and homes (OAs typically have capacity for at least 2,500 homes or 5,000 jobs). These were part of the Central London Growth Corridor, steering densification through large-scale development and regeneration in areas already supported by key transport infrastructures or linked to potential public transport improvements (new London Underground lines, stations or multi-modal nodes). OAs have been unlocking large pieces of (publicly-owned) land through the regeneration of large social housing estates, active industrial estates with low density, and inactive brownfields. There are similar to programmes in other large and middle-sized de-industrialised cities in England, that have followed the London OA model, we focus here on the London model as illustrative of this paradigm. Despite the substantial increase in housing provision by the private sector and non-profit sector, this mode of densification has driven a loss or transfer of social housing stock, processes of residential displacement into peripheral areas, and gentrification.

By analysing and understanding the actual underlying rationales behind densification in the UK, as well as the mechanisms and policy processes that have been used to achieve it, this calls into question the strategic relationship between densification and the net-zero agenda. Instead, we suggest that densification is more closely linked to the politics of land and the residualisation of social rented housing in the UK. Within the mechanisms for housing delivery that have been established as part of the UK housing (and planning) system, regeneration and densification are processes through which housing provision – and the land underlying housing provision – have become privatised, and the land and housing system is further re-commodified. This form of urban development has been prioritised in the revitalisation of cities and, notwithstanding current discourses around walkability, sustainability and inclusivity, they can radically increase housing inequalities in the affected areas.

In the UK we can distinguish between ‚hard‘ densification (large-scale (re)development projects concentrated on large pieces of land, usually kick-started through legislative catalysts such as Growth Corridors and Opportunity Areas, and often focused on regenerating pre-existing social housing estates, brownfield and active industrial sites), and ‚soft‘ densification, sometimes called “English-style densification“ (Touati 2015) (small-scale development scattered throughout the city or rural areas, such as infil sites, garden ‚grabbing‘, rural exception sites, windfall sites, conversion of single-family houses into apartments, and small-scale redevelopments using permitted development rights).

1930s-1990s: Metropolitan green belt policy as the foundation for urban densification

Densification is an important aspect of the UK’s green belt policy (as set out in the National Planning Policy Framework), which was established in 1955 and designed to encourage development within settlement boundaries, in order to limit urban sprawl. Ecological sensitivity grew in the 1970s - 1990s, with this policy being championed for reasons of environmental protection, and densification of inner-city areas established as an ideal

2003: Sustainable, ‚mixed‘ communities

The Sustainable Communities Plan was intended to guide redevelopment across England. The plan prioritised urban intensification across England and identified key Housing Growth Areas for concerted densification: The Thames Gateway, The London–Stansted–Cambridge–Peterborough Corridor, Milton Keynes–South Midlands, and Ashford (Kent). Notably, none of these areas are in the Midlands proper or North of the country.

Additionally, under this plan, the creation of ‚Mixed communities‘ became a goal throughout the country, by which all new development should be mixed tenure, „reflecting an integrated and egalitarian society in which people of all social classes and incomes share the same space, services and facilities, creating conditions in which mutual understanding and/or shared norms can potentially develop.“ (Tunstall and Lupton 2010).

However, sites for mixed-tenure development and regeneration were identified using the indices of deprivation, to focus redevelopment in deprived neighbourhoods. Thus, the policy effectively concentrated redevelopment in areas of high social housing density, ultimately reducing the numbers of affordable homes available to the local community. The underlying rationale of ‚mixed communities‘ has been called into question. Lupton and Tunstall (2008) argue that the policy of ‚regenerating disadvantaged neighbourhoods by reconstructing them as mixed communities‘ is based on „a neoliberal analysis of the problems of low-income neighbourhoods, in which structural problems are individualised and spatialised, and disadvantaged neighbourhoods, particularly those with majority social housing tenure, are discursively repositioned as irredeemably problematic.“

2004: First London Plan under Mayor Ken Livingston: local authorities to identify areas for densification

The first London Plan, developed under mayor Ken Livingstone, stipulated that the London boroughs should survey their local areas for key parcels of land that could be made available, and where density could be increased, to meet massive local housing needs targets. These

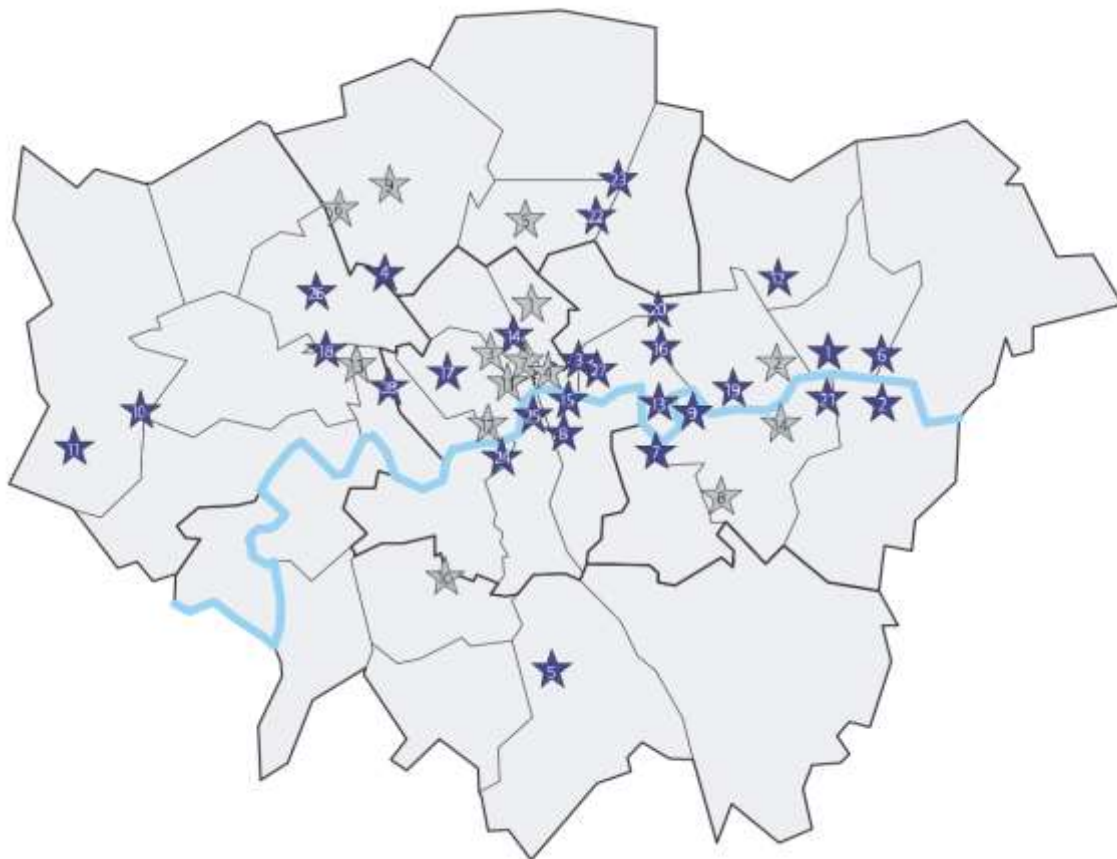
areas were to be identified in relation to their local infrastructure capacity to serve a higher density of homes. They therefore needed good connection to transport hubs, which would make them more 'sustainable'.

While the key method of densification was to draw private investment into these areas, the plan aimed to protect the provision of social and affordable housing through the substantial sums of Section 106 (S106) money that denser development could deliver (New London Architecture 2024). S106 (of the Planning and Compulsory Purchase Act 2004) stipulates that a proportion of all newly developed housing provided by private developers must be 'affordable', and the plan contained an ambitious strategic target that developers should provide 50% affordable homes (70 per cent social housing and 30 per cent intermediate housing). However, by linking social housing delivery to the proportion of private housing delivered, Section 106 means that social housing is not provided on its own terms, instead being linked to the profit requirement of the private sector. This has opened the proportion of affordable housing delivery open to negotiation within specific planning applications. At the time, there was debate about whether such high affordable housing targets would act as a disincentive for developers, or whether the opportunity to build at higher densities would draw developers into the housing programme (Blackler 2002).

Emergence of Opportunity Areas

The first London Plan contained the objective to accommodate London's growth within its boundaries, partly by allowing several 'Opportunity Areas' to intensify (or densify) in order to accommodate the growing housing need and growth in jobs (see also Chapter 3, Part B). Opportunity Areas became a baseline for a new wave of regeneration and densification across London. The Plan states: "*Opportunity Areas have been identified on the basis that they are capable of accommodating substantial new jobs or homes and their potential should be maximised. Typically, each can accommodate at least 5,000 jobs or 2,500 homes or a mix of the two, together with appropriate provision of other uses such as local shops, leisure facilities and schools. These areas generally include major brownfield sites with capacity for new development and places with potential for significant increases in density.*"

map 2A.1 Opportunity Areas and Areas for Intensification



★ Opportunity Areas

- | | |
|---|--------------------------------------|
| 1. Barking Reach | 15. London Bridge |
| 2. Belvedere/ Erith | 16. Lower Lee Valley |
| 3. Bishopsgate/ South Shoreditch | 17. Paddington |
| 4. Cricklewood Brent Cross | 18. Park Royal |
| 5. Croydon Town Centre | 19. Royal Docks |
| 6. London Riverside | 20. Stratford |
| 7. Deptford Creek/
Greenwich Riverside | 21. Thamesmead |
| 8. Elephant & Castle | 22. Tottenham Hale |
| 9. Greenwich Peninsula | 23. Upper Lee Valley |
| 10. Hayes/West Drayton/Southall | 24. Vauxhall/Nine Elms
/Battersea |
| 11. Heathrow/Feltham/Bedfont Lakes | 25. Waterloo |
| 12. Ilford | 26. Wembley |
| 13. Isle of Dogs | 27. Whitechapel/Aldgate |
| 14. King's Cross | 28. White City |

Source: https://www.london.gov.uk/sites/default/files/the_london_plan_2004.pdf

London boroughs are required to prepare Opportunity Area Planning Frameworks (OAPFs), which set the frameworks for planning applications for private development on these sites. These set out „how [local authorities] will encourage and deliver the growth potential of OAs and support development that create job opportunities and housing choice for Londoners“ (Mayor of London n.d.). In the most recent London Plan (Mayor of London 2021), Opportunity Areas are intended to support regeneration and the creation of mixed communities.

2011: London Plan under mayor Boris Johnson

London Mayor Boris Johnson abolished affordable housing targets, and while his Housing Strategy urges that schemes „must ... provide an uplift in affordable housing where viable“, in reality this created conditions where no additional social housing would be built in areas where social housing already existed, as the strategy effectively ensured only that “any affordable homes that are demolished as part of estate regeneration schemes are replaced on a like-for-like basis“ (Mayor of London 2018). During this time many redevelopment projects delivered affordable housing proportions in the low teens (New London Architecture 2024). This also occurred during a time of austerity, which meant local authorities increasingly lacked resources and capacity, something used to justify the authorities’ increasing inability to negotiate for higher proportions of social housing with private developers, due to the S106 mechanism which reduced their leverage. This plan therefore altered the mechanisms of densification to weaken value capture as a mechanism for the production of social housing.

2012: creation of the National Planning Policy Framework (NPPF)

The NPPF simplified the previously disparate and single-issue planning policy guidance notes and statements into a single national planning strategy that supported urban intensification, use of brownfield land for development, and high-density development near public transport. This national-level policy document set the framework for local urban densification strategies such as London’s ongoing Opportunity Areas and subsequent Housing Zones.

2014: Housing Zones

This programme was launched by the Mayor of London Boris Johnson, and Chancellor of the Exchequer George Osborne, creating 20 Zones in London in which homes could be delivered at greater density on brownfield land. £400 million of funding was made available, for local authorities to submit applications to designate an area of ‚majority brownfield land‘ as a Housing Zone, usually including „a bid for investment finance from private sector development partners to enable housing schemes to be unlocked or accelerated“. Each bid for Housing Zone designation was required to include „either (a) ... a bid for investment funding from one or a number of private sector partners or (b) confirm that the local authority only wishes to apply for Housing Zone designation and provide a development proposition that will be delivered without government investment.“ (DCLG 2014). Under this scheme, Housing Associations including Peabody have successfully partnered with local authorities to bid for GLA Housing Zone status in several areas.

2016: Estate Regeneration National Strategy

The estate regeneration strategy extended the logic of 2003's 'mixed communities' to encourage the redevelopment of housing estates – usually areas of social housing density – across England. The policy provided 'a detailed framework' for how local authorities can support estate regeneration in their areas, from adopting a 'place-based approach' to planning, to ensuring good design principles are adopted by developers on site, to meeting affordable housing needs on site, in order to deliver 'mixed and inclusive communities'.

The estate regeneration funding prospectus enables areas to bid for a share of £140m of loan funding, £30m of enabling grant, and £2m of capacity building funding. This financial support from government is directly targeted at de-risking the early stages of regeneration schemes and providing support to areas for such activities as community engagement, feasibility studies, scoping of proposals and masterplanning. There is also support available for preconstruction activities such demolition and moving residents.

2021: London Plan under mayor Sadiq Kahn

In Sadiq Kahn's 2021 London Plan, the affordable housing target for new development was restored to 50%, with all affordable housing to be delivered on site, unless in exceptional circumstances.

The Mayor also outlined plans to put funding in place to 'unlock' housing development and build on the Housing Zone programme. For example, the Plan outlines how in the Opportunity Area of Thamesmead, "Housing Zone status and investment by Peabody in estate renewal in the area will improve the quality of the environment and bring new housing opportunities." (Mayor of London 2021). This followed a decision in 2020 to allocate £83.7 million of GLA affordable housing grant to the Peabody Trust for the acquisition of a large brownfield site in Barking and Dagenham. Thus, strategic planning for London at this time was geared towards funding private and non-profit sector partners to deliver housing, including against affordable housing targets, in specific areas designated for densification.

2023: UK Long term plan for housing commits to 'a new era of regeneration, inner-city densification and housing delivery across England'

These plans for a "programme of urban regeneration and a new inner city renaissance" stretch beyond London: "Densification, done the right way, will transform the opportunities available to people across the country" (Gove 2023). The plans included:

- Launching a consultation on new Permitted Development Rights, [which] would make it easier to convert larger department stores, space above shops and office space.
- Establishing a new "super-squad" team of leading planners and other experts charged with working across the planning system to unblock major housing developments, underpinned by £13.5 million in funding.

This strategy went hand in hand with a statement from the Secretary of State for Levelling Up, Housing & Communities, Michael Gove, confirming that "local planning authorities are not expected to review the Green Belt to deliver housing". (Gove 2022). Ultimately this meant that densification would be the primary strategy for housing delivery across the country, with strong guards in place against greenfield development.

6.2 The implementation process

The UK system of planning for housing

The legislative frameworks used to catalyse densification are outlined in section 5.1., namely, Sustainable, 'mixed' communities, growth corridors, Opportunity Areas, Housing Zones, and Estate Regeneration (National Strategy).

Analysis of this implementation process can be extended by looking at the UK planning system, which determines the role (and relative power) of central and local government, as well as the non-profit sector (and we return to the relationships between them in section 5.3 below). This section explains how through certain planning mechanisms, the role of local government has been weakened in densification processes, as well as how the role of housing associations and power of private sector developers has grown, with implications for housing affordability.

The introduction of S106 in 1990 as the primary policy for the production and provision of affordable housing (see section 5.1) has weakened the role of setting statutory affordable housing targets for new development, since these can be negotiated down according to the viability of development for private developers. S106 agreements are negotiated and agreed during the planning process, therefore remove regulatory control over planning gain.

Several further mechanisms within the UK housing and planning system have limited the ability of local authorities to steer densification agendas or provide social housing within densification projects, including:

Local authority Housing Revenue Accounts (HRAs), a system of ring-fencing council revenue on housing (from social rents and Right-to-Buy sales) for spending on housing delivery, were introduced in the 1989 Local Government and Housing Act. With the pool of local authority housing shrinking with the RTB, this prevented local authorities from cross-subsidising housing delivery from other sources of revenue, effectively limiting local authority finance for housing. HRA 'borrowing caps' (a cap on how much local authorities can borrow against their housing assets to fund new developments) were also centrally defined, further limiting local authority finance for housing until they were abolished in 2018. This also limited local authority budgets for the maintenance and management of their housing stock, residualising this stock and meaning that authorities have become reliant on non-profit housing providers (mostly housing associations) for the production and provision of social housing and delivery of affordable housing targets. During the 1980s and 1990s, much of the social housing stock owned by local authorities was transferred to the non-profit sector.

As well as using the funds available in the HRA, since 2004, local authorities have been "free to finance capital projects by borrowing, provided they can afford to service their debts out of their revenues" (UK Debt Management Office n.d.). This has been part of a shift requiring local authorities to self-finance a greater proportion of their services, with reduced government grant, and has weakened local authority financial sustainability.

Local authorities have also been encouraged to dispose of public land, through policies such as the "Right to Regenerate", which "will enable public to require councils and public sector to

sell unused land and assets” unless councils can demonstrate a clear plan for future use, for conversion into homes by the private sector (MHCLG 2021). This undermines the ability of councils to protect public land for the provision of affordable homes in the future.

The UK planning system thus renders local authorities as enablers of densification by the private sector, rather than active shapers of the densification agenda. Authorities have needed to sell assets as a source of revenue and to attract private investment for residential growth, and social / affordable housing provision where possible. This emphasis on private sector housing provision and limiting of local authority involvement means that the densification agenda has created the foundations for new forms of ‘affordable’ housing provision by the private and non-profit sector which ultimately undermine genuine affordability (e.g. intermediate housing as a form of social housing not tied to local incomes but determined according to 80% of local private rents, or Shared Ownership programmes promoting home ownership as a share of the affordable housing offer of new densification projects).

Regeneration policy and strategy

‘Soft’ densification is encouraged in UK regulatory frameworks, nevertheless it is ‘hard’ densification (large-scale regeneration projects, including inner-city estate regeneration, growth corridors, OAs, and urban extension projects into the surrounding countryside in smaller cities) that have a more significant impact on housing inequalities. This form of densification can be considered an exercise by government to stimulate private sector market activity within urban development. They are also indicative of a dis-alignment between central and national governments, through which the central government has prioritised expansion of the private housing sector (owner occupation and private rent) at the expense of social and affordable housing provision.

Growth corridors and OAs have created a legislative framework for the implementation of hard-densification through the regeneration of social housing estates, brownfield and active industrial areas, with local authorities acting as enablers of private sector development to ‘unlock’ densification. Once initiated, these programmes can span 20-25 years (some have not yet been started), creating new housing markets and a huge increase in land value, usually near current or future public transport hubs at prime locations of central and inner London (1st generation regeneration, see below for details), and more recently in the outer London boroughs supported by the extension of the London underground Elisabeth line and other public transport routes (2nd generation regeneration). These 1st and 2nd generations of regeneration are intended to support a strategy of growth in the real estate market, by attracting large amounts of inward investment underwritten by the sale of public land and poor regulation of speculative activity. Rather than pursuing public benefit on its own terms, these schemes illustrate an approach by which “the lines between the state and developer become blurred as the state becomes increasingly reliant on land value capture to achieve broader public benefit” Ferm (2023: 265).

- **1st generation regeneration** projects link to the 2003 ‘Mix-community’ policy outlined in section 5.1. This targeted central and inner-city boroughs, and was effectively the demolition of social housing estates (often moving social tenants further afield) to be replaced with denser mixed-tenure neighbourhoods, increasing

owner occupation and private rent in the area. These schemes often relied on non-profit housing providers for new social housing production, if any, and required that local authorities sell public land to developers as part of public-private partnerships, as outlined above.

- **2nd generation regeneration** replaced the governance mechanism of public-private partnerships used in the 1st wave (e.g. London Borough of Southwark partnering with Lendlease landowner-developer) with non-profit-private joint ventures (e.g. Peabody housing association partnering with Lendlease landowner-developer). The increasing role given to non-profit sector housing providers in the 1st wave was scaled up in last decade, meaning that large housing associations are now the leading actor in coordinating regeneration projects, rather than local authorities. This new role for the non-profit sector is sometimes supported by central or regional government finance (e.g. Peabody were allocated £83.7 million of affordable housing grant from the London Mayor's affordable housing programme, for the acquisition of the former Ford Stamping Plant site in Daggenham, for regeneration including 50% open market tenures and 50% affordable tenures including Shared Ownership). Non-profit housing providers will also acquire land and housing from local authorities and other housing associations before establishing a joint-venture with larger private developers (e.g. Lendlease, a transnational real estate company). There is also a potential for financialisation of these sites if, for example, non-profit organisations issue bonds to finance the regeneration. This reflects a further weakening of the role of local authorities, which no longer lead or coordinate densification projects, but rather are left as enablers of the private and non-profit sector.
- **3rd generation regeneration** shows some positive signs of a paradigm shift towards an increased role of regional government (particularly the Greater London Authority), and direct provision of social housing by some local authorities. This is exemplified by the Regent Estate in Sommerstown, London, where the existing social housing stock has been retained and infilled with new affordable housing stock. Since the removal of the HRA borrowing cap in 2018, increasing numbers of local authorities have created public companies, often called "local housing companies", for direct delivery of new social housing stock (Marrs 2019). This new direction in densification has shown promising results and may be a response to increasing recognition of the need for new social and affordable housing, as well as grassroots contestation of 1st wave regeneration.

The Current Mayor of London, Sadiq Kahn, has made efforts to increase local authority housing provision within densification projects through various initiatives, including the Council-led Housing Network (peer-to-peer support and good practice sharing), the Housing Development Academy (providing development management courses to council teams) and underpinned by funding from the GLA Affordable Homes Programme (2021-26). In 2022 Kahn introduced a £4 million programme called Land for Council Homes Revenue Fund, intended to scale up local affordable housing delivery programmes by local authorities.

6.3 Size and role of the market

Soft-densification programmes are small construction interventions, supported by the national construction industry.

Hard-densification, catalysing development at a greater pace, fuelled the construction boom of the 2000s, with a large new market from private investors, large scale developers, and international institutions. Densification was harnessed by central government as a way to pursue inward investment by these institutions, as well as attracting house purchase by international buyers through the expansion of owner occupation, particularly in London (with many homes sitting empty). Thus, estate regeneration has been a way to release land in prime locations, with value captured disproportionately by the private sector.

There has been an increased role of the non-profit sector within such schemes, as detailed above in section 6.2.

The global financial crisis of 2008 only temporarily slowed the construction boom in areas marked for densification, but led to a reorganisation of its governance, particularly through a renewed emphasis on Build-to-Rent models of private rental delivery (see Deliverable 4.1), paving the way for ‘financialisation 2.0’, in which risk-averse investors sought the more secure returns that could be achieved from private rental revenue streams. Unconventional monetary policy (e.g. Quantitative Easing) used post-2008 supported a ‘rush-to-assets’ and maintained the value of private property, and a continued prioritisation of regeneration as mechanism for drawing private investment into the housing market, urban development and the construction industry have maintained a development boom throughout this period.

Increasing pressure for new housing starts has led to changes in permitted development rights allowing office-to-residential conversions to be completed without planning permission (Madeddu and Clifford 2022) and for industrial areas with low density industries to be released for housing development (Ferm and Jones 2017).

As noted above in section 5.2, the 3rd wave of regeneration represents a recent counter-trend in this market organisation, with the GLA supporting local authority housing delivery and the creation of some innovative programmes allowing local authorities to deliver housing through mechanisms not limited to planning gain (direct delivery, rather than through S106 agreements). However, these have been relatively small in size, and are restricted by local authority capacity and power relative to central government.

The size of the ‘market’ for densification is difficult to quantify in the UK case. While international investment from Real Estate Investment Trusts (REITS) and other financial institutions surged following the 2008 financial crisis, as Ryan Collins has observed, “Detailed data on non-bank private and institutional investment into the housing market in the UK is limited. This is an area where more transparency, disclosures and research is needed.” (Ryan Collins 2024: 24). Institutional investment into residential assets rose consistently from almost 4Bn in 2012 to almost £10Bn in 2021, with £5.5bn of capital invested into UK residential assets coming from overseas (Knight Frank 2022). This market research also suggests that the proportion of institutional capital invested in residential property (over other forms of property including commercial) continues to rise (ibid). The UK has a consistent history of leveraging

deregulation, planning policy and public funds towards ushering private investment into real estate (See Deliverable 4.2, also Stirling et al 2022). Post crisis, during a low-interest-rate environment which constrained individual (and thereby institutional) investment into owner occupied housing, the government became interested in increasing investment into the private rental sector, commissioning the Montague Report (Montague 2012) which identified barriers to long-term institutional investment in purpose-built rental homes. Many of its proposals were adopted, for example the creation of a government supported Built-to-Rent development fund. Thus, while the pre-crisis market revolved around owner occupation, post-crisis this market was maintained by policies ushering investment into the PRS. While these shifts do not indicate the size of this market, they are an indication of broad policy support for and ongoing success of institutional investment into the UK real estate market, post 2008.

6.4 The multilevel governance process

Here it is worth drawing attention again to the tension that exists between central and local levels of government, which have very different priorities when it comes to housing delivery.

As we have described, densification has been enacted by all levels of government (but pursued particularly at the national level as a means of drawing private investment into the housing market and urban development) since 1990s.

Until the 2008 GFC, we would argue that local and national frameworks converged, with national densification strategies and the strategies of the GLA / Mayor of London following similar paths. These have ultimately intensified the residualisation of social housing and created a bigger role for the non-profit and private sector in the governance of densification, as detailed above in sections 5.1, 5.2, and 5.3.

Post-2008 we see a divergence in the direction of travel between the national level and the regional tier in London (the GLA). Successive London Plans (a competence of the GLA: see Section 5.1) have been used as a test-bed for new governance frameworks, including the removal of affordable housing targets by Mayor Boris Johnson (replacing social housing ,like-for-like), the creation of Housing Zones in 2014, and then under Mayor Sadiq Kahn, the reintroduction of affordable housing targets at the local level, alongside innovative programmes to support direct delivery by the London Boroughs. While local authorities have been increasingly weakened through changes in the planning and housing system, this implies a role for regional tiers of government like the GLA, in protecting housing affordability.

While densification has predominantly been used to recommodify the housing system (through demolition of social housing, reduction of statutory affordable housing requirements and the privatisation of land), it is clear that the national and regional tiers of government can travel in different directions, each with implications for how the local level can operate through densification projects, and with potential for decommodification therein. Nevertheless, beyond the creation of the London Plan and use of affordable housing grant from the GLA's affordable housing programme, the GLA does not have direct competences on densification, and thus plays a largely supporting role to the London Boroughs.

Given the UK's emphasis on regeneration in London as the main mechanism of densification policy (through OAs and other mechanisms), London itself might also be considered something of a test-bed for national strategy. The London Plan has been the site of experimentation (e.g. removal and reintroduction of affordable housing targets within densification frameworks), which are then in national strategies such as the 2016 Estate Regeneration National Strategy. This line of enquiry requires further analysis, however.

It therefore remains something of an open question the extent to which there is space for the continued development of alternative approaches and tools for densification that might foster the decommodification of land and housing, at the regional, and/or local level.

Key actors and institutions

Institution type	Name	role
Central Government	Office of the Deputy Prime Minister (ODPM 2001 – 2006)	Ministerial department responsible for housing, communities and local government.
	Department for Communities and Local Government (DCLG 2006 – 2018)	Design of UK policy strategy relating to densification, e.g. Estate Regeneration National Strategy (2016).
	Ministry of Housing, Communities and Local Government (MHCLG 2018 – 2021)	Produces the The National Planning Policy Framework (NPPF), and the The Planning and Compulsory Purchase Act 2004, which sets the framework allowing S106 agreements to be negotiated between local planning authorities and 'persons interested in land', determining contributions, arrangements and restrictions as planning agreements or planning obligations.
	Department for Levelling Up, Housing and Communities (DLUHC 2021 – 2024)	
	Ministry of Housing, Communities and Local Government (MHCLG 2024 –)	
Local and regional governments	GLA	The Mayor of London leads the GLA and is responsible for the strategic governance of Greater London. Sets out the spatial development strategy for London to be followed by local authorities in the London Plan, including strategic initiatives such as Opportunity Areas and Housing Zones. Provides affordable housing grant from the Mayor's affordable housing grant, e.g. providing £83.7million of funding to Peabody housing association for the acquisition of the former Ford Stampint Plant site in Dagenham for mixed tenure housing delivery (50% 'affordable' tenures including for owner occupation).
	Local authorities (numerous)	Coordinate planning strategies, permissions and land release e.g.: prepare local housing needs assessments and design local development plans, bringing land forward for development; form development agreements with private developers over the transfer of public land

		(including single-tenure social housing estates) for densification; negotiate S106 agreements with developers, including for the provision of social and affordable housing; partner with non-profit and for-profit housing providers and developers e.g. to submit applications to designate areas of majority brownfield land as Housing Zones. Would previously partner with construction companies and private developers to coordinate delivery of densification projects (1st generation densification); currently play a more enabling role, with non-profit housing providers performing this coordinating role (2nd generation densification).
Non-profit sector developers and housing providers	e.g. Peabody housing association	<p>Currently the main actor coordinating densification projects. For example:</p> <p>Peabody as formed a strategic partnership with the GLA for the delivery of regeneration and densification projects, to deliver housing (including up to 7,000 ,affordable' tenure homes in e.g. Thamesmead, Daggenham Green, and the former Holloway Prison in Islington.</p> <p>Peabody works in partnership with private construction companies (e.g. The Hill Group) to deliver masterplanning and housing at these sites.</p> <p>As the owner of densification sites (e.g. having purchased the site at Daggenham Green in partnership with Dagenham Dock Ltd), Peabody acts as the client coordinating development and acquiring services related to sustainability, social value advice, town planning, architectural design, masterplanning, landscape design, public realm design, structural engineering, civil engineering, access and inclusivity consultancy, sales and capital markets consultancy.</p>
Private sector construction companies, developers and housing providers	e.g. The Hill Group, British Land (a UK 'developer and asset manager') or Lendlease (an Australian multinational construction and real estate company)	With local authorities playing an enabling role to ensure land release for densification projects, private developers provide the capital required for design, construction, and delivery of new housing. These actors therefore ensure such schemes are ,commercially viable'. Often work in partnership with local authorities or non-profit housing providers in the interest of public benefit (e.g. provision of affordable housing), nevertheless there are trade-offs due to these companies' profit requirements, and planning structures (e.g. S106, affordable housing targets, local authority capacity) which have weakened the leverage of the public interest.

Table UK20. Key institutions involved in the policy cycle for densification

6.5 Achievements, assessments, and challenge

UK densification strategy has encouraged the gentrification of areas designated for regeneration through the residualisation of the social housing stock and extension of owner occupation and private rental tenures.

More significantly, densification has been used to recommodify the land and housing supply system, progressively weakening the role and power of public institutions in these processes, and transferring land, responsibility and revenue streams to the private sector, including to large international organisations. This opens the door for the financialisation of land for densification and the management of these projects, with huge implications for residential inequalities, not least curbing the redistributive role that local authority direct delivery can play in housing provision.

In place of central government finance, the hard regeneration projects detailed above have depended on bringing forward the value inherent in public land (including single tenure social housing estates) and transferring this to the private sector. This means that provision of affordable housing under this densification agenda relies on cross-subsidising social provision with the provision of private tenure owner occupied or rental homes (as negotiated under S106 agreements between local authorities and the developers who take ownership of densification projects). The National Housing Federation suggests that cross-subsidy models of housing delivery result in a net decline in social housing on all estate regeneration projects, alongside an increase in private tenure housing (Riding 2024b). This is supported by Penney (2024) who illustrates the extent of social housing loss using examples from the Heygate and Aylesbury Estate Regeneration programmes in the London Borough of Southwark: *„On these two estates, 3,971 homes, including 3,435 council homes, will have been demolished by 2035. In their place, a total of 6,979 homes (1.76x density) have been built or planned: 1,897 (27%) will be social homes, 1,017 (15%) will be intermediate homes, and 4,065 (58%) will be market homes. This represents a net loss of 1,538 truly affordable homes. Additionally, the replacement social rented homes are being provided with less secure Assured Tenancies and with £107.51 higher average per week social housing costs“.*

Constraints

The transfer of public land to private ownership, encouraged under the regeneration agenda, constrains direct delivery of social housing by local authorities. This has an impact for any future programmes to expand the de-commodified housing stock, as land price cannot be controlled or constrained, meaning it will cost far more to deliver public services (including housing provision) on private land. As an additional concern, since industrial areas have also been targeted for release to private housing developers, there is a risk that many SMEs will be relocated, undermining ‘blue-collar’ employment opportunities and substituting these for predominantly owner occupier and private rental tenure housing.

Opportunities

We have pointed to various innovative programmes of the GLA intended to support local authority housing delivery. This includes the Council-led Housing Network, the Housing Development Academy, and the £4 million Land for Council Homes Revenue Fund. The

removal of the HRA borrowing cap in 2018 increased local authority access to finance, and some local authorities have created 'local housing companies' for direct delivery. While these initiatives are unlikely to reach scale while local authorities are not sufficiently supported by central government grant, they at least offer opportunities for more direct delivery, and indicate the significance of the local level for reducing housing inequalities in the face of the densification agenda.

The previous points are summarised in the table below, with further insights drawn from Policy Lab workshop #1, held in London.

Hypothesis: impacts on housing inequalities	Further insights, drawn from Policy Lab workshop #1 (WP7)
Densification encourages the gentrification of areas designated for regeneration	Not necessarily. Yes, in relation to first-generation densification, based on public-private partnerships, but local authorities are learning from past mistakes. Public sector participants do not regard densification/regeneration as a driver of gentrification in the latest regeneration programmes. Some see the process as 'good gentrification' when the concentration of deprivation of the estate and surrounding area is very high, or when the existing estate is not demolished (as in most recent regeneration programmes).
Densification as implemented in the UK transfers the value inherent in public land (including social housing estates) to the private sector.	Yes, particularly in 1st generation regeneration (public-private partnerships) with the selling of public land to private developers and demolition of council estates. But in the last decade this transfer to the private sector is not so direct, with a change in the governance of regeneration to non-profit-private joint venture (2nd generation), and more GLA funds/loans for acquisition of land (to local authorities and non-profit housing providers), and changing approach to demolition of council estates.
Densification limits the possibility of direct delivery of housing by local authorities.	Yes, due to how the planning system and housing supply system is organised. However, there are signs of growing direct delivery from local authorities in recent years, with introduction of council-owned regeneration companies and housing companies.
Social housing delivery relies on cross-subsidy from private tenure production (Section 106) and results in a net decline in social homes.	Yes. Section 106 is an issue: housing provision by the private sector does not ensure reaching affordable housing targets or good quality homes, so local authorities need vehicles to build better / build themselves (like council-owned regeneration companies)
Opportunities: various innovative programmes of the GLA intended to	Yes. More recently there are signs of a paradigm shift (towards direct delivery), stopping the decline of social housing delivery.

<p>support local authority housing delivery.</p>	
<p>Opportunities: removal of the Housing Revenue Account (HRA) borrowing cap in 2018 increased local authority access to finance, some have created 'local housing companies' for direct delivery.</p>	<p>Yes, there are signs of a shift towards new vehicles for local authority direct provision (see above), but it may be too early to see the benefit of lifting the borrowing cap, as local authorities still have difficulty in borrowing due to the high rise in interest rates (and high cost of construction).</p>
<p>The impact of crises: rising construction costs (alongside stagnant house price rises) means housing developers engaged in densification have increasingly narrow profit margins. This falling viability can compell developers to reduce Section 106 contributions, affordable housing delivery and other 'negotiable' aspects (including net-zero construction targets) where possible.</p>	<p>Higher cost of regeneration (particularly green regeneration) for private, public and non-profit sector, due to raised interest rates, rising construction costs, and Brexit. Brexit in particular made procurement for construction more challenging.</p> <p>Housing associations also struggle with the increased costs of production and raised interest rates. The non-profit sector is changing: housing associations are getting larger by merging, but some are having financial difficulties.</p>
<p>Where we need to improve: coordination</p>	<p>Holistic thinking about budgets at national level for more long-term funding.</p> <p>The planning system is precedent-led, and things are reviewed because of objections, rather than being set against criteria, measurements or data.</p>

Table UK21. Summary table

7 Summary and discussion of results

7.1 Summary of changes in EEP

In the UK, retrofitting, urban greening, and densification are replicating many of the residential inequalities that are already produced by the UK housing system. This is because of a broader contextual historical shift in UK governance structures, that has occurred over several decades. The governance structures determining how these environmental initiatives are rolled out, are underpinned by the same logic that governs the existing housing system: a preference by UK policymakers to catalyse economic activity through the commodification of public goods.

The underlying macroeconomic conditions of this policy preference have deep roots. From the 1960s onwards, attempts have been made to reduce government intervention in the economy, to liberate the supply side (production and provision) of public goods¹ from state control, alongside tax reductions implemented with the aim of increasing personal consumption and the declining productivity of British industry. These shifts were turbo-charged during the Thatcher era, and increase as Britain shifts increasingly towards a services dominated economy.

This means that while national policy for EEPs is set by national government, these policies are designed so that responsibility for implementation falls to private, public and non-profit housing providers. In this context, public and non-profit institutions are usually left to rely on the private sector to fund implementation. Some funding, guidance and support is available from the national level, but this is usually not sufficient to extend retrofitting, NBS delivery or densification at scale. Rather, national-level funds and support are usually intended as a ‘pump-priming’ exercise, to stimulate activity at lower scales of governance and market operation. Ultimately, this means that the costs of implementing EEPs are usually shouldered by the private sector, and therefore ‘shunted-on’ from housing providers to end users, ultimately increasing housing inequalities.

7.2 Relations and trade-offs between EEPs and housing policies

In the UK, environmental debate and the green policy initiatives—such as retrofitting, NBS, and densification—have developed largely in isolation from the housing affordability debate. The housing affordability debate predates the decarbonisation and sustainability debate, and the links between these areas are not part of the current political agenda. Their nexus also remains underexplored in academic circles due to disciplinary silos, although some synergies are gathering momentum.

¹ We define public goods as goods and services the provision of which benefits all members of society, being non-excludable and non-rival. This includes the availability of affordable housing and the creation of a sustainable and net-zero economy, both of which provide benefit at a societal level that individuals cannot be excluded from. These specific public goods cannot be reduced to (for example) individually owned homes or individually owned green space, but extend to the benefit felt by society at large in their wider provision and availability.

Our view however, and as stated above, the governance structures determining how these three green initiatives are rolled out, are underpinned by the same logic that governs the existing housing system: a preference by UK policymakers to catalyse economic activity through the commodification of public goods. These EEPs are public goods that are manifested through the built environment, and as such their design follows the same logic as the UK housing system, and replicates many of the mechanisms whereby housing inequalities are created.

This policy preference for private provision of public goods, the historical context of which is outlined above, has seen shift from state intervention and investment in the supply side (largely but not limited to central government subsidy) to the demand side (largely but not limited to tax restructuring). This has created decades' worth of housing, fiscal and welfare policy intervention intended to lubricate the flow of private (rather than public) investment into housing, and now into green initiatives. Direct state investment into supply (which was a norm during the postwar de-commodification of the UK housing system) has been replaced by attempts to stimulate privately funded supply by boosting. This logic has been applied both to housing and to green initiatives.

We would add that this is not primarily an issue of environmental policy or governance, but of how the governance of public goods provision works in the UK. By outsourcing the provision of public goods to the private sector, the costs of both housing production and of green interventions will rise, with costs ultimately re-couped from end-users, thereby increasing residential inequalities. These three green initiatives are therefore replicating and amplifying the residential inequalities that are already produced by the UK housing system.

In retrofitting, homeowners and landlords (whether private, public, or non-profit) have struggled to retrofit their properties and are unlikely to do so by 2035–2050 due to prohibitive costs. Similarly, the provision of NBS remains scarce, often off-site, and of poor quality, while densification continues to drive up housing prices, making the delivery of affordable housing increasingly untenable.

Just as the UK housing debate (since 2004 – see Deliverable 4.2) has framed the housing affordability crisis as a supply-side (market failure) problem, the climate and environmental discourse is now expected to follow suit—framing shortfalls in the provision of retrofits, NBS, and densification of housing as a supply-side problem, rather than a problem of state funding, coordination and provision. This narrative risks justifying further demand-side subsidies and deregulation of planning and the housing system to stimulate market-led production of green goods, rather than addressing the complex implications of green interventions for housing affordability and regional or urban inequalities.

Thus, although the housing affordability and environmental debates remain largely disconnected, the systems themselves are deeply intertwined—following similar narratives, governance structures, and policy patterns, albeit with a time lag.

More importantly, the idea that decarbonisation may hinder housing affordability—and in fact make housing less affordable—is largely absent from the UK's national debate. In international academic circles, the the green-housing affordability nexus has gained traction through the concept of 'green gentrification' (Anguelovski et al 2022) (environmental initiatives triggering neighbourhood changes which drive green gentrification and displacement). Green gentrification may occur in certain areas (particularly those that are already quite gentrified

such as Woodbury down – see WP2 for more details). However, our hypothesis is that green gentrification is far from being the main mechanism whereby EEPs reinforce housing inequalities in the UK context.

Green initiatives in the UK are impacting housing affordability more fundamentally through the housing provision/production system itself. As the cost of production for green initiatives such as NBS and retrofitting continues to rise, and with minimal direct state intervention and only limited demand-side subsidies, the financial burden of the UK's low-carbon policies is increasingly falling on housing providers rather than the national government. Private developers, non-profit organisations, and local authorities are being tasked with both funding and implementing decarbonisation efforts. Consequently, a portion of these costs is either passed on to tenants and prospective buyers, further exacerbating housing affordability challenges, or re-couped through negotiable aspects of development such as Section 106 contributions and affordable housing unit delivery. As housing providers are increasingly required to deliver green initiatives—whether on-site or off-site—the production and retrofitting of affordable housing is being constrained. Small and medium-sized private and non-profit providers are already struggling to operate under these conditions. At the same time, policies aimed at expanding low-carbon technologies are not improving housing affordability. In fact, green policy instruments and subsidies often raise development costs, indirectly limiting the supply of affordable housing and reinforcing the commodification of the housing system.

Due to the UK's exit from the EU, the scale of public investment in the UK green agenda is significantly smaller than for other EU countries, which benefit from substantial EU subsidies. One issue here is not only the size of these funds, but also how they are distributed. In the UK, the limited availability of grants (for example, local authorities must bid competitively for limited funds to retrofit their social housing stock, meaning many apply for but are left without grant funding) constrains the capacity to support 'green and affordable' housing initiatives effectively.

The UK's environmental agenda is missing a critical opportunity to support the production of affordable housing. Current green policies lack mechanisms to foster the de-commodification of housing, which would mitigate the affordability crisis. This would require, for instance, direct state intervention in the provision of these three green initiatives. Furthermore, green programmes and subsidies to housing providers are not accompanied by regulatory safeguards to prevent rent increases or speculative practices. Nor do they include fiscal tools and land value capture mechanisms that would allow the state to reclaim a portion of the increased land value resulting from public investment (e.g., through improved environmental quality). This gap is rooted in the UK's weakly regulated private rental sector, and in the negotiable nature of planning gain (like Section 106 agreements), which are designed to allow the private sector to retain much of the uplift in value as an incentive to deliver public goods.

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