

Unlocking the benefits of building renovation

November 2021



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1 Foreword

Since the EU led the way, the United States, China and other major economies have pledged to achieve net zero emissions, mostly by 2050. But although this is the gold standard of climate commitments, it is not yet having a discernible impact on emissions. Quite the contrary. Greenhouse gas concentrations reached a record high last year, and increased faster than their average annual growth rate over the past decade.

What this suggests to me is that political and public will is outrunning the capacity to implement climate objectives. This is especially true in the buildings sector. Buildings are both the world's most valuable financial asset, worth over €150 trillion, and the biggest source of greenhouse gas emissions. They account for 36 percent of emissions in the EU; 40 percent in the United States; and 42 percent in the UK. And yet building renovation rates in the EU, for example, remain low, at around one percent a year.

One could carve the message in stone: to succeed on climate action, we need energy efficient buildings.

So how do we achieve that goal? This is the question this new report by Cambridge Econometrics seeks to answer. Money is not the problem. While there will always be a debate about the costs of climate action - and hopefully also about the costs of inaction - the fact is that there is plenty of money available for building renovations and other green investments. The issue is connecting the funding sources with the on-the-ground projects.

Renovation itself is not rocket science - it requires using well-known materials and building practices, and that is a big advantage.

The report urges policymakers to develop the long-term renovation programmes that manufacturers need to plan production capacity and properly train more installers; team up with banks to combine public grants and low-interest loans; and set up more 'one stop shops' to help households apply for subsidies and find qualified workers.

None of these measures are particularly headline-grabbing, but they can be game-changing if they are scaled up. And that is what people want. Supplementing this report, ROCKWOOL commissioned public opinion polling in seven countries - Denmark, France, Germany, Italy, Poland, the United Kingdom, and the United States to better understand the level of public demand regarding energy efficient homes and buildings.

The responses were overwhelmingly positive. Overall, 79 percent of respondents said they would renovate their homes if they had the support. And 73 percent said they would support mandatory energy performance standards for buildings, given the right enabling conditions.

In short, there is a strong popular interest and support for making our homes and buildings more energy efficient, but we need to avoid the allure of supposed quick-fixes. It may be a cliché, but it is also true - the cheapest, cleanest and safest energy is that which we do not use. If we prioritise renovation, we send a clear message that we are investing in the future of people and our planet. And that is a winning formula that we can act on now.



Jens Birgersson
President & CEO, ROCKWOOL Group

2 Executive summary

As world leaders prepare to meet in Glasgow for COP26, the pressure is on to decarbonise all parts of the global economy in order to limit the scale of climate change. And whilst there is no silver bullet, there are changes required across the economy, without which reaching net zero will be impossible.

Decarbonising the built environment is one such requirement. In 2020 buildings accounted for around 28% of total global energy-related emissions¹, whilst in the EU building-related emissions stand at 36%². These figures reach 40%³ in the US and 42%⁴ in the UK.

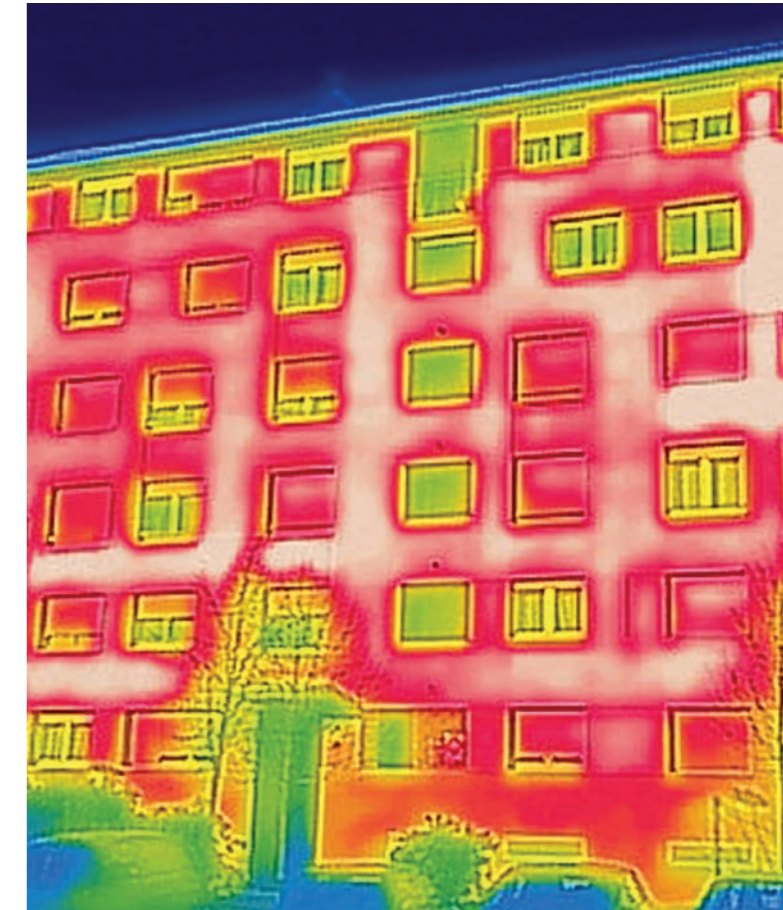
Governments have long understood the substantial contribution buildings make to overall emissions and have made efforts to reduce their impact over the past three decades through state-led retrofitting incentives. Yet these efforts have largely been piecemeal and have failed to drive renovation at sufficient scale.

Calls from industry, environmental and fuel poverty campaigners to address building performance have spurred a recent wave of funding commitments, including the EU Recovery funds and the UK's Green Homes Grant Scheme (GHGS). Yet the GHGS, launched in 2020, was scrapped after only a matter of months due to administrative problems. And the EU has yet to flesh out a plan for matching renovation money with building renovation projects, while in the US there is no comprehensive federal programme to support the scale of retrofits needed.

The common challenge is how to translate money into action - to ensure that retrofitting schemes operate smoothly, drive renovation at pace and at scale, and deliver buildings fit for the future.

This report seeks to break new ground in tackling this delivery challenge, working across silos with 40 international renovation experts including policymakers, industry leaders and financial institutions, pursuing solutions that will unlock the benefits of building renovation.

Alongside this, polling conducted by OnePoll in the UK, US and EU has produced new insights into consumer appetite, understanding and awareness of home retrofitting.⁵ The results are summarised below.



The common challenge is how to translate money into action - to ensure that retrofitting schemes operate smoothly, drive renovation at pace and at scale, and deliver buildings fit for the future.

¹ Buildings GSR_Executive_Summary FINAL_0.pdf (globalabc.org)

² Renovation Wave (europa.eu)

³ Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)

⁴ Climate change - UKGBC - UK Green Building Council

⁵ Survey of 14,000 people, September 2021, OnePoll



79%
 would make their homes
 more energy efficient if they
 had the means to do so*
 *See Polling results

Polling results

Consumer appetite for retrofitting is extremely high:

- An average of 79% of respondents across the UK, US, France, Germany, Italy, Poland and Denmark would make their homes more energy efficient if they had the means to do so.
- Across the countries surveyed, 73% of respondents would also support mandatory energy efficiency improvements if there was financial support, renovation advice and information on where to find qualified contractors to do the work.

Energy efficiency is a major influence in choosing property:

- 79% cited energy efficiency ratings as an important factor when buying property or moving home.
- 81% believe it is important that buildings in general (including homes, offices, schools and hospitals) are energy efficient.

Finances are a major driver and barrier:

- People are motivated by potential energy bill savings, with 62% of respondents citing this as a driver to understanding energy efficiency improvements.
- Meanwhile 51% cite cost as a barrier to undertaking works, with 53% choosing grants as a preferred incentive and 30% welcoming the idea of local/council tax rebates.

Consumers need access to more information and support:

- 45% of respondents said they were 'somewhat' aware of the personal finance benefits of energy efficiency improvements to their homes, whilst 38% were not very aware or not aware at all.
- Similarly, only 11% felt knowledgeable about how to apply for funding, seek advice on what to do, and find qualified contractors.

Policy solutions

The analysis highlights a number of ways in which policy can address existing problems and accelerate the rate and depth of building renovation globally.

A framework fit-for-purpose

- Above all, a lack of coherent and long-term renovation programmes is holding work back and creating uncertainty for industry and consumers.
- Coordination across actors is key. Policymakers would benefit from greater collaboration with industry, financial institutions, citizens and local authorities to design better renovation programmes that ensure all actors have the resources they need.
- A variety of financial incentives tailored to tenure, affordability and building type are needed alongside gradual uplifts in minimum energy efficiency standards.

A focus on outcomes

- The worst performing buildings should be tackled first, whilst resources should be directed towards deep renovation projects over high-volume, light-touch measures.
- Quality standards underpinning renovation programmes also need to be sufficiently robust yet proportionate to overcome barriers associated with consumer trust.

Enabling delivery

- Substantial investment in programme administration is needed to ensure schemes run effectively and deliver results.
- Local government needs support to strengthen its administrative capacity and technical knowledge so that it can help roll out delivery.
- Policymakers and industry should work together to forecast the renovation pipeline to support investment in supply and skills and avoid delivery bottlenecks.
- Investment is needed in workforce training to attract and upskill labour, focusing not only on practical skills but also developing knowledge on the benefits of improved energy efficiency and customer support.

Communicating with consumers

- Impartial awareness and information campaigns are needed to encourage renovation, with a focus on benefits that resonate with building owners.
- One-stop shops should be created to ensure a smooth and seamless consumer journey, alongside tailored support that addresses the varied needs of households across different tenures and building types.

3 Introduction

3.1 The role building renovation plays in reaching net zero

The Paris Agreement and net zero

The world is facing a climate emergency. Globally, governments are under pressure to decarbonise all parts of their economies, and many have set decarbonisation targets linked to the 2015 Paris Agreement. Following the 2018 Intergovernmental Panel on Climate Change (IPCC) report concluding that emissions need to reach net zero by 2050, an increasing number of countries have also pledged to achieve net zero by 2050 or earlier and are developing pathways to do so.

The role of building renovation in decarbonisation

In 2019 the buildings and construction sector accounted for the 38% of energy and process-related CO₂ emissions globally - with buildings alone responsible for 28%⁶. In the EU building-related emissions stand at 36%⁷, reaching 40%⁸ in the US and 42%⁹ in the UK. Although the energy intensity of the buildings sector has been decreasing steadily, total emissions from buildings have been rising, as new buildings are increasing emissions more rapidly than overall efficiency gains are reducing them. Consequently, buildings-related CO₂ emissions rose to an all-time high of 10 GtCO₂ in 2019 (IEA, 2020).

Decarbonising the building sector through implementing energy efficiency measures and the use of low-carbon heating can clearly play a huge role in helping individual countries meet their net zero targets. Emissions associated with heating homes also make up a large share of households' total carbon footprint (Energy Saving Trust, 2020) - often a larger share than from any other source of emissions such as use of a car, taking flights or using electricity.

Improving the energy efficiency of a home through renovation measures such as insulation can therefore make a substantial contribution to a household's efforts to live a greener and more environmentally friendly life, alongside creating more comfortable homes at a more affordable running cost, and potentially increasing the value of the property (Hyland et al., 2013; Jensen et al., 2016).

There are also wider societal benefits to retrofitting, including reduced energy poverty, improved health and well-being, and greater educational attainment possibilities. Building renovation is also beneficial for the economy, creating additional, mostly local, jobs within SMEs and economic activity in sectors such as manufacturing and construction (Cambridge Econometrics, 2021; European Commission, 2016).

The role of building renovation in a COVID-19 economic recovery

Many of these benefits are particularly pertinent in light of the COVID-19 pandemic and subsequent economic recovery plans. Globally, governments are prioritising job creation to offset the losses resulting from unprecedented economic downturns, and investment in measures which deliver both green outcomes and green jobs are particularly advantageous.

There are other synergies between the need for increased building renovation and the economic recovery from COVID-19. The pandemic has in many cases exacerbated energy poverty and associated inequality issues. For example, households on low incomes, or households with children, are facing rising energy bills (therefore spending an even higher proportion of their income on heating) because of spending more time in the home. At least 96m Europeans are estimated to be at risk of poverty and social exclusion.

Furthermore, recent rises in gas prices have highlighted how countries can become exposed to volatile international prices, which ultimately lead to higher bills for consumers and can exacerbate energy poverty.

An increased drive by governments to renovate buildings, as part of a green and inclusive post-COVID recovery, presents an excellent opportunity to address some of these inequalities.



⁶ Buildings GSR_Executive_Summary FINAL_0.pdf (globalabc.org)

⁷ Renovation Wave (europa.eu)

⁸ Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)

⁹ Climate change - UKGBC - UK Green Building Council

3.2 The purpose of this study

Many governments recognise the need to reach net zero and the specific role building renovation can play. This has prompted a wave of funding commitments, including the EU's Green Recovery fund and the UK's Green Homes Grant Scheme (GHGS), alongside the availability of private capital.

Yet the GHGS, launched in 2020, was scrapped after only a matter of months due to administrative problems; meanwhile many EU Member States have yet to flesh out plans for matching renovation money with building renovation projects, and in the US there is no comprehensive federal program to support the scale of retrofits needed.

This speaks to a common challenge of how to translate money into action - to ensure that retrofitting schemes operate smoothly, drive renovation at pace and at scale, and deliver buildings fit for the future.

This report reflects independent research carried out by Cambridge Econometrics on behalf of ROCKWOOL Group, in which we have sought to break new ground in tackling this delivery challenge. The research consisted of extensive stakeholder engagement with 40 individuals from a wide range of groups including policymakers, industry representatives, energy efficiency experts, think tanks, advocacy groups and financial organisations, working to consider how factors hindering building renovation might be overcome.

We examine the specific challenges faced in the following geographies:

- US
- UK
- EU
 - o Denmark
 - o France
 - o Germany
 - o Italy
 - o Poland

Parallel research was carried out by OnePoll, who polled citizens in these countries to assess consumer appetite, understanding and awareness of energy efficiency measures and building renovations. The information and insights gathered through the one-to-one interviews with stakeholders and the results of the polling were supplemented by evidence collected via a literature review, with all evidence culminating in the challenges described and solutions suggested within this report. The report is intended to describe to policymakers the potential benefits of accelerated building renovation targets, and potential solutions to overcome the barriers faced by all actors involved with building renovation.



4 Challenges to building renovation

The clear message from the consumer poll carried out as part of this study is that the public want our built environment to be more energy efficient. Not only would 79% make their own homes more energy efficient if they had the means to do so (see table 1 below), but a huge 81% believe it is important that buildings in general, including offices, schools and hospitals, are energy efficient.

Despite this and the overwhelming environmental need to make our buildings more efficient, renovation rates across the EU, UK and US are lagging behind decarbonisation targets.

Through our stakeholder interviews, polling and literature review, a series of common challenges have emerged that shed light on what has been holding building renovation back. Unpicking these issues from both a demand and supply side has been critical to informing the recommended solutions proposed in Chapter 5.

Table 1 If you had the financial support and other resources you needed, how likely would you be to make your current home more energy efficient?

	UK	US	France	Germany	Italy	Denmark	Poland	International Average
Very likely	39%	46%	28%	33%	53%	35%	40%	39%
Somewhat likely	45%	39%	42%	42%	36%	41%	41%	40%
Very likely + somewhat likely	84%	85%	70%	75%	89%	76%	81%	79%
Not very likely	12%	9%	18%	16%	8%	17%	13%	13%
Not likely at all	4%	6%	11%	9%	3%	7%	6%	7%

Source: OnePoll

4.1 Challenges facing consumers

Lack of awareness and information

One of the most substantial social barriers has been the lack of awareness of potential benefits and opportunities associated with energy efficiency improvements. The consumer polling showed that on average, only 17% of respondents considered themselves fully aware of the personal financial benefits of implementing energy efficiency.

This speaks in part to a communications gap, with neither government-led schemes nor private finance options having historically focussed on providing information to building-owners on the benefits of energy efficiency improvements (Green Finance Institute, 2020).

Similarly, where renovation measures entail long pay back periods, this further constrains demand for building owners who may not plan to stay in the property long enough to reap the forecasted financial rewards.

The polling showed that 62% of people considered it their social responsibility to make their home as energy efficient as possible. Yet even if homeowners are conscious about improving their individual carbon footprint, investing in other low carbon measures such as an electric car can be seen as a more exciting and desirable prospect. Consequently, when individuals make decisions about how to spend discretionary income, home energy efficiency improvements are not necessarily a priority.

There are also specific challenges relating to different housing tenures. In the private rented sector, for example, building owners are not motivated to invest in energy efficiency improvements that they perceive as benefitting tenants rather than themselves. Tenants are also discouraged from requesting improvements on the basis that landlords may want to recoup their costs through higher rents.

In the public building sector, municipalities face a lack of detailed information about their building stock and technical systems. And where there is a local inventory of public buildings, in many cases it is incomplete as the information it includes - such as energy consumption, building design, energy audits, previous energy efficiency measures - is insufficient or not properly described (EmBuild, 2017).

Financial barriers

Even when building owners are interested in undertaking retrofits, they often face difficulties financing projects, primarily due to high upfront investment costs. To perform deep renovation, building-owners often rely on loans to finance the renovation work.

Where renovation grants and other support schemes are available, they are not typically geared towards covering the full costs of the works, and building owners may find it difficult to make up the difference. This is especially true for low-income households, which may not have access to sufficient finance to carry out building renovation.

Indeed in the consumer polling, high upfront costs were reported as the major and most common constraint to the implementation of energy efficiency retrofits (see table 2 below).

Table 2 Which of the following would be contributing factors to you not making your home more energy efficient?

	International Average
Cost	51%
Fear of poor quality installation	20%
Avoiding contact because of COVID 19	16%
Not knowing what needs to be done	15%
Hassle to organise the necessary finance (e.g. grants/subsidies)	13%
Fear of unskilled tradespeople	12%
Inconvenience to home living/working	12%
Hassle to organise/locate the necessary workers	11%
Not knowing who to contact to do the work	10%
Impact on the aesthetic of the home	9%
Not knowing how long this may take	8%
Lack of coordination with neighbours (in flats/rows of houses)	6%
None of the above/I wouldn't do this	13%

Source: OnePoll

51%

said cost was a factor in not making their homes more energy efficient

In addition, many individuals are not aware of the financial support available for energy efficiency improvements. The polling revealed that, on average, only 11% of respondents considered themselves very knowledgeable on how to apply for funding support, seek professional advice and find qualified workers. This points to the fact that energy efficiency programmes are often not well promoted and can be difficult to understand and navigate.

Ability to plan works

Furthermore, building owners need coherent, long-term incentives to carry out deep energy renovations in their properties. But most home renovation programmes (for example the Green Homes Grant Scheme in the UK) have short horizons and high administrative burdens, thereby failing to provide compelling incentives for individuals to plan their renovation works.

Energy efficiency improvements can also involve hassle and disruption. Deep renovation work in particular can require legal permission and necessitate cooperation with neighbours, finding reliable contractors, and possibly temporarily vacating the property (Ipsos, 2018).

In addition, industry fragmentation means most providers focus on one aspect of a renovation project, such as window replacement or installing insulation, meaning multiple contractors are needed to complete a renovation project. This makes the process more challenging for building owners to coordinate, and it can also be difficult to secure high quality workers (BEUC, 2020). These organisational challenges are particularly acute for consumers in multi-unit housing, who have to deal with governance issues and decision-making inertia.

4.2 Challenges facing industry

Energy retrofits rely on a combination of materials supply, technological innovation and an available and skilled workforce. A series of intersecting barriers must be overcome by the renovation supply chain to meet the scale of upgrades needed across the built environment.

Skills and capacity

Energy efficiency renovations require skilled contractors and installers across a range of specialities. Additionally, innovative deep renovation techniques can require specialised skills sets that are not readily available – for example in advanced heating, ventilation, and air conditioning systems or smart connectors – and this hinders the wider adoption of promising technologies (D’Oca et al., 2018).

Investment in training is needed, but the uncertainty associated with future renovation programmes means suppliers often lack the confidence to make major investments in training and development.

Meanwhile, construction work is not attracting enough younger workers to counter the advancing gap resulting from an aging (and therefore retiring) workforce.

Similarly, manufacturers cannot be expected to meet a step change in volume requirements for the materials and products needed to upgrade buildings without sufficient time to plan and invest in production. These are all challenges we consider in more detail in Chapter 5, where we propose solutions.

No one-size-fits-all solution

It is difficult to create standard renovation packages as all homes are different. There is no one-size-fits-all package, which creates difficulties for both building owners and suppliers. Suppliers must assess the home to calculate the costs of renovations and to model the various energy efficiency improvement options. Consequently, suppliers invest significant resources into renovation projects even before they are contracted, often with no guarantee they will actually be contracted. As well as differences between homes, there are different types of property owner, each with their own challenges, constraints and access to financial support to navigate.

High administrative burdens

Administrative burdens of home renovation programmes with short deadlines often inhibit suppliers to register. Consequently, applicants can face difficulties in finding a supplier to perform the renovation project funded by the programme. In general, registration for home renovation programmes is often complicated, and suppliers may struggle to deliver all required documents and forms in time.

4.3 Region or country-specific challenges

Key barriers in the EU

The decarbonisation of the European building stock is a key challenge in achieving climate neutrality by the target date of 2050. Currently neither the rates nor the depth of energy renovations are sufficient to accomplish this goal. Last year, the European Commission published a new strategy called ‘A Renovation Wave for Europe’¹¹ that aims to at least double the annual energy renovation rates, and increase renovation depths. It is currently in the process of preparing legislation. A key priority will be to focus as much on implementation as on policy development.

In the EU, two of the most-often quoted challenges faced by building-owners are low awareness of the long-term benefits of renovation and insufficient knowledge of what measures to implement and in which order (European Commission, 2020b).



Moreover, many building owners face great difficulties launching their renovation projects, even if they have the required financing, as they do not know where to start and what to do.

Key barriers in the UK

One major barrier is that the UK is characterised by one of the oldest and least efficient housing stocks, with significant variation in building types as well as tenures adding further complexity.

While it is clear that investment in improving the energy performance of buildings would deliver major benefits, and the Government has set increasingly ambitious national decarbonisation targets, uncertainty has grown over the last decade due to delays in proposing an overarching Heat and Buildings Strategy, and major gaps in policy and incentives to drive energy efficiency retrofits.

Programmes offering support to the ‘able-to-pay’ market such as the 2012 Green Deal and the 2020 Green Homes Grant Scheme have been discontinued due to issues with design and implementation. Meanwhile, on the fuel-poor side of the market, the size of the Energy Company Obligation has steadily decreased.

Unlike other countries, access to private finance is not a major barrier in the UK. However, there is not sufficient workforce capacity to deliver a major ramp up in renovation rates and depth: this directly reflects the lack of a long-term policy framework, which has dented confidence in industry investment in skills and capacity.

Key barriers in the US

In the US there are considerable differences at the state and local level in terms of decarbonisation priorities. While some states like New York and California are dedicated to pursuing ambitious reductions in greenhouse gas emissions, in many other states climate change is not a top priority. In addition, while 45 of the 100 largest U.S. cities have adopted serious climate pledges, two-thirds of these cities are not on track to achieve their targets¹².

Furthermore, within these climate plans there is no standard approach to quantifying energy efficiency within buildings. And although some cities have passed legislation requiring more energy efficient buildings, these types of policies are still the exception, rather than the norm. To complicate matters, there are multiple building codes (fire, energy, construction) which may vary from jurisdiction to jurisdiction and add to the administrative burden and workforce training challenges that many suppliers face. And while there is a federal Weatherization Assistance Program, implementation varies widely across states and localities. Similar to other geographies, there is a lack of knowledge of the benefits of deep energy renovation coupled with little awareness of how to access what financing mechanisms might be available.

¹¹ European Commission, 2020

¹² <https://www.usatoday.com/story/news/investigations/2021/08/10/hundreds-u-s-cities-already-adopted-climate-plans-what-happened/5541049001/>

5 Solutions to enable effective policy implementation

Benefits waiting to be unlocked

Accelerating the rate and depth of building renovation would deliver major benefits for the environment, economy and society. Alongside the building sector's essential contribution to delivering the climate objectives, effective renovation programmes create green jobs (the International Energy Agency estimates that between 12 and 18 jobs¹³ are created for every €1m spent on retrofitting) and economic activity in key sectors such as manufacturing and construction.

Meanwhile, the knock-on impacts of warmer and more affordable homes include reduced energy poverty and improved health and well-being. By extension, this helps governments to address issues of inequality and ensure that the transition to net zero is fair and inclusive.

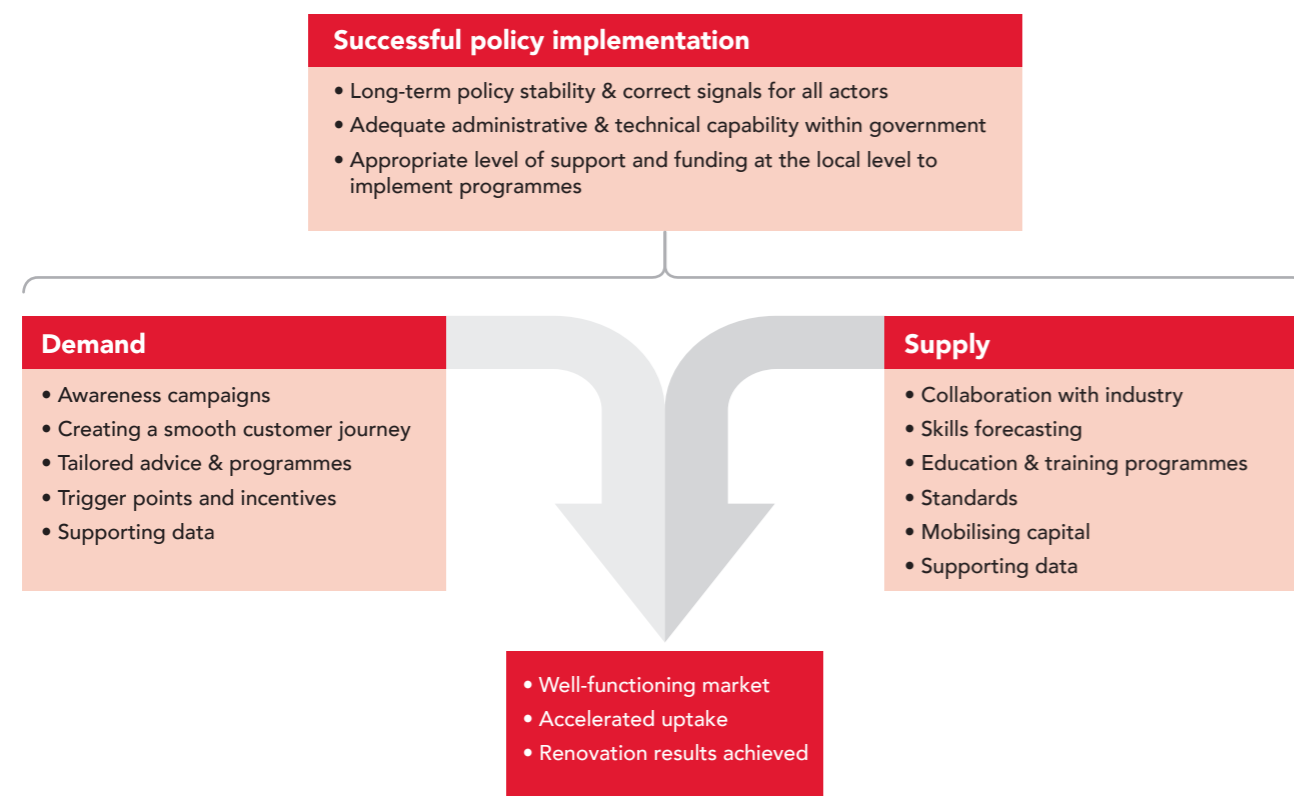
Cross-cutting solutions

Essential pieces of the building renovation puzzle are in place; in particular, there is growing political will, increased availability of public and private capital, and strong consumer appetite. However, solutions are needed to overcome the challenges highlighted in the previous chapter.

Whilst there is no single "silver bullet", our analysis has uncovered a number of ways to address these challenges and accelerate the rate and depth of building renovation globally.

Above all, long-term policy stability is needed as a signal to both suppliers and consumers. For a programme to run effectively, there must be sufficient administrative and technical capacity within government to enable collaboration, raise awareness, process applications, avoid bottlenecks and monitor results of the programme. The pivotal role that local government can play in the implementation of policy should not be underestimated.

The following figure illustrates the measures that must be implemented to create a well-functioning building renovation market.



¹³ World Energy Outlook special report, June 2020

5.1 A framework fit-for-purpose

Long-term policy frameworks

Short-term or shifting policies and programmes damage the confidence of both building owners and industry. In many cases, a lack of long-term commitment and planning from government is the root cause of the challenges outlined in Chapter 4.

Policy-makers should start by designing renovation strategies within the context of broader decarbonisation objectives, ensuring that national renovation targets are on the right trajectory to meet net zero. This is the logic behind the EU's Renovation Wave, for example.



Sadie McKeown
Executive Vice President, The Community Preservation Corporation

"What I often think about is what we could do if we threw the same amount of money at this problem as we did at the COVID vaccine."

When designing energy efficiency programmes, governments also have to engage industry early on in the planning, giving them sufficient time and support to prepare. Unsurprisingly, manufacturers or installers have little incentive to take on additional staff or invest in costly training if they lack confidence that building renovation programmes, and therefore demand for renovation from property owners, will exist in the long-term. For example, Italy's 110% 'Superbonus' scheme is effective at getting building owners to take up energy efficiency measures, but uncertainty about the duration of the scheme means installers are reluctant to take on more staff, leading to failures to meet short-term demand.

It also takes time for households to become aware of a renovation programme and decide to act on that knowledge. Similarly, installation companies are often SMEs with limited time and resources to keep abreast of policy developments. A clearer commitment to the decarbonisation of buildings through well-promoted, simplified and long-term incentives for building owners - like Germany's KfW scheme - would build general awareness and confidence and accelerate the take-up of building renovation projects.



Marjolaine Meynier-Millefert
Member of French National Assembly

"Suppliers say: 'It's too complicated for me to learn what you've just put into place; I'll start trying when you've stabilised it'. Policymakers say: 'Fine, it does not work. Let's change it again.' It's a vicious circle situation."

Designing policy collaboratively

Policy-makers should work with the renovation industry, consumer representatives and local governments at the design phase of renovations programmes to ensure that they are practical and implementable.



Steven Nadel
Executive Director, American Council for an Energy-Efficient Economy (ACEEE)

"In the US in particular, the collaboration between policymakers and contractors is viewed as key to successful delivery. We need to work very closely with consumer and industry associations to make it happen."

Coordination is also required between government departments in order to design and implement mutually supporting policies (e.g. on finance and workforce training), and to anticipate implementation challenges.

Sharing best practice between countries, regions and cities is similarly beneficial. This could be as simple as describing factors behind successful renovation projects or it could take a more sophisticated approach, such as best practices for combining different financial instruments. Where information sharing initiatives already exist - for example the European Commission and European Investment Bank are active in this field - it is important that information is made accessible and engaging to non-experts.



“National or regional authorities need to make sure that all stakeholders are put around the table to build real partnerships on building renovation, all partners are mobilised and are obliged to take part in the discussion and share a common renovation agenda”

Mathieu Fichter
Policy Officer, European Commission DG REGIO



“Policy should try and nudge industry in the right direction. Policies need to be designed in collaboration with industry to ensure there are solutions that are practical and implementable.”

Emma Harvey
Programme Director, Green Finance Institute

Creating suitable consumer incentives

An average of 51% of respondents polled listed costs as the main barrier for not renovating their homes. This underlines the fact that one of the best ways to incentivise people to carry out retrofits is to provide them with simplified access to finance. However, governments cannot take a ‘one-size-fits-all’ approach. A variety of fiscal incentives that account for differences in tenure, affordability and building type are needed.

Tenure variations mean government and financiers need to create tools to support owner-occupiers, some of which will be affluent whilst others are energy poor, as well as private and social landlords. Similarly, the tools and incentives need to account for wide variances in the housing stock, from purpose-built and converted flats to terraced and detached housing.

Financial mechanisms

This diversity means a blended approach of public and private financing will be needed and our interviewees highlighted various options in the provision of public and private capital.

State-led fiscal incentives could include subsidies and grants, tax exemptions, financial rewards and tax credits:

- **Subsidies and grants:** On individual technologies, renovation work, or collective purchasing.

- **Financial rewards:** Building owners are rewarded for installing insulation, better windows, or renewable energy-generating technologies, making their investment more financially viable.
- **Tax exemptions:** Examples include property purchase tax exemptions if a certain level of energy efficiency improvements are made to a home within a set time period following its purchase; 0% VAT on energy efficiency improvements; or council tax breaks linked to renovation.
- **Tax credits:** As seen in Italy’s ‘Superbonus’ green renovation programme. The programme targets three areas: thermal insulation, heating system efficiency and seismic resilience, with a 110% refund available to cover the cost of investment. Building owners have two options; they can transfer the tax deduction to a company which finances and carries out the renovation or they can pay for the work themselves, then recover their investment and an extra 10% over a five year period.

Attractive and well-promoted financial support delivers results. Around 53% of the polling respondents across all countries analysed ranked government grants as the most effective measure to encourage homeowners to green their homes, whereas 30% think that a reduction in council or local tax would be beneficial during the building renovation process.

Meanwhile **private finance initiatives** could include:

- **Property-linked finance** where financial repayments are made by whomever owns the property. This is a well-established product in the US and generally involves lower interest rates thanks to there being collateral to borrow against. It also avoids the problem of building owners being concerned they won’t recoup their investment before they sell the property.
- **Expansion of the green mortgage market** giving preferential rates for more efficient homes. Combining loans for building renovation with long-term mortgage-based financing could accelerate the take-up of building renovation.

Coordinating policy and private finance

In addition to highlighting the types of financial levers that could be deployed, our interviewees stressed that greater coordination between the policy and finance sectors is needed. They identified three key areas for improvement:

- **Simplify the financial subsidies that are currently available.** In the US, for example, an efficient approach to support upscaling and the spread of good practices from one region to others could be to streamline schemes into a single programme.
- **Much more funding needs to come from the private sector** (and at relatively cheap rates to make it attractive enough for the residential sector).

Regulation could include minimum amounts of capital provided for low-carbon purposes, as is already the case with the EU budget and recovery funds. Incentives could include publicly financed guarantee funds to reduce risks for banks and enable them to provide lower-interest rate loans.

- **Financing schemes should support holistic renovation** to encourage deep retrofits. Current programmes by contrast can be siloed – for example treating heating technologies separately from wall and roof insulation.

Trigger points

Financial incentives should incorporate trigger points - that is, specific moments when building owners should be targeted with information, or even required to carry out building renovation. These include:

- **Replacing worn out or broken technologies:** Building owners often wait to renovate until something stops working. This is a trigger point at which either regulation (e.g. a ban on replacing a gas boiler with another gas boiler) or incentives (e.g. a subsidy for installing a heat pump) should kick in. These incentives should go beyond replacing the defective equipment - for instance, a new heating system should go hand-in-hand with overall energy savings measures.
- **Carrying out home improvements:** Most home improvements have nothing or little to do with energy efficiency, but building-owners’ appetite to carry out improvements should be tapped in to. Incentives should be provided to encourage deep, whole-house renovation, ideally in line with minimum energy performance requirements (see following section). At the same time there could be disincentives for home improvements which do not include energy savings measures.
- **Taking out finance or re-financing/re-mortgaging:** Banks should work with customers who approach them for loans or mortgages and give them incentives to renovate. Green products that offer preferential rates or larger loans on the condition that energy efficiency improvements are carried out should be offered. Take-up can also be encouraged by linking financing offers to related financial products, such as re-mortgaging.

The role of regulation

The citizens poll found that there is widespread support for mandatory energy performance standards: 73% of the respondents said that they supported mandatory energy performance standards, provided the right enabling conditions are put in place (namely financial support, renovation advice and information on where to find qualified workers).

In parallel, many of our interviewees called for the use of a strong regulatory framework to reach building renovation objectives. For example, stakeholders from Germany say minimum energy performance standards are needed to increase building renovation rates and at the same time incentivise people to prioritise deep renovations. Meanwhile experts from Denmark felt that increases in the uptake of building renovation projects could be achieved through a combination of an extensive awareness campaign around the benefits of renovation, and strict adherence to the requirements of the existing building code (or more ambitious iterations of the code).

The UK, France, Italy and the Netherlands are useful examples where energy performance standards have been effective. The stakeholders we consulted believe the best approach is to introduce minimum energy efficiency standards with longer compliance periods, requiring the standard to be met by 2030 for example, but with a strong signalling period at the beginning during which future requirements are clearly explained and promoted.

Longer, clearly defined compliance periods help provide building owners with the time and solutions they need to meet the required standards. They also allow time for the renovation industry to adjust to meet the scale of future demand. However, shorter timeframes are possible too: Italy’s ‘Superbonus’ scheme requires an improvement of two energy classes. Other schemes in Central and Eastern Europe to renovate communist-era apartment blocks have similar requirements.

If the stable, long-term policies this report recommends are put in place, regulation becomes particularly essential to provide a sense of urgency to building-owners. This is why many stakeholders emphasised the need for a combination of regulation and incentives. Incentives are extremely effective - everyone wants a deal, regardless of their income levels - but may not be taken up at the speed which policymakers forecast. Regulation helps ensure building owners renovate at an appropriate pace.

5.2 A focus on outcomes

Tackling the worst performing buildings first

For climate and socio-economic reasons it is important to tackle the worst performing buildings first, which in many cases will be the residences of those in the lowest income and other vulnerable groups, often living in energy poverty. Policies which require a certain level of efficiency below which a property cannot be rented out, or provide targeted subsidies for those with the greatest need, can be very effective.

Low-income households are unlikely to be able to afford the up-front costs of renovation even with fiscal incentives. In addition, low-income residents may be experiencing compounding challenges such as transport poverty or digital exclusion. Programmes should be tailored to specific needs, thus ensuring access to information and advice.

Encouraging deep building renovation

While policymakers may want to demonstrate that a lot of renovation has taken place in a short space of time, a volume-based approach is not the right way to maximise the multiple benefits of building renovation. Deep renovation projects, whereby a whole-building renovation takes place, are much more efficient (albeit with higher upfront costs) than carrying out smaller individual upgrades to improve energy efficiency step by step, such as insulation, followed sometime later by double-glazed windows.

Government resources should therefore be directed towards encouraging and enabling comprehensive, deep renovation projects. This also boosts consumer support, since people clearly see the before-and-after changes in building efficiency and associated benefits.

Robust quality standards

Quality standards have a vital role to play in nurturing consumer trust, ensuring public and private funds are well spent, and that building performance outcomes are met.

Similarly, renovation programmes can mandate the use of certification schemes, whereby contractors have to undertake training prior to any works taking place, and/or be accredited to qualify for work under the scheme. Where such routes are pursued, a robust but proportionate approach is needed to ensure the schemes are suitable for SMEs and consumers (see also section 5.3 on attracting new workers).



5.3 Enabling delivery

Boosting administrative capacity

Administration lies at the crux of any renovation scheme. Whilst many fine minds inside and outside of government work on identifying the right policy levers to incentivise renovation works, delivering that vision ultimately relies on high quality administration. Yet so far the mechanisms for delivering renovation schemes have not received the same level of attention as the initial policy development work.

The recent experience of the Green Homes Grant Scheme in the UK illustrates this perfectly - though consumer uptake was strong, installers struggled to register quickly enough for the accreditation required to participate in the scheme, which had very short timeframes. Meanwhile, bureaucratic issues led to delays in issuing vouchers to customers and paying installers. Ultimately, some installation companies went bust and the scheme was ended early by the government, with just a fraction of the committed funds having been spent.

What this shows is that sufficient administrative capacity must be created to avoid delivery bottlenecks and delays, as well as to monitor outcomes and enable learning and adjustment. This is crucial to fulfilling consumer demand while also ensuring that suppliers engage with a scheme.

The pivotal role of local government

As a general rule, local governments struggle to secure adequate funding, administrative and technical support from central government. However, our interviewees noted that cities or regions can be very proactive in terms of decarbonisation strategies. Together with their knowledge about housing stock, population demographics and local industry, this means local government is ideally placed to play a pivotal role in implementing building renovation policies.

Supporting consumers and industry

Local governments can act as the point of contact for building owners, local installers/contractors and financing streams. This may take the form of a one-stop-shop, as described in section 3.4, or a private firm may be contracted to provide technical expertise and advise local authorities on the implementation of retrofit programmes.

Local governments are also well-placed to collaborate with training institutions to provide courses to address skills gaps for local workers. Like all local measures this needs to take place within the bigger picture context of nationwide training programmes, such as France's practice of requiring households to hire officially certified workers if they wish to apply for insulation subsidies.

Bolstering resources

In order to fulfil these functions, local initiatives need support to strengthen their administrative capacity for coordinating and managing renovation programmes, as well as running awareness campaigns to support overall central government efforts (see section 5.4 for further details).

In this context, support for educating personnel about the benefits of building renovation and the various actions which can be taken to improve energy efficiency would greatly enhance the quality of the services local government can provide.

Workforce and industry development

A skilled workforce operating at sufficient scale is a prerequisite to achieving national renovation targets. Renovation also provides significant opportunities for creating green jobs - in the broader picture of the green transition, renovation schemes have the potential to add more green jobs to the local economy than other low-carbon activities such as the deployment of electric vehicles.

But as discussed in Chapter 4, the lack of clarity in the energy efficiency pipeline means that more efforts are needed to increase workforce capacity. In the EU for example, there is already a noticeable shortage of qualified workers even though the renovation rate is only around 1% per year.

Workforce planning and training

Long-term renovation plans at the national level help anticipate and address workforce challenges. In developing these plans, government should work with industry and construction workers unions to forecast the renovation pipeline and in turn the required size of the workforce and potential skills gaps that may exist. Currently this information does not exist in most markets.

The construction sector should also be supported by government incentives for apprenticeships and workforce training programmes, such as the Retrofit Academy in the UK, or the 'Label Reconnu Garant de l'Environnement' in France. The latter requires households wishing to apply for energy efficiency subsidies to hire an officially certified installer. This is encouraging insulation and other manufacturers to train more installers to be able to meet household demand, and at the same time ensure the materials are well installed.

This illustrates the fact that workforce training should ideally involve public institutions as well as private sector companies. In many cases an incremental increase in skills may be all that is required - for instance, a roofer who already knows how to install insulation could also be trained to install solar PV panels.

Attracting new workers

Many stakeholders commented on the ageing workforce in the construction industry, which compounds the need to increase workforce capacity and skills.

To enhance the appeal of the new jobs and training programmes - notably to younger people - opportunities should be promoted as green, associated with higher societal value, and it should be highlighted that new jobs offer better conditions than the non-green construction jobs of the past.

Stakeholders interviewed for this report outlined other possibilities to increase the attractiveness of the sector. For example, specifying that only companies which are providing good salaries and working conditions can apply for public contracts, or even by linking good working conditions to the disbursement of public subsidies. These help attract new workers into the sector, build trust among building owners and minimise issues of poor-quality installation.

Broadening the knowledge base

Alongside practical skills training, the renovation workforce needs assistance to better understand the benefits of energy efficiency, and the process of applying for financial support. This knowledge would enable providers to play a better role in informing clients, thereby helping to drive deeper retrofits and increasing the overall quality and effectiveness of renovation work.

The same is true within financial institutions, where a lack of knowledge about building renovation and the benefits of energy efficiency, as well as what a green product looks like or how it operates, should be addressed. Banks need support from the government and specialised organisations to upskill their staff in these areas so that, in turn, they are better able to design and promote green financial products to their customers.



“There should be a very focused effort with the education of contractors on the selling of renovation measures, they can play a really important role because they are on the frontline when it comes to the action itself”

Lotte Schlegel
Executive Director, Institute for Market Transformation

Addressing fragmentation

Finally, the fragmented structure of the renovation industry creates challenges both for building owners - who have to coordinate many different tradespeople to carry out various segments of the renovation work - and within the renovation supply chain itself, where there is often a lack of understanding about other products or services. Government along with industry networks should help to facilitate links between different parts of the supply chain with a view to creating a more joined-up approach.



“Building the supply chain capability by linking the people that are installing the products with those manufacturing it - this is key in accelerating renovation project take-up.”

Jon Warren
Market maker supply and policy, Energiesprong

5.4 Communicating with consumers

Increasing public awareness

As highlighted in section 4, our polling found that interest in energy efficiency is universally high in the US, UK and EU. Nevertheless, understanding which benefits are most appealing to building owners is critical to successful policy design and implementation.

Motivating consumers

According to the polling, the main factors motivating consumers' interest in energy efficiency measures are the expected savings in energy bills and the need for a better insulated and more comfortable home.

However, for some measures, savings on energy bills may not be appealing enough on their own, since the pay-back period can be very long. As such, many of the stakeholders engaged in this study stress that alongside cost savings, the comfort benefits of higher performing homes should be a key focus when carrying out public awareness campaigns.

Within the general public there is a growing awareness of the climate crisis, and it could also help to show that households can 'do their bit' for climate action by renovating their homes. Almost two thirds of the people polled (62%) agreed that it is an individual's social responsibility to make their home as energy efficient and climate friendly as possible.



“Show people how renovation works, make public awareness campaigns - help them shifting away from the ain't broken - don't fix it mentality!”

Graham Lloyd
Director of Strategy, Performance & Sustainability, Nationwide Building Society



“Highlight the benefits with the maintenance of the building, the fact that it is profitable, the comfort factor, that you in fact create a new experience with the building. It's not that the green aspect is not important, but it is key to show other benefits.”

Raphaël Claustre
Director, Île-de-France Energies

Table 3 What would be motivating factors for you to improve the energy efficiency of your home?

	International Average
Cheaper energy bills	62%
Keeping warmer in winter/cooler in the summer	49%
Being more environmentally friendly	43%
Live in a healthier building (e.g. less likely to accumulate mould and damp from inefficient heating systems, which in turn can cause respiratory issues)	35%
Being able to re-sell my home more easily	19%
Cheaper mortgage	16%
None of the above / I wouldn't do this	8%

Source: OnePoll



In addition, 79% of respondents to the citizens poll said energy efficiency ratings are an important factor to them when buying or moving home.

However, the contribution energy efficiency improvements make to the value of a property is not sufficiently well understood. Better measurement of efficiency gains through smart data solutions can provide the basis for more detailed energy performance certificates - this would help inform property valuations as well as providing evidence to feed back into awareness raising campaigns on the benefits of renovation.

A role for government, industry and financial institutions

Government, industry and financial institutions all have their part to play in boosting public awareness of building renovation benefits and ensuring support programmes are well known. For example, local government can adapt ministry-level messages on a region-by-region basis, and industry can contribute with relevant advertising.

Creating a smooth customer journey

Everyone has an interest in avoiding bad consumer experiences which could damage the overall reputation of renovation programmes. Consequently, as well as helping people understand why they should be making their homes more energy efficient, more information is needed on how to carry out a building renovation project.



Louise Sunderland
Senior Advisor, Regulatory Assistance Project

“Everyone - particularly vulnerable, lower income, marginalised households and communities - needs independent advice. Not only upfront advice on what to do, but more a two-way, handholding, through-the-whole-process. This kind of retrofit coordination is the high end of service needed.”

Technical assistance and one-stop shops

To address this, one-stop-shops should be established to guide building-owners through the renovation process, from identifying the potential energy efficiency improvements and the financial support eligible to them, through to contracting and coordinating installers, and to monitoring results once the work has been done. A one-stop-shop may assign a ‘renovation coach’ or ‘guide’ who essentially manages the entire renovation project, taking much of the burden off the building-owner’s hands.

There are various examples of the one-stop-shop model working successfully, for example Cosy Homes Oxfordshire (UK), Reimarkt (Netherlands), Ile de France Energies (France) or Elevate Energy’s one-stop-shop service for multifamily building owners (US).

Many stakeholders recognised the benefit of one-stop-shops remaining localised and focused on the housing stock, demographics and contractors they know best. Serving the local area also builds up trust with local people. Meanwhile, best practices of successful examples should be shared, even if local specificities mean they cannot be copy-pasted, and government should play a role in facilitating this knowledge exchange with and between local authorities.

At the same time, national or multinational sources of funding and other support must be better-known and easy to access. One typical catch-22 challenge is that regions and cities are short of funding and staff for bigger renovation programmes, but lack the capacity to apply for extra resources. Solutions exist - the EU provides one-off grants for cities to hire people to put together applications, for example - but they must be scaled up and replicated in other geographic areas.

Better data to enable tailored advice

Advice needs to be tailored to suit the type of building and ownership. For example, owner-occupied detached homes require a different approach than apartment blocks with a mix of owners and tenants. This in turn requires good quality data. Energy performance certificates (EPCs) give useful information on the efficiency of buildings and can provide a helpful starting point in the renovation journey. However, work is needed to strengthen the quality of the assessments in order to build consumer confidence, whilst greater harmonisation of EPCs would support multi-national lending programmes.

Similarly, building renovation passport schemes have been successfully implemented in some EU Member States such as Belgium, France and Germany. These attest to the environmental credentials of a property and help building owners identify areas for further improvement.

The concept of one-stop-shops is to provide a customer-centred service offering advice and support throughout the renovation journey, establishing a bridge between the fragmented renovation industry and the consumer, and offering a comprehensive solution to overcome many demand-side challenges

(Boza-Kiss & Bertoldi, 2018).

“A key factor making one-stop-shops successful is when they manage to stimulate the interest of local commercial banks, to make them provide loans and financial products that are for renovation projects specifically.”

European Commission
DG ENER representative

5.5 In conclusion

This report seeks to emphasise three key points. First, energy efficient buildings are a pre-condition for successful climate action. This is not only because buildings account for a very high share of greenhouse gas emissions – 36% of energy related emissions in the EU, 40% in the U.S., 42% in the UK - but also because they offer an opportunity for people to personally experience the benefits of climate action, which can help to sustain momentum over the next decades. All while simultaneously offering cheaper-to-run and healthy homes.

Second, there is strong public support for ambitious building renovation programmes. The polling by OnePoll in Denmark, France, Germany, Italy, Poland, United Kingdom and United States shows that the vast majority (79%) of respondents would renovate their homes if they had the support and almost as many (73%) would support mandatory energy performance standards, given the right enabling conditions. However, it is clear that the conditions are not yet in place, with a majority of respondents listing costs as a major barrier and over half (56%) saying they have little or no knowledge about applying for funding, seeking advice and finding suitable workers.

The polling results support the third, and central, point of this report - that the demand for renovation is there but that there is a need for more ambitious legislation, combined with a major focus on simplifying access to finance, increasing workforce capacity and project management support.

As one of the stakeholders interviewed for the report put it, building renovation programmes have to be seen in a similar light - and be accorded similar priority - to Covid-19 vaccination campaigns. In short, it has to become easier to renovate than not to act. This requires a combination of stable, long-term plans, attractive incentive schemes, clear communications, qualified workers and sufficient administrative capacity to ensure a smooth customer journey.

Do this, and the benefits of building renovation will be unlocked.



6 Summary of recommendations

A framework fit-for-purpose

- Long-term policy clarity and stability is needed to reduce uncertainty and increase the confidence for home/building owners and the renovation industry.
- Effective coordination within government as well as among government and other actors will aid policy design and delivery. Policymakers would benefit from greater collaboration with industry, financial institutions, citizens, and local authorities to design better renovation programmes ensuring all actors have access to required resources.
- A variety of fiscal incentives that account for differences in tenure, affordability and building type are needed alongside gradual increases in minimum energy efficiency standards.
 - Fiscal incentives could include subsidies and grants, tax exemptions, financial rewards and tax credits.
 - Trigger points need to be identified - times where building owners should be targeted to either be informed about, or required to carry out, building renovation.
 - Setting gradual increases in minimum energy efficiency standards (MEES) can help to ensure building owners renovate at an appropriate time.
- Sufficient administrative capacity must be created to avoid delivery bottlenecks and delays as well as to monitor outcomes, learn from experience, and adjust accordingly.

A focus on outcomes

- The worst performing buildings should be tackled first. These are most often residences of those in the lowest income groups, or other vulnerable groups living in energy poverty.
- Government resources should be directed towards encouraging and enabling comprehensive, deep renovation projects rather than towards achieving a high-volume of smaller renovation works.
- Policymakers need to set robust yet proportionate quality standards to overcome barriers associated with consumer trust in building renovation investments. For example, certification schemes to help ensure good quality workmanship can bolster consumer confidence and reduce the perception of risk that can be associated with home renovation works.

Enabling delivery

- Local government needs support to strengthen administrative capacity to complement existing know-how. Local authorities' superior knowledge about the local housing stock, population and skills base makes them ideally placed to help ensure renovation schemes run effectively.
- Local government needs support to acquire renovation-specific knowledge and skills. Doing so would facilitate local government acting as the point of contact in terms of technical assistance for both home/building owners and local contractors.
- Policymakers and industry should work together to forecast the required size of the workforce and potential skills gaps that may exist. This will help avoid execution bottlenecks in otherwise well designed renovation programmes.
- Governments should support workforce training programmes and/or academies through funding to ensure that workers are equipped with the right mix of skills and qualifications to carry out new and changing jobs linked to building renovation.
- The workforce should be trained in practical installation skills as well as on the broader benefits of improved energy efficiency. This would enable them to better educate clients on how different measures combine to improve building performance.

Communicating with consumers

- Renovation programmes and the benefits they bring need to be adequately promoted to the public if ambitious renovation results are to be achieved.
- Understanding which benefits are most important to home/building owners helps policymakers, industry and finance institutions frame promotion to encourage consumer action.
- Impartial and tailored information for building owners on renovation works is needed to help them understand what measure or combination of measures would work best given the varied needs across different tenures and building types.
- Ensuring a smooth and seamless consumer journey through the use of one-stop-shops is in the shared interest of all actors along the value chain.

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November 2021

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