Blueprints for replicating lighthouse districts

Guidance for municipalities, housing providers and companies to create thriving affordable housing neighbourhoods

Short version

SHAPE .EU

European Affordable Housing Consortium

Coordinated by

HOUSING EUROPE

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Short version / 2024

This publication constitutes a short version of the full *"Guidance for municipalities, housing providers and companies to create thriving affordable housing neighbourhoods".* The full version is available in English only and is accessible on the European Affordable Housing Consortium's website . This short version is available in English, French, Dutch, Estonian, Italian, and Spanish to give opportunity to a wider audience to access some of the knowledge contained there in.

The European Affordable Housing Consortium, SHAPE-EU is the point of reference for a socially-inclusive Renovation Wave and New European Bauhaus.

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Cover photo credit: Social Housing, Goedkope Woning in Kortrijk, Belgium - Responsible Housing Awards 2016

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Introduction

The European Commission's Renovation Wave strategy for Europe aims at least doubling renovation rates in the EU by breaking down long-standing barriers to energy and resource-efficient renovation as well as improving reuse and recycling. In numbers, this could and should result in 35 million renovated buildings for people and neighbourhoods by 2030.

The acceleration of renovation, however, should not come at the expense of **social fairness and affordability.** The transformation needs to be about providing **decent affordable homes in places where people can reach their full potential; about resilient communities, turning former no-go areas into places people are proud to live in; and an opportunity to change from linear to a circular system thinking approach.** Within this remit, escalating from a single building to the scale of a neighbourhood or district is an approach that would not only benefit from economies of scale and attract larger investments, but also be a suitable scale to involve residents in co-managing the process of building cohesive, thriving communities.

A partnership of public, cooperative, social housing providers, municipalities and companies in the construction and social economy sectors, as well as experts in the financial and social innovation field from the European Affordable Housing Consortium have come together to create **a set of blueprints to help local promoters across Europe create thriving communities in existing social and affordable housing districts.** These are based on the collection and organisation of information that is already available but remains scattered or simply not accessible.

The blueprints aim to encourage these actors to go beyond the traditional way of approaching decarbonisation towards integrating people-centred approaches with innovative building materials, services, processes, or new business models.

Who can use them as a source of inspiration?

- Housing providers (social, public, cooperative, and community-led providers of affordable housing).
- Municipalities.
- Companies in the construction ecosystem, including renewables, digital, electronics and other technologies for the housing sector.
- Companies in the proximity, social economy, and civil security ecosystem: social housing services and other social services that are active in housing districts, for example, incubation, and entrepreneurship support.
- Companies in the health, culture, and creative culture industries as these might be crucial for the co-creative and aesthetic aspects of renovation.

It is recommended that the blueprints are used in combination with other references and tools to support the decision-making process, including for instance digital tools to help elaborate different scenarios of renovations and choose the most appropriate one.

Structure of the Blueprints

Thriving social and affordable housing neighbourhoods require a comprehensive and inclusive approach guided by principles of **equity, affordability, low-carbon growth, and community engagement.** Central to this approach is the recognition that housing is not merely a physical structure but a fundamental determinant of one's quality of life, influencing health, education, and economic opportunities. For this reason, the blueprints consist of guidance on three complementary dimensions:

In the first section ("Overview") the related challenges are introduced and the scope is framed as a set of questions. The second section ("Recommendations and Good Practices") contains possible responses to the questions in the form of suggestions, step-by-step guidelines, and/or advantages and disadvantages of each approach, illustrated with examples/ good practices. Finally, a third section includes the list of references for further reading.

PEOPLE AND COMMUNITIES	TECHNOLOGIES & TECHNICAL APPROACHES	GOVERNANCE, FINANCE AND PROCESSES
• Supporting residents during renovations. • Engaging with occupants and co-designing renovation projects. • Promoting co-ownership of dwellings and utilities • Using mediation techniques. • Renovating multi-apartment blocks. • Neighbourhoods of tomorrow.	• Developing industrialised approaches. • Using modular building systems. • Applying a circular approach. • Energy efficiency at the district scale. • Digitalising housing services provision. • Promoting the uptake of new technologies.	• Choosing the right financial models and ensuring financial feasibility. • Regulatory landscape. • Ensuring cost-neutrality. • Overcoming split incentives between owners and tenants. • Delivering SME, Innovation and Partnership-friendly procurement. • Supportive spatial planning approaches. • Design and architectural approaches to combine multiple purposes.

Table 1. Topics covered in the blueprints (in colour, topics covered in this short version).

Notice: This guidance has been developed in a spirit of observation and reflection on current innovative practices in social and affordable housing renovation. As the related knowledge is ever evolving so do its advice and references. However, the underlying principles of integration, democracy, and partnership should remain and be considered long after the project duration.

Guidelines to create thriving districts

Chapter 1

People and Communities

1.1 Supporting residents during renovation

European Affordable Housing Consortium

Source: Multigenerational housing, HABION in Utrecht (Netherlands) Responsible Housing Awards 2019

1.1.1 Overview

In most decarbonisation projects that require deep energy retrofit, the occupants cannot live or stay all the time in their homes. The renovation work (façades, installations, structures) will be occupying those spaces, important components (walls, windows, floors) will need to be replaced, or the work will entail considerable nuisances (noise and dust) which will make the living spaces ill-suited for occupation.

If a deep energy retrofit is necessary, the occupants must be assisted with alternative accommodation. Alternatively, the project must be organised in such a way that the dwelling can still have the living conditions required. A clear advantage of relocation is that the renovation can be completed without affecting the occupant's claims during the renovation process. On the other hand, additional challenges occur when relocating tenants, even if only temporarily. Understandably it is frequently a challenge to find, manage and finance alternative accommodation. Preference must be thus given to solutions that have the shortest, less costly, renovation process while ensuring the least nuisance to the occupants.

Another approach will be to organise and phase the renovation process so that the tenants can temporarily use empty dwellings when they cannot be in their own. Once again, housing providers will have to support the vulnerable tenants during the whole process of emptying the dwelling and the moving actions.

Find answers to your questions on the following topics:

I. What can be done to reduce nuisance during renovations?
II. How can renovation projects be organized so that the occupants do not have to move completely to alternative housing?
III. What are important aspects to consider when providing alternative accommodation for tenants during the renovation?

1.1.2 Recommendations and Good Practices

1 What can be done to reduce nuisance during renovations?

When renovation work is being performed, disruptions can be frustrating for those who spend their day at home. Even if renovations do not affect individual apartments, the rest of the building or area may be undergoing works, such as drilling, or windows may be covered for extended periods. The noise, dust, scaffolding, and irregular parking during renovations can be disruptive to residents. If one works in shifts and needs to sleep during the daytime or works from home, the long renovation periods may be invasive and stressful. There is no doubt that renovation can cause severe problems for the neighbourhoods.

Renovations will inevitably disrupt the tenants. Therefore, it is essential to determine the housing provider's legal responsibility and cooperate with the tenant to achieve a reasonable agreement. The contractors will have to identify potential nuisances (including noise, dust, odours, vibration, and other sources of pollution) caused by renovation measures and the significant adverse impacts they may cause.

There are **several precautions** that the housing manager can take to reduce or avoid nuisances during renovation constructions:

- **Communicate with the neighbourhood** to inform about the renovation processes and potential nuisances.
- Carry out renovation works only at **reasonable times and limiting noisy** activities to specific periods.
- **Use appropriate construction equipment** and materials placement, minimising demolition or crushing dust, and timely construction and renovation debris clean-up.

- **Set up effective transportation routes** to avoid scattering of garbage during transportation.
- Conduct **proper waste management.**
- Use well-maintained, low-noise machines that **minimise vibration and perforation.**
- Use **preventive measures,** where possible, to minimise noise transmission through natural or dedicated barriers or shielding of other buildings.
- Commission the construction and management of housing renovation works to contractors with sound operational management and mature construction skills.

In addition, when renovating, it is necessary to pay attention to specific groups, such as older adults and people with disabilities. Renovations may be troublesome and even cause anxiety, and those who move before renovations often mention a desire to avoid disruption or evacuation. Elderly groups often experience unpleasant and new experiences. In these situations, the support that vulnerable people need can sometimes be complex for those without disabilities to grasp fully. For example, knowing what to pack may take work when one needs to relocate temporarily. The inherent squalor and poor conditions around the buildings may be an extra burden, especially for people who need mobility aid to move.

2 How can renovation projects be organised so that the occupants do not have to move completely to alternative housing?

There are several practical approaches to organising a renovation project so that occupants do not have to move to replacement housing altogether.

- **Relocate tenants in the same building or complex.** This can be done in an interim basis until their original unit is renovated and ready for them to move back in. This way, tenants can continue to live in the same community and avoid the stress and disruption of moving to a new location. Provide tenants with detailed information about the new unit's location, the expected move timing, and any other important details to minimise confusion and uncertainty. When relocating tenants to a new unit within a building or complex, consider their preferences, such as their preferred floor, size of the unit, and location within the building. Offering tenants moving assistance, such as providing moving boxes and equipment or even hiring professional movers, to help make the transition as smooth as possible.

- **Adopt a multi-phase renovation:** break the renovation project into smaller, manageable phases, each with its own schedule, budget, and scope of work. Splitting the renovation project into multiple phases, one at a time, in one building area allows for different areas to be renovated at different times. This measure also allows occupants to continue living in other parts of the building while work is done in one area. And the non-occupied parts can be renovated, thus minimising the disruption to their daily lives. In addition, this measure also requires creating a master plan that includes all phases of the renovation, including the scope of work, schedule, and budget for each phase. This will help ensure that the project runs smoothly and within budget.

- **Adopt staggered construction schedules:** work on one unit or floor of the building at a time rather than all units/floors simultaneously, allowing

occupants to continue living in their units. In the meantime, work is being done on adjacent units. Staggered construction schedules are an effective way to organise a project so that occupants do not have to move to another location altogether. Prioritise the units or floors that need to be renovated first, and then develop a schedule that staggers the renovation of each unit/floor. Staggered construction schedules require coordination with multiple trades, such as electrical, plumbing, and HVAC, to ensure that work is completed efficiently and in the correct sequence. It is also possible to keep certain areas of the building ready for occupancy while other areas are being renovated. This may involve enclosing renovated areas and installing barriers to control dust and debris. Timing is also important when implementing a staggered construction plan. For example, if some units/floors have occupants who are elderly, have children, or are disabled, it is important to plan and organise the renovation schedule in such a way as to avoid disrupting their daily lives or access.

- **Provide temporary housing solutions:** arrange on-site trailers, off-site apartments or other temporary accommodation if occupants need to leave their unit temporarily. Another option is to rent an apartment or other short-term housing unit locally for occupants to stay in during the renovation. For example, the occupant could temporarily stay in a nearby hotel or motel during renovation. Coordinating with other properties with temporary vacancies, such as nearby apartment complexes or hotels, helps minimise the number of people needing alternative housing during the renovation process. Overall, it is important to have a temporary housing plan before the renovation begins so that occupants are aware of their options and are prepared to move to temporary housing if necessary. It is also important to ensure that the temporary housing solution is comfortable, safe, and easy to use and that occupants are aware of the timeline and duration of their temporary accommodations.

- **Communicate with occupants:** communicate with occupants about the renovation schedule and any necessary temporary relocations. Providing alternative solutions for occupants will ensure that the renovation process goes as smoothly as possible. Provide a communication channel or platform for the occupants to ask questions and report issues or concerns. This can be via email, phone, website, or messaging app. By keeping homeowners informed and involved, you can help build trust and ensure a positive experience for all involved, which benefits both the occupants and the renovation process. It is also beneficial to communicate and coordinate in advance with other buildings or communities that may have temporary vacancies, which can reduce the risk of disruption to their daily lives and ensure a smooth and successful project.

- **Adopt modular building construction methods:** minimise onsite construction work by using prefabricated building modules, which can reduce completion time compared to traditional construction methods. This means that occupants can return to their units faster, thus minimising the time they spend in alternative housing. On the other hand, with modular construction, renovation work can be done on a unit-by-unit basis, which means less disruption to the occupants' daily lives. This is because the work is done in a closed environment, away from the occupied units. Modular units are constructed in a controlled factory environment, which enhances quality control and reduces on-site delays due to weather or other factors. It is important to note that using modular construction methods is not always the best option, depending on the type of project and specific requirements. For example, retrofits involving complex or specific architectural designs may not be suitable for modular construction methods. The best approach is to evaluate the feasibility and benefits of modular construction methods for specific retrofit projects and make decisions accordingly.

Photo credit: Arch. DI Christof Reich

Wir inHAUSer Project

Salzburg, Austria • Western Europe

In the inHAUSer Project tenants were supported throughout as the renovation works demanded relocation for one and a half years. This process was facilitated by the cooperation of five social housing providers in Salzburg who made their stock available for temporary needs of the project.

3 What are important aspects to consider when providing alternative accommodation for tenants during the renovation?

It is **important to minimise the impact on tenants** while ensuring that the work is completed effectively and efficiently. Some of the best ways to provide alternative accommodations for tenants during energy retrofits are as follows:

- **Assisting with off-site rental housing.** This may be a good option if there are no suitable vacant units on the property or if paying or arranging for tenants to move into off-site rental housing, such as apartments or hotels, while renovations are underway. It will be a challenge to find something suitable and affordable being available. Research and identify rental options that are appropriate for tenants in the area, considering cost, location, security, and amenities and offering tenants a relocation package that includes moving expenses and other associated costs. It is important to note that relocating a tenant to off-site rental housing can be disruptive and may cause additional stress to the tenant. Therefore, providing as much support and assistance as possible during this process is critical.

- **Thoughtful renovation planning and communication.** For tenants who may not want to move or have other constraints, it is important to carefully plan renovation work, schedule work around residents, and maintain good lines of communication with them to minimise the impact of the work on their daily lives. Tenant convenience, comfort, and renovation costs must be considered. Also, consider phased renovations that alternate between units so tenants can stay in them. In contrast, renovation work is being done in adjacent units, thereby reducing the number of tenants displaced at the same time.

- **Offering incentives for participation and relocation assistance.** In some cases, offering incentives such as rent discounts or utility bill reductions can encourage tenants to participate in energy retrofit programs and temporarily vacate their units while work is being done. Provide tenants with relocation assistance, which can help cover moving costs and/or

provide other forms of support during the transition, such as financial assistance or counselling services.

The alternative accommodation provided should meet the same safety and occupancy standards as the original unit and that tenants should be adequately informed and assisted in transitioning to the new accommodation. Remembering the legal rights and responsibilities of tenants and landlords concerning renovations and temporary relocation is equally important.

1.1.3 Further reading and online resources

P Femenias et al (2022). "The voices of vulnerable tenants in renovation". IOP Conf. Ser.: Earth Environ. Sci. 1078 0120.

BPIE (Buildings Performance Institute Europe) (2021). Deep Renovation: Shifting from exception to standard practice in EU Policy.

Reindl, K. Agency and capacity in the planning and design phase of building renovations. Energy Efficiency 13, 1409–1425 (2020).

BMG (2022). "How to Avoid Eviction and Still Get a Tenant to Move Out".

SHELTER (2022). "Moving out during repairs".

SHELTER (2022). "Problems during repair work".

WirINHause project.

Urban Rehabilitation Programme in the City of Pécs.

Photo credit: City of Pécs, Pixabay

Urban Rehabilitation Programme in the City of Pécs

Pécs, Hungary • Eastern Europe

This project included the resettlement of residents during renovation works in specially developed housing containers. Additionally, the promoters carried out an active programme before and while people were relocated: community building activities, forums, workshops, inviting notable individuals to speak, and activity clubs such as the Craft Club, Photography and Film Club to improve the community spirit.

Chapter 2

Technologies and Technical Approaches

2.1 Developing Industrialised Approaches

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Photo credit: Scherillo Affori cooperative housing in Milan by ABITARE

2.1.1 Overview

While the building sector belongs to the industrial sector, it has not seen the same level of productivity rise as other areas in the last decades, which were brought upon by new automation and digitalisation-based systems. Indeed **the cost of construction projects have risen faster than inflation.** This gap is pronounced for example in France and Germany, where construction costs rose by around 60% between 2008 and 2016, while the inflation, measured by the consumer price index, rose by 10%.

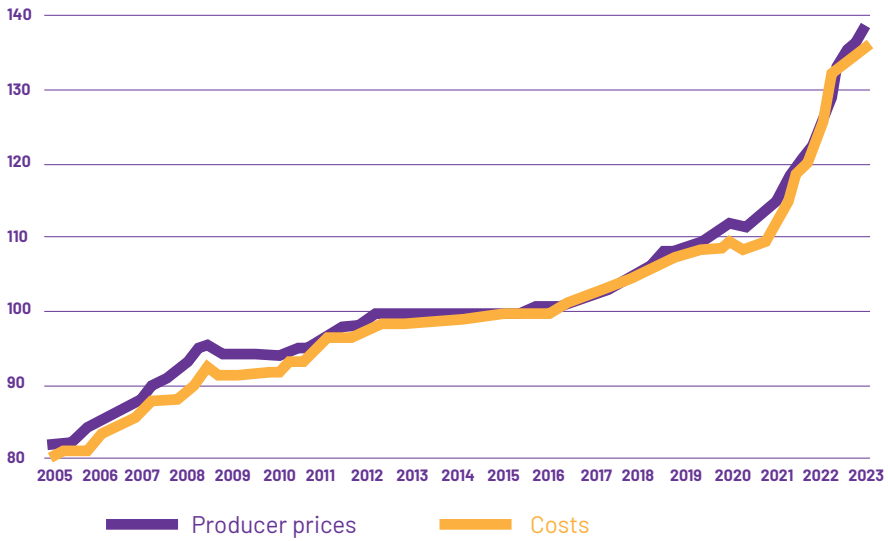

Figure 1. Construction costs since 2005 (Source: Eurostat)

The use of industrialised approaches in construction and renovation is being put forward as one solution to improve the productivity of the sector. These are facilitated by improvements in Building Information Modelling (BIM) and standardised, modular solutions (see Modular Building Systems sub-chapter in the full version). Digital models are used to build and adapt solutions to the buildings, which are then prefabricated in a controlled, offsite environment. And then set up and applied at the building premisses in a fraction of the traditional time. **Industrialised renovation makes it possible to achieve a high volume of renovations in a limited time, making them cheaper and quicker to install,** which is why they are frequently mentioned in the context of achieving the ambitious renovation targets of the EU.

In addition to price, **industrialised construction improves delivery times.** Between 80% and 95% of the work is carried out in the factory, a method of operation that allows the different stages of a construction project (which traditionally follow one another), to be carried out simultaneously. Industrialisation and, above all, the assembly process, reduce the risk of unforeseen risk events and therefore allows for predictable outcomes. The value created by productivity gains could also be transferred to customers in the form of lower prices, through additional services in housing (personalization, etc.), employees in the form of higher salaries, or subcontractors in the form of higher margins.

Another advantage of industrialised construction is quality control. Combining a digital model with industrial machines allows high precision design. This entails industrialised processes with effective quality control. As with industrial assembly lines in other sectors, quality issues can be identified as soon as the modules leave the assembly line and solutions can be found even prior to the modules being shipped to the site. Thanks to constant checks, identifying failures is easier in this environment than on a building site.

The questions to be addressed in this section are:

I. What are the requirements for a company to adopt an industrial approach to renovation?
II. What actions can a buyer (housing owner) of industrialized approaches put in place to encourage this kind of renovation?
III. What are some of the drawbacks associated with industrialized approaches?

2.1.2 Recommendations and Good Practices

1 What are the requirements for a company to adopt an industrial approach to renovation?

Adopting an industrial logic in the renovation of a given building implies that the building company chooses to undertake this approach. As a novel approach, the company should be prepared to adopt the required processes that the approach entails. The following requirements should be anticipated:

a) Developing an industrialised renovation product
Industrialisation cannot take place without a pre-designed standardised product. Industrialisation is inserted into the process of creating the standardised product so that it can be prefabricated on a large scale, reducing costs, time and improving quality. The product must therefore be designed for large-scale production. Industrialisation can only be achieved through a triple transformation leading to digital design and monitoring, centralised and automated production sites and lean manufacturing.

b) Digitalising the retrofit process through Building Information Modelling (BIM)
The use of BIM is becoming increasingly prevalent in the construction sector. In the context of industrialised energy retrofitting the extensive use of these digital tools is essential to guarantee the correct production of prefabricated elements according to an industrial logic. A specific section on BIM is available in sub-chapter 2 on prefabricated modular systems in the full version of the Blueprints.

c) Considering non-standard building specificities
Building-specific constraints may cause difficulties to the application of industrialised solutions and increase costs or installation times. These constraints may be related to heritage protection, façade offsets, the proportion of glazed surfaces, the presence of asbestos or fire constraints and the need to take account of existing cabling. It is then recommended for companies to identify which building archetypes adapted to their solution in order to bid on adapted contracts.

d) Integrating up-front investment into the company's strategy
The investment cost of developing a solution and then setting up production lines can be high. As construction companies often work with tight profit margins, they are often reluctant to invest in new processes. An industrialised approach investment often represents 15 to 20% additional cost compared to traditional construction or retrofit methods. Companies must therefore calculate the critical number of renovations needed to achieve profitability. As industrialised solutions require design costs to be mobilised, it is often more cost-effective to start with the social housing sector, where the potential for replication and the resources of social housing organisations are greater than for private owners.

Photo credit: Social housing provider Vilogia in France

An Industrialised Approach to Renovation in France

Wattrelos, France • Western Europe

In the BuildUp project an off-site energy renovation was carried out for a social residential area in Wattrelos, France. The façade and roof elements were prefabricated in a fully automated process. The company then wrapped the buildings in an insulating envelope of pre-assembled, energy-efficient elements. In ten months, it renovated 160 social housing units zero energy.

2 What actions can a buyer (housing owner) of industrialised approaches put in place to encourage this kind of renovation?

Industrialised approaches imply a change to the common binary procedure that is prevalent in construction: project management first, construction contracting later. Indeed, an industrialised renovation service provider often sells a complete engineering and materials service. Also, given the tight margins often, any company will require a large volume of orders to make their product profitable. In this sense, there are a number of actions that the housing owner (contracting entity) can put in place to favour industrialised approaches and attract innovative companies:

a) Working on a common set of specifications to adapt contract volumes to industrial standards

Project owners (and in particular social housing owners) can group together and work on a common set of specifications, allowing them to commit a significant volume of housing to be renovated and to give visibility to solution providers.

b) Offering multi-year orderbook visibility to companies on housing stock retrofit demand

Industrialisation implies, as explained above, committing large volumes of production to be competitive. Thus, it is advisable that project owners devise a multi-building / multi-year contract agreements for a high volume of housing to be renovated, so that they companies are able to provide an economical solution and adapt their production capacity to cater for the future demand.

As part of the EnergieSprong movement, groups of social housing organisations have given companies in the Netherlands and in France (Pays de la Loire and Auvergne Rhône Alpes) visibility of their renovation portfolio over a number of years. This was done via commitment charters,

or "market development clubs" organised between companies and the social housing organisations, allowing synergies between supply and demand players. As the companies were able to anticipate the market volume necessary for payback, they were able to develop a catalogue of lower-cost renovation solutions that fit the needs of the housing providers.

c) Taking into account industrialisation techniques in the award criteria in energy renovation procurement

Owners have the power to direct the choices made by contractors through the technical specifications in energy renovations tenders. Contracting authorities can include criteria such as volume thresholds, time on-site, serialised renovations, or other industrialisation-based requirements in the contract award criteria to encourage bidding from the appropriate companies.

3 What are some of the drawbacks associated with industrialised approaches?

Apart from the multiple benefits addressed above, industrialisation is not without its drawbacks, which can sometimes seem counterintuitive. These are some of the challenges to take into account:

- **Dependency on global supply chains:** the reliance on a globalised supply chain for materials and components makes the construction industry susceptible to disruptions, leading to project delays and increased costs during supply chain interruptions. This was the case of the Covid-19 years, where global supply chains were disrupted and a number of sites renovated with industrialised approaches were ground to a halt.

- **Loss of craftsmanship:** standardised and repetitive industrial processes can diminish the need for skilled craftsmanship, leading to a decrease in traditional building techniques and the uniqueness of building architecture and structures.

- **Job displacement:** automation and machinery in industrialised construction may replace manual labour, resulting in shifts in work offers and challenges for workers who lack the necessary skills for new technologies.
- **Environmental Impact:** mass production and resource-intensive processes in industrialised construction may contribute to localised environmental degradation.

2.1.3 Further reading and online resources

L'industrialisation de la construction, Bernard Michel and Robin Rivaton, Ministère Chargé du Logement, 2021

Reinventing Construction: A route to higher productivity, McKinsey Global Insitute, 2017.

Climbing the Curve, Global Construction Project Owner's Survey, 2015

VEFA, les acquéreurs particulièrement mal lotis, UFC Que Choisir, 2018

EnergieSprong, France - In Wattrelos (FR)

Chapter 3

Governance, Finance and Processes

3.1 Choosing the Right Financial Models and Ensuring Financial Feasibility

SHAPE
European Affordable Housing Consortium

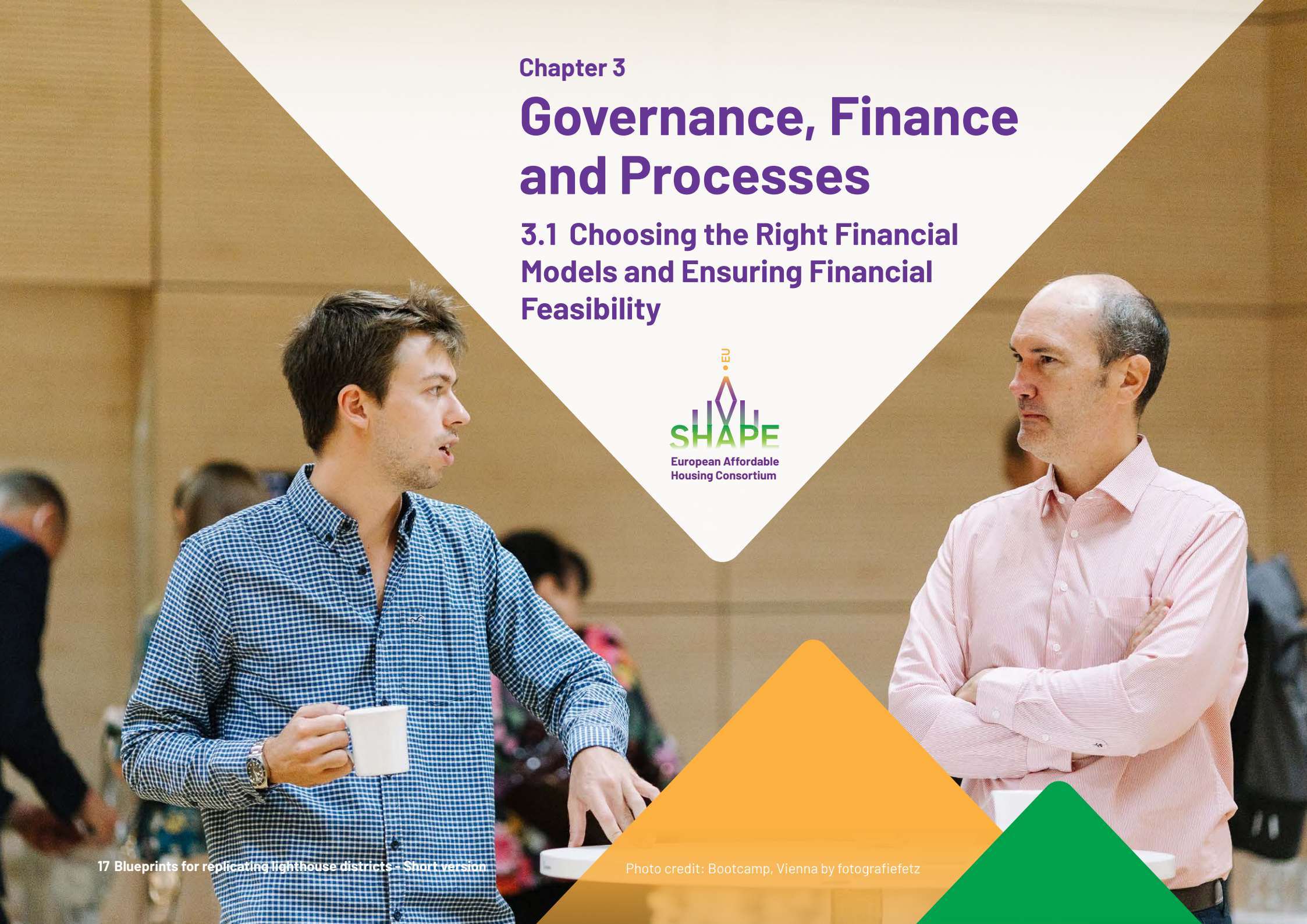

Photo credit: Bootcamp, Vienna by fotografiefetz

3.1.1 Overview

Energy renovations for affordable housing pose a **significant financial challenge for both small housing providers and especially low- and middle-income homeowners.** For social housing tenants, maintaining affordability means that the total living cost - including rents and energy expenses - does not increase. The European Commission is advising Member States to incorporate renovation considerations into financing regulations for both public and private sectors, with a focus on developing supporting mechanisms for low-income households.

Renovation costs encompass various expenses beyond construction materials and labour, including environmental cleanup, consulting, and financing costs. There are significant differences between social housing providers and privately-owned housing actors.

The objective of this chapter is to **provide some insights into financial planning and returns on investment assessment.** This involves considering a blend of funding sources, both public and private, alongside business models like Energy Performance Contracting. The scope extends from light to deep energy renovations, addressing both building and district-level initiatives for social and affordable housing owners, public entities advocating for private housing stock renovation, and privately owned affordable housing with low incomes.

To facilitate the understanding in such a complex domain, the following questions will be addressed:

I. What should we consider to achieve financial viability and how can we ensure a fair and equitable return of investment (ROI)?
II. What private and public financing options are available for building energy renovations?
III. What are the different financial models?
IV. What does Energy Performance Contracting stand for, and which are the different options?
V. Which are the different types of citizen investment models in renewable energy projects?

3.1.2 Recommendations and Good Practices

1 What should we take into account to achieve financial viability and how can we ensure a fair and equitable return of investment (ROI)?

STEP 1: Information gathering and advisory:

First of all, **any decision making should be informed,** which means:

- to be informed about the level of energy rehabilitation of the building to be performed.
- gather information and decide whether to incorporate renewable energy self-production (solar panels or others).
- order an energy audit to know the costs of the investment and subsequent savings.

Detailed assessment of the costs is necessary. In this sense, for larger complex projects, and before any larger undertakings, **it is advisable to develop smaller scale (pilot) renovations.** This will contribute to developing added insights into the approach's feasibility and come up with improved cost energy savings estimations.

In the case of privately multi-ownership properties (prevalent in East Europe for example), this approach is made difficult as there is substantial uncertainty on who will renovate their property . In addition, the apartment owners often have limited technical knowledge to decide on the best renovation option and capacity to control quality. For these reasons, public authorities choose to intervene to support homeowners via a one-stop-shop or other mediation facilities, often within a large renovation programme.

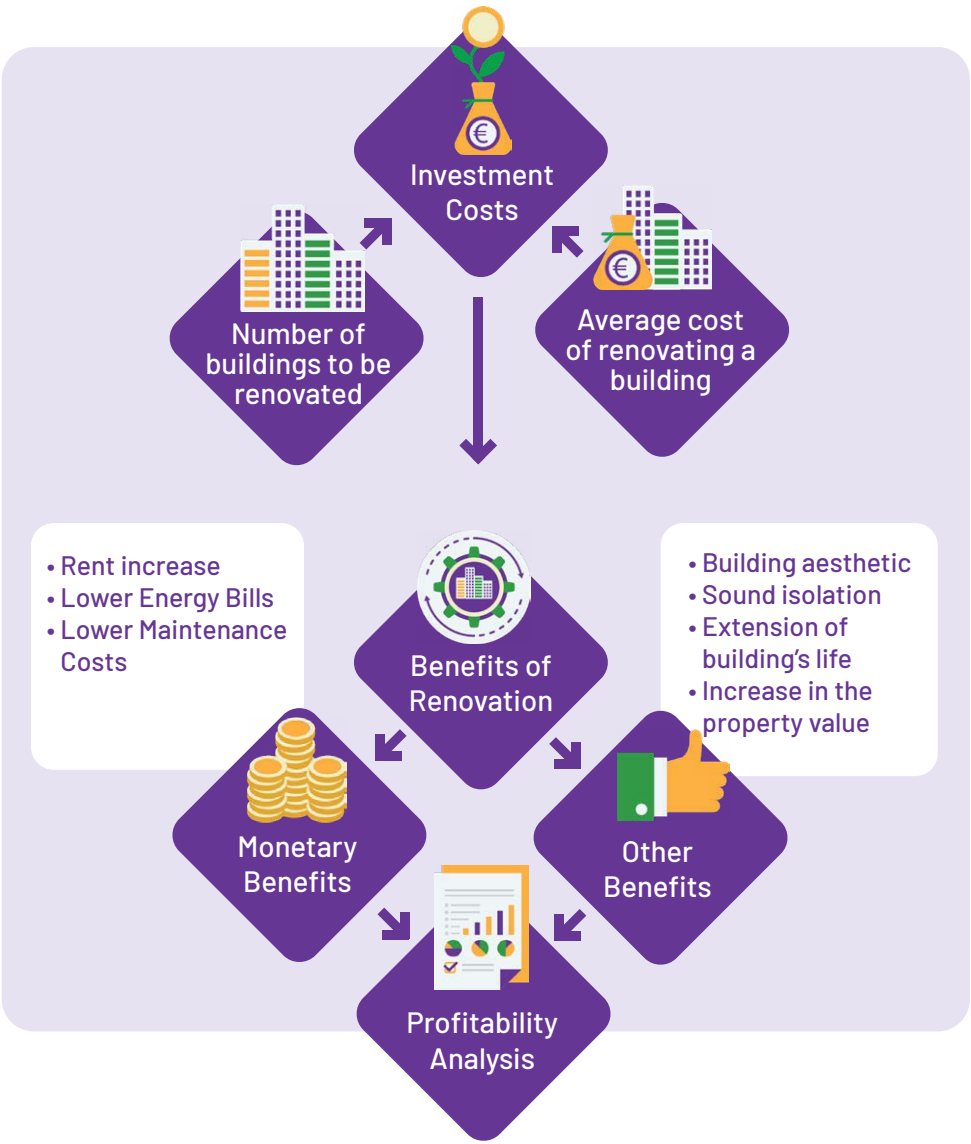

Figure 2: Financial Feasibility of a building renovation project.
Source: GNE Finance own elaboration

Photo credit: Bill Mead, Unsplash

Energy-efficient Refurbishment Programme

Germany • Western Europe

The Energy-efficient Refurbishment Programme (KFW) in Germany comprised the commitment to modernise 181,000 homes. The programme could either include a pre-decided package of modernisation measures to attain a KfW level efficiency house standard or the owner could implement customised measures towards reaching similar targets. As of 2011, the programme supported 45,000 building projects.

STEP 2- Assessment of the required investment

The next step is the actual assessment of the required investment. This depends on the number and type of buildings to be renovated and as well as the scope of renovation works.

The **cost of renovation is a key factor when deciding on a financing strategy,** notably the required improvement level of the energy performance of the building (energy efficiency measures and/or use of renewable energy). **Energy renovations have sharply declining returns,** i.e., increasing the EPC (energy performance certificate) label from B to A is substantially costlier than raising it from D to C. In other words, higher marginal costs provide smaller benefits. Hence, **a decision to renovate should be based on a careful balance between the intervention's costs and future energy savings.** However, new parameters are now being incorporated into the assessment of the renovation cost of a building, such as the building or material lifecycle, or considerations related to material reuse or recycling. This allows for a longer-term perspective and the addition of new parameters to the renovation equation, namely calculating present costs and future savings. As this approach is novel and seldom used in the private sector banking, it may be (or become) a powerful argument in public grant applications.

STEP 3 - Profitability analysis

A profitability analysis is used to evaluate the ability of a project, investment, or activity to generate economic returns in relation to associated costs.
In the context of the energy renovation of buildings, this analysis includes assessing whether the investment required for the renovation can be offset by the economic benefits derived from that renovation, such as reduction in energy costs, increase in property value, among other factors.
Deep energy renovations, such as those needed to achieve net-zero objectives, represent a substantial cost for the housing provider. Additionally, public policy plays a determining role. For example, such costs can become economically feasible if CO2 price / taxes are allowed to rise.

At present and given the state of the building stock in Europe, **the extent of renovations required by the Renovation Wave are deeply dependent on loans or grants to ensure financial viability.** Fortunately, many countries offer such grants. The European Affordable Housing Consortium developed a Funding Simulator with an indication of funding opportunities . Additionally, a number of banks such as the EIB and the CEB have dedicated funding for the EU Green Deal investments. The following table shows what these financial institutions are normally looking at when analysing a project.

OWNER TYPE	RENOVATION BARRIERS	ECONOMIC AND NON-ECONOMIC BENEFITS	FINANCIAL INSTITUTION ANALYSIS
Privately Owned Buildings	• Lack of profitability analysis by owners • Significant barriers preventing energy investments (e.g., access to information, priority of energy investments) • Financial constraints and limited capacity to pay for low-income households	• Reduction in energy bills • Potential increase in property value • Improved comfort and living conditions • Potential access to grants or subsidies to offset renovation costs (assuming eligibility)	• Capacity to implement the project on time, within budget, and with good quality • Assessment of the financial viability and risk associated with the renovation project • Consideration of the owner's financial capability and creditworthiness • Evaluation of potential collateral or guarantees provided by the owner
Social and Affordable Housing	• Complexity in implementing large renovation programs • Capacity constraints for building owners (public entities or non-profits) • Limited resources for creating dedicated implementation units	• Reduction in energy bills for tenants, potentially leading to lower rent costs • Improved living conditions for residents • Potential access to grants or subsidies to offset renovation costs (assuming eligibility) • Enhanced reputation for public entities or non-profits managing the housing	• Evaluation of the capacity of the building owner to manage and oversee the renovation project • Assessment of the financial resources and capabilities of the public entity or non-profit • Consideration of potential funding sources and partnerships to support the renovation project • Analysis of potential long-term financial sustainability and return on investment
Privately Rented Housing	• Investment financed by landlords) • Lack of profitability analysis by owners	• Reduction in energy bills for tenants, potentially leading to increased tenant satisfaction • Potential increase in property value • Possible access to grants or subsidies to offset renovation costs (assuming eligibility)	• Assessment of the landlord's financial stability and ability to support the renovation project • Analysis of potential risks and returns associated with financing the renovation • Consideration of the landlord's track record in property management and maintenance • Evaluation of the potential impact of the renovation on rental income and property value

Table 2. Financial analysis criteria adopted by the financial institutions

STEP 4: Deciding how the investment will be recovered.

a) Through rents

In the case of rental property or multi-ownership with tenants, the cost of renovation could be recovered through rents, either because rents include provisions for regular maintenance or because it is possible to increase rents. The latter is possible in some countries, to some extent.

An oft-followed business model is that investment in building renovation is indeed recovered through rents, in part or in totality. In this regard, national legislation is key. This varies significantly across Europe, and multiple nuances have been identified. For example, in Spain, the rules surrounding rent adjustments due to property improvements are outlined in two scenarios. Firstly, if both landlord and tenant agree to enhancements during the lease, the landlord can increase the rent, while the tenant can seek reimbursement or opt for a rent reduction. In a second scenario, if the landlord independently carries out improvements that cannot wait until the lease end, certain conditions must be met for a rent increase, including the completion of the minimum legal term, written tenant notification, and no conflicting agreements.

Another important matter is **cost neutrality.**

Tenants in the social housing sector are vulnerable and hence, investment costs cannot easily be passed on without worsening affordability. Being able to finance autonomously a deep renovation depends also on financial capacity of the housing provider, which unfortunately is not a given. **Access to external financing is thus crucial for social housing associations,** alongside well-balanced minimum energy efficiency requirements (to lower the energy supply needs and bills). To circumvent potential financial limitations, while keeping the accommodation affordable for the social tenant, some social housing organisations have been developing creative solutions to be able to finance the renovations, such as the case of Vienna (see box below). In general, in the cases where financial capacity of the

Photo credit: City of Vienna/Bojan Schnabl

Hauffgasse 37-47
Vienna, Austria • Western Europe

In the 'Smarter Together' project the renovation of Limited-Profit-Housing at Hauffgasse 37-44 in Vienna was carried out within the standardised system of the City of Vienna where roughly a third of the refurbishment costs is subsidised by the City of Vienna and a third is covered by long term contributions of tenants for future refurbishment needs. As for the additional financing needs, it involved collecting from the tenants a portion of the investment by instituting a gradual increase of 2.57 EUR per square meter over a span of 10 years. What is specific to the Vienna model is the deliberate focus on a fair approach to recovering the investment, with a well-defined and reasonable time frame for the rental increment, devoid of speculative intentions.

provider is limited, it is recommended to adopt gradual payback strategies to prevent the cost being transferred to a socially vulnerable individual / family. Another solution is to look at the savings side or the funding or contracting model, which are explored below.

b) Through energy (cost) savings or other quantitative or qualitative attributes

For owner-occupied property in a multi-ownership building or for a residential building owned by a social or affordable housing, investments can be recouped through a reduction of the operating costs (energy or maintenance). Energy investments should reduce operating costs of the building and thus imply a concrete saving for the tenants. In some countries the regulations allow for a rise in the rent to reflect a similar (or a fraction of the) saving for the tenants of energy investments. In addition, these investments generate value either quantitatively (property value, added building life or less maintenance requirements), or qualitatively such as thermal comfort, indoor environmental quality, accessibility, physical and mental health or aesthetics.

In this case, **it is recommended not only to carefully measure relevant parameters before and after the renovation but also to demand reliable estimations from the energy service company** (ESCO). This is usually a point of contention across Europe, which is why energy performance-based guarantees and contracts are seeing a renewed attention in the affordable sector. In this model, the energy company remuneration is performance based, guaranteeing a predictable outcome in terms of savings achieved (measured in energy efficiency not energy bills) and all-inclusive costs of the services. Predictability also means that it prevents technical and operational risks over the project term.

See for example the STUNNING project

2 What private and public financing options are available for building energy renovations?

There are numerous financing options for social and affordable housing. The financing landscape in Europe is quite complex as it includes EU level as well as country and even regional level instruments, which frequently are characterised by increasingly strict access conditions and target groups. The following table provides an overview of financing options.

Energy efficiency credit lines offered by banks in combination with risk-sharing facilities set up by international financial institutions go a long way to mitigate the perceived high financial risk of energy efficiency projects and lower transaction costs. These lines usually have standardised project appraisals and loan processing procedures. Ethical Banking is doing a great job in facilitating loans and mortgages even when the owner is an entity or even when it cannot link the mortgage to a person-ownership.

As housing organisations seldom have enough experience in analysing financial options themselves, they can seek advice from financial experts or public financing institutions. The European Investment Bank offers advice, usually free-of-charge, in the preparation of the financial plan or project management – in the ELENA facility or the European Investment Advisory Hub (EIAH).

FINANCING OPTIONS	INSTRUMENTS	DESCRIPTION	TYPE
New financial instruments	• Green mortgages • Unsecured green lending • ESCO financing • On-bill financing • On-tax financing	These instruments, such as green mortgages and ESCO financing, are aimed at reducing the cost of financing energy renovations and typically have tenors similar to the asset life. They are emerging business models of the private sector led to finance energy efficiency improvements for homeowners.	Primarily Private
Financing from the EU	• EIB funding • InvestEU • Jessica funds • European Energy Efficiency Fund (EEEF) • Private Finance for Energy Efficiency (PF4EE)	EU financing options like EIB funding and InvestEU are often prioritised due to their cost-effectiveness. Other options like Jessica funds and the European Energy Efficiency Fund (EEEF) also provide significant financial support for energy renovations.	Primarily Public
Dedicated Funds	• Debt • Equity • Hybrid instruments • Public-Private Partnership • Guarantee instruments • Technical assistance (or capacity development inside banks)	Dedicated funds offer various financial instruments including debt, equity, and hybrid instruments, along with guarantee instruments and technical assistance. These funds aim to lower transaction costs and provide de-risking tools for energy efficiency projects, although practical implementation can be challenging.	Can be Public and Private

Table 3. Financing options of housing providers (selection).

Photo credit: Himmerland Boligforening, social housing provider in Denmark

Aalborg East

Aalborg, Denmark • Northern Europe

Aalborg East is a project derived from a long-term strategy underpinned on resident co-creation to ensure quality of life for the residents. East Aalborg, like many other public housing examples in Denmark benefited from an effective financial structure in place at the national level to support large-scale renovation projects.

3 What are the different financial models?

Different types of financial models can be used to finance renovations for housing associations or low-income homeowners. These models are categorised into asset-based models, output, and outcome-based models depending on the final services and guarantees that need to be delivered to the end-users.

ESCOs play a key role, not only regarding the installation of the equipment, but also in supporting the housing provider or the local authority from the technical point of view or even contributing (partly or fully) to the financing of the renovation. A hybrid model can also be used to provide different types of benefits for tenants or people with affordability issues. These financial models are indicated in the following table.

MODELS	DEFINITION	ADVANTAGES	DISADVANTAGES
Asset-based	The renovation is carried out and the beneficiaries pay for it. *Examples: leasing, continuous commissioning*	• Payments in instalment • Energy saving in the long term • Owning the asset • Lower than loan payments • Cost saving covers the lease payment	• The split incentives problem for tenants and building owners • No guarantee of energy saving and thermal comfort
Output-based	Payment for the result of the energy renovation, e.g., guaranteed saving contract *Examples: output purchase agreement, energy performance contracting, energy efficiency as a service, on-bill repayment*	• A predictable (guaranteed) level of energy savings • Protecting the client from a wide array of risks	The split incentives problem for tenants and building owners
Outcome-based	Payment for the management of a building's maintenance	• A predictable (guaranteed) level of energy savings and thermal confort • More flexibility	The split incentives problem for tenants and building owners

Table 4. Financial models and respective advantages and disadvantages for building owners or tenants.

In order to materialise these financial models further, some concrete examples are presented below. Energy Performance Contracting (EPC) are presented in length in the next section given its relevance to the sector.

Green Mortgage

This model offers low interest rates or other financial incentives to homeowners who undertake energy-efficient home upgrades. Building owners can obtain lower mortgage rates, or even grants or tax abatements, which can help offset the cost of energy renovations or upgrades. The tenants can benefit from reduced energy costs. They can also benefit from improved indoor air quality and increased comfort levels, improving the overall living experience. It is important to note that green mortgages are typically only available to building owners who are making energy-efficient upgrades, and the terms and conditions of the mortgage can vary depending on the lender.

In addition, building owners should be aware of any additional requirements or restrictions that may apply, such as energy audits or certifications.

On-bill financing

Under the on-bill financing model, building owners can finance energy efficiency upgrades through a surcharge on their utility bills rather than a traditional loan. In this case the utility provider not only collects payments via energy bills, but it also finances the investments from its own capital. This model works well for housing providers that require simple, turnkey approaches to improve their energy efficiency and for private owners seeking financing for energy efficiency measures.

As the utility is the borrower, failure to pay is connected with disconnection. Counterintuitively, this can be viewed also as an advantage of this model. Given the high leverage of the utility provider (to be able to disconnect the energy) the entailed risk is lower, which allows the same utility to offer lower interest rates. Building owners should also be aware of additional requirements or restrictions that may apply, such as energy audits or certifications, as well as the terms and conditions of financing.

Public-Private Partnerships (PPP)

In this model, partnerships between public and private companies are used to fund and carry out energy efficiency measures. This allows the public sector to leverage the expertise and resources of the private sector. It is important to note that public private partnerships (PPP) projects can be complex and require significant coordination. The public sector must ensure that the PPP contract is consistent with their policy objectives, while the private sector should ensure that the project is economically viable. In addition, building owners should be aware of any additional requirements or restrictions that may apply, such as energy audits or certifications, as well as the terms and conditions of financing.

It is important to note that each model has its own advantages and disadvantages, and the best model depends on the context in which it is located. Key factors are the financial capacity of the housing provider and the impact on tenants, namely the cost neutrality of the intervention.

Photo credit: Opengela project

Opengela

Guipuzkoa, Spain • Southern Europe

The 'OPENGELA' project provided an interesting financing model for the region. Born out of the premise that the income and repayment capacity levels of a great share of the population was too low to access ordinary bank loans and could only access subsidies or high-interest rate credits, they created the 'MAS OPENGELA' mechanism (a mix of public and private funds) which offers loans refundable in 15 years to help low-income households cover the full investment needed for the renovation of their homes.

4 What does Energy Performance Contracting stand for, and which are the different options?

Energy Performance Contracting (EPC) is a financing method to fund energy renovation projects through energy savings or revenue from renewable energy production. It shifts technical risks from the client to an external organization, making it an effective solution for achieving performance. This model involves a third-party provider Energy Service Companies (ESCOs for short) which finances, designs, and carries out energy efficiency upgrades for a building that is repaid through a long-term contract with the building owner based on the energy efficiency savings. **This model entails that the building owner does not need to make an upfront investment.** Owners also have the choice to outsource the energy efficiency improvement's technical, operational and maintenance aspects to the ESCO, allowing them to focus on their core business (providing and managing homes).

There are two types of EPC distinguished by the scope of their intervention: "system" EPC and "global" EPC. The following table outlines their main characteristics.

TYPES	PERFORMANCE ACTIONS	CONTRACTS INCLUDE	DURATION
System EPC	Performance actions focus on building energy systems or equipment.	Typically include awareness-raising, training, or information actions for occupants, users, managers, or staff regarding energy-saving practices.	Aligned with equipment lifespan.
Global EPC	Performance actions target building and systems, including high-impact renovations like air tightness and insulation.	Involve extensive renovation actions to significantly enhance energy efficiency.	Generally longer, aligned with renovation amortization.

The cost of an EPC can be substantial, making it crucial to meet several requirements for competitiveness. These include ensuring confidence in the quality of work, implementing adequate yet not overly burdensome monitoring, maintaining balanced contractual conditions, and minimising homeowner inquiries. ESCOs serve as a key mechanism for attracting private investment in ambitious renovations, and there are different formulas that can be utilised for this purpose.

a) The owner pays the ESCO for the service.
This formula entails that the owner, either a private individual or a housing provider, compensates the selected ESCO for the retrofit. To ensure post-renovation energy efficiency targets are delivered, the owner and the contracted company may enter into an agreement that ensures performance agreeing on penalties for underperformance and/or bonuses for exceeding targets. This incentivises the ESCO to achieve the promised outcomes.

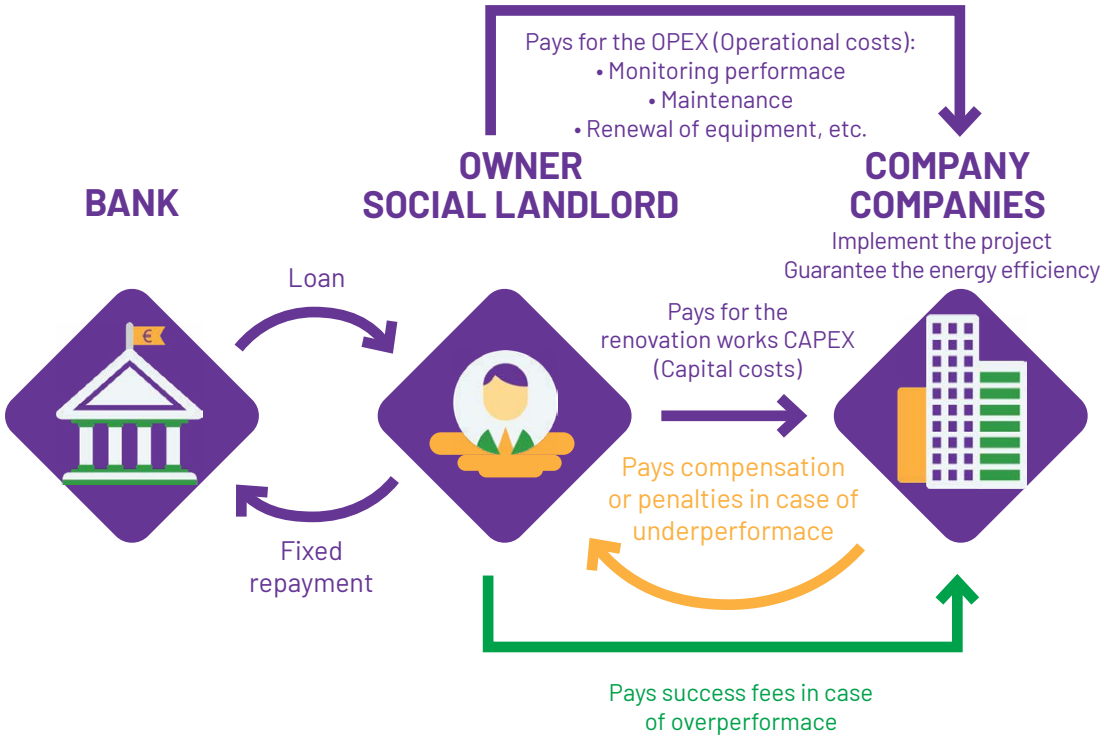

Figure 2. The owner carries out a traditional, global and efficient renovation

Additional expenses may be included from ancillary operations such as performance monitoring, equipment maintenance, and replacements.

b) The owner enters a guaranteed saving agreement with the ESCO
This model is akin to guaranteed savings as the ESCO commits to achieve energy efficiency targets for the client and bears all technical risks associated with the project. Repayment is sourced from obtained savings (partly or fully).

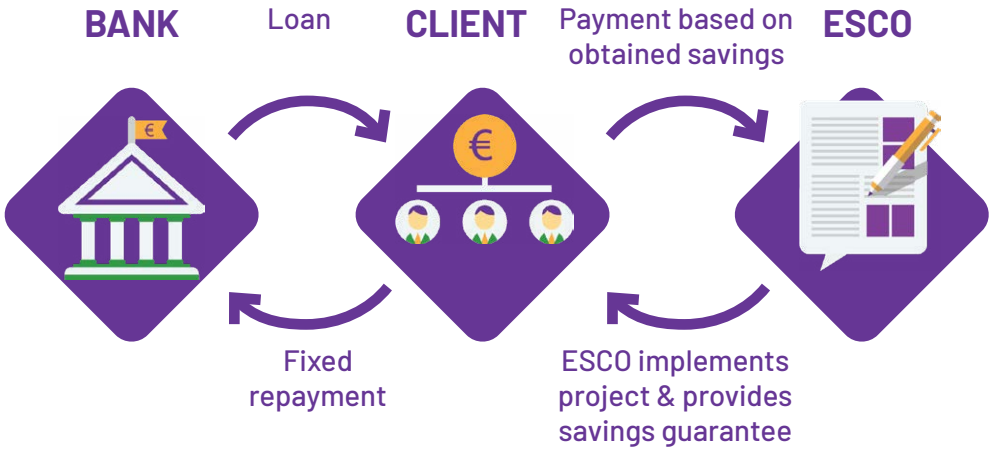

Figure 3. Guaranteed savings model with an ESCO. Source: IEA

c) The ESCO and the owner enter into a shared savings agreement
In a shared savings model, the owner and the ESCO join forces to finance the retrofit, for example via a financial institution. The payment is also made via obtained savings but is only partial as some of the burden has already been borne by the owner. This model can take a formalised structure as the owner and the ESCO can create a joint company which manage the renovation works together. This model is recommended in the case of large city-wide renovation projects.

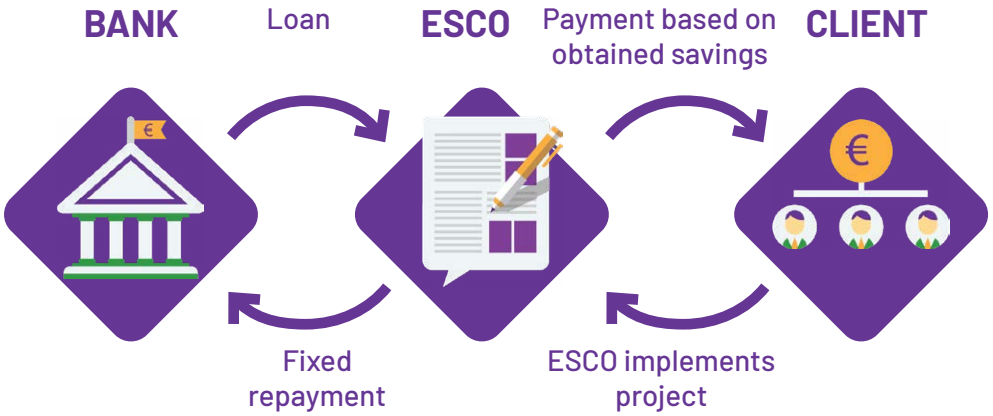

Figure 4. Shared savings model with an ESCO. Source: IEA

d) The ESCO directly takes the responsibility for the retrofit (the Super ESCO model)
The ESCO, usually a governmental entity, is tasked to undertake a large retrofit endeavour, which would involve the aggregation of numerous city-wide projects. These organisations are given sufficient capital to manage both the works and the responsibilities associated with retrofitting housing stock of third-party housing providers. This model still allows payment to be based on obtained energy savings, usually to maintain the ESCO (renovation) fund afloat.

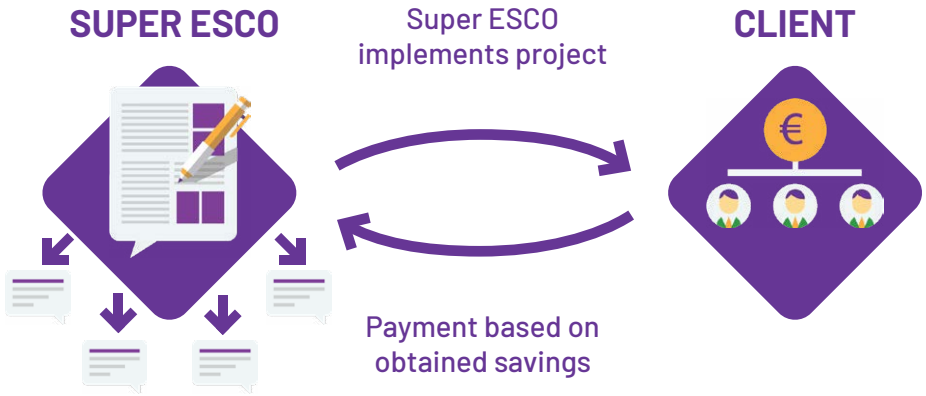

Figure 5. Super ESCO. Source: IEA

In any model, *it is recommended that ESCOs be selected based on their technical and financial (proven) capabilities and that the contract terms be structured to protect the interests of both owners and tenants.*

5 Which are the different types of citizen investment models in renewable energy projects?

For renewable energy installations, local consumers who stand to benefit from the production may find interest in taking the initiative and invest themselves in renewable energy projects. In this case, they are required to finance the intervention themselves (also via third-party financing) and organise the shared distribution of the energy (and income) produced among the stakeholders. Various forms of citizen financing exist:

Local or regional governments play a crucial role in fostering the emergence of these different forms of citizen organisation. They can offer financial support, expertise, and guidance, while also streamlining regulatory processes for better clarity and accessibility. European directives, such as the Directive on Common Rules for the Internal Electricity Market, empower active consumers to engage in various energy markets, either individually or through citizen energy communities. This includes participation in electricity production, consumption, sharing, and sale, as well as providing flexibility services through demand response and storage solutions.

TYPE OF INVESTMENT	DESCRIPTION	EXAMPLES
A donation	Large sums contributed by numerous small donors, sometimes associated with symbolic counter-gifts.	Community fundraisers for renewable energy projects.
A loan	Funds provided with or without interest, often through micro-finance, involving lending between individuals or to companies/ start-ups.	Peer-to-peer lending platforms for renewable energy initiatives. > Crowdfunding
Investment in securities	Involves purchasing bonds, shares, or royalties, offering a stake in profits generated by renewable energy projects.	Buying shares in a local energy community project or renewable energy company.
Dedicated project company	Formation of an organization or project-specific company where inhabitants invest in shares to finance renewable energy installations, adhering to national regulations.	Residents investing in a dedicated company to fund solar panel installations for the community.
Local Governance project	Citizen-driven initiatives where communities invest in various energy production projects, such as wind, solar, or hydroelectricity, becoming shareholders in the project.	Residents investing in a wind farm project and receiving dividends from energy sales. > Energy Communities

Photo credit: Progetto Energheia, Italy

Energheia Project

Caselle Torinese, Borgaro Torinese, Cavour, Racconigi, Moretta Pinerolo, Italy • Southern Europe

Propelled by beneficial fiscal conditions in Italy, the Energheia project is a model of self-consumption in residential buildings. The model includes energy efficiency measures (insulation of façades, substitution of windows, solar panels and heat pump) and the creation of an energy community by the residents. The involvement of the inhabitants in the energy community is facilitated by gamifying their energy consumption and starting "competitions" where residents are encouraged to consume less than their neighbour.

3.1.3 Further Reading and Online Resources

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The European Affordable Housing Consortium's Funding Simulator

STUNNING project

The Aalborg model.

The OPENGELA financial model.

The ENERGHEIA project.

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The European Affordable Housing Consortium

The European Affordable Housing Consortium (SHAPE-EU) supports SMEs, public authorities and social and affordable housing providers in their planning and implementing integrated renovation projects at the district level. The Consortium brings together 10 partners with European-wide reach and local technical expertise:

Housing Europe (coordinator) - the European Federation of Public, Cooperative & Social Housing. Since 1988 it's a network of 42 national & regional federations gathering 43.000 housing providers in 31 countries. Together they manage around 25 million homes, about 11% of existing dwellings in Europe.

Eurocities - the network of more than 200 cities in 38 countries, representing 130 million people, working together to ensure a good quality of life for all.

Energy Cities - the European Association of local authorities in energy transition. It represents 1000 towns and cities in 30 countries.

European Construction Technology Platform (ECTP) brings together the collective vision for a leading edge European Built Environment on behalf of their Members. ECTP gathers more than 140 Member organisations from across the construction sector and other sectors from the whole supply chain of the Built Environment.

GNE Finance - a high impact investment company based in Barcelona (Spain), Bilbao (Spain) and Amsterdam (the Netherlands) providing financing for sustainable home and building renovation.

Legacoop Abitanti (Italy) - the national association that organises and represents housing cooperatives in Italy and promotes their planning and entrepreneurial development.

Vlaamse Huisvestingsmaatschappijen (VVH) (Flanders, Belgium) - the umbrella organization of the social housing companies that provide social housing rentals in Flanders.

L'Union Sociale pour l'Habitat (USH) (France) - represents around 730 social housing associations (Hlm) through its five federations (the National Federation of Public Housing Offices, the Social Enterprises for National Federation of Hlm Cooperative Societies, the Social Economy Union for Home Ownership and the National Federation of Regional Associations of Social Housing Organizations).

Eesti Korteriühistute Liit (EKÜL) (Estonia) - an independent non-profit working across Estonia to support apartment associations and to represent their interests at the local, national and international level. The Union has more than 1400 members (apartment associations).

Delft University of Technology (TU Delft) is one of the main universities in the Netherlands with about 24,000 students that can choose from 16 bachelor studies and 33 master courses.

SHAPE EU

European Affordable Housing Consortium

shape-affordablehousing.eu

Join the LinkedIn Community

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