

AN ACTION PLAN FOR THE RENOVATION WAVE:

COLLECTIVELY ACHIEVING SUSTAINABLE BUILDINGS IN EUROPE



10 YEARS
BPIE

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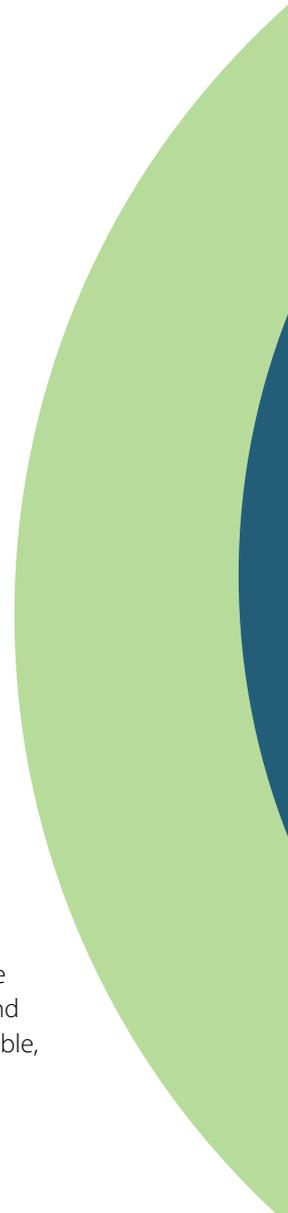
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ABOUT BPIE

The Buildings Performance Institute Europe (BPIE) is Europe's leading centre of expertise on decarbonising the built environment, providing independent analysis, knowledge dissemination and evidence-based policy advice and implementation support to decision-makers in the public, private, and non-profit sectors. Founded in 2010, BPIE combines expertise on energy efficiency, renewable energy technologies, and health and indoor environment with a deep understanding of EU policies and processes. A not-for-profit think-tank based in Brussels and Berlin, our mission is to make an affordable, carbon-neutral built environment a reality in Europe and globally.



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FOREWORD

As the world navigates its way through the coronavirus crisis and its global repercussions, our society has been forced to deal with unexpected impacts and to introduce changes affecting everybody and everything. Measures had to be introduced without much time to reflect as the emergency was knocking on the front door. There is one central lesson arising from this crisis: resilience to external shocks and the ability to adapt are essential for a society's stability and survival.

While we are getting an understanding about the consequences of the pandemic, we cannot stray from the path to achieving carbon neutrality by 2050 in Europe. Meeting this challenge will require a transformative approach in the way we live, move, work, produce and consume.

The building sector plays a crucial role in this transition. This document suggests actions by the many decision-makers who should embrace change and launch the renovation wave. Change will require adapting habits, modifying routines, adopting new behaviours, trying innovative ideas and learning from mistakes, but this process can and must lead to better living conditions for all Europeans.



We are anticipating a complete transformation, not in the form of a shock but as a well-prepared integrative process: construction and renovation practices, the way buildings are integrated with power and heat networks, strategies to make buildings resilient to the impacts of climate change, the use of digital technologies, how renovations are financed and many other practices will need to evolve compared to today's standards.

While it may be demanding from a business-as-usual perspective, this transformation will positively affect our daily lives. As well as being necessary to avoid catastrophic climate change, it will lead to increased comfort in our buildings, reduced indoor and outdoor air pollution, strides towards the elimination of energy poverty and a much higher level of preparedness to manage the impacts of climate change. It will also improve environmental, social and governance performance of businesses and help achieve the sustainable development goals (SDGs).

The renovation wave announced in the European Green Deal must be the catalyst for this transformation. The Green Deal recognises that our buildings infrastructure needs an urgent upgrade, not only to fight climate change but also to lift millions of Europeans out of energy poverty and to ensure that buildings provide a healthy and affordable living and working environment.

The success of the renovation wave and the European Green Deal also depends on the coordination with other initiatives like the New Industrial Strategy for Europe, the SME Strategy for a sustainable and digital Europe and the Strategy for a sustainable Built Environment expected in 2021. Some of the measures suggested in this document may also fit these initiatives. It is important to ensure the initiatives are not developed in silos but rather create the right framework to mobilise all the different actors. It is time to roll up our sleeves; it will take a collective effort to launch the renovation wave delivering better buildings for all.



Oliver Rapf

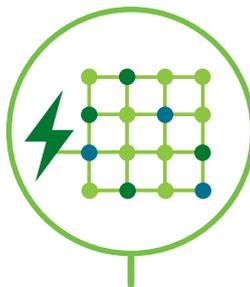
Executive Director
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IN A CLIMATE-NEUTRAL EUROPE, BUILDINGS WILL BE...



HEALTHY AND FOSTER WELL-BEING

People will live, work and study in buildings with thermal comfort in all seasons, good air quality, sufficient access to daylight and very low noise levels.



PART OF THE ENERGY SYSTEM INFRASTRUCTURE

Buildings will fully interact with the power and heat networks.



HIGHLY ENERGY EFFICIENT

Energy in buildings will not be wasted. Both new and existing buildings will have very low energy consumption.



CIRCULAR IN MATERIALS AND USE

Material circularity should be the norm. Buildings should also adapt to occupants' changing needs and allow for a variety of uses over time.



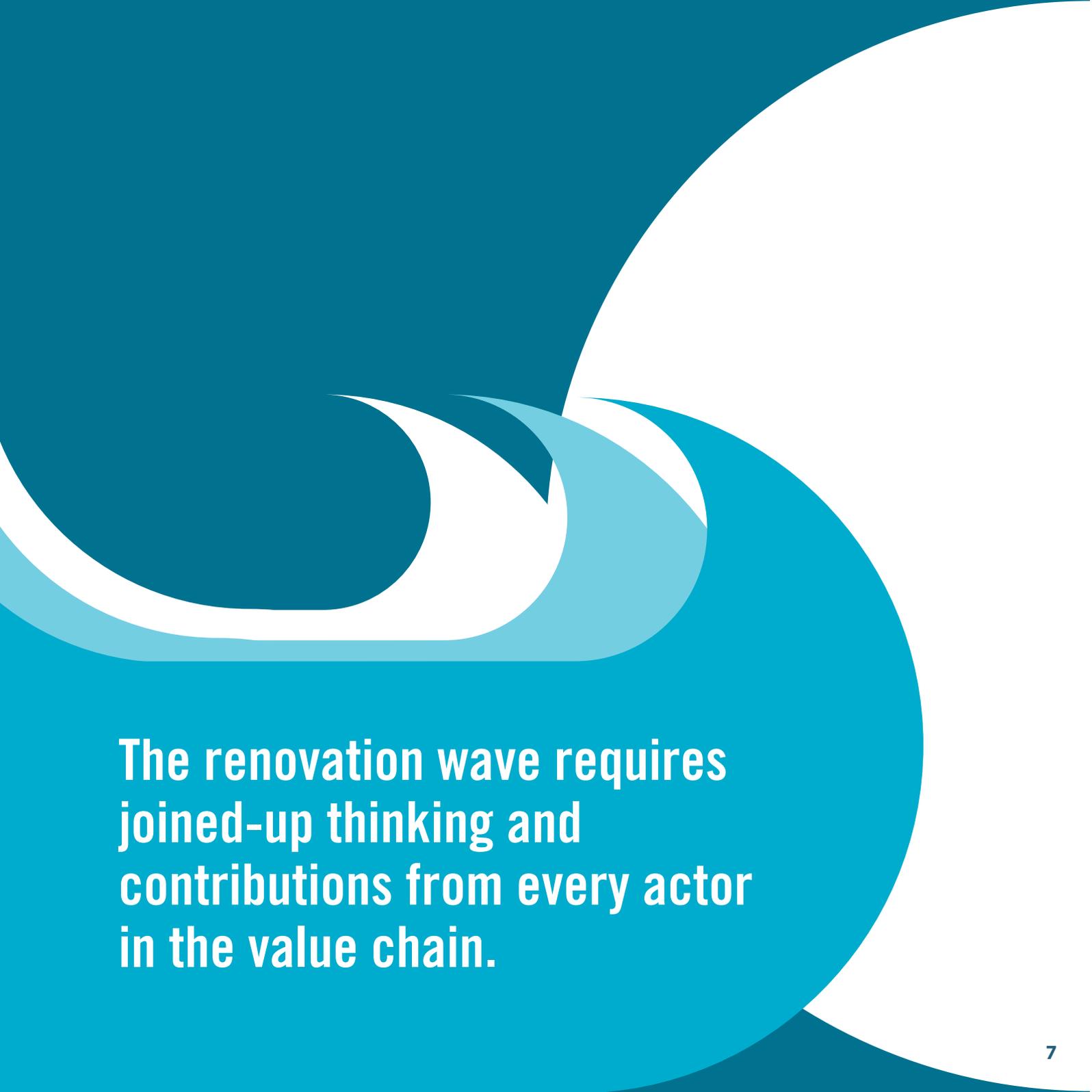
FOSSIL FUELS FREE

Renewable energy will cover the low energy needs of the building sector.



RESILIENT TO CLIMATE RISKS

Buildings must be resilient and adaptable to impacts caused by a changing climate.



**The renovation wave requires
joined-up thinking and
contributions from every actor
in the value chain.**

THE RENOVATION WAVE

ADDRESSING THE CHALLENGE WITH COLLECTIVE EFFORT

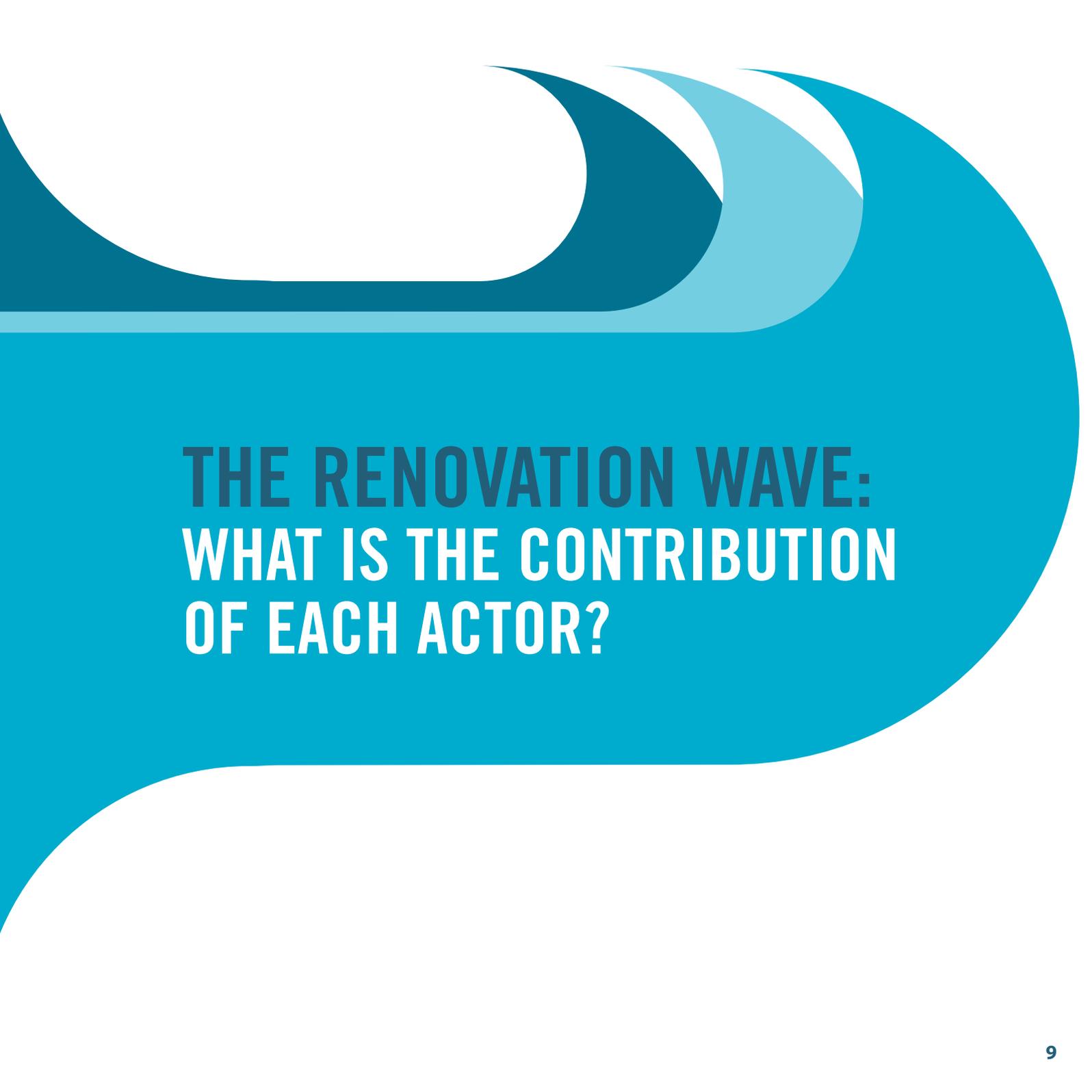
The European Green Deal, with its proposed renovation wave initiative, aims to kick-start the transformation of today's buildings into the buildings of the future. While the benefits of a climate-neutral building stock are clear and largely understood, achieving it will require immediate actions and an unprecedented level of collective effort by all segments of the wider sector, with specific attention to affordability and inclusiveness.

The fragmented nature of the building sector makes its transformation extremely complex. Challenges include diverse value chains, ownership relationships, local regulations and the involvement of different stakeholders at separate stages of the lifecycle, who rarely interact directly with each other.

The renovation wave requires joined-up thinking and contributions from every actor in the value chain. However, these multiple actors are often uncoordinated and have conflicting interests and motivations;¹ they adapt their actions and behaviours to different triggers and drivers. For example, a clear long-term regulatory framework is a trigger for capital markets to invest in building renovations, the provision of tailored advice and support for building renovations is one of the drivers for private homeowners to renovate their buildings, while the existence of easily accessible funding streams coupled with technical assistance is a driver for local authorities to renovate their building stock.

The European Commission must first and foremost create the right framework to mobilise all the different actors and make sure that their actions are aligned for the renovation wave. The building sector can successfully contribute to the EU climate neutrality objective only if all actors move in the same direction.

¹ BPIE. 2016. Driving Transformational Change



**THE RENOVATION WAVE:
WHAT IS THE CONTRIBUTION
OF EACH ACTOR?**



EU energy policy, including promotion of energy efficiency, energy saving and the development of new and renewable forms of energy, is a shared competence between Member States and the EU.

The European Commission can propose new legislation and create an enabling framework to support building renovations. It is also responsible for monitoring the implementation of EU law, ensuring compliance and enforcement in Member States. It can convene and facilitate dialogue and collaborations amongst the buildings and construction sector.

When proposing the strategy for the renovation wave, the European Commission must take the lead in creating the legislative and enabling framework to support building renovation in Europe. This is crucial to ensure that all actors and stakeholders are engaged, mobilised and work together. In particular, the European Commission should:

★ Ensure ambitious implementation of the Energy Performance of Buildings Directive (EPBD, EU 2018/844) by Member States, as the necessary first step towards achieving a climate-neutral building stock. This includes:

- Assess the decarbonisation objectives in the long-term renovation strategies (LTRS) under the EPBD against the EU climate neutrality objective and ensure that the milestones in the national LTRs are on the right trajectories towards this objective.
- Check whether Member States have fully accounted for the wider benefits of building renovations in their LTRs, as required by EPBD Article 2a. For example, healthier buildings reduce pressure on healthcare and social services,² and those cost savings should be considered in the estimation of wider benefits.
- Closely monitor and enforce the implementation of the nearly-zero energy buildings obligation for new buildings occupied and owned by public authorities (since 1st January 2019) and prepare to monitor and enforce the enlargement of this obligation to all new buildings after 31st December 2020.

★ Consider introducing and/or reviewing existing legal provisions, including the following:

- Review the impact of the energy performance certificate (EPC) across EU Member States and amend existing provisions to strengthen it. Reliability, consistency and comparability of EPCs across the EU should be improved so that they become a trusted market tool to assess performance and quality of buildings. Additionally, EPCs should be better designed to provide tailored renovation advice to building owners, for example by being complemented by a building renovation passport.
- Expand and strengthen the obligation to renovate public buildings to minimum energy performance requirements (Article 5 of the Energy Efficiency Directive). Currently this covers 3% of the total floor area of buildings owned and occupied by central governments each year; it should be expanded to all public buildings, including schools and hospitals. The provision, which currently also includes the possibility for Member States to choose alternative measures, is insufficient to make public buildings leaders by example.

² BPIE, 2018. Building 4 People: Quantifying the impact of a better indoor environment in schools, offices and hospitals

- Develop legislation requiring Member States to set mandatory minimum energy performance requirements for certain buildings. To tackle the worst performing buildings, Member States must define a comprehensive policy package to trigger their renovation to a higher performance level: for example, by requiring that after a certain date residential buildings with the lowest EPC ratings cannot be rented until they have achieved a higher level, or that commercial buildings (e.g. offices) must meet a defined level of performance. Mandatory minimum energy performance requirements must not be introduced as a stand-alone measure but must be carefully planned and phased in, and include accompanying measures to advise and support building owners and occupants, especially the most vulnerable.
- Develop legislative proposals to ensure Member States carry out integrated planning for supply- and demand-side measures in the building sector. This could include, for example, expanding LTRs to cover measures favouring the decarbonisation of heating or supporting local authorities with integrated planning.
- Review and improve the EPBD cost-optimal methodology. The current methodology overlooks many of the societal gains of getting to nearly zero-energy buildings, including environmental, health and climate benefits. These should be clearly quantified and included in a revised methodology.
- Revise public procurement rules to include energy efficiency and circular economy criteria and ensure that procurement rules better value lower operating costs.
- Propose measures to further enable the provision of energy services, particularly energy performance contracting, at the national level. The EU should aid Member States in implementing the provisions of Article 18 of the EED, including by establishing a framework for transparency and information sharing, creating model contracts, as well as sharing best practices.
- Invest in well-structured and -facilitated knowledge and experience sharing among all actors in the value chain, with a strong focus on national and regional policymakers.
- Provide continued and sufficient financial support for the European Building Stock Observatory to update data, monitor changes related to the building stock in the EU and evaluate policies' impacts.

The European Commission can also contribute to creating a supportive framework to mobilise private investments. This includes the following:

- ★ Recognise buildings as a priority infrastructure enabling the shift to a decentralised, highly efficient, interconnected and renewables-based energy system. By doing so, the Commission will contribute to creating a supporting framework for investments in renovation as this will put buildings on a par with supply-side infrastructure. In particular, in the expected revision of the Trans-European Energy Networks (TEN-E) Regulation, the European Commission should recognise investment in building renovations, including public buildings, as a “project of common interest”.

- ★ **Mobilise existing EU funding in support of the renovation wave:**
 - Use the Just Transition Fund for financing the upskilling and reskilling of workers in the area of building renovation.
 - Design operational programmes to direct structural and cohesion funds towards building renovations, and in support of developing skills or technical assistance.
 - Require consistent impact monitoring of operational programmes for building renovation.
- ★ **Develop an appropriate policy and regulatory framework to enable property investors and professionals to systematically apply and integrate environmental, social and governance performance criteria into investment and lending decisions.**
- ★ **Support robust and internationally consistent climate- and environment-related disclosure standards for real estate.**
- ★ **Develop robust, consistent and widely supported guidelines to help financial institutions identify environmentally sustainable buildings that comply with the EU taxonomy. Such guidelines will also enhance transparency in relation to the underlying asset, as well as provide certainty for investors facilitating their due diligence processes.**
- ★ **Encourage regulators and financial institutions to build in-house capacity to foster collaboration and improve their understanding of how climate-related factors translate into financial risks and opportunities. Linking both financial and technical skillsets would be of tremendous importance.**
- ★ **Under the umbrella of its supervisory and industry initiatives, facilitate the development of more risk-sensitive approaches in prudential rules in order to make sure that capital requirements are aligned with risks relating to climate change and environmental investments.**
- ★ **Set up a joint working group with interested parties to bridge the existing data gaps and start sharing data for assessing environmental and financial performance of real estate.**
- ★ **Provide strong incentives for the Covenant of Mayors to develop and implement municipal renovation strategies.**
- ★ **Use its conveying power to promote and facilitate dialogue and cooperation between stakeholders in the property and construction market; sensitise all building value chain stakeholders and professionals to their role, responsibilities and opportunities in creating a climate-neutral property market by improving data sharing, availability and quality.**





MEMBER STATES

Member States are responsible for implementing EU law, including the EPBD, but they can also adopt national provisions that are more ambitious than what is agreed at EU level. They can create an enabling national framework for building renovation in many different areas, from financing to better skills for the workforce to supportive housing regulations.



EU Member States play a crucial role in decarbonising the building sector; in particular, Member States should take the following actions:

- ▶ In the transposition and implementation of the EPBD, put into place effective supporting policies and measures that go beyond EPBD requirements, developing a strong long-term renovation strategy which leads to a climate-neutral building stock.
- ▶ Carry out an inclusive regular dialogue with all stakeholders, including local authorities, to develop a shared vision on how to decarbonise the national building stock; the multilevel climate and energy dialogue that Member States must set up under the Governance Regulation provides one platform for this.

- Regularly tighten minimum energy performance requirements for all building typologies in the national building codes, and strictly monitor and enforce compliance. Efficient buildings not only reduce energy consumption and greenhouse gas emissions, but also improve citizens' living conditions.
- Gradually but steadily, bring the worst-performing buildings to high performance standards. Defining specific moments (trigger points) at which the energy performance of a building must be upgraded would increase renovation rates and reduce energy poverty. These policies must be accompanied by a comprehensive package of policy measures including financial support, particularly for vulnerable groups, and tailored advice to reduce possible negative social effects, such as increased rents or "renovictions"³.
- Engage in the renovation of the public building stock: public buildings are an important driver to stimulating market transformation towards zero-carbon buildings by promoting best practice examples and by raising awareness among citizens of state-of-the-art renovations. In particular, Member States should target schools and hospitals where renovations that improve indoor comfort conditions maximize educational and health benefits.⁴
- Ensure renovations are not planned in isolation, but are a part of an integrated planning approach that goes beyond the building, spanning to the district or city level: joint planning with supply-side actors unlocks synergies with renewable energy, which is crucial for the decarbonisation of the building sector.
- Put in place an overall strategy for improving skills in the construction sector: skill development of the construction workforce is crucial to ensure both a decarbonised building stock and the competitiveness of the sector. A national strategy should be devoted to improving knowledge and practical expertise linked to energy efficiency, digitalisation and innovation. Specific national support should target workers in micro and small enterprises by offering tailored incentives, such as tax rebates.
- Develop a sustainable energy skills passport/register for building professionals at national or regional level, and gradually phase in the requirement that public financial support for building renovation can only be obtained when the work is carried out by qualified or certified installers.

³ Eviction of tenants resulting from a planned renovation of their apartment building.

⁴ BPIE. 2018. *Building 4 People: Quantifying the benefits of energy renovation investments in schools, offices and hospitals*



- Support the creation of renovation advisory services at local level, such as one-stop-shops, to offer tailored advice to citizens during their renovation journey, including information on possible financial support and on technical advice related to renovations.
- Revise housing laws to ensure that homeowners associations can access financing and make renovation decisions for multi-family buildings with streamlined procedures, without requiring unanimity or very high majorities. This would reduce barriers for the renovation of multi-family buildings.
- Raise public awareness through building renovation passports, digital logbooks, EPCs, awareness-raising campaigns and promotion of existing and new advisory services to help building occupants understand renovation needs.

Member States are in a prime position to create a supportive financing framework by directly providing public funding and simplifying access to funding, but also by creating the right conditions to mobilise private investments. This includes the following:

- Use financing from the EU structural and investment funds to guarantee and de-risk private investment. Operational programmes should be aligned and contribute to the objectives of the renovation wave.
- Earmark carbon revenues from the EU Emissions Trading System for building renovation, particularly deep renovation.
- Encourage cities, municipalities and communities to develop and aggregate renovation proposals by providing preferential access to finance and technical assistance.
- Take into account potential supply of large private capital and understand specific requirements of large investors. To leverage support from international financial institutions,⁵ national governments should strive to establish financing schemes with high transparency, independent management, reduced risks, autonomous technical assistance facilities, and significant involvement of the local banks.

⁵ The term international financial institution typically refers to the International Monetary Fund (IMF) and the multilateral development banks, such as the World Bank Group and the European Bank for Reconstruction and Development.



LOCAL AUTHORITIES

Regions, cities,
municipalities

Local authorities do not share the same definition across EU Member States, nor do they have similar competencies or degrees of autonomy within each country. However, irrespective of the national set-up, building renovation decisions, construction works, or spatial and urban planning have a direct impact on local communities. Local authorities can have influence on these.

Local authorities, thanks to their proximity and direct relation with their citizens, play a critical role in unlocking and facilitating building renovation. Local initiatives can greatly contribute to the achievement of national building decarbonisation objectives if actions between the different levels of governance are well aligned and coordinated.

LOCAL AUTHORITIES SHOULD:

- 📍 Ensure buildings renovations are not planned in isolation but are a part of an integrated planning at the local level that exploits synergies with available local renewable energy sources, including renewable heat, and with urban quarter or district-based strategies.
- 📍 Aggregate demand between neighbourhoods and neighbouring municipalities to better access financing, implement innovative approaches such as renovating buildings with prefabricated modules, and enhance flexibility of energy demand and local production of renewable energy.
- 📍 Act as role models by renovating public buildings with a focus on schools, hospitals and the worst-performing buildings.
- 📍 Establish local one-stop-shops to reduce transaction costs, overcome information barriers (such as a lack of information on available financing or tailored advice on carrying out refurbishments) and offer integrated solutions for building renovations.
- 📍 Offer training to improve the skills of local construction workers.
- 📍 Introduce minimum energy performance requirements stricter than in national building codes. Where local authorities have the competency to do so, they can set more ambitious local building code requirements, showing leadership at the local level. Such codes also must be well enforced.
- 📍 Develop tools to gather data on the local building stock. Information on energy consumption, building typologies, age of construction, energy poverty levels and other aspects of the building stock is essential to provide an accurate picture of the building stock. Gathering this data is a necessary first step for planning and implementing effective and well-tailored renovation policies at all levels.





FINANCE INDUSTRY

Retail and investment banks, institutional investors, real estate funds

The real estate finance sector is traditionally populated by equity and debt providers, including mortgage lenders, public or private companies, pension funds and residential or commercial Real Estate Investment Trusts (REITs).

Real estate development and building renovations are notoriously capital heavy. Current mainstream real estate financing is driven and limited by business models focused on commercial returns and prudent lending decisions. Energy efficiency investments will be adopted and actively promoted when they are perceived to add value and reduce risks by the virtue of changing market preferences and regulatory interventions.

Financing is the lifeblood of any building project. Investment in housing, commercial buildings and infrastructure represents almost two-thirds of capital investment in the European economy.⁶ Around 37% of all commercial property – with a total market value of over €2.6 trillion – is held as an investment, while the value of the European mortgage market represents more than 45% of the EU's GDP.⁷ Bridging these two worlds – the building sector and financing – has the potential to deliver significant energy efficiency improvements and enable the transition to a climate-neutral building stock.

ACHIEVING THESE GOALS WILL REQUIRE THE REAL ESTATE FINANCE SECTOR TO:

- € Establish energy efficiency departments that would showcase strong expertise in the field of building technical analysis and risk assessment linked to energy renovation investing.
- € Build in-house expertise and skillsets to establish links between technical and financial risks, providing stakeholders with more certainty about expected risks and returns of energy investments.
- € Assess material risks and opportunities that impact value by systematically applying and integrating environmental, social and governance (ESG) performance criteria into investment and lending decisions.
- € Analyse how climate change externalities and carbon exposure might affect investment returns over the short, medium and long term in order to define strategies, set targets, and clarify responsibilities and consequences if targets are missed, met or exceeded.
- € Constantly set goals to measure and reduce the environmental impact and resource intensity of assets and portfolios not only for benchmarking purposes, but for environmental tracking and sustainability proofing against well-below 2°C pathways. For the wider real estate investment industry, the pathways will be an important tool to understand and mitigate the long-term systemic risk associated with the retrofit investments required to transition to a low-carbon economy.
- € Work towards standardised metrics and reporting protocols in close dialogue with the building sector and policymakers; engage with property managers, developers and certification providers to ensure “best in class” energy/carbon reduction.
- € Disclose ESG performance and publicly report climate risk assessments of real estate investments.

⁶ INREV and EPRA. 2018. *Real Estate and the Real Economy*

⁷ EMF. 2019. *Hypostat*



BUILDING DESIGNERS AND PLANNERS

Architects, engineers

The design of a building, including the selection of materials, has an impact on its entire lifecycle, from construction to demolition. Additionally, these decisions have a clear impact on the wellbeing of building occupants, both in private terms (indoor comfort) and from a social perspective (use of common public spaces, interactions with neighbours).

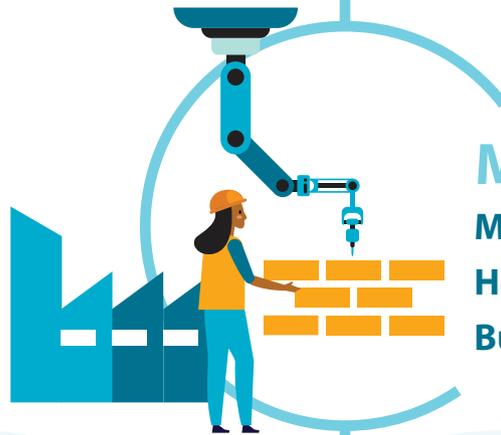
The building design is equally important for new constructions and for building refurbishment projects.

The design stage of a renovation project is likely to be the time of greatest aspiration in terms of energy efficiency objectives and environmental quality for both architect and client. As the level of individual understanding and commitment to the sustainability agenda may differ, it is paramount that appropriate targets, tools and benchmarks are identified and fully translated into design. Building designers should plan for renovation projects that create a highly efficient and decarbonised built environment fit for tomorrow's challenges, including climate adaptation.

BUILDING DESIGNERS AND PLANNERS SHOULD:



-  Design in an interdisciplinary manner and involve the widest range of interests in the design process.
-  Optimise passive use of building form and fabric, avoid gimmicks and oversizing, think long term and be prepared to innovate with the right advice.
-  Include state-of-the-art solutions for refurbishments in their client proposals that lead to a building that is highly energy efficient and supplied with renewable energy sources.
-  Directly integrate technologies and practices generally used only for new constructions into renovation projects.
-  Use healthy and benign materials; select building materials to ensure they are recyclable and/or recycled, locally sourced and with low embodied carbon.
-  Provide solutions to climate change adaptation through renovation projects. Climate change impacts represent a significant threat to citizens' health, comfort and safety. Building design must increase the built environment's resilience to extreme weather events and should include the integration of nature-based solutions.
-  Consider a district approach whenever possible: enlarging the boundaries of a project to maximise the synergies with the neighbourhood facilitates greater integration of innovative renewable energy supply solutions.
-  Push the profession to include zero-carbon design principles at the core of its curricula and organise life-long professional trainings: professional qualifications and education must develop and evolve in accordance with sustainability needs.



MANUFACTURERS

Materials & building components
Heating & cooling equipment
Building automation & controls

Building material manufacturers produce products and materials used in buildings for specific applications, like insulation or roofing. These components are incorporated into the overall building system. The design, production, operation and disposal of these products and materials have a substantial impact on the performance and carbon footprint of new construction and renovation.

Manufacturers of heating and cooling equipment and building automation and controls can substantially contribute to improving building performance by selling highly efficient products and offering comprehensive and innovative services to their customers.

The production of building materials is often associated with high energy demand and emissions, mostly provided by carbon-intensive energy sources. The high volumes of material used in the construction sector, including for renovations, make it essential to minimise the environmental and climate impacts of raw materials by fully applying circular economy principles.

MANUFACTURERS OF MATERIALS SHOULD:

- ⚙️ Increase efforts to reduce emissions resulting from the energy and industrial processes used in the production of materials.
- ⚙️ Consider the recyclability and reusability of building materials, in particular composite materials, from the start. Building materials can have a second life if they are designed for that purpose. This would avoid the production and associated environmental impacts of new materials while extending the economic value and lifetime of materials already in their use phase.
- ⚙️ Develop a fuller understanding of the sustainability of materials, including consideration of a complex and interconnected set of environmental, economic and social factors. Pilot product roadmaps to assess impacts of products across their full lifecycle, to identify and prioritise any particular impact area and to develop the most effective solutions for improving the environmental and social performance of products and services.
- ⚙️ Increase, together with construction companies, off-site prefabrication of building components such as walls and roofs. This would allow circular economy principles to be applied, as prefabrication allows better control over resource use.⁸
- ⚙️ Provide increased services to customers (both B2B and B2C) by including training on how to best handle and install materials/equipment, rather than just supplying them.
- ⚙️ Provide performance guarantees and introduce measures to increase traceability of products by establishing agreements with other actors in the value chain (distributors, installers, construction companies), providing packaged services and ensuring sustained quality.

BUILDING EQUIPMENT MANUFACTURERS (E.G. HEATING, COOLING, VENTILATION AND CONTROLS) HAVE A KEY ROLE TO PLAY IN THE RENOVATION MARKET. THEY CAN CONTRIBUTE WITH THE FOLLOWING ACTIVITIES:

- ⚙️ Offer service packages and maintenance during the life-time of the equipment to monitor the equipment performance, maximise efficiency level and timely engage with customers about replacing faulty or old equipment.
- ⚙️ Cooperate with their distribution chains and installers to plan and size their equipment to the building, avoiding simple equipment replacement and oversizing.
- ⚙️ Design and manufacture efficient products using only non-fossil energy .
- ⚙️ Commit to a quick phase-out of all inefficient and fossil-fuelled equipment (e.g. also using the Eco-design process to speed up these measures)
- ⚙️ Actively participate in the circular economy by providing professional handling of end-of-life equipment and recycling.

⁸ BPIE. 2016. Driving Transformational Change



CONTRACTING & CONSTRUCTION COMPANIES

Large companies, micro, small and medium-sized enterprises, installers

Construction companies vary greatly both in terms of their size and the type of projects they specialise in. Large companies often focus on commercial buildings and large-scale projects, and small companies on individual residential renovations.

In 2016, according to Eurostat,⁹ 95% of construction companies in the EU were micro enterprises with less than 10 employees. Micro and small enterprises together employed more than half of the construction of buildings workforce. By contrast, the 4,500 largest enterprises employed 11.6% of the total building workforce. Businesses large and small experience similar challenges in terms of shortages of skills to deliver zero-carbon buildings or the need to make the construction process more circular, though the ability of larger businesses to manage such trends should be more developed.

⁹ Eurostat. 2020. Construction of buildings statistics

The increasing complexity of buildings due to enhanced performance standards and the various technologies used and products installed requires a considerably increased specialisation in the construction phase.

LARGE AND MEDIUM-SIZED CONSTRUCTION COMPANIES SHOULD:

-  Ensure processes on construction sites are designed to optimise performance and avoid wasteful use of resources. A comprehensive waste avoidance system on-site enables reuse and recycling of materials and any residual waste.
-  Attract and grow talent in the construction sector and invest in constant upskilling of the workforce. New technologies, digitalisation and energy efficiency require a constant upgrade of skills, but an ageing workforce combined with very low training makes outdated skills a critical barrier to overcome.¹⁰
-  Invest in innovation: with only 1% spent in IT, construction is one of the least digitalised sectors (only the hunting and agricultural sectors spend less).¹¹ The integration of digital technology innovations, such as building information modelling (BIM), the internet of things, 3D laser scanning and printing, big data analytics and the use of drones, could have a huge impact in the daily operations, activities and business models of construction companies.
-  Engage in off-site prefabrication of building components such as walls and roofs, in cooperation with material manufacturers. The industrialised production of building components, including for refurbishment, is one of the most promising ways to accelerate renovations in a cost-efficient manner, enabling deep renovation of buildings.¹²
-  Develop feedback loops so that experiences and good practices can be shared, and construction practices can be continuously improved.

MICRO AND SMALL ENTERPRISES SHOULD:

- Create and join collaboration platforms to offer integrated renovation services and advice to their clients.
- Invest in training and upskilling of their workers by making increased use of governmental support systems. While small and micro enterprises may lack dedicated resources to train their employees, it is important to recognise the lack of a qualified workforce as a challenge for their sector and make efforts to exploit all existing opportunities from local or national authorities.

¹⁰ European Construction Sector Observatory. 2017. *Analytical Report – Improving the human capital basis*

¹¹ European Construction Sector Observatory. 2019. *Trend Paper – Integrating digital innovations in the construction sector: The case of 3D Printing and Drones in construction*

¹² BPIE. 2020. *Industrial net-zero renovation in Europe: Case studies from the Netherlands, France and UK*



DEVELOPERS

Real estate developers are responsible for managing and coordinating different processes and activities related to buildings. They initiate construction projects, buying land in order to sell or lease the final construction, and carry out renovation of existing buildings, also with the purpose of selling or leasing them.

In general, they work very closely with the building designers and construction companies they commission.

Real estate developers are key actors in the construction and renovation of commercial and residential buildings. They generally cooperate with many actors along the building value chain and have the capacity to influence the renovation market due to comprehensive building portfolios.

IN PARTICULAR, DEVELOPERS SHOULD:

- ◆ Ensure their building renovation projects meet the highest standards: set nearly zero-energy targets and objectives for all renovation projects.
- ◆ Develop comprehensive handover processes with building users and owners concerning the energy management of a building, establish feedback loops (including post-occupancy evaluations) and meet regularly during the building defects liability period.
- ◆ Implement internal energy and greenhouse gas standards for new and renovated buildings, either using internal expertise or engaging with a third party verifier.
- ◆ Engage in urban regeneration projects. Renovation of neighbourhoods, with consideration both to social cohesion and to environmental and climate challenges, can improve people's quality of life at the city scale. Developers should prioritise regenerating urban areas rather than developing greenfield land.
- ◆ Support communities. Identify and meet the real needs, requirements and aspirations of communities and stakeholders; involve them in key decisions to create a sense of community and ownership
- ◆ Enhance biodiversity and create healthy environments – improve living, leisure and work environments, and integrate nature-based solutions in their projects.
- ◆ Use resources effectively. Develop comprehensive resource management plans, including, energy, water, materials and land, during construction, use, renovation or disposal. Develop measures to avoid unnecessary waste due to short life, poor design, inefficiency or inadequate quality of construction and manufacturing processes.
- ◆ Develop buildings which are affordable and respond to the needs of a sustainable society over the course of their lifetime.



SUPPLIERS OF ENERGY EFFICIENCY SERVICES

Energy auditors, installers, ESCOs, technical and advisory services

Energy auditors, installers, energy service companies (ESCOs) and providers of technical and advisory services are most often the gatekeepers of the relationship with building occupants in energy renovation projects. As a result, these professionals have a clear influence on decisions concerning building renovation or building components replacement.



Energy auditors, installers, and providers of technical and advisory services very often provide direct advice to building owners, especially of residential buildings, on renovation decisions or replacing components. These professionals are therefore crucial in shaping building owners' choices and behaviours.

THESE SERVICE PROVIDERS SHOULD:

- Receive regular training so as to be able to advise about and implement the installation of the best available solutions. Very often installers or providers keep proposing the same (outdated) technical solutions to building occupants simply because they do not have the skills to install or propose more innovative solutions.
- Create awareness among prospective clients about the multiple benefits of building renovations, especially in relation to improved comfort.
- Monitoring and share the results of energy efficiency measures and track performance improvements to ensure quality and transparency and contribute to data collection at local level.
- Be a member of a (national/regional) system which encourages independent advice on measures and should benefit from recognised qualification certification schemes.

SUPPLIERS OF ELECTRICITY, FUELS AND DISTRICT HEATING



Power companies,
heating suppliers

Utilities and fuel suppliers provide energy to building users. Building renovations have a clear impact on the quantity and type of energy they can sell to their clients. They also have accurate and granular information and data about their clients' consumption patterns.

To decarbonise the building stock, energy efficiency measures in buildings should be accompanied by the provision of sustainable renewables-based electricity and heating energy. Heating and electricity suppliers can make a clear contribution towards a climate-neutral building stock by being directly involved in building renovation projects.

ELECTRICITY AND FUEL PROVIDERS SHOULD:

- ⚡ Switch their business models from selling a unit of energy to selling energy services: decoupling revenue streams from quantity of energy sold enables them to support efforts to reduce energy consumption. Energy efficiency obligations under the Energy Efficiency Directive (Article 7) already serve this purpose. When the obligated parties (e.g. energy companies) carry out energy efficiency measures to comply with this obligation, they should favour measures that bring long-lasting energy savings, like building renovation. In this framework, they should offer tailored renovation services to clients based on energy consumption profiles and revenues.
- ⚡ Utilities should implement on-bill financing measures to facilitate the financing of affordable energy efficiency solutions to their clients. On-bill financing is a method of financing energy renovation investments by addressing the upfront costs of energy efficiency upgrades. The capital costs are paid by the utility (or potentially a financial institution) and paid back over time by the customer on the utility bill. This model is slowly emerging throughout Europe¹³ and is already in use in the United States and Canada.
- ⚡ Provide transparent and accurate information about electricity and heating consumption to final users to empower them to make renovation choices and adapt their energy use behaviour. Smart meters can empower end-users by giving them a better understanding of and control over their energy use. Accurate measurement of energy consumption to provide real-time data is necessary to create a market for demand-response services.¹⁴
- ⚡ Provide granular energy consumption data to researchers and policymakers to enable monitoring and evaluation of policy effectiveness.
- ⚡ Offer demand-response solutions that enable buildings to become active players in the overall energy system. Energy companies can provide enabling technologies for demand response to customers by e.g. developing digital tools that allow end-users to check on the status of their home appliances and thermostats and to take control.¹⁵
- ⚡ Explain to their clients the synergies between renewable energy technologies, especially for heating, and energy efficient building renovation. Reduced energy consumption of buildings is a prerequisite for effective and economic renewable heat installations.

¹³ See e.g. www.renonbill.eu

¹⁴ BPIE. 2016. *Smart Buildings in a Decarbonised Energy System*

¹⁵ BPIE. 2016. *Smart Buildings in a Decarbonised Energy System*



BUILDING OWNERS

Residential building owners, commercial buildings owners

Real estate markets vary considerably across Europe. Property markets are defined by property type, tenure and jurisdictions, leading to highly different ownership profiles across Europe. Properties have an important use value for businesses and households. Real estate is an investment asset that produces both income and capital growth.

Decision-making in residential and commercial real estate markets is influenced by many factors, and investors have different attitudes to risk. However, regardless of tenure and property type, owners determine whether to renovate or dispose of buildings, and how to access funding for renovation (e.g. private savings, loans, government programmes). They should be able to select the renovation depth and delivery method. It is the owner who usually outlines roles and responsibilities, establishes timelines and deliverables, and contractually determines the level of collaboration with trades and contractors. This can be a complex and challenging process, especially for residential owner-occupiers. Greater access to independent and trusted advice and clear information can help sensitise building owners to the importance of building renovation and increase their confidence in energy efficiency measures.



Building ownership has a clear impact on renovation decisions. When a building owner also occupies his or her property, especially for residential buildings, renovation decisions are not only, if at all, dominated by financial reasons linked to return on investment.¹⁶

FOR RESIDENTIAL BUILDING OWNER-OCCUPIERS, THE RENOVATION WAVE SHOULD GIVE THEM THE OPPORTUNITY AND TOOLS TO:

- ✔ Make informed choices when deciding to renovate their buildings by seeking specialised advice and by contacting qualified professionals and comparing their offers.
- ✔ Consider reliable information sources to better understand what they can do to improve the energy efficiency of their homes, and how to procure and finance energy efficiency solutions.
- ✔ Integrate health, environmental and climate considerations in their decisions to buy or renovate a building whenever possible.
- ✔ Easily access finance for renovation.
- ✔ Engage with neighbours, when living in a multi-apartment building, to raise awareness about improved living conditions resulting from building renovation.

INVESTMENT-DRIVEN BUILDING OWNERS SHOULD:

- ✔ Seek professional advice to understand and assess the risks of inefficient properties; develop and implement climate mitigation and adaptation strategies
- ✔ Ensure a proper foundation for the renovation/regeneration works by preparing a comprehensive investment analysis, business case, and building and energy performance requirements, taking into account the multiple benefits of energy efficiency improvements.
- ✔ Consider trading off lower operational costs for higher front-end capital costs (lifecycle vs. capital costs).
- ✔ Ensure that buildings regularly undergo energy audits and have well-functioning energy management systems in place.
- ✔ Appoint a well-trained energy and facilities manager.
- ✔ Ensure their buildings play an active role in the energy system by generating, storing and providing electricity to the grid and integrating demand response technologies.

¹⁶ In this case, renovation decisions are more dependent on making homes a comfortable and healthy place to live, while saving costs on the energy bills. See IPSOS. 2018. [Uncover the underlying motivations and barriers for energy efficient renovations](#)



CONCLUSIONS

If the many different groups addressed in this paper live up to their individual responsibility and take action, a healthy and sustainable future is possible for all.

The renovation wave is a unique chance to drive innovation and create new opportunities in the building sector while making European buildings fit for climate neutrality and creating better living conditions for all Europeans. Strong, coordinated action is needed, and each actor must contribute to a successful outcome.

The renovation wave will be made up of many components: step-by-step renovations and holistic ones, interventions that target specific segments of the building stock and those that focus on particular areas, sector-wide innovations and tailor-made solutions. All these will need to be accompanied by supportive legislation, enabling measures and appropriate access to funding.

IF DESIGNED AND RESOURCED PROPERLY, THE RENOVATION WAVE WILL:

- ✓ Stimulate local economies, while supporting societal cohesion and healthier living conditions.
- ✓ Support the achievement of climate goals and a just transition.
- ✓ Create new and better jobs along the construction value chain, and new economic dynamics in supporting services and industries on a regional and local basis.
- ✓ Improve the quality of our buildings and the indoor environment, reducing health problems related to poor building standards.
- ✓ Create investment opportunities in long-term real estate assets which provide better and healthier living and working conditions for people.

Focusing on saving energy is important, but not sufficient. In fact, we need to give our buildings a much more humane architecture, fulfilling our need for sustainable and socially oriented living conditions.

IN A CLIMATE-NEUTRAL EUROPE, BUILDINGS WILL BE...





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