Green Finance Institute

Financing energy efficient buildings:

the path to retrofit at scale

A report on phase one of the Coalition for the Energy Efficiency of Buildings

May 2020

Foreword

Citizens, communities and economies are facing the two greatest challenges of our times: climate change and the Covid-19 pandemic. The response to both these crises is rooted in science and innovation, as we seek solutions to monitor, mitigate and adapt to the impacts of coronavirus and our changing climate. The role of our financial system is also increasingly recognised as essential in facilitating those solutions, while also helping to create a more inclusive and sustainable global economy.

In the UK, our built environment is responsible for almost 30% of total greenhouse gas emissions. And yet this sector has significant potential to decarbonise and unlock wider benefits across the economy: energy savings that increase consumer spending power, healthier homes that reduce the burden on our health system, and the creation of new skilled jobs that can help stimulate the UK's economic recovery.

In December 2019, the Green Finance Institute established the Coalition for the Energy Efficiency of Buildings to stimulate action across the finance sector to support the decarbonisation of our homes. In line with the Institute's theory of change – which focuses on creating opportunities for the financial sector to profitably support the transition towards an environmentally sustainable economy – the Coalition is developing the market for financing net-zero and resilient homes, through the co-design and launch of viable and impactful financial 'demonstrators' that provide the catalyst for further financial innovation at scale.

This report outlines the results from the Coalition's first phase including a focused review of the domestic retrofit market, a portfolio of 'demonstrators' that were developed by the 52 member organisations to unlock the barriers to investment, and policy recommendations that establish a conducive environment for rapid adoption and scale-up of energy efficiency improvements.

The UK has shown global leadership in tackling climate change and developing the green finance market. The Coalition for the Energy Efficiency of Buildings builds on the important work of the Green Finance Taskforce and Green Finance Strategy. As the Coalition moves into its next phase, delivering the first portfolio of demonstrators to market as set out in this report, we aim to demonstrate that cross-sector collaboration, focused on practicable, financial solutions to deliver local real-economy impact, is a key component to achieving the systemic change needed to meet the global challenge of decarbonising our built environment. We welcome you to join our journey.

Dr Rhian-Mari Thomas OBE
CEO, Green Finance Institute
Chair, Coalition for the Energy Efficiency of Buildings

"The work carried out by the Coalition for the Energy Efficiency of Buildings represents a positive step towards achieving our Green Finance Strategy ambition to build the market for green home finance. The proposed demonstrators aim to support the development of innovative products to finance energy efficiency and build a vibrant market for energy retrofit. This will support the UK in delivering its commitment to move towards net zero whilst growing our economy."

The Rt Hon Kwasi Kwarteng MP, Minister of State for Business, Energy and Clean Growth

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60-second summary

- This report sets out the findings to date and the intended next steps of the Coalition for the Energy Efficiency of Buildings.
- Established by the Green Finance Institute in 2019, the Coalition brings together a powerful multi-stakeholder group focused on developing market solutions to scale up the finance needed to retrofit UK homes to high standards of energy efficiency, and deliver significant social and environmental benefits.
- Building on existing research, international best practices, and a focused review of the state of UK market for financing energy performance retrofits, the Coalition puts forward 21 scalable demonstrator projects, designed to overcome the barriers to mobilising capital towards the social-rented, private-rented and owner-occupied residential sectors.
- The Coalition will take forward a portfolio of these demonstrator projects, helping to practically demonstrate the viability of much-needed financing solutions for energy efficient buildings, both in the UK and across the globe, in the run-up to important UN climate talks to be co-hosted by the UK and Italy in 2021.
- The report identifies further government policy measures that would help bolster the commerciality and scalability of the demonstrators and respond to the social and economic impacts of the Covid-19 pandemic. A key recommendation is the inclusion of both energy efficiency and climate resilience investment in the government's economic recovery plans.
- The report outlines further areas of work the Coalition will explore with a growing network of stakeholders, as it continues its uniquely collaborative and pragmatic approach to this critical agenda.

Executive Summary

Increasing the resilience of UK buildings to the effects of climate change and reducing the number of households at risk of fuel poverty will be critical in ensuring that our economy and society can thrive in the longer term.

Executive Summary

Buildings – a priority for decarbonisation, investment and economic recovery

The UK housing stock is responsible for approximately 20% of the country's total greenhouse gas emissions, and the challenge of decarbonising our built environment could result in a 40% shortfall to our economy-wide decarbonisation targets by 2030[1], unless it is addressed at pace.

As climate shocks - including flooding and heat waves - continue to strike with increasing impact, increasing the resilience of UK buildings to the effects of climate change and reducing the number of households at risk of fuel poverty will be critical in ensuring that our economy and society can thrive in the longer term.

Climate breakdown is not, however, the only global crisis we currently face, with governments and citizens also confronted by the social and economic impacts of the Covid-19 pandemic. The construction sector is facing significant challenges and should be considered as a central pillar of a longer-term green stimulus package.

Energy efficiency measures and other building retrofit works are among the most cost-efficient ways to reduce emissions, with many co-benefits including improved living standards, healthier and more resilient communities, and the delivery of new, skilled green jobs in every part of the country. Focussing on buildings will therefore help the UK deliver on its climate targets, support a green and inclusive recovery, and generate innovative green finance opportunities.

[1] Derived from BEIS (2019) ***Updated energy and emissions projections:*** 2018 and CCC (2016) *fifth carbon budget dataset*.

The Coalition for the Energy Efficiency of Buildings

The Green Finance Institute was established in 2019 to mobilise capital and accelerate the domestic and international transition to a climate-resilient economy. The Institute convened the Coalition for the Energy Efficiency of Buildings (CEEB) for the purpose of developing the market for financing net-zero carbon and climate-resilient buildings. Formed of global experts from financial services, local and national governments, energy and construction industries, academia and civil society, under the chairpersonship of the Green Finance Institute's chief executive Dr Rhian-Mari Thomas OBE, the CEEB is a unique and powerful collaboration.

Since its formation in December 2019, the CEEB's 52 member organisations have conducted a focused review of the extensive research, best practice examples and current state of the market for energy performance renovation in UK homes across the owner-occupied, private-rented and social housing tenures. This exercise allowed them to identify and co-design financial solutions to overcome barriers to scaling up finance, as well as policy levers that could bolster the commerciality and scalability of these solutions.

In the next phase, the Coalition and its members will bring to market a portfolio of 'demonstrator' financial solutions that are commercial, scalable and mobilise capital flows towards the retrofit of UK homes to improved energy performance standards. The Green Finance Institute will help unlock the synergies between the demonstrator projects, working with government and other stakeholders to drive systemic change in the run-up to important UN talks on climate change (the 26th Conference of Parties, or COP 26) to be hosted by the UK in 2021, and beyond.

Context and timeline for the Coalition

Across the UK – at a national, regional and local level – there is a mosaic of policy initiatives and targets related to energy efficiency and building standards, which can contribute towards a roadmap for reaching economy-wide net-zero emissions by 2050, as well as the UK-wide target for as many homes as possible to achieve an Energy Performance Certificate (EPC) rating of C[2] by 2035[3].

Ready availability of private finance for the 'able-to-pay' market is critically important, but will not on its own drive sufficient demand for insulation and low carbon heating systems. Actions and activities – better information, access to capital, standards to ensure that works deliver the energy savings predicted, as well as incentives and regulation for both borrowers and lenders to act – are also needed. For low income and fuel-poor households, public capital has a much larger role to play. Government-supported schemes can achieve the economies of scale that reduce costs for all.

[2] On a scale of A (most efficient) to G.

[3] HM Government (2017) ***The Clean Growth Strategy: Leading the way to a low carbon future***

Meeting the 2035 target alone will require a total investment in energy efficiency upgrades of up to £65 billion[4], while the broader decarbonisation challenge will require even greater sums of public and private capital to be mobilised.

The exact timeline is uncertain due to the Covid-19 pandemic, but key policy announcements expected this year include the National Infrastructure Strategy, Spending Review and Heat Strategy. These can shape stimulus responses to the pandemic into a longer-term strategy, providing certainty of the path ahead, and allowing the leverage of further private capital for housing infrastructure projects.

Profiling the market for home decarbonisation and resilience

The Coalition's market review was structured to explore the three main tenures: owner-occupied, private-rented and social-rented homes. The Coalition identified key decision-makers and behavioural drivers for each of these groups, including barriers – both financial and non-financial – faced in scaling up retrofit activity. Some barriers were identified as common to all three groups, including: uncertainty on the benefits of energy saving measures; lack of access to information about the retrofit journey and finance options; high supply chain costs and uncertainty around green credentials; and a lack of incentives to incur the upfront costs and 'hassle factor' associated with retrofits.

Sector-specific barriers were identified: for example, owner-occupiers can experience long payback periods on investment and a limited impact on property valuations, which can hold households back from expending the upfront costs required. In the private-rented sector there is a 'split incentive', whereby the landlord pays for energy efficiency improvements and yet tenants accrue the benefit through reduced energy bills. In the social-rented sector, the short-term nature of grant schemes can prevent more ambitious retrofit projects, and private leaseholders and occupiers within blocks of flats and terrace rows can prevent social housing providers from undertaking large-scale retrofit projects.

Mobilising capital: the portfolio of demonstrator solutions

The portfolio of over 20 'demonstrator' projects, comprising financial products and services designed to overcome the challenges identified by the Coalition, seeks to appeal across the market's breadth of housing tenures, socio-economic and geographic profiles, interact with existing energy efficiency initiatives and inform government policy. Importantly, this portfolio seeks to focus on homeowners who are not already supported by existing government policy or its manifesto commitments on energy efficiency.

[4] BEIS (2019) *Green Finance Strategy: Transforming Finance for a Greener Future*

The demonstrators include projects that will create the 'enabling' conditions needed by other financial demonstrators, by overcoming some of the universal barriers faced across all tenures. An overview is provided below:

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Data and enabling frameworks	Energy Efficiency & Property Valuations	Research and development of practical solutions, based on the relationship between energy performance and property valuation, that unlock investment towards net-zero homes.	✓	✓	✓
	Metered Energy Savings	A standardised savings calculation methodology to deliver rich data on real-time energy savings over the lifetime of a retrofitted building.	✓	✓	✓
	Building Renovation Passports	A tool to increase the rate and depth of retrofits, providing information on what measures are possible and a long-term renovation plan that can be achieved at a flexible pace.	✓	✓	✓
	TrustMark 'Call to Action' Platform	A platform to support customers through the full retrofit journey: identifying improvements, sources of funding and linking homeowners to a reputable supply chain.	✓	✓	✓
	Residential Retrofit Principles	An industry-recognised certification for financial solutions that support the retrofit of residential buildings to a high standard, to enhance the confidence of lenders and borrowers.	✓	✓	✓
	Sustainable Housing Label	A certification scheme for green buildings and retrofit projects, spanning the full breadth of tenures, to stimulate demand and investment into the sector.	✓	✓	✓

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Tenancy agreements	Green Leases	Green Leases with an 'Energy Alignment Clause' enable landlords to recover the cost of a retrofit, based on the predicted energy savings, and minimise the landlord-tenant split incentive.		✓	
	Affordable Rent, Affordable Living	Adjust the 'affordable rent' definition to include modelled energy costs, to incentivise landlords to deliver properties where tenants can afford the combined cost of rent and energy bills.			✓

* **OO:** owner-occupied homes; **PRS:** private-rented sector; **SRS:** social-rented sector;

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Lending products	Property Assessed Clean Energy 'style' financing	Financial institutions provide long-term capital for retrofit projects, while local authorities or associated independent third parties collect repayments via an additional property charge that is passed through to the lender.	✓	✓	✓
	Green Equity Release	Enables homeowners over the age of 55 to unlock the equity in their property for investment, with favourable terms to incentivise investment into energy efficient improvements.	✓	✓	
	'Help to Green' Equity Loan	Homeowners can borrow against the equity in their property, in order to invest into energy efficiency improvements. Government support, similar to the Help To Buy scheme, could facilitate favourable borrowing terms.	✓	✓	
	Domestic Energy Efficiency Salary Sacrifice Scheme	A salary sacrifice scheme that allows employees to draw a loan through their employer for investment into home energy improvements, which is repaid via gross salary contributions.	✓		
	Leaseholder Financing	Provides an attractive financing offer to private leaseholders, via social landlords or related intermediaries, to foster positive engagement and consent for multi-property retrofit projects.			✓
	Add-to-my-Mortgage Platform	A digital platform to streamline the process for homeowners to apply for a Further Advance (e.g. additional borrowing on their mortgage) at the 'point of sale' of energy efficiency measures.	✓	✓	

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Saving and investment products	Community Municipal Bonds	Utilises a crowdfunding approach to create an efficient, scalable and cost-effective source of funding for local authorities to finance projects that address the climate emergency.			✓
	Long-Term Retail Investment	Retail investors to provide capital for home improvements, receiving predictable returns from energy-efficient private rental properties	✓	✓	✓
	Energy Saving ISA	Energy bill savings from a retrofit project can be directed towards an ISA or savings product, to help tenants build up their savings for a mortgage deposit or other investments.		✓	✓

* **OO:** owner-occupied homes; **PRS:** private-rented sector; **SRS:** social-rented sector;

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Energy service products	Insurance-backed Comfort Plans	An insurance-backed guarantee mechanism for 'Comfort Plans' to increase confidence amongst early adopters (e.g. social landlords) and improve the financing available for deep retrofit projects.		✓	✓
	Comfort as a Service	Financial mechanisms to unlock the cash savings in energy efficient and optimised homes, to support the investment case for housebuilders and homeowners to achieve high efficiency standards.	✓	✓	✓
	MEES Compliant Funding	An energy performance guarantee that allows private-rental landlords to procure long-term compliance with MEES requirements.		✓	

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Guarantee mechanism	Government Guaranteed Financing	A government guarantee to support large-scale retrofit projects in the social housing sector, aimed to scale the supply chain and drive economies of scale that benefit all housing tenures.		✓	✓

* **OO:** owner-occupied homes; **PRS:** private-rented sector; **SRS:** social-rented sector;

Driving systemic change, empowered by policy recommendations & financial innovation

'Systemic change' refers to the finance industry, government, supply chain and households working together around a shared ambition to drive system-wide change that is greater than the sum of individual efforts. There is huge opportunity for positive and mutually reinforcing interplay between the demonstrators profiled in this report. Innovations in data depth and the establishment of industry-recognised standards could act as crucial enablers for many financial products, nurturing market-wide confidence in the quality of retrofits and supply chains, and showcasing the benefits associated with energy savings. This could help drive demand for financial products, which could be aggregated and securitised, utilising sustainable housing labels to attract investors from the ever-growing market for responsible investment opportunities.

Government policy can help to bolster the commerciality and scalability of these demonstrators. Alongside tackling carbon emissions and fuel poverty, upgrading the energy efficiency of our homes corresponds to three essential criteria for resetting the economy in response to the coronavirus pandemic: supporting the goal of 'levelling up' infrastructure and opportunity across the UK; stimulating rapid

investment; and stimulating consumer spending. In order to support the economic recovery plan, key policy recommendations include: a new interim target of EPC C for all homes by 2030; delivering the manifesto commitments for a Social Housing Decarbonisation Fund and Home Upgrades Grant; a loan guarantee mechanism for lending to at-scale renovation projects anchored in social housing to scale-up a quality supply chain; long-term regulatory clarity for rented housing and new Minimum Energy Efficiency Standards for owner-occupied homes; fiscal incentives for able-to-pay owner-occupiers and private landlords; and a government standardised methodology and framework for Building Renovation Passports.

Conclusion: navigating uncertainty and realising opportunity

This decade will be defined by our response to the twin crises of climate breakdown and the coronavirus pandemic. In partnership with government, the finance sector will play a crucial role in providing the capital and services to underpin these efforts. Likely to be among the sectors heavily affected by the fallout of the coronavirus pandemic, housing is key for meeting decarbonisation and climate resilience ambitions; upgrading the UK's housing stock will also capture significant environmental, social and health benefits.

The Coalition's wide-ranging expertise, and its delivery of innovative and practical solutions, presents an opportunity for the financial sector to support the market for net-zero carbon and resilient buildings, vital in driving momentum on climate action in the run up to COP 26 and beyond.

Introduction

The strategy to decarbonise our homes and other buildings is a critical component in the UK's ability to reduce emissions over the next 10 years.

Introduction

The role of buildings in a greener economic recovery

Our climate is changing, and with it the global financial system. As people and communities across the world respond to new phenomena that impact our daily lives, the financial system is uniquely positioned to invest capital into a net-zero carbon and climate resilient economy.

An unprecedented scale, pace and immediacy of action is required to limit global temperature rises to 1.5°C. The special report published by the Intergovernmental Panel on Climate Change is clear that significant decarbonisation progress is required in the next 10 years to achieve climate safety – globally cutting emissions by 50% between 2018 and 2030[5] – demanding decisiveness and speed.

The UK became the first G7 member to pass into law its target to reach net-zero emissions by 2050[6] and over two thirds of local governments have declared a climate emergency[7]; however, without a significant acceleration of emission reductions across the UK built environment – including energy efficiency improvements and low-carbon heating systems – the sector could account for nearly 40% of the overall shortfall[8] in meeting 2030 targets.

Therefore, the strategy to decarbonise our homes and other buildings is a critical component in the UK's ability to reduce emissions over the next 10 years.

The resilience of our built environment is also increasingly important as the new decade heralded extreme flooding across the UK with storms Ciara, Dennis and Jorge damaging thousands of homes. Our summers continue to become hotter, placing new pressures on housing and the way we build and renovate. With homes accounting for one fifth of greenhouse gas emissions[9], and further sustainability issues arising throughout the lifecycle of buildings – from the production and choice of materials, through construction, use and renovation, demolition and subsequent impacts – an ambitious and circular approach to our built environment is needed.

[5] IPCC (2019) ***SR15: Global warming of 1.5°C***

[6] BEIS (2019) ***UK becomes first major economy to pass net zero emissions law***

[7] climateemergency.uk (2020) ***List of Councils who have declared a Climate Emergency***

[8] Derived from BEIS (2019) ***Updated energy and emissions projections: 2018 and CCC (2016) Fifth Carbon Budget Dataset.***

[9] CCC (2019) ***UK housing: Fit for the future?***

Climate breakdown is not the only global crisis we currently face. As governments and citizens confront the social and economic impacts of the coronavirus pandemic, the construction and building sectors – whose workers and supply chains will be severely impacted[10] – must be considered as a central consideration in any stimulus package that places economic and environmental recovery at its core. As the near-term fiscal response to the coronavirus crisis takes hold, and longer-term structural stimulus packages are explored, the financial sector can play a critical role in channelling investment towards the net-zero transformation of our homes and directly contribute to the UK's economic and social recovery.

Housing currently presents a considerable challenge in the context of the UK's climate response. If this can be turned around, the social and economic benefits will be extensive; with improved living standards for millions of households, healthier and more resilient communities, and the potential to create a thriving sector that provides skilled green jobs in every part of the country.

The Coalition for the Energy Efficiency of Buildings

Ahead of the UK and Italy's hosting of important UN climate talks (the 26th Conference of Parities – COP26), it is critical the UK shows climate leadership to energise and inspire the international community to join the net-zero transition. The launch of the UK's Green Finance Strategy in July 2019, complementing the earlier Clean Growth Strategy and Industrial Strategy, demonstrated an ambition to expedite the transition towards cleaner and more resilient economic growth. Delivering this ambition at pace and scale represents a significant challenge that will require collaboration across all markets and sectors.

In response to this challenge, the Green Finance Institute (the 'Institute') was established in July 2019 as the UK's principal forum for public and private sector collaboration in green finance. As an independent organisation supported by HM Treasury (HMT), the Department for Business, Energy and Industrial Strategy (BEIS), the Foreign and Commonwealth Office (FCO) and the City of London Corporation, the Institute is uniquely placed to mobilise capital through accelerating the domestic and global transition to a sustainable, net-zero carbon and climate-resilient economy. In particular, by convening mission-led coalitions, the Institute aims to identify and unlock barriers to deploying capital at pace and scale towards impactful, real-economy outcomes.

In December 2019, the Green Finance Institute convened the Coalition for the Energy Efficiency of Buildings (CEEB) to develop the market for financing net-zero carbon and climate-resilient buildings in the UK. The Coalition's goal is to design, develop and launch a portfolio of new financial solutions that unlock investment into the sector and stimulate further innovation. Formed of global experts from financial services, energy and construction industries, local and national government, academia and civil society, the Coalition represents a unique and powerful collaboration.

[10] FT (2020) ***Building site closures undermine key housing targets***;
Unite (2020) ***Government must extend wage assistance to help construction's million plus self-employed***

This report presents the findings and recommendations of the Coalition's 52 member organisations from January to March 2020. It assesses the state of the market for energy efficiency improvements in UK homes across the owner-occupied, private-rented and social-rented tenures and identifies specific initiatives where financial services and government can bridge investment gaps, drive systemic change and smooth the path to retrofitting over 28 million homes in the UK[11], taking into account the wider economic and social benefits that can play an important role in a green and inclusive economic recovery from the coronavirus pandemic.

In the next phase, the Coalition and its members will bring to market a portfolio of 'demonstrator' financial solutions that are commercial, scalable and mobilise capital flows towards the retrofit of UK homes to improved energy performance standards. The results of this report will inform the overall portfolio, whilst the Green Finance Institute will unlock synergies between individual demonstrators and facilitate cross-sector collaboration to address specific challenges that limit the uptake of energy efficiency, low-carbon heating and resilience upgrades in UK homes.

[11] Compiled from: MHCLG ***(2020) English Housing Survey 2018 to 2019: headline report***; NRS (2019) ***Estimates of Households and Dwellings in Scotland, 2018***; Statistics for Wales (2019) ***Dwelling Stock Estimates for Wales, as at 31 March 2019***; NISRA & DfC (2019) ***Northern Ireland Housing Statistics 2018-19***.

Context and timeline for the coalition

An estimated investment of £65 billion is required to achieve the UK government's stated ambition to improve as many homes as possible to an Energy Performance Certificate (EPC) rating of C by 2035

Context and timeline for the coalition

An estimated investment of £65 billion[12] is required to achieve the UK government's stated ambition to improve as many homes as possible to an Energy Performance Certificate (EPC) rating of C[13] by 2035[14]. However, the total investment will be significantly greater; the target is only a milestone on the way to the UK's net-zero ambitions (see box).

To set the £65 billion investment in context, the size of the home repair, maintenance and improvement (RMI) market in the UK was £28.8 billion in 2019[15]. Tapping into this market is one of the best opportunities to mobilise capital at the scale and speed required - through incorporating energy efficiency measures into renovation decisions (often referred to as 'trigger points') and investments wherever possible - and offers opportunities to grow the construction sector and create skilled jobs[15].

Layered over the plethora of targets, regulations and supportive policies across the UK's four nations, many cities and regions have committed to net-zero ambitions by 2035 or even sooner, with more than two thirds of local authorities having declared a climate emergency[17].

A challenge inextricably linked: decarbonising heat

The replacement of fossil-fuelled heating systems with low-carbon alternatives requires considerably more investment, in which energy efficiency upgrades will play a crucial role in keeping costs to a minimum. Without all appropriate efficiency improvements, the cost of heat decarbonisation could be £6.2 billion higher per year to 2050*. Whilst low-carbon heating and related infrastructure upgrades are mostly outside the Coalition's current scope, there will be lessons in financial innovation that can be drawn from its work that could be applied to the broader project of decarbonising the UK's homes.

* Imperial College London (2018) ***Analysis of Alternative UK***

[12] BEIS (2019) ***Green Finance Strategy: Transforming Finance for a Greener Future***
[13] On a scale of A (most efficient) to G.
[14] HM Government (2017) ***The Clean Growth Strategy: Leading the way to a low carbon future***
[15] ONS (2020) ***Output in the construction industry***
[16] For example by incorporating external wall insulation works when scaffolding is up to renew roofs.
[17] climateemergency.uk (2020) ***List of Councils who have declared a Climate Emergency***

This has spurred numerous councils – for whom housing is a large source of emissions – to seek a level of ambition over and above the national policy. For instance, Bristol has pledged that its new buildings will be carbon neutral and climate resilient by 2030, and the energy performance of existing buildings will be improved through tailored retrofit solutions to minimise heat demand and prevent overheating[18].

For homeowners in the 'able to pay' category, private capital will deliver the lion's share of investment in energy efficiency improvements. Ready availability of private finance is critically important, but – as the Green Finance Taskforce and Green Finance Strategy have acknowledged and experience in other countries shows – will not on its own drive sufficient demand for insulation and other efficiency measures. For low-income and fuel-poor households, public capital has a much larger role to play.

Across all housing tenures, additional activities are needed to generate consumer demand and unlock the provision of finance for decarbonising and improving the resilience of our homes. These include activities such as the providing better information, access to capital, standards to ensure that projects deliver the predicted energy savings, as well as incentives and regulation for both borrowers and lenders to act. As highlighted in the Government's Call for Evidence on Building a Market for Energy Efficiency, "…there is no single 'silver bullet' policy for improving energy efficiency[19]."

Important policy announcements were expected in 2020 regarding energy efficiency, the renovation supply chain and finance providers. However, the Covid-19 pandemic has cast uncertainty over timings: the delayed National Infrastructure Strategy was due in the first half of 2020; the Spending Review has been postponed from July 2020; and the Heat Strategy had been anticipated in September this year. A provisional timeline of targets, commitments and processes is mapped over the deliverables of the Coalition in Figure 1.

[18] Bristol City Council (2020) ***One City Climate Strategy***

[19] Green Finance Taskforce (2018a) ***Accelerating green finance: Green Finance Taskforce report***

	2020				2021-2025	2026-2027	2031-2035	2036-2040	2041-2045	2046-2050
	Q1	Q2	Q3	Q4						
Coalition	Phase 1: Segmental Market Review	Phase 2a: Demonstrator Delivery (Market Enablers) Interim report		Present portfolio of demonstrators Final report (1)	Phase 2b: Demonstrator Delivery (Financial Solutions) Present portfolio of demonstrators at COP26 Ongoing scale-up and mainstreaming; Final report (2)					
Targets, milestones and moments		England & Wales: all private rented homes at least EPC E		National Infrastructure Strategy Spending Review Heat Strategy Sixth carbon budget proposal (expected) England: all fuel poor homes at least EPC E	UK 2021: COP26 England 2025: all fuel-poor homes at least EPC D Scotland 2022: all private-rented homes at least EPC E; 2025: all social-rented homes at least EPC D	UK 2030: all rented homes at least EPC C or equivalent (expected) England 2030: all fuel-poor homes at least EPC C	UK 2035: EPC C for all homes Scotland 2032: EPC B for social rented homes	Scotland 2040: at least EPC C for all homes; EPC B for fuel poor homes	Scotland 2045: net-zero emissions	UK 2050: net-zero emissions
Current policy (see Appendix II for Devolved Nation policies and programmes)	Great Britain: Energy Company Obligation for delivering home heating cost reduction measures until 2028									
				England & Wales: new building regulations enter into force	England & Wales 2025: Future Homes Standard enters into force	UK 2030: halve the cost of retrofitting homes to new build standards				
Commitments	UK (2019 manifesto commitment) to 2030: £3.8bn Social Housing Decarbonisation Fund									
	UK (2019 manifesto commitment) to 2025: £2.5bn Home Upgrades Grant									
Proposals and other processes	Each Home Counts implementation (on consumer advice, protection, standards and enforcement)									
					UK 2021: Shared Prosperity Fund to replace EU Structural Funds Scotland 2024: owner occupiers must achieve EPC C at point of sale and/or major renovation (proposed)					

Figure 1: **CEEB in the context of the UK housing energy efficiency timeline**

Profiling the market for home decarbonisation and resilience

The working groups rapidly reviewed and collated recognised issues to help evaluate the opportunities to scale up activity across the sector.

Profiling the market for home decarbonisation and resilience

The overarching goal for the Coalition is to mainstream financial solutions related to the construction and retrofit of UK homes to net-zero carbon and climate resilient standards. To achieve this ambition, the Coalition's work is structured in two phases: the Segmental Market Review (Phase 1) and the Demonstrator Delivery (Phase 2).

The Segmental Market Review was conducted between January and March 2020, bringing together stakeholders from finance, industry, civil society, academia and government, to review different segments of the residential housing market and identify the barriers and enablers of retrofit projects and investment. Benefitting from the extent of research already completed in this field, the working groups rapidly reviewed and collated recognised issues to help evaluate the opportunities to scale up activity across the sector. These findings were applied to design a series of scalable 'demonstrators' of new financial solutions and finance-enabling initiatives that could unlock investment in retrofit projects.

The review was organised by housing tenures: owner-occupied, private-rented and social-rented homes.

Each working group employed a set of questions to structure the review:

- **Who are the financial decision makers?**
- **What is their profile?**
  - Their motivations and trigger points for renovation
  - Their awareness and knowledge
  - Geographic and socio-economic differences
- **Existing initiatives and the delivery partners**
- **What are the main barriers to retrofit?**
  - Financial
  - Non-financial

The following sections provide further detail on each tenure and conclude with an overview of common themes around resilience and data.

Owner-occupied homes

Chaired by Jenny Holland, UK Green Building Council

At 62% of the UK's 27.2 million households in 2017[20], owner-occupiers comprise the largest housing tenure, and therefore the largest potential market (by volume) for financing home decarbonisation and climate resilience. The number of new entrants to the sectors has been declining steadily, with the share of households who live with a mortgage at 28% in 2017, down on 37% in 2007[20]. This decline has been mirrored by growth in the share of households renting privately. The incidence of fuel poverty amongst owner-occupiers is lower than in the other sectors, at 8%, although given the percentage of homes in this sector the number of fuel poor households – 1.2 million in England[21] – is the largest.

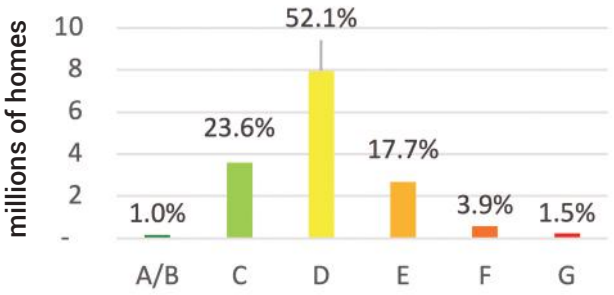

Figure 2: **Distribution of EPC ratings in the owner-occupied sector, England 2016/17**

Public and private finance for owner-occupiers

Operating across the devolved nations (except Northern Ireland), the **Energy Company Obligation** is the UK government's current flagship energy efficiency policy. Delivered by energy suppliers and worth £380 million in 2019, it primarily funds insulation measures and efficient gas boiler replacements, with a focus on lowering heating costs for low income and vulnerable households across all tenures. It helped 78,000 owner-occupied households in 2019[22]. A former flagship policy, the **Green Deal** – an 'on-bill' financing mechanism secured against the electricity meter – had public investment withdrawn after homeowner take-up fell short of expectations. The scheme is currently under review and still available to private finance providers wishing to enter the market. The **Renewable Heat Incentive** offers financial support for seven years to owner-occupiers adopting a renewable heating system.

The government's election manifesto committed to a new **Home Upgrades Grant** scheme of £2.5 billion over five years from 2020/21, focused on subsidising 'whole-house' retrofits for low-income households. Eligible households include owner-occupiers living in F- and G-rated properties in deprived areas.

Whilst at an early stage, the private sector is starting to develop financial products to help owner-occupiers retrofit their properties. **Green Mortgages** are available from Barclays, Nationwide and Ecology Building Society, whilst the Energy Efficient Mortgage Initiative aims to develop a pan-European model for energy efficient mortgages.

[20] ONS (2019) *UK private rented sector*

[21] BEIS (2019) *Fuel poverty detailed tables 2019*

[22] BEIS (2020) *Household Energy Efficiency Statistics, detailed report 2019*

Profiling financial decision-makers

There are significant variations across the owner-occupier segment, ranging from highly mortgaged first-time buyers to those who own a property outright; and there are wide differences in purchasing power within these groups, even if they tend to cluster around particular demographics. For example, in England the outright owners are typically older and evenly distributed across the income quintiles[23]. Owner-occupiers might use a range of finance sources for retrofit and renovation purposes, including housing-related finance such as advances on an existing mortgage or equity release. The variation in circumstances and choices across multiple dimensions generate variation in the motivations, challenges and opportunities for homeowners to improve the energy efficiency of their property.

Lower energy bills and creating an environmentally friendly home are common motivators, but owner-occupiers may also choose energy efficiency improvements when pursuing other goals, such as increased comfort and a healthier home, for aesthetic reasons, or to protect the value of their property. Major renovations to homes (e.g. extensions, kitchen or bathroom refurbishments) or general maintenance and repair (e.g. roofs or façades) create valuable opportunities to undertake concurrent work to improve energy and emissions performance.

Changing household circumstances, such as moving home, preparing for a growing family, or planning for later life, can drive building works that could incorporate energy improvements. It is important to acknowledge that the Covid-19 crisis has temporarily stalled the housing market, with unprecedented consequences for sale volumes and property valuations. Following the financial crisis, owner-occupiers pivoted their housing investments towards 'staying and improving' rather than moving up the housing ladder. Should a similar trend emerge in the years ahead, this has implications for the composition of retrofit trigger points that households could experience.

Owner-occupiers engage with a wide range of potential professional influencers of renovation and retrofit decisions including lenders, mortgage brokers, architects and builders, surveyors and estate agents, regulators, and freeholders should the property be a leasehold.

[23] DCLG (2018) ***English Housing Survey, 2016-2017: Household Data***

Barriers to retrofit

Owner-occupiers experience a breadth of financial and non-financial barriers depending on their individual circumstances, as outlined in Table 2.

Financial Barriers	Non-Financial Barriers
• **High upfront costs** for improvements. • **Lack of access to capital.** • **Low confidence in energy bill savings:** A barrier for homeowners seeking full repayment via energy savings. • **Duration of tenancy:** Energy bill savings may not accrue to the original homeowner if they move property. • **Property value-add:** Efficiency improvements not considered to increase and/or protect property values. • **Availability and accessibility of products:** Low penetration and availability of attractive financial offers for efficiency measures.	• **Low awareness** among homeowners, and disconnect between a genuine concern about climate change and the energy efficiency of their property • **Professional influencers fail to inform and educate** homeowners of benefits. • **Lack of good quality information and support** on products, choices and suppliers. to embark on a renovation 'journey'. • **Duration, hassle and complexity** (i.e. supply chain, installation, finances) of retrofit projects. • **Lack of confidence in the supply chain.** • **Leaseholders gaining permission:** Getting collective agreement amongst groups of share-of-freeholders.

Table 1: **Financial and non-financial barriers to retrofit projects in the owner-occupied sector**

Sub-segment / profile features	First-time buyer	High loan to value	Low loan to value	Own outright (recently repaid)	Own outright (sufficient savings)
Decision Maker	Y	Y	Y	Y	Y
Characteristics	Cash poor, generally lower credit rating, more likely to own a new home (Help to Buy etc.)	A: Mixed ability to access credit, typically 30-49 | B: highly leveraged property developers	Typically 45-65, first time buyers with parental support, mature career stage	Generally older; often asset rich and cash poor; fixed income; less efficient home	A: Generally older, sufficient savings and/or fixed income; less efficient home / B: cash-rich property developers
Key influencers	Lenders, mortgage brokers, surveyors	Lenders, mortgage brokers, surveyors, architects, supply chain (for property developers)	Surveyors/valuers, architects, advisors of home retrofit	Peers, advisors of home retrofit, financial advisors	Valuers/ surveyors, architects/designers, financial advisors
Level of Awareness	Generally very low | EPC data is the only item and not all OOs consider it | High climate awareness not linked to home and not translated into action				
Drivers	To buy an already energy efficient home | concerned about cost of living | growing family	Desire improvements | aesthetics, comfort | consider dwelling as an investment/ asset value increase | rapid turnover	Changing family circumstances | consider home as retirement plan | aesthetics, comfort	Minimising costs | consider home as retirement plan	A: Aesthetics, health, comfort | minimising costs | B: consider dwelling as an investment/ asset value increase | rapid turnover
Trigger Points	About to move / recently moved	Recently moved | growing family | recently acquired investment	Becoming empty nesters | recently moved | extensions and repurposing	Becoming empty nester | retirement | moving to downsize	A: Adapting home for future | B: recently acquired investment
Barriers - Financial	Highly leveraged | seeking to minimise outgoings | limited options/desire for further borrowing	High upfront costs, low certainty of savings | combination of financial products required| improvements not reflected in asset value	High upfront costs, low certainty of savings | combination of financial products required| improvements not reflected in asset value	Limited options/desire for borrowing | high upfront costs, low certainty of savings	Improvements not reflected in home value
Barriers – Non-financial	Uncertain performance of EE | lack of access to good information	Uncertain performance of EE | lack of access to good information | trust in supply chain	Uncertain performance of EE | lack of access to good information | hassle | trust in supply chain	Uncertain performance of EE | lack of access to good information | hassle | trust in supply chain	Lack of access to good quality information | hassle | trust in supply chain

Table 2: **Profile of the owner-occupier segment**

Private-rented homes

Chaired by Simon Gordon, National Residential Landlords Association

This sector has grown rapidly in recent years, from 13% of UK households renting privately in 2007 to one in five in 2017[24]: approximately three million households. This growth has been mirrored by a decline in the percentage of households that purchase a property, and it overtook social housing as the second-largest tenure in 2014.

Owing to a typical combination of lower energy performance and housing quality than other tenures, combined with a high proportion of low-income households, the sector has the highest incidence of fuel poverty at 19.4% in England, equivalent to 900,000 households.

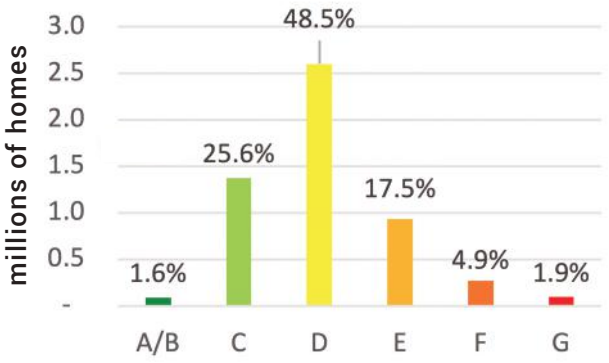

Figure 3: **Distribution of EPC ratings in the private-rented sector, England 2016/17** [Source: DCLG (2018)]

Policy and commercial offers

As of April 2020, the **Minimum Energy Efficiency Standard** (MEES) mandated all private rental properties to have an EPC rating of E or above in England and Wales, and a consultation proposing to increase this to an EPC rating of C by 2030 is anticipated later in 2020. In 2019, the **Energy Company Obligation** (ECO) funded energy improvements for 14,500 low income and vulnerable private-renting households across Britain[25]. **The Green Deal** was available across the private-rented sector, where tenants were responsible for repaying the upfront investment via the energy bill. The scheme experienced difficulties in this tenure, as landlords were unable to apply for the financing during void periods when renovations are typically completed.

The Renewable Heat Incentive is also available, where landlords fund the new renewable heating system and receive subsidy payments.

The government's 2019 election manifesto commitment to a **Home Upgrades Grant** scheme also applies to low-income households living in inefficient homes in the private-rented sector, and could dovetail well with current MEES.

Finance offerings from the private sector are limited, with only Ecology Building Society offering a **Green Buy-To-Let Mortgage**. As of March 2020, LendInvest announced a new **Bridge-to-Let Loan** offering cashback to landlords that improve the EPC rating of their investment property.

[24] ONS (2019) *UK private rented sector*

[25] BEIS (2020) *Household Energy Efficiency Statistics, detailed report 2019*

Profiling financial decision-makers

The profile of landlords is wide-ranging: from small landlords with portfolios of one or two holdings, through to corporate landlords, institutional investors and asset managers. 94% of landlords are individuals, and almost half of landlords own just one property. However, the top 17% of landlords by portfolio size account for approximately half of all tenancies in the UK. On average, landlords report a gross rental income of £15,000 per year and the median borrowing value of mortgages to purchase a rental property is £180,000.

With the notable exception of students in purpose-built accommodation, tenants are typically responsible for paying the energy bills. Private-rental tenants tend to be younger than households in other tenures and stay in properties for a shorter time than owner-occupiers, with an average duration of four and 18 years, respectively. An estimated 63% of private renters have no significant savings, and one in five receives Housing Benefit. These factors mean that, despite tenants possibly benefitting from energy bill savings, the capacity of tenants to directly contribute towards the cost of retrofits – as is common in France, Germany and the Netherlands – is limited and leaves landlords as the principal investors and decision makers.

MEES may become a significant driver of energy efficiency improvements to private rental properties, especially if – as is planned in England and Wales – its scope is expanded beyond properties with an EPC rating of F or G (approximately 7% of properties in the sector) to encompass E and D rated properties by 2030. At 42%, awareness and understanding amongst landlords and agents of MEES is low, but steadily rising. Tenants' awareness of, and willingness to act on, their rights in respect of MEES is expected to increase over time. More broadly, renovation works in the sector are usually driven by the need for repairs (e.g. heating system replacement) especially amongst small landlords. Property improvement works are usually undertaken during void periods, due to the reduced complexity and potential to recoup a portion of the improvement costs through higher rental rates on the new tenancy.

Given the regulatory and fiscal changes to landlords' circumstances in recent years, coupled with short-term uncertainty caused by the coronavirus health crisis, the landlord community is likely to favour longer-term clarity on the technologies and timelines for energy efficiency improvements. And the professional network of letting and management agents, sustainability advisors, asset managers and larger landlords – as well as tenants – has significant potential to influence the energy renovation decisions of landlords.

Barriers to retrofit

The private-rented sector faces significant, yet not insurmountable, challenges to retrofit. The degree of separation from the owner to the property can create an additional layer of complexity in motivating landlords to make the significant upfront costs required.

Meanwhile, the short length of tenancies and lack of disposable income typically seen among private-rented tenants limits their ability to contribute to efficiency measures.

Financial Barriers	Non-Financial Barriers
• **Split incentive:** Most landlords do not pay energy bills, hence do not benefit from energy savings that help justify retrofits. • **High upfront costs,** particularly for landlords with multi-property portfolios. • **Access to capital:** Landlords with medium-sized portfolios (3-5 properties) are not well served by financial products suitable for renovation projects. • **Uncaptured value:** Energy improvements do not translate into increase rental rates or property valuations. • **Leasehold limitations:** Leasehold are landlords not permitted by default to recoup costs of improvements via increased service charges, only for replacements or repairs. • **Freeholder incentive:** Freehold owners of leasehold rental properties typically interested in ground rent only, which is unaffected by property improvements.	• **Low awareness of MEES:** Particularly amongst smaller landlords, whilst tenants have limited appreciation of their rights and relatively weak position. Influencers (e.g. letting and management agents) and tenants often fail to raise efficiency issues. • **Duration, hassle and complexity of projects,** coupled with uncertainty about tenancy length (to plan projects for void periods). A challenge for tenants as well, especially those in short-term lets. • **Lack of good quality information** and support on how to meet or exceed MEES, product choices (technical and financial) and suppliers. • **Regulatory uncertainty** about future requirements, in particular MEES and how compliance fits in with future regulation.

Table 3: **Financial and non-financial barriers to retrofit projects in the private-rented sector**

Sub-segment / profile features	Small Landlord (1-2 holdings)	Medium Landlord (2+ Holdings)	Private Investor	Corporate Landlord	Assset Manager
Decision Maker	Y	Y	Not unilaterally	Y	Y
Energy Bill Payer	Tenant	Tenant	Typically 45-65, adult children, mature career stage supply chain	Tenant	Tenant/Landlord
Characteristics	Often accidental landlords| Property can be a pension fund | Less available cash for investing | Often mortgaged on their property | Sub-set of inactive 'rogue' landlords	Tend not to manage their own properties | Tax issues with expanding or decreasing property portfolio | Limited capabilities to retrofit due to tenant rights	Interested in returns on investment | Investment according to climate risk and ESG becoming more prevalent	Typically, large organisation with liquidity and capacity to leverage debt | Not encouraged to go beyond minimum standards	Typically, large organisation with liquidity and capacity to leverage debt
Key influencers	Management Agent	Management Agent	Investment advisor	Sustainability Advisor	Sustainability Advisor
Level of Awareness	Low	Medium	Medium	High	High
Drivers	Increase in asset value from measures |Positive relationship with long-term tenant	Increase in asset value from measures |Positive relationship with long-term tenant	Increase in asset value from measures |Green building certification	Increase in asset value from measures |Green building certification	Increase in asset value from measures |Green building certification
Trigger Points	Replacing faulty item | Void periods |MEES compliance | Change of tenancy	Replacing faulty item | Void periods | MEES compliance | Change of tenancy	Market indicators | Performance of housing portfolio (energy consumption etc) | Risk profile	MEES compliance | Change of tenancy	MEES compliance | Change of tenancy
Barriers - Financial	Split incentive where tenant pays energy bills and landlord doesn't benefit from energy savings | Leaseholders cannot recoup the investment in measures by increases in service charges | Not often a financial incentive to retrofit a home | Perceived that valuation surveys do not reflect increased value from investment | Limited capacity to leverage credit	Leaseholders cannot recoup the investment in measures by increases in service charges | Split incentive where tenant pays energy bills and landlord doesn't benefit from energy savings | Existing financial products do not serve these landlords	Ambiguity surrounding new housing standards	High upfront costs, particularly for landlords with multi-property portfolios | Uncaptured value: energy improvements not adding to rent or property valuation.	High upfront costs, particularly for landlords with multi-property portfolios | Uncaptured value: energy improvements not adding to rent or property valuation.
Barriers – Non-financial	Lack of good quality information and support on how to meet or exceed MEES | Limited awareness of opportunities for acquiring finance	Low awareness of energy efficiency requirements | Duration, hassle and complexity of projects, coupled with uncertainty about tenancy length |Lack of good quality information and support on how to meet or exceed MEES, or measures		Regulatory uncertainty about future requirements | Ambiguity surrounding new housing standards	Regulatory uncertainty about future requirements | Ambiguity surrounding new housing standards

Table 4: **Profile of the private-rented segment**

Social-rented homes
Chaired by John Godfrey, Legal & General

The number of homes rented from registered social landlords (RSLs) in the UK has declined steadily over the past 40 years, from a peak of nearly seven million around 1980 to just under five million homes in 2017[26]. This is attributed to the fact that provision of new social housing cannot keep pace with the depletion of existing stock through the Right to Buy scheme. Over the same period, the number of homes rented from councils has fallen starkly, whilst the number of homes provided by Housing Associations has grown, primarily via stock transfers.

There is renewed pressure on Local Authorities to provide more social housing, as austerity measures of the past decade impact low-income households and homelessness rises. The removal of the Housing Revenue Account borrowing caps is expected to enable councils to increase construction by 10,000 homes per year, however there will remain a shortfall between social housing demand and supply.

The energy performance of social-rented homes is significantly better than in private housing, owing to a combination of a newer stock, a higher proportion of flats, regulatory requirements and RSLs' typically pro-active and planned approach to renovation. The incidence of fuel poverty is 13.4% – low compared to the private-rented sector – and more commonly a consequence of low household incomes, rather than particularly poor energy performance as per other tenures.

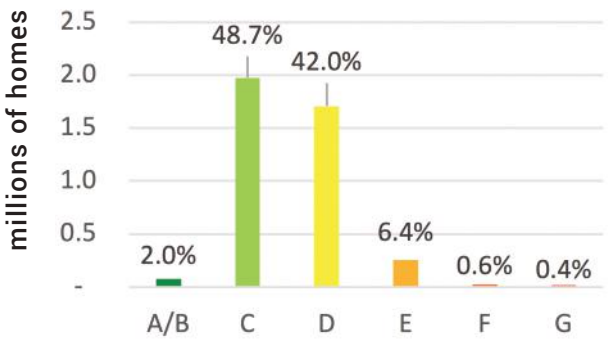

Figure 4: **Distribution of EPC ratings in the social-rented sector, England 2016/17** [Source: DCLG (2018)]

Policy and commercial offers

National regulatory and statutory drivers to meet energy efficiency and fuel poverty targets, alongside council and RSL ambitions and policies, feature strongly in the decision-making processes of social housing providers. Government policy and regulatory drivers differ significantly across the four nations, with higher levels of ambition and support for social housing in the devolved nations compared to England, where policy is widely viewed as needing renewal. For example, the Clean Growth Strategy commitment to consult on how social housing could meet EPC C by 2030 has been overtaken by the milestone agreed in Scotland for all social housing to achieve EPC C five years earlier, from 2025, and EPC B by 2032.

[26] MHCLG (2020) ***Live tables on dwelling stock (including vacants), Table 102*** and NISRA & DfC (2019) ***Northern Ireland Housing Statistics 2018-19***

The government's election manifesto committed to a new £3.8 billion **Social Housing Decarbonisation Fund** over ten years from 2021/22, focused on supporting RSLs to renovate their stock up to a standard equivalent to EPC C by 2030. With EU withdrawal, access to the **European Regional Development Fund** – a major source of capital for renovation in the most deprived regions of the UK – will no longer be possible. The applicability of its replacement, the **UK Shared Prosperity Fund**, for social housing renovation remains to be seen. Dedicated financial offerings from the private sector are focused on larger social-rented landlords, most notably the **Ritterwald Certified Sustainable Housing Label** that unlocks opportunities to raise capital from green, social and sustainability bond investors

Profiling financial decision-makers

Decision-makers in this sector include property owners, managers and tenants. Landlords encompass housing associations, who have the largest and growing share of social housing stock. Local Authorities own a declining share, with significant geographic variations in available resources for low-carbon renovations. A large proportion of Local Authority housing stock is managed by arm's-length management organisations (ALMOs), often operating across council boundaries in geographically concentrated areas, with scope to deliver larger-scale retrofit projects in specific locations. Reduced void periods and rent arrears are important goals for social housing providers, who acknowledge that improved energy efficiency is linked to achieving both[27].

Numerous councils have ambition, yet are poorly informed on the options for climate action and how these can be financed. With government committed to net-zero emissions by 2050, there is a responsibility for councils to incorporate this into local planning policy, which many are failing to do[28]. Nevertheless, the policies and ambitions of individual councils and housing associations on energy, emissions and fuel poverty are a major driver of renovation activity. Many that have declared a climate emergency own social housing – often the first port of call for local authorities' efforts to tackle carbon emissions, frequently combined with efforts to reduce fuel poverty.

Social housing is allocated based on need, and tenants include low-income households, families, retired and disabled people. In 2017-18, there were an estimated 2.1 million households in the social-rented sector (54%) in which at least one household member had a disability or long-term illness. The profile of tenants includes private leaseholders in flats or terraces, who are statutory consultees on improvements to buildings but have no obligations to contribute to the retrofit process. Tenants are often organised and sometimes pursue community energy projects, including energy efficiency improvements.

[27] Sustainable Homes (2016) ***Touching the Voids***

[28] ClientEarth (2020) ***Lawyers put local authorities on notice over climate inaction***

Barriers to retrofit

A number of financial and non-financial barriers stand in the way of effective social housing retrofits. Financial barriers may not be the primary concern; scaling up existing initiatives is a greater priority for Local Authorities, and significant issues arise if supply chains are not sufficiently developed to deliver. Challenges to achieving economies of scale include private leaseholders and Right to Buy households acting as 'blockers' to change.

Financial Barriers	Non-Financial Barriers
• **Limited funds:** New construction and renovation of existing stock compete for small budgets in Councils. • **Access to capital** is acute in smaller RSLs. • **Bureaucracy:** Financing models for renovation projects have long lead-times for approval. • **Planning horizons:** Short-term government grant programmes are difficult to reconcile with longer-term stock improvement plans. • **Interest rates:** Housing associations have the highest share of stock and face higher borrowing rates than local authorities.	• **Supply chain constraints:** Renovation on the scale needed, at an acceptable cost, cannot be routinely relied upon. • **Project development, delivery expertise and capacity** often in short supply at many Councils and smaller housing associations, where capacity struggles to match net-zero ambitions and complexity of renovation projects. • **Reluctant private leaseholders** in flats and terraces are rarely compelled to permit or contribute to changes, which can suppress economies of scale. • **Multi-property retrofits impacted by Right to Buy,** such that a portfolio of properties is not centrally controlled.

Table 5: **Financial and non-financial barriers to retrofit projects in the social-rented sector**

Sub-segment / profile features	Housing Association	Local Council	Arm's Length Management Organisation (ALMO)	Company
Decision Maker	Y	Y	Y	Y
Characteristics	Can be for profit and non-profit | Have a growing share of the social housing stock | Geographically dispersed portfolio	Declining share of social housing stock | Lower borrowing costs than other social housing landlords | Range of ambition, many declared climate emergency	Manage Local Authority stock and follow Council policies | Portfolio can often consist of many inefficient properties	Starting to work more with Local Authorities to set up joint ventures for debt vehicles to deliver projects and access finance
Key influencers	Tenants	Tenants and Government	Tenants	Tenants
Level of Awareness	Have some knowledge and awareness, but differs between Housing Associations	Though highly variable, most do not generally have the skills, knowledge and understanding to develop a long-term plan incorporating decarbonisation, net-zero, into asset management	Have some knowledge and awareness, can be dependent on the Local Authority but differs between ALMO	Climate change becoming a priority issue and a financial risk issue. Limited capacity to enact change at low cost
Triggers and Drivers	Maintenance cycles | Void periods in tenancy | Genuine interest in placing health and wellbeing in decision making	UK net-zero 2050 target (climate emergency declarations) should encourage action | Very different regulatory system depending on location, e.g. Wales, Scotland or England | Tackling fuel poverty	Maintenance cycles | Void periods in tenancy | Genuine interest in placing health and well-being in decision making	Maintenance cycles | Void periods in tenancy | Genuine interest in placing health and wellbeing in decision making
Barriers - Financial	Typically higher cost of borrowing than Local Authorities | High upfront costs to retrofit large portfolios	New build and existing stock compete for budgets | Establishing new financial models difficult due to approval required | Short-term grant profile difficult to reconcile with long-term objectives | Bureaucracy of new finance models getting clearance by Local Authorities	Bureaucracy of new finance models getting clearance by Local Authorities | High upfront costs to retrofit large portfolios	High upfront costs to retrofit large portfolios
Barriers – Non-financial	Stock is often widely dispersed | Decision making is sometimes with cooperatives | Supply chain maturity | Right to Buy leaseholders within tenements	Minimal void periods for (deep) retrofit of buildings | Limited new stock coming online | Priorities within Councils | Right to Buy leaseholders within tenements	Private leaseholders refusing permission to retrofit | Supply chain maturity | Right to Buy leaseholders within tenements	Supply chain maturity

Table 5: **Profile of the social-rented segment**

Adapt and protect: strengthening homes' resilience to climate change

Whilst the principal focus of the Coalition is the energy efficiency of residential buildings, it has considered the opportunities to improve the resilience of homes against the physical impacts of climate change, for example flooding or heat stress. Home resilience encompasses a spectrum of measures including water efficiency, prevention of overheating and passive cooling, flood defence and mitigation (e.g. through measures that reduce water run-off rates). In many instances these can be an integral part of energy efficiency projects and investments, such as green roofs.

An estimated 1.8 million people are living in homes at risk of flooding[29], which is forecast to increase by the 2080s to 2.5 million if average temperatures rise by 2°C, and 3.5 million under a 4°C scenario[30]. Severe flooding in the north and south-west of the UK over the winter of 2019/20 has propelled the case for investing in resilience, but policy gaps are inhibiting the construction of better, more resilient homes[31]. According to the 2019 Committee on Climate Change Adaptation Report, installations of property flood resilience measures are "well below optimum" and water efficiency plans are off track to account for future climate impacts[32].

Physical climate risks are a financial risk: if a property is not resilient to physical risks, then any debt secured against the home is at risk. Stakeholders across the banking and insurance sectors must work with government to create an environment that supports the construction of new homes, retrofit of existing homes and rebuilding of flood affected homes to net-zero carbon and resilient standards.

The Coalition reiterates the recommendations made by the Green Finance Taskforce and the Committee on Climate Change in their calls for[33]:

- Support for homeowners and landlords to understand how to improve the resilience of their home.
- Homeowners and landlords to have sufficient information on the benefits of adaptation and the incentives to take action so that when Flood Re is withdrawn in 2039, properties remain insurable.
- Support for the supply chain to grapple with the standards and regulations they must meet to build a climate resilient home.
- Building regulations and standards to be introduced for property flooding resilience in new and existing homes that are at high risk of flooding.
- The development of Building Renovation Passports to include resilience measures, and work with the insurance and finance sectors to ensure they have the evidence required to make informed decisions on the risk associated with lending and the reduced risk as a result of investing in energy efficiency and resilience measures.
- Insurers to require resilience and energy efficiency measures to be factored into post-flood repairs.

[29] The Climate Coalition (2020) ***Home Truths: How climate change is impacting UK homes***

[30] Sayers et al. (2015) ***Climate Change Risk Assessment 2017: Projections of future flood risk in the UK;*** assuming no population growth and continuing current levels of adaptation.

[31] CCC (2019) ***UK housing: Fit for the future?***

[32] CCC (2019) ***Progress in preparing for climate change - 2019 Report to Parliament***

[33] Green Finance Taskforce (2018b) ***Accelerating green finance: Green Finance Taskforce report;*** CCC (2019) UK housing: ***Fit for the future?***

Foundations for investor confidence: data that mobilises capital

Data is a critical component in decision-making across the housing market, from homeowners and tenants to housebuilders and lenders. However, existing datasets tend to have significant limitations and can be hard to acquire, if they exist at all. Availability of relevant and reliable data is a commonly cited barrier. This can undermine ambitions to improve the energy efficiency and resilience of buildings, since the evidence-base upon which decisions are made is often missing.

The Segmental Market Review identified that data – from the metrics collected to easily accessible and consistent databases – is a crucial lever to unlock the retrofit challenge. Therefore, the Coalition has included data-related initiatives, aimed at establishing the foundations for future financial innovation.

There are several existing sources of data that are relevant to retrofitting a home: for example, an Energy Performance Certificate (EPC) which details the energy efficiency of a home on a scale of A (highest) to G (lowest), and smart meter data that informs residents of the amount and cost of the energy they consume.

A range of challenges were identified with existing datasets across all housing tenures. The most common were related to EPCs (see box), while others highlighted the limited accessibility to smart meter data, the poor consistency and interoperability of various datasets, and the lack of data infrastructure to enforce standards (e.g. MEES being difficult to enforce without a register of private landlords).

Energy Performance Certificates: useful but flawed

Coalition members identified Energy Performance Certificates (EPCs) as the most common source of information on the efficiency of buildings. EPCs are based on Standard Assessment Procedure (SAP) or Reduced Standard Assessment Procedure (RdSAP) methodologies, and provide an energy efficiency rating on a scale of A (highest) to G (lowest). EPC data is available on every residential property that was built, sold or rented in the UK since 2008. They are a valuable source of data and describe the general features of a property (e.g. fabric, heating systems, renewable energy technologies).

However, EPCs experience several widely recognised issues: the data is static and provides no insight on operational performance, the results can be inconsistent and undermine confidence in their reliability, and the open source database of EPC lodgements does not link to Land Registry data (a significant issue for lenders seeking to assess the efficiency of properties on their mortgage portfolio).

The landscape of existing datasets and challenges, as well as the opportunities that were identified in the Segmental Market Review, are outlined in Table 6.

Data point	Existing collection point	Challenges and opportunities
Building fabric • Dimensions of the building • Insulation • Heating system • Flood protection measures	• EPCs (note, these do not provide information on flood protection measures)	• Static data point • Long intervals between update • Not easily accessibly or linked to Land Registry data • Could be enhanced by integrating with the PAS2035 retrofit measures database
Operational performance • Smart meter data: energy and electricity consumption • Water consumption • Relative weather conditions affecting performance	• Smart meters • Existing water, gas and electricity meters • Met Office data and local weather data collectors	• Limited access to aggregated smart meter data • Opportunity to design bespoke retrofit pathways for the home by targeting poor performance, specifying improvements, and verifying the performance improvement
Location • Geospatial position: assess viability of alternative energy sources (solar PV, district heating etc.) • Resilience potential: flood and drought risk, heat stress risk	• Ordnance survey • Environment Agency flood maps • Ofwat	• Limited adoption of flood maps by industry • Geospatial data can identify characteristics of the area to enable location specific solutions • Opportunity to develop a standard flood resilience assessment
Financial data • Maintenance costs of the home • Mortgage repayments • Letting costs • Insurance premium	• Banks, mortgage lenders and insurers • Landlords and letting agents	• Opportunity to aggregate above data points to create a rich database to help engage and inform customers • Opportunity to assess portfolio risks, trigger innovation in financial products and improve the accuracy of insurance premiums.

Table 6: **Landscape of renovation-relevant datapoints and sets, and associated challenges**

Collaboration across data providers and end-sectors has the potential to establish a reliable, consistent, and interconnected network of rich datasets, where real-time data is easily accessible to the relevant parties. The protection of homeowner privacy is critical to ensure responsible application of data by market actors. And whilst each data point will have relevance on the individual property level, it also forms part of a wider picture that could deliver insights into regional and national patterns of energy efficiency and climate resilience.

Mobilising capital:

the portfolio of demonstrator solutions

These demonstatros seek to appeal across the breadth of housing tenures, geographies and socio-economic profiles, interact seamlessly with existing energy efficiency initiatives and inform government policy.

Mobilising Capital: the portfolio of demonstrator solutions

The findings of the Segmental Market Review were applied by Coalition members to inform and devise a series of financial solutions that incentivise retrofit projects across the tenures.

The portfolio of financial and finance-enabling 'demonstrators' seeks to appeal across the breadth of housing tenures, geographies and socio-economic profiles, interact seamlessly with existing energy efficiency initiatives and inform government policy. Each demonstrator was assessed against a standard set of criteria to determine feasibility, scalability, commercial potential, operational deliverability and impact.

The following sections summarise the full portfolio of demonstrators.

Data, digitalisation and enabling frameworks

Demonstrator 1: **Energy Efficiency & Property Valuations**

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Data & Enabling Frameworks

Overview: Building on existing studies that explore the relationship between energy performance and property value, this demonstrator will establish the financial case in support of retrofitting homes, which should in turn increase demand. It will implement practical solutions that leverage this relationship along the financial value chain and unlock capital flows towards low-carbon homes.

Real-Economy Outcome: Homeowners, surveyors and mortgage lenders are better equipped to quantify the impact of energy efficiency on property valuations. Subsequently, homeowners are incentivised to retrofit their property and lenders are empowered to develop new financial models that tap into the investment-value correlation.

Delivery Partners include:

- Data specialists
- Financial regulators
- Government
- Mortgage lenders
- Surveyors and related professional bodies
- Trade associations

Demonstrator 2: **Metered Energy Savings**

OO | PRS | SRS

Data & Enabling Frameworks

Overview: Property owners and lenders are currently unable to measure the real-time energy savings that are delivered by energy efficiency measures. To overcome this data gap, a standardised savings calculation methodology, based on proven models in other countries, could be developed and calibrated to homes in the UK to deliver rich data on actual energy savings over the lifetime of a retrofitted building.

Real-Economy Outcome: Real-time energy savings provide an evidence base to support the design of new and targeted financial products - including several concepts presented in this report – and could unlock a wider overhaul of building data to enable the flow of retrofit finance, especially if linked to existing datasets such as the EPC register. The concept has ramifications for data use by utilities and energy companies, whilst also building confidence amongst homeowners on the long-term financial benefits of energy efficiency measures.

Delivery Partners include:

- Data specialists
- Energy specialists
- Financial institutions
- Not-for-profit organisations (i.e. as a possible host of the IP)
- Property owners (i.e. across all tenures)
- Trade associations

Policy levers to support demand and scale-up:

- Greater access to smart meter data
- Integrate real-time energy savings data into mandatory information collected on a property

Case study: Focus on Metered Energy Savings

There is a gap between the measurement of outcomes of energy efficiency measures installed in homes, for example whether they were installed correctly and perform as expected, and how well they perform. Without this data, householders and those providing finance have no idea of the impact of efficiency measures on energy bills and hence their ability to make repayments, and there is no feedback loop to contractors to hold them accountable for delivering a high-quality project.

Taken forward by EnergyPro in the UK, 'Metered energy efficiency' uses technology to collect data, such as energy use and other inputs including the local temperature conditions, across a portfolio of homes , and uses a fixed, transparent and open source methodology to calculate savings or avoided energy use. This gives a reliable quantification of the true, weather-normalised savings achieved by an energy efficiency programme, which can be used by the financial sector to better design and target financial products for retrofit.

Metered Energy Savings has seen early success in California, New York and Oregon in the United States, adopted by utility companies including PG&E, conEdison in New York and East Bay Community Energy. A process to apply this in the UK is being developed to enable finance for at-scale energy efficiency projects.

The graphs show the calculated energy savings after implementation of an Energy Conservation Measure (Figure 2) and the distributed savings across a portfolio of properties (Figure 3). Applications of the technology in the US have accurately quantified savings from installing measures, and enabled utility companies to incentivise consumers' use of the grid and create a more even load. Metered Energy Savings therefore provides a means to create new financial products and improve use of the existing infrastructure in the energy system.

Figure 2: **Energy savings measured across projects using live data**
[source: Recurve Analytics (2020)]

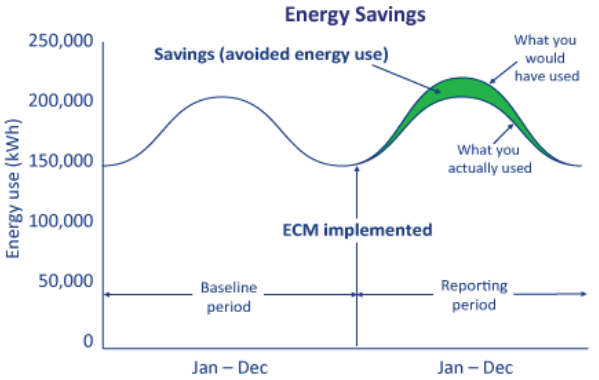

Figure 3: **Measurement and verification of energy savings ('ECM' = energy conservation measure)**
[source: EEVS Insight (2018)]

Demonstrator 3: **Building Renovation Passports**

OO | PRS | SRS

Data & Enabling Frameworks

Overview: Building Renovation Passports are a valuable tool to increase the rate and depth of retrofits, providing information on what measures are possible and a long-term renovation plan that can be achieved at a flexible pace, creating a link with the supply chain and finance providers, and forming a digital logbook of renovations associated with each property. Similar passports are commonplace in other countries and can be adapted to encompass buildings across all housing tenures.

Real-Economy Outcome: Clear, accessible and affordable information that is bespoke to individual buildings would bring benefits along the retrofit supply chain: homeowners can make informed decisions that align with a net-zero trajectory, installers can fit measures that complement existing technologies in the home, and lenders can assess risks and support customers in a more accurate manner.

Delivery Partners include:

- Consumer advocacy groups
- Data specialists
- Government
- Mortgage lenders
- Local Authorities
- Property owners
- Retrofit co-ordinators, contractors and installers

Policy levers to support demand and scale-up:

- A standardised methodology and framework for Building Renovation Passports
- Review of data privacy regulations to enable access to, and appropriate controls for, data to inform the Building Renovation Passports

Case study: Focus on Building Renovation Passports

Homeowners and landlords are often unaware of the options to make their home more comfortable, energy efficient, low carbon, resilient and ultimately more valuable. It's not always apparent which route forward is best to retrofit a home, nor certain how much a homeowner can afford to invest at any point in time. Building Renovation Passports would collate all data relating to energy efficiency, carbon and resilience, and put it together digitally in one place with a long-term roadmap for improvements to make the home net-zero and resilient in its environment by 2050.

The Green Finance Taskforce report (Accelerating Green Finance, 2018) advocated bringing together information on the energy performance of individual buildings, works undertaken and operational data, combined with a roadmap for future retrofits – in the context of national targets, supportive policies and regulatory requirements – in a digitally rooted building passport which draws on, enhances and ultimately subsumes EPC data. This was echoed by the Committee on Climate Change report (Housing Fit for the Future, 2019), which noted the importance of home-specific forward-looking advice to enable homeowners to renovate over time, and to bridge changes in ownership. This requires two major components, the roadmap and the logbook.

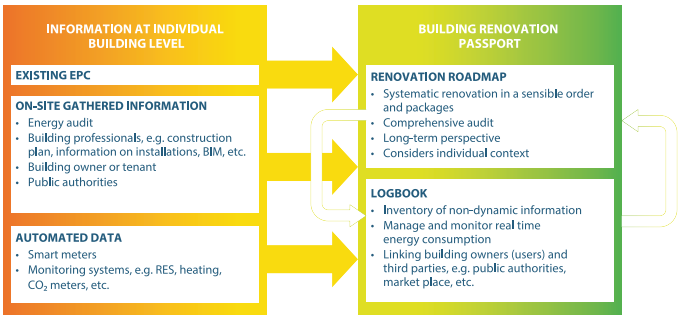

Figure 4: **Scope of Building Renovation Passports** [source: BPIE (2018)]

Building passports are an essential piece of the puzzle to make homes net-zero and enable property owners to meet future energy efficiency standards sensibly, including Minimum Energy Efficiency Standards as they rise for private landlords. Government-sanctioned methodologies underpin the renovation roadmap component of passports already available in Denmark, Flanders, France and Germany, in many cases available with government subsidy. The Government's ongoing review of EPCs presents a major opportunity to drive forward the development of a national standard for UK Passports.

Figure 5: **Summary sheet of Germany's standard federal renovation roadmap** [source: BAFA (2017)]

Demonstrator 4: **TrustMark 'Call to Action' Platform**

OO | PRS | SRS

Data & Enabling Frameworks

Overview: Retrofit projects can be viewed as complex, resource intensive, and difficult to deliver, with a lack of information about the technical and financial options available. A platform to help customers identify and visualise the technical changes, provide information on accessing finance, and direct homeowners to reputable supply chains – all powered by TrustMark, a government-endorsed quality mark for renovations – will simplify the customer journey, build trust in the quality of retrofit projects, and create a secure store of retrofit data to inform future improvements.

Real-Economy Outcome: Property owners across all housing tenures can access reputable information that is specific to their needs and minimises the 'hassle factor', thereby acting to stimulate and aggregate demand for retrofit projects. In particular, an impartial source of available financial products that is integrated into the customer journey will help facilitate finance towards retrofit projects.

Delivery Partners include:

- Data specialists
- Financial Institutions
- Manufacturers
- Retrofit co-ordinators, contractors and installers
- TrustMark
- Delivery with a non-profit organisation for independence

Policy levers to support demand and scale-up:

- Continued government support for retrofit quality assurance standards will bolster market confidence
- Higher minimum energy efficiency standards could stimulate demand for services offered by the platform

Demonstrator 5: **Residential Retrofit Principles**

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Data & Enabling Frameworks

Overview: An industry-recognised certification for financial solutions that support the retrofit of residential buildings to a high standard (similar to the LMA Green Loan Principles). The Residential Retrofit Principles would provide confidence to lenders and borrowers on the environmental and social benefits of their investments, whilst mitigating reputational risks including greenwashing.

Real-Economy Outcome: Financial institutions have increased confidence in the green credentials of products and services, thereby encouraging the development of, and demand for, all financial products presented in this report.

Delivery Partners include:

- Buildings and energy specialists
- Financial institutions
- Law firms
- Trade associations

Policy levers to support demand and scale-up:

- The Principles can align with green finance standards adopted in the UK, for example building on the EU Taxonomy

Demonstrator 6: **Sustainable Housing Label**

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Data & Enabling Frameworks

Overview: There is growing evidence that favourable financing terms can be achieved on securities that have an environmental or social impact label or certification. For instance, the Ritterwald Sustainable Housing label was applied in the successful bond issuance for sustainable new builds by Clarion Housing in 2019, and in Minergie quality label underpinned preferential Minergie-branded mortgage deals offered by Swiss lenders.
A certification scheme for green buildings and retrofit projects, across all tenures, could stimulate demand and investment.

Real-Economy Outcome: A pan-tenure certification scheme that dovetails with other existing labels and taxonomies could increase capital flows towards retrofit projects, improve visibility on the pipeline of green investment opportunities, and enhance the consistency of green investments in the building sector.

Delivery Partners include:

- ESG certification bodies
- Impact investors
- Institutional investors
- Real estate specialists
- Social-rented and private-rented landlords
- Trade associations

Policy levers to support demand and scale-up:

- Clear mandatory energy and carbon performance standards for social housing to meet by 2030 and beyond
- Long-term clarity on the trajectory for MEES to inform landlords and guarantors

Case study for Sustainable Housing labels: Minergie in Switzerland, a gold standard

Minergie is a Swiss building label for new and retrofitted low-energy consumption buildings, providing a quality assurance in planning, construction and operation. To comply with the standard, buildings and retrofits must meet stringent social and environmental standards. Distinctive features of Minergie buildings are that they go beyond energy efficiency to include comfortable and healthy living conditions, have high-quality building envelopes, controlled air exchange, and very low energy consumption with maximum possible use of renewable energies.

Those with homes that comply with the Minergie standard benefit from favourable mortgage conditions, as well as subsidies for retrofit. For instance, Banque Cantonale Vaudoise offers a 0.25% reduction on the interest rate for those purchasing Minergie® certified properties. Similar offers are available from most Swiss lenders. This creates an incentive for prospective homeowners, as well as acting as a quality assurance for the providers of finance.

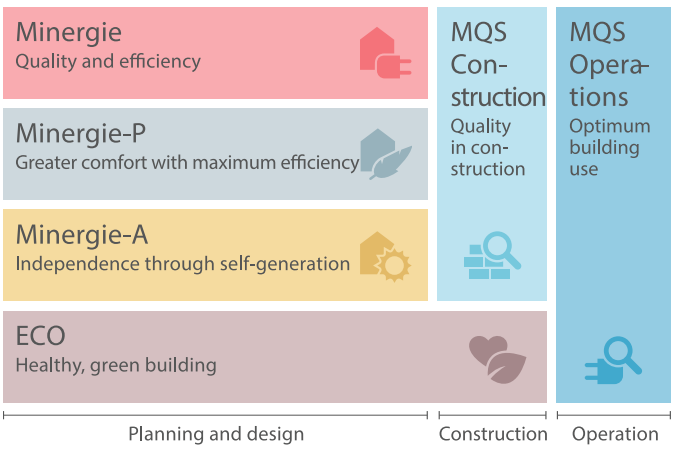

Figure 6: **Scope of coverage of Minergie accreditations** [source: Minergie (2020)]

Demonstrators for owner-occupied homes

Demonstrator 7: **Property Assessed Clean Energy (PACE) financing**

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Lending Product

Overview: Property Assessed Clean Energy (PACE) financing enables homeowners to receive financing to support 100% of the upfront costs for a retrofit project. The liability is secured against the property and repaid through an additional property tax, typically over extended timescales (e.g. 15-25 years) that make repayments more affordable. Importantly, the liability remains with the property if there is a change of ownership. In the US, PACE schemes have mobilised over $5 billion into domestic retrofits and trials, and other 'property-linked' financing mechanisms are being trialled around the world.

Real-Economy Outcome: PACE financing overcomes several traditional barriers to energy efficiency improvements and can unlock demand for retrofit projects, particularly in households with limited debt capacity; for instance, the ability to transfer obligations to subsequent property owners addresses the temporal split incentive, and finance terms of 20+ years improve the investment case for installing measures with long payback periods. Lenders are able to support customers with a low risk financial product, while the aggregation and securitization of PACE loans provides a route to lower cost capital for lenders and homeowners alike.

Delivery Partners include:

- Energy companies
- Energy specialists
- Financial institutions (i.e. banks, securitisation experts)
- Financial regulators
- Government
- Law firms
- Local Authorities
- Retrofit co-ordinators, contractors and installers

Policy levers to support demand and scale-up:

- Legislative amendments to enable Local Authorities to collect PACE repayments via council taxes or business rates
- Leveraging existing frameworks (e.g. Green Deal) to support the operationalisation of a PACE style scheme in the UK
- Financial regulations that ensure robust consumer protections and allow scope for financial innovation

Case study: Focus on Property Assessed Clean Energy 'style' financing

PACE financing in the United States allows homeowners to finance energy efficiency, renewable energy and other eligible improvements on their homes, using private sources of capital to fund the up-front cost and pay the costs back over an extended timeframe. The unique characteristic of PACE loans is that the liability is 'attached' to the home, rather than the homeowner.

PACE schemes are delivering growing impact in the US, where programmes have seen public-private partnerships support 200,000 homeowners to invest $5 billion in energy. The European Union has been exploring this financial model through EuroPACE to explore the opportunity for long-term secure repayment of financing to reduce energy consumption, emissions and energy poverty.

EuroPACE has developed a demonstrator with GNE Finance in Olot, Spain, where loans of between EUR 5,000 and EUR 100,000 are open for application and recorded in the property registry. A notary deed secures a title against the homeowner's assets in case of default.

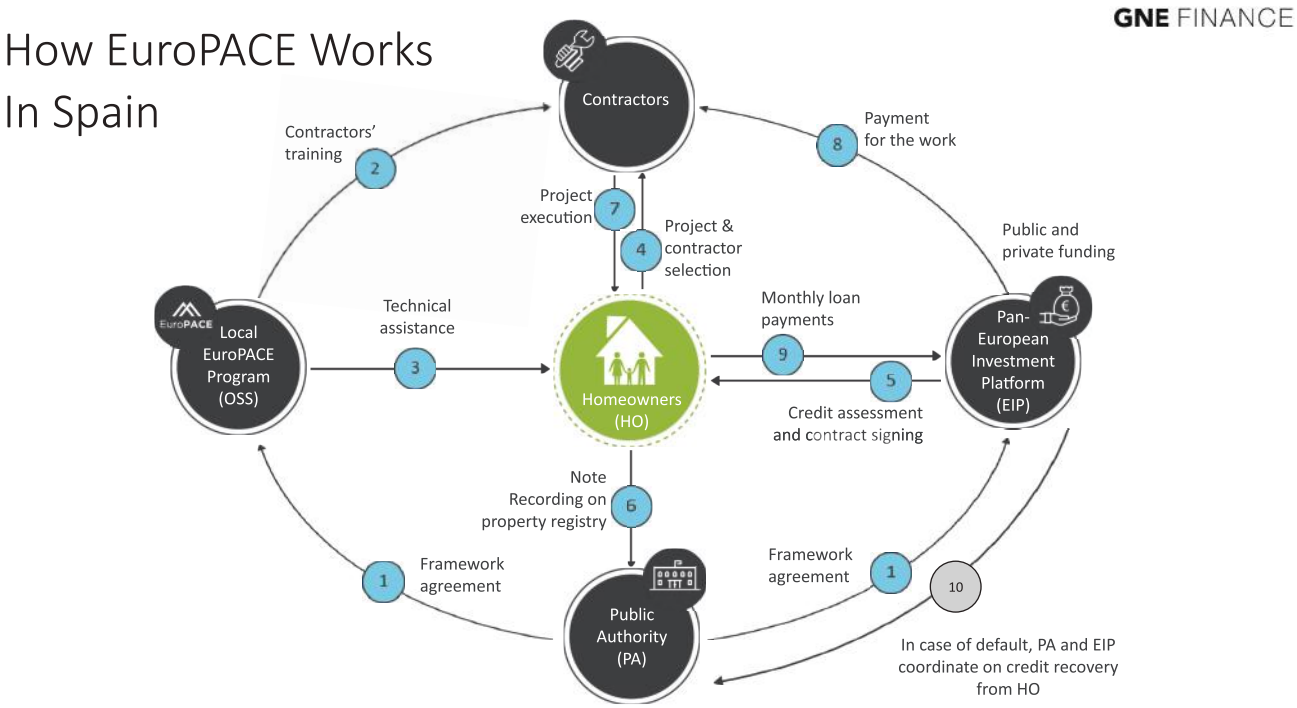


Figure 7: **How EuroPACE Works in Spain** [source: GNE Finance (2019)]

Demonstrator 8: **Green Equity Release**

OO | PRS | SRS

Lending Product

Overview: Equity Release allows homeowners over the age of 55 to unlock the equity in their property without the requirement to move home. A Green Equity Release product would unlock cash for investment into energy efficient improvements, with favourable terms to incentivise retrofit and the ability to protect the property's value for posterity.

Real-Economy Outcome: Green Equity Release offers a route for owner occupiers aged +55 years, with potentially limited access to alternative sources, to finance energy efficiency improvements to their home. Prior to the Covid-19 crisis the equity release market was experiencing record-high activity, therefore coupling building retrofits with the UK economic recovery could kickstart the Green Equity Release market.

Delivery Partners include:

- Consumer advocacy groups
- Mortgage lenders (i.e. banks, equity release specialists)
- Financial regulators
- Institutional investors
- Retrofit co-ordinators, contractors and installers
- Surveyors
- Trade associations

Policy levers to support demand and scale-up:

- Financial regulations that ensure robust consumer protections, align with PAS2035 standards and allow scope for financial innovation

Demonstrator 9: **Help to Green Equity Loan**

OO | PRS | SRS

Lending Product

Overview: A 'Help to Green' Equity Loan would enable homeowners to borrow against the equity in their property to invest into energy efficiency improvements, for which the Home Energy Efficiency for Scotland Equity Loan pilot offers a template. In addition, if the UK Government supported Help to Green Equity Loans for first-time buyer deposits towards the purchase of existing (rather than newly-built) homes that meet energy efficiency criteria, either pre- or post-sale, then favourable borrowing terms could be offered such as interest-free periods, whilst lenders could leverage the existing operational infrastructure of the Help to Buy scheme.

Real-Economy Outcome: Government support for a Help to Green scheme could increase awareness and unlock demand for energy efficiency improvements amongst households with limited investable capital (e.g. lower income, first-time buyers). The scheme could be structured to crowd in private investment alongside public capital and stimulate job creation in the retrofit sector.

Delivery Partners include:

- Financial intermediaries
- Financial regulators
- Mortgage lenders (i.e. equity loan specialists)
- Government
- Institutional Investors
- Trade associations

Policy levers to support demand and scale-up:

- Legislative amendments to expand the 'Help to Buy' mechanism to support retrofit projects on existing homes and the purchase of existing homes that meet specific efficiency criteria
- Mandating that Help to Green renovations are conducted by TrustMark endorsed contractors
- Increased spending requirement in private-rented properties that fail to meet MEES, if the landlord has a minimum percentage of equity in the property

Demonstrator 10: **Add-to-my-Mortgage platform**

OO | PRS | SRS

Lending Product

Overview: A Further Advance, or additional borrowing on an existing mortgage, is a simple route for many households to access finance for energy efficiency improvements. The Add-to-my-Mortgage digital platform aims to streamline the process for homeowners to apply for a Further Advance at the 'point of sale' of energy efficiency measures.

Real-Economy Outcome: Availability of 'point-of-service' financing can increase sales by 32% and easily link into broader repair, maintenance and investment (RMI) activities in the home. As homeowners typically postpone moving home and improve their property during a downturn, the platform could compliment and accelerate capital flows in a receptive market.

Delivery Partners include:

- Architects
- Consumer advocacy groups
- Digital specialists
- Financial intermediaries (e.g. mortgage brokers)
- Financial regulators
- Mortgage lenders
- Retrofit co-ordinators, contractors and installers
- Surveyors

Policy levers to support demand and scale-up:

- Increased access to the FCA's Regulatory Sandbox to create a positive environment for business model and financial innovation
- Regulatory support to apply open banking protocols for retrofit financing solutions
- Fiscal incentives for renovation, as recommended by the Green Finance Taskforce
- Clarity on the future of the Renewable Heat Incentive

Demonstrator 11: **Domestic Energy Efficiency Salary Sacrifice Scheme**

OO | PRS | SRS

Lending Product

Overview: A salary sacrifice scheme that allows employees to draw a loan through their employer for investment into home energy improvements, which is repaid via gross salary contributions. The effective discount and ease of access to finance should appeal to employees, while overcoming communication challenges by marketing the scheme through employers who already have existing relationships with the homeowner. Parallels exist in the successful Ride to Work scheme.

Real-Economy Outcome: Increased awareness of retrofit and related financing options, as employers typically maintain strong lines of communication with employees and can position the scheme as a benefit. Consequently, the scheme could stimulate demand from salaried homeowners for home energy improvements.

Delivery Partners include:

- Accountants and related professional bodies
- Employers of scale (e.g. public sector, academia, retail, manufacturing)
- Government
- Retrofit co-ordinators, contractors and installers

Policy levers to support demand and scale-up:

- Energy efficiency and other green home improvements need to be made permissible under salary sacrifice schemes
- Use of public money may require a managed list of approved equipment and suppliers, plus auditable measures of effectiveness

Demonstrator 12: **Comfort as a Service**

OO | PRS | SRS

Energy Service Product

Overview: The construction or refurbishment of homes to high energy performance standards, with energy controls that support remote optimisation of the building performance, can deliver significant energy savings that outweigh the cost of home energy optimisation. Financial mechanisms that unlock these cashflows can support the investment case for housebuilders and homeowners to achieve high efficiency standards.

Real-Economy Outcome: Commercial and scalable models that offer a cost-effective mechanism for housebuilders to construct, or homeowners to retrofit, a property to high energy performance standards will help overcome the 'efficiency premium' associated with energy efficient new builds, thereby supporting demand for energy efficient homes.

Delivery Partners include:

- Business innovation specialists
- Data specialists and aggregators
- Energy companies
- Financial institutions
- Financial regulators
- Housebuilders
- Retrofit co-ordinators, contractors and installers

Policy levers to support demand and scale-up:

- Increased access to the FCA's Regulatory Sandbox to create a positive environment for business model and financial innovation
- Amendment to qualifying criteria for the Renewable Heat Incentive (RHI) rules to include leased heating equipment

Demonstrators for private-rented homes

Demonstrator 13: **Green Leases**

OO | PRS | SRS

Tenancy Agreement

Overview: Green Leases with an 'Energy Alignment Clause' enable landlords to recover the cost of a retrofit, based on the predicted energy savings of the retrofit measures. To protect tenants against underperformance and allow them to also benefit from the retrofit, only 80% of annual predicted savings are passed through to the landlord, offering a 20% performance buffer. Similar models have been successfully piloted for commercial tenancies in New York state.

Real-Economy Outcome: An 'Energy Alignment Clause' reduces the landlord-tenant split incentive by allowing landlords to recoup the upfront investment over time, while tenants benefit from a small yet meaningful reduction in their energy bills. This could drive greater proactivity on energy performance improvement to private-rented portfolios and accelerate renovation ahead of MEES regulations.

Delivery Partners include:

- Data specialists
- Energy companies
- Energy specialists
- Law firms
- Letting and managing agents
- Trade associations

Policy levers to support demand and scale-up:

- Standard framework or methodology to calculate the predicted energy savings
- Review the compatibility of Green Leases with the Tenant Fees Act and other relevant legislation
- Fiscal incentives to further incentivise landlords to retrofit beyond current MEES standards, such as a renewal of the Landlord Energy Saving Allowance

Demonstrator 14: **Minimum Energy Efficiency Standards (MEES) Compliant Funding**

OO | PRS | SRS

Energy Service Product

Overview: An energy performance guarantee would allow private-rental landlords to procure long-term compliance with MEES requirements. The landlord would pay an ongoing service charge or premium to the guarantor, who would cover the capital investment required to retrofit the property should MEES regulations be tightened. Similar models are adopted for landlord boiler insurance and energy performance contracting models.

Real-Economy Outcome: Energy performance guarantees enable landlords to achieve MEES standards in a cost-effective manner over the duration of the guarantee policy, which could appeal from amateur landlords through to large corporate portfolios and institutional investors. Furthermore, if combined with Building Renovation Passports it could support growth in the market for deep and staged retrofits.

Delivery Partners include:

- Corporate landlords
- Financial regulators
- Institutional investors (e.g. insurance companies and guarantee providers)
- Retrofit co-ordinators, contractors and installers
- Trade associations

Policy levers to support demand and scale-up:

- Long-term clarity on the trajectory for MEES to inform landlords and guarantors
- Financial regulation to ensure adequate consumer protections
- Fiscal incentives including a renewal of the Landlord Energy Saving Allowance
- A standardised methodology to underpin Building Renovation Passports

Demonstrator 15: **Energy Saving ISAs**

OO | PRS | SRS

Saving & Investment Product

Overview: Private-rented tenants are typically unaware of the financial benefits associated with energy efficiency measures, therefore have limited incentive to request energy improvements from their landlord. An Energy Saving ISA, which directs energy bill savings into an ISA or savings product following the retrofit of a private-rented property, could help tenants build up their savings for a mortgage deposit or other investments.

Real-Economy Outcome: Energy Saving ISAs create an incentive for rental tenants to proactively drive engagement and action by landlords to improve the energy performance of their properties, leading to more organic MEES compliance.

Delivery Partners include:

- Data specialists
- Energy companies
- Financial institutions (e.g. banks, building societies, investment managers)
- Government
- Letting and management agents
- Trade associations

Policy levers to support demand and scale-up:

- Regulatory amendments to support the redirection of energy savings into the Energy Saving ISA
- Financial regulations that ensure robust consumer protections and avoid unintended consequences
- Clear guidance for landlords to establish 'warm rent' tenancy agreements that are simpler to operationalise

Demonstrator 16: **Long-Term Retail Investment**

OO | PRS | SRS

Saving & Investment Product

Overview: Crowdsourcing investment for community-based renewable energy projects has grown in popularity over recent years. An investment product could be structured that allows retail investors to provide capital for retrofits and receive predictable long-term returns from energy efficient private-rented properties.

Real-Economy Outcome: Structuring a product that links retail investors to retrofit projects in the private-rented sector, offering attractive and long-term returns, could help crowd in alternative sources of investment and expand the pipeline of eligible projects. The potential scalability of such an offering is significant – there is no lack of investment need in the UK's housing stock and £60-80 billion is saved through ISAs alone each year – providing much needed capital for energy efficiency projects, particularly those where energy savings and performance are assured.

Delivery Partners include:

- Consumer advocacy groups
- Financial institutions (e.g. investment managers and platforms)
- Financial regulators
- Retrofit co-ordinators, contractors and installers
- Trade associations

Policy levers to support demand and scale-up:

- Financial regulations that support retail investment products with appropriate consumer protections
- Include these opportunities in tax-free investment envelopes

Demonstrators for social-rented homes

Demonstrator 17: **Community Municipal Bonds**

OO | PRS | SRS

Saving & Investment Product

Overview: The model for Community Municipal Bonds – developed by Abundance Investments – utilises a crowdfunding approach to create an efficient, scalable and cost-effective alternative source of funding for Local Authorities, moving beyond conventional sources such as the Public Works Loan Board. The capital raised from retail and social impact investors can be directed towards climate emergency activities, such as the retrofit of social housing.

Real-Economy Outcome: Community Municipal Bonds create a powerful new model for Local Authorities to engage with citizens as investors, thereby raising capital and awareness among the local community. Widescale adoption of this model offers a financing route for the two-thirds of Local Authorities that have declared a climate emergency and could foster a new community investment culture for retail investors.

Delivery Partners include:

- Community influencers
- Independent Financial Advisors
- Impact investors
- Institutional investors
- Local Authorities
- Social-rented landlords (i.e. housing associations, RSLs, arms-length management organisations)

Policy levers to support demand and scale-up:

- Grant support for local authorities producing template documentation for issuances and communicating offers to local residents
- Review of the guidance and framework on hypothecating funds for particular purposes, which is currently a barrier to financing certain activities

Demonstrator 18: **Insurance-backed Comfort Plans**

OO | PRS | SRS

Energy Service Product

Overview: The Energiesprong model, and other forms of deep retrofit, can offer guarantees of carbon savings and a household comfort for up to 30 years. Currently, the 'Comfort Plans' rely on recourse to the retrofit contractor or installer if the retrofit measures underperform and fail to deliver the guaranteed savings. An insurance-backed guarantee mechanism for the Comfort Plans could increase confidence amongst early adopters, such as Housing Associations, while improving the financing available for deep retrofit projects.

Real-Economy Outcome: An insurance-backed guarantee mechanism will increase the certainty cashflows associated with energy savings, thereby enhancing the risk dynamics of individual projects and improving the access and cost of financing from sources of private capital. An attractive financing solution for scaled and deep retrofit, where social landlords have certainty on the benefit for tenants, could also drive growth in the supply chain and create economies of scale that support retrofits across all tenures.

Delivery Partners include:

- Consumer advocacy groups
- Energy companies
- Financial institutions (e.g. banks, alternative corporate lenders)
- Institutional investors (e.g. insurance companies, pension funds)
- Local Authorities
- Social-rented landlords
- Retrofit co-ordinators, contractors and installers

Policy levers to support demand and scale-up:

- Increased access to the FCA's Regulatory Sandbox to trial the guarantee mechanism to support Comfort Plans
- Delivery of the commitment to a Social Housing Decarbonisation Fund of £3.8 billion over ten years could be used to pump-prime the market for this type of renovation model to lower costs

Demonstrator 19: **Government Guaranteed Social Housing Finance**

OO | PRS | SRS

Guarantee Mechanism

Overview: The retrofit supply chain has not reached a stage of maturity where it can deliver the UK's net-zero targets with consistent high quality and affordability. The ambition and scale of the social-rented sector offers a valuable base to develop the supply chain to meet the needs across all tenures; a guarantee mechanism to support deep retrofits in the social-rented sector, underpinned by the UK government, could improve the economics for scaled projects and stimulate demand, consequently driving growth in the supply chain.

Real-Economy Outcome: A government-supported guarantee could alter the risk profile of deep retrofit projects, positively impacting the availability and cost of capital from private sector sources. This could stimulate demand for scaled retrofit projects to social-rented property portfolios, thus driving growth along the retrofit supply chain and unlocking economies of scale that benefit all tenures. Furthermore, the creation of skilled jobs would contribute towards the UK's economic recovery following the COVID-19 crisis

Delivery Partners include:

- Financial institutions (i.e. banks, insurance companies, institutional investors)
- Government
- Law firms
- Social-rented landlords
- Retrofit co-ordinators, contractors and installers
- Trade associations

Policy levers to support demand and scale-up:

- Legislation to enable a government-supported guarantee mechanism
- Energy and carbon performance standards for social housing to meet by 2030 and beyond
- Delivery of the commitment to a Social Housing Decarbonisation Fund of £3.8 billion over ten years to contribute towards supply chain development
- Full and swift implementation of the remaining Bonfield Review recommendations, including grant-aiding for first-line advice to certify the quality of installations

Demonstrator 20: **Leaseholder Financing**

OO | PRS | SRS

Lending Product

Overview: At present, widescale retrofit programmes by social-rented landlords can experience challenges if private leaseholders own a property in a block of flats or a row of terrace housing, typically purchased through the Right to Buy scheme. If an attractive financing offer was available to private leaseholders, via the social landlord or related intermediaries, this could foster positive engagement and consent for multi-property retrofit projects.

Real-Economy Outcome: Offering a simple and attractive finance solution to private leaseholders – of whom 37% of in England and Wales live within social housing areas – could help overcome a major barrier to multi-property renovations, with the potential to reduce capital and energy costs for all parties.

Delivery Partners include:

- Advisory services (e.g. Leasehold Advisory Service, Tenant Participation Advisory Service)
- Consumer advocacy groups
- Financial institutions
- Local Authorities
- Social-rented landlords
- Tenant associations

Demonstrator 21: **Affordable Rent, Affordable Living**

OO | PRS | SRS

Tenancy Agreement

Overview: The current definition of 'affordable rent' has little recognition of energy costs incurred by tenants, meaning affordable rent may not equate to affordable living due to high energy bills. Adjusting the 'affordable rent' definition to include modelled energy costs would incentivise landlords to deliver properties where tenants can afford the combined cost of rent and energy bills.

Real-Economy Outcome: If fully embraced, this approach has the potential to end fuel poverty in social housing and leave no one unable to afford energy costs on top of rent payments; by incentivising large-scale comprehensive retrofits, this creates economies of scale that can bring supply chain costs down for all.

Delivery Partners include:

- Consumer advocacy groups
- Government
- Local Authorities
- Social-rented landlords
- Tenants associations

Policy levers to support demand and scale-up:

- Redefinition of 'affordable rent' by the Department of Work and Pensions to include energy costs
- Fiscal incentives for landlords to adopt the new definition on a voluntary basis before the legislative amendments are formalised

Driving systemic change

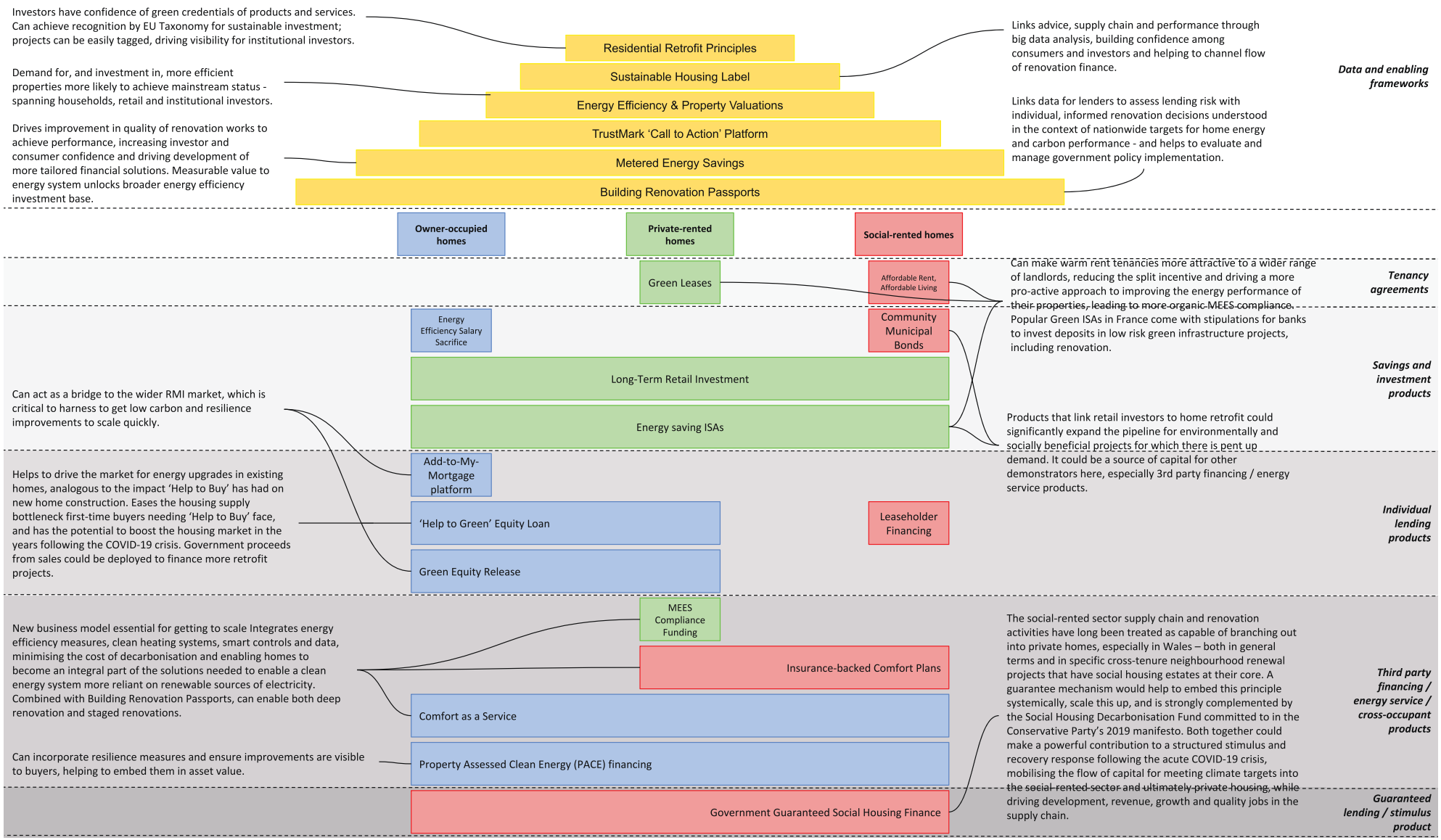
How a concerted energy efficiency effort across government and industry can meet many of the criteria for economic recovery, while meeting existing long-term policy commitments and targets.

Driving systemic change

Systemic change to mobilise the flow of capital into upgrading our housing stock to be 'future-ready' requires a step-change in how finance, government, supply chain and households work together around the shared ambition for net-zero emissions and climate-safety.

The following sections illustrate some of the system-wide impacts of the demonstrator initiatives introduced above, and present policy recommendations that would stimulate renovation demand and scale-up across, and beyond, the portfolio's scope. Taken together, these highlight how a concerted energy efficiency effort across government and industry can meet many of the criteria for economic recovery, while meeting existing long-term policy commitments and targets.

Portfolio Impact



Policy recommendations

The overall government ambition for, and pace of change in, the decarbonisation of homes currently falls short of addressing the net-zero challenge. At the same time, financial flows into low carbon and resilience upgrades to our homes are insufficient to weather the future. For the challenge to be met, the government needs to act alongside the Coalition, to help overcome regulatory barriers faced by individual demonstrator initiatives and enable systemic change to drive the investment needed to flow into homes at the speed required. The first step is to establish a **common goal for all homes to achieve EPC C by 2030,** in line with England's fuel poverty targets, around which the finance industry, supply chain, homeowners and tenants can coalesce.

Alongside tackling carbon emissions and fuel poverty, upgrading the energy efficiency of our homes corresponds well with three essential criteria for stimulating and rebooting the economy in response to the coronavirus pandemic. First, homes across the whole country need to be improved, supporting 100,000s of skilled workers in the hard-hit construction industry, especially in areas already facing higher levels of unemployment and higher energy bills: **this supports the goal of 'levelling up' infrastructure and opportunity across the UK.** Second, energy efficiency upgrades are quick to get off the ground, meaning **investment can be stimulated rapidly** – particularly if energy efficiency stimulus is deployed via delivery mechanisms and supply chains already in place under the Energy Company Obligation, through social housing providers or schemes in the devolved nations. Third, energy cost savings for households can translate into increased consumer spending, particularly on local goods and services, thereby supporting the wider recovery.

Embedding energy efficiency and resilience investment into the wider fiscal stimulus and economic recovery plan should be a top priority for the government. Plans do not need to be drawn up from scratch – existing delivery routes can be built on. In addition, **manifesto commitments on home energy efficiency can be implemented via the forthcoming Infrastructure Strategy and subsequent Spending Review,** such as the a £3.8 billion Social Housing Decarbonisation Fund and £2.5 billion Home Upgrades Grant, and need to extend to 2030. Correctly designed, these will go a long way to drive the systemic changes to help mobilise capital, which the portfolio of demonstrators presented in this report also aims to secure; for example, scaling up a supply chain that delivers quality and performance while driving down cost, and enabling rapid heat decarbonisation. To this latter end, the Coalition is keen to explore with government the potential for a **loan guarantee mechanism** for at-scale retrofit projects to develop the supply chain, anchored in social housing.

To go beyond low income households and **unlock private investment** from those who are able to pay for energy efficiency upgrades – the main target (by volume) of Coalition members' development of new financial products – **new regulatory, fiscal and information measures are needed to stimulate demand. Clarity on the long-term MEES requirements** for the rented sectors is urgently needed to motivate landlords and the supply chain to plan and invest. **New MEES for owner-occupied homes** that mitigate the risk of a two-tier market would provide the clearest signal to homeowners of the need to upgrade their homes. Complementing this, **fiscal incentives for private homes are needed,** for example a Landlords Energy Saving Allowance and Stamp Duty or Council Tax-linked rebates that reward owners of efficient and resilient homes. Alongside this, the government should build on EPCs via their ongoing review, and related data architecture to develop a **standardised methodology and framework for Building Renovation Passports** – this is critical to enable informed homeowner choices and build investor confidence.

Existing policy, existing commitments, new incentives and information frameworks – in parallel with the Coalition's portfolio of demonstrators – must form an integral part of the developing response and recovery from the coronavirus pandemic, 'levelling up' infrastructure and opportunity across the UK, rapidly stimulating investment and local consumer spending, while contributing towards net-zero, fuel poverty targets and healthier, more resilient places to live.

Conclusion:

a decade of recovery and regeneration

The Coalition's work to develop the market for financing net-zero carbon and climate-resilient buildings will play an important role in the run up to COP26 and beyond.

Conclusion: a decade of recovery and regeneration

This decade will be defined by our collective response to the twin crises of climate breakdown and the coronavirus pandemic. The finance sector will play a crucial role in providing the capital required to deliver an impactful and inclusive response, in partnership with government.

While the housing sector will be heavily impacted by the Covid-19 health crisis, it also represents a critical component for regenerating our economy and meeting the UK's net-zero ambitions. Coordinated and collaborative action is required to stimulate the market and reduce carbon emissions, currently at 20% of the UK's total emissions, to achieve our 2050 target.

The Coalition for the Energy Efficiency of Buildings, convened by the Green Finance Institute, is working to develop the market for financing net-zero carbon and climate-resilient buildings in the UK by accelerating the pace of financial innovation. This report has presented the findings of the Coalition's 52 member organisations to date: assessing the market for energy efficiency improvements in UK homes and identifying specific initiatives where financial services and government can bridge investment gaps and drive systemic change.

Coalition members have already started to develop and launch a portfolio of scalable 'demonstrators' of financial and finance-enabling solutions, working alongside international partners to adopt and share best practices. There are huge opportunities for positive and mutually-reinforcing synergies between the demonstrators presented in this report.

Importantly, innovations on data and industry-recognised standards can establish a firm foundation upon which to develop many financial products.

Clear and ambitious policy signals provide a roadmap for the financial services and other sectors to navigate the journey towards low-carbon housing. In the wake of the coronavirus crisis, a green and just stimulus package will be essential to support the UK Government's commitment to the Paris Agreement. The availability of public finance to support scaled and ambitious retrofit programmes could help unlock economies of scale across the supply chain costs, thereby making investments in home decarbonisation and resilience more attractive for consumers and the private finance sector. This could build upon existing policy and manifesto commitments to increase the energy efficiency of homes and address fuel poverty.

In the aftermath of the coronavirus pandemic, mobilising finance towards the deep retrofits required for the UK's housing stock can unlock both environmental and social benefits as part of the UK's economic recovery. The Coalition's work to develop the market for financing net-zero carbon and climate-resilient buildings will play an important role, both in the run up to COP26 and in the years beyond.

Bibliography

BEIS (2019) ***Fuel poverty detailed tables*** 2019. [Online]. Available from: *https://www.gov.uk/government/statistics/fuel-poverty-detailed-tables-2019* [Accessed: 20 April 2020].

BEIS (2019) ***Green Finance Strategy: Transforming Finance for a Greener Future.*** [Online]. Available from: *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf* [Accessed: 20 April 2020].

BEIS (2020) ***Household Energy Efficiency Statistics,*** detailed report 2019. [Online]. Available from: *https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-detailed-report-2019* [Accessed: 20 April 2020].

BEIS (2019) UK becomes first major economy to pass net zero emissions law. ***GOV.UK.*** [Online]. Available from: *https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law* [Accessed: 20 April 2020].

BEIS (2019) ***Updated energy and emissions projections: 2018.*** [Online]. 2019. GOV.UK. Available from: *https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2018* [Accessed: 21 June 2019].

CCC (2016) ***Fifth Carbon Budget Dataset.*** [Online]. Available from: *https://www.theccc.org.uk/publication/fifth-carbon-budget-dataset/* [Accessed: 21 June 2019].

CCC (2019) ***Progress in preparing for climate change - 2019 Report to Parliament.*** [Online]. Available from: *https://www.theccc.org.uk/wp-content/uploads/2019/07/CCC-2019-Progress-in-preparing-for-climate-change.pdf* [Accessed: 20 April 2020].

CCC (2019) ***Reducing UK emissions - 2019 Progress Report to Parliament.*** [Online]. Available from: *https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/* [Accessed: 20 April 2020].

CCC (2019) ***UK housing: Fit for the future?*** [Online]. *Available from: https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf* [Accessed: 21 June 2019].

ClientEarth (2020) Lawyers put local authorities on notice over climate inaction. ***ClientEarth.*** [Online]. Available from: *https://www.clientearth.org/press/lawyers-put-local-authorities-on-notice-over-climate-inaction/* [Accessed: 20 April 2020].

climateemergency.uk (2020) ***List of Councils who have declared a Climate Emergency.*** [Online]. 6 February 2020. climateemergyency.uk. Available from: *https://www.climateemergency.uk/blog/list-of-councils/* [Accessed: 20 April 2020].

DCLG (2018) ***English Housing Survey,*** 2016-2017: Household Data. [Online]. 2018. UK Data Service. Available from: *https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8386* [Accessed: 20 April 2020].

FT (2020) Building site closures undermine key housing targets. ***Financial Times.*** [Online] 12 April. Available from: *https://www.ft.com/content/7b753e8f-593c-44d9-a6db-4df232bcd96c* [Accessed: 21 April 2020].

Green Finance Taskforce (2018) ***Accelerating green finance: Green Finance Taskforce report.*** [Online]. Available from: *https://www.gov.uk/government/publications/accelerating-green-finance-green-finance-taskforce-report* [Accessed: 21 June 2019].

HM Government (2017) ***The Clean Growth Strategy: Leading the way to a low carbon future.*** [Online]. Available from: *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf* [Accessed: 15 February 2018].

IPCC (2019) ***SR15: Global warming of 1.5°C.*** [Online]. Available from: *https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf* [Accessed: 20 April 2020].

MHCLG (2020) ***English Housing Survey 2018 to 2019: headline report.*** [Online]. Available from: *https://www.gov.uk/government/statistics/english-housing-survey-2018-to-2019-headline-report* [Accessed: 20 April 2020].

MHCLG (2020) ***Live tables on dwelling stock (including vacants), Table 102.*** [Online]. Available from: *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/803934/LT_102.xls* [Accessed: 20 April 2020].

NISRA & DfC (2019) ***Northern Ireland Housing Statistics 2018-19.*** [Online]. Available from: *https://www.communities-ni.gov.uk/system/files/publications/communities/ni-housing-stats-18-19-full-copy.PDF* [Accessed: 20 April 2020].

NRS (2019) ***Estimates of Households and Dwellings in Scotland, 2018.*** [Online]. Available from: */statistics-and-data/statistics/statistics-by-theme/households/household-estimates/2018* [Accessed: 20 April 2020].

ONS (2020) ***Output in the construction industry.*** [Online]. Available from: *https://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputintheconstructionindustry* [Accessed: 20 April 2020].

ONS (2019) ***UK private rented sector.*** [Online]. Available from: *https://www.ons.gov.uk/economy/inflationandpriceindices/articles/ukprivaterentedsector/2018* [Accessed: 20 April 2020].

Sayers, P.B., Horritt, M.S., Penning-Roswell, E. & McKenzie, A. (2015) ***Climate Change Risk Assessment 2017: Projections of future flood risk in the UK.*** [Online]. Available from: *https://www.theccc.org.uk/wp-content/uploads/2015/10/CCRA-Future-Flooding-Main-Report-Final-06Oct2015.pdf.pdf* [Accessed: 20 April 2020].

Statistics for Wales (2019) ***Dwelling Stock Estimates for Wales, as at 31 March 2019.***

Sustainable Homes (2016) ***Touching the Voids: The impact of energy efficiency on social landlord income and business plans.*** [Online]. Available from: *https://www.passivhaustrust.org.uk/UserFiles/File/PH%20Social/touching-the-voids---Sustainable%20Homes.pdf* [Accessed: 21 April 2019].

Unite (2020) ***Government must extend wage assistance to help construction's million plus bogus self-employed.*** [Online]. Available from: *https://unitetheunion.org/news-events/news/2020/march/government-must-extend-wage-assistance-to-help-constructions-million-plus-bogus-self-employed/* [Accessed: 21 April 2020].

Appendix 1/

Acknowledgements

Appendix I / Acknowledgements

Members

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Abundance Investments
AddToMyMortgage.com
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CMS
Countrywide
Centre for Research into Energy Demand Solutions
Department for Business, Energy & Industrial Strategy
DWS
E3G
Ecology Building Society
Energiesprong UK
Energy Efficiency Infrastructure Group
Energy Saving Trust
Energy Systems Catapult
EnergyPro
Engie
Eversheds Sutherland
Gemserv
Greater London Authority
Greengage Environmental
Green Place Partners
Grid Edge Estates
ImprovEasy
Knauf Insulation
Leeds City Council
Legal & General
Lloyds Banking Group
Loan Market Association
Ministry for Housing, Communities and Local Government
Monmouthshire Building Society
National Residential Landlords Association
Nationwide Building Society
Nottingham City Homes
Paragon Bank
Parity Projects
Phoenix Group
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Appendix II /

Devolved nation energy efficiency programmes

Appendix II / Devolved nation energy efficiency programmes

Northern Ireland

- **Affordable Warmth Scheme:** free home energy efficiency improvements for low income households in owner-occupied or private-rented homes.
- **Boiler Replacement Scheme:** contribution to cost for low income owner-occupiers.

Scotland

- **Area Based Schemes:** local authority-led, area-based free or subsidised energy efficiency improvements for households in all tenures living in areas with high concentration of fuel poverty.
- **Equity Loan:** up to £40,000 for low income owner-occupiers or landlords with low income tenants seeking to install energy efficiency improvements and renewables. Up to 45% of amount borrowed can go towards other home improvements. Repaid upon sale of property. Appreciation of government stake in property capped at 2.5% APR.
- **Home Energy Scotland Loan:** interest-free loans for owner-occupiers of up to £38,500 for home energy efficiency improvements, renewables and storage
- **Loan scheme for Registered Social Landlords:** interest-free loans of up to £1m to help RSLs complete energy saving improvements to their housing stock.
- **Private Rented Sector Landlord Loan:** loans for registered private landlords of up to £250,000 (£38,500 per property) depending on number of properties in their portfolio for home energy efficiency improvements, renewables and storage. Interest-free for landlords with up to five properties, otherwise 3.5%.
- **Warmer Homes Scotland:** free home energy efficiency improvements for low income households in owner-occupied or private-rented homes.

Wales

- **Arbed Programme:** area-based renovation anchored to social housing.
- **Nest**: free advice and home energy efficiency improvements for low income households in owner-occupied or private-rented homes.

Appendix III /

Selected further resources

Appendix III / Selected further resources

Household preferences

Energy Systems Catapult (May 2018) *Heat in the Home – Consumer Segmentations*	Data reviewing the motivation of residents in their home for energy efficiency practices.
Home Builder's Federation (January 2020) *Poll on Home Buyers and the Environment*	Polling shows the scale of the challenge faced by the homebuilding sector as it holds a summit to plot a route map to net zero carbon housing and other environmental objectives.

Valuation and energy efficiency

Department of Energy and Climate Change (June 2013) *An investigation of the effect of EPC ratings on house prices*	This report presents the results of an empirical investigation of the relationship between the energy performance ratings, as measured by Energy Performance Certificates (EPCs) and the sale prices of residential properties in England. It is the most comprehensive UK research in this area to date. It indicates that energy efficiency is correlated with higher sale prices of homes in England.

Home lending

Bank of England (January 2020) *Does Energy Efficiency Predict Mortgage Performance?*	"[BoE] analyses suggest that mortgages against energy-efficient properties are less frequently in payment arrears than mortgages against energy-inefficient properties. This result is robust when controlling for other relevant determinants of mortgage default including borrower income and the loan to value ratio of the mortgage. [BoE] conclude that energy efficiency is a relevant predictor of mortgage defaults."
EeMAP (June 2019) *D5.4 Final Report on the correlation between energy efficiency and probability of default*	The report suggests there is a link between the energy performance of buildings and credit default risk regardless of whether energy efficiency is captured via individual energy performance labels or proxies such as property types and construction years. Energy efficient mortgages and loans appear to be less risky than their non-energy efficient counterparts.

Investing in energy efficiency

IEU Joint Research Centre (2019) *Accelerating energy renovation investments in buildings – Financial & fiscal instruments across the EU*	This report provides a country-by-country overview of the most important public schemes identified across the EU, and investigates new private financial products in place to stimulate more energy efficiency investments in residential, commercial and public buildings.
G20, UNEP FI, IEA, IPEEC (2017) *G20 Energy Efficiency Investment Toolkit*	The toolkit provides a voluntary framework and tools for G20 countries to enhance capital flows for energy efficiency investments in their economies.
LSE Grantham Institute (March 2020) *Delivering strong and sustainable growth in the UK: A special decade for innovation and investment*	The report highlights particular areas of the economy where the public sector could leverage private investment and in so doing contribute to achieving the strategic priorities of regionally balanced growth and decarbonisation.

Resilience

Environment Agency, (2020) *Draft National Flood and Coastal Erosion Risk Management Strategy for England*	The report aim was to explore how government and the private sector currently build urban resilience thinking into their infrastructure program.
Lloyds and LSE Grantham Institute LSE (March 2020) *Below 2oC: Insurance for a low carbon economy*	This report provides a strategic overview of the potential effects of the low carbon transition on the general insurance market.

Local government

Infinite Solutions, Energy Cities, City of Delft, Brussels Environment (February 2017) *Financing the Energy Renovation of Residential Buildings through soft loans and third-party investment schemes*	Several cities share their experience of setting up a soft loan financing scheme for residential buildings. Also including Stuttgart's 'care-free energy renovation package' and third-party investment scheme.

National bodies

Energy Efficiency Infrastructure Group (October 2019) *Net-Zero Litmus Test: Making Energy Efficiency a public and private infrastructure investment priority*	This report sets out the benefits of action on energy efficiency and clarifies the risks to the Government and the UK if a step- change in energy efficiency investment is not achieved. It makes clear that energy efficiency's impacts are much broader than greenhouse gas reductions and sets out the benefits that energy efficiency investment will bring to housing and other policy objectives within and across numerous departmental remits.
National Infrastructure Commission (July 2018)2020) *National Infrastructure Assessment*	The National Infrastructure Assessment sets out the National Infrastructure Commission's plan of action for the country's infrastructure, including energy efficiency, over the next 10-30 years.
Committee on Climate Change (May 2019) *Net Zero Technical Report*	The report determines what each UK-wide climate scenario means for each devolved administration, as well as an assessment of whether and when each devolved administration could credibly achieve net-zero domestic emissions.

Supply Chain Maturity

BEIS (February 2019) *Local Supply Chain Demonstrators*	The project aims to mirror approaches taken in other countries to stimulate the able-to-pay market by focusing on addressing non-financial barriers, building skills in the supply chain sector, and providing a joined up/ one-stop shop or 'concierge' service for consumers.

Technology

Energy Systems Catapult, (2019) *Living Carbon Free: Exploring what a net-zero target means for households*	Energy Systems Catapult considers the implications for households of increased ambition across six activities: heat, transport, electricity use, aviation, diet and waste. ESC explores possible actions for decarbonisation and, using pathways set out by the CCC, shows the emissions reduction that can be achieved under different ambition levels.
Energy Systems Catapult, (March 2020), *Innovating to Net Zero*	The Energy Systems Catapult found Net Zero by 2050 is possible if the UK supports innovation and scale-up across three essential areas – Low Carbon Technology, Land Use and Lifestyle. The report modelled 100s of potential pathways to 2050 – ramping up or down different technologies and behaviour changes – to understand the combinations, interactions, and trade-offs of competing decarbonisation approaches.

Data

The Investor Confidence Project	The Investor Confidence Project Europe unlocks access to financing for the building, industry, district energy and street lighting markets by standardizing how energy efficiency projects are developed, documented and measured.
Welsh Government's Implementation Group on the *Decarbonisation of Existing Homes in Wales*	The Welsh government has signalled it will collect data knowledge about the status and condition of the housing stock to inform future decisions and measure progress towards targets. This includes energy consumption data from before and after retrofit activities to inform the measurement of progress, policy development and investment.
TrustMark *data warehouse*	The Data Warehouse aims to address a range of market risks in response to the recommendations of the Each Home Counts review commissioned by Government in 2015 and published in December 2016. The Data Warehouse acts as the industry facing repository of information about work undertaken and the property being improved and a Property Hub to act as the consumer-facing platform where they can access a 'log book' about their property – helping establish who did what and when.