FALCO

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Financing Ambitious
Local Climate Objectives

FINAL REPORT

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1 Summary

Context and objectives

FALCO (Financing Ambitious Local Climate Objectives – 2017-2021) is an EU horizon 2020 funded project aimed at developing financing solutions needed to achieve the ambitious objectives that are formulated in the numerous Flemish local climate action plans.

The **main objective** of the FALCO project is to **develop** *and* **pilot financing solutions** that lift existing financial AND non-financial barriers, and to prove these solutions' validity by realising a total investment portfolio of ca. € 18 million in 3 main domains: 1) renovation of public buildings, 2) renovation of private buildings, and 3) energy-efficiency investments for SMEs. At the same time, the FALCO project aims at developing **accompanying (policy) measures** that will boost interest in emission reduction investments and the demand for the proposed financing solutions.

Below we summarize the key results of the FALCO project for each of four targeted segments: social housing, private homes, small and medium enterprises, and public buildings. We conclude this summary with a number of lessons learned.

Social Housing

In the Flemish region (Belgium), social housing is offered through social housing companies who notably receive soft loans from the VMSW (Flemish Government). To achieve (local) climate ambitions, the social housing sector must substantially increase the pace of renovation.

The search for a financing solution came to a halt when significant legal barriers arose, causing a *split incentive problem.* Indeed, while the renovation investments are entirely borne by the social housing companies, the savings on the energy bills accrue entirely to the tenants. Legal barriers prevent increasing the rent of renovated dwellings, and increasing the renovation pace would only further deteriorate the already fragile financial situation of social housing companies. Flemish social housing companies (VVH) have engaged in efforts to change and lift this regulatory barrier. This process will continue beyond the FALCO project period.

Pending the removal of the regulatory barrier, the project's focus shifted towards solutions that increase the social housing companies' own financial means and address the lack of human resources and expertise to accelerate the pace of renovation. In this regard, we analysed the relevance of selling part of the housing portfolio and refinancing solutions such as securitization of future rent payments and a usufruct and lease-back approach. Furthermore, we considered the value add of ESCO and demand-side management solutions in the light of the renovation challenges faced by the social housing companies.

Energy renovation - private homes

Solution characteristics – The ER2.0 loan is a personal loan for energy renovation of individual private homes and ancillary investments. It has the following features, which address key market barriers: a loan amount of up to €50,000 to allow deep renovation investments; a loan period of up to 20 years to limit monthly instalments; technical assistance services complementing the loan to assist borrowers in making the right renovation choices. The ER2.0 loan is targeted at average income households, but it also allows (low-income) households that do not meet loan approval criteria to benefit from the loan, subject to an additional public guarantee covering the credit default risk.

Structuring of the ER2.0 solution – At the heart of the ER2.0 solution is the ER2.0 Fund (1) which offers the ER2.0 loan together with technical assistance services via the energy houses (2) to private

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individuals (3) (see Figure 2). Structured as a revolving debt fund, the ER2.0 fund compensates the energy houses for the distribution of the ER2.0 loan and the related technical assistance services (4). The energy houses have longstanding experience in delivering an existing loan product for smaller energy efficiency investments. Once loans (5) are approved by the Fund, the energy houses, acting as intermediaries, use the sums provided by the ER2.0 Fund to issue ER2.0 Loans (including technical advisory services) in the name, and for the account, of the ER2.0 Fund, via a loan contract between the ER2.0 Fund and the ER2.0 customer.

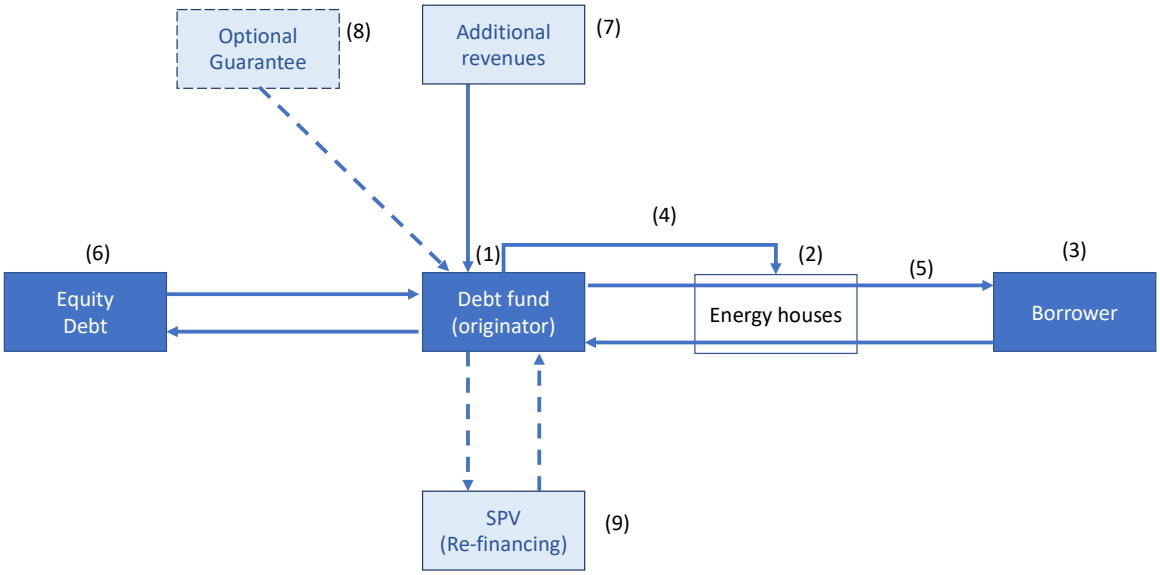

Figure 1 - Structure of the ER2.0 loan

The ER2.0 Fund's working capital is mainly composed of equity and debt (6). The shareholders providing the initial equity are local or regional/national authorities. In a first stage, the EIB would provide senior debt in a 1/5 equity/debt ratio. In addition to equity and debt, the ER2.0 solution would engage in activities aimed at securing additional revenues/financial resources (7), including: (a) subsidies from the Flemish Government, (b) ELENA grants covering the costs of project development services, and (c) revenues from a membership card system (MCS).

Two optional add-on solutions complement the ER2.0 solution: a guarantee scheme providing low-income households access to the ER2.0 loan; and refinancing solutions to accelerate investments.

Lessons learned - The development of the ER2.0 offered the following key lessons: a (fully) voluntary approach is not compatible with ambitious climate objectives; the real challenge is to find solutions for the many homeowners that are unable to afford deep renovation; financing solutions should extend their focus in order to cover both renovation investments *and* technical assistance costs.

The Flemish region recently announced a loan offering with key characteristics inspired by the ER2.0 loan, in addition to offering a 0% interest rate. The Flemish region's loan will at first be funded entirely by the Flemish budget. Hence, the proposed structuring, using a blended finance approach, is unlikely to be implemented in the short-term.

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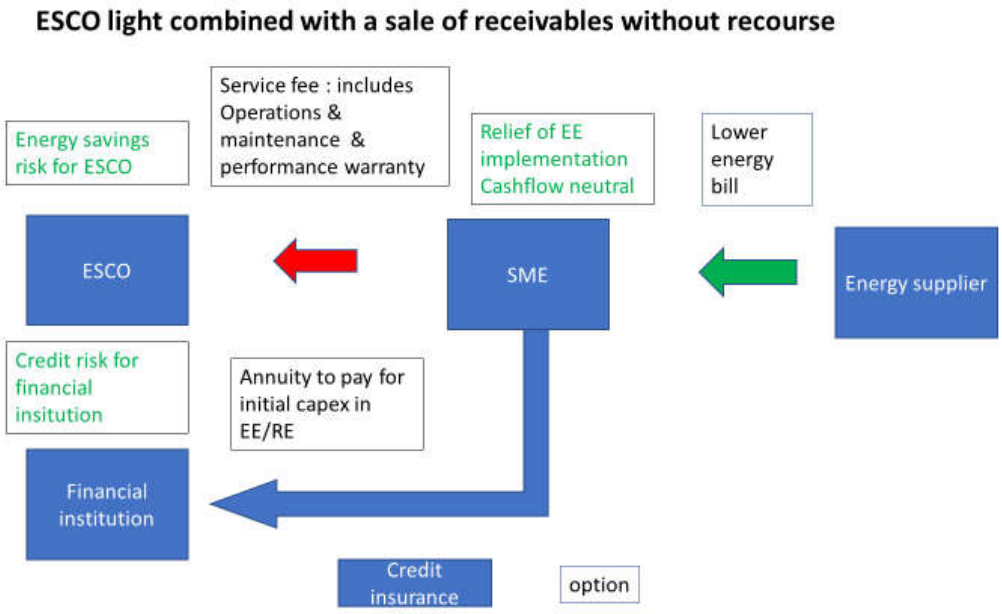
Small and Medium Enterprises

SMEs are a difficult target group for energy-efficiency investments, as the energy-savings are relatively small (in the SMEs total cost structure) and *transaction costs are high*. This translates into a focus on the low-hanging fruit investments, leaving *more in-depth renovation opportunities untapped*. Furthermore, financiers look for sizeable investment projects, and most *energy-saving projects for individual SMEs are rather limited in scope*, which rules out a number of project finance approaches because of the high transaction costs.

Characteristics of the solution – To address the above challenges, the solutions combined two or more of the following: *Pooling of buildings by focusing on network companies* to reduce the transaction cost; *integrating* renewables and energy-saving measures into one project, so as to combine low-hanging fruit with measures having a longer payback time, which increases overall energy-savings; *project financing for bigger projects* and a debt-sale approach for smaller sized projects.

For ESCO projects with a sufficiently large investment volume (> €2 million), a separate project company (i.e., special purpose vehicle – SPV) is used for the investment, whereby the revenues of this SPV (cf. remuneration for the realised energy-savings/renewable-energy) cover the financing and operating costs. Alternatively, for smaller investments, an EPC-light approach combined with a non-recourse sale or receivables was developed.



In a standard EPC, the ESCO charges the customer an annual fee that includes the financing of the energy-saving measures/renewable-energy *and* the maintenance/management of the installations. In the case of a sale of receivables, a distinction is made between the financing cost and the maintenance/management cost. In a sale of receivables approach, the future claims that the ESCO has on the customer are sold to a bank and, from then on, the customer pays the bank directly and the bank bears the customer's credit risk without recourse to the ESCO. The fee for the maintenance/management is paid by the customer to the ESCO. The ESCO bears the performance risk: if the actual energy-savings are bigger/smaller than the budgeted energy-savings in the business case, the fee paid to the ESCO is adjusted.

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Pilot cases and lessons learned – The proposed solutions were tested in 3 pilot projects. Two pilot projects covered a combination of both energy-savings and renewable-energy investments for a portfolio of residential care homes, each of which resulted in investments in the range of €6 million using a project finance solution via a special purpose vehicle, and resulting in energy-savings of around 30%. In a third project, an energy performance contract with a school combined different energy-saving measures with renewable energy (boiler renovation, relighting, monitoring of the devices, insulation and PV) for a total amount of €900,000 and with energy-savings of 40%. Given the relatively small investment amount, a financing solution was designed based on the sale of receivables.

From these pilots, we've learned that these solutions are appropriate to financing efficiency measures achieving 30-40% energy-savings, but they are ill-adapted for investments beyond that range. Indeed, higher energy-saving levels require higher investment volumes with long payback periods. From an ESCO perspective, this requires longer contract periods or co-financing from the customer.

Energy performance contracting is not equally easy to implement for all types of companies. Having large (groups of) companies pooling their buildings into a large portfolio reduces the relative transaction cost as well as the performance risk, which in turn benefits the bankability of the investment project. Conversely, small investments by individual SMEs often translate into high acquisition costs and performance risk for ESCOs. This explains why the latter often focus on measures with a shorter payback time, even though they offer smaller energy-savings. A stricter normative framework from the government could possibly offer some relief here.

Public buildings

Context and barriers – Aspiring to lead by example, public sector actors have often announced climate ambitions that reach well beyond the common private sector ambitions, in terms of both timing and depth of renovation.

Given this ambition, a key investment concern is that the savings from energy efficiency are unable to offset the costs of the deep renovations that are needed to achieve these ambitions. This may reduce the appetite of decision-makers, as the resources applied to renovation purposes are no longer available for other – equally important – societal needs and challenges. Hence, the FALCO team was faced with the challenge to design an efficient financing solution without unduly burdening public budgets.

Characteristics of the solution – The solution focuses on strategic real estate planning based on the following key principles:

- Start with an analysis of actual housing needs, followed by the sale of real estate assets **not in line with these needs and use the** proceeds to support the negative business case of deep energy renovations in the **core portfolio**.
- When investing in the core portfolio, it is important to make maximum use of **'natural renovation moments' (natural trigger points)** – e.g., end-of-life of technical installations, asbestos removal, fire safety upgrades – and s**ynchronize renovations** by forming building clusters that will be tackled jointly so as to increase tendering efficiency. Investments in buildings earmarked for sale are limited to 'no regret measures'.
- Buildings with heritage value require an alternative strategy, which may consist in **seeking a different balance between reducing energy demand and using renewable energy**.

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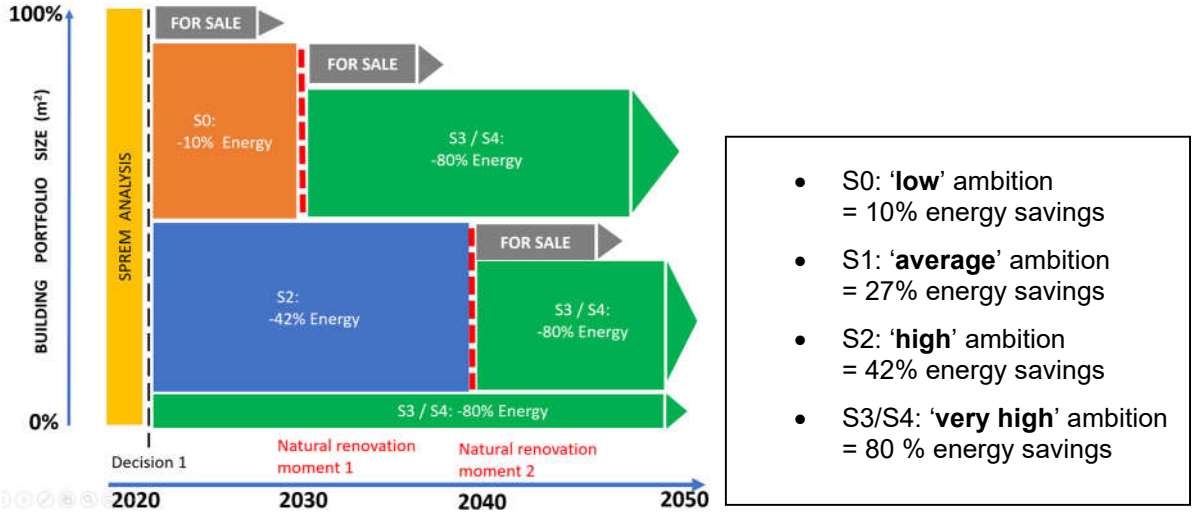

Figure 2: ***Staged (phased) approach, using natural renovation moments.***

In addition, research on how to improve existing EPC contracts led to the design of a 'new EPC' approach, which makes extensive use of the concept of **'residual value'** of the assets of a building, which notably incentivises ESCOs to invest in measures with a long life-span.

Pilots and lessons learned – The strategic real estate planning approach was applied in the provinces of West Vlaanderen (€2,900,000) and Vlaams Brabant (€4,500,000). The 'new EPC' approach was piloted by the city of Sint-Niklaas (€7,700,000).

Lessons learned include: solutions are to be sought beyond finance in the strict sense and notably include challenging the functional needs of a local authority. This is likely to entail a political discussion about the choice of amenities to be delivered to the citizens, and about the corresponding infrastructure needed to provide these amenities. Furthermore, many local authorities indicate that available human resources are not aligned towards conducting this strategic real estate planning approach. Hence, initiatives that help unburden local authorities are most welcome: e.g., centralized tenders for supporting advisory services, one-stop-shops providing access to contractors (e.g., EPC contracts), and improved EPC contracts that enable them to implement deeper energy retrofits than the current EPC contracts.

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Overarching lessons learned

Barrier-solution matrix – We learned that building an effective financing solution starts with clearly describing the financing problem that needs to be solved. This problem identification and analysis is essential to allowing an efficient search for an effective solution to the financing problem at hand. The barrier-solution matrix developed during the FALCO project supports the identification of relevant building blocks that will help you design a solution that addresses your financing problem.

				Return deemed insufficient			Cashflow problem			creditworthiness is insufficient			Status quo of credit position/lending capacity			Economic lock-in			Financing project development costs		
MICRO	MESO	MACRO	Financing solution \ Ambition level	L	M	H	L	M	H	L	M	H	L	M	H	L	M	H	L	M	H
x	x	x	1 Aggregation/Bundling	+++	++	+	+	+	+	+	+++	+++	0	0	0	0	++	++	++	++	++
x	x		2 Intracting – contracting	+	++	+++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	x	x	3 Climate plan benefit contribution	0	+	++	0	+	+	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	4 Deferment of payment of revenues from sale of EUA to industry	0	0	0	+	++	++	++	++	++	+	++	+++	+	+	+	++	++	++
x	x	x	5 Guarantee – Credit risk	+	++	++	0	0	0	+	++	++	0	0	0	0	0	0	0	0	0
x	x		6 Performance guarantee – performance risk	+	++	+++	+	+	+	+	+	+	0	0	0	0	0	0	+	+	+
x	x		7 Third party financing	0	0	0	+	+	+	0	0	0	+	++	++	+	+	+	+	+	+
	x	x	8 Retention of subsidies	0	0	0	+++	+++	+++	++	*++	++	0	0	0	+	+	+	+	+	+
	x	x	9 Credit Default Swap	0	0	+	0	0	0	0	+	++	0	0	0	0	0	0	0	0	0
x	x		10 Optimisation of use of real estate	+++	+++	+++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+
	x	x	11 Compensation mechanism (flexibility mechanism)	++	++	++	0	0	0	0	0	0	+	+	+	+	+	+	0	0	0
x	x		12 Sale & lease back	0	0	0	++	++	++	++	++	++	+	+	+	++	++	++	+	+	+
x	x		13 Usufruct & lease back	0	0	0	++	++	++	++	++	++	+	+	+	++	++	++	+	+	+
	x	x	14 PACE (Property Assessed Clean Energy)	0	0	0	++	++	++	++	++	++	++	++	++	+	+	+	0	0	0
	x	x	15 On-bill financing	0	0	0	++	++	++	++	++	++	++	++	++	+	+	+	0	0	0
x			16 Factoring	0	0	0	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0
x	x	x	17 Securitisation	+	+	+	++	++	++	0	0	0	++	++	++	+	+	+	0	0	0
x			18 Forfaiting	+	+	+	++	++	++	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	19 Domestic offset projects	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	20 Green investment scheme/domestic greening	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+	+	+
x	x	x	21 Pay-for-performance (alternative investment)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
x	x		22 Equity injection	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
x			23 Flexible loans	0	0	0	++	+	0	0	0	0	0	0	0	+	0	0	0	0	0
x			24 Loan with below market interest (form of concessional loans)	+++	++	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x	x		25 Community Land Trust	0	0	0	0	0	0	+++	++	++	+++	++	++	+	++	++	0	0	0
	x	x	26 Hybrid Housing market	0	+	++	0	+	++	+	+	+	+	+	+	+	++	++	0	0	0
	x	x	27 Debt Fund	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	28 Equity Fund	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	29 Pledge funds	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	30 Insurance	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	x	x	31 Green Bond (Plus)	0	0	0	+	+	+	0	0	0	+(++)	+(++)	+(++)	+	++	++	0	0	0
x	x		32 Crowdfunding	+	+	+	0	0	0	+	0	0	+	+	+	0	0	0	+	+	+
x	x		33 Crowdsourcing	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+
	x		34 Grouped purchase	+++	++	++	+	+	+	0	0	0	0	0	0	+	+	+	+	+	+
	x	x	35 Membership Card System	+++	++	++	+	+	+	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	36 Joint incentive	++	++	+	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	37 Green Flexible Reward	+++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	+	+	+

The barrier-solution matrix builds on 2 central components: a list of 6 fundamental barriers, and a list of +/- 40 solutions addressing these barriers.

As illustrated by the financing solutions presented above, building a bespoke financing solution will often require a combination of different complementary solutions. To assist you in selecting the right combinations, the matrix also provides an indication of the scale (micro, meso, macro) and the ambition level (low, medium, high) that is best suited for a particular solution.

Source regionally, allocate locally – The FALCO experience points to benefits from a multilevel cooperation based on central sourcing of financing organised at the regional level and allocation of these centrally sourced means by local authorities in accordance with their local climate change plans (local autonomy). Such regional sourcing allows optimal use of economies of scope and scale and facilitates the interaction with financial markets (single point of contact).

Need for a long-term shared vision and strategy on financing ambitious climate objectives – The current energy financing landscape is still characterised by a notable focus on voluntary action, which leads to a sub-optimal use of public resources (Matthew effect, limited additionality, etc.). Moreover, this absence of a broadly shared vision on strategy and instruments has led to a myriad of climate funds, subsidies and ad hoc stand-alone solutions, which increases the management cost and reduces the effectiveness of these fragmented initiatives. While these stand-alone solutions have resulted in interesting experiments, isolated financing initiatives have hardly ever known a significant upscaling.

The many barriers encountered during the FALCO project point to the urgent need for a full-fledged financing vision and strategy on how the Flemish region as a whole will finance the transition to a climate-neutral society. This will notably require building a shared vision on the role of the societal actors with regard to financing (including local and regional authorities), and the translation of that vision into a financing strategy and solutions that are able to achieve the ambitious climate objectives of both the Flemish region and the local authorities.

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2 Introduction – the H2020 FALCO project

The H2020 FALCO project started in June 2017 and ended at the end of February 2022. FALCO stands for Financing Ambitious Local Climate Action Plans. The acronym summarizes what the FALCO project wanted to realize: developing financing solutions for investments that are needed in order to achieve the ambitious objectives that are formulated in the numerous Flemish local climate action plans.

In the paragraphs below, we briefly describe the context in which we set up the FALCO project in 2017, why a project such as FALCO was needed at that time (and is still needed today), and the project's main objectives.

The FALCO project has been organized around 'breakthrough projects' – projects (sectors) in which a breakthrough was / is needed in order to take a step forward in the direction of achieving the ambitious objectives that are stated in the local climate action plans but which have not been realized up to then / now because of financial and non-financial barriers.

In paragraph 2.3, we describe the general process and activities that have been carried out in order to select breakthrough projects for which we have developed financing solutions.

2.1 Context

In 2016, more than 180 local authorities of the Flemish region (Belgium) signed the Covenant of Mayors (CoM) committing to reduce their greenhouse gas emissions by 20% by 2020 (or the new signatories 40% by 2030). Among these local authorities, many have committed to go well beyond the CoM objectives, aspiring to achieve climate neutrality by 2050 … or even earlier. Flemish CoM signatories have prepared ambitious local climate action plans containing a vast array of emission reduction measures for different stakeholders. Given the sheer investment volume, the combined local climate action plans amount to a powerful economic recovery plan. However, most of these plans lack a comprehensive and robust financial plan. And without funding, even the best plan is nothing more than a plan: no investments, no emission reductions, no economic recovery.

2.2 Objective of the FALCO project

The **main objective** of the FALCO project is to further **develop** *and* **pilot financing solutions** that lift existing financial AND non-financial barriers, and to prove these solutions' validity by realising a total investment portfolio of ca. 18 million euro in 3 main domains: 1) renovation of public buildings, 2) renovation of private buildings, and 3) energy-efficiency investments for SMEs. At the same time, the FALCO project aims at developing **accompanying (policy) measures** that will boost the interest in emission reduction investments and the demand for the proposed financing solutions. The combination of financing solutions and accompanying measures should unlock a sustainable energy investments potential that has been left untapped up to now.

2.3 General process and activities

In this chapter, we describe the general process and activities that were followed to identify the projects for the project portfolio. The general process can be seen as comprising 4 steps:

1. Brainstorming on projects / markets in which a breakthrough is necessary in order to implement the actions defined in the local climate action plans;
2. Selection process in order to select a limited number of breakthrough projects that are worth

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working on;

3. Elaborating the different breakthrough projects: from identification of the barriers up to the identification and evaluation of one or more financing solutions;
4. Contracting project owners in order to offer the financing solutions.

The paragraphs below provide more details on these different steps in the general process.

2.3.1 Brainstorming on breakthrough projects

FALCO's project portfolio must be:

- Relevant to the local authorities;
- Ambitious in terms of energy savings and quantities;
- Innovative in terms of financing solutions offered.

Therefore, a brainstorming session on possible breakthrough projects was organized in Summer 2017. This brainstorm resulted in 36 possible breakthrough projects, all identified as important projects with major barriers by the local authorities. A total of 36 possible breakthrough projects were identified in the following categories:

- Renovation of private houses:
    - Private housing: Dampoort KnaptOp – The Shift – Cohousing projects (province Vlaams-Brabant) – Cohousing (province West-Vlaanderen) – West-Vlaanderen –Energy loan+ (Antwerp / Ghent / other);
    - Apartment buildings: Ghent – Antwerp – province West-Vlaanderen – province Vlaams-Brabant;
    - Social Housing: renovation (Ghent) – heat network (Antwerp);
    - New city development projects: Ghent;
- Energy investments in SMEs and similar:
    - Cultural institutions: Green Track Ghent;
    - New business zones: Ghent;
    - SMEs: energy coaching (Ghent) – energy renovation in combination with PV panels (Albert Canal zone – Antwerp) – offices – province Vlaams-Brabant – province West-Vlaanderen;
    - Agriculture – heat network (province West-Vlaanderen).
- Deep renovation of public buildings:
    - Public buildings: Ghent – province Vlaams-Brabant (own buildings / coaching local authorities on ESCO of EPC) – Antwerp – province West-Vlaanderen;
    - Schools: Antwerp – IOK;

2.3.2 Selection of the breakthrough projects

Out of this long-list of possible breakthrough projects, the FALCO consortium chose 4 breakthrough projects on which we focused to define financing solutions.

The selection process had been organized as follows:

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- Every partner evaluated the possible breakthrough projects based on a short explication and identified the top-5 ranked projects based on criteria such as degree of ambition, the project owner's willingness to experiment, impact of the project and replication potential, flexibility and other.
- Based on the evaluation, 6 possible breakthrough projects were retained by the project team for further investigation (identification of the barriers, engagement of the project owners (or umbrella organisations), first ideas on financing solutions, action plan for further elaboration, etc.):
    - Renovation of social housing;
    - Energy loan + for the renovation of private houses;
    - Renovation of school buildings;
    - Deep renovation of public buildings;
    - Renovation in the sector of healthcare institutions;
    - Energy efficiency investments for SMEs.
- From these 6 possible projects, 4 were selected by the Partner Board Meeting based on the results of the further investigation:
    - Renovation of social housing;
    - Energy loan + for the renovation of private houses;
    - Deep renovation of public buildings;
    - Energy efficiency investments for SMEs.

    Healthcare institutions were considered to be not promising enough at this stage. The Partner Board asked to follow up the process at the Flemish Government in order to be ready to take up this breakthrough project at the moment the project would be evolved further.

2.3.3 Elaboration of the selected breakthrough projects

Each of the selected breakthrough projects was assigned to a duo of breakthrough project leaders: one consultant and one local authority. The aim was to elaborate the breakthrough project further and to identify financing solutions for project owners within the territory of this local authority and scale up later on once the financing solutions had been evaluated or tested.

The processes of elaborating the selected breakthrough projects did not run in parallel, but each followed a different way of working.

Common activities for the 4 breakthrough projects were:

- Identifying weak links in the draft financing solutions (cross testing between consultants);
- Presenting the draft financing solutions at PMV;
- Identifying possible overarching solutions in order to strengthen individual financing solutions (e.g., an overarching fund);
- …

2.3.4 Contracting project owners

For each of the projects, project owners were contacted in order to explore the possibility to collaborate on investment projects and to solve the financial problems they encounter developing

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tailored financing solutions. The aim of this trajectory was to contract the project owners and realize the investment during the FALCO project period.

2.4 Reading guide

This report is organized around the breakthrough projects: renovating social houses (Chapter 3), energy renovation of private houses (Chapter 4), energy efficiency investments for small and medium enterprises (Chapter 5), and deep renovation of public buildings (Chapter6).

The following information is given for each of the breakthrough projects:

- The context;
- The ambition and barriers to realizing the ambitions;
- Description of the (possible) financing solution(s);
- (If so) investments realized by means of the developed financing solution;
- Lessons learned.

The last chapter (Chapter 7) presents the conclusions of the FALCO project and lessons learned.

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3 Renovation of Social Houses

The trajectory of the breakthrough project on the renovation of social houses was started in 2017, but had to be stopped in 2018 when we encountered legal barriers in identifying financing solutions. So, the results described in this paragraph represent the situation at that time.

3.1 Context

Social housing is offered in Flanders by social housing companies. For the investments of renovation or new construction, subsidized loans are offered by VMSW (Flemish Government) to social housing companies: -1% loans. Tenants pay rent depending on their income directly to the social housing companies.

The financial situation of the social housing companies has deteriorated in the last few years. The rents (incomes for the social housing companies) have been lowered, and inflation has lowered as well, causing lack of money at the social housing companies to pay back the VMSW loans. The financial situation of the social housing companies is especially bad in cities.

3.2 Ambitions and barriers

The global ambition of the local climate action plans of Flemish cities and communities is to become climate neutral in 2030 to 2050. Extending this ambition to the social housing sector means that a total renovation up to climate neutral buildings has to be realized.

For the social houses in the city of Ghent, this means a renovation of ca. 15,300 living units in the period 2018 – 2050. The current renovation rhythm is 129 living units per year (and no deep renovation is taking place). On their planning, the social housing companies plan to accelerate to 167 living units per year.

The first ambition of this breakthrough project within FALCO is to help the social housing companies realize their planned acceleration. With the financing solution, we want to be able to invest in the renovation of at least 19 living units per year.

The most important barriers the social housing companies are facing are:

- *Split incentive*. This is the most important barrier for investments in renovation of social houses. The investments have to be made by the social housing companies. They are not able to capture any part of the energy savings. The profit is a full 100% for the tenant. The association of Flemish social housing companies (VVH) is addressing this barrier and wants the legislation to be changed on this point. But this will not be done in the short-term.
- *Lead time of the renovation dossiers*. Because the investments pass through VMSW, the time to organize the renovation is very long. A shorter lead time can help the social housing companies accelerate the renovations. Investing with own financial means (no need for a VMSW loan) can be realized faster. However, the social housing companies do not have any financial means.
- *Lack of human resources to accelerate the investments* (preparations of dossiers, etc.). Engaging personnel is not possible due to the cost factor.
- *Lack of money at VMSW* – especially when a real acceleration will be needed (factor x acceleration). Op to now, this barrier has not yet been faced. The financial means at VMSW are sufficient. The Flemish Government has increased the budget in the past. However, a multiplication of the budget in the future will probably not be possible.
- *Emptying the social houses during renovation*. This is especially the case in apartment buildings,

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since all apartments must be empty at the moment of renovation. In individual houses, the renovation can be planned at the moment the tenant is changing. This is more of a technical issue. Experiments have been done elsewhere to renovate without emptying the social houses.

3.3 Possible financing solutions and evaluation

In the paragraphs below, we briefly describe the financing solutions that have been developed, explored and tested in interviews with the stakeholders. In summary, the financing solutions aim to overcome:

- The lack of own financial means at the social housing companies (and with this also the potential future lack of financial means at VMSW);
- The lack of human resources and expertise at the social housing companies.

Figure 3 gives an overview of the financing solutions that have been explored for this breakthrough project. In the paragraphs below, we detail each of the financing solutions and evaluate the possibilities.

Figure 3: Summary of the explored financing solutions for investments in renovation of social houses

3.3.1 Loans at VMSW (financing solution 1)

This financing solution is business as usual and faces the problems listed above. The VVH (Vereniging voor Vlaamse huisvestingsmaatschappijen) is lobbying the Flemish Government to change the rules: e.g., adapting rents for renovated and energy-efficient social houses to overcome these problems. However, changes in legislation are not expected in the short-term.

This financing solution is not explored further in the FALCO project.

Apart from loans from the VMSW, the social housing companies have the right to get a loan from local authorities, if these loans are at favourite tariffs. This option can be explored further where the local authorities are an intermediate link between a fund and the social housing company.

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3.3.2 Creating own means (financing solution 4)

Creating own financial means for the social housing companies can be realized (at least theoretically) in different ways:

- Creating own financial means by selling some houses, renting 1% of their patrimony to other than social tenants, etc.
- Financial constructions, other than loans: e.g., securization of future rents.

The first possibility has been explored only briefly. This option is not realistic because of the following reasons:

- Selling living units is not desirable because there is a long waiting list (social tenants waiting for a social house).
- The part of the patrimony that can be rented to other than the social target audience is limited to 1%. This part has been filled in already by most of the social housing companies.

Other incomes can be figured out (capturing profits of third parties), but will be treated in the other financing solutions that have been explored as a means of refunding the obtained financing or as a means to making deeper renovation possible.

The second possibility is meant to make large amounts of money available to the social housing companies at time 0 in order to be able to invest in renovating their buildings and without passing via the VMSW.

The following possibilities have been explored:

- Securization. This option is only feasible for large amounts of money (> €40 million). This exceeds the investment amount of the investments we aim to make within FALCO, but would be a valuable option later on.

  The option has been presented and tested in interviews with the Flemish Government (Wonen Vlaanderen / VMSW). VMSW states that, legally, securization is a financial instrument that the social housing companies cannot use. The social housing companies have to pass via the VMSW.

- As a fall back from securization (amounts needed are too large), the option of usufruct[1] and lease back was explored. Usufruct is a right in rem (in Dutch: 'zakelijk recht'). The social housing companies have the right to give the right in rem to third parties (e.g., local authorities) under certain conditions stipulated by the Flemish Government.

3.3.3 Third party financing (financing solutions 2 and 3)

We distinguish several different models in this group of solutions:

- ESCO-model, where the ESCO invests in energy renovation and is paid back by the tenants or the social housing companies based on the services the ESCO delivers. VMSW indicates that the technical knowhow the ESCOs can deliver is more important than the financing solutions they can offer.

  ESCO services can either be directed to the social housing companies (and thus directed to common rooms in apartment buildings) or to the tenants themselves. Because the tenants do not stay very long in the social houses, ESCOs would only be willing to invest in the warming

[1] A usufruct is a legal right accorded to a person or party that confers the temporary right to use, and derive income or benefit from, someone else's property.

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installations, … (short pay-back periods). On the other hand, ESCO services to the social housing companies (common parts of apartment buildings) might not result in large energy-savings.

- Demand side management (DSM), whereby a third party invests in installations / renovation of social houses and earns money back from the energy balancing market.
- Third party invests in energy renovation of social houses that are paid back (incl. profit / interest) after selling the building. Part of the added value that has been created by the renovation goes back to the third-party investor.

  Checking this option at the VMSW resulted in the insight that this option is not legally possible (social housing companies may not sell their houses / buildings, unless the houses or buildings are in very bad shape). Selling after renovating the building is thus not an option.

Common to these financing options is that there has to be an earning model for the social companies in order to permit them to invest in extra energy-efficiency measures. For example, this can be realized by requesting compensation from the third party for the use of the social housing companies' patrimony.

Considering the insight above, the option with the demand side management is the most promising, but possibilities must be checked with providers of demand side management services and an agreement on the ambition of the project must be reached.

3.4 Conclusion

The barriers for deep renovation of social housing are large. However, because of legal issues, the barriers could not be overcome within the relatively short term of the FALCO project. Interesting possible financing solutions have been developed that can be considered in the future.

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4 Energy renovation private houses (ER2.0)

4.1 Context

In line with international and EU commitments, the Flemish region (Belgium) set energy renovation ambitions for residential buildings for 2050. These will require an energy consumption of maximum 100 kWh/m2/year or, alternatively, investments in an energy measures package entailing insulation and an energy-efficient heating installation (max. output of 15 W/m2)

Currently, only 3% of the approximately 3 million residential buildings in the Flemish region satisfy the 2050 ambitions. Achieving these ambitions will require a sustained investment effort over the coming decades.

The renovation of private dwellings is also a key challenge for local authorities. Most of them have included home renovation targets as one of the cornerstones of their local climate action plans.

4.2 Ambitions and barriers

In support of the above-mentioned public sector ambitions, the Falco team set out to develop a personal energy renovation loan, lifting several investment barriers in order to make it attractive to a large set of the population. These investment barriers were the following:

1) The limitations on loan amount;
2) The limited loan period (maximum 10 years for loans under €37,000);
3) The lack of technical assistance.

At the time of the Falco project, no market solution combined these 3 elements.

In addition, the Falco team also sought to make the energy renovation loan available to borrowers with limited resources.

4.3 The developed financing solution

Below, we present the Energy Renovation loan 2.0 (ER2.0) developed during the Falco project. We describe its key characteristics and the structuring of the loan.

Key features of the ER2.0 loan

The ER2.0 loan is a personal loan for energy renovation of individual private homes and ancillary investments. It has the following features, which address the above-listed barriers:

- Loan amount of up to €50,000 to allow investments required for deep renovation;
- Loan period up of to 20 years to limit monthly instalments;
- Complemented by a technical assistance service to assist borrowers in making the right renovation choices.

The ER2.0 loan is targeted at average income households, but it also allows (low-income) households that do not meet loan approval criteria to benefit from the loan subject to an additional public guarantee covering the credit default risk.

Structuring of the ER2.0 solution

Figure 4 sets out the key actors and financial streams associated with the loan structure.

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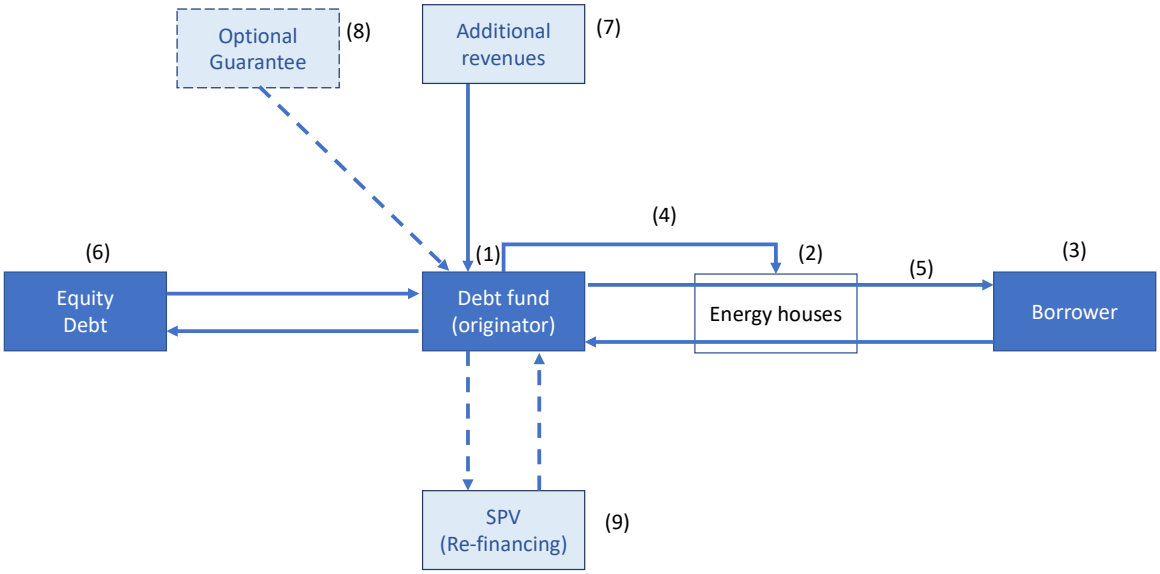

Figure 4 - Structure of the ER2.0 loan

The business model and viability of the ER2.0 solution was validated by an independent third-party expert review commissioned by the EIB Advisory Hub.

Before we proceed to the description of the ER2.0 solution, please note that – notably inspired by the results of the FALCO project – the Flemish region has announced that it is making available a loan offering with characteristics similar as the ER2.0 loan, in addition to offering a 0% interest rate. This Flemish region's loan will be funded entirely from the Flemish budget. Hence, the implementation of the structure presented below will remain on hold until such time as the current funding strategy is reviewed in favour of a blended finance approach attracting private sector financial resources to fund the loan solution.

Below, we present the central components of the ER2.0 solution. We start off with a summary presenting the key actors involved and their roles; we then describe the financial structuring of the ER2.0 solution; and we conclude the presentation with 2 optional add-on solutions.

Key actors and their main roles

At the heart of the ER2.0 solution is the ER2.0 Fund (1). This fund offers the ER2.0 loan together with technical assistance services via the Energy Houses (2) to private individuals (3) for the purpose of energy renovation investments. The ER2.0 Fund is structured as a revolving debt fund.

The fund's operations are managed by a Fund Manager who is entrusted with fund/portfolio-specific tasks (e.g., portfolio management and administration, monitoring risk management, strategy and performance, reporting, and research) in addition to the organisation of more general corporate services (e.g., accounting, tax, internal audit, link with external audit, ALM, etc.).

The energy houses are key intermediaries in the loan process. The currently 19 energy houses operating in the Flemish region, organized as a municipal institution or as collaboration between

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different municipalities, have become the go-to partner for advice on energy renovation of individual houses. The ER2.0 fund compensates the energy houses for the distribution of the ER2.0 loan and the related technical assistance services (4). The energy houses have longstanding experience in delivering an existing loan product for smaller energy efficiency investments.

Once loans (5) are approved by the Fund, the energy houses, acting as intermediaries, use the sums provided by the ER2.0 Fund to issue ER2.0 Loans (including technical advisory services) in the name and for the account of the ER2.0 Fund, via a loan contract between the ER2.0 Fund and the ER2.0 customer.

The loan servicer is entrusted with monitoring the loans' performance during the entire loan period, and he/she alerts both the Fund Manager and the energy house concerning delayed payments, defaults and other deviations from the approved 'reimbursement schedule' and the respective Energy Houses via the 'credit monitoring system'.

Financial structuring of the ER2.0 solution

The ER2.0 Fund's working capital is mainly composed of equity and debt (6). The shareholders, delivering the starting equity of the ER2.0 Fund, are local or regional/national authorities. Equity takes the form of pledges (drawing rights/credit facility) and is paid in full in function of the demand for ER2.0 Loans encountered in the market. Debt is capital temporarily made available to the ER2.0 fund by investors (EIB or other private lenders) in consideration of compensation (interest). Different types of debt can be envisaged. In a first stage, senior debt is provided by the EIB, subject to the EIB's credit approval process, in a 1/5 equity/debt ratio.

In addition to equity and debt, the ER2.0 solution engages in activities aimed at securing additional revenues/financial resources (7), notably to cover the cost of the technical assistance services during the renovation process and/or to improve the financial viability of the ER2.0 Fund. These activities / additional resources notably include: (a) subsidies from the Flemish Government, (b) ELENA grants covering costs of project development services, and (c) revenues from a membership card system (MCS).

Suppliers participating in the MCS offer ER2.0 clients a rebate and pay a contribution to the ER2.0 Fund. These funds can be used to cover part or whole of the technical assistance costs or to grant cheaper and/or additional ER2.0 Loans. A market survey performed during the FALCO project showed sufficient appetite from suppliers for participating in such a scheme.

Optional add-on solutions

Applicants that do not satisfy the standard acceptance criteria for the ER2.0 loan can nevertheless obtain an ER2.0 loan if the energy houses agree to guarantee (8) to the ER2.0 fund that the relevant local authority will cover any shortfall in the timely reimbursement of the loan by the borrower. This optional guarantee allows local authorities to add a social policy dimension to the ER2.0 solution.

In addition, as the ER2.0 loan is a high-volume standardised product, it may allow refinancing solutions (9) (through sale to an SPV or otherwise) that accelerate the repatriation of the outstanding loan amounts. The amounts made available to the ER2.0 Fund through refinancing operations could then be transformed into new loans. As refinancing solutions are not essential to the business model's viability, this part was not analysed in depth. However, it was highlighted as an optional add-on solution worthwhile considering once the loan portfolio reaches a critical mass.

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4.4 Lessons learned

In the course of the development of the ER2.0 solution we have learned a lot about financing energy renovation of private dwellings. A number of key lessons are summarised below:

A (fully) voluntary approach is not compatible with ambitious climate objectives

You can lead a horse to water but you cannot make it drink. For a long time, this has been the mantra of Flemish public policy: citizens were to be convinced – not forced – to do the right thing: namely, invest in climate-proofing their homes. This focus on voluntary action translated into the choice of policy instruments with a focus on communication instruments and subsidies. The standards on insulation/energy-efficiency, especially for existing buildings, have been close to mirroring the business as usual (common denominator) situation, with only a limited view on the challenges ahead.

This voluntary approach proves incompatible with the ambitious 2050 renovation targets set by the Flemish region. Indeed, notwithstanding the resources allocated to these soft instruments (communication, technical assistance and subsidies), no substantial additional effect in the form of accelerating or deepening of the renovation could be observed over the last 15 years. The added value of these voluntary policy measures is therefore questionable.

Furthermore, the voluntary approach is highly prone to a Matthew effect, whereby well-off citizens investing in energy efficiency or renewable energy drain the lion's share of the available subsidies[2].

Moreover, if the voluntary instruments would substantially accelerate renovation investments, the resources required to sustain the level of subsidies for a broad segment of the population would put a heavy burden on the regional budget.

Finally, if we are to achieve the very demanding targets of (near) climate neutrality by 2050, it's all hands on deck!… not only the willing ones, as is the case in a voluntary approach.

As the limitations of a voluntary approach become increasingly apparent, it is reasonable to expect a gradual shifting of (regional) public policy to a more goal-directed approach in which well-balanced obligations drive renovation investments.

With this conclusion in mind, we designed some of the key features of the ER2.0 solution. We notably provided for a long loan period (20 years) to reduce the impact of monthly instalments on household budgets and make deep renovation affordable for a larger segment of the population. Furthermore, we proposed a financial structuring solution based on a blended finance approach. Such an approach allows public resources to be leveraged by attracting private sector financial resources to fund the ER2.0 solution. Unlike the limitations of approaches that singularly source funding from public budgets, the ER2.0 blended finance solution offers an important upscaling potential without overly burdening public budgets.

The elephant in the room: homeowners unable to afford deep renovation

The focus on voluntary instruments allowed us to remain blind to the elephant in the room: before even considering investing considerable sums in improving the energy efficiency of one's home, one most have the financial capacity to do so. The crux of the matter is that, in the short-term,

[2] Johan Albrecht, Renovatiebeleid in België; weinig impact en (te) veel 'free riders', Itinera, 2021

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approximately 50% of the homeowners have insufficient financing capacity to match deep renovation investments of around €30,000 to €60,000[3].

This financing capacity problem has several public policy implications, including:

1) If we want to achieve ambitious climate objectives, the limited public budget resources need to focus on the group that cannot afford deep renovation (social target group);
2) To cover the large financing needs, public resources will need to be used to attract private sector investors (through blended finance solutions);
3) In order not to destabilise the budget supporting the target group, the financing effort will need to be spread over a long period. The corollary thereof is that the longer we postpone the renovation effort the less time we have to achieve the 2050 targets and the higher the impact will be on public budgets (because the investment will be concentrated in a shorter period).

Financing needs go beyond renovation investments sensu stricto

Deep renovation requires combining multiple technical measures. As such, it can be very complex, and that complexity will often constitute a sheerly insurmountable barrier for the layman. Technical assistance can help bridge this knowledge gap, but it comes with a price. Faced with the large financial burden associated with deep renovation, part of the homeowners may dispense with the 'extra' cost for technical assistance. Hence, if the government wishes to encourage homeowners to invest in deep energy renovation, and ensure that the renovation investment is technically sound and delivers the much-needed energy consumption reductions, it may need to consider (pre)financing the cost of technical assistance.

Hence, on top of the financing needs associated with the investments sensu stricto, (pre)financing of the technical assistance should also be provided to increase the probability of achieving real energy-savings.

In Flanders, the energy houses play a central role in dispatching the Flemish energy loans and providing technical assistance. Hence, the above reasoning translates into the need to recalibrate the financing of these energy houses by the Flemish region (or other sources) to align it to the increased need for technical assistance associated with deep renovation investments. Again, not only will this benefit the homeowner, but it is also essential to guaranteeing the effectiveness of public policy and, ultimately, achieving the 2050 climate objectives.

[3] J. Albrecht en S. Hamels, De financiële barrière voor klimaat- en comfortrenovaties, Itinera, 2020

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5 Small and Medium Enterprises

5.1 Context

Thanks to the European ETS scheme that applies to large corporations and energy-intensive companies, one can observe that these companies are taking substantial steps towards making their business processes more sustainable.

However, there is still a very large group of companies, often SMEs, that do not fall under this scheme. Nevertheless, the realisation of the European CO2 objectives is a matter that concerns these companies as well. In almost all European member states, it has been established that it is far from easy to shift this target group of companies into a higher gear when it comes to making their processes more sustainable.

5.2 Ambitions and barriers

Promoting energy efficiency among companies, and SMEs in particular, is not always obvious. Company managers focus first and foremost on their core processes and look for investments with a high return. Energy costs represent a limited share of the total costs for quite a few companies and energy-saving investments often have a long payback time – which means that, if energy saving measures are implemented, it will often be the so-called low hanging fruit measures (cf. relighting) that will be implemented. By the way, this kind of solution is already available in the market today (e.g., Leasing of LEDs, light as a service).

The foregoing situation translates into a number of bottlenecks that makes it difficult to support SMEs in becoming sustainable:

- Limited impact of energy savings and little time on the part of company managers translates into relatively *high transaction costs*, which weigh on the business case of an ESCO, third party financier
- It often involves limited energy savings with a focus on the so-called low-hanging fruit; *more in-depth sustainability projects are difficult to get off the ground*.
- Scale is important for third-party financiers: most *energy-saving projects for individual SMEs are rather limited in scope*, which means that implementing so-called project financing solutions isn't straightforward. After all, this approach requires quite some start-up costs (cf. the establishment of an SPV, due diligence costs, contracting, etc.).

5.3 The developed financing solution

This FALCO project took a closer look at these bottlenecks and, above all, looked for workable solutions to achieve more in-depth sustainability processes. 3 avenues were explored:

- *Pooling of buildings by focusing on network companies* to reduce the transaction cost
- *Integrated approach* by integrating renewables and energy-saving measures into one project, and thereby focusing on the so-called low-hanging fruit AND measures with a longer payback time to generate more substantial energy-savings
- *Financing on the basis of project financing for bigger projects* versus a debt-sale-approach to deal with smaller sized projects

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5.3.1 Importance of a portfolio approach

The first option was to focus on so-called network companies. These include multi-plant companies (e.g. retail and bank branches) but also retirement homes for elderly people that are increasingly becoming part of larger groups. Often, these different branches function as a kind of SME, employing a relatively limited number of people at each branch, with their own P&L responsibility and targets to be met. However decisions on the renovation of the buildings are taken centrally, putting the ESCO in a one-to-one relationship with the other party, but for multiple sites. In this way, there is no need to negotiate with each site manager individually, although obviously the renovation proposal is made on the basis of site visits and discussions with the site managers. Usually the buildings are not owned by the nursing home operator but by real estate funds. A long lease is then concluded between the two parties (typically for 27 years), which also means that the nursing home operator will be interested in energy-saving measures insofar as they have a payback period shorter than the remaining long lease. Compared to individual SMEs, transaction costs are significantly lower, enabling projects with longer payback periods and consequently higher energy-savings.

5.3.2 Integrated approach

In order to set up projects that result in substantial energy-savings, an integrated approach is needed on 2 levels:

On the one hand, by focusing not only on energy-savings but also on the integration of renewable energy. Compared to energy-saving measures, renewable energy has the big advantage that production estimates can be made with a high degree of certainty. There is an electricity meter that registers electricity production, and there are also very reliable models available for solar radiation. This is less the case when it comes to energy-saving. The estimation of the energy-saving is based on on-site audits and analysis of the energy data, but it always remains an estimation with an inherent margin of error. By combining both renewable energy and energy-savings, the risk of the expected income stream that the ESCO will receive is reduced, thereby reducing the average cost of capital (WACC). This allows the ESCO to go a step further with regard to energy-saving.

A second way consists of combining the so-called low-hanging fruit (cf. relighting, cavity wall insulation, optimisation of the boiler room controls) with measures with a longer payback time (cf. boiler room renovation, PV, roof insulation, ...). In this way, you get paybacks that are between those of the low-hanging fruit and the measures with a long payback period.

Both approaches result in Energy Performance Contracts with energy-savings of at least 30% to 40% for a contract period that fluctuates between 10 and a maximum of 15 years.

5.3.3 Financing based on project finance versus sale of receivables

As far as financing is concerned, 2 avenues were followed: firstly, for ESCO projects with a sufficiently large investment volume (> €2 million), project financing was opted for by analogy with how renewable energy projects are financed (cf. wind projects). In this case, the investments are placed in a separate project company – so-called special purpose vehicle (SPV). The business case is then built up in such a way that the income of this SPV (cf. remuneration for the realised energy savings/renewable energy) is sufficient to cover the financing and operational costs.

In addition, a second option was also tested: we investigated to what extent an EPC-light could be set up by abandoning project financing, which requires a certain scale (min. €2 million).

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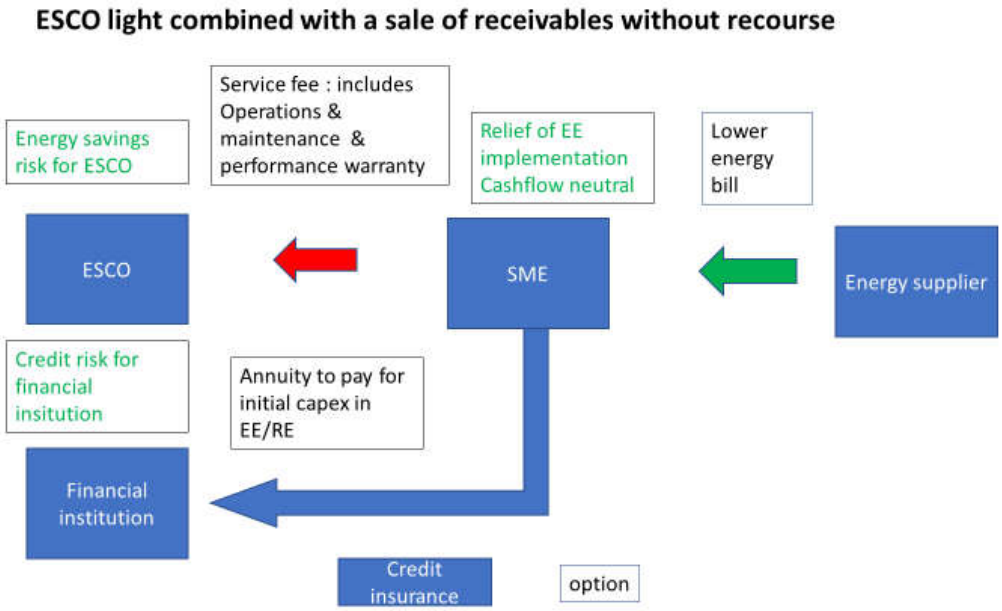

Figure 5 - ESCO light combined with a sale of receivables without recourse

In a standard EPC, the ESCO charges the customer a certain annual fee that includes a range of services. Firstly, the financing of the energy-saving measures/renewable energy. In addition, a fee is charged for the maintenance, management and monitoring of the installations.

In the case of a sale of receivables, however, a clear distinction is made between the financing cost on the one hand and the maintenance/management and monitoring cost on the other. In a sale of receivables, the future claims that the ESCO has on the customer are sold to a bank and, from then on, the customer pays the bank directly. The fee for the maintenance, management and monitoring is paid by the customer to the ESCO. This fee is linked to the actual energy-savings. If the actual energy savings are bigger/smaller than the budgeted energy-savings in the business case, this is adjusted up/down.

On the other hand, the bank takes care of the customer's credit risk. In other words, no recourse is possible regarding the ESCO should the customer run into financial difficulties.

In this way, the energy-saving and credit risk are assigned to the right party: the ESCO on the one hand, and the financial institution on the other.

5.4 Investments realized with the financing solution

The 3 previous paths have since been effectively tested in 3 pilot projects. For this, 3E cooperated with Wattson – a subsidiary of 3E that specifically focuses on the realization of Energy Performance Contracts (EPC).

A first EPC focusing on network companies, combined with a portfolio investing in both energy-savings and renewable energy, was set up by Wattson with the nursing home operator Armonea, whereby 49 residential care homes were modernized. Investments focused on boiler renovation, relighting and solar panels. Together, these investments represented approximately €6 million; with energy-savings of about 30%. This first pilot is an example in which a large number of buildings were pooled (solution 1), renewable energy and energy-savings were integrated into the case, with

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attention to both low-hanging fruit and measures with a longer payback time (solution 2). Given the size of the project, project financing could be applied.

A second EPC, based on a sale of receivables, was also realized by Wattson – this time with the Sint-Jozefinstituut in Bokrijk as counterparty. The receivables were sold to Belfius Bank. Again a combination of different energy-saving measures was worked out (boiler renovation, relighting, monitoring of the devices, insulation and PV). Total investments added up to an amount of €900,000; with energy-savings of 40%. This second pilot is an example in which only 1 site was made sustainable. Renewable energy and energy-savings were integrated into the case, with attention to both low-hanging fruit and measures with a longer payback time (solution 2). Given the limited size of the project, a sale of receivables was applied (solution 3).

Finally, an EPC was set up with another nursing home operator – SLG, now Korian – whereby 40 nursing homes were renovated. And again, this involved a combination of investments in energy-savings and renewable energy. An integrated approach was followed by combining boiler renovation, relighting, monitoring and solar panels. Total investments of €6 million and energy-savings of 30%. This last pilot, like the first one, is again an example of pooling different buildings in 1 EPC (solution 1). Again, energy-savings were combined with renewable generation on-site, and low-hanging fruit measures combined with measures with a longer payback time (solution 2). For this case as well, project financing via an SPV was used.

5.5 Lessons learned

Based on the pilots described above, we can formulate a number of lessons learned.

Firstly, that it is effectively possible to make companies more sustainable by applying the Trias Energetica principle. By combining energy-saving measures (e.g. insulation, relighting) with the generation of renewable energy on-site (e.g. PV), and finally by using fossil energy as efficiently as possible (e.g. boiler room renovations), energy-savings of 30% and more can be realised.

In itself, this is already an important achievement, but also a point for attention: because 30-40% energy-savings is still insufficient to achieve the European Union's targets in 2050. Achieving energy-savings levels of 80% is currently not an easy task. And this is certainly the case from an ESCO perspective. To achieve such levels of energy-savings, thorough renovation of the building envelope is required, resulting in substantial investment volumes with long payback periods. Longer contract periods and/or co-financing from the customer are necessary conditions for this, as well as a critical evaluation of the use of the buildings. Are all these volumes really necessary, and is it not possible to valorise part of the building stock, whereby this income can then be used to finance the deep renovation of the remaining buildings? The latter is discussed in more detail in the financing solution for public buildings in the next section.

A second lesson learned is certainly that EPC is not equally easy to implement for all types of companies. As explained above, pilots could be set up for network companies that manage a large portfolio of buildings. By pooling these buildings in an EPC, it was possible to gather sufficient critical mass to justify the costs of project financing as well as to mitigate the risks of achieving energy-savings. By working with portfolios, the law of large numbers applies, and relatively robust energy-savings can be achieved, which can only benefit the bankability of these cases.

The opposite situation occurs with individual SMEs – in this case, often only a limited investment is possible, although a lot of acquisition costs are often required to achieve an effective cooperation. This steers ESCOs towards measures with a shorter payback period and thus more limited energy-savings. Moreover, for this group of companies, it is less obvious to mitigate the risk of not achieving the energy-savings. Thus, achieving the European 2050 targets is a real challenge for SMEs. A

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stricter normative framework from the government could possibly offer some relief here.

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6 Public buildings

6.1 Context

By 2050, society must be climate neutral. This also applies to the built environment of local authorities. Therefore, cities and municipalities face the major challenge of upgrading their real estate portfolio. The corresponding investments place a heavy burden on their budget. As part of the FALCO project, we examined how this 2050 goal can be reached in a cost-effective manner.

6.2 Ambitions and barriers

6.2.1 In terms of real estate management, the 2050 goals require action now.

There are only 28 years between now and 2050. Knowing that buildings have a 'shelf life' of at least 15-20 years[4], we need to act soon. Moreover, public authorities are expected to fulfil an exemplary role towards society as a whole. This is reflected in the requirement to make their building portfolio climate neutral a little sooner (in 2045).

It is a common misunderstanding that the challenge of the cities and municipalities consists in earmarking initial financing and that, after that, the payback effects of investments in energy efficiency measures will do their work. Additional repayment capacity will be required to offset the negative business case. This can be found, among other things, in strategic real estate management at portfolio level. Optimized building management and the sale of redundant or obsolete buildings results in less expenditure and also generates income. The latter can be invested in the core portfolio to make it climate neutral.

Hence, in translating this ambition into practice within the FALCO project, we asked ourselves the question: What is the better option from a cost-effectiveness perspective? Renovating the existing building stock at a fast pace, so that the climate impact will also decrease quickly? This approach also facilitates taking advantage of some financial payback effects at an early stage. Or, and this is the second option, do we spread the investments over 30 years, and shall we search for an optimally phased approach for this? For the sake of clarity of the analysis, we have formulated both options in a rather simplistic manner. Of course, reality contains more nuances.

6.2.2 Accelerated or staged approach?

The two options are visualized in Figure 6, with the period 2020-2050 on the horizontal axis and an entire building portfolio (0-100%, in square meters) on the vertical axis.

The yellow bar represents a thorough strategic analysis of a complete real estate portfolio ('SPREM' analysis). The coloured blocks represent several energy renovation ambition levels: green (80% less energy consumption), blue (-42%), orange (-10%). The grey blocks represent the sale of real estate.

[4] Depending on the component ('layer') of the structure, cf. 6 layers concept of Stuart Brand https://en.wikipedia.org/wiki/Shearing_layers

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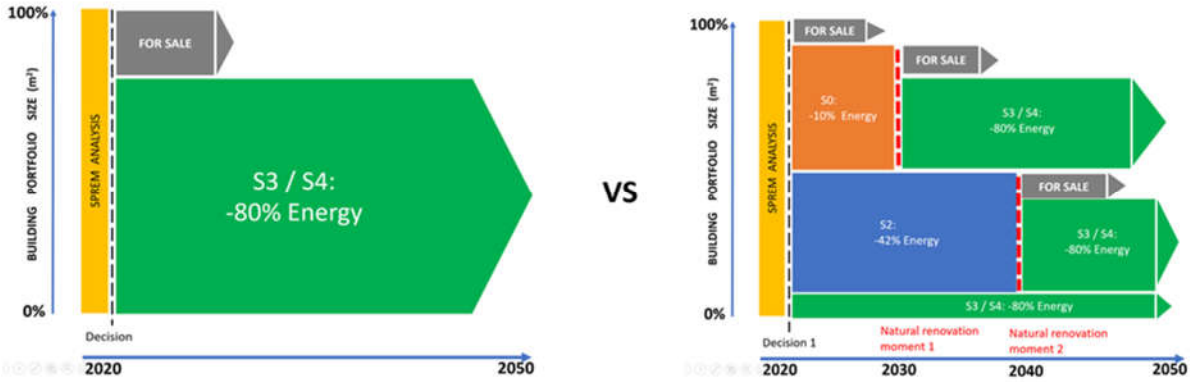

Figure 6: ***Two strategic options for deep energy retrofits of building portfolios: accelerated vs staged.***

We compared both strategic options (accelerated vs. staged) by assessing various parameters. The conclusion was that the staged approach (as shown in more detail in Figure 7 below) is the more cost-effective option. The rationale behind this conclusion is described in the following paragraphs in which we assess various observations with regard to the **pace of renovation**.

The accelerated option, in which substantial investments in the buildings are made as early as possible, has the advantage that it contributes to climate mitigation earlier, by significantly reducing carbon emissions at an early stage. However, this political choice entails significant costs, which are higher compared to the costs of the phased approach. This is explained by two factors: the accelerated approach does not benefit from natural renovation moments. This is the consequence of replacing installations that have not yet been written off from a bookkeeping perspective. In addition, the payback effect of in-depth energy renovations is often over-estimated: at current energy prices, these investments cannot be recovered. Therefore – from a financial perspective – there is no interest in having all investments take place as early as possible.

The sale of surplus real estate can significantly contribute to the financing of deep energy renovations. This sounds simple, but of course it requires a thorough strategic review of the building portfolio of a city or municipality. In this exercise, various factors need to be taken into account, of which two are key: location of a building (e.g., access to amenities and to transport hubs), as well as the building's adaptability to other functions in the future (long-term 'resilience'[5] of a building). The buildings that pass this test are the candidates to stay in the core portfolio.

Real estate management at portfolio level, rather than at building level, also means that the target of reduced energy consumption at the building level can be ''relaxed' to a certain extent. This is particularly relevant for heritage buildings that might face difficulties in being made carbon neutral. Hence, in a portfolio approach, very deep renovations may compensate for less deep renovations in heritage buildings. Also, clustering and concentrating municipal services in a well-chosen selection of buildings automatically leads to a reduced total energy consumption – hence, subsequent reduced total carbon emissions – while delivering the same service.

Finally, we would like to mention a few non-financial aspects that should not be overlooked when choosing the renovation pace. We would like to focus on two of them that, in our opinion, are quite important: (1) There is still insufficient knowledge regarding deep renovations (technological, conceptual, tendering, etc.). Literature shows that the actual energy-savings are often (considerably)

[5] in Dutch the term 'toekomstbestendigheid' is often used

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less than originally expected. In a staged approach, each renovation feeds into the learning curve, and one can use these insights in the subsequent renovations. This is less possible in an accelerated approach. (2) Implementing a renovation operation in a cluster of buildings also has a significant impact on the professionals who have to manage this. This concerns two important processes: on the one hand, the tendering of the works, but also the relocation operations of the staff working in the buildings. This factor may seem ancillary compared to the factors discussed elsewhere in this note, but, based on interviews that we conducted with building managers, we know that these services are often understaffed. The latter means that an accelerated approach would create an organizational spike that would be difficult to absorb. Also, the increase in demand for renovation works is likely to impact their price levels due to lack of contractor capacity.

6.2.3 Public or private financing methods?

In principle, there are 2 options for the initial financing of energy-efficiency measures: public and private financing. In the FALCO project, it was initially assumed that private financing was the better option because it has no impact on local government debt consolidation. This would make it possible to opt for an accelerated scenario instead of a staged one. A decisive element in our evaluation, however, turned out to be the requirement to maintain a structural financial balance, which the Flemish government places on the local authorities, and that, in the jargon, translates into maintaining a 'positive auto-financing margin (AFM)'. In other words, it is not so much the avoidance of debt accumulation that determines the choice of financing method, but rather the pursuit of a sound financial policy in the long-term ('structural' balance). Moreover, cities and municipalities borrow at lower rates than private companies such as ESCOs. It would be illogical for a local authority not to make use of this. In short, public funding is recommended when implementing deep energy retrofits. In this context, we would like to clarify that, contrary to common perception, private financing is not a necessary condition for implementing an EPC (Energy Performance Contract). EPC contracts can also be funded with public funding.

6.3 The developed financing solution

6.3.1 Strategic real estate planning

The developed financing solution basically consists of introducing strategic real estate planning as a recommended approach for taking renovation decisions. This approach is based on the following principles and is visualized below in Figure 7.

- Start with an **analysis of actual housing needs**. Which amenities do you wish to provide to the citizens of the municipality? Which buildings are needed for this? Is it possible to cluster functions or services?
- After this initial analysis, it will probably seem that part of the portfolio is no longer needed. Also, it is possible that part of it cannot be made future-proof from a technical perspective (not resilient). By **no longer investing in this part of the portfolio (divesting)**, you can avoid maintenance costs and even generate income, which can be invested in the buildings you do keep and that will become the core portfolio. These revenues will help support the difficult business case of deep energy renovations in the **core portfolio**.
- When investing in the core portfolio, it is important to make maximum use of **'natural renovation moments' (natural trigger points).** These are moments in time when investments must be made in buildings anyway for reasons other than energy efficiency – e.g., end of life of technical installations, asbestos removal, fire safety upgrades, accessibility improvements, facilities for the 'new way of working', aesthetic upgrades.

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- Try to **synchronize renovations** across several buildings, so that packages of buildings are formed that are tackled jointly. This increases the tendering efficiency of (for example) EPC contracts.
- The building portfolio of cities and municipalities often also includes buildings with heritage value. The technical possibilities for drastically reducing the energy demand of these buildings often conflict with aesthetic criteria. This group of buildings requires an alternative strategy –which may consist in **seeking a different balance between reducing energy demand and using renewable energy**. Compared to non-heritage buildings, the balance will tip more towards the use of renewable energy. This renewable energy is preferably produced locally (not necessarily on the site itself, but still on the territory of the municipality).

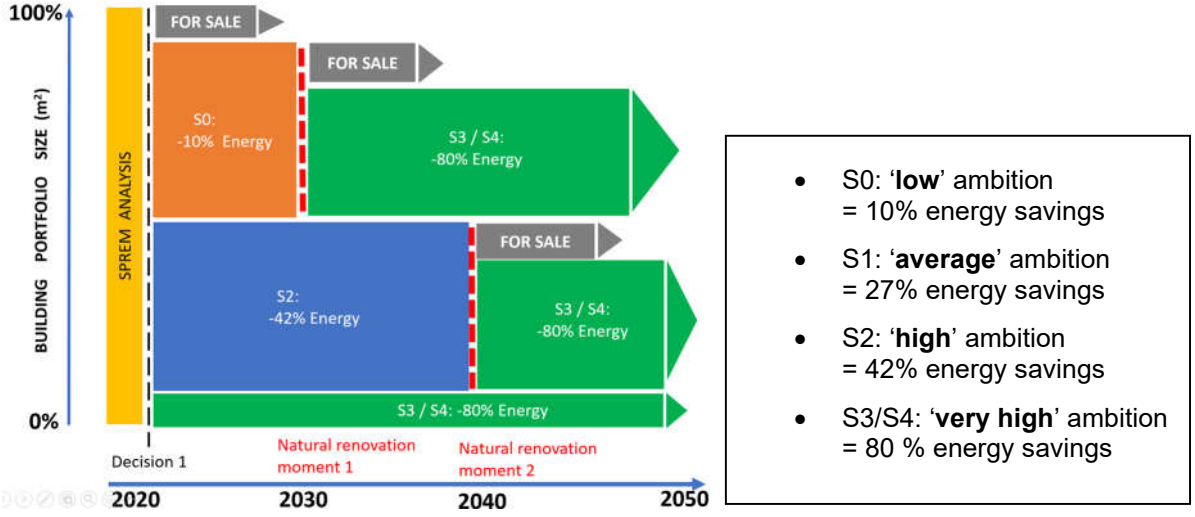

Figure 7: ***Staged (phased) approach, using natural renovation moments.***

6.3.2 Improved energy performance contracts

Implementing energy retrofits by means of Energy Performance Contracts (EPC) is likely to become an important way of realizing tangible progress in saving energy and reducing carbon emissions, particularly in public buildings. Therefore, Factor4 has investigated how to improve EPC contracts. One way of doing this is by **stretching the budget neutrality of EPC contracts and, at the same time, enabling higher ambitions in energy-savings**. This resulted in a second-generation EPC-contract, which received 'new EPC' as its working title in the course of the FALCO project.

The core innovative feature of the 'new EPC' approach is the extensive use of the concept of **'residual value'** of the assets of a building. In principle, the residual value is the estimated value of a fixed asset at the end of its useful life. The residual value, however, may also be estimated at any moment in time (e.g., mid-term in a maintenance contract). The residual value is assessed based on a widely accepted standard, NEN 2767[6], which enables valuing the technical condition of technical assets in an objective way. Adopting 'residual value' as an important KPI for the ESCO that is implementing an energy retrofit generates several advantages. These advantages are summarized in Table 1.

[6] https://www.nen.nl/en/nen-2767-1-2017-nl-227639, Condition assessment built environment - Part 1: Methodology
This standard describes a method to establish the technical quality of building and installation components univocally.

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Table 1: Comparison of a conventional EPC-project and a 'new EPC' project (Source: Factor4)

	Conventional EPC-project	New EPC-project (case City Sint-Niklaas)
Maximal energy savings and carbon reductions?	✗	✓
Guaranteed energy savings	25%	ca. 40%
Cost optimal share of structural energy efficiency measures?	✗	✓
Cost optimal maintenance (of technical installations)?	✗	✓
Guaranteed residual value at end of project	0 k€	10.400 k€
Share of elements with guaranteed Condition score (very) good ('1' or '2') upon completion of an EPC project.	0%	64%
ESCO is rewarded for good preventive maintenance?	No	Yes
Finance cost of reserve fund 'Total warranty' may be avoided?	No	Yes
Implementing principles of circular economy?	✗	✓
ESCO is incentivized for investing in measures with a long life span?	No	Yes
ESCO is rewarded for prolongation of technical lifetime of measures?	No	Yes

Meanwhile, the 'new EPC' approach has been further elaborated by Factor4, also beyond the scope of the FALCO project. Its nomenclature has evolved into 'BPC': Building Performance Contracting. It is being applied for the first time by the City of Sint-Niklaas. More information (in Dutch) is available via this link[7].

6.4 Investments realized with the financing solution

All investments as well as their impact on carbon emissions are detailed in the project's PDA report (D3.3). In the paragraphs below, we have summarized the key information.

6.4.1 Province of West-Vlaanderen

The provincial government intends West Flanders to evolve towards a climate-neutral territory by 2050. It also has the ambition to be a CO_2-neutral organization by 2030.

In the latter context, the province of West-Vlaanderen has implemented the strategic portfolio approach on their own real estate portfolio by selling one of their buildings (which was not efficiently used) and concentrating their services in fewer buildings. More precisely, during the research into the possibilities for centralizing administrative staff in the Bruges region, it was established that the occupancy capacity in, among others, the Provincial House Abdijbeke and the Provincial House Boeverbos was not 100%. In other words, space was available at both locations. After research and evaluation, it was concluded that the staff housed in the Provincial House Abdijbeke could also be relocated to Provincial House Boeverbos as a new location, provided the necessary rearrangements were made in this building. Such a relocation operation meant that the Provincial House Abdijbeke (5200 m^2) became empty and could be disposed of by the Province of West Flanders.

In parallel to this portfolio exercise, a maintenance and energy performance contract (OEPC) was implemented on two large sites, namely the Boeverbos Provincial House site and De Gavers Provincial Domain. The investments amount to €2,900,000.

[7] https://factor4.eu/nl/stad-sint-niklaas-bespaart/

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6.4.2 Province of Vlaams-Brabant

In 2016, the provincial council of the province of Flemish Brabant decided to strive for a climate neutral province (territory) by 2040. This implies that the same objectives apply to the province as to an organisation. The own building portfolio plays an important role in this regard, in view of its energy consumption. The objectives of the 2020-2025 energy policy statement are the following for the entire building portfolio:

- 30% less energy consumption;
- 60% less CO2 emissions;
- Striving for 20% own renewable energy production;
- Exploring and integrating principles of circular construction;
- Using an internal CO2 price of €100 per tonne of CO2 in investment decisions.

The provincial real estate portfolio consists of 10 sites with one or more buildings. In the course of the FALCO project, 17 renovation and/or renewable energy projects were realized in 8 of the 10 sites mentioned. The investments amount to €4,500,000.

6.4.3 City of Sint-Niklaas

The city of Sint-Niklaas intends to become climate neutral by 2050. To contribute to this ambition, it has implemented the 'new EPC' approach on a package of 8 municipal buildings, having a total floor area of ca. 50,000 square meters. The selected buildings will have their energy cost reduced by 39%. The corresponding investments amount to €7,700,000.

The tender was launched in 2020. The ESCO was appointed in 2021 and is currently implementing the energy retrofit measures.

6.5 Lessons learned

6.5.1 Solutions to be sought beyond finance in the strict sense.

When reflecting upon how to finance ambitious energy retrofits in the built environment, it was concluded that targeting a climate-neutral building stock by mid-century is a vastly different endeavour compared to gradually improving the energy efficiency of individual buildings. Whereas investing in energy efficiency measures in the past was often approached in terms of identifying a sensible mix of measures per building, resulting in a business case with an affordable payback time, obtaining a carbon-neutral portfolio by 2050 is a truly strategic exercise, going beyond the competence of the technical departments that are in charge of facility management. The exercise should dare to question the functional needs of a local authority. This is likely to entail a political discussion about the choice of amenities to be delivered to the citizens, and about the corresponding infrastructure needed to provide these amenities.

The strategic real estate management approach proposed above was already partly tested in the framework of the FALCO project (case Province of West-Vlaanderen).

As part of the SURE2050 project (www.sure2050.be), the approach will be further tested and refined accordingly.

6.5.2 Lack of human resources is key hurdle

Based on contacts with local authorities, it seems that the local authorities acknowledge that the

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introduction of strategic portfolio thinking within their organizations is a useful direction to take when decarbonizing their building stock in a cost-effective way. At the same time, many local authorities indicate that they do not have sufficient capacity – in terms of FTE – nor the expertise to conduct this exercise. Therefore, all initiatives that help unburden the municipalities are welcome: e.g., centralized tenders for supporting advisory services, one-stop-shops providing access to contractors (e.g. EPC contracts), improved EPC contracts that enable them to implement deeper energy retrofits than the current EPC contracts.

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7 Conclusions and lessons learned

From a long list of possible breakthrough projects, 4 breakthrough projects have been selected in order to develop a financing solution that could lift the barriers the building owners are experiencing.

For 3 of these breakthrough projects, final financing solutions have been developed. For the breakthrough project on social housing, the legal barriers have prevented us from developing a financing solution for the Flemish situation.

The financing of 2 of the breakthrough projects has been implemented in order to realise investments. For the breakthrough project on energy renovation of private houses, negotiations are still going on between the Flemish government and the EIB in order to decide whether a common fund can be set up for the financing of the investments needed in order to accelerate and deepen the energy renovations of private houses.

For the breakthrough project on small and medium enterprises, and the breakthrough project on public buildings, the financing solutions that were developed during the FALCO project have been tested and are now being upscaled to new investments.

In the paragraphs below, we first present a barrier-solution matrix that was developed during the first phases of the FALCO project in order to help develop a relevant financing solution.

7.1 Barrier-solution matrix

Start from the problem, not the solution

Building an effective financing solution starts with clearly describing the financing problem that needs to be resolved. This means that we need to identify the key financing barriers applicable in the case at hand, and analyse these barriers in depth in order to identify their underlying causes. This problem identification and analysis is essential to allowing an efficient search for an effective solution to the financing problem at hand.

The barrier-solution matrix, presented in Figure 8, was construed to facilitate the identification of relevant building blocks that will help you design a solution that addresses the financing problem, starting from the result of the problem analysis.

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micro	meso	macro		Financing solution \ Ambition level	Return deemed insufficient			Cashflow problem			creditworthiness is insufficient			Status quo of credit position/lending capacity			Economic lock-in			Financing project development costs		
					L	M	H	L	M	H	L	M	H	L	M	H	L	M	H	L	M	H
x	x	x	1	Aggregation/Bundling	+++	++	+	+	+	+	+	+++	+++	0	0	0	0	++	++	++	++	++
x			2	Intracting – contracting	+	++	+++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	x	x	3	Climate plan benefit contribution	0	+	++	0	+	+	0	0	0	0	0	0	0	0	0	+	+	+
		x	4	Deferment of payment of revenues from sale of EUA to industry	0	0	0	++	++	++	++	++	++	+	++	+++	0	+	+	++	++	++
x	x	x	5	Guarantee – Credit risk	+	++	++	0	0	0	+	++	++	0	0	0	0	0	0	0	0	0
x	x		6	Performance guarantee – performance risk	+	++	+++	+	+	+	+	+	+	0	0	0	0	0	0	+	+	+
x	x		7	Third party financing	0	0	0	+	+	+	0	0	0	+	++	++	+	+	+	+	+	+
	x	x	8	Retention of subsidies	0	0	0	+++	+++	+++	++	'++	++	0	0	0	+	+	+	+	+	+
	x	x	9	Credit Default Swap	0	0	+	0	0	0	0	+	++	0	0	0	0	0	0	0	0	0
x	x		10	Optimisation of use of real estate	+++	+++	+++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+
	x	x	11	Compensation mechanism (flexibility mechanism)	++	++	++	0	0	0	0	0	0	+	+	+	+	+	+	0	0	0
x	x		12	Sale & lease back	0	0	0	++	++	++	++	++	++	+	+	+	++	++	++	+	+	+
x	x		13	Usufruct & lease back	0	0	0	++	++	++	++	++	++	+	+	+	++	++	++	+	+	+
	x	x	14	PACE (Property Assessed Clean Energy)	0	0	0	++	++	++	++	++	++	++	++	++	+	+	+	0	0	0
	x	x	15	On-bill financing	0	0	0	++	++	++	++	++	++	++	++	++	+	+	+	0	0	0
x			16	Factoring	0	0	0	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0
x	x	x	17	Securitisation	+	+	+	++	++	++	0	0	0	++	++	++	+	+	+	0	0	0
x			18	Forfaiting	+	+	+	++	++	++	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	19	Domestic offset projects	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	20	Green investment scheme/domestic greening	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+	+	+
x	x	x	21	Pay-for-performance (alternative investment)	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	+	+	+
x	x		22	Equity injection	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
x			23	Flexible loans	0	0	0	++	+	0	0	0	0	0	0	0	+	0	0	0	0	0
x			24	Loan with below market interest (form of concessional loans)	+++	++	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x	x		25	Community Land Trust	0	0	0	0	0	0	+++	++	++	+++	++	++	+	++	++	0	0	0
	x		26	Hybrid Housing market	0	+	++	0	+	++	+	+	+	+	+	+	+	++	++	0	0	0
	x	x	27	Debt Fund	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	28	Equity Fund	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	29	Pledge funds	0	0	0	+	+	+	0	0	0	++	++	++	+	+	+	0	0	0
	x	x	30	Insurance	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	x	x	31	Green Bond (Plus)	0	0	0	+	+	+	0	0	0	+(++)	+(++)	+(++)	+	++	++	0	0	0
x	x		32	Crowdfunding	+	+	+	0	0	0	+	0	0	+	+	+	0	0	0	+	+	+
x	x		33	Crowdsourcing	+	+	+	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+
	x		34	Grouped purchase	+++	++	++	+	+	+	0	0	0	0	0	0	+	+	+	+	+	+
	x	x	35	Membership Card System	+++	++	++	+	+	+	0	0	0	0	0	0	+	+	+	+	+	+
	x	x	36	Joint incentive	++	++	+	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+
	x	x	37	Green Flexible Reward	+++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	+	+	+

Figure 8: Barrier-Solution Matrix

Key features of the barrier-solution matrix

The barrier-solution matrix (BSM) builds on 2 central components: a list of barriers and a list of solutions.

Based on a literature review of the most common financial barriers for energy-efficiency investments, we found that the many different barriers and their variations can be condensed to 6 fundamental investment barriers from the point of view of the investor. These barriers are as follows: return deemed insufficient; cash flow problem; creditworthiness insufficient; status quo of credit position/lending capacity; economic lock-in; and project development costs. The guidance document accompanying the BSM describes these fundamental barriers and maps their most common causes/driving factors.

We also listed around 40 different solution types that address the barriers identified. The guidance document accompanying the barrier-solution matrix describes the key features of each of these solutions and – where relevant – points to practical experiences or further readings with regard to these solutions. Obviously, this is a dynamic list that can be evolved with new innovative solutions.

Building a bespoke financing solution using the barrier-solution matrix

A particular energy investment will often have multiple financing barriers. Hence, developing a bespoke financing solution will normally require a combination of different complementary solutions from the BSM. The financing solutions presented in previous chapters illustrate such a combination of different solutions and form the building blocks that can be combined into a coherent and effective financing solution.

Of course, a particular barrier may have multiple alternative solutions, and not all of these solutions will always be equally relevant to address this barrier in each case. Their relevance may notably depend on factors as diverse as the investment ambition or the scale of the investment considered. Hence, to further facilitate a swift identification of relevant solutions (building blocks) for a particular case, we introduced the following elements in the BSM:

- An indication of the scale at which a solution may be relevant: micro (an individual project); meso (a portfolio or programme of investments – i.e., multi-project & single period); and macro (a system transition: multi-project & multi-period). For each of these scale levels, we indicate (with x) whether the proposed solution is relevant for a particular scale. For example, solutions that are relevant for financing 1 apartment block (micro scale), will differ from solutions that may be relevant for the renovation of a portfolio of apartment blocks (meso scale), or solutions that are aimed at financing apartment renovation in an entire region over a longer investment period (macro scale).
- An indication of the ambition in terms of reducing energy consumption. We consider the following ambition levels : low (up to 20% reduction); medium (between 20% and 60%) and high (>60%). Indeed, whereas some solutions may well address barriers for low ambition levels, they may be inadequate for addressing the same barriers given a higher ambition. For example, a soft loan with a 10-year duration may alleviate cashflow problems for low ambition levels (requiring limited investments and thus small monthly instalments), but it will hardly solve cashflow issues for high ambition levels requiring substantial investments.
- A scoring system ranging from 0 (not relevant) to +++ (highly relevant) to indicate the extent to which a particular solution is relevant to addressing a particular barrier for a given ambition level.

7.2 Lessons learned from developing and implementing financing solutions for ambitious climate actions

In addition to the specific lessons learned at the level of each individual solution, we formulate a number of overarching lessons.

Source regionally, allocate locally

The Falco project was aimed at financing local climate change objectives. However, this does not mean that the regional authorities have no role in securing such financing solutions. Indeed, for several solutions, we rapidly found that the relatively small size of local authorities leads to sub-optimal solutions when each local authority tries to source finance individually. To bypass that problem, we tried to work with groupings of local authorities so as to pool their resources. However,

this led to a number of other problems and increased the overall complexity. Furthermore, economies of scale and scope pointed to the Flemish region as a more optimal scale for the design of a financing solution.

Building on our experience in the Falco project, we propose to review the casting of roles between the regional and local authorities along the following lines:

- The regional authority is in charge of the organisation and the coordination of the pooling (equity) and sourcing (debt) of the funding applied for by the local authorities to execute their local climate action plans. Such regional sourcing allows optimal use of economies of scope and scale and facilitates the interaction with financial markets (single point of contact).
- The local authorities allocate the centrally sourced funding to local investment needs, in accordance with the commonly agreed upon conditions (e.g., use restricted to climate-related investments). In this way, local authorities can allocate centrally sourced funds taking their local climate change plans (local autonomy) into account.

Need for a long-term shared vision and strategy on financing ambitious climate objectives

The current energy financing landscape is still characterised by an important focus on voluntary action, as opposed to using more normative or economically (taxes) driven instruments. This leads to a sub-optimal use of public resources, notably because of the Matthew effect combined with the limited added value of, for example, a 0% loan in a period of historically low interest rates. This focus also diverts attention from the fact that approximately 50% of homeowners are not able to finance a deep renovation. Building solutions addressing the financing needs of this segment is a condition precedent to achieving our climate ambitions.

Moreover, the energy financing landscape is very fragmented in terms of vision, strategy and practical instruments. This absence of shared direction has led to a myriad of climate funds, subsidies and ad hoc stand-alone solutions at both local and regional levels, increasing the management cost and reducing the effectiveness of these fragmented actions. While these stand-alone solutions have resulted in interesting experiments, isolated financing initiatives have hardly ever known a significant upscaling.

The above 2 elements are indicative of the urgent need for a full-fledged financing vision and strategy on how the Flemish region as a whole will finance the transition to a climate neutral society. This will notably require building a shared vision on the role of the societal actors with regard to financing, including local and regional authorities; and the translation of that vision into a financing strategy and solutions that are able to achieve the ambitious climate objectives of both the Flemish region and the local authorities.

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