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Pre-financing mechanisms for climate renovations accessible to all Flemish homeowners

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Executive summary

The Flemish region is committed to contribute to the EU long-term objective to achieve climate neutrality by 2050 the latest. Building on this, the Flemish long-term renovation strategy aims to renovate all existing residential buildings to energy label A by 2050 with the ambition to reach a carbon neutral building stock after 2050. **To reach those objectives, 95,000 dwellings should be deeply renovated every year between 2020 and 2050. For now, the region is not on track to achieve such results:** renovation rates remain low and often do not improve energy efficiency in any meaningful way (there are less than 3,000 deep renovations per year). **In parallel, the LTRS aims to be aligned with key housing policies in terms of pursuing high-quality, energy-efficient, and affordable housing for all.**

Several conditions are required to increase the number of deep renovations and reach the 2050 targets, including implementing strong regulatory (i.e., a MEPS¹ for worst performing buildings) and support (i.e., guidance, financing, and incentive) measures combined with comprehensive local renovation and urban planning strategies to ensure the relevance of renovation investments (e.g., identify the best strategy between demolition and renovation) and the synergies between policy objectives.

This report focuses on the financial barriers to renovation investments towards a carbon neutral building stock. The goal of this document is to outline the elements required to make climate renovations accessible to all Flemish households, provide guidance on the needed policy actions and highlight the priorities to be worked out in the next months. The report builds on the study by J. Albrecht (2020) that concludes that **40% of homeowners aged under 65 years cannot finance their label A renovation.** These homeowners face financing gaps ranging from 0 to more than 50,000€, making the impact of minor renovation subsidies insignificant for the latter. This report further focuses on the homeowners living in the worst-performing buildings (energy label E and F, that require climate renovation² investments of 80,000 € on average). To realize their renovation by 2030, 57,000 homeowners should get access to additional capital every year which amounts to 3 billion € of needed investments per year and represents 6 % of the public budget.

Although current efforts of the Flemish government are essential, these remain insufficient as the existing financing mechanisms do not offer suitable solutions for homeowner with too weak financing power. The maximum loanable amount (60,000€) is not high enough to cover the climate renovation costs of the worst-performing buildings and a series of households cannot afford the corresponding monthly repayments or has no access to long-term financing schemes (i.e., people older than 65 years old). Besides, there remain **limitations in the articulation between the grants and the pre-financing mechanisms:** grants are included in the maximum loanable amount of 60,000€ (so they cannot be used to cover the gap between this maximum loanable amount and the average 80,000€

¹ Minimum energy performance standard

² Climate renovations means that the building is low-temperature ready and phases out fossil-based heating. While the optimal energy efficiency improvements might depend on local and specific conditions (localisation, condition and type of the buildings), this study considers that climate renovations are renovations that lead to fossil-free label-A dwellings.

investment cost of climate renovation) and there remains an important Mattheus³ effect as – at EU level – 65% of the bonuses are going to “free-riders” (high-income households who would have renovated anyways regardless of the existing bonuses).

There are two possible approaches to address these financial barriers, strengthening public financing or supporting access to financing for vulnerable households via relevant pre-financing mechanisms that pay for upfront investments and allow repayment schemes suited to the households financing capacities. **Covering the 21 billion € financing gap for homeowners of E- and F-label purely with public money seems unsustainable. On the other hand, purely relying on pre-financing mechanisms is not feasible either** as households cannot endorse the related repayments. A balance must be found between both financing and pre-financing solutions.

The study focuses on pre-financing mechanisms and suggests that a portfolio of mechanisms is needed, including as much as possible market-based solutions to ensure rapid and feasible scale up. To this end, **public interventions must be focused where it is the most needed** to remove the barriers to the mobilisation of private capital by addressing the deficiencies remaining in the energy efficiency financial market, namely a viability gap (the investments show returns below market requirements and thus cannot attract private capital) and a financing gap (homeowners have no or a limited access to capital to pay for the upfront investments). Depending on the targeted household segment, the market deficiencies and needed public intervention will differ. **The most relevant financing solution will thus be different depending on the targeted household profiles and dwellings’ type (single-family houses or condominiums).**

Regarding homeowner profiles, the following groups are distinguished to best identify specific market deficiencies and design appropriate pre-financing mechanisms:

- **Group A: homeowners that can engage in long-term financing schemes but don’t have the financial capacity to cover the monthly repayments.**
 - A.1. Those that face relatively minor financial constraints and for which the financing barrier could be addressed by increasing the payback period to 30 years. They account for 4% of the Flemish homeowners below 65 years old.
 - A.2. Those excluded from the first subgroup (A1), with too low monthly repayment capacity, yet, with the ability to pay relatively normal to high energy bills. The financing barrier could be addressed by further reducing the monthly repayments or by factoring the energy savings in the repayment scheme. They account for 23% of the Flemish homeowners below 65 years old if energy savings can be factored in a (30-year) repayment scheme and down to 10% otherwise.
 - A.3. Those with no repayment capacity, including those that are barely (or not at all) able to pay their energy bills, and are at risk to (or already) live in energy poverty. They represent between 13% and 26% of the Flemish homeowners below 65 years old (depending on the ability or not to capitalize on energy savings for the financing in group A.2).

³ The Mattheus effect refers to a pattern in which those who begin with advantage accumulate more advantage over time and those who begin with disadvantage become more disadvantaged over time (the rich get richer, and the poor get poorer phenomenon)

- **Group B: older (>65 years old) homeowners that cannot engage in long-term financing schemes** for which the financial barrier can be addressed with financing mechanisms that allow transferability or that factors the real estate (added) value in the financial plan.

Besides household profiles, specific mechanisms are discussed for appartement buildings as they include a combination of different households' profiles. Depending on whether the co-owners' association has (or has not) a renovation fund to serve as collateral and/or the credit risk assessment shows that the owners are (or are not) eligible for credit, the approach differs. In the first case, the co-owner association (CA) is considered as "financially healthy" and can contract a standard loan. In the second case, the CA is considered as "non-financially healthy" and should rely on more innovative financing models with stronger public intervention (e.g., guarantee) to finance their renovations.

Based on this segmentation, the study identifies the following most relevant financing solutions (see Figure 1), organized in two groups based on their level of maturity (see Figure 2):

- **Mechanisms that build on existing market-based solutions and can be implemented in the short term (coming months). These mechanisms are the most mature and ready to scale. The focus should thus be put on adapting the related existing financing mechanisms and legislative framework to ensure their implementation in the short-term.** Namely,
 - **30-year renovation mortgage loan.** To ensure its implementation in the short term, **the priority policy actions are 1/ extending the mortgage duration** (in terms of notarial registration) of new and already-registered mortgages, and **2/ evaluating the possible set-up of a public guarantee to cover the risks related to the extension of payback duration.**
 - **Bullet renovation loan.** It is a special form of mortgage loan where the homeowner pays back the capital at the time of sale or property transfer. This loan is granted based on the value of the property and not on the income. To ensure its implementation in the short term, the **priority policy actions are 1/ assessing whether the scheme could be a scale up of the Rentelozelening Noodkoopleningen or should rather leverage market-based products** as suggested by this study for the sake of scalability, and **2/ updating the existing legislative framework** (i.e., Article VII.133, §2, Code of Economic Law) to allow using the property value as a basis for creditworthiness assessment.
 - **Long-term renovation credit to condominiums.** It is a long-term (i.e., 30 years) collective loan to an association of co-owners which allows to combine the co-owners' risk profiles thus enabling access to financing to riskier profiles that would alone not be eligible for existing financing mechanisms. When the loan is granted by a private party (i.e., banks), a joint guarantee of the co-owners is generally required (through a credit insurance). To ensure its implementation in the short term, the priority policy actions are **1/ assessing whether the scheme could be a scale up of the public scheme Mijn Verbouwen⁴ or should rather leverage market-based products** as suggested by this study for the sake of scalability. In the latter case, the priority action would be to set-up a guarantee fund to cover the guaranteed risks⁵ of the insurer in return for extending the loan payback duration.

⁴ As from July 2022, Mijn Verbouwen will offer a loanable amount of max 60.000€ for the building that can be combined with 25,000 €/unit with a payback time of 25 years

⁵ The risk that the premiums paid to the insurer won't be sufficient to cover the insurer's expenditures (i.e., claims in case of defaults of many co-owners)

- **New mechanisms that will require longer implementation (min 2 to 3 years) and roll-out (min 5 years) periods.** These mechanisms show great potential in terms of creating a well-functioning financial market for energy renovations. **The focus should be put on identifying the most adequate business model, to set-up the required legislative framework, and to conduct a pilot in the following years.** Namely,
 - **On-tax and on-bill financing** are an innovative way to finance energy efficiency investments in the building sector where the investment is repaid either through a special charge added to the property taxes during a certain period (on-tax) or using the energy bill as a repayment vehicle (on-bill). These mechanisms offer a solution to the older homeowners (target group B) as they can be transferred easily, the obligations being tied to the property (on-tax) or to the meter (on-bill) rather than to the household. Transferability also enables longer payback durations.
 - **A public ESCO (Energy Service Company) and third-party investor for condominiums** is a scheme where a public(-private) company provides technical assistance, oversees the renovation works and pre-financing the renovation costs as third-party investor. Given the cost of implementation, such financing models are most relevant for a structured and coordinated demand (i.e., larger amounts of investments which allow better returns and further de-risking of the aggregated investments). **Along with on-bill models, these mechanisms are the most promising, in terms of creating a market for integrated energy renovations services⁶.**

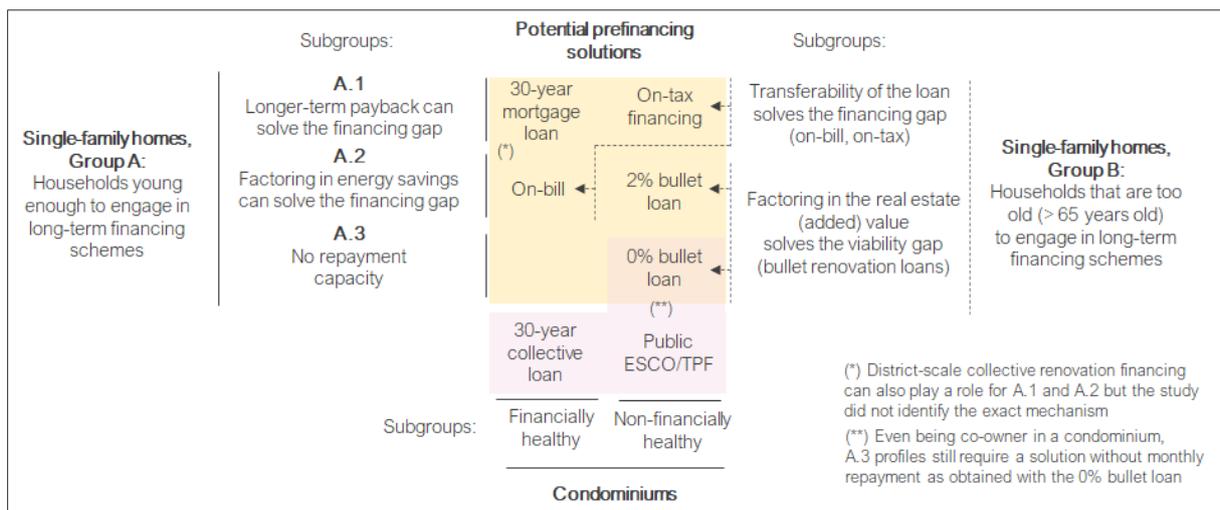


Figure 1. Recommended portfolio of prefinancing mechanisms by household segment

⁶ Services covering the whole customer journey from technical and social diagnosis, technical offer, contracting of works, structuring and provision of finance (e.g., loans or EPCs), to the monitoring of works and quality assurance.

Finally, the potential positive and negative socio-economic impacts deserve special attention. On the one hand, realizing these investments will contribute to lowering the dependency to fossil fuels, to realizing the climate goals and to improving the living conditions of the 200,000 homeowners living in energy poverty. On the other hand, the roll-out of these pre-financing mechanisms could have major impacts in terms of public budget, access to housing and stability of the financial sector. This study briefly discusses the latter, but the socio-economic impacts should be carefully considered to best design the financing and pre-financing mechanisms as well as the needed complementary measures.

Public and private (financial) actors have now to work collaboratively towards the successful implementation of the identified priorities, by designing, testing and rolling out the mechanisms and the needed accompanying measures in accordance with the financial sector’s requirements⁷ and the Flemish climate and social (i.e., high-quality, energy-efficient, affordable housing for all) objectives.

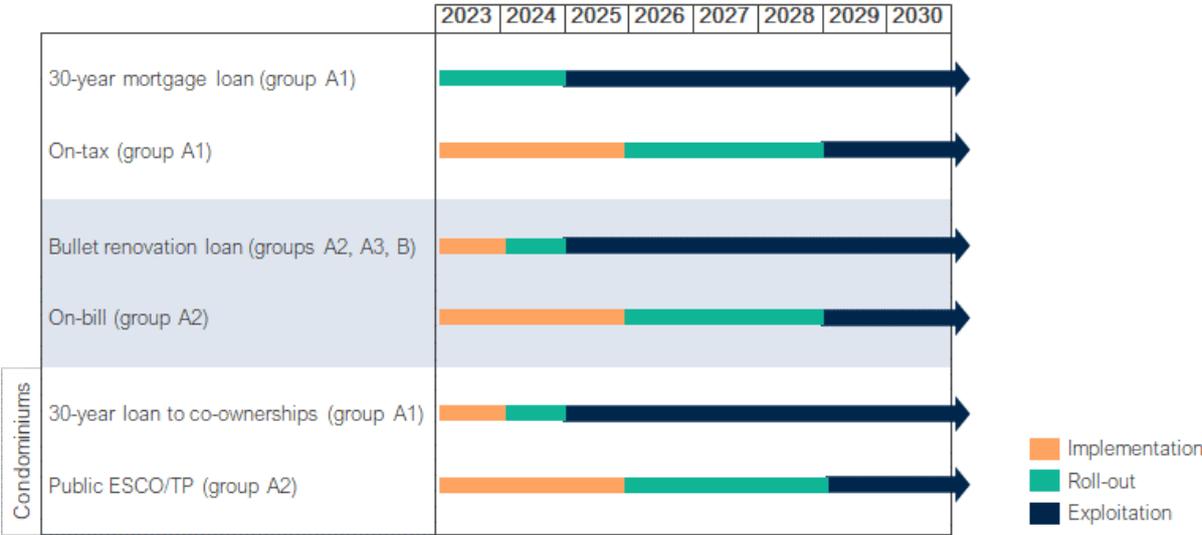


Figure 2. Recommended planning for implementation and roll-out of the identified prefinancing mechanisms

⁷For instance, in its 2022 the BNB recommends in this regard that banks proactively offer solutions to borrowers whose repayment capacity has deteriorated and maintain a supplementary capital buffer destined to cover potential systemic risks.

Setting the scene

The Flemish region is committed to contribute to the Paris Agreement objectives and the EU Long-term objective to achieve climate neutrality by 2050 the latest. One of the key measures is to reach a climate neutral building stock by 2050. A very ambitious renovation strategy driving significant energy efficiency improvements and heat decarbonation is required. The Flemish long-term renovation strategy (LTRS) suggests that there should be every year 95 000 renovations leading to EPC label A⁸ to reach the 2050 targets.

For now, the efforts remain insufficient:

- **Renovation rates are too low:** In 2021⁹ there were only 2,712 deep renovations¹⁰,
- **Renovations often do not improve energy efficiency in any meaningful way:** In 2018, shallow renovations were executed in 80,000 dwellings but led to insufficient GHG emissions reduction.

The Flemish LTRS intends to be aligned with key housing policy objectives on socio-economic aspects such as demographic developments, the pursuit of high-quality, energy-efficient, and affordable housing for all. Yet, the 2018 Housing Survey shows that housing quality is worse among certain groups of households with a lower socio-economic profile¹¹. **Households in energy poverty situation are more likely to live in poor quality housing.**

Existing provisions on renovations should therefore be complemented by:

- **Implementation of a minimum energy performance standard (MEPS)** to trigger within the next 10 years the renovation of the worst-performing buildings, where the potential for efficiency improvements is the greatest and the risk of energy poverty is the highest. The implementation of such MEPS is foreseen by the Flemish Government¹², mandating the renovation of the E- and F-label dwellings in the next years towards a maximum energy label D for 2030 and label C for 2040.

⁸ Renovations that lead to a fossil fuel-free label A dwelling

⁹ Presentatie energie & klimaatbeleid 2019-2022 given by the Vlaamse Energie- en Klimaatagenschap to the Milieu- en Natuurraad van Vlaanderen in May 2022

¹⁰ Referred to as “ingrijpende energetisch renovaties”

¹¹ “Larger shares of dwellings in poor or very poor condition are observed among unemployed people (29%), single-parent families (20%), households with a reference person of non-EU nationality (19%), sick or disabled persons (17%) and households with an income in the lowest income quintile (16%)”, Source: Vlaamse Regering, (Mei 2020), Langetermijnstrategie voor de renovatie van Vlaamse gebouwen, p.61-62

¹² [Vlaamse Regering, \(November 2021\), Visienota aan de Vlaamse Regering: Bijkomende maatregelen Klimaat](#)

- **Implementing comprehensive local strategies and planning¹³ for the decarbonization of buildings and fostering collective approaches to renovation.** Implementing the action at the city or district level allows to: better trigger the interest in renovation by leveraging the power of social connections between households, better identify optimal trade-offs between energy efficiency and renewable heat investments, trigger economy of scale and standardisation of solutions, and ensure consistency between climate, urban planning and housing policies,
- **Fostering, where it is relevant¹⁴, one-stage renovations leading to fossil-free label A** to secure the achievement of the climate targets and maximise the multiple other benefits¹⁵ ranging from economic (i.e., one-stage renovations are more cost-effective than staged approaches) to wider social benefits (i.e., alleviating energy poverty, improving public health, etc.). This will require a combination of strong regulatory (i.e., MEPS) and support (incentives, financing, accompaniment) measures.

However, financing deep energy renovation remains a challenge:

- **40% of homeowners aged under 65 years (19% of Flemish households) cannot finance the label A renovation of their dwelling¹⁶,** even with repayments spread on 25 years. In line with the LTRS socio-economic objectives and the region climate targets, the financing mechanisms should have the ambition to allow most vulnerable owners to renovate their dwellings to the expected climate standard,
- **The cost of label-A renovation for the worst performing single-family homes (E- and F-label) was estimated to 80,000€¹⁷ in average¹⁸,**
- Approximately, 30% of the E- and F-label single family houses (and more than 50% of apartments) are dwellings occupied by an owner that cannot finance a one-stage label A renovation¹⁹.

¹³ This could be inspired and informed by the « Transition Vision for Heating » program of the Netherlands waarin moeten steden en gemeenten met de wijkaanpak op een gestructureerde manier elke wijk aanspreken. De gemeente legt de planning vast en specificeert de voorzien oplossingen voor de betrokken wijken tegen 2030.

¹⁴ Given the status of the buildings (is the infrastructure sustainable enough or would demolition and reconstruction be a better option?), its localisation (Is investing in that building consistent with the urban planning strategy? Is there a renewable heat potential that can be captured that lower the needed energy efficiency efforts?) and its typology in the given localisation (Is it the write typology provided potential densification objectives in urbanized centres?)

¹⁵ Source: BPIE, (2021), Deep renovation: shifting from exception to standard practice in EU policy, p. 10

¹⁶ Source: Albrecht, 2020. De financiële barrière voor klimaat- en comfortrenovaties

¹⁷ 87,000€ for label F SFH (and up to 100,000€ for open SFH), 63,000k€ for label E SFH

¹⁸ Source: VEKA, evaluation made in 2019.

¹⁹ Based on the assumption that 80% (50%) of SFH (appartement) owners with a financing gap has a E- or F-label dwelling

To address these financing barriers, Flanders has already implemented or will shortly implement the following financing mechanisms:

- A zero-interest (and negative interest from 2023²⁰) mortgage loan for new owners subject to a renovation obligation (*renteloos renovatiekredit*, with a maximum amount of 60,000€ to pay back on 20 years),
- A zero-interest personal loan for households who inherit a dwelling with an E and F label (*energielening+*, 60,000€ to pay back in 20 years)
- A new zero-interest personal loan accessible to lower-income households (for singles family homes and association of co-owners) with a limit of 60,000€ (combined with 25,000€ per unit for apartment buildings) on 25 years (*Mijn VerbouwLening*),
- A personal loan repayable at property transfer (max 30,000€ and soon-to-be 55,000€ on 20 years) for “emergency buyers” (*Rentelozelening Noodkoopleningen*).

Financing mechanisms should allow the most vulnerable owners to reach fossil-free label A. The existing mechanisms in Flanders are relevant and important, but they do not allow the financing of climate renovation by all Flemish households (i.e., they do not provide sufficient solutions for the 40% target group and for homeowners aged over 65 years):

- The maximum loanable amount (60,000€) is not high enough to cover the climate renovation costs of the worst-performing buildings,
- At least 555,000 homeowners (aged below 65 years) cannot afford the corresponding monthly repayments corresponding to 25-year repayment schemes, and at least 670,000 homeowners (the ones aged above 65 years) have no access to long-term financing schemes
- Besides, there remain **limitations in the articulation between the grants and the pre-financing mechanisms**: grants are included in the maximum loanable amount of 60,000€ (so they cannot be used to cover the gap between this maximum loanable amount and the average 80,000€ investment cost of climate renovation) and there remains an important Mattheus²¹ effect as – at EU level – 65% of the bonuses are going to “free-riders” (high-income households who would have renovated anyways regardless of the existing bonuses).

In this context, Bond Beter Leefmilieu commissioned a study to CLIMACT in February 2022 to feed the policy debate with the identification of the most cost-effective prefinancing solutions for climate renovation to be accessible to all Flemish households, and the identification of the policy actions required to enable the deployment of these mechanisms.

²⁰ From 2023, the *renteloos renovatiekrediet* will offer negative interest rates for a 10-year period, beyond 10 years, zero-interest rates are applicable until the end of the loan duration (max 20-years), Source: VEKA

²¹ The Mattheus effect refers to a pattern in which those who begin with advantage accumulate more advantage over time and those who begin with disadvantage become more disadvantaged over time (the rich get richer, and the poor get poorer phenomenon)

Methodology

The study focuses on the financial accessibility of climate renovations, namely renovations with sufficient energy efficiency improvements to allow the substitution of fossil fuels by renewable heat solutions. Climate renovations means that the building is low-temperature ready and phases out fossil-based heating. While the optimal energy efficiency improvements might depend on local and specific conditions (localisation, condition and type of the buildings), **this study considers that climate renovations are renovations that lead to fossil-free label-A dwellings**. The study aims to identify and discuss prefinancing mechanisms to make climate renovations accessible to all Flemish households, focusing on homeowners that cannot finance it today.

The study focuses on homeowners occupying their own dwelling²². However, the renovation of rented dwellings deserves attention given that tenants represent a large share of vulnerable households (more less educated, more unemployed and more vulnerable households are tenants²³) and that rented dwellings are in general in a poorer condition in terms of energy and quality than owner-occupied dwellings²⁴. In addition to the general barriers, such as lack of financial resources, etc., the split incentive²⁵ is an important factor hampering the realization of climate renovation on the rental market. Although not the focus of the study, the ability of the proposed prefinancing mechanisms to alleviate the split incentive on the rental market will be briefly discussed.

Next to financing solutions, a set of other measures is necessary to reach the LTRS' climate and socio-economic targets. The study builds on the following assumptions:

- **The renovation of the worst-performing buildings is mandatory provided that a MEPS legislation will be in place.** The study looks at the policy actions required to ensure that financing is no more an obstacle to complying with such a legislation,
- **Integrated social, technical, and financial assistance is available**²⁶ to guide the homeowners in all steps of their renovation journey, including the identification of the financing solution that best match their specific constraints and needs. The fragmented buildings' sector

²² The underlying assumption is that owners of rented dwellings that cannot manage the climate renovation investment might consider the property transfer to owners that can carry the climate renovation.

²³ "The share of private tenants is 19% (550,000 dwellings) and the share of social tenants is 7% (approximately 165,000 dwellings) More young people (28%) and single persons (45%) rent, but also more less educated, more unemployed, more insecure households", Source: Vlaamse Regering, (Mei 2020), Langetermijnstrategie voor de renovatie van Vlaamse gebouwen, p.19

²⁴ Source: Vlaamse Regering, (Mei 2020), Langetermijnstrategie voor de renovatie van Vlaamse gebouwen, p.19

²⁵ "Split incentives refer to any situation where the benefits of a transaction do not accrue to the actor who pays for the transaction. In the context of energy efficiency in buildings, split incentives are linked with cost recovery issues related to energy efficiency upgrade investments due to the failure of distributing effectively financial obligations and rewards of these investments between concerned actors." Source: Economidou M. & Bertoldi P., (2015), Practices to overcome split incentives in the EU building stock, European Council for an Energy Efficient Economy

²⁶ Freely or with costs embedded in the prefinancing scheme

(different buildings' type and construction period) combined with the diversity of socio-economic profiles further stresses the need for solutions tailored to the homeowner needs and constraints. **There is no one-size fits all solution for climate renovation to be accessible to all Flemish households.**

The study by Albrecht (2020) highlighted that 40% of homeowners aged under 65 years (19% of Flemish households) cannot finance the climate renovation of their dwelling (see Figure 3). Figure 3 provides the distribution of financing gaps across homeowners. It is to be read as follows: considering that homeowners have access to 25-year repayment schemes²⁷, 10% homeowners lack more than 50,000€ to finance their one-stage label A renovation, 17% lack between 25,000€ and 50,000€, and 7% lack between 12,500€ and 25,000€, etc. Bins with positive amounts correspond to homeowners with sufficient financing power. Additional assumptions for the quantitative elements of the study are provided in appendix.

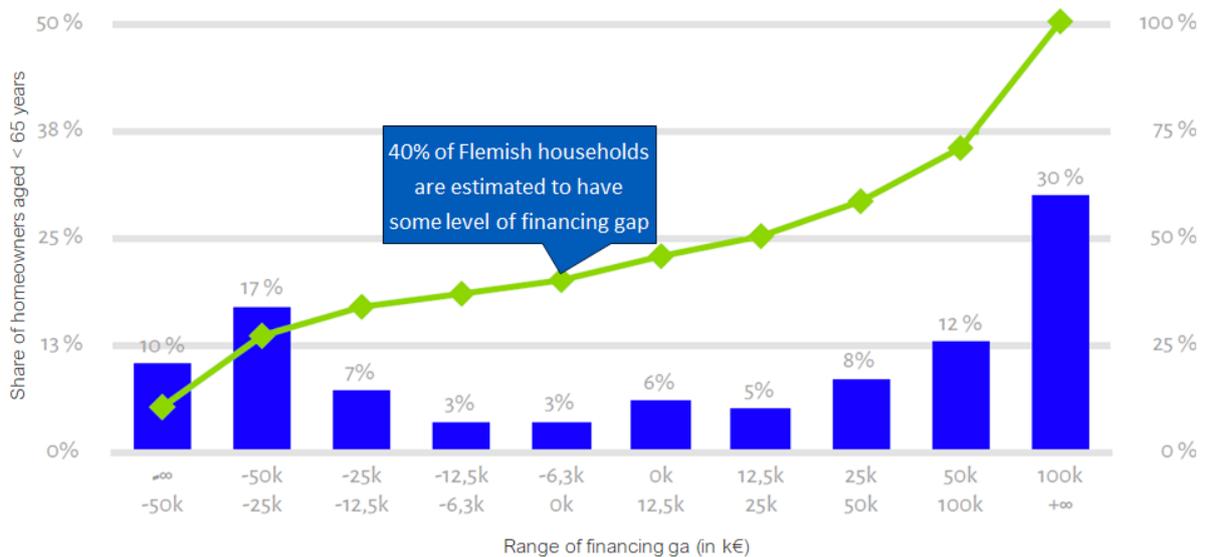


Figure 3: Share of household across levels of budget available for renovation and the related financing gap for one-stage climate renovation. Source: Albrecht, J., (2020), De financiële barrière voor klimaat-en comfortrenovaties

These results and the underlying assumptions are the starting point of this study, with the following attention points that worsen the picture:

- **The renovation costs considered in that study are too low²⁸**: the average renovation costs to bring E- and F-label houses²⁹ to label A amount to an average of 80,000€ (2019 estimation) and the recent rise in the price of renovation materials further increases these costs,

²⁷ Limited to a full repayment by their 70 years old

²⁸ Albrecht considered a cost distribution where only 8% of households face climate renovation costs higher than 60,000 €

²⁹ That represent 50% of single-family houses

- **Long-term financing products might not be accessible to all:** Albrecht considers that 25-year repayment schemes are accessible to all, with an age limit for full repayment by 65 years. In practice, banks are not always ready to lend to the poorest households, the zero-interest mortgage loan is limited to 20 years and the zero-interest 25-year 60,000€ personal loan (*Mijn Verbouw Lening*) will only enter into force by mid-2022,
- **Homeowners aged over 65 years should not be excluded** from the financing solutions. Financing gaps of homeowners older than 65 years were not considered in Albrecht’s study. Given that **no data on the latter were thus available**, Figure 4 only quantifies the number of Flemish households below 65 years old that cannot finance their renovation.

Figure 4 illustrates the structure of the Flemish households, in absolute and relative terms. The study focuses on the ~400,000 homeowners of E- and F-label dwellings for which prefinancing mechanisms should help solving the financing gap.

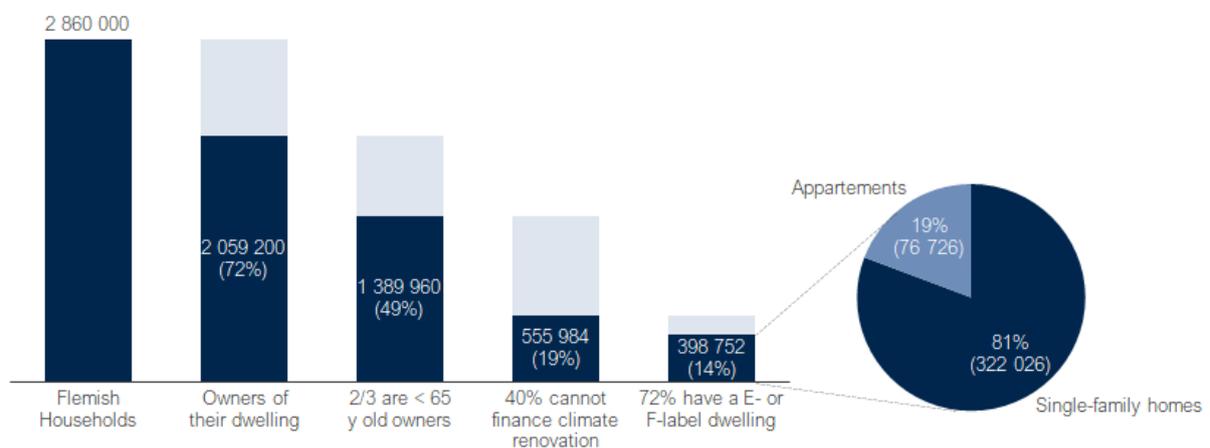


Figure 4. Structure of Flemish households (the text refers to the dark blue sections of the bars, the light blue being the remaining from the previous bar)

The next section explores the key elements required for climate renovations to be accessible to all Flemish households. It builds on the Albrecht’s study conclusions to identify specific households’ segments and to derive the most relevant prefinancing mechanisms for each segment. The potential implications of and for the set-up of these mechanisms are discussed together with the required investments and public costs.

For the sake of concision, a series of assumptions and complementary information is provided in the annexes.

Towards climate renovation financially accessible to all

As explained in the above section, a large proportion of Flemish homeowners do not have access to climate renovations due to financial constraints. Some owners face financing gaps of such levels (up to more than 50,000€) that minor renovation subsidies may not have any significant impact on their financing capacity. Two potential solutions allow to close these financing gaps:

- **Strengthen public financing:** renovations costs are paid via grants or fiscal abatements. Yet, this solution entails the following constraints:
 - It would require public expenditures amounting to 21 billion euros³⁰ to cover the financing gaps of these homeowners (corresponding to 3 billion € per year if this were to be tackled by 2030, corresponding to 6% of the 50 billion € regional budget³¹),
 - It might be unfair and reinforce inequalities between owners (who benefit from the public budget) and tenants.
- **Enable households' financing:** pre-financing³² the renovation costs through relevant pre-financing mechanisms that pay for upfront investments and allow repayment schemes suited to the households financing capacities. This study investigates the possible pre-financing solutions that are compatible with the financing needs and constraints of the above-discussed household segments.

This study focuses on the identification of the most promising pre-financing mechanisms. However, while relying only on public financing may not be sustainable in terms of public budget, fully relying on pre-financing mechanisms might put too much pressure on the households. Schemes solely based on monthly repayments are not suited to fully cover the most expensive deep renovation costs (i.e., more than 70,000 €), as it implies that households will be bound to large debt repayments that won't be payable in a realistic payback period (i.e., less than 30 years). Putting such pressure on households would not be in line with the socio-economic objectives of the Flemish LTRS (i.e., quality, energy efficient, affordable housing for all) and **a balance between financing and pre-financing remains needed to optimize the socio-economic impacts while avoiding setting a considerable burden on public funds.**

Private capital has to be mobilized. Prefinancing mechanisms could be purely public (a public institution channels public money towards homeowners), purely private (e.g., mortgage and personal

³⁰ Out of the 28 billion € investments needed for the climate renovation of E- and F-label dwellings occupied by homeowners aged below 65 years, the financing gap is assessed to 21 billion €

³¹ Source: Finance Flanders, <https://financeflanders.be/budget-highlights>

³² In this report, we distinguish pre-financing from financing considering that pre-financing is an advance to be paid back and financing is covering the costs with public budget.

green loans), or based on a combination of public and private contributions. Given the amplitude of the required investments and the need for fast large-scale roll-out (currently renovating all E and F dwellings of our target group would require 57,000 renovations/year³³, 156 renovations/day), it seems difficult to rely solely on public solutions and public capital.

A strategy that is both effective (i.e., one that meets the objective) and efficient (i.e., with an optimal use of public resources to meet the objective) for the financing accessibility of climate renovation to all Flemish households therefore needs to:

- **Mobilize as much as possible existing market-based solutions** such that the scaling-up can be rapid (as solutions are mature) and feasible (in terms of available public budget), as being on track with the long-term renovation strategy. If E- and F-label dwellings must be renovated by 2030, 57,000³⁴ homeowners with lacking financing power will need to finance their renovation every year with one of these prefinancing mechanisms, corresponding to 3.6 billion euros every year considering an average 64,000€³⁵ per climate renovation,
- **Mobilize a portfolio of financing mechanisms** to tackle these challenges in upscaling and diversify (for the sake of resilience and large scalability) the sources of capital and actors involved. The objective is to focus public interventions where it is the most needed to **remove the barriers to mobilizing private capital**. For now, financing mechanisms for vulnerable groups cannot compete on the market for energy efficiency investments. This results from the following market deficiencies:
 - A **viability gap**: the investments don't have a significant enough return on investment to attract private capital. This is linked to the households' socio-economic profile (vulnerable groups are riskier clients) and to the current market conditions (i.e., large volume of buildings to renovate, uncertainty linked to the energy savings, energy price volatility, high costs of deep renovations, resources availability, uncertainty in the higher resale value of deeply renovated buildings, ...),
 - A **financing gap**: homeowners lack financing capacity due to a limited access to capital, vulnerable groups do not have the financial means to pay for the upfront investments. They have difficulties to access appropriate financing due to; low creditworthiness and/or cannot afford debt's repayments and/or financing costs (i.e., interest rates).

In order to leverage market-based solutions, **there is a need for public intervention to address these market deficiencies** (i.e., de-risking private investment through public intervention such as guarantees for financial institutions, interest rate subsidization, co-financing, etc.)

³³ There are currently ~3500 renovation credits per year

³⁴ If the MEPS targets the renovation by 2030 of E- and F-label dwellings (the given number corresponds to owners with a financing gap)

³⁵ Weighted average between single-family houses and appartements

To identify cost-optimal public intervention, the target group should be subdivided into subgroups to determine how public intervention will best address each subgroup's market deficiencies and to elaborate the **appropriate financing mechanisms**.

There are two groups of homeowners that cannot finance the climate renovation of their dwelling:

- Households that are young enough to engage in long-term financing schemes but **lack the financing capability to endorse the monthly repayment** (group A),
- Households that are **too old³⁶ to engage in long-term financing schemes** (group B).

Group A can be divided into 3 categories:

- **A1: Those that face relatively minor financial constraints and for which longer payback duration (30 years) would enable them to finance fully their climate renovation.** The financing gap relates to the limited payback duration and/or limited maximum loanable amount of the current schemes. The viability gap relates to the difficulty to apply high financing costs (related to higher risks) in the financing schemes for vulnerable groups,
- **A2: Excluded from A1 but with the ability to pay normal-to-high energy bills.** Energy savings generated by the climate renovation could be factored in their financial plan to close their financing gap. The viability gap relates to the difficulty to finance climate renovation and the related risks (credit risk, performance risk) solely based on energy savings,
- **A3: Households that have no financing power based on their income, and that are barely or not at all able to pay an energy bill corresponding to decent living conditions.** This group includes households in energy poverty but is not limited to these. Alternative approaches are needed to solve the financing gap e.g., the increase in real estate value resulting from the renovation or the real estate value itself. The viability gap relates to the question: if these households cannot pay anything for their renovation, how could they pay additional amounts to cover the financing costs? While the study focuses on climate-related investments, it should be kept in mind that these households generally cumulate the difficulties with dwellings that will need preliminary health-, security- and conformity-related investments.

Group B (> 65 years old) can be divided between those with repayment capacity compatible with 25 to 30 years repayment, yet too old to engage in long-term financing (for these, transferability might solve the financing gap), and those with insufficient repayment capacity (for these factoring in the real estate (added) value might solve the viability gap).

In addition to this segmentation, **needs, constraints and opportunities will differ between owners of single-family homes and co-owners of appartement buildings (Vereniging van Mede Eigenaars).**

³⁶ Financial institutions generally request that the repayment be completed by the 70th anniversary. The exact age limit for this group B will depend on the available capital of the household and the resulting financing gap to prefinance (and thereby the needed loan duration). In the study, we consider that it corresponds to homeowners aged over 65 years.

Specific mechanisms should be discussed for the prefinancing of climate renovation of appartement buildings. We will further distinguish financially healthy from non-financially healthy³⁷ VME's³⁸. And it should be kept in mind that in condominiums there will be a combination of household profiles.

³⁷ (non) financially healthy = the building has (not) a renovation fund to serve as collateral and/or the credit risk assessment shows that the owners (even considered collectively) are eligible for credit (not creditworthy)

³⁸ Vereniging van Mede Eigenaars

A portfolio of mechanisms is needed to best address the diversity of household profiles

Given the diversity of homeowner profiles, a diversity of prefinancing mechanisms is needed to adapt to the diversity of personal situations. In this section, we first provide recommendations on the prefinancing mechanisms identified as most relevant by household segment. We then highlight the main motivation, limitation and required (policy) actions for the implementation of these mechanisms, and further details are provided in Annex.

Recommendations by household segment

As explained in the next paragraphs, the study concludes on the portfolio of prefinancing mechanisms illustrated in Figure 3. It does not intend to conclude that other mechanisms are not relevant. Rather, it recommends that at least these mechanisms be quickly and properly designed, implemented, and rolled out.

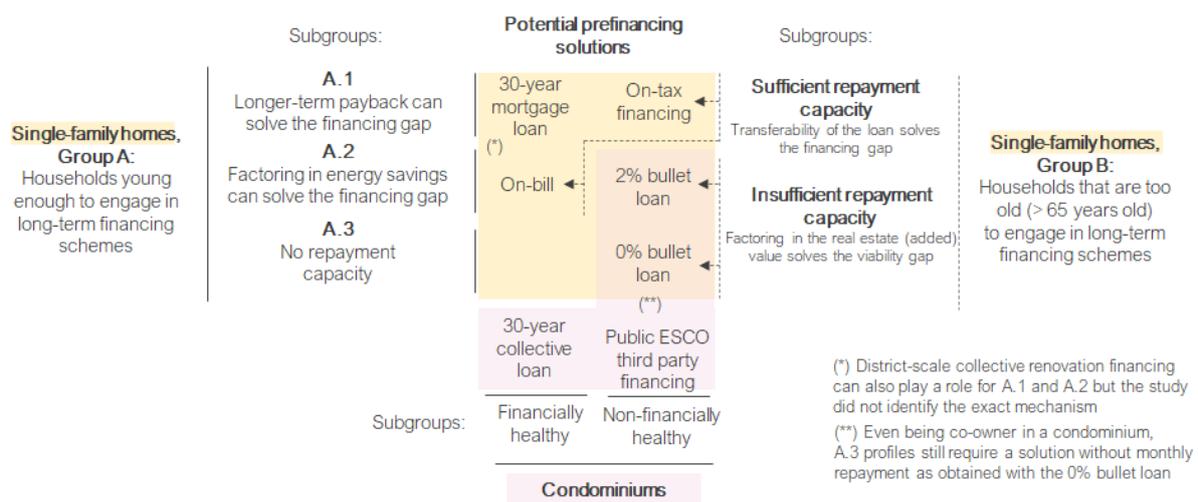


Figure 5. Recommended portfolio of prefinancing mechanisms by household segment

For the A1 group, the recommended strategy consists in extending the repayment duration. Increasing the payback duration from 25 years to 30 years increases this target group’s financing power by 20%. The study identifies the following relevant options:

- **A 30-year renovation mortgage loan is the cheapest and most ready-to-upscale solution** to finance one-stage climate renovation for this target group. Considering a 70 years-old age limit for the loan full repayment, 30-year mortgage loans would solve the financing gap for 4% (see Figure 14 and Figure 15 in Appendix) of the targeted homeowners (i.e., about 16,000 households for total investments amounting to 1 billion €). **Increasing the duration of mortgage loans is the most feasible solution in the short term.** Given the credit risk associated

with long-term financing³⁹, it is very unlikely that private financial institutions will increase their personal loans duration to 30 years. **In terms of limitations, loans cannot be transferred to the next owner**, which restricts their accessibility to older owners,

- **Alternatively, on-tax (PACE⁴⁰-) financing schemes enable homeowners to have access to energy efficiency financing with repayments through property taxes.** On-tax (PACE) financing is an innovative way to finance energy efficiency investments in the building sector where the investment is repaid through a special charge added to the property taxes during a certain period of time. PACE offers an alternative to regular loans for lower-income households that have lower credit scores (eligibility depends on the property value, not on credit scores) and/or cannot afford commercial financing costs (PACE offers lower interest rates). The model allows long-term financing and because it is associated with a property, repayment can be transferred to a new owner. However, developing a PACE programme in Europe would require some major regulatory changes (limitations are further developed in the following section). The model would require at least 2 to 3 years to be implemented and 4 to 5 years for market roll-out. It should thus not be considered as an immediate solution for financing renovations but as a promising solution to further investigate and develop by 2030.

For the A2 group, the recommended strategy consists in capitalizing on the renovations' energy savings to finance the debt's repayments. Renovations leading to a 50% reduction of the energy bills brings savings of 95 to 155€/month⁴¹. Such cost savings could finance reimbursement of a 25,000€ debt in ~20 years, and up to 45,000€ in 30 years⁴².

- **On-bill repayment schemes allow customers to pay back partly or fully the cost of their renovations with the money saved on their utility bills.** An On-bill financing scheme is an innovative way of financing energy efficiency investments in the building sector where the energy bill is used as repayment vehicle. Thus, allowing to capitalize on energy savings for debt reimbursements. On-bill have the following advantages:
 - It draws on the utility bill as a repayment vehicle which can be viewed by some investors as a form of security (customers tend to prioritize their utility bills payments)
 - It links the renovation costs with the energy savings
 - It allows transferability: when attached to the building's meter, the repayment can be transferred to the next owner
 - It serves as a potential solution to address the temporal and owner-tenant split incentive (the latter is further developed in the following section).

³⁹ Long-term finance (i.e., any source of funding which maturity exceeds at least one year) shifts the risk to the provider because they have to bear the fluctuations in the probability of default and other changing conditions in financial markets (i.e., interest rates), Source: Worldbank.org, Global Financial Development Report, Background, Long Term Finance

⁴⁰ Property Assessed Clean Energy

⁴¹ Considering energy prices of 0.15€/kWh of natural gas and initial energy consumptions ranging between 15,000 and 25,000kWh/year,

⁴² For initial energy consumptions higher than 20,000kWh/year

However, given the amplitude of the required investments to finance climate renovation, these mechanisms only apply to homeowners with available initial capital⁴³. 13%⁴⁴ of homeowners could cover their financing gap with a 20-year on-bill scheme, and an additional 14%⁴⁵ could potentially be addressed with a 30-year scheme. **This mechanism shows great potential. Particularly, in terms of creating a market for integrated energy renovations services⁴⁶ and should be further investigated.** Considering minimum 3 years for implementation and 5 years for market roll-out, it is essential to start developing it now to ensure full operationality by 2030,

- **An alternative solution is a bullet renovation loan where (part of) the capital is repaid only at the property transfer. The monthly repayment is limited to the interests⁴⁷ that potentially match the energy savings.** Advanced repayment of part of the capital should be made possible so that the granted investments can be repaid earlier, as well as to allow flexible early repayment resulting from the energy savings, as this will lower the financing cost. The study shows that 14% of the 40% homeowners with a financing gap could endorse a 2% interest rate. **It can be foreseen on a shorter-term** given that it builds on existing financing products⁴⁸, and it is already implemented in France. The important questions to be addressed relate to the respective roles of private and public actors in its implementation.

For the A3 group, the recommended strategy consists in factoring the real estate value in the financial plan.

- For households that want to remain owners of their dwelling and focusing on prefinancing solutions⁴⁹, **a quickly deployable prefinancing solution is the bullet renovation loan.** The *Rentelozelening Noodkoopwoningen* is a form of bullet renovation loan where the capital provides from public budget. Large-scale roll-out might need to better leverage private capital, and this requires the mobilization of market-based products combined with appropriate public intervention. Given that the A3 group has zero financing power and in order to avoid excessive financing costs because of interest capitalization, public budget should cover the interests to provide a 0% bullet renovation loan for these households. So, with this approach: a loan is

⁴³ It generates only 25k€ to 45k€ savings which does not cover the 80k€ average investment required for the climate renovation of the worst-performing buildings

⁴⁴ See Figure 6 13% homeowners have a financing gap lower than 25k€. This reduces down to 9% if the 4% of group A.1 are subtracted.

⁴⁵ Considering that 80% of the 17% with financing gaps ranging between 25 k€ and 50 k€ have a financing gap lower than 45k€.

⁴⁶ Services covering the whole customer journey from technical and social diagnosis, technical offer, contracting of works, structuring and provision of finance (e.g., loans or EPCs), to the monitoring of works and quality assurance.

⁴⁷ E.g., 2% interests on an 80,000€ bullet loan corresponds to a monthly payment of 133€, and to 100€/month for a 60,000€ bullet loan.

⁴⁸ Lifetime mortgage (private products), rentelozelening noodkoopwoningen (public product)

⁴⁹ as compared to financing where the investment is covered with public budget

given for the investment, the interests on the loan are paid with public money, and the capital is paid back by the homeowner at property transfer.

- Financing the climate renovation of dwellings owned by the most vulnerable households can also be considered with broader perspectives.** It can be the opportunity to reconsider the ownership culture⁵⁰ and to increase the offer of decent social housing via the following approaches:
 - Given the need for additional social housing capacity, **public authorities or social real estate actors could buy the dwelling⁵¹, carry the renovation** and for instance contract a lease for life with the initial owner. The dwelling then enters in the portfolio of (social) public housing.
 - Alternatively, leveraging **community land-trust approaches the purchase can be limited to the land** where the price of the land complies with the needed investment costs. This also offers the possibility for public authorities to control with social perspectives the real estate activity occurring on their land.

These approaches have the potential to bring in synergy climate and housing policy objectives. They deserve attention from the policy makers. However, they were not further investigated in this study that focuses on the identification of prefinancing mechanisms.

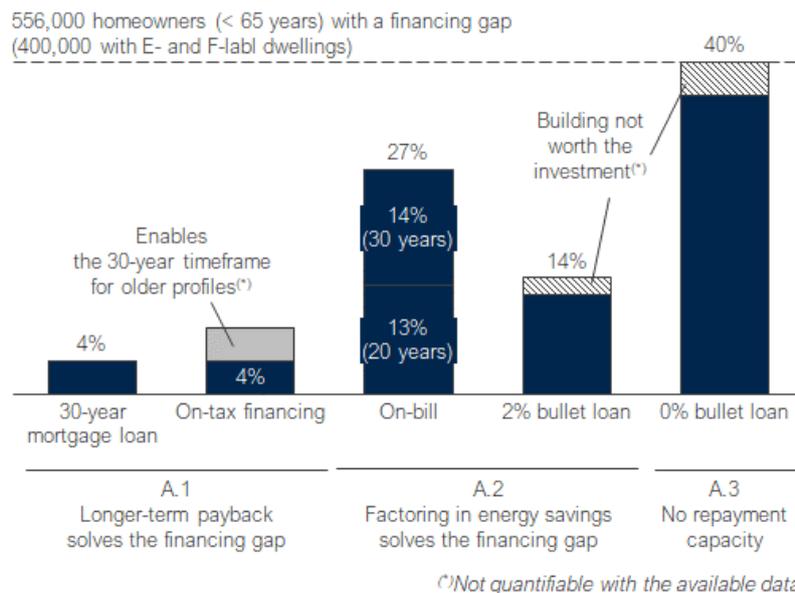


Figure 6. Coverage ability of prefinancing mechanisms to tackle the financial gaps of climate renovation (the potential of collective renovation was not assessed), in % of homeowners below 65 years old

⁵⁰ For instance, the rental market stands for 41% in Denmark, 45% in Austria, 50% in Germany and even 58% in Switzerland (Source: [Housing in Europe – 2021 Interactive Edition](#)). This contrasts with the 28% in Flanders.

⁵¹ There are different options for purchase and contracting between the public body and the initial owner that stays in the dwelling

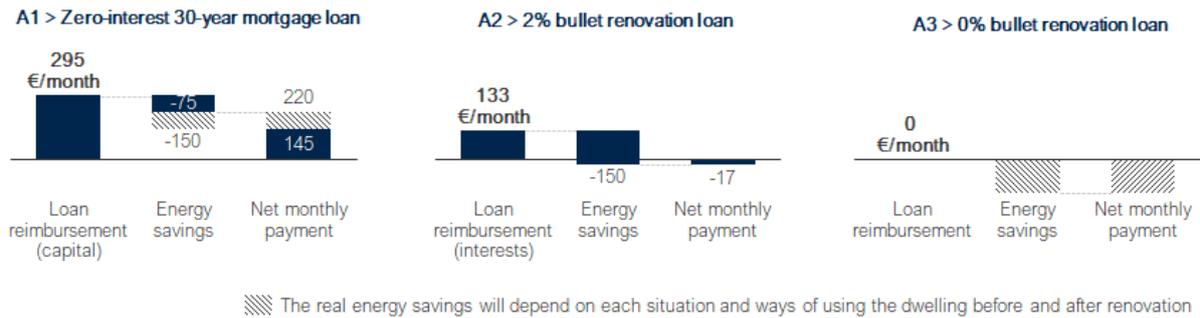


Figure 7. Net monthly repayment (in €) for the prefinancing mechanisms to implement on the short term for the three subgroups, illustrative example for an 80,000€ renovation investment

For “non-financially healthy” condominiums, a public ESCO acting as third-party investor should be put in place. Inspiring examples can be found in France with the “SPEE Haut de France” and “Îles de France Energies”. For some households that cannot (fully) engage in the corresponding monthly repayment scheme will, the bullet renovation credit remains the best option.

It remains that, provided the diversity of owner profiles that will be found in condominiums, some co-owners will still need to rely on the individual pre-financing options suggested above.

Coming back to single-family houses, **collective prefinancing solutions could also apply in collective renovations organized at the level of cities or districts.** Such financing solutions should still be tested in practice to identify their ability to alleviate financing barriers. Collective financing approaches could allow the accessibility to financing for riskier profiles that would not be eligible to individual financing schemes. **Through actions designed at the level of districts,** the mobilization of capital and the prefinancing modalities can be organized by a (local) public, private or citizen-led body, the financing through that body leads to an aggregation of homeowner (risk) profiles which lowers the average risk of the renovation project, and potential economies of scale can support the inclusion of riskier profiles.

Recommendations by prefinancing mechanism

Building on previous elements (i.e., the strategy is to prioritize existing market-based solutions and mobilize a portfolio of financing mechanisms), the prefinancing mechanisms are considered in two groups:

- **Mechanisms that build on already existing market-based solutions:** 30-year mortgage loan, bullet renovation loan and 30-year collective loan⁵². They can be quickly rolled out provided that appropriate public contributions are implemented to alleviate market deficiencies,
- **New mechanisms that will need longer implementation and roll out times:** on-tax, on-bill and public ESCO/TPF. **These mechanisms show great potential in terms of creating a well-functioning financial market for energy renovations.** They have already been tested in other countries, but they do not reach the investment volumes needed for climate renovation of the worst performing buildings. Deeper analysis is required rapidly to initiate their implementation in the next months in view of having them ready by 2030.

This is illustrated in Figure 8. The paragraphs below provide for each mechanism: the motivations, the potential obstacles, the required public intervention and the needed policy actions. The mechanisms are further presented in appendix.

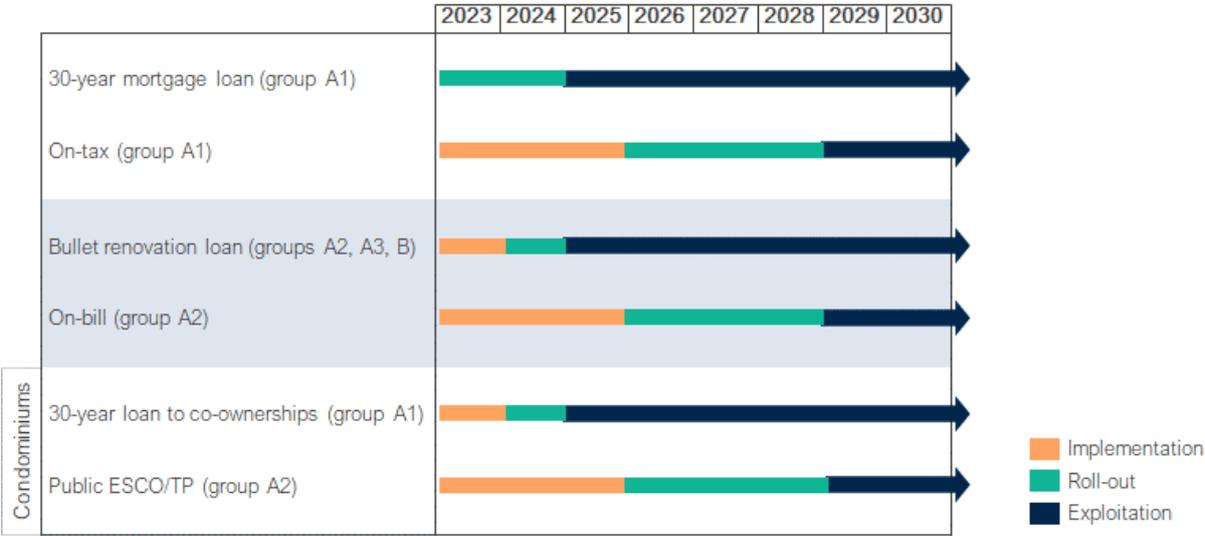


Figure 8. Recommended planning for implementation and roll-out of the identified prefinancing mechanisms

⁵² Collective loans can apply to prefinance collective renovations in the frame of district-scale renovation actions. However, it was not possible in the scope of this study to discuss the specific mechanisms that could be put in place. Thereby, the study limits the discussion of collective loans to the case of condominiums.

1. Prefinancing mechanisms to roll-out in the next months

On the short term, prefinancing mechanisms should build on available market-based financing products. Public interventions are needed to alleviate market deficiencies to address the targeted household profiles. There are three loan formulas that can be implemented:

30-YEAR RENOVATION MORTGAGE LOANS:

- **Reason why:**
 - When it can apply, mortgage loans are the cheapest solution given that a mortgage is provided as collateral which reduces the risk
 - Considering a 0% interest rate, 5 years longer pay back duration increases by 20% the financing power of homeowners with sufficient monthly repayment capacity (30 years compared to 25 years)
- **Limitations:**
 - **There remains a maximum realistic amount** that can be repaid by lower-income households without initial capital. We estimate this amount to 60k€ to 70k€⁵³. Given the estimation of renovation costs for E and F-label dwellings, extra amounts must be covered with complementary solutions.
 - **The current mortgages (notarial registration)⁵⁴ are limited to 30 years.** 30-year repayment would then be only accessible to new owners. An extension of the mortgage (notarial registration) duration to 40 years is required if we want the mechanism to apply for a broader range of households, namely households that have already been repaying their mortgage loan during up to 10 years.
 - **High transaction cost if a new mortgage must be registered.** This will be lowered in a series of case if the mortgage is extended to 40 years.
- **Required public intervention:**
 - Public guarantee or insurance (which could build on the already-existing life insurance⁵⁵) on the increased risks due to the extended duration.
- **Policy actions:**
 - **Extend to 40 years the duration of the mortgage (notarial registration),** with the possibility to extend already registered mortgages.
 - **Update the articulation of the grants with the zero-interest mortgage loan such that it can be used to (pre-)finance the 80k€ to 100k€ investments need for the climate renovation of E- and F-label dwellings. First in terms of financeable investment:**

⁵³ see the general assumptions in appendix

⁵⁴ The mortgage is the notarial registration of the owner agreement to use the house as a collateral for a financing solution. The mortgage loan is the credit provided with financing conditions that rely on the house value as collateral thanks to the mortgage.

⁵⁵<https://www.wonenvlaanderen.be/www.wonenvlaanderen.be/premies/de-gratis-verzekering-gewaarborgd-wonen>

either the maximum amount is net of the grants⁵⁶ (with the grants then being added to the maximum loanable amount thereby covering the needed renovation costs) or the maximum loanable amount (including the grant prefinancing) is increased. **Second, grants should be guaranteed to homeowners before renovation works** (grants are confirmed after the renovation works depending, bringing uncertainty that limits the accessibility to vulnerable households that cannot endorse the financing without grants).

- **Evaluate the possible set-up of a public guarantee on the additional risks** related to the duration extension, taking into account the State Aid Legislation.
 - **Engage with banks** to trigger their interest, understand their needs, and fine tune the required public interventions (guarantee, interest bonification, others).
 - **Determine how clear conditions (and the evaluation process) can be designed for the accessibility to 30 years renovation mortgage loans**, to ensure that is used only by the ones that cannot repay on 25 years⁵⁷.
- **Inspiring example:** This mechanism is technically already available in Flanders as the current mortgage loans can already run on 30 years.

BULLET RENOVATION LOAN

- **Motivations:**
 - The bullet renovation loan is a tool that provide a prefinancing solution to homeowners that have no financing power based on their incomes by factoring the real estate (added) value in the financing plan. This prefinancing mechanisms makes it possible not to exclude a household because of its income, its age, its health, or its employment situation.
 - The scheme provides a solution for prefinancing the share of the investment homeowners must endorse for homeowners that do not have access to bank credit, as well as the grants (that can be paid back as advanced capital reimbursement).
 - It allows the households to benefit from the energy savings on their bill and to repay the capital at property transfer. If the reduction of the energy bill exceeds the interest repayment (e.g., 100€/month for a 60,000€ 2% bullet renovation loan), early repayment of part of the capital can reduce the financing costs.
- **Potential difficulties:**
 - **Uncertainty related to the time before property transfer.** Comparing the number of real estate transactions⁵⁸ with the number of dwellings⁵⁹ informs that the average

⁵⁶ Today, the maximum 60,000€ loan includes the prefinanced grants. A 20k€ grant does not allow to finance an 80k€ investment but lowers the repayments, i.e., leading to the repayment of a 40k€ loan.

⁵⁷ Risk that households that can finance within 25 years opt for a 30-year solution to limit their monthly repayment although this increases their financing costs (or increases the public costs in case of interest bonification)

⁵⁸ [Vastgoedprijzen | Statbel \(fgov.be\)](#)

⁵⁹ Kadastrale statistiek van het gebouwenpark [be.STAT \(fgov.be\)](#)

duration between two transactions is higher than 30 years. However, the bullet loan will not only be contracted by new owners but probably by the spectrum (regarding the remaining time before sale) of owners leading to 15 years in average.

- **Uncertainty related to the long-term evolution of the real estate market** (i.e., how to account for external factors to best reflect the real estate evolution?)
- **High risks if the building is not worth the investment.** There is a need to properly screen and filter the renovation projects.
- **Financially more expensive and high transaction cost** (if a mortgage must be provided as collateral).
- **Need of sufficient demand** to cover the potentially high development costs for the financial institutions
- **Need of legislative modification** as Article VII.133, §2 of the Code of Economic Law prevents from solvability analysis solely based on the real estate value
- **Particular need of appropriate balance between financing and prefinancing** to avoid that the scheme exacerbates the access to decent housing for homeowners who want to move in another dwelling (i.e., risk that the owner cannot buy a dwelling with similar level of quality if part of the sold dwelling's value is channelled for the reimbursement, and not compensated by the added value generated by the climate renovation).
- **Public interventions:**
 - **Public guarantee of the payment defaults**⁶⁰. In France, the set-up of such a public guarantee has triggered the offer of this product by financial institutions
 - **Grant subsidization to zero interests** for the lowest-income households
- **Policy actions:**
 - **Organize exchanges between Belgian and French actors** (public and private) to best build on their learnings
 - **Evaluate whether the scheme should consist of a scale up of the *Rentelozelening Noodkoopwoningen* or should better leverage market-based products** as suggested in this study.
 - **Trigger the interest of financial actors.** The discussions of the sustainable energy investment forum could serve this purpose.
 - In parallel, **update the legal basis** to allow for this mechanism (Code of Economic Law)
 - **Organise a call for propositions to select actors and discuss the required conditions** (public interventions) for them to propose this financing mechanism⁶¹
 - **Define and implement the tools and processes** to ensure that renovation works are appropriate and worth the investment (e.g., as compared to demolition)

⁶⁰ In the French scheme, in the absence of repayment after a period of twenty years from the date of its subscription, the lender may receive an advance on guarantee from the fund up to a limit of 75 % of the total amount remaining due to him at the date of the application.

⁶¹ The French design of the “prêt avance mutation” can serve as starting point

- **Increase knowledge on the green value of buildings** to properly evaluate the optimal balance between financing (grants) and prefinancing (share of the investment the homeowner must endorse).
- **Inspiring example:**
 - See the French “Prêt avance mutation”. Recommendations by the Caisse des Dépôts in the [report by Sichel \(Sichel, 2021\)](#) (see Annex 6) and [information on the implemented mechanism](#) by the French Agency for Information on Housing. The main elements are provided in annex of this report.
 - The rolling fund (*Rentelozelening Noodkoopwoningen*) implemented in Flanders is already a pilot of this scheme and provides the foundation for its design.

LONG-TERM RENOVATION CREDIT TO CONDOMINIUM

- **Motivations:**
 - **Risk collectivisation** through a credit insurance for co-owners’ association
 - Long-term loans are an **existing fully market-based solution** that could be easily implemented for condominiums
 - It offers **reduced interest rate combined with a long payback duration without the need of individual collateral**
- Barriers/limitations:
 - **Financing gap:**
 - The existing financing solutions on the market do not offer the required flexibility in terms of interest rates (too high) and payback duration (too low) to allow deep energy renovations of condominiums
 - Allocated grants need to be pre-financed by the owners which raises an issue of liquidity for the owners
 - **Viability gap:** Long-term reduced interest loans have financial returns below market requirements which make it not viable on the financial market. Currently, insurances offer risk coverage for 10 to 15-year loans. **The focus should thus be put on identifying (in collaboration with condominium credit risk insurance) which amount of public intervention is required to extend the duration to 30-years and which amount of risk should be transferred to the public.**
- Policy actions:
 - **Identify what is the relevant co-ownership size**⁶² beyond which it is worth considering the condominium as a unique private entity (instead of the combination of individual dossiers)
 - **Dialogue with insurance companies**
 - **Set-up of the guarantee fund**

⁶² number of dwelling units in the building

- **Inspiring example:** Although still niche, this mechanism is technically already available in Flanders. Some banks (have) propose(d) 15-to-20 years loans to condominiums provided that the condominium has elaborated a master plan (long-term plan of the needed renovation investments) and that the condominium contracts an insurance of the credit default. A series of cases, amongst others in Antwerp, can provide useful learnings.

2. Prefinancing mechanisms to develop in the next months for implementation and roll-out in the next years

Promising alternative mechanisms will help to diversify the sources of capital and the actors who carry the prefinancing mechanisms, thereby fostering resilience of the financing toolbox that Flanders can rely on. Interestingly, on-tax and the on-bill mechanisms are transferable to the next owner, which is not the case with loan mechanisms that are related to the individuals.

The implementation details cannot be fully designed in the scope study. Given the time that will be required for the design, the implementation and the roll-out of these mechanisms, if we want them to be available by 2030 at the latest, it is highly recommended to quickly analysed their design and to initiate their implementation in the next 1 to 2 years. This study provides a series of attention points to guide the next steps.

ON-TAX (PACE⁶³) MECHANISMS

- **Main motivations:**
 - The PACE loan program is a novel mechanism, likely to be less of a burden for public budgets (usually the local government issues bonds to attract private investors) and a viable solution for the long-term financial sustainable growth.
 - PACE financing can be transferred easily, because the obligations are tied to the property rather than to the individual. Hence, improvements can be conducted even when the owner plans to sell the affected dwelling
 - This is a promising alternative to long-term (30 years) mortgage loans because (i) the transferability can contribute to reducing the risk and therefore the financing costs (ii) it relies on the fiscal administrative tools and procedures as a “safe conduit” for the debt's repayments. This secure repayment and collection mechanism reduces the risk of payment default, thus increases the attractiveness for private investors and attracting cheaper funding (regular loans have higher interest rates)
 - The property tax is due only once or twice a year which allows participants to first benefit from the cost savings and then pay their property tax.
 - In addition, complementing the existing mechanisms (i.e., Mijn VerbouwLening) with a PACE model might also offer a more cost-effective solution (public budget wise)

⁶³ Property Assessed Clean Energy

compared to the 25-years personal loans that the Region is about to provide (for households outside of the target group of this study).

- **Attention points:** the challenge remains to find a suitable legal solution realistic to implement, given that
 - **The program requires a review of current fiscal and non-fiscal legislations** to find a way to secure the financing by a property and allow municipalities to participate in the collection
 - **This implies implementation challenges** related to the needed interactions with the 300 Flemish municipalities.
 - **The financing is attached to the property which serves as collateral in case of default.** It **raises questions regarding the nature of this property lien** in comparison with potential existing loans on the property. The United States consider PACE loans as senior lien⁶⁴ loans while in the EuroPACE pilot project in Spain, the lien would be equal or junior to existing mortgages (but never senior) to avoid conflicts with existing lenders.
 - **Municipalities cannot always impose senior liens on properties with a commercial mortgage.**
- Policy actions:
 - **Further investigate the legal implication and essential requirements** (in terms of operationalisation, stakeholders involved, associated accompaniment) of the model. In particular, it should be examined to which fiscal instrument the repayment can be attached and the level (regional or local) at which it would best be implemented
 - **In collaboration with relevant stakeholders** (i.e., municipalities, policy makers, ...) identify and implement a suitable legal solution
 - **Conduct a pilot** building on the learnings of ongoing projects such as EuroPACE and focusing on the financing of one-stage climate renovations

ON-BILL MECHANISMS

- Main motivations:
 - **Factors energy savings in the financial plan** and allow the mobilization of private investments under certain conditions (see On-bill mechanisms section in annexes)
 - **Removes first cost barriers** to energy efficiency investments by using the utility bill to assess the creditworthiness of the households
 - **Allows transferability when the reimbursement is attached to the meter**, linking the product to the property and not to the household.

⁶⁴ Senior mortgage loans or “senior lien” shall be reimbursed first (compared to second mortgage or ‘junior lien’ loans) in the event of default

- **Answers the temporal split incentive⁶⁵**: the ability to attach the repayment scheme to the meter allows for the transferability of the mechanism to the next owner
- **Answers to the owner/tenant split incentive⁶⁶**: tenants contribute to the investment in a proportion corresponding to the energy savings they benefit from
- **On-bill creates a clear link between renovation costs and energy savings** which enables the final user to relate a reduction in energy consumption with the investments made and thus **encourages public acceptance of energy efficiency investments.**
- **Limitations:**
 - **Ability to leverage private funds:** Financial institutions and private investors terms might not be attractive enough for on-bill schemes and vulnerable groups (i.e., high interest rates, unattractive maturity, significant collateralisation requirements on homeowners).
 - **The model is less suitable for deep retrofits** given the amplitude of the required investments fully relying on energy savings to cover the debt's repayment is not feasible. There is a limit in the maximum amount that can be paid back through energy savings (See Annex 1 On-bill financing schemes). On-bill thus requires homeowners to have available initial capital to cover the remaining costs needed for deep renovations.
 - **Complexity of implementation:**
 - **Implementing an on-bill scheme requires the development of a complex framework** (see Figure 23 in Annex 2) which includes several stakeholders, each facing specific challenges that will need to be addressed. Among these, an operator that oversees the technical aspect and incurs the performance risk⁶⁷ and a financial operator that substitutes to the financing institutions and act as an interface between the operator and the financing sources.
 - **Drawing on energy bills as a repayment vehicle requires changes in legislation** that allows to include renovation costs in the utility bill.
 - **Energy prices' volatility:** if there's a sudden increase in energy prices, final users might not be able to pay an increased energy bill and the debt repayments. However, considering on-bill schemes make climate renovations accessible for some of our

⁶⁵ "Temporal split incentive refers to situations where the energy efficiency investment does not pay off before the property gets transferred to its next occupant/owner. In this situation, the occupant (tenant or owner-occupier) does not have a clear idea of how long they will live in their property or simply plan to move relatively soon. An energy efficiency upgrade attached to a high upfront capital cost will not be an appealing investment in this situation and may be perceived as risky", Source: Economidou M. & Bertoldi P., (2015), Practices to overcome split incentives in the EU building stock, European Council for an Energy Efficient Economy

⁶⁶ "In these cases, the landlords lack incentives for investing in energy efficiency upgrades as they do not directly reap the benefit and often cannot capitalise these upgrades into higher rents", Source: Economidou M. & Bertoldi P., (2015), Practices to overcome split incentives in the EU building stock, European Council for an Energy Efficient Economy

⁶⁷ Risk that the renovation works do not lead to the expected energy savings

target group, it would reduce the impact of prices' volatility on their energy bill in comparison to a situation where they are not able to renovate their dwellings.

- **Increase the pressure on the energy supplier's debt position:** in case of default, (final users are not able to pay their utility bill) the utility bears all the consequences.
- **Required public intervention:**
 - **Public intervention is needed to tackle the market failures** (i.e., the model does not attract private investments due to the associated risks of non-payment, lengthy return on investment, sensitivity to energy prices volatility). The national or regional authority could establish guarantee funds that support renovation lending and investments. However, the following questions remain: what would be the required public intervention to convince private parties to invest and is it feasible in terms of available public budget/funds?
 - **Depending on the type of on-bill business model** (see Annex 2 On-bill mechanisms) the needed public interventions to cover each stakeholder's risks differ and may have a significant impact on the public budget.
- **Policy actions:**
 - **Conduct a broader study to further investigate** the legal (i.e., required changes in legislation) and financial (i.e., ability to leverage private capital and impact on the public budget) implications of the model and its requirements for market roll-out
 - The remaining questions on the private parties' involvement should be discussed with private actors and financial institutions
 - On that basis, **define a concrete and detailed action plan with key milestones to ensure the timely execution of the model's implementation** (min 2 to 3 years) and market roll-out (min 5 years) **by 2030**.

PUBLIC ESCO THIRD-PARTY INVESTMENT FOR CONDOMINIUMS

- **Motivations:**
 - The set-up of a public ESCO providing integrated technical assistance and third-party financing is a required solution for the financially non-healthy condominiums, as no other alternative meets the complexity of financing renovation operations in this target group.
 - The more the financial accounts of a condominium deteriorate, the more the property value of the dwellings deteriorates, meaning that: 1/ condominiums in financial difficulty will have no chance of accessing collective bank loans because of the inability to obtain credit insurance coverage, 2/ co-owners will face similar difficulties to access mortgage-based loans due to the devaluation of their property.
 - Deep renovation of a condominium with affected financial accounts is an even more complex journey because of the need to ensure a financial package that allows the recovery of the condominium's accounts while absorbing the burden of financing the renovation works.

- **Attention points:** A legislative framework authorising a public or public-private operator to grant loans to individuals should be put in place. A model approach could be found in France with the regime applicable to "sociétés de tiers financement" (Article L381-1 of the Construction and Housing Code of the 2014 ALUR law).
- **Required public intervention:** Public funding is a prerequisite for the business model of third-party financing companies to cover at least the operating costs.
- **Inspiring examples:** There are today seven "sociétés de tiers financement" operating in France, such as SPEE Haute de France, Îles-de-France Energies.

3. High-level analysis of the impacts

This section highlights some expected impacts of the proposed prefinancing mechanisms. Complementary work is suggested to further complete this high-level analysis.

PUBLIC BUDGET

In the EU, 65% of the renovation subsidies go to the higher incomes that would most probably have renovated even without the subsidies⁶⁸.

This study investigated alternative approaches focusing on prefinancing mechanisms and considered the costs of fully granting the needed investments as benchmark. This section provides high-level estimation of the costs with the aim to highlight the relevance of appropriate balance between financing and prefinancing.

If market-based prefinancing mechanisms are appropriately leveraged, this could reduce the public costs by -57% to -72% (excluding the impact of guarantees on public budget) as illustrated in Figure 9 (details are provided in appendix), considering that there are:

- about 400,000 homeowners of single-family houses that cannot finance their climate renovation, that 80% of them will be subject to the MEPS in the next 5 to 10 years as they have a E- or F-label buildings, and that climate renovation amounts in average to 80,000€, financing these renovations fully with public money would cost ~ 25.8 billion €.
- about 150,000 owners of appartements that cannot finance their climate renovation, that 50% of them will be subject to the MEPS in the next 5 to 10 years as they have a E- or F-label buildings, and that climate renovation amounts in average to 24,000€, financing these renovations fully with public money would cost ~ 1.8 billion €.

⁶⁸ European Commission (2019). Comprehensive study of energy renovation activities and the uptake of nearly zero-energy buildings in the EU, https://ec.europa.eu/energy/sites/ener/files/documents/1.final_report.pdf Cited in Albrecht, 2021. Renovatiebeleid in België; weinig impact en (te) veel 'free riders'

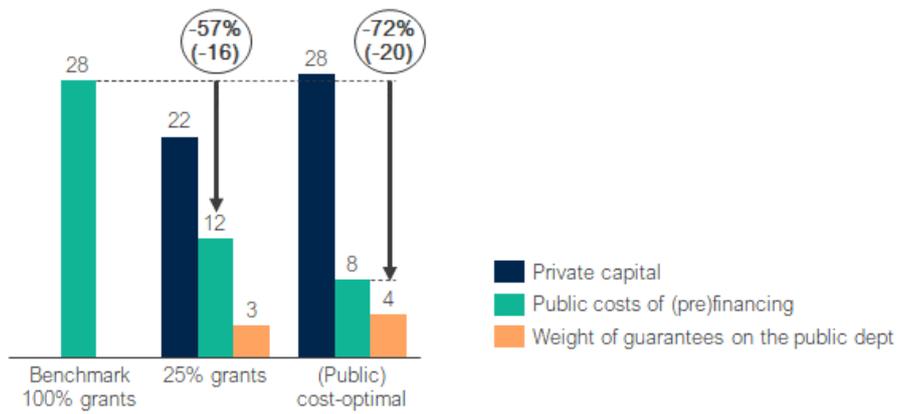


Figure 9. Costs of climate renovations of dwellings of the target group across different (pre)financing scenarios (in billion €)

While Figure 9 provides the total costs, it does not explicit when the costs occur and thereby what is the level of engagement of the public authority today and what is left as remaining effort for the next governments and generations. There is actually an important difference between grants (allocated on today's budget) and reduced interest rates that engage the next legislatures. Figure 10 provides an illustrative example of the needed balance between financing and prefinancing, as using the public budget to reduce the investment rather than lowering the interest might lead to reduced total costs for both homeowners and public authorities.

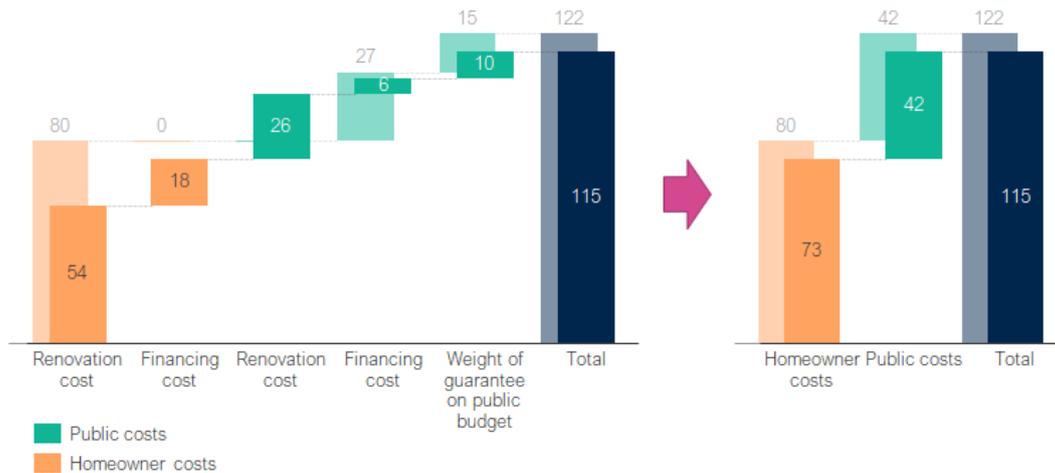


Figure 10. Illustration of the costs (in thousand euros) for a 30-year loan in two scenarios: lighter bars provide the costs for a zero-interest loan, darker bars provide the costs for a 2%-interest loan where the public costs are switched to a reduction of the investment rather than the coverage of the financing costs (the cost of public capital is considered at 1.5%). See the appendix for the approximation of the impact of the guarantee.

In terms of operational costs, today's management of the mortgage and personal loans amount to about 360€/new file in average⁶⁹. Considering that the number of yearly files for the targeted homeowners should range between 33,000⁷⁰ and 57,000⁷¹ depending on the level of stringency of the forthcoming MEPS, operational costs could range between 12 and 20 million euros. This will of course be significantly impacted by the choice between public and market-based instruments.

For the bullet loan specifically, today's operational costs of the rentelozelening noodkoopwoningen amount to 8,500€ in average, corresponding to 31% of the lent budget. This is like covering the financing cost of 2% interest on an average 15-year duration⁷² bullet loan. We however expect that leveraging market-based instruments will lower the impact on the public debt, thereby facilitating the upscale.

FOSSIL FUEL REDUCTIONS

Oil and gas consumption for residential heating in Flanders amount to 15TWh and 24TWh respectively. The scenario assumes the renovation of 398,752 dwellings (homeowners below 65 years with a financing gap) to fossil free EPC label A. On the one hand this reduces gas consumptions by 3.95 TWh (considering that E and F labels consume 17% more in average) and oil consumptions by of 2.39 TWh of heating oil or 1.50 million barrels of oil. On the other hand, considering that they are switched to heat pumps leads to an increase in electricity demand of 1.06 TWh (taking into account a SCOP of 3 and 50% energy demand reduction due to insulation) this leads to an increase of 0.48 TWh gas (taking into account a 24,80% of electricity production comes from gas and average efficiency of gas power plants is 55%). The total reduction thus amounts to 3.47 TWh or 0.34 bcm of gas. For comparison Belgium uses about 18bcm of gas across all sectors.

The final energy consumption for heating would be reduced by 5.28 TWh or a decrease of 11%. Resulting in a decrease of 1.04 MtCO₂-eq.

SOCIO-ECONOMIC IMPACTS

7%⁷³ of Flemish households are homeowners in situation of energy poverty. If we assume that they mostly live in the worst-performing buildings, rolling out the appropriate financing and prefinancing toolbox (along with amongst other appropriate accompaniment and regulatory measures) could **improve the living condition of about 200,000 households.** In addition to improving their ability to properly warm their dwelling and/or reducing the weight of their energy bill in their budget, climate renovation has also the potential to reduce health issues related to bad-quality dwellings. Today, there are 5% of homeowners with (very) bad general state of health and 11% with an average state of

⁶⁹ Back-office and energy houses (source: VEKA)

⁷⁰ All E- and F-label dwellings renovated by 2035

⁷¹ All E- and F-label dwellings renovated by 2030

⁷² see appendix for assumptions

⁷³ Estimation based on the Energy Poverty Barometer 2021

health⁷⁴. Useful insights can be drawn from the Irish Warmer Home Scheme⁷⁵ that triggered and accompanied the deep energy renovation for vulnerable and energy poor households with quantified results on the energy poverty reduction, indoor environment quality and health⁷⁶.

Regarding the access to decent housing, contrasting impacts can be discussed with some attention points specific to the bullet renovation loan. On the one hand, **the climate renovation allows to maintain or improve the market value of the dwelling**. In 2019, an A-label house was estimated to value 10.9% more than the same E-label house (and 3.4% for appartements)⁷⁷. The further introduction of MEPS should strengthen the integration of the climate quality of dwellings in their market value. On the other hand, **in the case of the bullet renovation loan, there is a risk that when homeowners sell their dwelling to move elsewhere, they cannot buy a dwelling with a similar level of (climate/comfort) quality**. Indeed, the added value could not fully compensate for the needed investments. Thereby, after the reimbursement of the loaned capital, these owners could remain with less capital than the value of the dwelling they leave. This is an important element for the design of the financing/prefinancing balance for the vulnerable groups, as the reimbursement that vulnerable homeowners have to endorse could be limited to the increased market value resulting from the climate renovation⁷⁸. This will need careful monitoring of the real estate market. Finally, in case of donation or succession, a zero-interest loan could be provided to the heirs if they are not bankable or unable to repay the debt⁷⁹.

The rise in energy prices and the uncertainty on their future evolution also bring some risks for homeowners that engage in monthly repayment schemes. Indeed, although their financing power estimated today might allow them to afford the repayment scheme, increases of energy prices could significantly impact their financing power. However, it should be put in perspectives with the impacts of energy price increase on homeowners that did not renovate and with the type of measures that would then be needed to mitigate the impact on the vulnerable groups. It should be kept in mind that the increase of the energy bill will be lower than it would have been without renovation (see illustrations in Figure 21 and Figure 22 in appendix). Thereby, if we consider that social policy measures will need to be put in place to cancel the impact of the increased energy price on vulnerable people, it

⁷⁴ Source: Energy Poverty Barometer 2021. Numbers for Belgium

⁷⁵ [Energy upgrades for homeowners on low incomes \(Better Energy Warmer Homes Scheme\) \(citizensinformation.ie\)](https://citizensinformation.ie/en/energy/energy-upgrades-for-homeowners-on-low-incomes-better-energy-warmer-homes-scheme)

⁷⁶ "The number of beneficiaries who found it difficult or impossible to pay utility bills on time decreased from 48% to 28%. The number of families with children that could keep a comfortable temperature at home increased considerably from only 27% to 71%. The number of beneficiaries who suffered from long-term illness or disorders decreased by a massive 88%." Source: [BPIE, 2017. Reducing energy poverty with national renovation strategies: a unique opportunity](#)

⁷⁷ S. Damen, 2019. Het effect van het EPC en energetische kenmerken op de verkoopprijs van woningen in Vlaanderen

⁷⁸ For illustration, based on the median value of houses and considering a green value of 10%, the climate renovation would bring about 30,000€ that could be factored in the repayment. For an average 80,000€ investment, this means that in average 50,000€ should be covered with public budget, i.e., 63% of the investment. The bullet loan would then be limited to the remaining 30,000€ (in average) for the vulnerable households.

⁷⁹ Sichel, 2021.

will remain a better strategy to engage in the climate renovation scenario than a doing nothing approach.

Housing is a key sector of the real economy and represents a major part of households' wealth and bank lending. Previous crisis events have shown that financial crises relating to housing (possibly combined with other types of crisis events) occur relatively often and can have severe repercussions on the real economy and households' welfare⁸⁰. Belgium having never experienced a severe housing crisis, the risks remain low⁸¹. However, easing lending standards for the most vulnerable groups and increasing the number of credits to lower-income households may imply risks for the stability of the financial sector and should be considered. The 2022 BNB financial stability report puts special emphasis on the potential impact of risky loans on the financial sector's stability. Especially, mortgage loans⁸² on buildings with lower-quality EPC ratings for which the share of income allocated to the mortgage repayments is higher⁸³. These are thus more likely to be affected by the surge of energy prices which would increase borrowers' repayment difficulties and decrease the value of the building used as a collateral. This could lead to an increase in credit losses which could result in a financial and social crisis. However, the latter could be partially mitigated by fostering climate renovations that dramatically improve the EPC-rating and reduce the energy consumptions.

To avoid macroeconomic shock resulting from the roll-out of riskier financing products, the BNB recommends to:

- Maintain a supplementary capital buffer destined to cover systemic risks in mortgage loan portfolios
- Reduce the share of riskier loans in new mortgage loan production
- When necessary, offer solutions to borrowers whose repayment capacity has deteriorated.

The financial sector must be ready, if necessary, to conservatively book loan loss provisions, but also **to proactively and bilaterally offer tailor-made solutions to borrowers faced with liquidity or repayment problems on existing loans** (e.g., suggest a specific insurance as proposed in the Flemish region's life insurance⁸⁴ or to switch towards a bullet renovation loan)

Finally, the investments required for the climate renovations of the target group amount to approximately 27 billion € which represents 11% of the total amount of mortgage loans granted today by Belgian banks⁸⁵. **To reduce the share of risky mortgages loans,** it will be essential to determine clear conditions and evaluation processes to reserve the accessibility of such financing mechanisms to

⁸⁰ European Systemic Risk Board, (2019), "Vulnerabilities in the residential real estate sectors of the EEA countries"

⁸¹ Belgian National Bank Financial Stability report 2022

⁸² Delivered for dwelling purchase

⁸³ BNB Financial stability Report 2022

⁸⁴ <https://www.wonenvlaanderen.be/www.wonenvlaanderen.be/premies/de-gratis-verzekering-gewaarborgd-wonen>

⁸⁵ "Over the 2014-2021 period, the total amount of mortgage loans granted by Belgian banks to Belgian households went up from approximately € 170 billion to approximately € 245 billion. As a percentage of banks' total assets, this corresponds to an increase from 15% to approximately 21%", Source: BNB Financial stability Report 2022

homeowners that really need them. A detailed risk assessment considering the energy performance of buildings, the interest rates' fluctuations and a thorough monitoring of defaults will thus be needed to best anticipate a potential impact on the financial sector's stability.

Conclusions

Flanders is currently not on track to achieve the goals of its long-term renovation strategy: renovating all existing residential buildings to energy label A by 2050 with the ambition to reach a carbon neutral building stock after 2050.

The massification of the climate renovation of buildings in Flanders needs a comprehensive and coherent set of policy measures. Climate renovations need to consider the diversity of Flemish households, they need to be embedded within the broader social and policy context and to consider the access to decent housing for all, high energy prices, and the interlinkages between the climate impacts of buildings and mobility. Financing volumes to trigger the renovation of the worst-performing buildings towards climate neutrality are significant. Realizing these investments is an opportunity to improve the living conditions of vulnerable groups and to generate economic opportunities in Flanders.

It is crucial to ensure the relevance and the quality of the renovation projects. Taking into account the condition of the buildings, as well as its localisation and its typology, to ensure consistency with the spatial planning and housing policy orientations. Clear orientations from the regional and local public authorities are necessary to engage in comprehensive strategies and planning of the action at the level of their districts. The study has considered a simplified approach, considering that each building should be climate renovated and should remain in the hands of their current private owners.

The study investigated prefinancing mechanisms that must be put in place to ensure that financing is no more an obstacle to one-stage climate renovation of the owner-occupied worst-performing dwellings. It builds on the study by Albrecht (2020) that highlighted that 40% of homeowners aged under 65 years (19% of Flemish households) cannot finance the climate renovation of their dwelling, despite the new prefinancing solution (Mijn VerbouwLening) that Flanders is about to launch during the summer 2022.

The study brings the following conclusions in terms of prefinancing mechanisms for homeowner that today cannot finance the climate renovation of their dwelling:

- **The toolbox of prefinancing mechanisms should be optimized.** Today's mechanisms in Flanders do not allow the financing of one-stage climate renovation by the most vulnerable homeowners. The maximum loanable amount is lower than the average required investment and the duration and/or design of the schemes do not allow low-enough monthly repayment to afford the average required investment. In addition, today's mechanisms are intensive in public capital, which questions their scalability (there should be between 33,000⁸⁶ and

⁸⁶ Climate renovation of E- and F-label dwellings owned by vulnerable groups triggered by 2035

57,000⁸⁷ files/year depending on the climate ambition, and there are currently about 3,500 files/year).

- **The toolbox of prefinancing mechanisms can be optimized.** The cost of climate renovation of the worst-performing houses is 80,000€ in average. For owners without initial capital, leveraging already-existing prefinancing products allow to finance such an investment with monthly payment amounting to 222€/month with 0% interest and 30-year repayment schemes, and 133€/month with 2% bullet loans (down to 0€/month if the interests are covered with public budget) where the capital is paid back when the owners sell their dwelling. If grants are provided to cover 25% of the investment in average such that the maximum budget to endorse is limited to 60,000€, these monthly payments are respectively reduced to 167€/month and 100€/month. This requires that the amount to be loaned be net of the public grants.
- **A diversity of prefinancing mechanisms is needed** to comply with the diversity of homeowner profiles. There is a set of prefinancing mechanisms that can be put in place to enlarge the range of homeowners who can finance their climate renovation. The study recommends that at least these identified mechanisms should be quickly designed, implemented and rolled out and maybe complemented by other relevant mechanisms.
- **The design and implementation of these prefinancing mechanisms should be realized in the coming months.** The proposed mechanisms need to be designed and their implementation require time, depending on their complexity.
- **For households with no financing capacities, the study suggests factoring the real estate (added) value in the financing plan via a bullet renovation loan.** The rentelozelening noodkoopwoningen is a starting point, and the study recommends that a quick upscale strategy leverage market-based products. This bullet loan also offers senior homeowners a prefinancing solution that can be set-up on the short-term. Alternative transferable schemes (on-bill, on-tax) will require few years for their implementation.
- **Financing and prefinancing needs to be balanced.** The right mobilisation of market-based products and private capital can lower the public. In some cases, the transfer of the ownership to the public sector can increase the offer of public and social housing and should be considered to bring in synergies climate and housing policies. This has not been further investigated in the study.

A series of policy actions are identified as next steps to move forward in the implementation of the proposed prefinancing mechanisms.

- **For the mechanisms that build on existing market-based solutions and that can be implemented in the short term (coming months), the focus should be put on adapting the related existing financing mechanisms and the legislative framework to ensure their implementation:**

⁸⁷ Climate renovation of E- and F-label dwellings owned by vulnerable groups triggered by 2030

- For the **30-year renovation mortgage loan**, the **priority policy actions** are 1/ extending the mortgage duration (in terms of notarial registration) of new and already-registered mortgages, and 2/ evaluating the possible set-up of a public guarantee to cover the risks related to the extension of payback duration.
- For the **bullet renovation loan**, the **priority policy actions** are 1/ **assessing whether the scheme could be a scale up of the Rentelozelening Noodkoopleningen or should rather leverage market-based products** as suggested by this study for the sake of scalability, and 2/ **updating the existing legislative framework** (i.e., Article VII.133, §2, Code of Economic Law) to allow using the property value as a basis for creditworthiness assessment.
- For the **long-term renovation credit to condominiums**, the priority policy actions are 1/ **assessing whether the scheme could be a scale up of the public scheme Mijn Verbouwenling⁸⁸ or should rather leverage market-based products** as suggested by this study for the sake of scalability. In the latter case, the priority action would be to set-up a guarantee fund to cover the guaranteed risks⁸⁹ of the insurer in return for extending the loan payback duration.
- **For the mechanisms that will require longer implementation (min 2 to 3 years) and roll-out (min 5 years) periods, the focus should be put on identifying the most adequate business model, to set-up the required legislative framework, and to conduct a pilot in the following years.** These mechanisms include on-tax and on-bill financing for individual dwellings and a public ESCO (Energy Service Company) and third-party investor for condominiums. These mechanisms are **the most promising, in terms of creating a market for integrated energy renovations services⁹⁰.**

In addition, the following general next steps are needed:

- **Improve the socio-economic knowledge of the housing stock**, their owners and their occupants, with a particular focus on the worst-performing dwellings (owner age, socio-economic profiles, financing power and/or gaps).
- **Ensure the availability of renovation accompaniment** (ranging from advice to coaching or even delegated project management), provided freely or with costs embedded in the prefinancing mechanism
- **Integrate a role and responsibility of technical validation by accompaniment operators** (e.g., energy houses). This will also require the standardization of the elements to be provided to banks, the set-up of secured communication system and the acknowledgment of these by the banks⁹¹.
- **Setting-up by local authorities of holistic strategies at the level of their districts** and collective renovation strategies

⁸⁸ As from July 2022, Mijn Verbouwenling will offer a loanable amount of max 60.000€ for the building that can be combined with 25,000 €/unit with a payback time of 25 years

⁸⁹ The risk that the premiums paid to the insurer won't be sufficient to cover the insurer's expenditures (i.e., claims in case of defaults of many co-owners)

⁹⁰ Services covering the whole customer journey from technical and social diagnosis, technical offer, contracting of works, structuring and provision of finance (e.g., loans or EPCs), to the monitoring of works and quality assurance.

⁹¹ Sichel, 2021. Rapport pour une réhabilitation énergétique massive, simple et inclusive des logements privés

Finally, the high-level discussion of the socio-economic impacts suggested that:

- The roll-out of these prefinancing mechanisms can contribute to **improving the living conditions of 200,000 Flemish households** in energy poverty situations.
- The climate renovation will **increase the market value of homeowners' dwellings**, but its financing by vulnerable households also raises **questions on the longer-term impact on their access to housing**⁹².
- **The rise in energy prices and the uncertainty on their future evolution also bring some risks** for homeowners that engage in monthly repayment schemes but fostering and enabling the **climate renovation for vulnerable households remains a better strategy than a doing nothing** approach if we expect that social policies will need to mitigate the impacts on these households of increased energy prices.
- **There is a series of actions required to avoid that the roll-out of riskier financing products** turn into a macroeconomic shock.
- There is a need for clear criteria to distinguish the groups eligible to the proposed mechanisms. We recommend that the diversity of mechanisms remain open and that homeowners be guided towards the most relevant one given their personal situation, based on the advice from the renovation coach and the solvability analysis carried out by banks⁹³.

⁹² when they move to another dwelling

⁹³ guiding whether the homeowner should be redirected or not towards a mechanism with higher risks (and higher public intervention)

Annex 1: Impact assessment

This annex provides the assumptions made to evaluate the coverage of the different mechanisms, the volume of investments and the financing costs.

General assumptions

The impact assessment is based on the following assumptions:

- Out of the 19% of households who are homeowners with insufficient financing power, **E and F EPC labels apply to 80% of single-family homeowners and to 50% of appartement owners.** This is a working assumption.

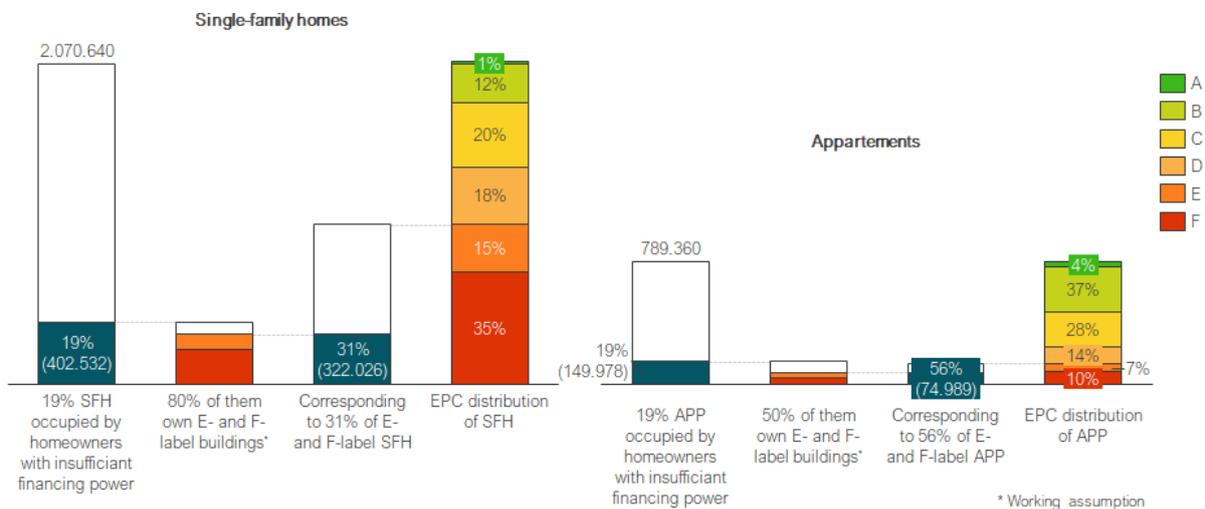


Figure 11. Estimation of the share the target group represent in the total worst-performing buildings (E- and F-label) (the text below the bars refers to the coloured sections of the bars)

- The average renovation cost amounts to 80,000€ per single-family homes and 23,000€ for appartements. These estimations are based on 2019 market prices⁹⁴, the impact of the increase in the costs on the construction market is not considered.

⁹⁴ Source: VEKA

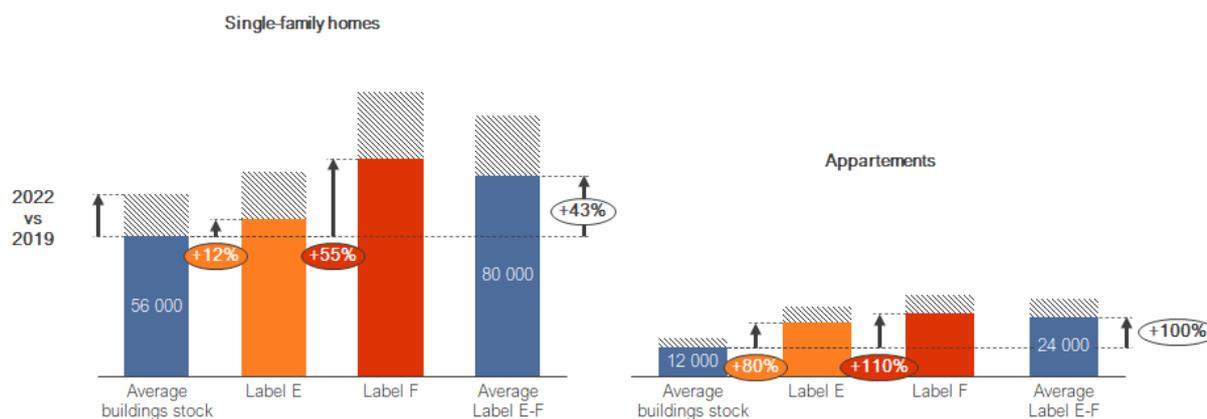


Figure 12. Renovation costs considered in the study (€)

- The maximum amount the lower-income homeowners should endorse through loans should be limited to 60,000€, up to maximum 70,000€
 - A. There are 40% of homeowners (<65 years) who have a mortgage loan with repayment corresponding to 30% or more of their income, 21% with remaining financing capacity despite their mortgage loan and 39% without mortgage loan⁹⁵. Considering that the two latter groups can dedicate 15% and 30% of their income to a renovation loan, we observe the following size

Monthly repayment (€/month)	150	200	250
Share of homeowners wo/ mortgage loan or w/ mortgage loan but remaining financing capacity who cannot afford the monthly payment	1%	6%	12%

- B. With current energy prices, the energy savings will probably be always lower than 200€/month
- C. With a monthly repayment approach, the maximum amount should then be limited to 60,000€ to maximum 70,000€.

Tableau 1. Monthly payment by investment level and payback duration for 0%-interest loans

Investment (€)	Duration (years)				
	20	25	30	35	40
50,000	208€	167€	139€	119€	104€
55,000	229€	183€	153€	131€	115€
60,000	250€	200€	167€	143€	125€
65,000	271€	217€	181€	155€	135€
70,000	292€	233€	194€	167€	146€
75,000	313€	250€	208€	179€	156€
80,000	333€	267€	222€	190€	167€

⁹⁵ Source : Albrecht, 2020

Coverage of the prefinancing mechanisms

Although it might carry some discrepancies with the above-provided cost assumptions, the main piece of information considered in this study to evaluate the financing capabilities and needs is the result of the report by Albrecht. To reduce the discrepancies, Albrecht's results have been translated into financial power by household segment, which has then been confronted to the financial implications of the mechanisms under discussion. Assumptions have been made and can certainly be refined in future works.

The coverage of each financing mechanisms by range of financing gap is provided in Figure 13, and the underlying assumptions are details in the following subsections.

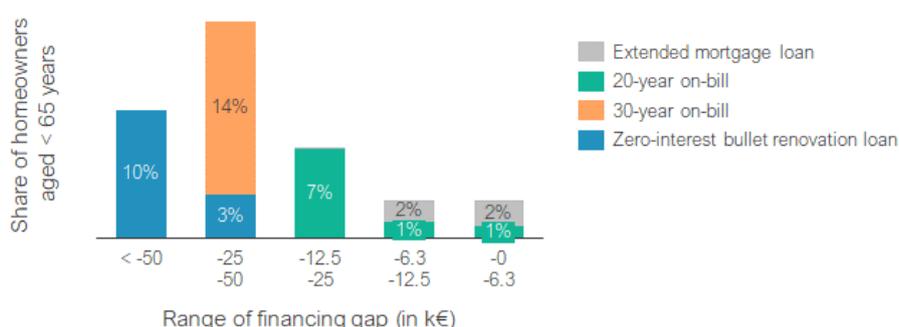


Figure 13. Coverage of the prefinancing mechanisms by range of financing gap

1. 5-year extension of the mortgage loan

Considering that the distribution of renovation costs is found in each homeowner segment (by range of financing gap), Figure 14 provides the financing gap as a share of the needed renovation investment (considering the middle values of the bins). Financing gaps lower or equal to 20% of the renovation cost are highlighted in green. They sum up to 6% (out of the 40%).

Out of these 6% potential candidates to extended mortgage loans, we identify the following groups to which it could apply:

- Owners who change of dwelling: 2.5%/year⁹⁶ for 7 years (18%)
- Owners who will stay in their dwelling (81%):
 - 61% with a mortgage loan⁹⁷. If the standard mortgage loan duration is 25 years, there are in average 40% (10/25) of them that have repaid during less than 10 years and for which a mortgage extension to 40 years would leave a 30-year time horizon for the renovation mortgage loan. This leads to 24% (61% x 40%).
 - 39% without mortgage loan.

⁹⁶ Source: LTRS

⁹⁷ Source: Albrecht, 2020

- The share of this group that will realistically be eligible depends on the distribution of their age and on the maximum age by when the loan must be fully paid back. We can expect that this group will mainly consist of > 40-year households, which limits the applicability if the maximum age for full repayment is limited to 70 years.
- However, given that the financing gap are estimated considering a 65-year age limit in (Albrecht, 2020), an extension to 70 years of the age limit will extend by more than 20% the financing power of the 45-to-65-year group.
- It should still be noted that « among homeowners, households without mortgages are significantly more at risk of energy poverty without reaching tenant vulnerability levels. There are significantly more isolated persons than homeowners with a mortgage, and these isolated homeowners are older. In addition, older isolated homeowners are more vulnerable to energy poverty due to their lower income, increased presence in housing, sometimes under-occupied.»⁹⁸

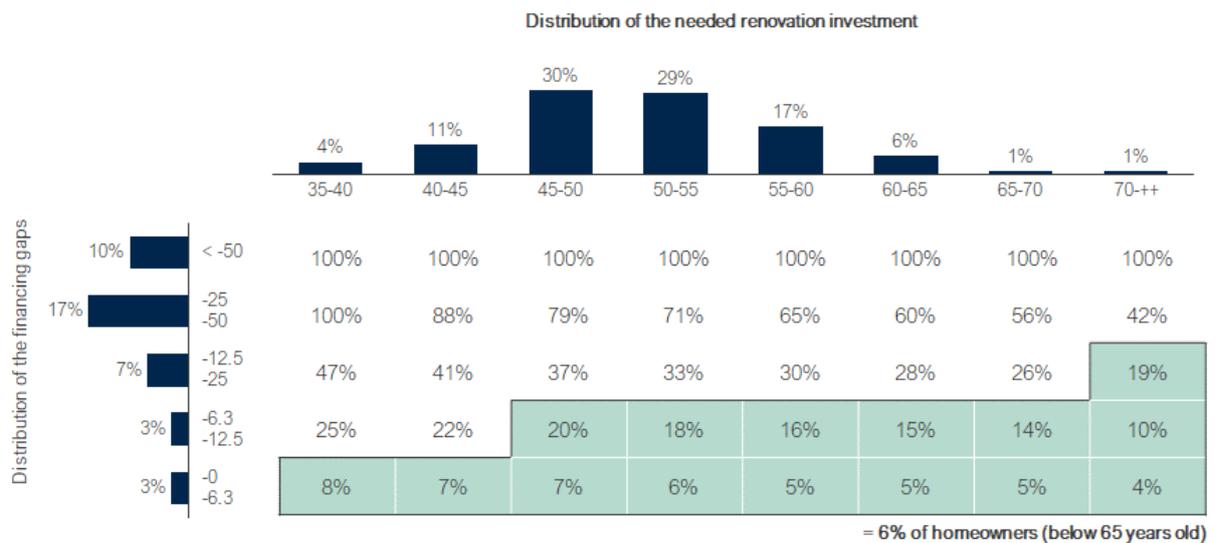


Figure 14. Estimation of the financing gaps as share of the renovation investment

⁹⁸ Barometer of the energy poverty in Belgium <https://media.kbs-frb.be/fr/media/7775/20210323NT.pdf>



Figure 15. Estimation of the maximum coverage potential of renovation mortgage loan duration extended to 30 years

2. Bullet renovation loan

To evaluate the number of homeowners that can endorse a 2% interest repayment, we proceed as follows:

- We consider that the distribution of the renovation costs equally applies to each bin of financing gap.
- The average financing capacity is derived from the average investment costs and the financing gap (AVG invest – FGAP). The monthly repayment capacity is then derived considering that this financing capacity was based on 25-year repayment schemes in Albrecht’s study.
- This monthly repayment capacity is confronted to the 2% interest repayment of the corresponding investment cost.

This leads to 14% of homeowners below 65 years old who can endorse the 2% interests of a bullet renovation loan. This is illustrated in Figure 16.

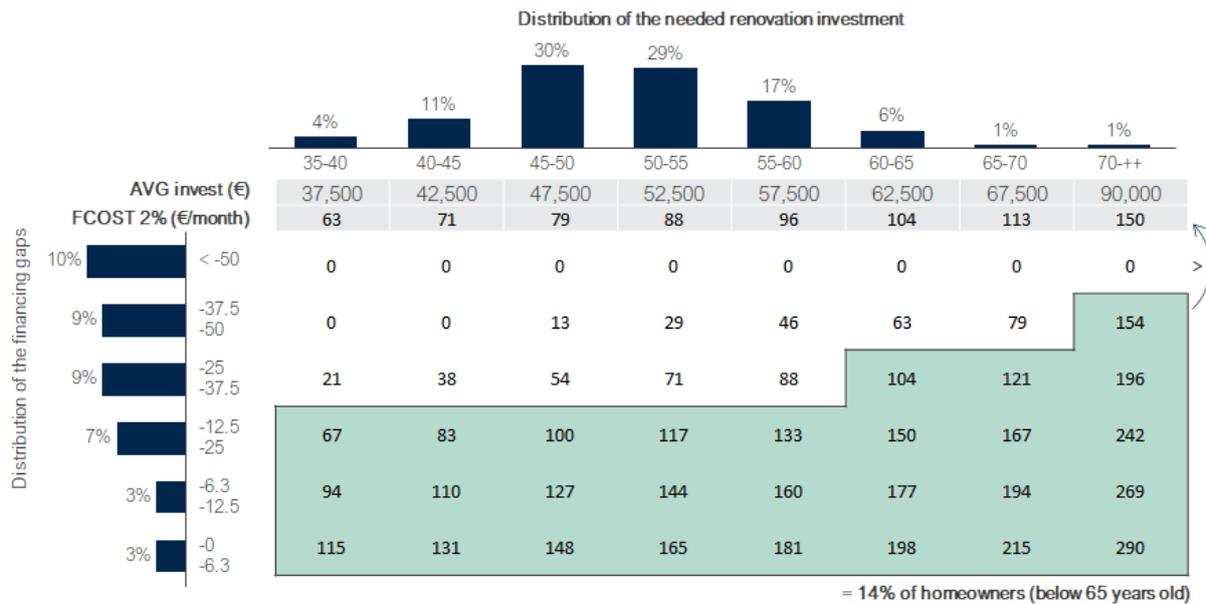


Figure 16. Monthly repayment capacity of homeowners with a financing gap (€/month)

As discussed above, we can expect that the climate renovation costs will be higher than the ones assumed in Albrecht’s study. Table 1 shows how this coverage would evolve if the total investment were to range between 60,000€ to 80,000€ in average for all households, considering the monthly repayment capacities of Figure 16.

Table 1

Total investment (€)	60,000	70,000	80,000
Monthly repayment corresponding to a 2% bullet renovation loan (€)	100	117	133
Share of homeowners < 65 years that can endorse the monthly repayment	13%	10%	6%

Regarding a 0% bullet renovation loans, the limitations to its application relate to the buildings (its real estate value and the relevance of the works with respect to demolition and reconstruction). Regarding the real estate values, the median price single family homes in Flanders is 250,000€ for terraced or half-open houses and 350,000 for open houses, and it amounts to 210,000€ for appartements^{99,100}. In average, the climate renovation costs will be lower than 50% of the real estate value which limits the risks, and the green value of houses (estimated to 11% in Flanders) will also contribute to the financing.

3. On-bill financing schemes

⁹⁹ Source : [Prix de l’immobilier | Statbel \(fgov.be\)](https://www.statbel.fgov.be/fr/themes/immobilier)

¹⁰⁰ Average values for 2019, 2020, 2021

Factoring the energy savings in the financial plan can cover the financing gap met by some homeowners, if there is a mean to secure the energy savings for the financing plan. **However, there is a limit in the maximum amount that can be paid back through energy savings.** This amount depends on the initial energy consumption, its reduction through renovation and the price of energy (see Figure 17, renovation costs that can be paid through 50% energy savings depending on the gas prices). With today's energy prices, the mechanism could cover financing gaps up to 25,000€ in 20 years in most situations, and up to 45,000€ for higher energy consuming households. Combining this with the distribution of the financing gaps faced by homeowners indicates that 13% of homeowners (having a financing gap lower than 25k€) could cover their financing gap with a 20-year on-bill scheme, and an additional 14% (considering that 80% of the 17% with financing gaps ranging between 25 k€ and 50 k€ have a financing gap lower than 45k€) could potentially be addressed with a 30-year scheme.

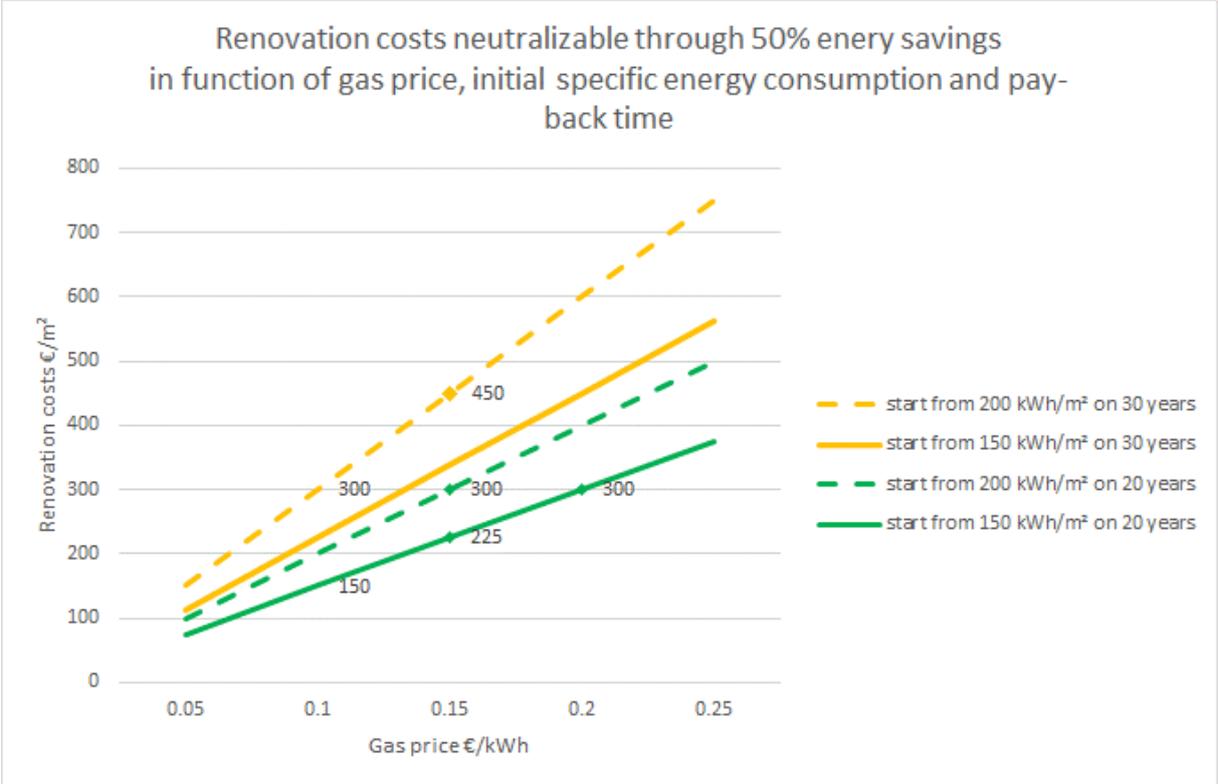


Figure 17. Impact of the evolution of gas prices on renovation

Table 2. Number of years to cover the financing gap via factor 2 energy renovation for different initial energy bills

Financing gap to cover	Energy bill - kWh/year						
	10,000	12,500	15,000	17,500	20,000	22,500	25000
5,000 €	7	5	4	4	3	3	3
10,000 €	13	11	9	8	7	6	5
15,000 €	20	16	13	11	10	9	8
20,000 €	27	21	18	15	13	12	11
25,000 €	33	27	22	19	17	15	13
30,000 €	40	32	27	23	20	18	16
35,000 €	47	37	31	27	23	21	19
40,000 €	53	43	36	30	27	24	21
45,000 €	60	48	40	34	30	27	24
50,000 €	67	53	44	38	33	30	27

Considering deep renovation costs (i.e., 80,000€ for worst performing single-family houses), homeowners should have available initial capital or additional solutions should be provided to cover the extra renovation costs (i.e., via grants).

4. On-tax financing

Considering that 30 years is a relevant maximum payback duration given the lifetime of the investments at stake, the potential of the on-tax financing is similar to the 30-year mortgage loan for younger homeowners. However, for older profiles (still below 65 years-old) the mechanism allows to secure the 30-year timeframe generally limited by a maximum age for repayment in the loan approach. It could not be quantified with the available data.

5. 30-year loan to co-ownership associations

Considering the monthly payment capacities provided in Figure 16, there would be 18% of appartement owner below 65 years that can endorse the 67€ monthly repayment of an average 24,000€ climate renovation cost for E- and F-label appartements with 0% interest rate (down to 13% of households with a 2% interest rate).

It should be kept in mind that the added value of the prefinancing at the level of the co-owner associations is to aggregate a diversity of risk profiles, thereby providing access to financing to homeowners that would otherwise be excluded. The amount of appartement owners that would use the mechanisms, and thereby the investment volume, is then higher than the group targeted by the study.

Costs of prefinancing the climate renovation

To evaluate the costs, we consider the following assumptions:

- The commercial interest rate for a 20-year mortgage loan is 2%, it increases to 3% if the duration is increased to 30 years,

- Given that the average duration between property transfers is 30 years, the commercial rate of a bullet loan is 3%, like the 30-year mortgage loan,
- If the public authority provides securities by mean of a guarantee, the weight on the public dept corresponds to the interest rate reduction resulting from the guarantee, namely the 1% difference between 3% and 2%,
- In terms of time already spent in their dwelling, the full spectrum of owners will use the bullet loan, so that the average duration before sale is 15 years.

For single-family houses, we consider that 80% of the target group live in E- and F-label houses. These are 322,000 houses to renovate with an average cost of 80,000€. In a benchmark scenario, we consider the corresponding 26 billion € investments are covered with public finance.

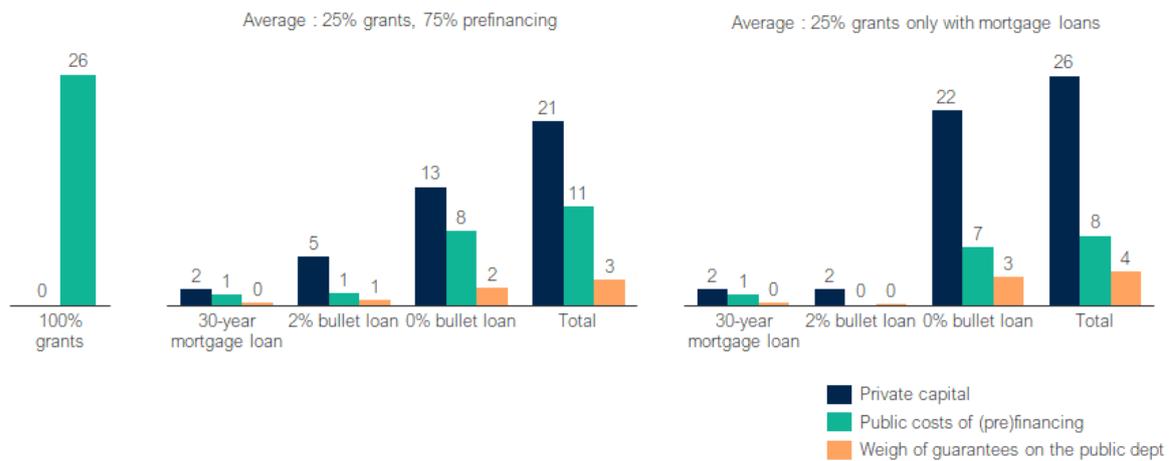


Figure 18. Distribution between public and private actors of investment and financing costs (in billion €) for the climate renovation of single-family dwellings, in 3 scenarios: 1/ 100% grants used as benchmark, 2/ channelling each prefinancing mechanism to homeowner segments with 25% average grant associated to each prefinancing mechanisms, 3/ with 25% average grant associated only with 30-year mortgage loan.

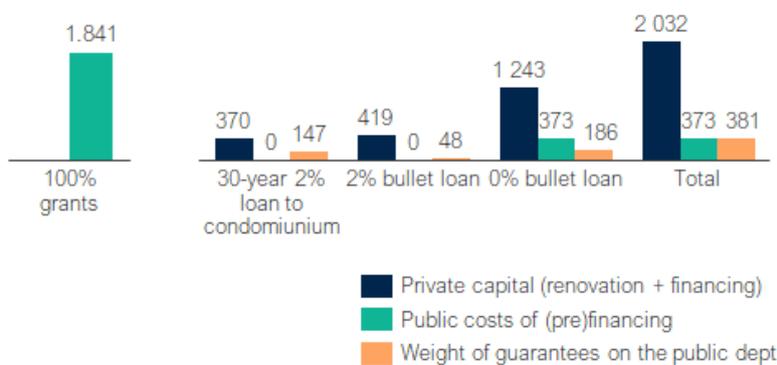


Figure 19. Distribution between public and private actors of investment and financing costs (in million €) for the climate renovation of appartements when channelling each prefinancing mechanism to homeowner segments, in 2 scenarios: 1/ 100% grants used as benchmark, 2/ channelling each prefinancing mechanism to homeowner segments

Annex 2: Additions on the recommended prefinancing mechanisms

The tables below provide an overview of the selected prefinancing mechanisms and their adequacy to meet the need of the different segments. Then the next paragraphs provide important additions to understand their strengths and limitations, as well as the actions required to enable their implementation.

	Mortgage loan	On-tax	On-bill financing	Renovation bullet loan
A.1: Monthly repayment capacity				
<i>At purchase</i>				
<i>w/o mortgage</i>				
<i>w/ mortgage</i>	Could apply for ~30% of them			
A.2: Need to factor the energy savings in the financing plan			A third party takes the technical risk of securing the energy savings	Monthly repayment of interests, capital paid back at sale
A.3: No monthly repayment capacity at all				They repay when selling the house
B: No possibilities to engage in long-term financing			Thanks to the transferability if attached to the meter	They repay when selling the house

Key strength	Leverages market-based mechanisms	Accessibility	Performance risk taken over from HH Transferability	Leverages market-based mechanisms
Key weakness	Limited accessibility	Intensive in public capital	Sensibility to energy prices	More expensive

Table 5. Most relevant mechanisms for Condominiums

	Long-term collective loans	Public ESCO	Bullet renovation loans
“Financially healthy” condominiums	<ul style="list-style-type: none"> • Access to existing credit solution. • Condominium credit risk insurance is needed to reach the needed amount for global renovations 		
“Non-Financially healthy” condominiums	<ul style="list-style-type: none"> • No access to existing credit solutions • Market based actors won’t incur the risk. 	<ul style="list-style-type: none"> • A public entity substitutes itself to financial operators • Capital is raised through third party investment • The public entity oversees the technical aspect of renovations 	
Specific groups:			
Most vulnerable groups			
Owners that can’t engage on the long-term (i.e., old owners)	<ul style="list-style-type: none"> • Transferrable as loans are taken by syndicate of owners 	<ul style="list-style-type: none"> • Possible if the program is built for renovation to be done at the collective condominium scale 	

Bullet renovation loan

The recommendations of this study regarding this prefinancing mechanisms were mainly informed by the report by Sichel¹⁰¹, the actual implementation of the mechanism in France and discussions with stakeholders.

The bullet renovation loan is a loan granted based on the value of the property and not on the income. It is a special form of mortgage loan where the homeowner pays back the capital at the time of sale or transfer of the dwelling. It was introduced in 2015 in the French legislation. Building on the lifetime mortgage¹⁰² and focused on building renovation, it allows progressive repayment of the interests as well as early repayment of part of the capital. Avoiding that interest be capitalized reduces the lenders’ risk and therefore help to lower the interest rate, thus broadening the accessibility to younger clients.

¹⁰¹ O. Sichel, 2021. Rapport pour une réhabilitation énergétique massive, simple et inclusive des logements privés. This annex provides the key elements of the Annex 6 of the report by Sichel.

¹⁰² The homeowners can get this credit without any condition of resource, health, or age. They pay nothing during their lifetime, except sometimes interest. When they die, the loan is automatically repaid, as the debt can never exceed the value of the property appreciated on the maturity date.

After a weak appropriation by financial actors, it was recently rolled out in France by two financial institutions: “La Banque de Postale¹⁰³” and “Le Crédit Mutuel¹⁰⁴”. They propose the loan with a 2% interest rate, provided that a public guarantee covers 75% of the repayments in default. A prepayment of the capital by the public authorities to the financial institution is foreseen when the reimbursement has not occurred within the 20 years.

The product fills a market gap in financing products provided by the banking sector, as it will provide a solution for homeowners today excluded from the credit system. Being more expensive than classic loans¹⁰⁵, it should be reserved for homeowners with no alternative (exclusion from the credit market is evidenced by the refusal of financing by banks within a reasonable time).

Public support is needed, in particular to provide guarantees for the proper functioning of the mechanism. Ensuring accessible interest rates will be obtained through:

- the dwelling value as collateral via a mortgage¹⁰⁶. Alternatively, the credit could be backed by a privileged claim status which would reduce the operational costs.
- a public guarantee. This guarantee could cover a share of the default repayment or specifically cover the difference between the final value of the property and the debt to be repaid if it were negative.

It is crucial to ensure the relevance of the renovation investments

To ensure that the investment contributes to maintaining or increasing the value of the dwelling, the bullet renovation loan should be restricted to accompanied climate renovations.

Given that the income of eligible households is inherently fragile and insufficient to ensure good credit solvency, it is essential to control the risks of the claims associated to the asset value. To limit the loss or even the drift in the granting of the scheme, **a screening and filtering of the dwellings to be renovated is essential to establish a sufficient and robust guarantee base.**

To that end, it is necessary to ensure:

- the relevance of the foreseen investment (sustainability of the infrastructure, adequacy with urban planning objectives),

¹⁰³ <https://www.labanquepostale.fr/particulier/emprunter/financement-logement-et-travaux/pre-avance-renovation.html>

¹⁰⁴ <https://www.creditmutuel.fr/fr/particuliers/credits/pre-avance-renovation.html>

¹⁰⁵ For instance, to finance 80,000€ on 30 year with 2% interests, a mortgage loan will cost about 27,000€ while the bullet loan will cost 48,000€

¹⁰⁶ In the French scheme, the mortgage can be of second rank (i.e., the homeowner can have an ongoing mortgage loan).

- the limitation of the renovation investments as compared to the real estate value of the dwelling¹⁰⁷,
- that the real estate value be higher than a minimum value (to be defined)

These verifications could be performed by the renovation coach. The result will be transmitted to the financing operator which will check them (verification of the completeness of the documents and the expected results) and will have to carry out the additional procedures as well as the solvency analysis.

Long-term renovation credit to co-ownerships

Figure 20 shows an example of a transfer of the credit risk to another party (here a guarantee fund is used to cover the insurance's risks)

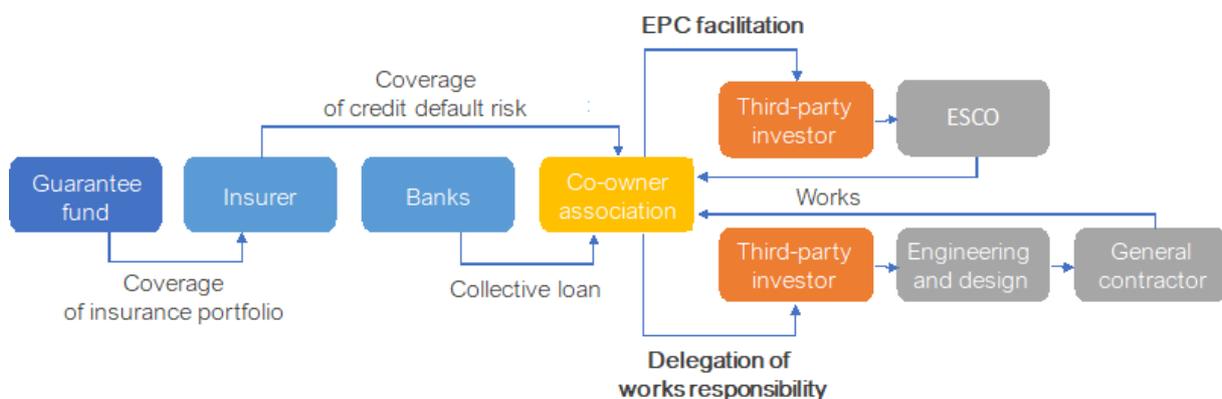


Figure 20. syndication of credit risk (counter guarantee) (source: Bruwatt, Energinvest)

On-bill mechanisms

On-bill mechanisms are a method of financing energy renovation investments in buildings that **draws on utility bills as repayment vehicle**.

Possible options for the design of on-bill mechanisms

Taking into account the source of financing, on-bill mechanisms can be grouped in two categories:

- **On-bill financing:** upfront capital for the renovation costs is provided by the energy provider (or alternatively the distribution system operator) with its own or public funds

¹⁰⁷ In France, this is set to 70% of the property value (before renovation) for homeowners below 60 years old, and to between 25% and 45% for people aged over 60.

- **On-bill repayment:** upfront capital for the renovations costs is provided by a private third party and the utility or energy provider or the distribution system operator (DSO) acts as repayment intermediary.

Other variants of on-bill mechanisms with different services infrastructures or financial arrangements can also be considered. **In this report, we will study the potential of an on-bill repayment or financing model with a DSO (i.e., Fluvius) acting as a facilitator.**

Other consideration can be taken into account such as whether the mechanism is associated with the property's meter and if disconnection is allowed in case of no payment of the utility bill.

Considering our target groups, on-bill schemes offer the following advantages:

- **It removes firms cost barriers to energy efficiency investments as it allows to use alternative underwriting methodologies** that use different metrics (such as the historical rate of default in paying bills) to assess the creditworthiness of the final user.
- **It can be structured to ensure bill neutrality**, which means that the project energy savings should offset the fixed monthly debt's repayments. In this way, the final user does not pay higher bills than before the interventions and once the payback period is completed, the final user can have real financial savings.
- **It allows transferability when the reimbursement is attached to the meter**, linking the product to the property and not to the household, thus addressing the temporal split incentive
- **It ensures the collection of the debt's reimbursements through the energy bill** that is generally perceived as a high priority payment by the final customers. The latter allows to create a "safe conduit" for the debt's repayments which reduces the credit risk for the lender and facilitate the mobilization of private capital

Is it suited for market roll-out?

We identified the following market failures to address:

- **Financing gap:** our target group (group A2) cannot raise the upfront capital to cover the costs of renovation and they do not have the capacity to afford a minimum repayment scheme. Yet, a reduced energy-bill would allow them to capitalize on the energy savings for the debt's repayment.
- **Viability gap:** private investors won't incur the risk associated with on-bill mechanisms (risks of non-payment, lengthy return on investment, sensitivity to energy prices volatility). In addition, **using those mechanisms to fully finance deep renovations** would require higher upfront investments and thus a longer payback period, **decreasing the profitability and increasing the risks for the lender.**

The development of such mechanisms implies **changes in regulations and a period of implementation (min 2 to 3 years) and market roll out (min 5 years) before it is fully operational.** To implement such

programs and leverage private financing, it is **essential that public budget** (through public funds for instance) is **used to cover the financing institutions’ risks, bring co-financing, and finance the program’s implementation. In addition, on-bill programs do not systematically guarantee energy savings.** To ensure the transfer of performance risk (i.e., the risk that the energy savings are not sufficient to repay the debt through the utility bill) from the households to another party. on-bill programs should be bundled with other instruments such as energy performance contracts or one stop shops.

A potential approach could be to set up a public investment fund that issues loans and repays its investment through a recovery mechanism (on-bill) in collaboration with a complementary operator (one stop shop) which takes responsibility for the technical aspect (renovation, guaranteed energy savings). The public would most likely take on the role of the complementary operator.

Table 3. Pros and Cons comparison on bill schemes with DSO or energy suppliers as facilitator

On-bill schemes	Pros	Cons
On-bill with the DSO acting as a facilitator	<ul style="list-style-type: none"> • Connects well with current discussion within Flemish administrations (VEKA has • DSO’s have access to the financial market and are used to manage financial products on the energy market 	<ul style="list-style-type: none"> • Necessary to implement substantial organisational procedures for the management of the programme • Grid operators are reluctant to be involved since these tasks are not included in their energy policy • Requires regulatory changes at national level
On-bill with the energy supplier acting as a facilitator	<ul style="list-style-type: none"> • Energy suppliers have more incentives to engage in such a scheme as it secures a long-term client • The energy supplier acts as a unique interface with final users 	<ul style="list-style-type: none"> • Does not allow transferability through reimbursements attached to the meter • Increase the pressure on the energy supplier’s debt position • Poses issues if the household wants to change energy supplier

Examples of on-bill schemes implemented in Europe:

- **United Kingdom – Green Deal:** First on-bill programme introduced in Europe in 2009. It was launched to address fuel poverty in the country, waste of energy in British households due to poorly insulated houses and inefficient equipment’s and achieve their carbon emission target (-80% in 2050 vs 1990). The loans were repaid through a surcharge on the electric bill which was collected by the supplying utility and paid to the Green Deal provider.
- **Renonbill project – Horizon 2020 research**

Barriers to the implementation

Implementing an on-bill scheme requires the development of a new framework which includes:

- **An operator** which **oversees the technical and contractual aspects** of the renovation (finding the contractors, support the households, guarantee quality and energy savings, follow-up) and is **responsible for the operating costs and coordination** of the program
- **A financial operator** substituting to the traditional financial operators (i.e. banks, financial institutions) that has the capacity to:
 - **Act on the financial market:** Given the amount of investment to mobilize, it is essential that the operator has access to and experience in exchanging on the financial market.
 - **Mobilize private investments while offering better conditions:** A bank aggregate financing sources which have specific return requirements and add its own return requirements. The total return requirement gives the interest rate. **The objective is to identify an operator that has the capacity to substitute to and offer better conditions than banks by managing risk differently (i.e., on-bill use energy bills a secure repayment vehicle to lower the credit risk) as and requiring lower returns.**

In this context, **the main challenge remains to:**

- **Identify a financing source that has the required funds to provide the needed upfront capital and is willing to incur the associated credit risk.** Private actors have the needed capital but are not willing to incur the risk.
- **Find incentive to pursue deep retrofits:** it is difficult to structure attractive loans for comprehensive improvements due to longer payback periods

The volatility of the energy prices can also be seen as a barrier to leveraging the effect of on-bill schemes, namely bill neutrality. Actually, if the energy price increases the bill neutrality does not apply anymore. However, the increase of the energy bill will be lower than it would have been the case without renovation. This is illustrated in the below figure: if a social policy measure were to be put in place to cancel the impact of the energy price on vulnerable people that have not renovated, it would cost 200€/month/household to dedicate to fuel expenditures (with climate impacts and low local benefits). If the same social measure is applied but the renovation program has been applied, it only cost 100€/month/household to cover the increase of energy price, and the initially invested 100€/month for the renovation have generated local benefits. In conclusion, the argument that pay as you save does not work if the energy price increases should in fact be contrasted with what happens if energy price increases without renovation and the type of measures that are then needed to mitigate the impact on the vulnerable groups.

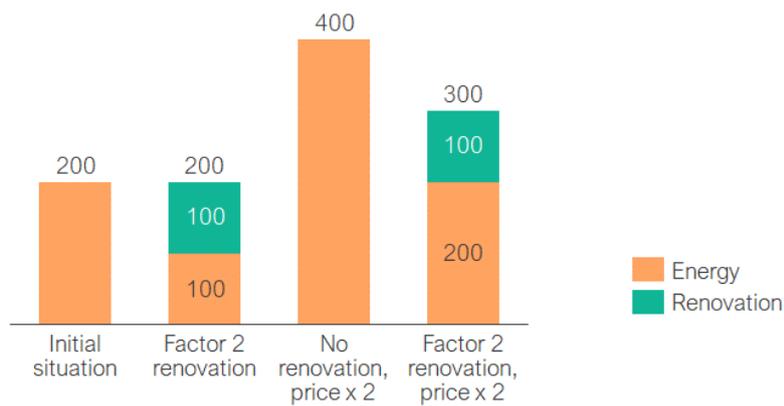


Figure 21. Illustrative impact of increased energy prices on the energy + renovation bill (€/month). Bill-neutral financing schemes do not allow to finance label A renovation in general. It should be complemented by personal capital when available, or by a personal loan, or by a transfer mortgage loan otherwise

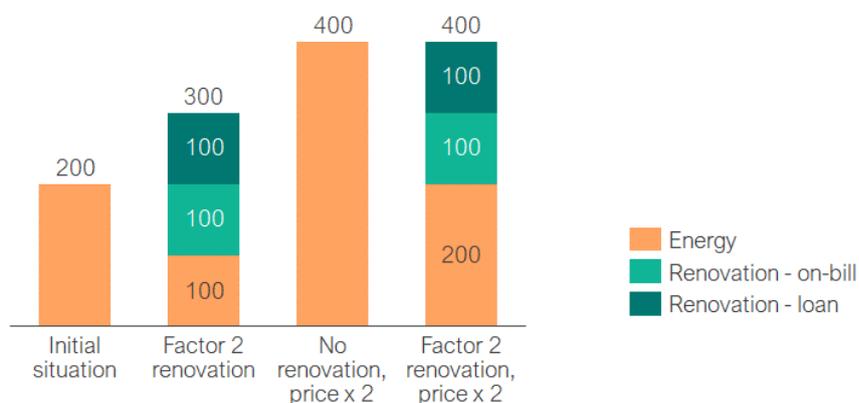


Figure 22. If the level of incomes allows it, the on-bill scheme can be complemented by a personal loan (energielening), otherwise, finance via transfer mortgage loan. 200€/month for 25 years allows to pay back a 60,000€ investment

Public interventions needed to tackle market failures

As mentioned before, **no market-based actors are willing to incur the associated credit risk. Public financing allows to manage the risk** (and thus induces private party to get involved) by bringing co-financing solutions such as:

- **Public-private partnership** where the public co-finance through a regional or national investment funds or government bonds issuing
- **Credit risk guarantee by the public** through a regional or national guarantee fund or public budget that pays for the financing costs

In addition, **public authorities can bring the additional funds needed to pursue deep retrofits** through grants (i.e., the renovation is paid through an on-bill scheme until a certain amount and the additional needed investments are covered by pre financed public grants).

Which actors are involved in the financing framework?

- **Operator: The government can act as the operator** responsible for the operating costs incurred by the DSO (i.e., Fluvius), for the roll-out and coordination of the renovation plan, as well as for renovation advice, guidance and follow-up (through a one stop shop).
- **Funder or financing source:** which brings the needed capital. This role can be taken by a public funds, a private fund (with the support of a public guarantee fund) or a public/private partnership
- **Financial operator**, this role can be taken by one of the following:
 - **The grid operator can take on the role with the support of the government which guarantees the repayments** by the resident via the meter. In the event of default with regard to the DSO, the government therefore intervenes.
 - **A private party** can take on the role with the support of the public through a private/public partnership
 - **A regional or national public body**
- Attention point: invoicing is done via the supplier, not via Fluvius, so the collection risk actually lies with the supplier. Suppliers have already important difficulties with their responsibility to cover payment defaults. This can be an additional obstacle to the implementation.

Next steps

Figure 23 maps an example of an on-bill scheme where:

- The capital is raised through a Fund that can be
 - Fully fuelled by public funds
 - Fully fuelled by private funds but with a public fund to cover the credit risk and act as guarantee in case of default
 - A public/private partnership where the public lowers the cost of the debt by co-financing with public money (which requires lower interest rates) with capital raised through national or regional investment funds or government bonds issuing.
- A financial operator manages the financing and acts as an interface between the operator and the financing sources (Fund). For instance, the financial operator could be the DSO.
- An operator (i.e., Energie Huizen) that oversees the technical aspects (contracting the works with the renovation professionals, coordination of the renovation plan, renovation advice, follow up) and contract with the final users to discuss with the renovation professionals on their behalf. The operator is in charge of guaranteeing the renovation works' performance (incurs the performance risk).
- The final user pays their utility bill to the energy supplier (utility).
- The utility has the obligation to pay DSO tariff and on-bill fees (with the final users' money) to the DSO and the DSO uses the on-bill fees to reimburse the debt to the financial operator.

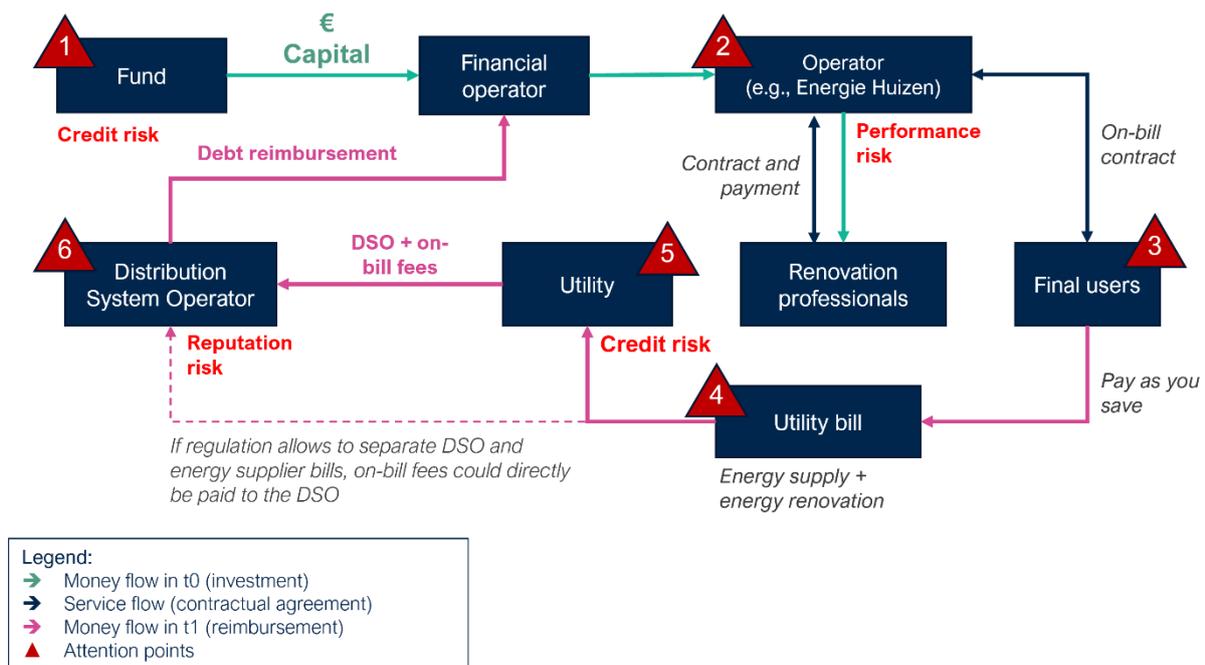


Figure 23 : Schematic of an on-bill business model

The following attention points (cf. corresponding number in Error! Reference source not found.) remain and will need to be addressed in the action plan:

- 1. Ability to leverage private funds:** Financial institutions and private investors do not necessarily favour energy efficiency investments and even if they do, their terms might not be attractive enough for on-bill schemes and vulnerable groups (high interest rates, unattractive maturity, significant collateralisation requirements or strict credit capacity requirements on homeowners). The national or regional authority could establish guarantee funds that support renovation lending and investments. However, the following questions remain: what would be the required public intervention to convince private parties to invest and is it feasible in terms of available public budget/funds? This should be discussed with private actors and financial institutions.
Impact on the public debt: In the case where the public guarantees the risk of default, how does it affect the public debt?
- 2. Legal:** The operator needs to be able to contract with renovation professionals on behalf on the final users. The operator should be responsible in case the energy savings are not met (performance risk)
- 3. Energy prices volatility:** if there's a sudden increase in energy prices, final users might not be able to pay an increased energy bill and the debt repayments. Yet, on-bill schemes reduce the impact of prices' volatility on the households.
- 4. Legal:** drawing on energy bills as a repayment vehicle requires changes in legislation that allows to include renovation costs in the utility bill. The legislation does not consider that such tasks are in line with the DSO core tasks. The role of the DSO will thus need to be revised
- 5. Increase the pressure on the energy supplier's debt position:** in case of default, (final users are not able to pay their utility bill) the utility bears all the consequences.

6. **Reputation risk:** if the DSO's activity changes, it could potentially affect its rating which would increase their cost of borrowing and could indirectly lead to an increase of DSO tariffs. To avoid such a scenario, the risk could be covered by the public. However, it is not clear what would be the cost for the public.

Public ESCO and third-party investor for condominiums

The structuring of a public ESCO with third-party financing capacities requires the development of the following core competencies:

- Financial engineering: acting as a financial advisor, the operator manages the financing of the renovation operations, by integrating all the existing financial incentive tools (grants, existing public and private loans), including third-party financing, allowing for its financial optimisation.
- Energy savings guarantee: acting as a front-end ESCO, the operator guarantees a volume of energy savings by contract (under the form of an Energy Performance Contract), the value of which evolves with future energy prices. By calling on the project's partners and subcontractors (generally in back-to-back contracts), it masters all the sources of energy savings and offers integrated techniques. It thus fills a gap in the market where currently no player is able to manage all the sources.
- Property development: acting as a property developer, the operator mobilises the construction and public works sector to offer a complete renovation package that meets both heritage (waterproofing, gutters, etc.) and energy objectives.

In addition to those core competencies, the operator will have to rely on third-party financing and de-risking instruments which have generally the following form:

- Third-party financing fund. Consisting in principle of public funds, it offers the operator access to a partial financing capacity at an advantageous rate and reduces the cost of the operation. If the fund is set-up as a public-private fund, it could leverage additional private funds with the public funds aiming to lower the cost of funding.
- Third-party guarantee fund. The creation of a guarantee fund covering the risks of non-achievement of contracted energy savings, funded for example by the operator and the public authorities could complete the framework to secure the arrangements and intervene in the event of a major claim.

With such a set-up, the public ESCO could act as an integrated service provider offering technical design, implementation and operations, financing and insurance services to owners of multifamily residential apartment buildings in specific financial situation. The figure below describes the general set-up.

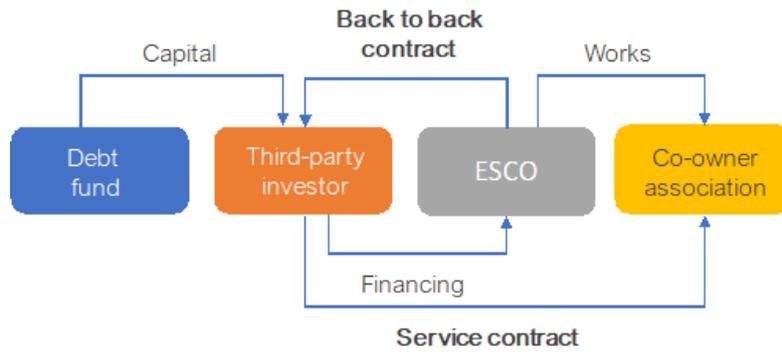


Figure 24. Integrated financing and performance contracting for condominiums

The following attention points will need to be addressed in the action plan:

- A legislative framework authorizing a public or public-private operator to grant loans to individuals should be put in place. A model approach could be found in France with the regime applicable to "sociétés de tiers financement" (Article L381-1 of the Construction and Housing Code of the 2014 ALUR law).
- Public funding is a prerequisite for the business model of the public ESCO to cover at least the operating costs.
- The third-party financing fund should be set-up as a public-private fund with the objective to leverage additional private funds.



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