2. Choosing the Right Financial Models and Ensuring Financial Feasibility

Overview

Energy renovations for affordable housing pose a significant financial challenge for low- and middle-income homeowners, who require suitable financing options such as low-interest loans or grants. For social housing tenants, maintaining affordability means that total living costs - including rents and energy expenses - do not increase.

Despite the fact that since 2018 all EU countries must establish a long-term renovation strategy to support the renovation of their national building stock as part of their NECPs, there is still a major lack of financial support to back up these plans. Renovation costs encompass various expenses beyond construction materials and labour, including environmental cleanup, consulting, and financing costs. It differs significantly between social housing and privately-owned affordable housing. If we consider an integrated approach to renovation, which consider also citizen engagement or multi-stakeholder partnerships, then the cost is even higher (one can count with an additional 20% in costs).

Government grants have not been enough to achieve EU targets. More public investment, improved public-private partnerships as well as the establishment of dedicated financial institutions are increasingly called for. There are various low interest loan schemes supporting building renovation[9], but it has been shown that they have not been mobilised enough[10]. Financial instruments, like revolving funds, pay-for-performance arrangements, revenue-sharing, EPC models, public-private partnerships, build-operate-transfer models, etc., are still not used in the sector. Public sector can stimulate private investments in building renovation and in fact, the public sector co-financing is fundamental for distributing the risk and encouraging more private investments.

Moreover, the social housing sector is not favourable to innovation in terms of business models as there is often a struggle to keep up with the upfront investments. This is partly due to regulatory barriers that complicate or even hinder innovation, for example, regulations that prevent local authorities from going into debt simultaneously preventing them to making investments in building renovation.

[9] More detailed analysis of existing practices for financing social and affordable housing across EU in SHAPE-EU's "Handbook of Project Funding" at https://shape-affordablehousing.eu/handbook-of-project-funding/.

[10] The 'Report of the High-Level Task Force on Investing in Social Infrastructure in Europe' identified a minimum investment gap in affordable housing of € 57 billion/ year.

The objective of this chapter is to provide some understanding and tools for achieving financial viability and initiating the assessment of economic returns on investment. It will explore various financing options to develop a comprehensive financial plan for building or district renovation projects, which involves considering a blend of funding sources, both public and private, alongside business models. The scope extends from light to deep energy renovations, addressing 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.

The following questions are posed and answered:

I. What should we take into account 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 energy renovations and how to start a financial plan?
III. How can different financial models be classified?
IV. What does Energy Performance Contracting (EPC) stand for, and which are the different contract models?
V. Which are the different types of citizen investment in renewable energy projects?

Recommendations and Good Practices

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

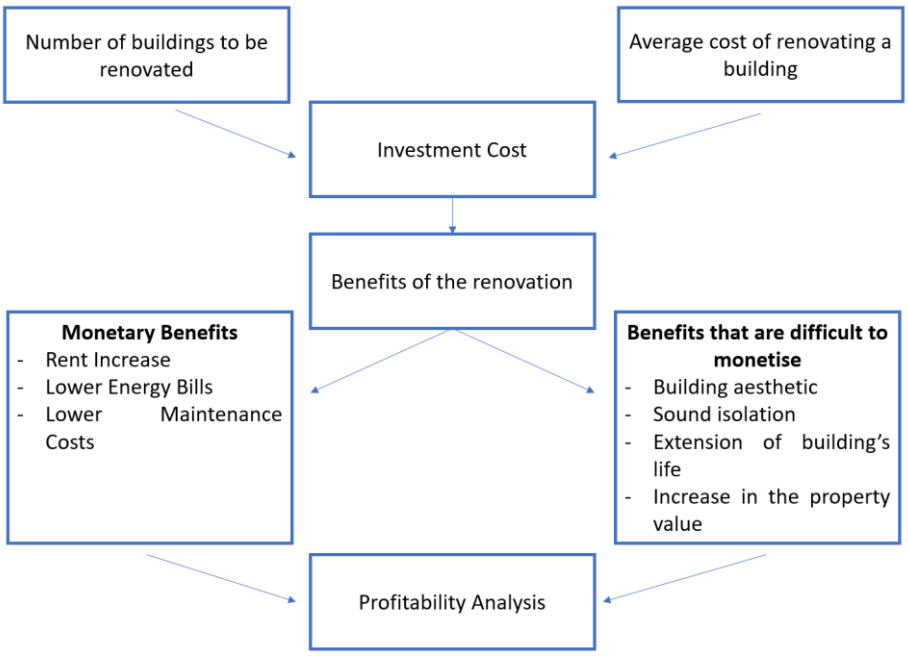

Figure 2: Financial Feasibility of a building renovation project

Source: GNE Finance own elaboration

STEP 1: Information gathering and advisory:

Thus, for informed decision-making, the initial steps to be taken can be as follows:

- to be informed and decide on the level of energy rehabilitation of the building to be done.
- inform yourself 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 cost of renovation is necessary. For larger projects, it is advisable to develop smaller scale renovations, before larger undertaking to improve approach feasibility, cost energy savings estimations.

In the case of privately multi-ownership properties, there is substantial uncertainty on who will renovate their property[11]. In addition, apartment owners often have limited technical knowledge to decide on the best renovation option and capacity to control quality. For these reasons, public authorities often decide to support homeowners via a one-stop-shop or other kinds of mediation facilities, often within a large renovation programme.

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 the renovation works. The decision falls the housing owner (organisation or individual).

The cost of renovation is a key factor when deciding the financing strategy, notably the level of improvement of the energy performance of the building (energy efficiency improvements and use of renewable energy). The share of the cost dedicated to energy renovations increases substantially depending on the level of energy savings and GHG emission reductions. Furthermore, 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

[11] See corresponding chapter on multi-apartment block renovation.

calculating present costs and future savings. As this approach is novel and seldom used in the private sector, it may be a powerful argument in public grant applications.

STEP 3 - Profitability analysis

This type of analysis is used to evaluate the ability of a project, investment, or activity to generate economic benefits in relation to associated costs. In the context of energy renovation of buildings, a 'profitability analysis' would assess 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, potential grants, 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.

In general though, given the state of the building stock in Europe[12], the level of interventions 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 has developed a Funding Simulator with indication to Funding Opportunities[13].

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

[12] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/eu-building-stock-observatory_en

[13] https://shape-affordablehousing.eu/funding-simulator/

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	- Split incentives (benefits for tenants, 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

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, and varies significantly across Europe, with multiple nuances 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 rent, but the tenant can seek reimbursement or opt for a rent reduction. In the second scenario, if the landlord independently carries out improvements that could not wait until the lease ends, 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 issue is renovation cost neutrality. A primary concern of a social housing provider is to ensure rent is kept at an affordable rate vis-à-vis the financial capabilities of the families. Unfortunately, being able to finance autonomously a deep renovation depends also on financial capacity of the housing provider, which is not a given. To circumvent potential financial limitations, while keeping the accommodation affordable for the social tenant, some social housing organisations develop 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 provider is limited, it is still 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.

EXAMPLE

Western Europe

Vienna - Austria

Hauffgasse 37-47

In the 'Smarter Together' project the renovation of Limited-Profit-Housing at Hauffgasse 37-44 in Vienna was carried out with an innovative financing scheme. It involved collecting a portion of the investment by instituting a gradual increase of 2.57 EUR per square meter from the tenants over a span of 10 years. What sets this example apart 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.

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, renovation investments can be recovered through a reduction of the operating costs (mainly energy and maintenance). Energy investments should reduce energy costs or others of the building and thus imply a concrete saving for the tenants. Some national legislations allow 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 require a reliable estimation to the energy service company. 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. This predictability also means that it prevents technical and operational risks over the project term[14].

II. 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 instruments as well as country and even regional level instruments, which frequently are characterized by increasingly narrow access conditions and target groups. The following table provides an overview of the financing options.

FINANCING OPTIONS	INSTRUMENTS	DESCRIPTION:	SOURCE 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 prioritized 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	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	Can be Public and Private

[14] See for example the STUNNING project https://renovation-hub.eu/business-models/energy-performance-contracting-epc/

	– technical assistance (or capacity development inside banks)	projects, although practical implementation can be challenging.	

Credit lines established by banks (and often supported by international financial institutions) can help mitigate the perceived high financial risk of energy efficiency projects, when combined with risk-sharing facilities, and can lower transaction costs by establishing standardized project appraisals and loan processing procedures. Ethical Banking[15] 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.

Finally, as housing organisations seldom have enough experience in analysing financial options, they can seek advice from financial experts or public financing institutions. The European Investment Bank for example 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).

EXAMPLE

Western Europe

Germany

KFW
Bank aus Verantwortung

KfW "Energy-Efficiency Refurbishment"

The KFW Energy-efficient Refurbishment programme comprised about 60,000 promotional commitments to modernise 181,000 homes. This led to the implementation of modernisation measures for increasing energy efficiency in 0.5 % of all housing units in Germany.

When modernising there are two approaches: Either the building is subjected to a complete package of modernisation measures to attain a KfW efficiency house standard or individual measures or combinations of measures are implemented to increase efficiency.

The Energy-efficient Construction programme supported about 45,000 building projects in 2011. These represent a good 81,000 housing units and thus almost every second newly constructed home in Germany in 2011.

III. What are the different financial models?

[15] https://febea.org/

Different types of financial models can be used to finance renovations for low-income homeowners. These models are categorized 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. For each financial model, numbers of actors are essential for efficient performance, including the energy service companies for installation of the equipment and management, supporting governmental, energy companies, and more. A hybrid model can also be used to provide different types of benefits for tenants or people with affordability issues. The differences between these financial models are provided in the following table.

Table 6. Financial models and the benefits for the building owners and tenants

Models	**Definition**	**Benefits**	**Disadvantages**
Asset-based	An energy measure will be delivered to the end users, and they need to pay for it. Examples: leasing, continuous commissioning	Payments in instalment Energy saving in the long term Owing 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 output of energy saving measures, e.g., guaranteed saving contract Examples: output purchase agreement, energy performance contracting, energy efficiency as a service, on-bill repayment	A certain levels of energy saving Protecting the client from any performance risks	The split incentives problem for tenants and building owners
Outcome-based	Payment for the management and optimization of a building's operational situations	Certain levels if thermal comfort and cost savings for the end users More flexibility	The split incentives problem for tenants and building owners

In practice these models for affordable housing energy retrofits, each with its own benefits for building owners and tenants during the renovation process. Some examples include:

<u>Green Mortgage:</u>

This model offers lower interest rates or other financial incentives to homeowners who make energy-efficient home upgrades. Building owners can obtain lower mortgage rates, making energy-efficient upgrades more affordable. Building owners can also benefit from other financial incentives, such as grants or tax abatements, which can help offset the cost of upgrades. Tenants can benefit from

reduced energy costs, leading to significant savings over time. Tenants 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

Bill financing is a financial model that can be used for energy retrofits in affordable housing in Europe. Under this model, building owners can finance energy efficiency upgrades through a surcharge on their utility bills rather than a traditional loan. This can make upgrades more affordable for building owners and allow tenants to benefit from reduced energy costs. Building owners can fund energy efficiency upgrades by imposing a surcharge on their utility bills, making the upgrades more affordable. It is important to note that bill financing is unavailable in all areas or for all energy efficiency upgrades. 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.

Public-Private Partnerships (PPP)

In this model, partnerships between public and private companies are used to fund and implement energy efficiency upgrades to affordable housing. This allows the public sector to leverage the expertise and resources of the private sector to improve the energy efficiency of affordable housing. Tenants can benefit from reduced energy costs, leading to significant savings over time. Tenants can also benefit from the reduced environmental impact of the building, as energy efficiency upgrades can help reduce greenhouse gas emissions. It is important to note that PPP projects can be complex and require significant coordination between the public and private sectors. 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. The public sector should also ensure that the PPP contract is consistent with their policy objectives, while the private sector should ensure that the project is economically viable.

It is important to note that each model has its own advantages and disadvantages, and the best model depends on the specifics of the housing and the community in which it is located. In addition, it is important to consider the impact of renovations on tenants, such as the timing of renovations, the inconvenience caused, and the provision of temporary housing when needed.

EXAMPLE

Southern Europe

Guipuzkoa - Spain

Opengela

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.

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

The Energy Performance Contract (EPC) is a financing method for funding 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.

Energy Performance Contracting (EPC):

This model involves a third-party service provider Energy Service Companies (ESCOs for short) which finances, designs, and implements 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 means that the building owner does not need to make a significant 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).

Residents also benefit from reduced energy costs, leading to substantial savings over time, as well as other outcomes such as improved indoor air quality, and increased comfort.

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.

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 minimizing homeowner inquiries. ESCOs serve as a key mechanism for attracting private investment in ambitious renovations, and there are different formulas that can be utilized for this purpose.

1) 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 incentivizes the ESCO to achieve the promised outcomes.

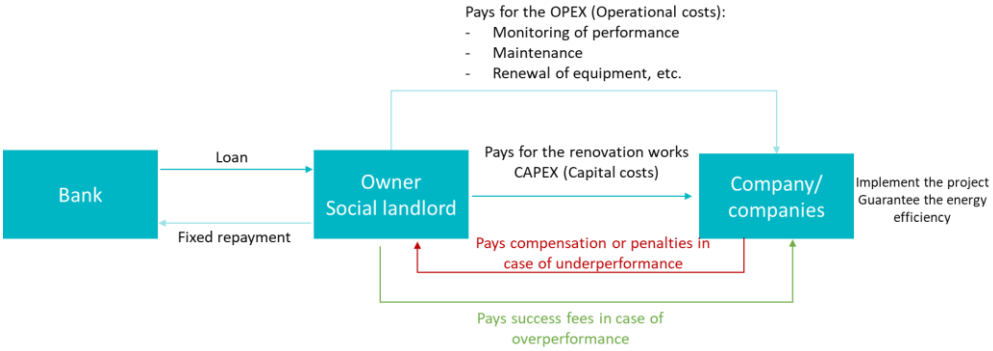

Figure 9. The owner carries out a traditional, global and efficient renovation

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

2) 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 10. Guaranteed savings model with an ESCO. Source : IEA

3) 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 11. Shared savings model with an ESCO. Source: IEA

4) The ESCO takes directly 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 12. Super ESCO. Source: IEA

EXAMPLE

Western Europe

Energiesprong

Energiesprong is a Dutch programme that aims to make large-scale, deep energy retrofits of social housing affordable and easy. An “Energiesprong” renovation is financed by future energy cost savings plus the planned maintenance and repairs budget over the coming 30 years. This programme uses "Energy Performance Contracts" (EPC) model, which involves the use of long-term performance contracts. Energiesprong's EPC model addresses the issue of split incentives in energy renovation of affordable housing by shifting the financial burden of energy efficiency upgrades from the social housing provider or building owner to the private company performing the retrofits. Under the EPC model, the private company is responsible for financing, designing, and constructing the energy upgrades. The social housing provider then pays for the upgrades over time through savings on energy bills. This shifts the financial risk from the social housing provider to the private company and eliminates the need for the provider to come up with upfront capital. This approach allows social housing suppliers and tenants to benefit from energy efficiency upgrades, making costs more manageable for suppliers and providing more energy-efficient and comfortable living spaces for tenants while reducing energy bills

v. Which are the different types of citizen investment 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 have to look for financing, and organise the shared distribution of the energy (and income) produced among the stakeholders. Various forms of citizen financing exist:

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

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.

EXAMPLE

Southern Europe

Pinerolo, Turin, Caselle Torinese, Borgaro Torinese, Cavour, Racconigi, Moretta - Italy

Progetto Energheia

Energheia is a model of self-consumption in residential buildings. The model includes energy efficiency measures (insulation of façades, substitution of windows, solar panels on the roof and the installation of a heat pump in the thermal room, etc.) and the creation of an energy community with 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

Further Reading and Online Resources

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