



In association with:



Accelerating Net Zero Delivery

Unlocking the benefits of climate action in UK city-regions

March 2022



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This summary report is accompanied by a detailed Supplementary Report and a Technical Annex.



Foreword



Rob Saunders
Challenge Director,
Prospering from
the Energy
Revolution,
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In Innovate UK's recent plan for action, Building the Future Economy, we laid out the opportunity ahead of us to scale innovation en route to net zero – not only by helping accelerate the development of new solutions, but also by helping to align the ecosystem that supports innovation, and helping government make best use of the levers it has available to it.

This report, funded from our 'Prospering from the Energy Revolution' challenge programme aims to do exactly that, helping to unblock the barriers to net zero projects in our cities. It targets a key missing piece of evidence – for the first time modelling the relative benefits of different net zero approaches and considers how best to deliver those benefits.

The conclusions suggest very significant prizes: more benefits for less investment, speeding up decarbonisation of heat and transport, prioritisation of needs of individual places, and £ billions of growth and investment in businesses providing net zero solutions right across the UK.

To realise these outcomes, we will need to join up national policy and local delivery in new ways that put the right accountabilities in the right places, while bringing in badly-needed finance, skills and innovative businesses. This work lays out a clear and deliverable path for cities' net zero journey across the UK; one that unblocks rapid progress, stimulates investment into growing innovative businesses and delivers better net zero lives for UK citizens.



Dan Dowling
Partner, PwC UK

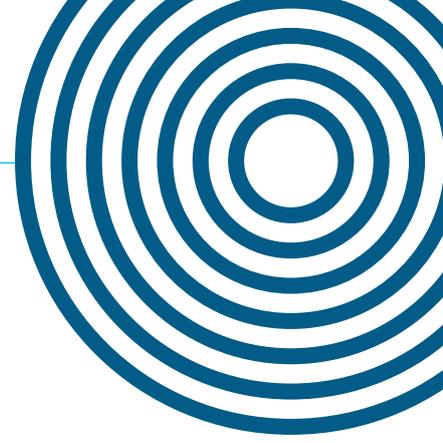
The UK has made a globally leading commitment to tackle climate change and COP26 in Glasgow set the stage for a critical 'decade of delivery'. As a nation we have made progress on decarbonising electricity generation and industry, however more than a third of our emissions are still driven by heating, buildings and surface transport.¹ These emissions are not reducing nearly fast enough and the built environment now offers the biggest untapped opportunity to realise the UK's net zero ambition.

We therefore need a laser-like focus on how to accelerate decarbonisation in our towns and cities. This report brings

important new evidence to the table that supports the wider economic case for local climate action. We then turn practical attention to why these benefits are not being realised today and how to deliver them at the pace and scale required. A national-to-local delivery framework is proposed that fosters collaboration between a range of actors across a whole-systems approach that will deliver climate goals, but as just as important, investment and benefits to every part of the UK.

We thank and are proud to have worked with Innovate UK, the University of Leeds, Otley Energy and our participating cities to produce this work.





Executive summary

As we raise our ambition to deliver net zero at pace and scale, the role of local delivery is critical. A missing piece of evidence has been the economic and social value of locally tailored approaches. To help close this gap, this report compares the benefits of place-specific and place-agnostic approaches for the first time. **It shows significantly better outcomes when places tailor their net zero delivery to the needs and opportunities of the area** with the potential to contribute to levelling up.

To realise these extra benefits a new delivery framework is required. The framework should coordinate local delivery with national policy including a revised governance model, consistent intervention design and management approaches, refreshed funding and finance instruments and targeted skills and capacity development. Recommendations for key next steps towards a coordinated approach are proposed including important roles for key actors such as national and local governments, businesses, utility suppliers and communities.

zero

achieving net zero by 2050

78%

reduction from a 1990 baseline by 2035

Why is this report needed?

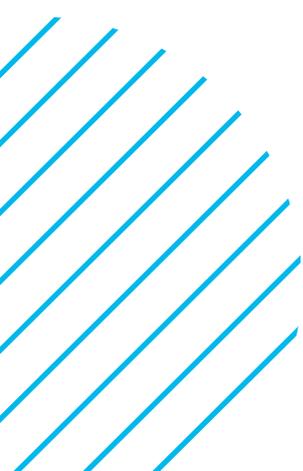
The Government's Net Zero Strategy sets out the long-term pathway by which the UK plans to meet the nation's legally binding target of achieving net zero by 2050 and a 78% reduction on a 1990 baseline by 2035.² Over the past decade, important progress was made phasing out coal and decarbonising electricity supply. However, advances in other sectors such as heat and buildings and surface transport have slowed.

To meet the Climate Change Committee's (CCC) Sixth Carbon Budget for the period 2033-2037, we must transform how we heat our buildings and how we travel.³ Many 'low carbon

measures' already exist that support this transformation. Examples include investments in electric heat pumps, energy efficient lighting, insulation, switching to electric vehicles, public transport, or behavioural changes such as walking or cycling instead of driving.

Our approach explored the benefits of local climate action and the readiness of six city-regions

Innovate UK, part of UK Research and Innovation (UKRI) commissioned PwC, together with Otley Energy and the University of Leeds, to explore the strategic and economic potential of local climate action, focusing specifically on buildings and transport.



£58bn

Investment

£108bn

Energy savings
for consumers

Our analysis modelled the social costs and benefits of adopting low carbon measures under different scenarios. The study also assessed the existing constraints and challenges in the delivery environment and stakeholder readiness in six city-regions before making recommendations for its improvement.

The unique 'place-based' analysis is bottom-up, comprising detailed local datasets and analysis across six diverse city-regions. The city-regions were chosen for their different characteristics and typologies, including Manchester with its dense urban core and semi-rural places such as Cambridgeshire and Peterborough. We compared a baseline deployment of low carbon measures with two alternative scenarios which both meet the Climate Change Committee's Sixth Carbon Budget:

- > **'Place-agnostic'** deployment, where low carbon measures are adopted uniformly across places. For example, all towns and cities contribute proportionately to the UK-wide target of installing 600,000 heat pumps-a-year.
- > **'Place-specific'** deployment, which reduces carbon emissions in line with the place-agnostic scenario, but enables each city-region to adopt the most socially cost-effective combination of low carbon measures. Selection of low carbon measures is based on the specific characteristics, needs and opportunities of different locations. For example, a city-region with predominantly Victorian building stock could prioritise measures to promote improvements to glazing and insulation.

There is a powerful economic case for local climate action

Each place is unique, so what works in Glasgow or Manchester may not work in Peterborough or Swansea. We found that the wider impact, or social benefits, of decarbonisation significantly exceeds their anticipated costs under both scenarios. The place-specific scenario also delivers the greatest financial savings or 'energy savings' and social benefits at the lowest cost.

Local costs less. Our economic analysis of the place-agnostic scenario shows it requires £195bn of investment to meet targets set out in the Sixth Carbon Budget and this investment releases £57bn of energy savings. These savings are reflected in lower bills for consumers – whether they be individuals, businesses or other organisations. Our place-specific scenario requires just £58bn investment and releases £108bn of energy savings for consumers. This means when city-regions are able to adopt the most socially cost-effective combination of low carbon measures based on the specific characteristics, needs and opportunities of their location it requires significantly less investment, whilst creating nearly double the energy savings.

place-agnostic scenario

£195bn

investment

£444bn

wider social benefits

place-specific scenario

£58bn

investment

£825bn

wider social benefits

Local action has a greater wider societal impact

In addition to reducing our impact on greenhouse gas emissions, widespread adoption of low carbon measures improves citizen health and local and national economies. Targeting action to insulate homes in poor housing stock leads to warmer homes which in turn creates wider social benefits. This includes better health for citizens, which leads to reduced health costs from lower hospitalisations and fewer sick days taken. The wider social benefits are significant in both scenarios but the place-specific investment of £58bn generates wider social benefits of £825bn. This is compared to £195bn investment realising £444bn of wider social benefits in the place-agnostic approach. This targeted action will lead not just to energy savings but also wider social benefits that have potential to advance the levelling-up agenda

The delivery environment has blockers and barriers to maximising the benefits of a place-specific approach

Our analysis found that a range of 'blockers' currently prevent the benefits of low carbon measures being realised. These blockers to adoption include a lack of knowledge, high upfront costs, mistrust in technologies, inconvenience and supply chain skill deficits. They are a result of either market failures or the unintended and uncertain consequences of government policies.

Several interventions are required to enable the adoption of low carbon measures by individuals and organisations. For example, awareness raising campaigns, regulation or funding incentives.

The lack of a clear mandate for local authorities to own the local net zero agenda exacerbates the delivery challenge. Whilst many local climate strategies and plans are ambitious, they are limited in their deliverability and bankability. Our research highlighted considerable variation of readiness levels at both city-region and sector level, but consistently found low levels of readiness in funding and delivery.

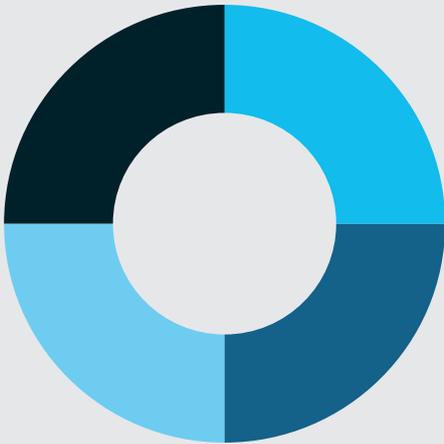
To increase the pace and scale of decarbonisation of buildings and transport, we must urgently relook at the net zero local delivery environment.

A new Local Net Zero Delivery Framework is required

The recent UK Net Zero Strategy commits to a range of policies that enhance climate action.² Along with the associated Heat & Buildings Strategy, it endorses a whole-systems model that acknowledges the diversity of local needs; however, execution details still need to be defined.⁴

Delivery Framework

Accelerated Local Delivery



System Governance

Building on the foundations of the Net Zero Strategy, clarify the respective roles of delivery ecosystem actors so that each role is attributed to the most effective level and with appropriate authority and accountability.

Portfolio Management

Building on the momentum of climate action and local area energy planning by UK places, bring a consistent methodology to integrated LCM portfolio design, management, implementation and reporting.

Capacity & Skills

Building on the Local Net Zero hub infrastructure, enhance their capabilities and services to support multi-level local portfolios develop their plans and pipelines with Technical Assistance in parallel to national skills programme.

Funding & Financing

Building on the local mandate of the UKIB, furnish portfolio investment needs with a local Net Zero financing framework including core, borrowing, private and innovative investment instruments.

The gap in local delivery should be filled with a joined-up and integrated national-to-local framework, which maximises the economic and social benefits of local net zero delivery. This follows the principle of 'subsidiarity', where decision-making is devolved to the level where it is most effective. The proposed Local Net Zero Delivery Framework must define the governance structure and accountabilities, design and execution processes, investment models, and capability needs that will make it a success.

Governance

The UK's Net Zero strategy defines the key national policies and institutions that will deliver net zero locally including a Local Net Zero Forum and Local Net Zero Hubs.² The delivery framework must enhance the UK's existing multi-tier governance system with a clear devolved and local government mandate. It should define how responsibility for common activities is shared between national and local stakeholders, and support bringing those stakeholders together. We set out three high level options to do this: centrally led, locally led or a hybrid model and find that a hybrid model, where

a central guiding framework is complemented by locally coordinated action and support by regional specialist hubs, has the most potential for impact. The Local Net Zero Forum is the ideal environment in which to further evaluate new governance models.

Portfolio Design and Management

Local Net Zero Portfolios, a portfolio consisting of sectoral and local low and zero carbon actions to help a local authority deliver against their climate targets, are critical to the delivery framework. Each portfolio must contain a tailored selection of low carbon measures best suited to the local environment, alongside interventions to enable their adoption. Clear ownership is critical alongside effective stakeholder coordination, agile and iterative design, and the underpinning of strong data provision that in turn enables effective oversight. Specialised support will be required for design and delivery, particularly for smaller locations or more complex projects. Enhanced Local Net Zero Hubs could provide on-demand assistance with technical design, project development and investment support.

Funding and Financing:

The UK's Green Financing Strategy published in 2019 recognises the role of local green finance and is committed to improving access to it by addressing barriers and developing innovative approaches and ways of working. The delivery framework must enable the transformation of investment volumes from millions to many billions of pounds each year. This scale of investment in our towns and cities cannot be supported entirely by the public purse, so other sources of capital must be tapped to pay for net zero investments via a range of underutilised funding models and innovative financing mechanisms.

Meeting the investment challenge should first build on a credible and stable policy framework that offers both the market confidence to invest in innovation, skills and supply chains. The presence of high quality and long-term local investment portfolios will then enhance access to a new range of investors that are active in reallocating capital to sustainable ventures and assets. These foundations will help the transition from a traditional reliance on grant funding towards a catalyst model where judicious public investments pave the way for the mobilisation of private finance and investment at scale.

Where clear additionality can be demonstrated, it remains relevant to continue to grant targeted support to lighthouse projects that leverage private finance such as the Heat Networks Investment Project.

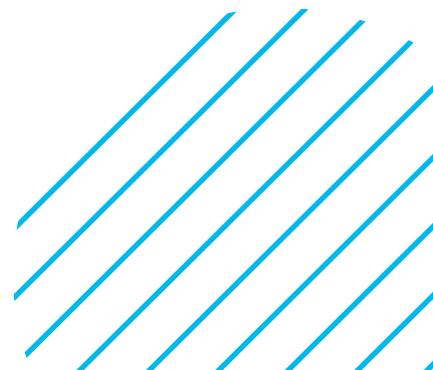
Equally, it is recognised that local net zero delivery creates new responsibilities for local government. A clear case therefore exists for allocating means tested increases to core funding. This new climate action funding may be time bound and should be adjusted to reflect the nature of local portfolio opportunities, levelling up potential and the underlying financial health of the local government entity.

Where adequate safeguards are present that maintain sustainable levels of debt, an opportunity also exists to optimise local government borrowing. This would raise finance for low carbon measures by, for example, facilitating partnerships with the UK Infrastructure Bank (UKIB), reviewing lending conditions of the Public Loan Works Board (PLWB), exploring the use of national guarantees to de-risk lending, engaging with commercial banks on new loan structures, maximising capital efficiency through revolving fund structures and enhancing the market for municipal bonds.

The final and perhaps biggest opportunity is to unlock and blend private capital through the design and deployment of special purpose investment structures and innovative financing instruments that overcome barriers to participation by private capital. Examples could include development corporations, land value capture, portfolio investments and local delivery concessions.

Skills and Capacity

A range of specialist expertise, both public and private, is required to successfully design and deliver Local Net Zero Portfolios. This includes economic and appraisal skills to model measures, commercial and finance expertise to develop business models attractive to the private sector and portfolio management skills to "do the right things" and "do them right". A combination of complementary interventions are needed to address the skills gap: building regional skills academies into the existing Local Net Zero Hubs can help to build specialist skills or meet surge capacity at a regional level, whilst targeted skills development is required at the national level, building on the recommendations of the Green Jobs Taskforce.⁵





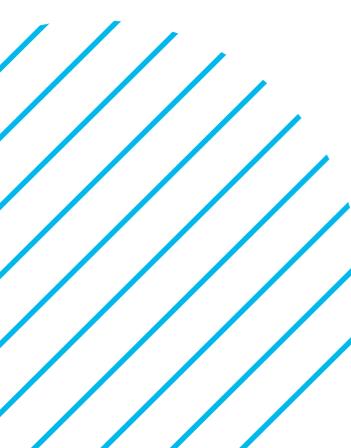
Conclusions and summary

of recommendations for an enhanced local net zero delivery framework

A transformation in our progress on decarbonising buildings and transport cannot be delivered through business as usual. We must find an urgent yet collaborative solution to decarbonise our cities and towns. **In doing so we can address the dual objectives of climate action, and if delivered well, levelling up.**

This report provides evidence for a place-specific approach to deliver the net zero strategy and proposes the key elements of a delivery framework that connects national and local system actors to what can become a blueprint for executing local net zero plans at pace and scale. The proposals build on the foundations of current delivery but create a step change in mindset, collaboration, new working practices and effective collaboration.

A founding principle of the delivery framework is that a whole-system approach is required to respond to the complexity of net zero and maximise the potential benefits. It is critical therefore that all actors in the system play their part. Our recommendations are targeted to encourage collective action.



For Central Government

CG1

Give devolved and local government clear mandate for local net zero delivery where aligned to their responsibilities in housing, building and local transport.

CG2

In consultation with the local Net Zero Forum, design and implement a national delivery framework that supports enhanced local net zero action as part of a whole-system approach, including consistent portfolio approaches and technical methodologies and data oversight set out in a Net Zero route map.

CG3

Reinforce and diversify the services of Local Net Zero Hubs to support local government with technical assistance, specialised skills, project development and finance.

CG4

Reform core local funding to address the delivery cost of funding public investments and building local delivery capability.

CG5

Install skills pathways into the national green jobs delivery plan, which enable housing retrofit, green building and sustainable mobility.

For Local Government

LG1

Assume appropriate accountability for net zero portfolios for buildings and transport, and adopt a coordination role.

LG2

Identify and appraise the most appropriate low carbon measures for each place and interventions that will support their adoption.

LG3

Lead engagement with local system actors including business and communities to prioritise opportunities and capture projects to a consistent standard in Local Area Energy Plans.

LG4

Build core internal technical and delivery capacity, and bring in external specialist skills from Local Net Zero Hubs or the private sector, as required.

LG5

Assess skills needs for local net zero delivery and audit capacity to inform the national skills delivery plan.



For Business and Enterprises

BE1

Engage with local government and other local system actors to contribute skills, partnerships and investment to their portfolios.

BE2

Assess the market opportunities created by the national delivery framework, and develop business models, products, services and financing solutions that deliver local portfolio objectives.

BE3

Build supply chain capacity and skills that support implementation at scale.

BE4

Transform operations to stimulate new markets and jobs growth for green products and services.

For Private Investors

PI1

Engage with the government on investment priorities and strategies, risk appetite, ticket size, incentive attractiveness, and de-risking support.

PI2

Mobilise capital at scale using creative financing models.

PI3

Develop innovative financing products that support housing upgrades.

PI4

Review your risk appetite for, and the return profiles of, local net zero portfolio opportunities. Approach these as a new asset class.

For other system actors

SA1

Electricity system operators and distribution network operators should proactively coordinate with local authorities and other system actors to plan, coordinate and enable energy system change.

SA2

To inspire and demonstrate positive action, communities should adopt low carbon measures such as a locally owned solar electricity project that sells power back to the community.

SA3

Academia and research should continue to support energy system innovation, enhance digital and data solutions, and study the issues that create blockers. Further exploration of the potential for local net zero action to deliver wider outcomes, including levelling up, should be prioritised.

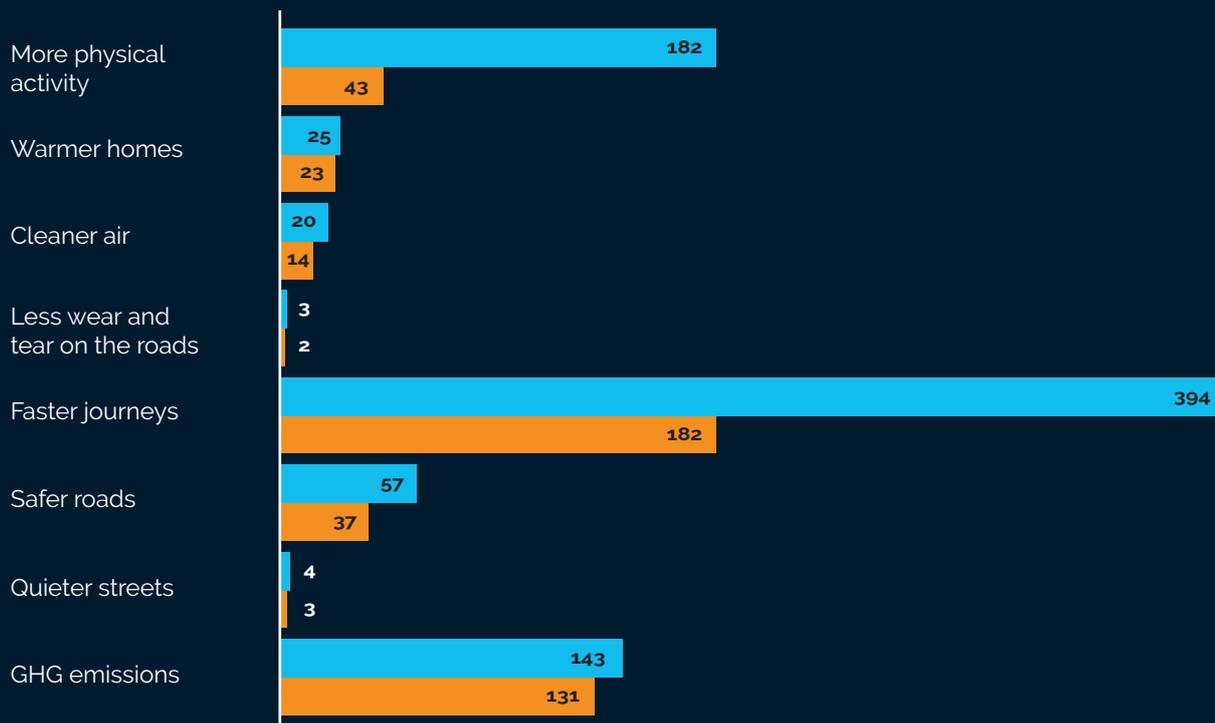
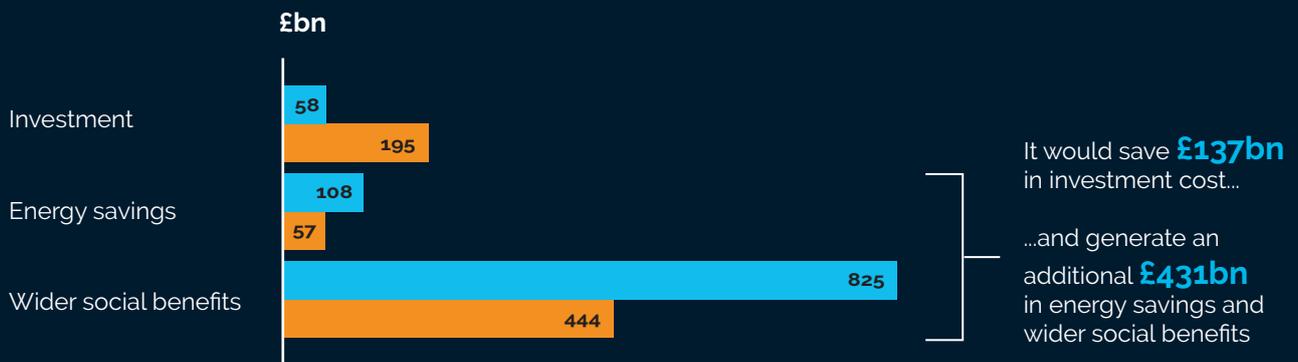
Maximising the benefits of Net Zero requires a place-specific approach

There are different ways for the UK to transition to Net Zero

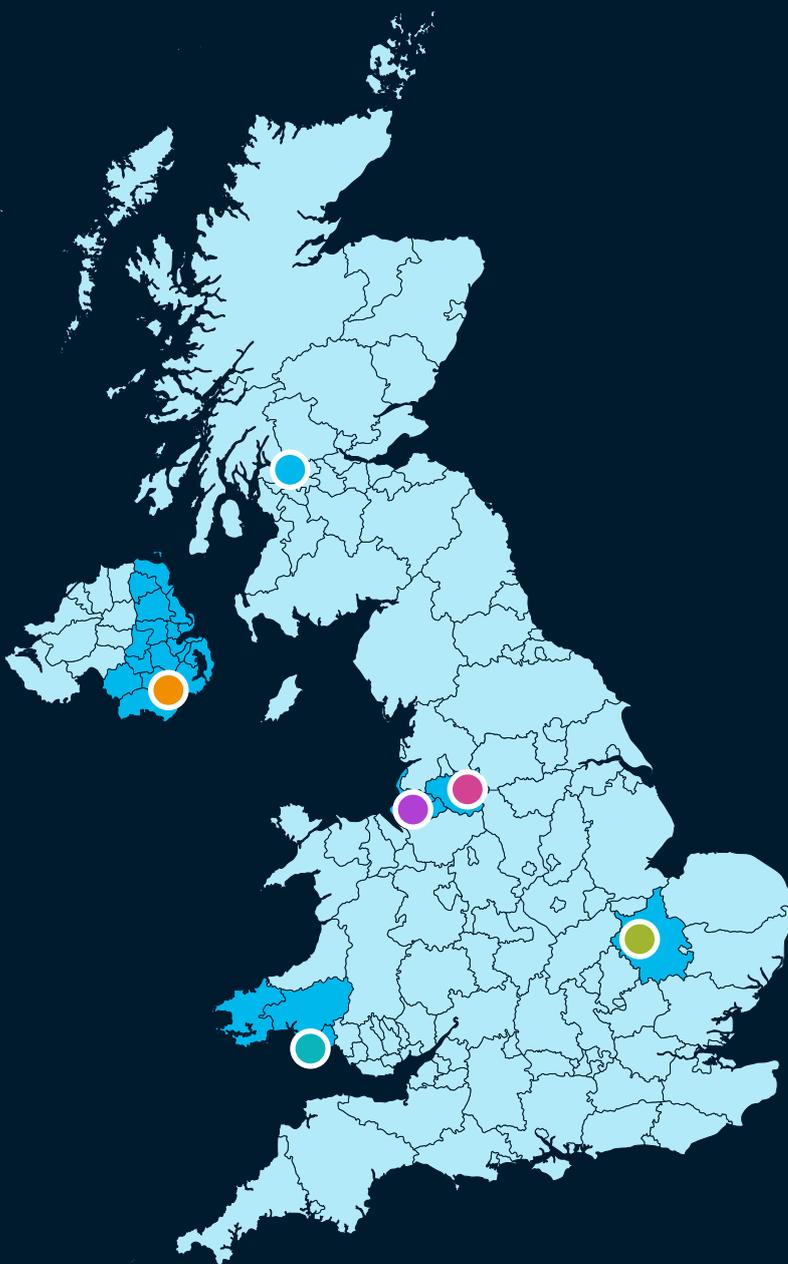
Place-specific assumes city regions select the most socially cost-effective combination of low carbon measures.

Place-agnostic assumes proportionately uniform adoption of low carbon measures across city regions.

Adopting a place-specific approach (rather than a place-agnostic one) could generate greater benefits and lower costs.



UK city-regions benefit in different ways from a place-specific approach



*Compared with current (baseline) trends in each city. Note that these emissions reductions will be the same under both the place-agnostic and place-specific scenarios

Glasgow

Emissions reduced by **40% more** by 2035*
£2.4bn investment
 Would reduce energy bills by **£2.4bn**

And lead to **£38bn** in wider social benefits

Belfast

Emissions reduced by **17% more** by 2035*
£910m investment
 Would reduce energy bills by **£2.3bn**

And lead to **£12bn** in wider social benefits

Greater Manchester

Emissions reduced by **27% more** by 2035*
£3.2bn investment
 Would reduce energy bills by **£5bn**

And lead to **£59bn** in wider social benefits

Liverpool

Emissions reduced by **28% more** by 2035*
£2.5bn investment
 Would reduce energy bills by **£3.1bn**

And lead to **£34bn** in wider social benefits

Cambridgeshire & Peterborough

Emissions reduced by **25% more** by 2035*
£1.1bn investment
 Would reduce energy bills by **£2bn**

And lead to **£15bn** in wider social benefits

Swansea Bay

Emissions reduced by **30% more** by 2035*
£1.2bn investment
 Would reduce energy bills by **£2bn**

And lead to **£12bn** in wider social benefits

Introduction

The battle to deliver net zero will be won or lost in UK towns and cities. **Our urban areas are one of the most important levers in decarbonising the nation.** Therefore, it is vitally important that we better understand the economic case and reconsider delivery arrangements required to accelerate the pace and scale of delivery.

Reduction in carbon emissions, 2009-2019, from:

65%

electricity supply

1%

surface transport

8%

buildings

The UK is a leading nation in the global race to decarbonise

The UK government has set an ambitious and legally binding climate change target to reduce emissions by 78% by 2035, compared to 1990 levels.⁶ In line with the recommendation from the independent Climate Change Committee, the UK's Sixth Carbon Budget limits the volume of greenhouse gas emissions over a 5-year period from 2033 to 2037.³

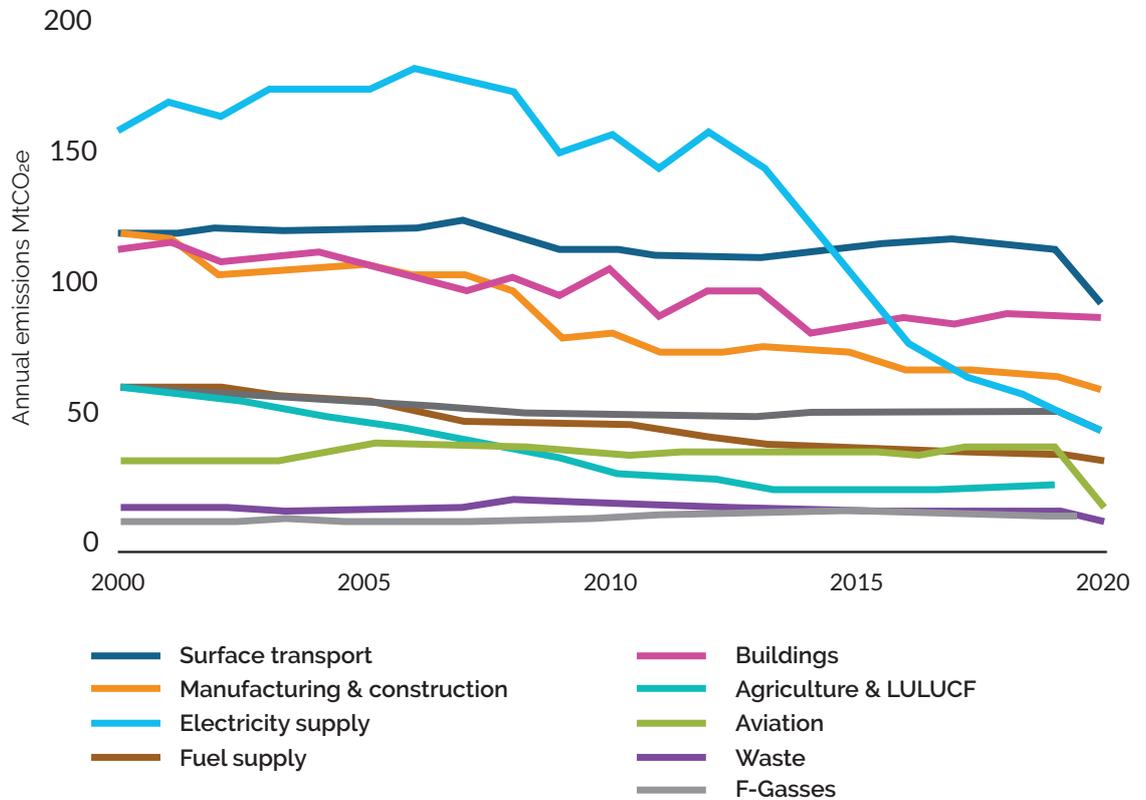
The publication of the Government's Net Zero Strategy (October 2021), defines the UK's long-term pathway to meet its emissions reduction targets.² The Strategy builds on the existing government commitments to provide a comprehensive set of measures that, if successfully implemented, will keep the UK on track to meet its emission targets and transition to net zero. This is essential in the global efforts to limit warming to 1.5°C this century – and avoid catastrophic climate change.

In its publication of the comprehensive cross-sectoral strategy, the UK continues to set the bar for countries around the world to follow.

The focus on buildings and transport

Current policy and delivery efforts have succeeded in decarbonising electricity supply and parts of industry. UK Greenhouse Gas (GHG) emissions have almost halved since 1990 levels, primarily driven by the phase out of coal from electricity generation: carbon emissions from electricity production fell by 65% between 2009 and 2019. Despite this rapid success, progress on decarbonisation has slowed recently with a 'flatlining' of emissions from buildings and transport, as set out in Figure 1 (dark blue and pink lines). The UK must rapidly scale up and accelerate decarbonisation efforts in these sectors, which account for 40% of total GHG emissions or 201 metric tons of carbon dioxide equivalent (MtCO₂e) per year.⁷

Figure 1 – UK carbon emissions by sector (2000-2020)



Source: Climate Change Committee (2021). Progress in reducing emissions 2021: Report to Parliament

The Net Zero Strategy acknowledges that to achieve net zero we must transform how we heat and power our homes and offices, and how we travel within and between places.² Tackling the stubborn stabilisation of buildings and transport emissions is now the priority. The UK must scale up and accelerate action if it is to meet its net zero commitments.

The scale of the challenge is illustrated by these simple facts:

- > There are currently almost 19m homes (two thirds of the total) that are below the energy efficient Energy Performance Certificate (EPC) standard C across the UK.⁸
- > 1bn sq ft of office (87%) space across the UK is rated EPC C or below.⁹
- > Each person living in towns and cities makes an average of almost 1,000 trips a year, with almost 55% of those trips in petrol and diesel cars.¹⁰

Whilst the Net Zero Strategy identifies the integrated national policies and actions that will take us there – including the role of local actors – the complexity of delivery requires an integrated and consistent delivery approach that can be tailored to the needs and specific challenges in each town, city and region.

The importance of accelerating local climate action

Many of the critical actions needed to deliver net zero in buildings and transport are local. The action needed to tackle building and transport emissions therefore forces a deep transformation agenda on our towns and cities, with comprehensive and coordinated action by individuals, households, business, utilities and infrastructure.

It also requires engagement from all parts of the UK's multi-tiered government to activate change in our homes and influence how we travel. This transformation involves either the widespread adoption of new technology — such as switching to an electric vehicle or installing new cavity wall insulation — or changes in behaviour — such as walking instead of driving. These measures are referred to as low carbon measures throughout this report and, whilst they vary significantly, adoption of all of them will enable us to make progress towards net zero.

A recent Housing, Communities and Local Government Committee report sets out the importance of local authorities in ensuring a just transition to net zero:

“...no layer of government is closer to people or better able to tailor climate action to meet the needs of local communities”.¹¹

The Local Government Association has described the transformative action local government plays in the race to net zero as master planners, through procurement, as asset owners and conveners of local partners, businesses and civil society.¹²

The Net Zero Strategy recognises the important roles local leaders play in community engagement and the identification of the low carbon measures that maximise local environmental, social and economic benefits. In setting out how it will support the transition with cross-cutting action, the Strategy sets out that it will

“...take a place-based approach to net zero, working with local government to ensure that all local areas have the capability and capacity for net zero delivery as we level up the country”.²

Challenges and opportunities of a local approach

Delivering the next phase of our decarbonisation journey will be difficult to implement, due to the range of geographic contexts in which they are delivered: local places, our cities and towns nationwide. Delivering local change is challenging for three reasons:

- > **The economic case for action is not well defined.** Little concrete evidence has been published that combines investment costs of net zero with economic and social benefits at the local level. This has hindered the policy development and funding that will unlock the problem.
- > **There are many local barriers that hamper the pace and scale of progress.** These include a lack of awareness or confidence in the technology, the high direct costs of investment and the inconvenience, or ability for the supply chain to respond.
- > **The local net zero implementation challenge is complex and difficult.** The Climate Change Committee report, “Local Authorities and the Sixth Carbon Budget” called for a framework to enable better coordination between national and local authorities to respond to that complexity.¹³



The UK needs a delivery framework that matches the scale of the challenge: one which builds on foundations in place but defines how governance, processes, capabilities, systems, and financing are coordinated to deliver net zero.

Purpose of this report

Getting the national-to-local system to work is an important but nascent agenda, with many significant problems that must be addressed. In its Local Chapter, the Net Zero Strategy sets out some of the elements that support local action including the new Local Net Zero Forum and Local Net Zero Hubs.² This report builds on the UK's Net Zero Strategy and provides recommendations for the new bodies.

The report provides the following outputs:

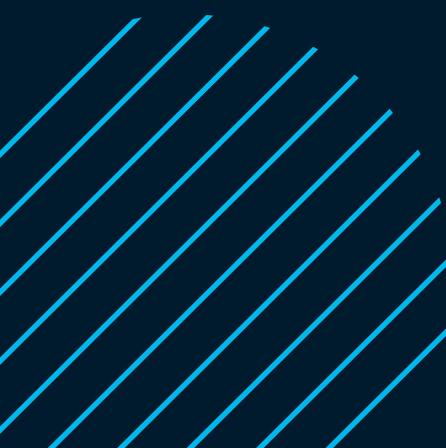
- > **Evidence to support the importance of local decarbonisation approaches**, and how they contribute to levelling up.
- > **Modelling of the wider social costs and benefits to understand the "size of the prize"** of the widespread adoption of low carbon measures.
- > **Detailed insight and analysis of the implementation challenges** and complexities of a local approach, including barriers to low carbon measure adoption and the need for enabling interventions.
- > **Recommendations for a delivery framework** that, building on the UK's Net Zero Strategy, unlocks local climate action at pace and scale.

The outputs are set out in five sections including:

- (i) Our Approach.
- (ii) Economic Findings.
- (iii) Blockers and Barriers to Adoption.
- (iv) Our Proposed Delivery Framework.
- (v) Critical Next Steps.

Two documents support this report:

- > Supplementary Report which shares evidence collated through our review.
- > Economic Technical Annex with detailed approach and assumptions.





CHAPTER 1
The approach

CHAPTER 1

The approach

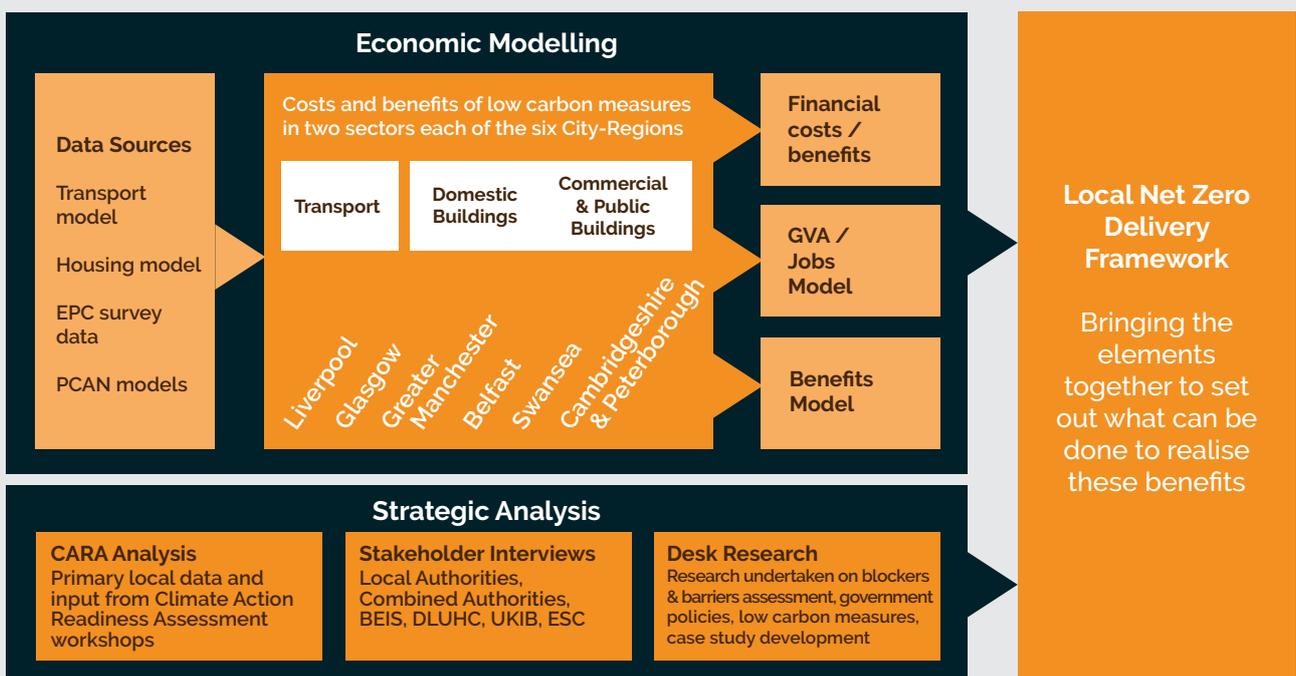
Our approach involved analysing six diverse city-regions, combining economic modelling, desk-based research and stakeholder readiness assessments, which together contribute a new body of evidence to the net zero delivery challenge.

UK Research and Innovation commissioned PwC, together with Otley Energy and the University of Leeds, to explore the strategic and economic potential of local climate action to deliver net zero, focusing specifically on the role of two sectors: heat and buildings (described as buildings throughout this report) and transport.

This report first presents the economic analysis of the benefits and cost effectiveness of locally tailored approaches and then sets out the basis of a Local Net Zero Delivery Framework, which could inform the Government's execution of the UK Net Zero Strategy. Figure 2 summarises the main activities undertaken.

We brought together economic and strategic research and analysis to create our solution

Figure 2: Summary of overall methodological approach



Six city-regions are at the heart of our approach

Many UK cities have already declared climate emergencies. We chose six such city-regions to form the basis of our research:

Belfast

Glasgow

Greater Manchester

Liverpool

Swansea

Cambridgeshire & Peterborough

These areas were carefully selected to represent the diversity of the UK. They cover each of the UK's nations and a diverse mix of urban typologies, including the city of Glasgow, to the peri-urban city region of Cambridgeshire and Peterborough. Each of the places has a political mandate such as a city-deal or combined authority, all of which have declared a climate emergency. We excluded any atypical levels of heavy or extractive industries, as these have a distorting impact and require different decarbonisation actions and pathways.

We also modelled a seventh place, 'Non-London Urban UK' which comprises building and transport data for all of the towns and cities in the UK, with the exception of London (70% of the population). This allows us to consider what the total size of the urban prize is at the national level.

Economic modelling

We assessed the costs and benefits of deploying different combinations of low carbon measures in the six city-regions.

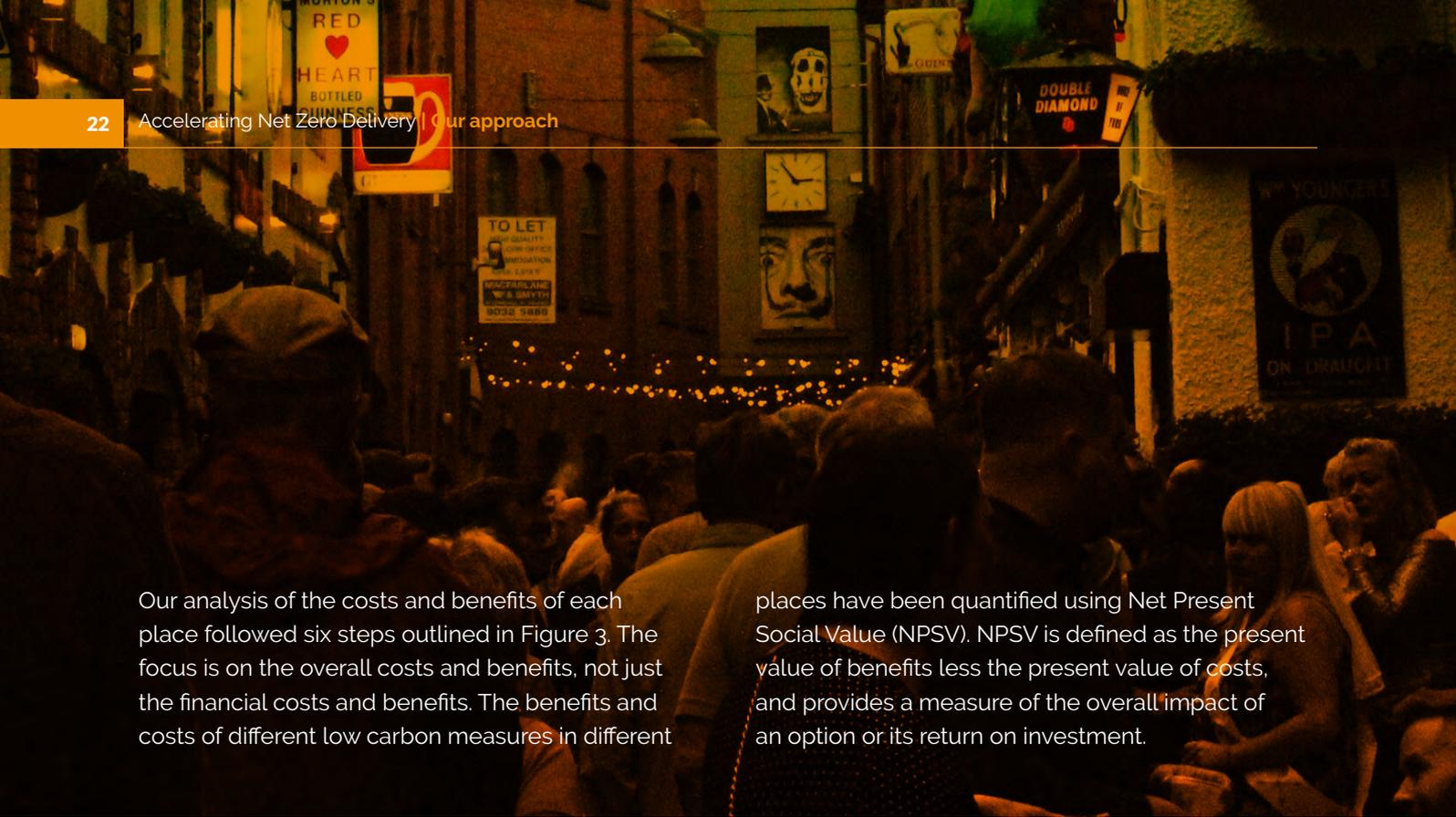
Our approach builds on the established Place-based Climate Action Network (PCAN) models.¹⁴

Developed by the University of Leeds in 2012 for the Network, the underlying modelling techniques have been employed in multiple cities around the UK. The analysis draws on both national and local information and data to understand the costs and benefits associated with the adoption of more than 500 low carbon measures at the local level.

Our modelling provides additional areas of analysis, including (i) assessment of the financial costs and benefits of adopting different combinations of low carbon measures, and (ii) analysis of the wider social costs and benefits of adopting low carbon measures. The analysis helped identify the most socially cost-effective combination of low carbon measures in each place.

We modelled three different scenarios: (1) The Baseline is pre-Net Zero Strategy, and (2) the place-agnostic and (3) place-specific scenarios are both based on the level of decarbonisation set out in the Net Zero Strategy, but represent two ends of a spectrum in terms of how far low carbon measure adoption is tailored to local circumstances.

- > **Baseline Scenario:** uses BEIS's forecasts of Greenhouse Gas emissions from buildings and transport, which reflect pre Net Zero Strategy policy commitments.¹⁵
- > **Scenario 1: Place-agnostic:** the place-agnostic scenario assumes that all towns and cities adopt local carbon measures at levels similar to those set out in the Net Zero Strategy but the level is scaled up or down based on each city-region's size and local characteristics (for example, housing stock and transport systems). The model does not take local needs or opportunities into account.
- > **Scenario 2: Place-specific:** this scenario achieves the same reduction in carbon emissions as the place-agnostic scenario but allows each city-region to adopt the most socially cost-effective combination of low carbon measures. This includes measures which are diverse in scale and scope such as district heat networks.



Our analysis of the costs and benefits of each place followed six steps outlined in Figure 3. The focus is on the overall costs and benefits, not just the financial costs and benefits. The benefits and costs of different low carbon measures in different

places have been quantified using Net Present Social Value (NPSV). NPSV is defined as the present value of benefits less the present value of costs, and provides a measure of the overall impact of an option or its return on investment.

Figure 3: How total costs and benefits of different scenarios are assessed

Scenario	1 Assess need to decarbonise	2 Determine deployment potential	3 Estimate wider social costs & benefits	4 Define expected deployment	5 Estimate total social costs & benefits (as sum of financial and wider costs & benefits)
Baseline	Determine current decarbonisation needs for each city region under each scenario	Assess deployment potential for each low carbon measure in each city region	Estimate the NPV of the wider social costs & benefits of each low carbon measure for each city region	Determine assumed deployment of each low carbon measure without Net Zero Strategy	Calculate as the product of the sum of NPV of the financial costs & benefits and the wider social costs & benefits and assumed deployment: this gives us the Net Present Social Value (NPSV) of decarbonisation in each city region under different scenarios
Place-agnostic				Determine assumed deployment of each low carbon measure based on Net Zero Strategy	
Place-specific		Include scale & scope low carbon measures		Determine assumed deployment of each low carbon measure for each city region based on most socially cost-effective	

Our modelling aligns to the Green Book approach to valuation of social benefits.¹⁶ Notable points are set out below:

- > To help the analysis focus on what local government can have reasonable influence over, it only covers existing buildings and transport systems, excluding aviation and shipping from transport, and new-builds from heat and buildings.
- > We have excluded the costs of any 'enabling programmes', which promote the uptake of low carbon measures (e.g. to implement the delivery framework, or run an awareness campaign). This includes national and regional programmes, for which electricity, grid and network operators are responsible. Taking a decentralised approach could also increase administrative costs, and may reduce opportunities to invest in low carbon technologies that require significant coordination at a national level, such as hydrogen.
- > The wider social costs and benefits are presented in total (either nationally or by place), but we do not specify their distribution – for example, between the public and private sector, businesses and households, rich or poor.

A technical annex provides more detail on each group of economic models focusing on the methodology, key data inputs and key assumptions.

What is a Low Carbon Measure?

There is a wide range of choices of measures – both technological and behavioural – that will help us decarbonise. The transformation to net zero requires the widespread adoption of these measures. Critical low carbon measures that decarbonise buildings and transport are categorised in Table 1:

Table 1: Low carbon measures

Sector	Category
Buildings	Insulation
	Energy efficiency
	Heating efficiency
	Low carbon heat
	Behaviour change
	Microgeneration
Transport	Car trips shifted to buses
	Car trips shifted to cycling
	Car trips to walking
	More efficient logistics
	Electrification of private transport
	Electrification of bus network
	Electrification of freight

Some low carbon measures achieve the same goal. For example, installing a more efficient gas boiler is an alternative to installing a heat pump, but both contribute to decarbonisation. Others are complementary. Cavity wall insulation and draft excluders improve energy efficiency, and add to the decarbonising impact of either heating system.

A low carbon measure can both meet a decarbonising need and bring wider social benefits. For instance, reduced Internal Combustion Engine (ICE) vehicle usage also reduces air pollution. This means decarbonisation and wider social outcomes can be improved in parallel.



Some low carbon measures are large in scale, for example a district heat network heats multiple homes. Some low carbon measures are diverse in scope, meaning that multiple aspects work together to decarbonise, for example whole house retrofit. We have called these “large in scale and/or diverse in scope” measures and they are included within the place-specific approach.

Assessing Climate Action Readiness

Taking our six city-regions, we invited representatives from each area to workshops to discuss the readiness of their city-region to adopt decarbonisation measures, how readiness could be improved, and to test how a net zero delivery framework could deliver these changes. These six workshops, two per sector, were built on the established Climate Action Readiness Assessment approach developed by the University of Leeds and Otley Energy. The audience comprised stakeholders from the city-regions.

By focusing on key sectors – and associated sub-sectors – we identified the areas where cities are most ready to act now and those where interventions are needed to build readiness. In parallel, we reviewed existing literature to validate or explain our findings.

Desk-based research and stakeholder interviews

Throughout this project we underpinned our findings with desk based research and extensive consultation with key stakeholders. This included engagement with UK100, EIT Climate-KIC, Department for Levelling Up, Housing and Communities, BEIS and Innovate UK.

Our desk based research included:

- > Developing case studies to diagnose barriers to uptake, focusing specifically on six key low carbon measures within buildings and transport.
- > Undertaking root cause analysis to identify barriers to uptake of low carbon measures.
- > Analysis of existing policies and published policy evaluations.
- > Research into current local and whole-system thinking for net zero, in particular:
 - > Net Zero Strategy,² Heat and Buildings Strategy,⁴ and other recent strategy publications.
 - > The Future of Local Area Energy Planning in the UK by Energy Systems Catapult.¹⁷
 - > A Systems Approach to Delivering Net Zero: Recommendations from the Prime Minister’s Council for Science and Technology.¹⁸

Steering Group Oversight

In order to deliver high-quality findings we tested our ideas and consulted extensively. We would like to thank the Steering Group which oversaw the project as well as all of the participants in our workshops and interviews, and the individuals and organisations that have collaborated on this piece of work. A full list of Steering Group members and interview consultations can be found in the Supplementary Report.





CHAPTER 2

Economic findings

How to optimise the benefits
of low carbon measures

CHAPTER 2

Economic findings

How to optimise the benefits of low carbon measures

There are many different paths to decarbonise buildings and surface transport. The two scenarios modelled show how the social costs and benefits of decarbonisation vary depending on the low carbon measures chosen. We find that while the social benefits exceed their anticipated financial costs under both scenarios, a place-specific approach delivers more benefit for less cost.

A place-agnostic delivery pathway

Under the place-agnostic scenario, the extent of change required to building and transport systems is significant.¹⁹ Table 2 sets out the deployment of low carbon measures for a typical city-region under

the place-agnostic scenario and change to shows the change required. For example, more than one insulation measure (e.g. loft, triple glazing) will be required in every home, and 29% of trips will require shifting away from private transport by car, to travel by bus (17% of trips), walking (10% of trips) or cycling (2% of trips).

Table 2: The change required from the baseline in the deployment of low carbon measures under the place-agnostic scenario

Sector	Low Carbon Measure Category	Unit	Increase from the baseline
Buildings: Commercial and public	Energy efficiency	m ² with new Measures	6%
	Heating efficiency	m ² with new Measures	86%
	Low carbon heat	m ² with new Measures	23%
	Insulation	m ² with new Measures	1.4%
Buildings: Domestic buildings	Insulation	New Measures per home*	1.2
	Low carbon heat	New Measures per home	0.26
	Integrated domestic measures	New Measures per home	0.03
Transport	Car trips to cycling	Trips shifted	2%
	Car trips to buses	Trips shifted	17%
	Car trips to walking	Trips shifted	10%
	Electrification of private transport	Trips improved	14%
	Electrification of bus network	Trips improved	46%
	Electrification of freight	Trips improved	37%

*The total number of LCMs deployed in each city divided by the number of homes. I.e. the average home will install 1.2 measures in the insulation category – insulation, draught-proofing, glazing

£195bn

total investment of the place-agnostic scenario between now and 2050

£57bn

of energy savings

The costs and benefits for UK towns and cities from place-agnostic delivery

Our modelling shows three key findings from the place-agnostic scenario:

- > The place-agnostic scenario requires a total investment of £195bn between now and 2050 in transport and buildings, across the UK's towns and cities outside of London (70% of the population).
- > This is partly offset by energy savings of £57bn: reflected in lower bills for consumers –

whether they be individuals, businesses or other organisations.

- > The wider social benefits are nearly three times greater than the net costs. At £444bn, the social benefits – cleaner air, warmer homes, healthier people – of reaching net zero under a place-agnostic scenario are much larger than the investment cost. This means that the total net benefit of reaching the Sixth Carbon Budget target is 2.6 times greater than the cost, over the period to 2050.

Table 3: Investment, energy savings and wider social benefits from buildings and transport in towns and cities across the UK under the place-agnostic scenario (2022 to 2050)

Category of Low Carbon Measure	Investment £billions	Energy savings / costs £billions	Wider social benefits £billion
Transport			
Electrification of bus network	-17	-4.2	11.7
Electrification of freight	22.3	15.1	37
Car trips to cycling	0.3	4.3	39
Car trips to buses	96.7	45.4	107
Electrification of private transport	12	11.9	7.6
Car trips to walking	0*	17.8	147
Heat & buildings			
Energy efficiency	0.05	1.2	1
Insulation	50.4	24.5	69
Heating efficiency	1.4	2.8	4
Low carbon heat	13.1	-7.6	20
District heating networks	0.9	-0.8	2.5
Total	195	57	444

* Assumption that walking is free

Decarbonisation needs and opportunities vary by place, which means that the optimal way of decarbonising will differ between places.

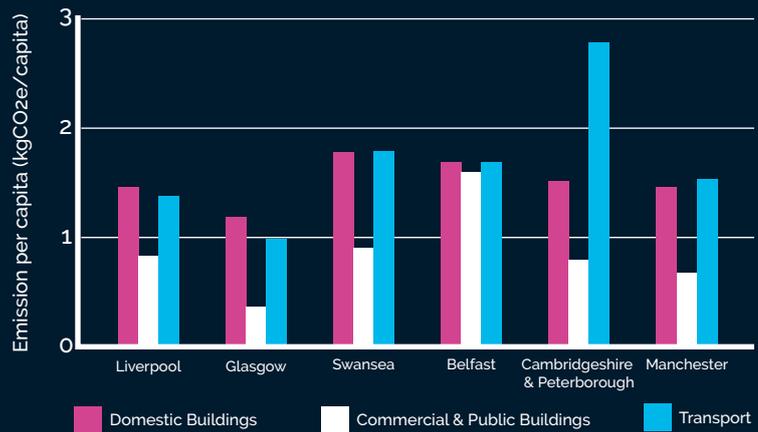
Although towns and cities in the UK share some similarities, there are important differences in their scale and urban form, and their social and economic characteristics. For example, Swansea has an older housing stock which suffers from lower energy performance. Meanwhile, Cambridgeshire and Peterborough is geographically more spread out and has lower public transport connectivity.

% of trips taken by bus	
Glasgow 16%	Cambridgeshire & Peterborough 6%

% of homes below EPC C standard	
Swansea 70%	Manchester 55%

Figure 4 highlights the impact of this diversity on the carbon emissions of different city-regions. Glasgow emits the least carbon per capita from transport; Cambridgeshire and Peterborough emits the most.

Figure 4: Carbon emissions per capita (2021); buildings, transport



Opportunities to reduce carbon emissions vary from place to place. The diversity of our towns and cities means that each city’s decarbonisation journey may be different: a place where a lot of houses already have cavity wall insulation will have less scope to reduce emissions through adoption of this measure, regardless of the extent of their ambition. Likewise, a place where a typical journey spans a greater distance will not have the same ability to encourage people to use alternative modes of transport (such as walking or cycling) to travel by private car.

In turn, this means that there are different costs and benefits of decarbonisation for each city-region, and that a tailored ‘place-specific’ approach has the potential to unlock many more benefits.

A place-specific approach

The Net Zero strategy recognises the need for a local approach, but has not yet fully developed the economic case for policy-makers. Our modelling calculates the costs and benefits if each place adopts the most appropriate low carbon measures to achieving the same carbon-reduction target as the place-agnostic approach.





£58bn

total investment of the place-specific scenario between now and 2035

When compared to the place-agnostic scenario, the place-specific scenario achieves much greater benefits at a lower cost.

Place affects the social cost-effectiveness of low carbon measures

£108bn

of energy savings

Three key findings from the place-specific scenario are:

The place-specific scenario achieves the same reduction in carbon emissions as the place-agnostic scenario but allows each city region to adopt the most socially cost-effective combination of low carbon measures. Social cost-effectiveness is measured as the lowest-cost, highest-benefit way in which a city can achieve its Sixth-Carbon budget emissions target, within the bounds of available technology, reasonable behaviour change, and other assumptions.

£825bn

total of social and economic benefits over the next 30 years

- > The place-specific scenario requires total investment of £58bn between now and 2035 in transport and buildings to adopt the most socially cost-effective low carbon measures required to deliver the Sixth Carbon Budget.
- > This is significantly offset by energy savings of £108bn. Energy savings are reflected in lower bills for consumers – whether they are individuals, businesses or other organisations including savings on petrol when switching to electric vehicles or directly from energy bills.
- > The wider social benefits are greater still. In this scenario, investment in decarbonisation delivers wider social and economic benefits worth **£825bn** over the next 30 years.

The social cost-effectiveness of low carbon measures changes by place, affected by three key drivers.

- > The deployment potential of low carbon measures varies between city-regions.
- > The financial costs and benefits of decarbonisation vary by low carbon measure.
- > The social costs and benefits vary by low carbon measure and between city regions, and these are in addition to the financial costs and benefits.

Spotlight

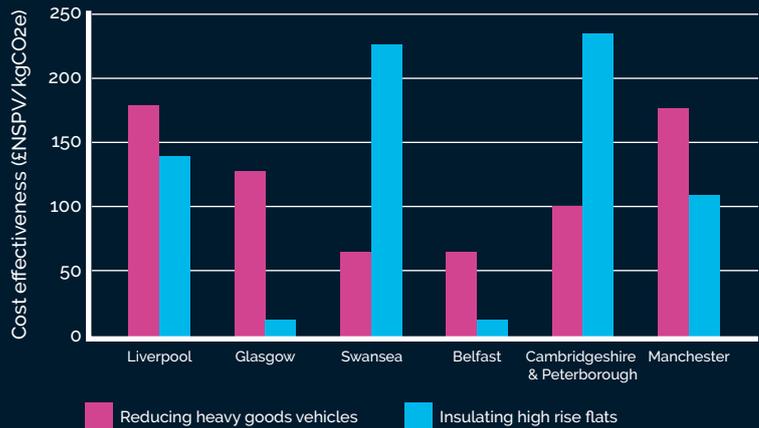
Cost-effectiveness of freight and insulation low carbon measures in six city-regions.

The chart shows that differences in social cost-effectiveness vary significantly for low carbon measures, based on where they are adopted.

Heavy goods vehicles are more prevalent in some cities than others and they are more damaging in denser areas due to congestion, air pollution and accidents

Insulation delivers greater benefits where there is poorer housing stock – in this case high-rise flats – higher levels of fuel poverty, and exposure to excess cold.

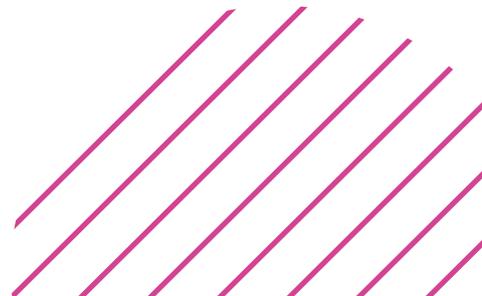
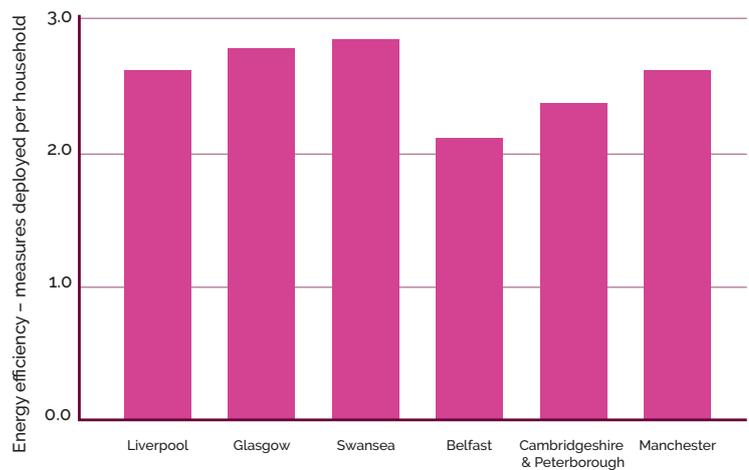
Figure 5: The cost-effectiveness of two low carbon measures in different cities



Key Driver 1: The deployment potential of low carbon measures varies between city-regions

Because the built environment varies across the UK, the 'deployment potential' – the number or scale of a low carbon measure that it is feasible to deploy in a given area – of each area differs. For example, in an area with a high proportion of new build properties, many homes will already have energy efficient appliances and will not need to deploy them. The chart shows how this low carbon measure varies across the six city-regions. For example, in Belfast, the average homeowner has the potential to install two energy efficiency measures – such as LED lighting – whilst in Swansea they have three.

Figure 6: The deployment potential of 'Energy efficiency' low carbon measures in the domestic buildings sector, per household



The opportunity to deploy measures which are large in scale and diverse in scope relies heavily on local factors. Some low carbon measures meet a decarbonisation need for many people ('economies of scale', e.g. heat networks), or concurrently meet many decarbonisation needs ('economies of scope', e.g. whole-house retrofit), or do both.

These opportunities are often more place-specific than individual low carbon measures. For example, district heat networks are most viable in dense urban areas and where there is an existing waste heat source. As a result, there is greater regional variation in the opportunities to deploy larger, more economical low carbon measures than for individual measures.

Population density determines mode sharing opportunities

Bicycle sharing is a cost-effective way to decarbonise transport because the fleet is shared by multiple users. To be successful, bicycles must be easily available, with a large fleet in convenient locations. This is only commercially viable where there is sufficient demand, for example in cities such as Glasgow with densely populated cores.

Heat sources for district heat networks vary by place

District heat networks powered by renewables or waste heat are a particularly cost-effective

means of decarbonising heat generation. Local characteristics determine the availability of these sources. For example, the Swaffham Prior Heat Network, Cambridgeshire is powered by heat generated through boreholes drilled in nearby land. District heat networks must also be located near adequately sized housing developments. Both determining factors are highly place-specific, but the benefits are large.

Our analysis shows that a district heat network's economies of scale reduce the levelised cost of heat to 40% less than an air source heat pump, per household.

£130 / MWh air source heat pump

£92 / MWh district heat network



Key Driver 2: The cost of decarbonisation (financial costs and benefits) varies by low carbon measure

Marginal abatement cost is a measure of the unit cost (or benefit) of abating each unit of CO₂e.



A negative marginal abatement cost (MAC) means that energy savings more than offset the investment and operating cost because either the costs are low (zero in the case of walking) and/or the expected energy savings are high. However, it is not just a question of selecting low carbon measures based on the most attractive MAC.

The financial benefits of some low carbon measures exceed their costs. Some low carbon measures have a negative marginal abatement cost but the opportunity to deploy them is limited. Conversely, other low carbon measures such as heat pumps which do not pay for themselves may be integral to the long-term goal of net zero as there are few other technologies available at scale. Low carbon measures such as cycling to work, rather than driving, offer potential energy savings on fuel which exceed the initial cost of a bicycle and its accessories. Similarly, in homes, energy savings can be realised by switching to more energy efficient light bulbs.

Other low carbon measures do not yet reap energy saving returns. In some cases, the energy savings of low carbon measures are expected to be less than their costs, creating a financial blocker, but contribute significantly to decarbonisation.

Shifting journeys from cars to buses:

Although public transport is a cheaper option than a private car for passengers, the overall service is costly to run, with local government subsidising significant capital and operating costs. These include the cost of buses (~£250k) as well as infrastructure investments and driver salaries.

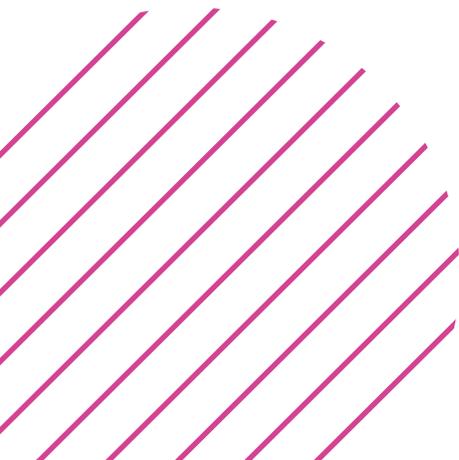
This means that despite being critical to decarbonising cities, the marginal abatement cost of shifting journeys from cars to buses is approximately 10 times higher than a switch to electric vehicles.

However, the MAC does not take into account the considerable social costs of motor vehicles, which buses can help to avoid. When we consider all of these costs and benefits, a bus journey is more socially cost-effective than a car journey.

Measures that are large in scale and diverse in scope have even more favourable marginal abatement costs

Economies of scale or scope can reduce the unit cost of low carbon measures. For example, where whole house retrofits are delivered through an area-based programme, several houses can be tackled at the same time. Economies of scale mean that installers can bulk-buy products and employ retrofit engineers on long-term rates, lowering the unit costs of installation and administration:

MAC of installing measures separately	MAC of installing measures as part of a whole house retrofit scheme
£2.67 / kgCO ₂ e	£1.01 / kgCO ₂ e



Key Driver 3: The social costs and benefits vary by low carbon measure and between city-regions

The geographic, economic and social characteristics of a place affect the wider social co-benefits of low carbon measures.

Wider Social Benefit Categories

More physical activity: The health of the population differs by place. Places with less healthy populations can gain larger benefits from active travel.

Air quality: The negative health impact of air pollution caused by car exhausts or gas boilers is higher in more densely populated places.

Warmer homes: A warm home provides a utility benefit, so places with colder homes gain more.

Reduced excess cold: The cost to the NHS of excess-cold-related illness varies by place, due to variations in temperature, housing and fuel poverty.

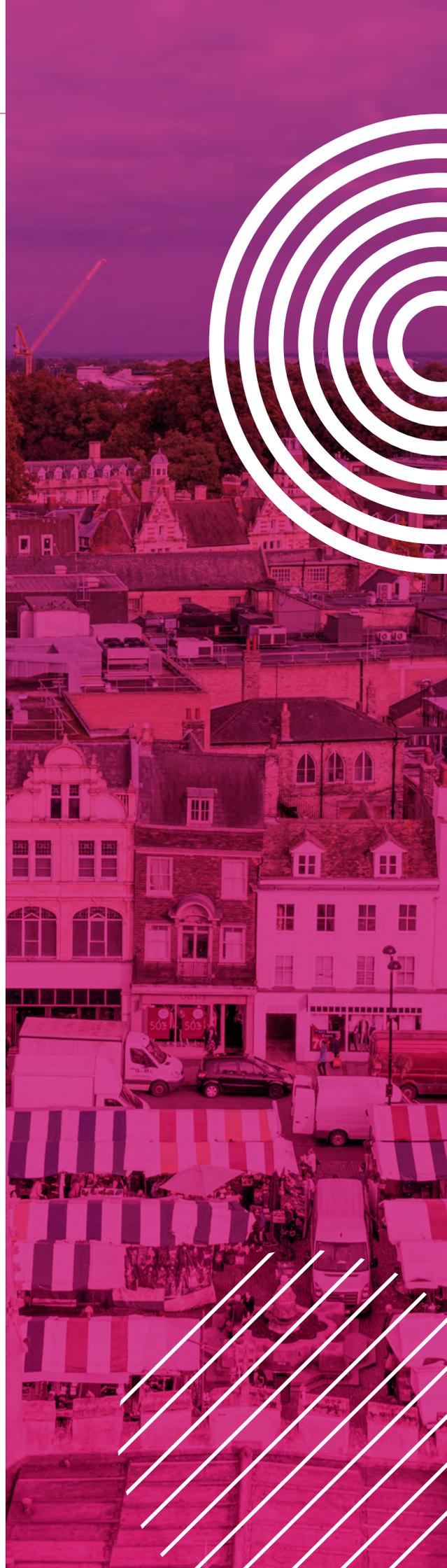
GHG emissions: A tonne of carbon emissions has the same effect on climate change, regardless of where it is emitted. But places with higher per capita emissions reductions contribute more towards this benefit.

Reduced congestion: Traffic congestion varies by place. It follows that places with higher levels of congestion gain more by reducing it.

Quieter streets: Places with higher traffic levels experience higher levels of noise pollution, so gain more from a shift towards non-motorised transport.

Safer streets: Places with higher traffic levels also experience more road accidents – all things being equal – so gain more from reduced car usage.

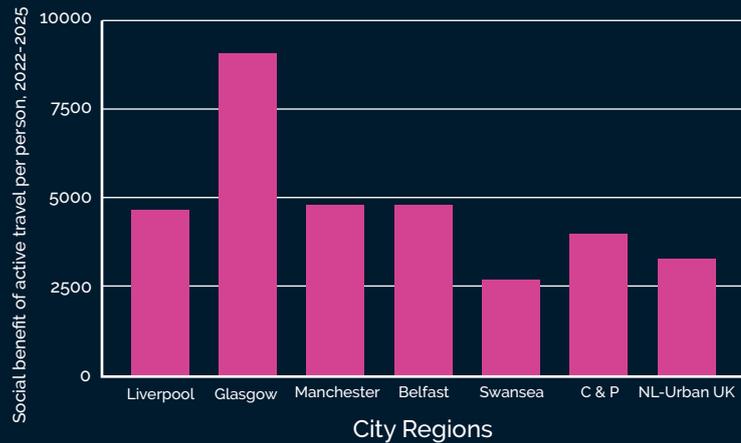
Road repairs: places with more active travel require fewer road repairs.



Each low carbon measure delivers different social benefits to varying degrees but, on aggregate, the largest social benefit from decarbonising buildings is the reduction in carbon emissions; while for transport, there are significant benefits from reduced congestion and increased physical activity.

Our analysis shows that two city regions employing the same measure generate different benefits from that measure. Glasgow has lower than average life-expectancy, so gains more from the health benefits of more active travel than Swansea, as per Figure 6.

Figure 7: Social benefits generated per person if walking and cycling schemes were deployed to their full potential in each city-region.



The benefits of place-specific deployment of low carbon measures

Under both scenarios the social benefits of decarbonisation financial costs. Other findings include:

- > Around 10% of the expected benefits of decarbonisation arise from energy savings.
- > About 90% of benefits are attributable to wider social benefits: between 16% and 26% of the benefits are attributable to Greenhouse Gas emission reduction whilst the majority of social benefits accrue as either avoided costs (e.g. for the NHS), improved productivity or improved experiences.

There are many social benefits of low carbon measure adoption, including cleaner air, a quieter environment, and improved physical health. Investment in decarbonisation will deliver wider social and economic benefits worth **£444-825bn** over the next 30 years. This significant range demonstrates the difference between adopting a place-agnostic versus a place-specific approach, under which measures are chosen based on social cost-effectiveness.

£444-825bn

worth of social and economic benefits over the next 30 years

The benefits of place-specific deployment of low carbon measures in our six city-regions:

Figure 8 shows the incremental value added by adopting a place-specific approach over a place-agnostic one.

Figure 8: The "size of the prize" in a place-agnostic and place-specific scenario

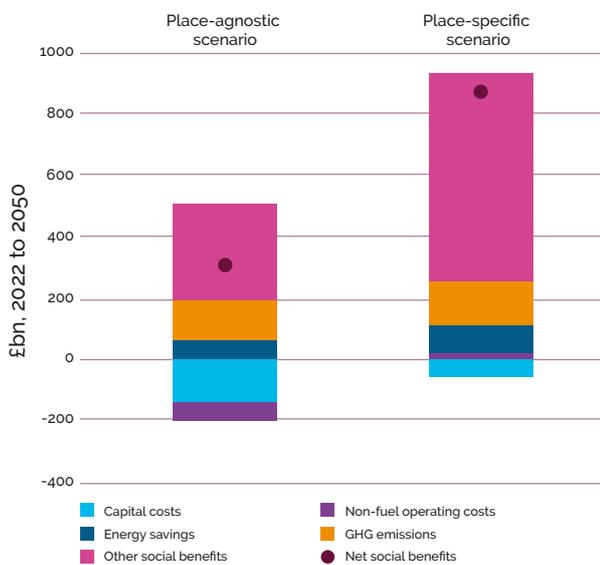
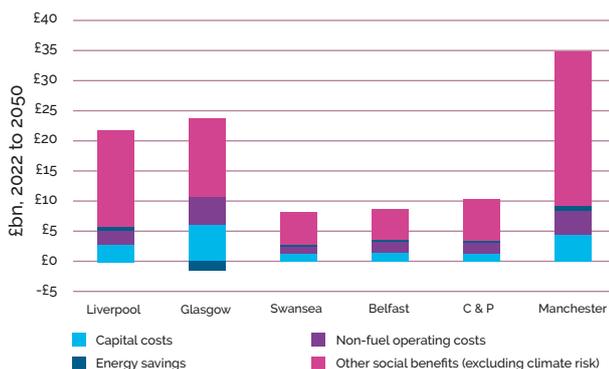


Figure 9 shows that on aggregate, larger cities such as Manchester have more to gain than smaller ones from a place-specific approach. Some places benefit more than others in the race to net zero, and some face higher costs.

Figure 9: Taking a place-specific approach in our city regions.

The difference between the place-agnostic and place-specific scenarios for major costs and benefits



The Table 4 shows that optimising low carbon measure deployment for local circumstances delivers six times the net benefits of a place-agnostic approach. All city-regions must be informed, enabled, and incentivised to decarbonise in the most socially cost-effective way.

Table 4: Benefits of a place-specific approach

Average unit benefit of decarbonisation (NPSV/kgCO ₂ e)				
City-region	PA scenario	PS scenario	Benefit of PS compared to PA scenario	Total benefit of PS scenario
Liverpool	£6.80	£22.70	£15.90	£34bn
Glasgow	£6.44	£20.49	£14.06	£38bn
Manchester	£9.35	£24.19	£14.84	£61bn
Belfast	£3.02	£14.28	£11.26	£14bn
Swansea	£3.18	£13.88	£10.70	£13bn
C&P	£2.82	£14.77	£11.95	£16bn
Urban UK	£4.71	£18.59	£13.87	£875bn

Investment of **£58bn** (place-specific)-**£195bn** (place-agnostic) in these sectors over the next three decades will generate additional Gross Value Added (GVA) of **up to £120bn** and support between **21,000** (place-specific)- **105,000 jobs** (place-agnostic) each year.

Investment in low carbon measures supports local growth and jobs. Significant investment in low carbon measures will support GVA and jobs in towns and cities across the UK.

Jobs will be supported in industries such as EV manufacturing, home retrofitting and public transport; however, up to 12,000 jobs will no longer be supported in areas such as oil and gas production. More jobs are supported in the place-agnostic scenario. This is due to differences in both the labour intensity of different low carbon measures (most people can install low-energy lightbulbs, but not triple-glazing), and the overall size of the investment required.

Levelling-up with place-specific action

Delivery of the Net Zero Strategy will require a social and economic transformation of the UK's towns and cities. This also presents an important opportunity to contribute to the Government's ambition with respect to levelling up. The Levelling Up White Paper, released in Feb 2022²⁰, acknowledges that 'The Net Zero transition could create huge opportunities for many of the UK's left-behind places'. A low-carbon heating system or unit of energy costs the same to everyone in absolute terms but in relative terms costs much more to those on lower or no incomes – poorer households pay around three times more than richer ones for energy, relative to their income.²¹

Poorer and more vulnerable groups are also likely to disproportionately gain from the benefits of decarbonisation, which will:

- > Create the need and opportunity to develop a skilled workforce and the supply chains capable of enabling adoption of low carbon measures; disparities are already arising in how the transition to greener jobs is affecting different parts of the UK and targeted action can benefit the potential regions most impacted.²²
- > Help to improve health by improving air quality, enabling warmer homes and promoting more physical activity: life expectancy decreases with average income, so poorer people gain more healthy life years from targeted action to support walking and cycling.²³
- > Drive improvements in the transport system, which will not only yield economic benefits, but by reducing congestion and improving accessibility will also realise wider health benefits.

The key to unlocking these opportunities is to enable the Net Zero Delivery Framework to define place-based climate action which recognises the

needs and opportunities of all places in a holistic way. We recommend further research into these distributional implications.

Table 5: Wider social benefits of a place-agnostic vs a place-specific approach:

Wider Social Benefit	Place-agnostic	Place-specific
Road Repairs Saved	£2bn	£3bn
Quieter Streets	£3bn	£4bn
Cleaner Air	£14bn	£20bn
Warmer Homes	£23bn	£25bn
Safer Streets	£37bn	£57bn
Health benefits linked to increased physical activity	£43bn	£182bn
Faster Journeys	£182bn	£394bn
GHG emissions	£131bn	£143bn
Annual jobs supported	105,000	21,000

To maximise the benefits of a place-specific approach several challenges must be resolved in the delivery landscape

We explore several challenges to the delivery landscape, which must be addressed.

(i) The mechanisms by which climate action is delivered must address the current market failure to enable wider benefits, since they do not directly accrue to whoever adopts the low carbon measures.

(ii) Several 'blockers' prevent the adoption of low carbon measures. These are explored further in Chapter 3.

(iii) These blockers are exacerbated by weaknesses in the delivery landscape. A new delivery framework is required, which enables the adoption of the most socially cost-effective combination of measures at pace and scale.

Case Study

The benefits of a place-specific approach in Liverpool

Liverpool City Region is home to 1.5m people with a density of 2100 people per square kilometre, and is made up of six local authorities. In May 2019, Liverpool City Region declared a climate emergency and set an ambitious goal to achieve net zero by 2040. Achieving this goal ten years ahead of national targets requires a fast, transformative change to the way the city functions. However, our baseline model shows that Liverpool will not meet its Sixth Carbon Budget target. The gap is projected to be 2140 ktCO₂e in 2035, which is equivalent to 1.30 tCO₂e per person.

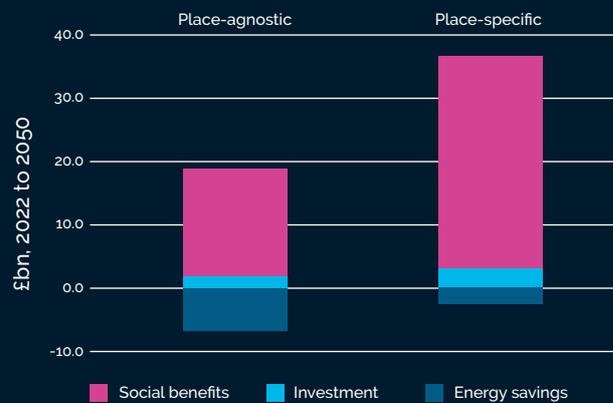
Taking a place-specific approach

Liverpool's dense urban environment means that mode shift interventions are particularly impactful and drive ~70% of the potential social benefits. Widespread active travel and more efficient logistics are the most socially cost-effective low carbon measures.

Liverpool is also home to the fifth busiest port in the UK, and as a result it has higher levels of HGV traffic than the other cities. This means that logistical improvements that reduce the number of lorries on the road would create proportionately higher benefits for Liverpoolians, i.e. through reductions in air pollution, noise and congestion.

Local housing stock is responsible for approximately half of the city's emissions. Liverpool also suffers from higher levels of excess winter deaths per capita than other cities (0.62 per 1000 people vs 0.4 in Cambridgeshire and Peterborough and 0.5 in Manchester).²⁴ Liverpool will benefit significantly from more efficient, better insulated and warmer homes.

Figure 10: The NPSV of a place-agnostic strategy vs place-based delivery in Liverpool



Wider Social Benefits

£bn	Place-agnostic	Place-specific
Investment	-6.8	-2.5
Energy savings	1.8	3.1
Social benefits	17.0	33.6
NPSV	12.0	34.3

The table above shows the impact when a city region can adopt the most socially cost-effective combination of low carbon measures. In both scenarios Liverpool meets the Climate Change Committee's Sixth Carbon Budget, but in the place-specific scenario it does so with less investment, higher energy savings and significantly higher social benefits.



CHAPTER 3

**Blockers to adoption
of low carbon measures**

CHAPTER 3

Blockers to adoption of low carbon measures

Our root cause analysis and local government readiness assessments **identified many blockers to low carbon measure adoption**. These affect consumer and organisations' capability, motivation and opportunity to adopt low carbon measures, and exist in part due to weaknesses in the delivery landscape.

Many blockers constrain the pace and scale – and increase the costs–of low carbon measure adoption.

The UK market for low carbon measures in transport and buildings remains immature. The market faces a complex system of interrelated financial, social, and institutional blockers which either slow or prevent the adoption of low carbon measures, restricting the private sector's role in decarbonisation. For instance, high costs and the difficulty of finding a supplier cause some communities to object to new heat networks or dissuade homeowners from buying heat pumps. Similarly, the low adoption of heat pumps can dissuade others from adopting them.

We analysed the blockers faced by consumers and organisations, and categorised them using the COM-B

framework.²⁵ This framework diagnoses blockers by individuals or organisations' lack of capability, opportunity or motivation to change their behaviour. This is illustrated in Figure 11 and examples of their impact is set out in Figure 12.

Not all blockers are the same, and some low carbon measures face a combination of many blockers, which must all be addressed before they can be widely adopted. For instance, many homeowners lack the capability to retrofit a home because they are unaware of the value it brings, and/or cannot afford the upfront costs, the supply chain needed for large-scale retrofits does not yet exist, and the payback period is unattractive. All these blockers must be resolved to enable widespread whole-house retrofits.

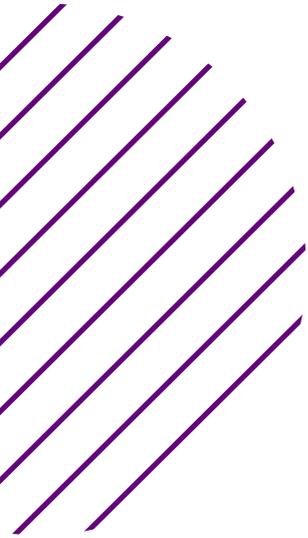


Figure 11: Mapping of blockers against common local carbon measures

Blockers		Low Carbon Measures					
Category	Types of blocker	Domestic heat pumps	Domestic whole-house retrofit	Commercial solar PV	Smart local energy system	Cycling	Electric vehicle sharing
Individuals and organisations do not have the capability to make the required changes	Individuals and organisations do not know what changes they need to make	●	●	●	●		
	Individuals and organisations do not know how to make the required changes	●	●	●	●		
	Individuals and organisations do not have the capacity to make the required changes	●	●	●	●		
The supply chain does not provide good opportunities	There is a limited supply of opportunities	●	●	●	●		
	Opportunities are of low quality	●	●	●	●		●
Third parties prevent change	Regulatory barriers prevent individuals and organisations from making changes	●	●	●	●	●	●
	Local communities prevent individuals and organisations from making changes			●	●		
Individuals and organisations cannot afford to make the required changes	Individuals and organisations cannot access the requisite finance		●	●	●		
Individuals and organisations do not benefit enough from making the required changes	The financial benefits are less than the financial costs	●	●	●	●		
	The total benefits are less than the total costs	●	●	●	●	●	●
	Individuals and organisations prefer to fund other things	●	●	●	●		●
Individuals and organisations are wary of making the required changes	Individuals and organisations do not want to be the "first mover"	●	●	●	●		
	Individuals and organisations do not trust the product	●	●	●	●		

Government policy-making has attempted to relieve blockers

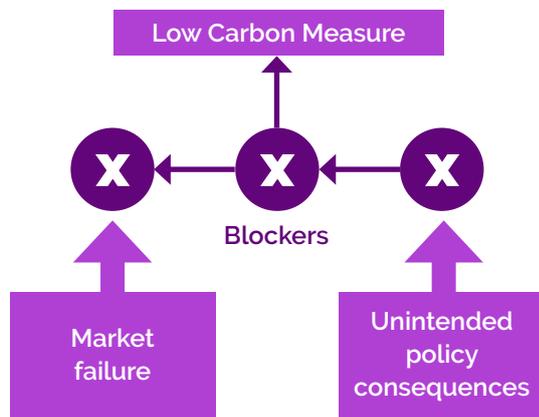
Over the past 10 to 15 years, the government has tried to implement policies to accelerate low carbon measure adoption. Many have been successful, some have been beset by difficulties, but much has been learned. A key challenge is that many schemes simply do not achieve scale. For example, to increase retrofitting of private rented housing, the government introduced new regulations in 2015. The Non Domestic Private Rented Sector Energy Efficiency Regulations were introduced to tackle a lack of motivation on the part of private landlords

who don't personally benefit from retrofitting their rented properties. Retrofitting reduces energy consumption and emissions, and provides additional benefits of a more comfortable and healthier home.²⁶ It results in lower fuel bills for the tenant, not the landlord. When it reviewed the scheme, BEIS found that the cost of energy efficiency improvements and lack of access to finance prevented some landlords from complying with the regulations. Despite intervention, lack of both motivation and opportunity remained for landlords. Where interventions are introduced to help adoption of low carbon measures, they need to address all of the blockers to be fully effective.

Figure 12: Categorisation and examples of blockers to low carbon measure adoption

Individuals and organisations do not have the <u>capacity</u> to make the required changes	Individuals and organisations do not have the <u>opportunity</u> to make the required changes			Individuals and organisations are not <u>motivated</u> to make the required changes	
	The supply chain is not offering good opportunities	Third parties are preventing change	Individuals and organisations cannot afford to make the required changes	Individuals and organisations do not benefit enough from making the required changes	Individuals and organisations are wary of making the required changes
They do not know what changes they need to make (e.g. 51% of homeowners unaware that gas boilers contribute to climate change. ²⁷)	There is a limited supply of opportunities to make changes (e.g. 34% of housing associations cited a lack of capacity and capability in supply chains as the principal obstacle to retrofit. ²⁸)	Regulatory barriers prevent individuals and organisations from making changes (e.g. the bureaucratic burden of dealing with so many local authorities has prevented the emergence of some EV sharing schemes. ³¹)	They cannot access the requisite finance (e.g. local authorities cannot get large scale integrated programme finance for Smart Local Energy Systems)	The private financial benefits are less than the financial costs e.g. Retrofit energy savings take up to 15 years to offset their cost and are typically not factored into house prices. ³²)	They do not trust the product (e.g. less than 50% of people trust energy suppliers to give impartial advice; ³³ 37% of agents are put off electric vehicles due to "range anxiety". ³⁴)
They do not know how to make the required changes (e.g. low adoption of whole house retrofit means limited suppliers and low trust in the suppliers they find.)	Where opportunities do exist, they are not good quality (e.g. two-thirds of people say the biggest barrier to cycling to work is that it is unsafe. ³⁰)	Local communities prevent individuals and organisations from making changes (e.g. district heating networks have been prevented by a lack of community support)		The total benefits to the individual or organisation are less than the total costs (e.g. over 50% of people think changing to a heat pump would be too inconvenient to do. ²⁷)	They do not want to be the "first mover" (e.g. homeowners do not want to be the first person they know of to install a heat pump or buy an electric vehicle)
They do not have the capacity to make the required changes (e.g. Local Authorities do not have the resources to fund decarbonisation efforts; ²⁸ homeowners do not have the time to coordinate retrofit.)				Individuals and organisations would rather fund other things (e.g. 54% see excessive upfront cost as a barrier to switching from petrol or diesel to electric vehicles. ²⁷)	

Blockers are caused by market failures and unintended consequences of government policies



The market failures include:

- > Imperfect information: individuals and organisations do not know about the assets they own or the low carbon measures available to them.
- > Externalities: the financial cost is higher than the financial benefit and significant wider social and economic benefits are not received directly by the individual or the organisation.
- > Coordination failure: large scale low carbon measures, e.g. district heating, require coordinated demand to be cost-effective. When uncoordinated, the measures are unaffordable.

Unintended policy consequences and a lack of policy certainty cause further blockers. Policies – both related and unrelated to net zero – can create adverse circumstances that prevent adoption. For example, restrictions on conservation areas can limit householders' ability to retrofit heritage buildings.

The root causes of blockers can sometimes interact to compound their blocking effects. Government intervention – in the form of policies and investment projects – is required to relieve blockers. The right action will catalyse private investment once the conditions are in place for the market to respond.

The Net Zero Strategy includes a range of interventions designed to resolve some blockers

The Net Zero Strategy commits to delivering the interventions required to remove blockers. These interventions include a range of policies, regulatory changes and public investments, and will tackle issues around opportunity, capability and motivation in parallel. For example, to accelerate heat pump adoption, three new parallel initiatives will tackle capability through an energy advice service, opportunity through a boiler upgrade scheme, and motivation with investment in innovation to strengthen the desirability of heat pumps.

Accelerating heat pump deployment

The Net Zero Strategy commits to making heat pumps as cheap to buy and run as a gas boiler. It aims to grow the heat pump market to 600,000 installations per year by 2028 and work with UK manufacturers to reduce costs by at least 25-50% by 2025, and achieve parity with gas boilers by 2030 at the latest. A number of initiatives will support delivery by tackling consumer and organisation capability, motivation and opportunity to adopt:

- > Boiler Upgrade Scheme: a £450m scheme provides grants of up to £5,000 for low carbon heating, bringing them to the equivalent cost of a gas boiler – to address the high cost of heat pumps, relative to their benefits.
- > Heat Pump Ready Programme: £60m will be invested in heat pump innovation and improve their desirability.
- > Simple Energy Advice service: An online platform on GOV.UK provides information and advice on low carbon heating, to help homeowners understand why they need to change their heating and how to do so.

All blockers must be taken into account when designing net zero plans

Policy makers must consistently take all relevant blockers into account when considering low carbon measure adoption, in order to maximise their benefits. The roll out and delivery of low carbon measures must include interventions that comprehensively tackle all associated blockers.

Well designed government interventions will enable private adoption of low carbon measures, and foster a supply chain that is capable and willing to deliver. Whilst some interventions will require public funding, many will focus on enabling private finance instead. New regulatory models that standardise returns on investment will encourage more private investment in low carbon measures.

Effective approaches to resolving blockers

Take a local approach. The wider benefits of low carbon measure adoption are maximised when the needs of a place are taken into consideration. It becomes harder to determine the most socially beneficial set of low carbon measures, because each place is unique, but means wider social outcomes are improved in parallel.

Optimise the low carbon measures selected. A single low carbon measure can meet multiple needs, and is more cost-effective when it does. For instance, whole house retrofit reduces heat loss and decarbonises heat generation. While low carbon measure design becomes harder – because it involves considering multiple needs at once – it also creates opportunities to deliver large-scale decarbonisation at a lower cost.

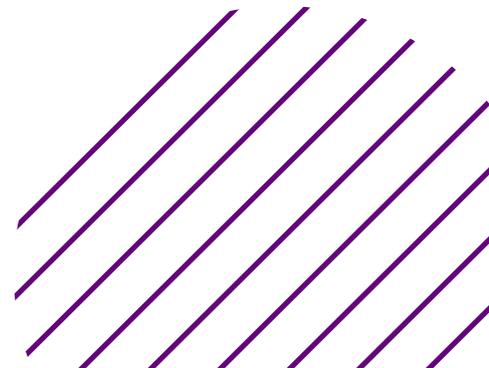
Target interventions at all blockers. Low carbon measures often face multiple blockers, which need to all be resolved to realise intended benefits. For instance, many homeowners are dissuaded from buying heat pumps because of their high cost and the difficulty of finding a supplier. Multiple interventions must be delivered for adoption to happen.

Prioritise interventions that resolve multiple blockers. Some interventions can address many blockers. For instance, an information campaign (such as the Simple Energy Advice service described in the Net Zero Strategy) can help homeowners understand how to retrofit their homes and make it easier for them to do so. This makes designing the best interventions harder, because multiple blockers must be considered at once, but it creates opportunities to stimulate adoption more cost-effectively.

Recognise that some blockers create others. Low rates of adoption of heat pumps can dissuade others from adoption, creating a vicious circle. Interventions must resolve the root cause of blockers and a whole-system approach should be taken when considering action.

Local government readiness also remains a barrier

The readiness of local government to design and manage Local Net Zero Portfolios varies. Not all levels of readiness are sufficient or equal between places. This makes the case for flexible technical assistance and support to level these capabilities for consistent and effective delivery.



We invited representatives from our six city-regions to assess their decarbonisation readiness.

Our Climate Action Readiness Assessment workshops worked closely with local governments in selected city-regions. We held two workshops for each sector. The first assessed readiness for action. The second proposed changes to improve readiness and tested how a Net Zero Delivery Framework could deliver these changes.

We identified barriers to low carbon measure deployment and the interventions required to resolve them. We worked closely with local governments in selected city-regions to identify where reform is needed to enable a local, whole-system approach that encompasses central to local government actors. To effectively assess readiness, we considered five readiness categories: Delivery, Financial, Policy, Technical, and Stakeholders. We also analysed policy evaluations and local government readiness assessments to identify additional challenges posed by the existing delivery framework.

We found that readiness levels vary considerably at both city-region and sector levels. However there are some core commonalities, including:

- > A clear mandate does not exist for local government to own the local net zero agenda. The public resources that underpin locally coordinated delivery are not made available in a predictable way or with the necessary scale.
- > Technical readiness – the technologies required to reduce energy use and emissions – are not considered a key constraint. Efforts therefore need to focus on stimulating private sector opportunities for implementation at scale, rather than innovation and local technical capability development.
- > Enhanced and cohesive policies that provide certainty, direction and incentives are required to drive net zero delivery. Some blockers are left unresolved because siloed policy development prevents coordination between national and local interventions, and between different local interventions.
- > Local governments often lack the resources, skills and financing capacity required to deliver all their priorities. For example, local government and local Energy Hubs struggle to recruit specialist expertise because they lack the finance to make larger, long-term changes.
- > Stakeholder readiness varies extensively across sectors and city-regions. Therefore a flexible and local approach is essential when designing portfolios of interventions and low carbon measures.

A summary of the results from both workshops is provided in Figure 13, the results of which fed into our proposals for a Local Net Zero Delivery Framework, set out later in this report.



CARA Readiness Assessment and literature review summary

Technical

(1) CARA Readiness Assessment: Are the technologies needed to reduce energy use / carbon emissions available and ready to deploy?

Technical readiness is not considered a significant blocker to decarbonisation in any sector or city-region.

As such, technical readiness scores highly for all but the highest levels of ambition across all sub-sectors. Participants felt that the technology to decarbonise all types of housing was available for almost all levels of ambition. Participants felt that technical readiness was high for commercial and public buildings, but innovation would be needed in order to achieve net zero.

Technical readiness was generally considered lowest for the transport sector. In particular, there are few alternative options to electric vehicles and grid capacity is not adequate to electrify transport at a large scale.

(2) Literature Review key findings

There are existing case studies of effective public-private technical delivery. Examples include the GLA's Retrofit Accelerate scheme. Delivery partners provide technical and economic backgrounds, while the GLA, local boroughs and housing associations bring local knowledge.

Financial

(1) CARA Readiness Assessment: Are the funds available, are there investable options with business models ready to be deployed?

Financial readiness scored relatively low across every sector and city-region.

It is the most significant challenge facing transport.

It was seen as less of a challenge for Cambridgeshire and Peterborough compared to other city-regions. It scored the lowest for all transport sub-sectors in Liverpool. COP26 has meant Glasgow may have higher financial readiness but this is not replicated in other areas or sub-sectors. It is also higher for social housing, but willingness to pay is a challenge in the private sector.

(2) Literature Review key findings

The UK Green Building Council found that homeowners do not want to fund retrofit based on the balance of financial and non-financial costs and benefits, and that landlords are not able to recoup the cost through charging higher rent if private tenants are not willing to pay

Figure 13: Stylised image of the CARA analysis findings: quantitative category readiness scores



Note: Swansea is not included in the CARA analysis due to availability for the workshop process. Similarly representation of all local authorities in each city-region was not comprehensive across all categories analysed.

Policy

(1) CARA Readiness Assessment: Are policies/plans in place to support delivery now, whether locally, regionally and nationally?

The lack of policy certainty is preventing readiness in all sectors and city-regions. Policy uncertainty was cited as a key issue for existing organisations trying to accelerate decarbonisation. Participants felt that the siloed approach to policy development had prevented local government from fulfilling this role so far.

Overall for commercial and public buildings, policy readiness is particularly low because of the disadvantages to setting local standards.

Regarding transport, participants in Cambridgeshire and Peterborough felt that policies still prioritised cars over active travel or public transport. In Glasgow participants highlighted that the devolution of powers relating to transport makes achieving policy readiness difficult.

In contrast in Belfast Energy policy is highly devolved in Northern Ireland meaning they have the potential to pursue a different approach.

(2) Literature Review key findings

CCC: Local authorities find themselves in an ambiguous position as to their role in tackling climate change and where they fit into a coherent national picture.

UK100: Local authorities had "insufficient powers to drive the big changes; and, where powers do exist, insufficient capacity to use them decisively.

Stakeholders

(1) CARA Readiness Assessment: Is there support and buy-in from the public and/or from the business community, or from some sectors of the public/business?

Stakeholder readiness exhibited considerable variation between sectors and city-regions. Overall people are reluctant to change their behaviour or expect their energy providers to roll out the technology. However awareness of the need to change is growing.

Participants from both Belfast and Glasgow felt they had better community readiness compared to their counterparts in Liverpool and Manchester. In particular Belfast representatives felt that the challenge was around getting the community to accept the technology.

Community readiness is higher in the cultural and public sub-sector than the commercial and retail sub-sectors. Reducing road capacity was noted as a politically sensitive issue in all city-regions, reducing community readiness.

(2) Literature Review key findings

UK100 found that local governments are in the ideal position of trust to support a coordinated approach to community engagement but lack the mandate and capacity to do so.

Delivery

(1) CARA Readiness Assessment: Do we have the skills, supply chains and organisations ready to deliver?

Delivery readiness overall scored lowly, with key distinctions between different sectors.

Delivery readiness scored lowest in housing due to the difficulties and timescales involved in retrofitting social housing. It scored relatively lowly across commercial and transport due to concerns about delivery capacity, reskilling and supply chain.

(2) Literature Review key findings

Urban Foresight: "the absence of skilled business modellers in natural capital and carbon sequestration was a recurring theme."

NAO: "In a Local Government Association (LGA) climate change survey in 2020, 79 out of 90 respondents thought a lack of workforce capacity was a moderate or significant barrier to tackling climate change" and "that the many sources of good practice can be difficult to work through, to filter out what might work in their area."



A local approach best resolves blockers to net zero

Many of the issues discussed in this chapter can be solved or improved through locally tailored portfolios. Local knowledge understands best the specific context, geography, demographic barriers of a place, and can better bridge policy and markets to local people.

In the absence of a nationally coordinated approach, those able to take early action have been doing so in a number of different ways, with greater or lesser degrees of success and, for the most part, without requisite funding or capabilities. Despite declaring local climate emergencies, local government lacks a clear mandate, comprehensive plans, funding, or a delivery framework to guide and coordinate their actions. There is currently no national coordinating entity, despite calls from local leaders to create one.

Challenges of this scale require an approach that builds on existing foundations, but enables a paradigm shift in delivery. A new delivery framework, underpinned by clear design principles from the analysis in this report, will enable the government to take a whole-system approach, unblocking the constraints that hinder local leadership. Changes to the building blocks of governance, portfolio design and management, funding and finance, and capacity and skills will accelerate local delivery.

Current local action plans are well intended, and include a raft of necessary low carbon measures, projects and initiatives. However, in many cases they lack critical elements that, if left unaddressed, will limit their delivery. These include:

- > A lack of analysis of interventions that address blockers to adoption.
- > Gaps in governance, process, finance or capacity within the delivery landscape.
- > Weak or insufficient funding and financing plans to accelerate investment.
- > Inadequate processes, management and accountability mechanisms in delivery plans.

This is endorsed by recent research by Energy Systems Catapult which found that just 15 local climate action plans reached the minimum standard required of a Local Area Energy Plan.¹⁷

To address all issues in all places a new national blueprint is needed that sets out consistency, technical support and coordination between national and local actors. This blueprint must include a whole-system, joined-up and place-based structure, in which each place can find the guidance, support and funding approaches they require. In our multi-tier governance system 'local' means different things across England and different in our Devolved Administrations. The delivery framework needs to take this into account so it is relevant to all actors.

What is a Local Area Energy Plan (LAEP)?

LAEPs are one of the most effective approaches for local, whole-system, portfolio design and delivery. The approach creates a plan that optimises efficiency, and reduces the risk of unforeseen consequences.

300

UK local authorities have declared a climate emergency

Nearly 300 UK local authorities have declared a climate emergency and developed plans to achieve net zero. These plans are varied and can include Climate Action Plans, Local Energy Strategies, and Net Zero Masterplans.

Whilst there is no formal definition of a Local Area Energy Plan, there are two vital elements: (i) using data, analysis and modelling to inform overarching strategy and approach (ii) using an action plan or road map – with detailed actions, responsibilities and timescales – to map how net zero will be achieved.

Most local authority plans do not meet the minimum standards of a LAEP. The Energy Systems Catapult found that only 15 local climate action or LEAP plans reached the minimum standard of a Local Area Energy Plan out of the 376 energy plans it analysed.¹⁷ Many plans lacked detail on how to make the transition to net zero, had little coherence or variety. The plans are underpinned by a variety of modelling tools, but no single tool is available that models the energy system simply and cost-effectively.



The following design principles guide the development of the Delivery Framework

The Delivery Framework design was informed by the CARA analysis, literature and policy reviews, evaluation, extensive case studies, interviews and consolidated findings of existing bodies of work (e.g. National Audit Office, Centre for Cities, UK100, Local Government Association, European Investment Bank and the Energy Systems Catapult), in addition to direct engagement with a range of practitioners at local and national levels.

The following design principles guided the Delivery Framework design. These should be similarly applied to any solutions that follow this work:

Design principle	Description and impact
Joined-up	Build on the foundations of the Net Zero Strategy and ensure impact from existing and new policy, commitments and governance arrangements. Align the Net Zero Strategy with local action taking place in towns and cities so that all tiers of policy and government are pulling in the same direction.
Place-based	A locally coordinated approach for coordinated design and delivery. In addition to tailoring of total benefits, engagement, socio-economic, practical and links to government services can be coordinated and improved. Maximises local expertise, working iteratively to respond to local needs.
Whole-system	A whole-system solution that addresses the connections between sectors such as energy and transport, addresses the complex overlapping barriers to change and maximises the wider social benefits and coordinates and the roles of different actors. Prevents duplicative effort and accelerates progress at a local level.
Empowered	Gives clear mandates that clarify future roles and allocates responsibilities. Aligns skill sets to teams to improve effectiveness.
Adaptive	A flexible, customisable and agile process maximises benefits, and enables teams to learn, fail fast and move quickly to capture new opportunities.
Enabling	A supported effort where guidance and assistance are provided where it is most needed. Clear roles will support private sector development nationally and locally.

Case Study

Project Local Energy
Oxfordshire (LEO)



This case study represents an example of the type of Project that the Delivery Framework should help mature, scale and replicate and illustrates many of the design principles in practice.

£15.2m

grant provided via the Prospering from the Energy Revolution (PFER)

£22.5m

further provided by project partners

LEO is developing a Smart Local Energy System (SLES) for Oxfordshire, which will create technical, commercial, and social insights into different energy assets.³⁵ Its primary aim is to 'deliver a transformative integrated smart local energy system to maximise prosperity from local energy systems and demonstrate new value creation opportunities'. The project will demonstrate how renewable generation, storage, and demand, can be coordinated in a flexible way to respond to over – or under-supply in the grid. By sharing this knowledge, it will help inform the development of SLESs elsewhere.

Project LEO is made possible by its working partnership approach, with partners including Low Carbon Hub, SSEN, University of Oxford, Oxford Brookes University, Piclo, EDF Energy, and Nuvve. This means it gains a wealth of academic knowledge, commercial expertise, and technical capabilities from its broad range of partners and stakeholders. It also has links to OxFutures, another Oxford-based innovation partnership; Project LEO sits within the 'Green Lab' aspects of this system, as a key project investigating methods of integrating technologies into local, regional and national energy grids. The project puts a strong emphasis on stakeholder buy-in, particularly to build individuals' capability and motivation to engage in the energy transition more widely.

The project is part-funded by UKRI as part of the Industrial Strategy Challenge Fund. UKRI provided a grant of £15.2m under the Prospering from the Energy Revolution programme, delivered by Innovate UK. A further £22.5m is being provided by project partners.





CHAPTER 4

Towards a Local Net Zero Delivery Framework

CHAPTER 4

Towards a Local Net Zero Delivery Framework

Accelerating the delivery of the UK's ambitious net zero agenda via a national-to-local, joined-up and whole-system approach.

Deep and urgent decarbonisation is required to deliver net zero. A local approach will also contribute to levelling up and build momentum in a green recovery from the pandemic. Our cities and towns are essential to these dual objectives. They are home to the largest and most diverse proportion of society, but also represent the critical path of emissions reduction opportunities that the UK now needs to deliver.

The Government's Net Zero Strategy endorsed a whole-system approach when selecting low carbon measures, acknowledging the diversity of local needs.

Each place is unique, so what works in Glasgow or Manchester may not work for Peterborough or Swansea. Yes there are common delivery challenges, but there are many differences caused by local and specific interdependencies between decarbonisation goals, prioritisation of socio-economic outcomes, urban form and structure, plus the local political context.

The current misfiring delivery landscape can be improved through ambitious enhancements

Previous chapters of this report have established that there is:

- > A strong economic case for local climate action.
- > A clear commitment to net zero across all of government, but a gap between planning and execution of this goal.
- > A series of blockers and market failures preventing delivery at pace and scale.
- > A need for practical interventions to remove these blockers.



This chapter describes a whole-system delivery framework that will accelerate net zero delivery. A whole-system approach requires a nationally owned framework that uses common solutions and tailored approaches to solve the many challenges. It guides actors to operate consistently and in an integrated way. And it respects the need for local design, but enables central government to provide support to accelerate deployments and enhance quality and consistency.

The Net Zero Strategy contains important enabling policies, providing support to technological maturity, innovation and affordability. The National Heat & Building Strategy further explains how data-based approaches to local energy planning can create a stronger supply of investable plans.⁴

This delivery framework is published at the same time as the launch of the UK Infrastructure Bank, which was established with a clear mandate for local net zero financing.³⁶ However, we still lack an ambitious national-to-local mechanism that activates a joined-up approach to bringing forward strong investment propositions.

An ambitious national delivery framework that accelerates and scales local action must be implemented without delay. Meeting this challenge requires considerable and coordinated effort. However, this approach will drive alignment to the national Net Zero Strategy, and accelerate action that delivers climate change targets, and catalyse private investment.



The Building Blocks of a Local Net Zero Delivery Framework

The Delivery Framework must increase investment from millions to billions of pounds each year. While the Net Zero and Heat & Building Strategies include some technical guidance on what local plans should include, they stop short of defining how these will be executed.

A sound and robust delivery framework should define the governance, processes, capabilities, systems and investment modalities required to coordinate all the necessary action to deliver net zero. These must be both clearly defined and then designed in detail, including agreement by all relevant system actors.

Our Local Net Zero Delivery Framework is composed of four building blocks. They address the critical gaps in the existing local delivery landscape and unblock the challenges to adoption identified in Chapter 3. To succeed, each of these building blocks must be implemented in unison. The framework's purpose is to present options rather than prescribe a single rigid solution. We therefore recommend that BEIS coordinates stakeholder responses to bring forward a final solution design in conjunction with the recently announced Local Net Zero Forum.

Delivery Framework

Accelerated Local Delivery



System Governance

Building on the foundations of the Net Zero Strategy, clarify the respective roles of delivery ecosystem actors so that each role is attributed to the most effective level and with appropriate authority and accountability.

Portfolio Management

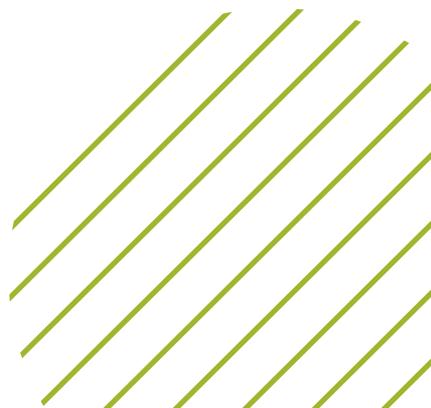
Building on the momentum of climate action and local area energy planning by UK places, bring a consistent methodology to integrated LCM portfolio design, management, implementation and reporting.

Capacity & Skills

Building on the Local Net Zero hub infrastructure, enhance their capabilities and services to support multi-level local portfolios develop their plans and pipelines with Technical Assistance in parallel to national skills programme.

Funding & Financing

Building on the local mandate of the UKIB, furnish portfolio investment needs with a local Net Zero financing framework including core, borrowing, private and innovative investment instruments.





PART A: System Governance

Building on the foundations of the Net Zero Strategy, clarify the roles of delivery system actors. Each role must be allocated to the most effective level, but with appropriate authority and accountability.

Building local net zero delivery into the UK government architecture

The Delivery Framework must enhance not replace the existing multi-tier governance system. The UK's Net Zero Strategy defines the key policies and national institutions that will deliver net zero locally. These include:

- > **A Local Net Zero Forum**, which has a mandate to bring together national and local government senior officials to discuss local policy and delivery options.
- > **Local Authorities (at all levels)** are central to leadership, delivery and integration. They have responsibility for local streets, parking, planning and building control, environment, waste and some energy assets. Therefore, they have an important role in shaping local net zero approaches.
- > **Local Net Zero Hubs** will have a bigger role to play if they are regionally distributed, and offer a locus for technical assistance, capability and capacity.
- > **The UK Infrastructure Bank** has a local financing mandate, but is still shaping its approach to local lending instruments and project / portfolio involvement.

Defining consistent activities

Six distinct activities are critical to a successful and joined-up Delivery Framework. These different activities must be delivered by different parts of government, so clear roles and responsibilities are vital for its success. These activities are:

1

Vision and oversight: BEIS should oversee the framework, coordinate with other central government entities and provide core (public) funding to operate the system.

2

Accountability: It is important to establish clear accountability for delivering outcomes, and cross-portfolio decision making. Therefore, a single organisation should decide which low carbon measures are prioritised and what interventions to pursue. It requires place-specific knowledge and a diverse range of skills and stakeholders, so responsibility should be assigned to an organisation with relevant knowledge, connections and expertise.

3

Portfolio design: A whole-system, iterative and data-driven approach to portfolio design, informed by local knowledge and specialist expertise, will help optimise the portfolio. Portfolio design identifies the barriers to each low carbon measure, their root causes, the interventions needed to overcome them, and calculates total costs and benefits. The entities that design local net zero plans may require support, as skill sets will differ.

4

Project delivery and practical implementation: Project teams must deliver projects in an agile way. They will plan project design and delivery alongside many other system actors. The parallel delivery of projects by different levels of government requires significant coordination between national, devolved, and local project teams.

Our economic models used significant data on the costs, decarbonisation impact, and wider social benefits of low carbon measures. However, this data is not widely available. In addition, the data changes over time as a result of innovation and external changes. Therefore, a data reporting organisation should collate and refresh this information centrally to support nationwide net zero efforts.

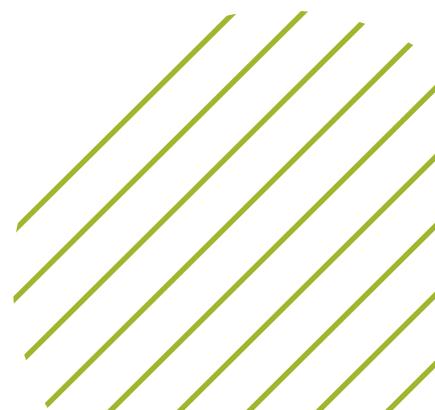
5

Data, research, and reporting: To monitor progress and improve project design, data and best practices should be collected and shared over time. A single point of access to data, research and reporting will support portfolio design and project delivery, nationwide. Data and best practices are collected throughout the design and delivery phases and will inform future projects.

For example, monitoring the success of different interventions in real-time provides insights to all organisations considering that intervention. In addition, horizon scanning will help identify emerging trends that could impact low carbon measures or interventions across all portfolios.

6

Assurance: An independent assurance function provides confidence in the progress of interventions and the readiness of projects. Assurance is provided through critical friend reviews and gateway reviews. Assurance must be an independent function. It can either sit within the Net Zero Strategy Unit or in a local, separate assurance body, where it builds on the functions of the Infrastructure Projects Authority (IPA).³⁷



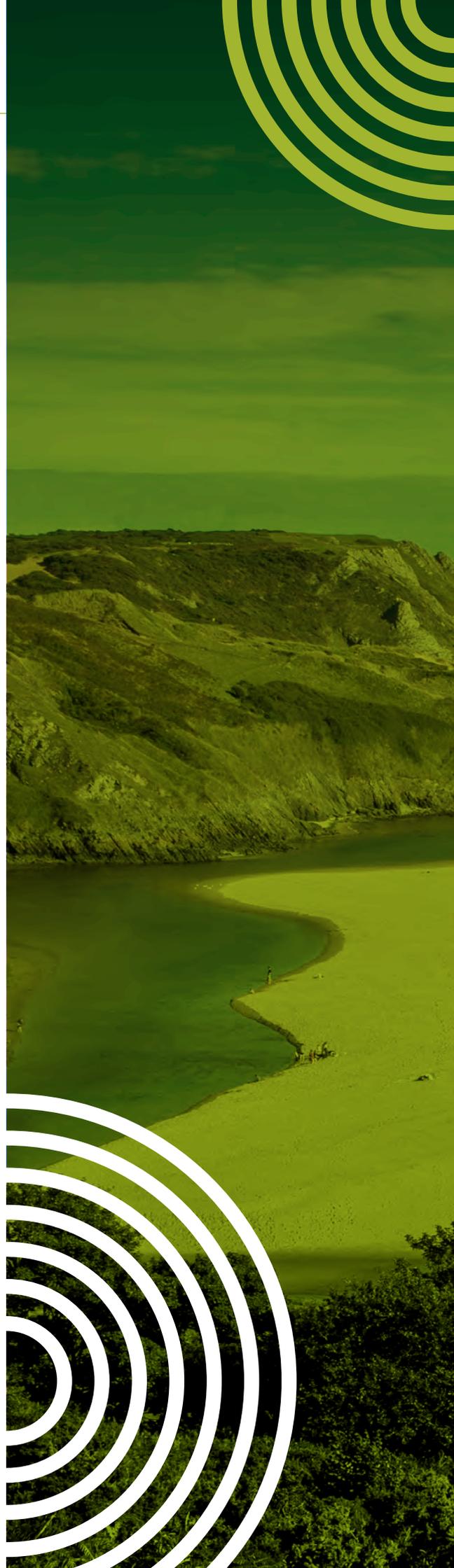
Distributing responsibility between national and local actors

A lack of clarity on 'who does what' is a critical failing of the current system. It is fundamental that all actors recognise the complexity of local delivery, so that clarity can be brought to the different roles they play. The Net Zero Strategy recognises the need for clearer expectations on the role of national, local and regional actors in delivery and the Local Net Zero Forum will consider this.

It will be critical for the Forum to agree where control sits on a continuum between locally and nationally owned solutions. Both ends of the continuum have benefits. For example, local ownership increases the ability to tailor local outcomes or engage more directly in delivery. Conversely, national ownership enables oversight on funding and results, establishes a clear and consistent operating model, and stimulates the private sector.

The evidence from the CARA analysis, NAO, local authority engagement and Energy System Catapult report did not build a case for complete system overhaul and implementation of a new and independent solution. This would be unhelpful. Instead, the current system should be enhanced. An optimised configuration of roles and responsibilities will maximise total and local benefits within a national framework. It provides consistency and oversight, while providing appropriate levels of autonomy for local actors.

Different levels of government are best placed to design and deliver different interventions, as they do now. At the core of any local approach is the commitment to the principle of 'subsidiarity', where decision-making is devolved to the level where it can be most effectively taken. With the right governance wrapper this should be a win-win for national Government and local places. However, because responsibility is devolved to different levels of government, coordination is vital to ensure success.



Governance options

There are three options to share responsibility for these activities between national and local government. Each option sits on a continuum from a nationally biased to a locally biased approach.

The Local Net Zero Forum has an important role coordinating the evolution of governance between national, local and other system actors. It is the most logical choice to decide on the exact, final configuration.

Option 1 – Centrally led:

A centrally led model establishes a Net Zero Strategy Unit in BEIS to design, assure and deliver local portfolios. While input is sought from local and combined authorities, decision making, design and oversight is driven by the central unit.

Option 2 – Locally led:

A locally led model gives local and combined authorities a mandate to deliver low carbon measures and enabling interventions autonomously. This allows them to establish independent local portfolios.

Option 3 – Hybrid:

A hybrid model gives ownership of the overall framework, guidance, national progress, and oversight to a central entity, which can intervene where necessary. This central entity's vision and governance flows down to programme design and management at the appropriate level of local government. However, local teams drive project delivery.

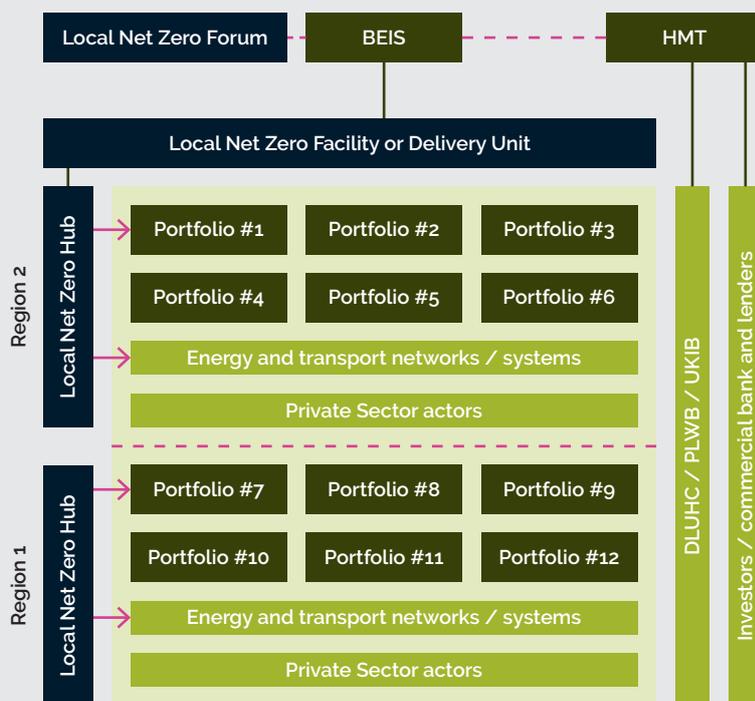
Each model recognises the importance of in-depth local knowledge and specialist expertise. The portfolio designer and owner sits at an administrative level appropriate to the portfolio's scale and complexity.

For many, the city-region level is the most appropriate level, because it recognises the value of appropriate scale, and brings coherence to Local Area Energy Plans and sustainable transport network planning.

Local Net Zero Portfolio owners will either have all the necessary specialist skills in-house, or will access technical support from Local Net Zero Hubs or other collaborators, such as the Energy Systems Catapult, PCAN, or other advisory companies.

An illustrative configuration of entities is presented in Figure 14 below. The options that then follow should show how entities and functions can be allocated in different arrangements to deliver, each with its benefits and trade-offs.

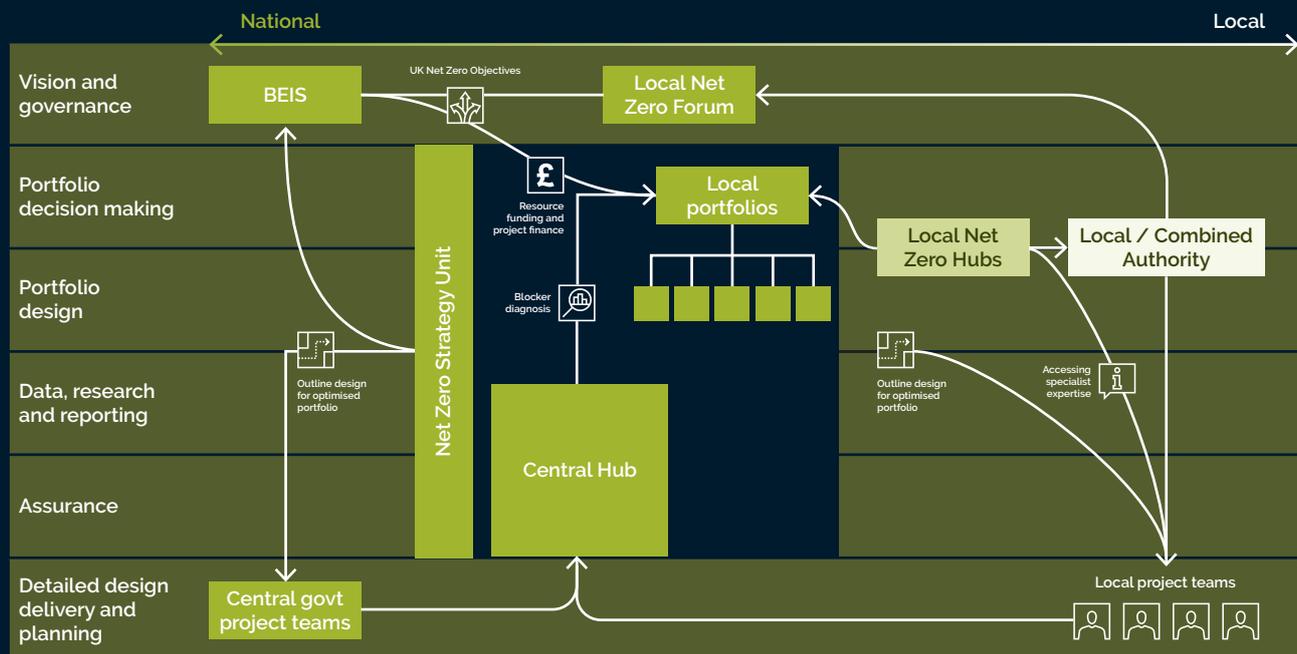
Figure 14: Illustrative configuration for a Delivery Framework (multiple refinements are possible)



The benefits and trade-offs of alternative delivery models

Option 1 – Centrally Led:

A centrally led model establishes a Net Zero Strategy Unit in BEIS to design, assure and deliver local portfolios. Local and Combined Authorities participate and local input is sought however decision making, design and oversight is driven by the centrally positioned unit.



Potential benefits

- > Increased oversight, financial and delivery control at programme level.
- > Greater opportunity to align with wider UK strategy.
- > Greater consistency in design approach.
- > Consistency in data.
- > Better linkages and coordination between national and local projects.

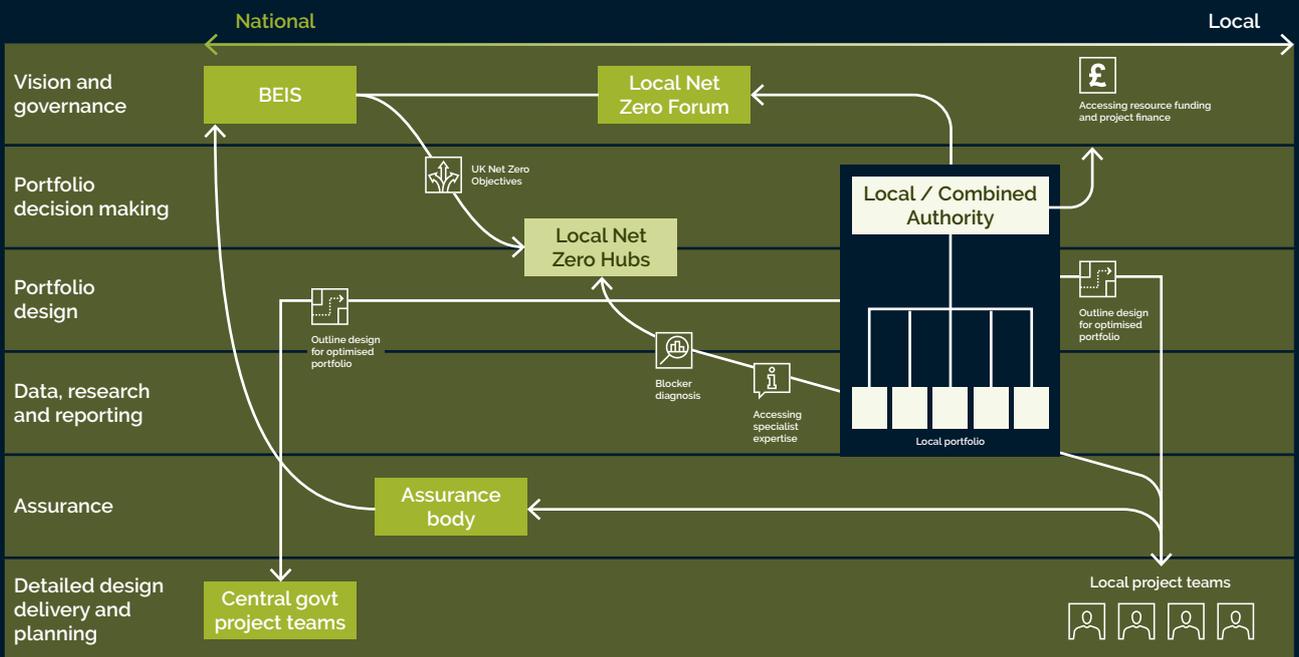
Likely trade-offs

- > Less clear role for Local Net Zero Hubs.
- > Risk that local blockers are not effectively addressed.
- > High demands on central government resources.
- > Lack of local knowledge within design and delivery teams.
- > Political tension regarding decision making over locally sensitive issues.
- > Real or perceived lack of connection with local people.

The benefits and trade-offs of alternative delivery models

Option 2 – Locally Led:

A locally led model requires giving local and combined authorities a mandate to deliver low carbon measures and enabling interventions autonomously. This would allow them to establish independent local portfolios.



Potential benefits

- > Lower central government resource intensity.
- > Increased knowledge of local place.
- > Optimised benefits reflecting local priorities.
- > Integration with local planning and infrastructure programmes.

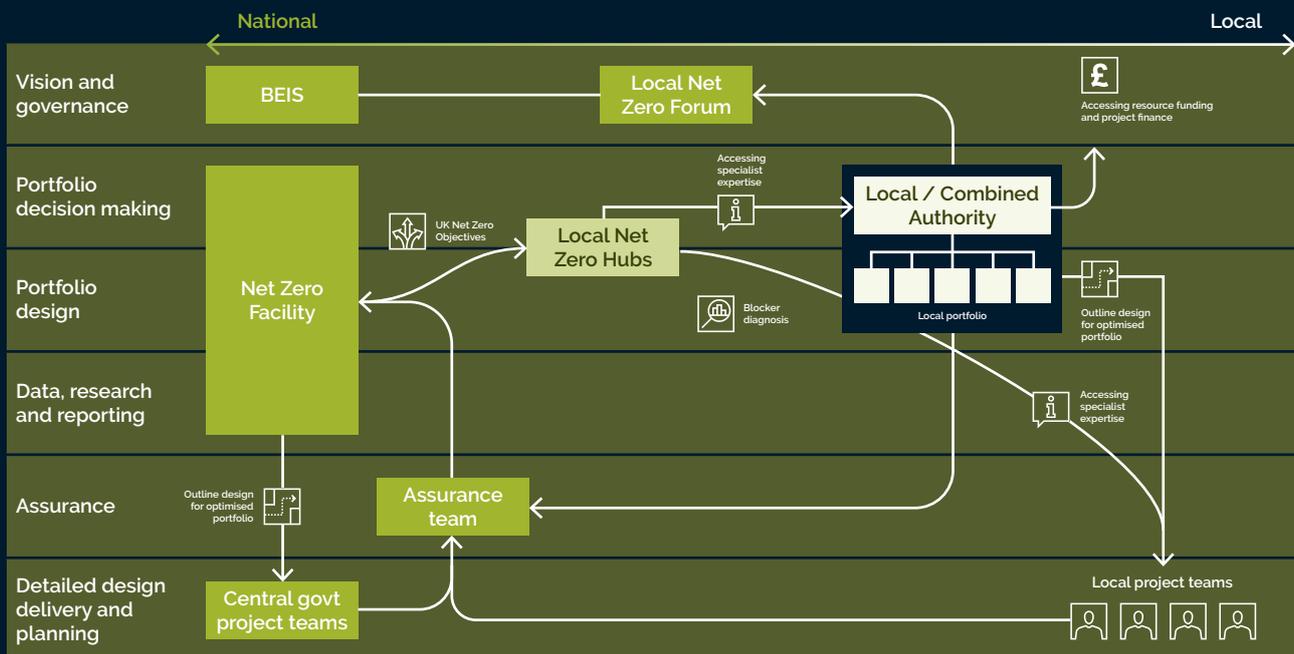
Likely trade-offs

- > Reduced visibility, oversight and progress data.
- > Reduced opportunity to coordinate alignment with wider UK strategy commitments.
- > Limited control of speed of execution.
- > Potential for reinventing the wheel.
- > Less direct linkages with national net zero projects.

The benefits and trade-offs of alternative delivery models

Option 3 – Hybrid:

A hybrid model would allow central vision and governance to flow down to design and programme management at the appropriate level of local government with local teams driving delivery of projects. A central entity would own the overall framework, guidance, national progress and oversight allowing for intervention where helpful or necessary.



Potential benefits

- > Roles and responsibilities allocated to most effective entities.
- > Balanced resource intensity between central and local government, maximising delivery resource.
- > Balanced understanding of both national strategy and local delivery context.
- > Capability and resources directed to where maximum speed, impact and benefits are achieved.

Likely trade-offs

- > Complex to set up, with a greater requirement for clearly defined roles and responsibilities.
- > Increased potential for conflicting stakeholder priorities.
- > Risk of gaps in delivery landscape if full clarity not achieved.

The hybrid approach optimises benefits

A hybrid model brings the fullest range of instruments and opportunities to the table. However, it requires clear design, strong coordination, and buy-in from all system actors.

The hybrid option can be successfully configured in many ways. When selecting a final configuration, the Government should consider the following criteria in a formal options appraisal exercise:

- > Scale and distribution of solution costs.
- > Potential for disruption in political, governance or practical regards.
- > Ability of solution to accelerate pace.
- > Potential of solution to maximise impact (i.e. benefit from local).
- > Capability to be agile and adaptive.

Institutional requirements

The preferred final option may require the extension of mandate from BEIS central teams or the creation of a dedicated unit or facility. This would represent the key mechanism for cascading the central-to-local government strategy, with a mandate to drive this at a local level.

The facility would interlock at a national level with central government project teams and at a local level with local government and Local Net Zero Hubs. It would assist in the assessment and deployment of technical support from the hubs.

In addition the facility would provide an assurance function for the use and deployment of resources in alignment with the UK's Net Zero Strategy, to support the rapid deployment of resources.

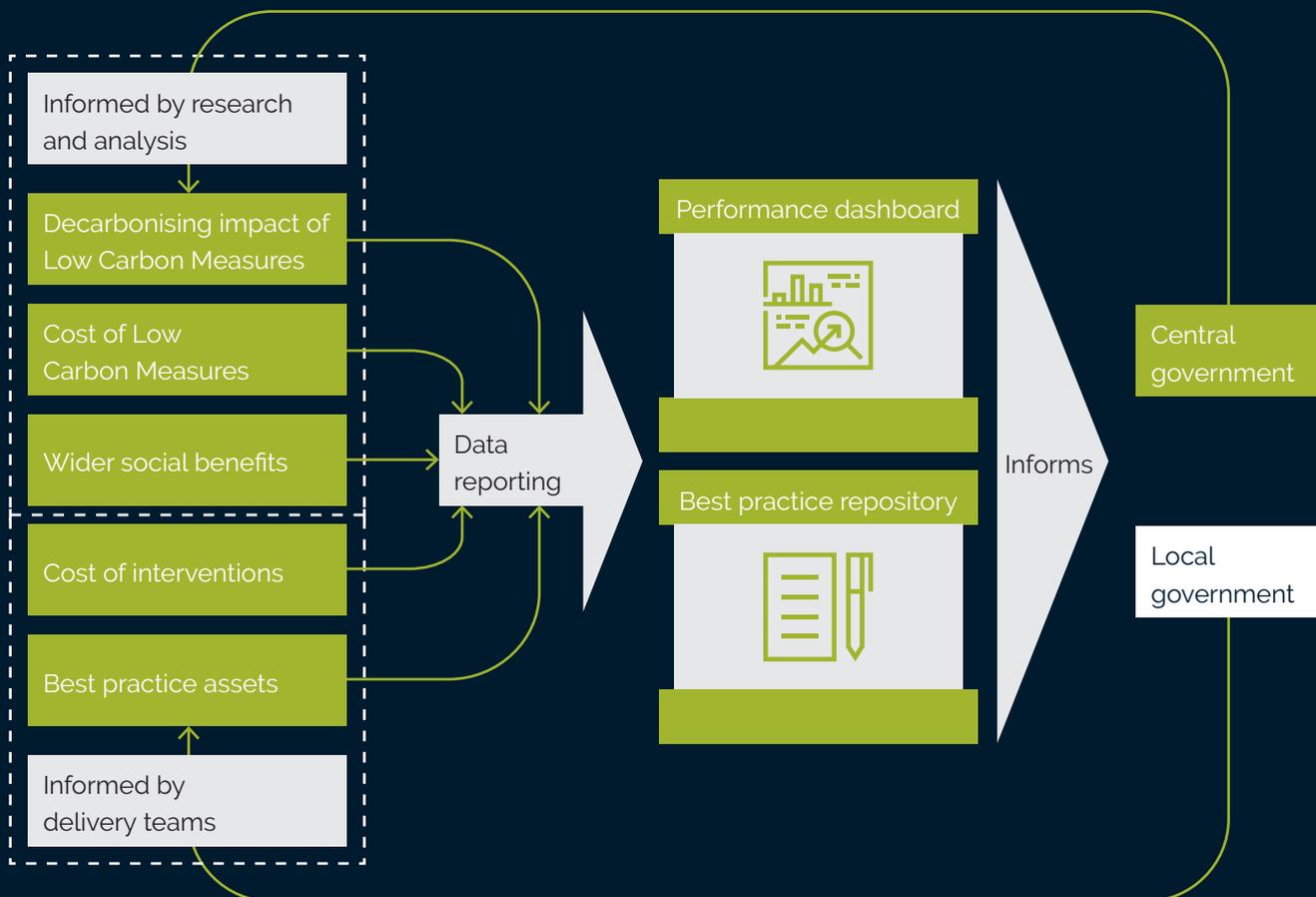
Oversight and progress monitoring

Data, research, and reporting must be the responsibility of a single national organisation, but it could sit in different parts of government. In the centralised model, this organisation could be the proposed Net Zero Strategy Unit; in a local approach it could be hosted by a committee of regional leaders, similar to the Net Zero Forum. A hybrid version may involve this being part of an Arms Length Body such as the Climate Change Committee.

Data on costs, benefits and best practice must be centralised, and systems developed that share them. The central, devolved, and local government teams that design portfolios should access this information through interactive dashboards. Project teams should be able to collect and share best practices – for instance, business models, contracts and software – throughout a project's delivery.



Figure 15: Illustrative dashboard and data repository



Next steps on governance

- > Engage **devolved administrations** to agree on participation or to define interaction with aligned objectives and programmatic approaches.
- > **Appraise detailed variants** of the hybrid option to discover the optimum and best value for money governance structure for the national delivery framework blueprint.
- > **Activate the Local Net Zero Forum** plus a steering group of wider system actors, with a clear focus on evaluating and appraising reformed governance arrangements and other recommendations raised in this report.
- > **Detail and refine a whole-system design**, processes and guidance that address the range of circumstances, typologies and places that they will support.
- > **Consult widely** on the final option to identify and negotiate critical stakeholder needs and safeguards – including across wider government – to enable a successful programme.
- > **Design and mobilise the new entities** required to govern the agreed solution.



PART B: Portfolio design and management

Building on the momentum of climate action and local area energy planning, create a consistent methodology that integrates low carbon measure portfolio design, management, implementation and reporting.

Optimising Local Net Zero Portfolios

Central to understanding the delivery framework is the concept of the Local Net Zero Portfolio; an integrated series of low carbon measures and interventions that help deliver climate targets.

In many cases this will be built from a body of existing work that has already been carried out at a place level by the relevant local authority. For example, in the form of a Local Net Zero Strategy, plan or programme. Often this must be enhanced to be credible, bankable and to include enabling interventions that support low carbon measure adoption.

Portfolios will have two types of activities that must be carefully designed and coordinated for each place:

1

Low carbon measures. Design and delivery of net zero plans and strategies, which include comprehensive projects and associated technologies. Examples might include, EV charging infrastructure, domestic retrofit, heat pump installation and bus or cycle lane schemes.

2

Enabling interventions, for example awareness programmes, financing schemes, neighbourhood programmes, market and supply chain development programmes, skills and apprenticeship schemes.

Determining geographic scales for place-specific portfolios

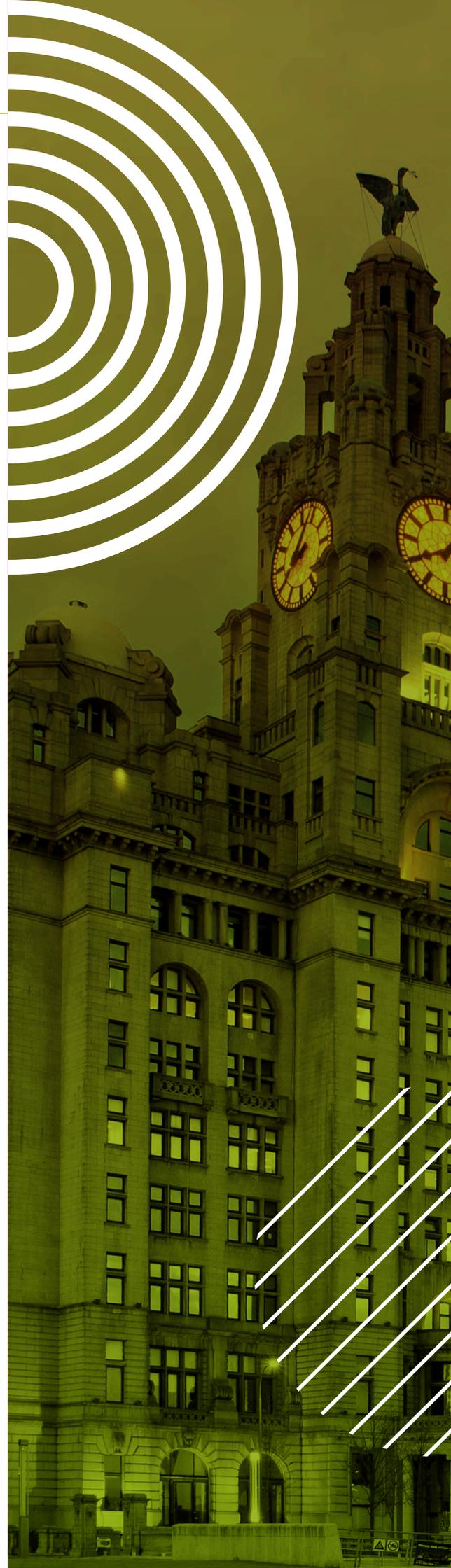
The right geographic scale for each place-specific portfolio must be determined. Just as a one-size-fits-all approach to low carbon measure deployment has limitations, so too does the approach for portfolio management given the UK's multi-tiered government. When considering a portfolio's geographic scale, it is important to strike a balance between increasing the opportunities to integrate low carbon measures and interventions, and the difficulties of designing and delivering a complex portfolio.

The larger the portfolio's geographic area, the more opportunities there are to integrate low carbon measures and interventions. But the larger a geographic area gets, the harder it becomes to design a well-integrated portfolio, identify the most appropriate interventions, fund their execution, and engage with all relevant stakeholders.

Balancing the portfolio's scale must consider all these factors, and requires a practical understanding of each place's unique requirements. For example, the types of travel networks, housing density, and the local interactions between individuals, local organisations, and businesses all influence the optimum geographic size of a portfolio.

Furthermore, the pragmatic considerations of institutional and political boundaries also influence where boundaries are drawn. For example, whilst Combined Authorities may optimise the delivery of some interventions, all interventions must work at a town or district level (particularly for those areas that do not have intermediate institutional governance).

Portfolios should also be able to be aggregated at different levels, in order to adapt to each place's needs. For example, designing a portfolio for Bristol could miss opportunities associated with Hinkley Point power stations if plans are not flexible enough to aggregate to a regional level.



Case Study

West Yorkshire Climate and Environment Plan



£4.4bn

of finance will, help protect 119,000 jobs

116,000

jobs will create a higher demand for skills

West Yorkshire has committed to reach net zero by 2038 and has published a Climate and Environment Plan to achieve this.³⁸

The Climate and Environment Plan takes a whole-system approach that identifies specific actions to enable the transition to net zero, including plans to “bring forward the finance and funding for energy efficiency measures and low carbon technologies by households and measures, technologies, waste and material efficiency, and circular economy solutions by businesses through financial incentives and products”.

In this way, the plan identifies interventions that address the barriers to adoption of low carbon measures specific to the region.

The plan estimates the cost of delivering this portfolio and some of the benefits it will deliver. It requires £4.4bn of finance, will help protect 119,000 jobs where upskilling and support is needed, and will create 116,000 jobs where there will be higher demand for skills.

The plan defines clear roles for the mayoral Combined Authority, the five constituent local authorities, national government, the businesses, and the people of West Yorkshire to deliver it. The West Yorkshire Plan is a particularly clear analysis using data, economics and benefits assessment to make the case for investment locally.

A common process for design and delivery of local portfolios

Building a consistent approach to Local Net Zero Portfolio design and delivery would greatly help actors within the whole system. It creates confidence, knowledge and skills in technical delivery, enabling an acceleration in pace, scale and quality.

Chapter 2 established that it is more socially beneficial for places to adopt place-specific sets of low carbon measures. Since different low carbon measures face different barriers, this means that places will each need to design and deliver a portfolio of interventions that is tailored to stimulate the low carbon measures they prioritise.

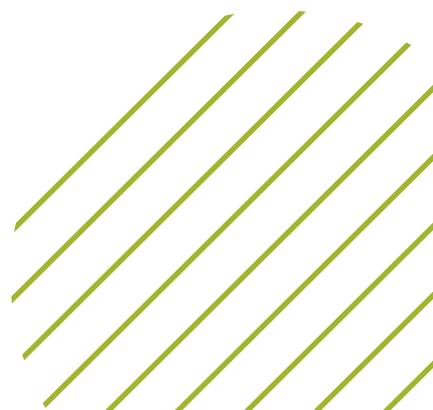
If low carbon measure adoption is tailored to the needs and opportunities of each place, the portfolio of interventions that will stimulate their adoption must be similarly designed to address these unique requirements. The dependencies between different interventions require well-coordinated national and locally-led action, managed as part of a single programme.

A portfolio of interventions will be complex, and must include a mix of nationally and locally-led interventions. For example, subsidy schemes are best managed nationally but community engagement is best done within those communities.

Some interventions require both. For instance, a skills brokerage service – which helps reskill workers currently employed in high carbon industries – should be established nationally, but requires local employer outreach to be effective.

When designing local net zero portfolios the following important considerations should be addressed:

- > **Consider the full range of decarbonising needs** and the wide range of alternative options that address them, driven by data and analysis.
- > **Select low carbon measures for each place-based on the full costs and benefits** of adoption (i.e. including both the cost and wider social benefits of the low carbon measure, and the cost of interventions that enable adoption).
- > **Check that the root causes of every barrier** to a low carbon measure are understood, and design interventions to address them.
- > **Manage dependencies between different interventions** and across organisations to ensure all barriers are addressed.
- > **Ensure that the appropriate tiers of government have responsibility** for, and are involved in, intervention design.
- > **Manage dependencies between different interventions** and across stakeholders to ensure all barriers are addressed in a coordinated manner.
- > **Incorporate socio-economic analysis** and levelling up priorities into portfolio design.



Case Study

West Midlands Combined Authority's Regional Energy System Operator (RESO)



£2m

worth of grant provided by the UKRI

£500m

part of investment long-term plan

+£15bn

wider investment in local energy projects over the next decade

Energy Capital is the West Midlands' smart energy innovation partnership, which combines academic expertise with businesses, innovators, local authorities and entrepreneurs, and provides a single point of contact for investors, funders and other partners.



The project is part-funded by UKRI as part of the Industrial Strategy Challenge Fund. UKRI provided a grant of £2m under the Prospering from the Energy Revolution programme, delivered by Innovate UK.

It aims to make the region one of the most attractive locations to build innovative clean energy technology companies. It will do this by responding to the needs of the region's vibrant manufacturing economy and local markets.

The long-term goal is to create an investment plan of £500m to direct more than £15bn of wider investment in local energy projects over the next decade.

The RESO project explores the advantages of a new type of city-scale energy system and is designing a Smart Local Energy System (SLES) with a clear governance structure and commercial operating model.³⁹ This detailed design will help the project to attract investment and gain stakeholder buy-in for the plan, as well as illustrate the benefits of this approach for other places.

This is an interesting model for large investment at combined authority level and could access private and institutional capital. Effective local stakeholder coordination is central to RESO's future success. The Local Enterprise Partnerships have also taken some of the burden from local authorities by driving the partnership.



Designing a consistent approach for implementing a local net zero portfolio

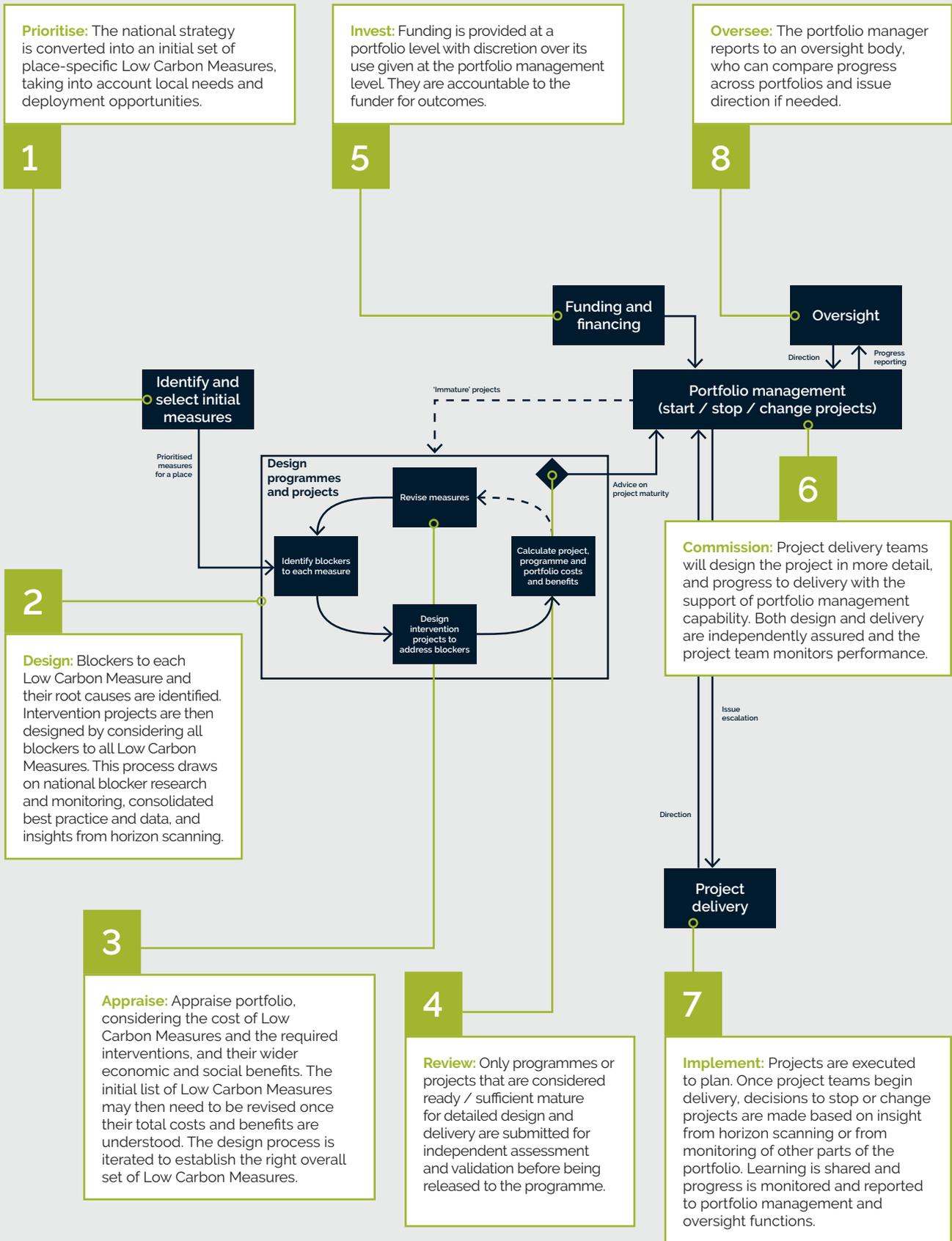
The different activities set out in Figure 16 will be delivered by different parts of government. Therefore clarity over roles and responsibilities is important for success. We have created guidelines for this, broken down by stage.

Figures 17 and 18 set out an eight-step framework that embeds these considerations into a coherent process. This is intended to inform the design, management, implementation and reporting for a whole-system, place-specific portfolio.

Figure 16: A consistent eight-step methodology to integrated low carbon measure portfolio design, management



Figure 17: The eight-step methodology



Some local interventions are already using these design principles

Despite the problems in the current policy and delivery landscape, several interventions are underway to stimulate the adoption of low carbon measures. A number of these interventions are designed to address multiple blockers for different low carbon measures, providing a more cost-effective solution to these blockers.

Many interventions require in-depth local knowledge, community trust and the ability to coordinate multiple local stakeholders. These capabilities are often concentrated at the local level, which means that local government is better placed to design and deliver them than central government as illustrated by the Greater London Authority case study.

Case Study

Greater London Authority Retrofit Accelerator – Homes



The Greater London Authority's (GLA) £3.6m [Retrofit Accelerator – Homes](#) programme aims to transform the way London retrofits its ageing and inefficient housing to achieve warm, affordable, and low-carbon homes across the capital. Additional aims include: initiating 1,600 whole-house retrofits in Greater London; creating a market for the low carbon and environmental goods and services sector; unlocking funding for retrofit projects; saving over 4,000 tonnes of CO₂ per annum; and tackling fuel poverty.⁴⁰

The Accelerator provides technical, financial and procurement advice to help housing associations and London boroughs kick start retrofit projects. The programme engaged with local partners and stakeholders to understand important local characteristics such as the housing stock and existing supply chain capacity. The programme is part of a whole-system approach to the Retrofit London Housing Action Plan which includes innovation, support, delivery, and funding initiatives across housing, commercial and public buildings, and energy.

The Accelerator programme's links to the Retrofit London Housing Action Plan mean that it can take advantage of collaborative working approaches to delivery, connecting the GLA with the 33 councils that are well-placed to drive forward locally delivered retrofit, at scale.

Key learnings are that:

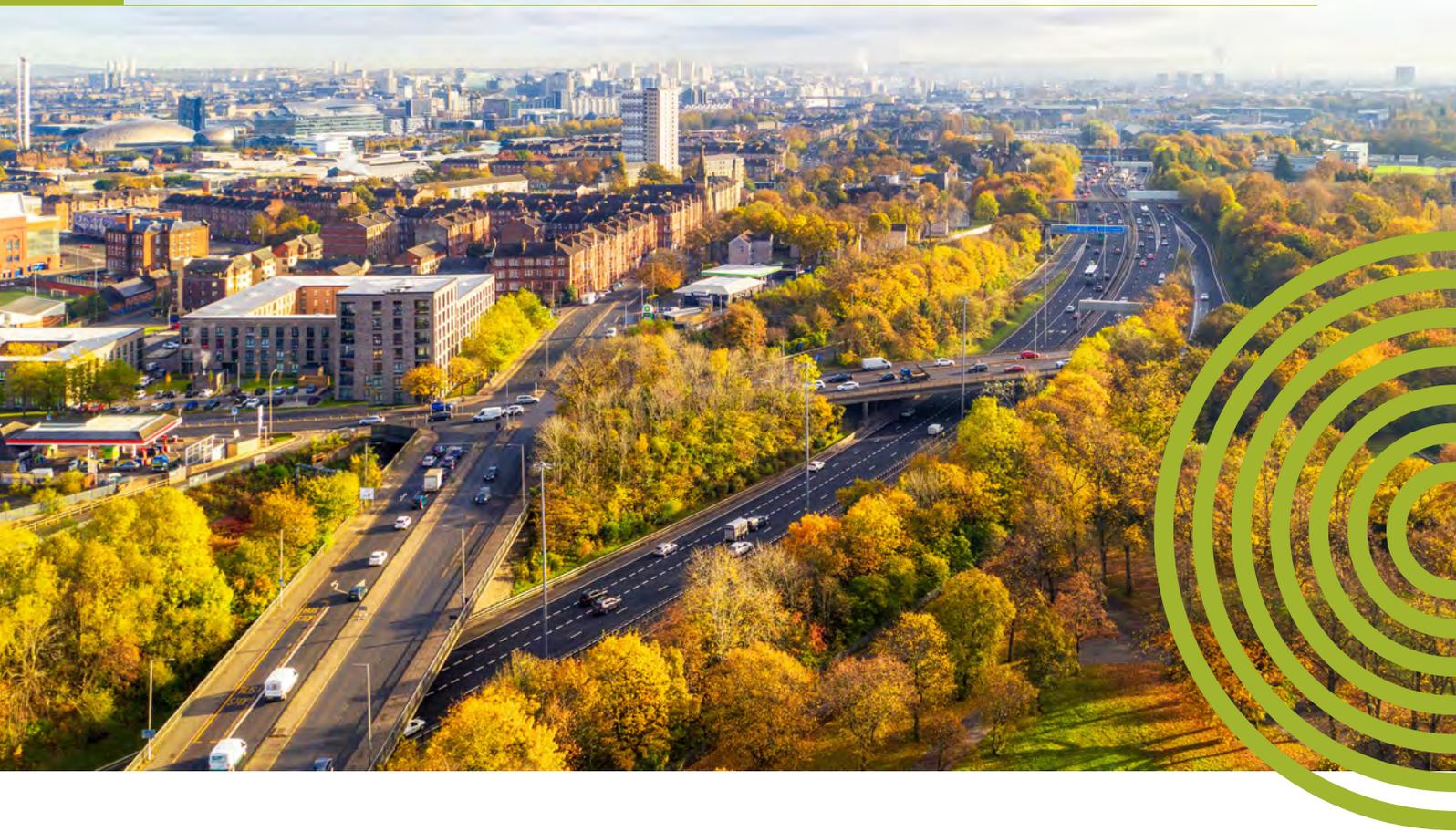
- > Successful design and delivery relies on a high level of local knowledge, local stakeholder buy-in, commercial expertise and technical capabilities.
- > Multiple blockers must be addressed to create successful implementing conditions.
- > The low carbon measures and technologies were well understood. However, the keys to success were the enabling interventions and design principles behind the programme, and access to scale in London's 33 Boroughs.



Next steps on local portfolio design and management

- > Undertake a technical guidance consolidation exercise to bring together guidance for Local Area Energy Planning and the design of local enabling interventions in Local Net Zero Portfolios.
- > Test with multi-stakeholder groups and pilot the combined approach in a range of contexts (i.e. single, unitary and combined authorities) across the nation.
- > Publish guidance and launch a national training programme alongside the Green Book and other IPA and BEIS guidance methodologies.¹⁶





PART C: Funding and Financing

A clear shift to a longer term investment strategy is required. Building on the UK Green Finance Strategy and local mandate of the UKIB, local net zero portfolio investment needs should be met via a new and ambitious funding and financing approach that boosts core resources and early action whilst crowding in private and institutional capital.

Investing in Local Net Zero Portfolios

The economic analysis sets out a significant national investment envelope. For the place-specific scenario this amounts to £58bn for low carbon measures with significant additional investment needs for other sectors such as industry, enabling infrastructure and nature, and programme management and implementation.

This scale of investment in our towns and cities cannot be supported entirely by the public purse, so other sources of capital must be tapped to pay for net zero investments via a range of underutilised funding models and innovative financing mechanisms.

Locally driven capital investment plans and blended financing strategies are essential components in the delivery of local net zero portfolios. The presence of high quality and long-term local investment portfolios will enhance access to a new range of investors that are active in reallocating capital to sustainable ventures and assets.

Meeting the investment challenge should also therefore build on a credible and stable policy framework that offers the market confidence to invest in innovation, skills and supply chains.

However, the existing investment landscape for financing local net zero action is dysfunctional. Local authorities are often chasing and competing for sub-scale funding pots – a situation which incentivises perverse tactical behaviours that prevent more strategic approaches to portfolio development and prioritisation. This in turn reduces the opportunity to raise private finance which is essential to scaling delivery. We have also seen that without the benefits of portfolio level scale, the 'ticket size' for private and institutional investors is often too small. Portfolios looking for investment of £50m and above are likely to be taken more seriously by capital providers with extensive reserves but often complain of a lack of quality projects.

In particular, projects, portfolios, and programmes must be able to access finance at scale and on reasonable terms including from private and commercial sources.

Through one of its three pillars, the UK Green Finance Strategy published in 2019 emphasises the need for financing green investments in the UK. This includes engaging locally, developing long-term frameworks, helping to reduce barriers to investment, improving access to finance and innovating in approach and ways of working.

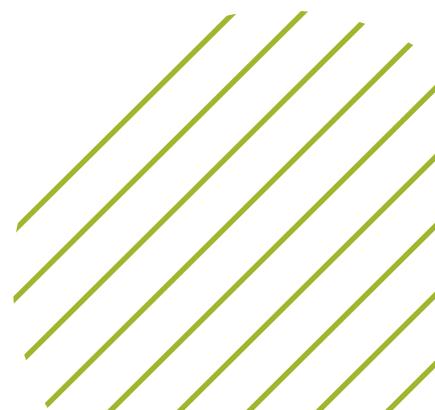
The Green Finance Taskforce also highlighted the important role of local actors in guiding potential investors towards opportunities that meet local priorities so these commitments bode well for a national to local partnership on financing local net zero portfolios. Central government has a role to play in supporting some aspects of local financing plans, but local government should also explore ways to leverage other sources of investment using innovative approaches, partnerships and private capital.

Blending funding and financing approaches

Many low carbon measures and interventions are capital intensive and require large-scale and long-term finance. Household low carbon investments such as retrofit and heat pumps can have significant upfront costs that require financing via green consumer investment products, such as green mortgages and asset linked green loans.

The UK Cities Climate Investment Commission's City Investment Analysis report⁴¹ explores the economic and wider barriers to private investment in local carbon measures. They find that some projects may not be commercially viable under any circumstances, but still deliver significant benefits. These include low carbon measures that cannot generate the commercial returns needed to attract private investment. These measures will always rely on public finance; however, many other interventions can be privately financed, such as district heat networks, rolling stock, bus and private vehicle electric charging infrastructure.

The scale of the investment will therefore require a blended approach to meet the net zero goal. There are four funding and financing strategies available to deploy, most likely in combination.



01 Expand core local funding

Central support is needed to kick start investment

Climate change is a top national and local government priority and achieving net zero is a legal obligation for the UK. There are many pressures on the public purse but climate finance must be prioritised, including at the local level. Better still, it can be used to catalyse and aggregate private investment through both project financing and wider business investment in technology, supply chains and skills.

Some national instruments have been successful in making inroads to demonstrating financing models with potential for private leverage. Examples include the £340m Heat Networks Investment Project, which has made grant-based gap funding available to larger scale local authority district heating projects, often as part of joint ventures with the private sector. The Local Energy programme funding should also continue and can play an enhanced role in providing a layer of specialist regional support to local authorities, Local Enterprise Partnerships and other local energy system stakeholders. These are important contributions, but there is a need for more structured support to underlying local capabilities, programme management resources and enabling investments that can unlock, catalyse and de-risk the wider suite of portfolio projects.

The current local government funding system has insufficient provision for these activities. By way of explanation, core funding is divided into three main tranches:

1

Central government funding which currently has limited provision for low carbon measures;

2

Council tax which is a property tax levied on each domestic residence; and

3

Business rates, another form of property tax recouped from local business premises.

These tranches are sometimes supplemented by unpredictable funding pot and bilateral deals which may include some climate related support for specific initiatives or projects. Local authorities have been under financial pressure for some time, particularly since 2010, when their spending power was reduced by about 15% on average in England.⁴² They also experience a range of constraints in terms of raising further taxes, creditworthiness and commercial restrictions on activities beyond their statutory duties.

Investment in net zero should follow the following principles to meet the overall challenge and needs of different stakeholders:

- > **Ambitious in scale and urgency:** rapid scale-up of public funding supporting clear targets and plans is an essential prerequisite to meet carbon budget goals in the UK.
- > **Additional and catalytic:** public funding should be used where needed to secure important public goods, and safeguard the poor and vulnerable, but also to reduce risks so that private capital can flow more freely.
- > **Fiscally responsible:** it is essential to make local borrowing sustainable by safeguarding debt burdens, adjusting borrowing levels to local capacity and financial resilience.
- > **Time-bound:** surge investment from public sources should be specific rather than general, as the market transitions. For example, grant funding will be reduced over time as transition takes hold.
- > **Accountable:** spending should be planned, transparent, monitored and evaluated for its impact on climate goals and wider social policy including levelling up.

Raising finance from public sources

Overall, local government spending accounts for over one quarter of all public spending. Whilst a step change in local climate funding is needed, we do not require wholesale revisions to the way local taxes and central government grant funding works. The following options should be considered when raising public funds for local net zero investments, each of which builds on existing foundations:

- > Time-bound surge funding aligned to carbon budget periods and delivered as core budget top-ups.
- > Levy a socially progressive environmental tax in the form of a 'climate precept' to targeted activities, income streams or taxation.
- > Enhance the targeting of, and tap previously allocated, funds and programmes including the Public Sector Decarbonisation Fund and the Transport Decarbonisation Fund.
- > Develop a form of net zero investment fund which could have a challenge, catalyst, revolving or formula-based structure.

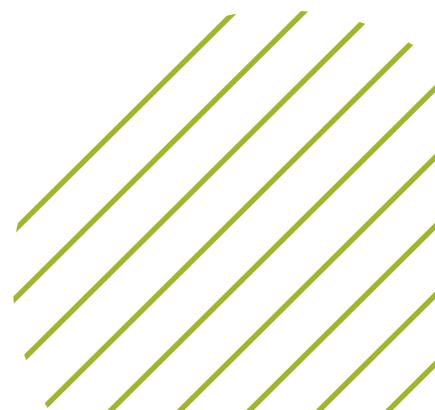
Directing finance to where it is most needed

Cities and local authorities that have created local net zero plans and portfolios often recognise a gap between the targets and intentions of the plans, and their ability to mobilise capital and investment to meet them.

A lack of core funding is exacerbated by a lack of knowledge of long-term strategic capital planning and forecasting, or the commercial and financial structuring required to co-deliver with banks, corporates, utilities and communities.

Standardised investment guidance for Local Net Zero Portfolios, for example how to best direct finance to best effect, includes:

- > Forecast portfolio activities and total long-term capital requirements to illustrate the scale and pathway of projects and programmes, sequenced by when each investment will be delivered.
- > Classify investment typologies by scale, strength of returns, social impact and attribution of benefits, timeline, feasibility and more. For example large scale renewable energy assets can usually attract commercial finance, but cycle lanes cannot.
- > Design funding and financing options strategies for each typology that delivers different interventions (e.g. public, private, household, blended approaches, special vehicles, local approaches and business model solutions).
- > Plan and manage a portfolio investment programme with appropriate local business cases, monitoring risk assessment, transparency and oversight.
- > In collaboration with other system actors, local authorities are encouraged to adopt similar approaches as part of their local portfolio design. The Local Net Zero Forum should consider how public financing reforms support central government's role, and provide further guidance and support to local government to develop their portfolio investment plans.



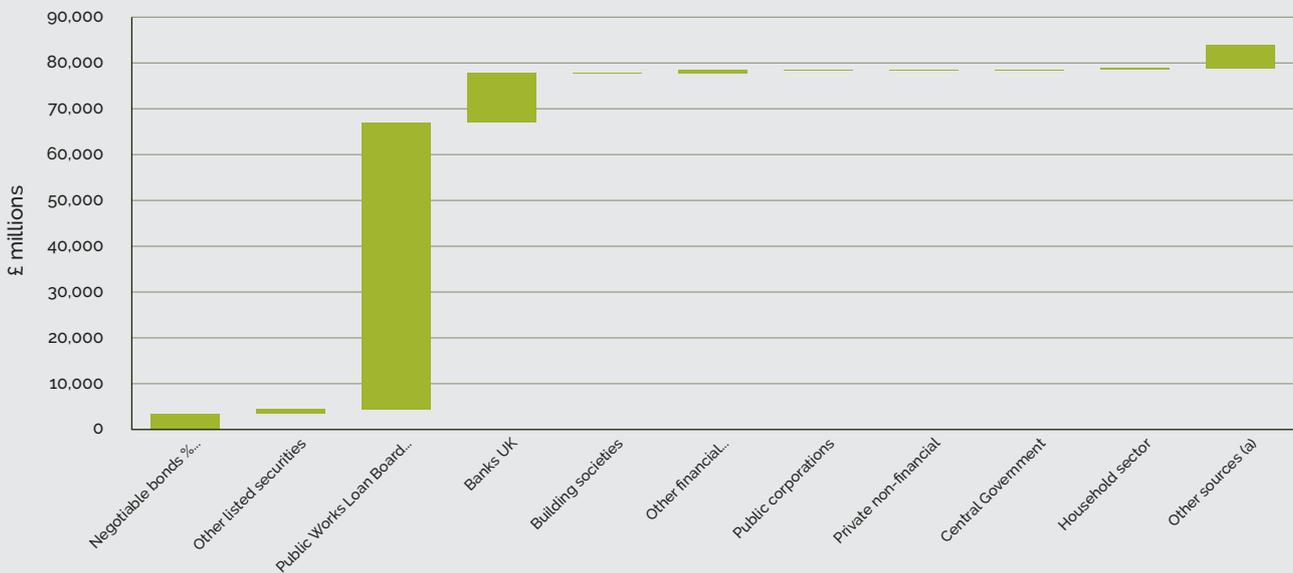
02 Local government borrowing

UK local authorities have borrowed £80-100bn per annum over the past five years.⁴³ The debt burden has steadily increased for a number of reasons, including austerity measures, increased demands on public services and the pandemic. Very little of this borrowing is financed by private sources because the cost of private finance is higher than other facilities available to local authorities.

Local authorities typically borrow from the Public Works Loan Board (PWLB) which accounts for nearly two thirds of their current borrowing needs, and will remain an important source of core borrowing that supports a range of public service investment requirements.⁴⁴ It is a well understood and affordable source of finance.

Although the cost of finance is attractive overall, it is not always the best or only source of finance for longer-term, outcome-based strategic projects. In the future, local authorities can access finance from UKIB, designed specifically for high value and strategic projects, through its Local Authority Lending Function.³⁶

Figure 19: Local government borrowing sources in the UK



Case Study

Tees Valley South Bank
Quay project



£107m

loan to Tees Valley
Combined Authority

In October 2021, Tees Valley Combined Authority became the first authority to agree a loan with the recently-launched UK Infrastructure Bank to finance the South Bank Quay project, which will provide services to the offshore wind industry in the North Sea.⁴⁵

The UKIB is still relatively new but it has some clear advantages. The £107m loan to Tees Valley Combined Authority allowed for more flexible debt repayment schedules, linked to bespoke project context, such as cash flow. In contrast, the PWLB generally requires structured payments every six months. This greater flexibility allowed maximum capital availability upfront, which helps accelerate net zero deployment and investment. Tees Valley also achieved a lending rate some 40 basis points below the PWLB borrowing rate, so there is no additional cost compared to its regular source of borrowing.



Local public sector borrowing can be further enhanced

Beyond the UKIB, commercial borrowing from mainstream banks accounts for about 15% of local authority borrowing in the UK.⁴⁶ Other intermediaries play a range of roles too. The decision to use commercial finance will depend on the cost of finance, lenders' risk appetite and the terms on which borrowing is secured.

Municipal Bonds are a further debt instrument which is underutilised in the UK due to the presence of the PWLB facility.⁴⁴ However, bond issuance has increased rapidly in recent years, with the Treasury issuing £16bn to the markets. Almost all urban infrastructure development finance in the United States is funded via such mechanisms. Green Municipal Bonds would be a 'labelled' version meeting certain project and programme requirements in support of climate objectives. The UK Municipal Bonds Agency has seen increased interest in its facility in recent years, but bonds remain an underutilised part of the local financing landscape, for capital projects in particular.

Local public sector borrowing can be further enhanced by the following potential actions:

- > Improve fiscal accountability for borrowing and investment including additionality, transparency and sustainability criteria.
- > Responsively revisit local government borrowing criteria e.g. limits, thresholds, safeguards, access and pricing. A certain level of underwriting may be necessary via a temporary guarantee facility given the urgency of action required.
- > Define which project typologies meet UKIB investment criteria and build a pipeline.
- > Develop common project criteria that assess risk and the impact a project has on net zero and levelling up, potentially linked to the emerging UK Taxonomy for sustainable investment or Green Bonds Initiative technical criteria.⁴⁷



03 Public Private Partnerships

Mobilising private investment

Private investment and supply chains are essential for scale in the local transition to net zero. The volume of private investment will need to be multiples of that supplied by the public purse. A global capital reallocation to Environmental Social and Governance (ESG) investments means that projects with purpose can tap into new sources of capital – if the scale, impact and returns can be made attractive.

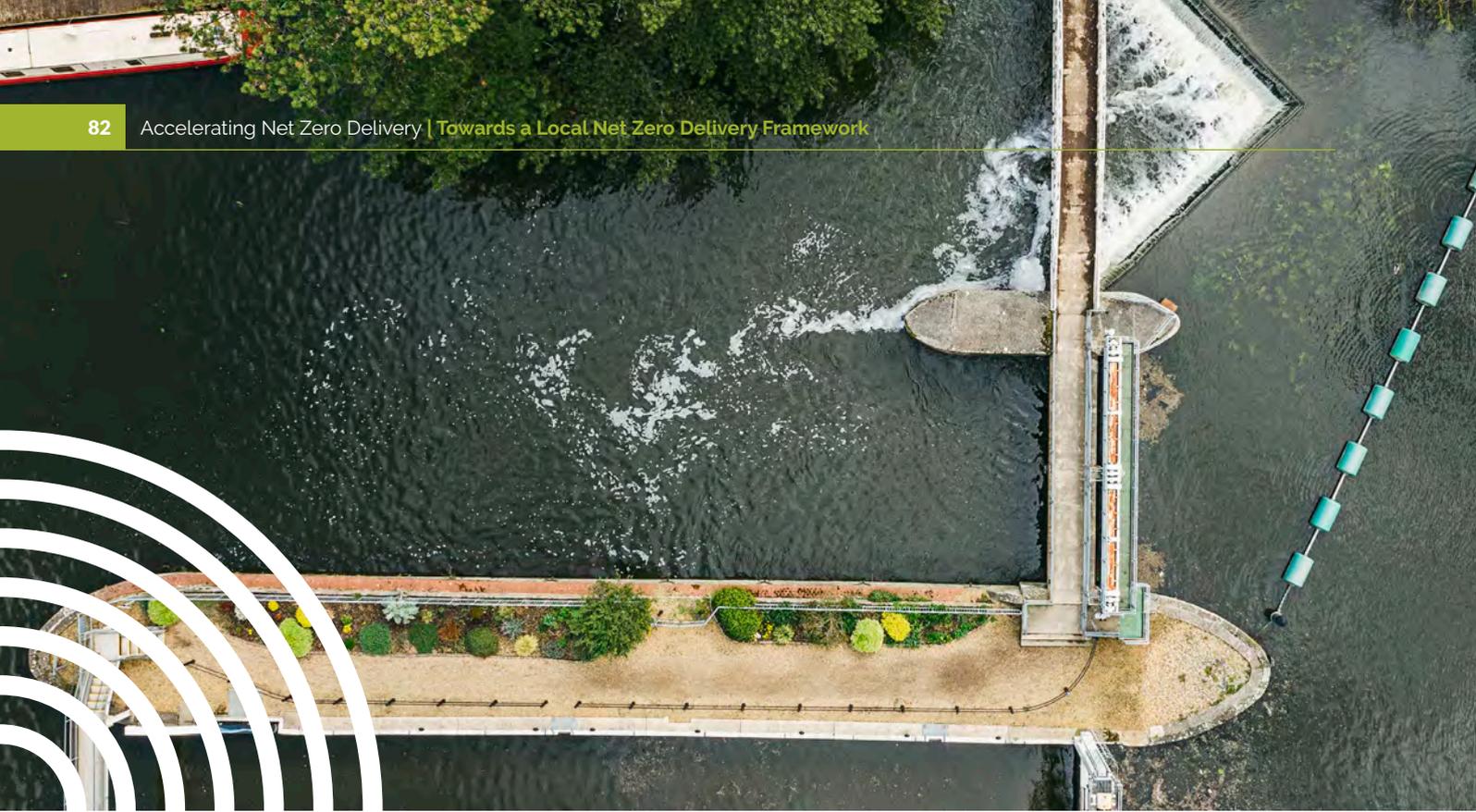
Local carbon measures often have longer payback periods than some investments, so capital partners must be patient and align their investment horizons with these longer term returns.

A public-private partnership (PPP) is a contract to utilise a combination of public and private sector capabilities in the design, finance, construction, operation and maintenance of public infrastructure assets. Investors participating in PPPs generally expect market-rate returns. This means that PPPs are typically well-suited to projects that will generate sufficient revenue to ensure cost recovery plus profits.⁴⁸ Often asset focused, PPP can be used to implement programmatic initiatives such as area-based insulation or upgrade schemes.

Local governments can accelerate private sector investment into low carbon measures, by developing capabilities to make investment opportunities attractive to the private sector. For example, they can:

- > Structure portfolio investments that blend risk from a range of projects and increase the scale. This can improve access to the capital markets which demand larger scale investments to incentivise participation.
- > Develop technical assistance or upskilling programmes so that local government can structure opportunities that are more attractive to the private sector (similar to the expert advisory service to be offered by the UKIB).
- > Reduce investment risk by standardising best practices. If investors see the same business models applied successfully elsewhere, they will have a better understanding of the associated risks.





04 Underutilised financing instruments

Local government finance follows a relatively traditional and well-trodden path in the UK. This has resulted in fairly stable local public finances, providing an important foundation for a well served and resilient society. It does not however enable transformational change of the type that is needed to solve the climate crisis.

In other locations we see a greater diversity of financing approaches. These include municipal bonds, which dominate in the US, land-value instruments, urban development funds, or public-private mechanisms, which are worth assessing for their potential to make a contribution as part of a more expansive investment strategy.

Land Value Capture (LVC): Value capture instruments have a particular focus on regeneration, densification and greenfield development. They seek to balance returns with significant upticks in land and real estate value that occur when new development land is unlocked or strategic transport infrastructure investments are made. While LVC revenue is locally derived, national legislation and frameworks are critical enablers that create revenue streams.

A regularly used but very basic form of LVC are Section 106 Planning agreements which are a very simple development contribution mechanism.⁴⁹ Additional infrastructure or services are usually provided. In other locations significant sums of capital are transferred, linked to incremental tax revenue increases or sale of property fees. Whatever the mechanism, careful thought should be given to how development gains can be captured, which must support net zero objectives via infrastructure or cash contributions.

Special Purpose Vehicles (SPV): There are a range of SPV structures already used, but they have the potential to finance larger projects as part of a Local Net Zero Portfolio. District heat networks are strong candidates for SPVs. They require coordination of generation equipment, distribution networks and offtake agreements, and a revenue model and asset utilisation that involve multiple parties. Revenue generating assets in energy are particularly suitable opportunities where, for example, municipal land and the energy project, finance and expertise can reflect the rationale for the JV. Like other forms of PPP, an over utilisation of SPV structures creates larger liabilities than are formally recorded on the public balance sheet.

Case Study

Edinburgh district heating Joint venture



£100m

worth of projects
delivered by the
Vattenhall partnership

A Scottish council has launched a 50/50 joint venture energy company with a Swedish state-owned energy firm to supply heating to a new town on the edge of Edinburgh. Midlothian Council says the venture, with partner Vattenfall, will deliver projects worth up to £100m through a district heating network over the next 40 years.⁵⁰

The new company will use heat from a nearby energy-from-waste facility to heat up to 2,900 homes and council buildings.

This initiative demonstrates that with the right partnerships, safeguards and skills interlock, public-private projects can be delivered together.

Municipal Development Corporations (MDCs):

Taking this one step further, the UK has historically made use of Municipal Development Corporations for 'special projects' including the development of Milton Keynes and Canary Wharf in London. MDCs are inherently place-based and have a position in UK legislation. The opportunity is to explore the use of special purpose MDCs to tackle the climate crisis at a local level, taking some of the marginal investment burden from the local authority, and channelling it through a special entity. This entity is tasked with providing 'decarbonisation-as-a service' which has the further benefit of attracting private finance.

Guarantees: One of the most direct and effective approaches to unlock private investment is for sovereign guarantees to underpin larger private investments, particularly where construction delays or other project risks hamper progress. Clearly, these risks will accumulate on the national balance sheet; however, given the social and wider benefits available, these should unlock investment at scale and risk can be significantly calibrated as required.

Green Urban Development Funds (UDF):

Implemented as grant, loan, equity or guarantee structures, or revolving structures, Green Funds administered at national or regional levels provide capital for specific investments or classes of investment. One of the established mechanisms previously available to the UK was under the JESSICA (Joint European Support for Sustainable Investment in City Areas) initiative, which was developed by the European Commission and the European Investment Bank (EIB). JESSICA has a broader sustainable regeneration remit but offers a potential model for UDF structures, which focus directly on climate related investment.⁵¹

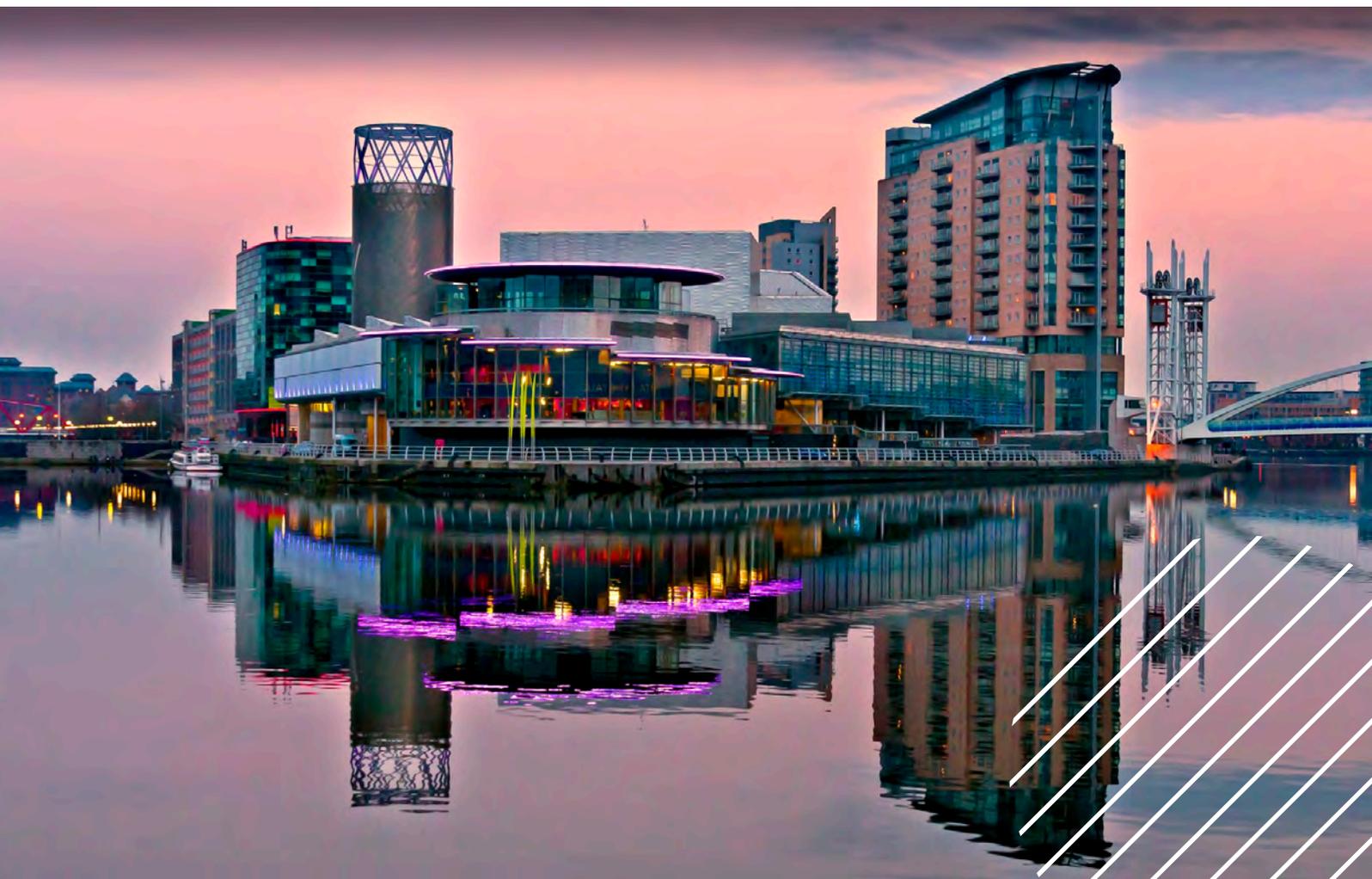
London has three UDFs that focus on the low carbon agenda. The London Energy Efficiency Fund, for example, has £100m to invest in retrofitting public and voluntary sector buildings such as universities, hospitals and schools to make energy efficiencies.⁵² Each UDF is run by a Fund Manager (a single institution or consortium of partners) who helps source potential projects, manage legal and financial due diligence for each project, contract projects, and subsequently monitor project performance.⁵³

Community finance schemes: In some cases there is appetite for local communities to raise and contribute hyper-local financing and cooperative structures. These initiatives are often project-scale community schemes, which supply renewable or local carbon energy to households and local businesses. The equity is raised locally and debt is owned by the cooperative. Sourcing operations and maintenance services is the responsibility of the cooperative and its members. The motivations include lower cost energy provision and insulation from energy price volatility, personal responsibility for climate action goals, and energy security or reliability.

The scale and potential of such schemes is small, particularly in the UK, and technically constrained in dense urban areas. However these approaches could have a role in addressing some of the 'small ticket' sized opportunities which investors are wary of or find unattractive.

Integrated financing solutions: It is unlikely that any one funding or finance solution will meet the diverse needs of local net zero portfolios. In practice a blend of approaches from public, private and household sources will be needed. Many of these already exist, but there is a lack of strategic coordination at portfolio level to plan, blend and execute them as a structured investment plan. This is partly due to a lack of specialist expertise and specific technical, risk and credit barriers, but access could be radically improved under conditions where investment planning is both guided and supported by the central government.

Bristol's City Leap initiative sheds light on how city-level portfolios could be financed in partnership with local system actors and the private sector.



Case Study

Bristol City Leap



£1bn
opportunity
wrapper

One example of where more strategic financing approaches are being blended is the City Leap initiative in Bristol.⁵⁴ Still in its planning phase, and therefore currently unproven, Leap is designed as a public-private joint venture run as a multi-stage competitive procurement process. From the City, Energy Services Bristol offers access to low cost finance and brings energy assets and load offtake to the partnership. The private sector brings delivery capacity, specialist skills, access to additional finance, and risk sharing attributes.

The Leap prospectus sets out a multi-asset and whole-energy-system structure in which domestic, commercial, heat networks, smart energy systems, projects and some district investment

opportunities are combined into a single £1bn opportunity wrapper. The benefits are intended to be equitably shared with the goal being the advancement of a zero carbon energy system.

While there are understandable concerns about the innovative and wide-ranging nature of the arrangement, Leap does offer an important test case from which to evaluate and improve such an ambitious approach. There is also a role for central government to support the initiatives and help it succeed.

City Leap is a pioneering initiative that has much learning still to do. But it could offer one of the most important models for scaling climate action at system level, and with private sector capital and skills at the heart of delivery.

Next steps on funding and finance

- > **Review the adequacy of public finance available** to local authorities to tackle net zero goals and identify additional sources and mechanisms for funding increased ambition.
- > **Further engage the UKIB** on potential options for joint technical assistance and other structural investment options that could offer a fast start.
- > **Optimise use of public funds** to catalyse and crowd in private finance by supporting portfolio investment approaches.
- > **Create standardised investment planning and execution approaches** to build confidence in scaled and blended financing models.
- > **Back innovative green and local financing initiatives** including a series of national demonstrators that test local net zero portfolio financing approaches.
- > **Build private sector and market confidence** in carbon reduction as a business and investment opportunity by communicating the direction, scale and goals of the delivery framework.



PART D: Capacity & skills

Building on the Local Net Zero Hub infrastructure, enhance capabilities to support local portfolio development with technical assistance, in parallel with national skills programmes.

A range of specialist expertise, both public and private, is required to design and deliver the interventions and low carbon measures that will achieve net zero. We have previously discussed the importance of place-specific knowledge, but many other skills are required.

- > Technical and engineering expertise to understand low carbon measures and interventions, and identify deployment opportunities. Each place requires local technical expertise that matches their priority low carbon measures.
- > Commercial and financial expertise to develop commercial business models that are attractive to the private sector, and manage large-scale, long-term finance streams.
- > Economic assessment and modelling skills to map the dependencies between low carbon measures and interventions, and optimise entire portfolios for multiple outcomes.
- > Portfolio management skills to monitor progress in the context of the whole portfolio, so that decision-making considers the interdependencies between projects.
- > Agile project and programme delivery skills, so that project teams can change direction as new information becomes available or issues with delivery emerge.
- > These capabilities are in strong demand across government and the private sector, and, as highlighted by the Green Jobs Taskforce, demand will grow. Therefore, it is imperative that the government identifies the full set of skills required to achieve net zero, how to develop them and who will teach them. Where skills are scarce, plans and resources must be in place to develop them.

A number of complementary interventions can help to address the current local net zero skills gap.

- > **Local government upskilling:** The CARA analysis demonstrated that local government capacity is a major constraint to progress. Develop upskilling programmes for local governments to improve their capabilities, by extending the Civil Service training set out in the Net Zero Strategy. This should focus on some technical training but also capability building in the areas of programme design and management, project finance, data, and smart solutions.
- > **Skills and career pathways:** Identify ways to create a career pathway structure and deliver a more focused pillar of the Net Zero Skills Strategy. This should be based on analysis of the needs and growth potential.
- > **Technical assistance to help places transition:** Local Net Zero Hubs should develop a 'service catalogue' that supports project developers with targeted and specialist technical and financial expertise. In-demand resources are pooled so that local authorities can access specialist expertise when required.
- > **Regional skills hubs:** Expand the role of Local Net Zero Hubs to become Regional Skills Hubs, which share best practices to develop skills. This includes investing in skills that feed and support private sector development, for example the training and deployment of growth businesses in the green economy. Local skills assessments will identify the most pressing needs, while engagement with industry will identify the best approaches to support the new workforce.

Next steps on capacity and skills

- > Prepare a focused national skills assessment and forecast for local net zero skills.
- > Collaborate with the private sector to design skills pathways as part of a national curriculum for high volume job roles.
- > Build a specialised skills programme to identify, access and mobilise specialist expertise.
- > Establish regional target 'quotas' to meet forecast demand.
- > Utilise and build the capacity of local Net Zero Hubs to train and deploy on-demand technical assistance to support surge capacity needs in local portfolios.





CHAPTER 5

Summary

Recommendations
for system actors

CHAPTER 5

Summary

Recommendations for system actors

Conclusion

This report was commissioned to address the two remaining gaps in the Net Zero Strategy. Firstly the economic evidence that local net zero action offers significant benefits to society; and secondly the lack of a national-to-local delivery framework that connects system actors with a framework for executing plans at pace and scale.

Building on the momentum of COP26 and growing public and market sentiment, 2022 will see us reset our trajectory and accelerate towards a green economic and societal recovery. The signs are that this future landscape will strengthen the values of environmental and social justice in society.

The buildings and transport systems in our cities and towns are central to meeting this challenge; however, progress on reducing emissions from these sectors has stalled to the extent that we have seriously put achievement of the UK's climate targets at risk.

This document sets out a case for change at a critical time for the UK, with energy prices soaring and the pandemic highlighting the importance of local delivery in the emergency vaccine rollout. The economic results are clear. Local design of Net Zero Portfolios brings huge benefits, because it allows for optimisation of benefits in response to socio-demographic and urban form and structure.

With legally binding targets and a Net Zero Strategy that supports a local approach, the foundations of government commitment are in place. The COVID-19 vaccination programme shows how concerted and urgent action, formulated as a national-to-local delivery framework, can quickly deliver strong outcomes.

Valiant local efforts and painstakingly designed national programmes have made some valuable progress on delivery but have not managed to successfully scale at pace. A plethora of overlapping approaches and solutions are constrained by inadequate funding and unintentionally dysfunctional delivery systems. This report identifies why progress is slow and difficult, the blockers to adoption, the barriers to planning and delivery, and the gaps that prevent coordination and scale.

A Local Net Zero Delivery Framework can help solve these challenges. It requires a different mindset and some new working practices, but it is evidently deliverable within the existing system, provided the right collaboration and governance is agreed and consistently implemented. The proposals lean towards a balanced system in which both national and local governments play important roles and help other system actors – households, communities, utilities and the private sector – to accelerate delivery.

Summary Recommendations

All actors in the system must play their part. For each group the key recommendations include:

For Central government

CG1

Give devolved and local government a clear mandate for local net zero delivery where aligned to their responsibilities in housing, building and local transport.

CG2

In consultation with the local Net Zero Forum, design and implement a national delivery framework that supports enhanced local net zero action as part of a whole-system approach, including consistent portfolio approaches and technical methodologies and data oversight set out in a Net Zero route map.

CG3

Reinforce and diversify the services of Local Net Zero Hubs to support local government with technical assistance, specialised skills, project development and finance.

CG4

Reform core local funding to address the delivery cost of funding public investments and building local delivery capability.

CG5

Install skills pathways into the national green jobs delivery plan, which enable housing retrofit, green building and sustainable mobility

For Local Government

LG1

Assume appropriate accountability for net zero portfolios for buildings and transport, and adopt a coordination role.

LG2

Identify and appraise the most appropriate low carbon measures for each place and interventions that will support their adoption.

LG3

Lead engagement with local system actors including business and communities to prioritise opportunities and capture projects to a consistent standard in Local Area Energy Plans.

LG4

Build core internal technical and delivery capacity, and bring in external specialist skills from Local Net Zero Hubs or the private sector, as required.

LG5

Assess skills needs for local net zero delivery and audit capacity to inform the national skills delivery plan.



For Business and Enterprises

BE1

Engage with local government and other local system actors to contribute skills, partnerships and investment to their portfolios.

BE2

Assess the market opportunities created by the national delivery framework, and develop business models, products, services and financing solutions that deliver local portfolio objectives.

BE3

Build supply chain capacity and skills that support implementation at scale.

BE4

Transform operations to stimulate new markets and jobs growth for green products and services.

For Private Investors

PI1

Engage with the government on investment priorities and strategies, risk appetite, ticket size, incentive attractiveness, and de-risking support.

PI2

Mobilise capital at scale using creative financing models.

PI3

Develop innovative financing products that support housing upgrades.

PI4

Review your risk appetite for, and the return profiles of, local net zero portfolio opportunities. Approach these as a new asset class.

For other system actors

SA1

Electricity system operators and distribution network operators should proactively coordinate with local authorities and other system actors to plan, coordinate and enable energy system change.

SA2

To inspire and demonstrate positive action, communities should adopt low carbon measures such as a locally owned solar electricity project that sells power back to the community.

SA3

Academia and research should continue to support energy system innovation, enhance digital and data solutions, and study the issues that create blockers. Further exploration of the potential for local net zero action to deliver wider outcomes, including levelling up, should be prioritised.



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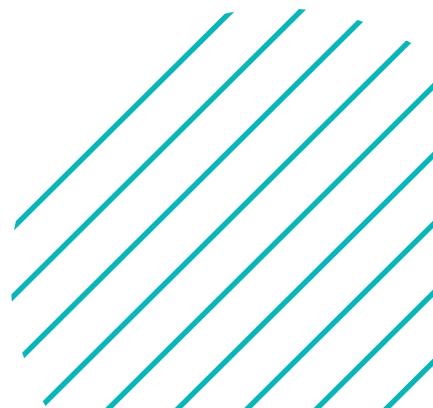
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Special Acknowledgements

- > Department for Business, Energy and Industrial Strategy
- > Steering Group (see Supplementary Information Pack for full list)
- > Cities: Belfast, Cambridgeshire & Peterborough, Glasgow, Liverpool, Manchester, Swansea

