Financing the Energy Transition in Dutch Co-owners Associations

A financing framework using public and private instruments for deep energy renovation

(own photo, 2025)

Estelle Gfeller
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Colophon

Student:

Name	Estelle Anouchka Gfeller
Student number	4867521
Date	21-01-2026

University:

University	Delft University of Technology
Faculty	Architecture and the Built Environment

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Super visors:

First mentor	Erwin Mlecnik
Second mentor	Michael Peeters
Third mentor	Ragy Elgendy

Preface

This thesis is the final step in my master's programme and follows from my practical experience at BKT-advies and BRIK Vastgoedmanagement, where I support co-owners associations in renovation and sustainability projects. In many conversations with boards and owners, I heard the same question over and over again: ‘We want to make our building more sustainable, but how do we organise and finance this within the co-owners association?’ This repeated gap between ambition and financing inspired me to focus this research on the financing of deep energy renovations in co-owners associations and to develop a framework that can actually support boards in making well-considered decisions.

I would like to thank my thesis supervisors for their guidance and critical feedback. Looking back on the process and the graduation period, I would especially like to thank them for their patience. I would also like to thank the participating co-owners associations and experts for sharing their time and experience, and my colleagues at BKT-advies and BRIK for their practical support and for providing a practical context in which to test my ideas. I hope that the results of this thesis will not only meet academic standards, but will also be useful in practice for those involved in the energy transition in multi-owner buildings

‘’*If this framework even helps to end one assembly meeting before 22h, it will have been worth the effort.*’’
Estelle Gfeller

Abstract

Buildings owned and managed by Dutch co-owners associations are a big part of the national housing stock and play an important role in achieving energy and climate targets. Yet, many struggle to finance energy renovations. This thesis asks: How can co-owners associations in the Netherlands overcome financial barriers to their energy transition with the support of public-private financial models?

In order to answer the main research question, four subquestions are created. The first sub-question clarifies the demand side by mapping the financial barriers. The most significant barriers for co-owners associations are high up-front costs, difficult collection of funds, and lack of sufficient funding. The second sub-question, also done by desk research, defines available financial models for Dutch co-owners associations. In the Netherlands, we have public and private financial resources. Across these models, the key differentiators are who pays the investment costs upfront, how costs are recovered, and how savings or revenues flow back. The allocation of risk also differs. After the sub-questions that involve desk research, the third sub-question involves a first round of semi-structured interviews with co-owners association board members and Dutch financing experts. The outputs are used to create a financial instrument framework. This framework is intended to support co-owners associations in selecting a financing route for deep energy renovation. The framework consists of four sequential steps: (1) Project and barrier profile, (2) Finance-ready dossier, (3) Selection of financial instruments, and (4) calculate and compare net monthly impact. The last sub-question validates the framework model by a second round of interviews with the co-owners association board members and financial experts. The feedback is implemented and used to refine the framework.

This qualitative, multi-method design delivers five outputs: (a) Overview of barriers (b) and opportunities for co-owners associations, (c) a list of design requirements from the board members to provide financing models, and (d) a financing instrument framework that structures decision-making and documentation for financing deep renovations (e) policy recommendations resulting from the synthesis of the analytical and empirical research. The main output is a practical framework that supports co-owners associations to compare relevant public and private instruments, understand their eligibility and data requirements, and structure a finance-ready dossier. In doing so, the framework reduces the risk of missing requirements and supports associations in making informed funding decisions for their energy transition. For policymakers, the findings are translated into actionable guidelines aligned with the Co-owners Association Acceleration Agenda. For financial experts, the framework and finance-ready dossier concept improves communication with co-owners associations.

Keywords

Co-owners association, energy transition, financial barriers, financial models, public instruments, private instruments, deep energy renovation, financing framework

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Terminology

Customized co-owners association energy advice (Maatwerk VvE Energieadvies, previously EPA-advies)
Maatwerkadvies, a customised energy recommendation, is a certificate based object oriented plan that provides an overview of the current insulation status, appropriate energy saving measures, and sustainable heating options, including costs, effects, and implementation packages (Propendum BV, 2024).

Deep energy renovation
Deep energy renovations, or deep renovations, are large scale upgrades, mostly focusing on the shell, to buildings that aim to achieve energy savings, reducing more than 60% of the energy use compared to before the deep energy renovation (BPIE, 2021).

Energy label
Official rating of a dwelling's energy performance. It is ranked from A++++ to G and determined with the NTA 8800 calculation method. Labels remain valid for 10 years (RVO, 2021).

Financial barriers
Barriers related to financing the energy transition of COA (Elgendy et al., 2025).

Financial instrument
The product is used inside a financial model. Instruments are the elements you need in order to form a financing model (BASE, 2019).

Financial model
A structured way to fund, organize and allocate risks to execute deep energy renovations. A financial model specifies who pays upfront, how payments can be done, how cash flows back, who carries risks, and for how long (BASE, 2019).

Financial framework
A practical comprehensive tool that helps assess and choose financial models (calculator, affordability model, guideline framework, checklist, template, conditions, etc) (BASE, 2019).

Co-owners association (COA)
Dutch legal body through which apartment-right owners jointly manage, maintain, and insure the common parts of a building. Membership is mandatory and automatic when buying an apartment right (Ministerie van Algemene Zaken, 2025).

Co-owners association board
Elected owners who execute GAM decisions and represent the COA. Operations include: contact person for the COA, mandate for a specific budget for certain activities within the COA, make decisions for the COA (Vereniging Eigen Huis, n.d.a).

Co-owners association manager (external)
Technical/administrative professional guidance hired by the COA. Advises and prepares documentation but does not decide (Vereniging Eigen Huis, n.d.a).

Housing association

Institutional owner when it holds one or more apartments in a mixed-ownership COA. It participates as a member with voting rights per the deed, pays its proportional share, and can contribute professional capacity (Vereniging Eigen Huis, n.d.a).

Lender
Any financier providing debt to the COA: public (Warmtefonds, SVVE, municipal facilities) or private institutions (banks, investment funds).

Measurement & verification (M&V)
The process of planning, measuring, collecting and analyzing data to verify and report energy savings from implemented measures (Tanguay, n.d.).

NTA 8800
Building energy performance standard. Dutch national method for calculating building energy performance. Basis for energy labels and compliance with 'Europese richtlijn Energieprestatie Gebouwen' (EPBD) (NTA 8800 - Gebouwenergieprestatie (EPG), 2025).

Policy recommendations
Evidence based suggestions or proposed actions intended to guide policymakers, financial institutions, and sector organisations in improving the regulatory and financial conditions that enables co-owners associations to undertake deep energy renovations (Dictionairy Cambridge, 2025).

Public instruments
Government provided or public financial support (subsidies and low interest loans). These instruments lower upfront costs and provide affordable debt (Vereniging Eigen Huis, n.d.c).

Private instruments
Capital provided through private lenders, mostly banks, but also other financing providers, via loans or third-party financing arrangements. Terms are usually commercial and can invlove higher interest rates than public instruments (Vereniging Eigen Huis, n.d.c).

Procurement
Procurement and contracting structures describe how renovation projects are organised and how responsibilities, risks, and ownership are allocated between the association and external parties (European PPP Expertise Centre, 2012).

Quorum
Minimum share of voting rights that must be present or represented at the general assembly meeting to validly make decisions (VvE-Belang, 2024).

Subsidy agency
Public body or programme operator that assesses applications, sets eligibility and evidence requirements, issues award decisions, and pays funds.

Sustainable Multi Year Maintenance Plan (SMYMP)
A SMYMP brings energy measurements and maintenance planning together for buildings. It includes measurements that are needed to obtain at least energy label C. For each action the plan determines whether it should be carried out as a separate project or aligned with the regular maintenance to limit cost (Vereniging Eigen Huis, n.d.b).

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1. Introduction

1.1 Introduction

The urgency of climate action is widely recognised. Climate change refers to long-term shifts in temperature and weather patterns, mainly caused by human activities such as burning fossil fuels, deforestation, and industrialisation (Horamo & Semebo, 2022). These activities release greenhouse gases like CO_2 and methane that trap heat and raise global temperatures. Over the past century, average temperatures have increased, leading to melting ice, sea-level rise, and more frequent extreme weather (Horamo & Semebo, 2022).

Urban areas are especially affected, experiencing higher temperatures than surrounding rural areas due to dense infrastructure and limited vegetation (Santamouris et al., 2014). These changes highlight the need for action across all sectors to mitigate the effects of climate change (Santamouris et al., 2014).

International and national policy frameworks set clear targets. The 2015 Paris Agreement aims to limit warming to well below 2°C (United Nations, 2015). The European Green Deal sets climate neutrality by 2050 and at least 55% emissions reduction by 2030 (The European Green Deal, 2020). In the Netherlands, the Dutch Climate Agreement outlines sectoral strategies for emission reduction, including a strong focus on energy efficiency in buildings and the integration of renewable energy systems (Ministerie van Economische Zaken en Klimaat, 2019).

In order to achieve these climate goals, an energy transition is essential (United Nations, 2015). It involves a shift from fossil fuels, improving efficiency, and adopting sustainable practices across all sectors. The building sector could play an important role in this energy transition, as buildings are highly energy intensive due to outdated energy systems and inefficient insulation in many buildings (CBS, 2025). In 2023, buildings in the Netherlands emitted about 17.3 megatons of CO_2 (= 11.9% of national emissions), compared with an EU estimate that buildings account for =36% of emissions (CBS, 2025). As seen in the figure below, residential buildings emit nearly twice as much CO_2 as the commercial segment, and although both are trending down, the decline must accelerate to achieve climate neutrality in 2050.

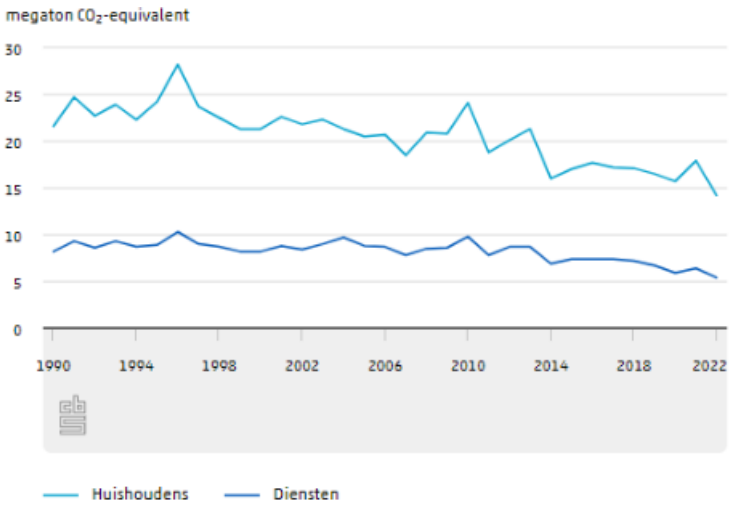


Figure 1: Fossil fuel emission in the built environment (CBS, 2023)

In the Netherlands, there are over 8 million dwellings, and since 2021, it has been mandatory for each dwelling to have an energy label (RVO, 2021). About 1.4 million dwellings are located in multi-owner apartment buildings (CBS, 2023). Those multi-owner apartment buildings, owned collectively through co-owners associations, which can be defined as ‘a collective legal entity of multiple property owners in a shared building that manages and maintains common property’ (Wetten.nl - Regeling, 2024). There are over 135.000 co-owners associations, each consisting of more than one household (CBS, 2024). These co-owners associations are responsible for maintaining the common areas, such as the facade, hallways, common rooms, and the roof.
Currently, only 66% of all dwellings in a co-owners association in the Netherlands have an official energy label (CBS, 2023). This is shown in figure 2. The lower the energy label, the more measurements are required in order to improve the energy label.

These responsibilities regarding maintenance involve complex decision-making processes (Ebrahimigharehbaghi et al., 2020). Examples are, consensus among multiple owners who may have different priorities and budgets. This complexity often results in delayed or inadequate action on deep energy renovations, which results in contributing to the slow progress in the energy transition among co-owners associations (Ebrahimigharehbaghi et al., 2020).

Deep energy renovations offer large scale upgrades, upgrade the energy label, and improve the energy performance of buildings (BPIE, 2021). Retrofitting buildings with modern insulation, efficient heating and cooling systems, and renewable energy installations like solar panels and heat pumps can cut energy use and emissions (ISDE, 2025).
Deep renovations, mostly focusing on the shell to buildings, aim to achieve energy savings reducing more than 60% of the energy use compared to the current condition (BPIE, 2021). Ebrahimigharehbaghi et al. (2020) explains the difference between renovation (interior/exterior works) and energy efficiency renovation (facade, systems, and renewable measures). Deep renovations refers to the packages of the energy efficiency renovation from table 1.

Type of renovation		Subtype of renovation
Renovation	Exterior	Roof construction/covering, Gutters/ drainpipes, Masonry/ jointing of the façade, Wood/ painting outside, new installation/ extension, Foundation repair
	Interior	Inner walls, Kitchen, Toilet and bathroom, Paint / wallpapering / tiling, electricity
Energy efficiency renovation		CV boiler, ventilation, roof insulation, glass insulation, floor insulation, facade/ cavity insulation, insulation of the pipes, solar panels, solar water heater, heat pump

Table 1: Categorisation of different types of renovation (Ebrahimigharehbaghi et al. 2020)

However, the current annual deep renovation rate of the residential building sector stands at 0.2% per year (BPIE, 2021). To align with climate goals and achieve neutrality by 2050, the deep renovation rate must accelerate to 3% per year (BPIE, 2021). Raising energy labels (label A+++ to G scale) through deep energy renovations can cut emissions, lower energy bills, and increase property value (Mawed, 2023). According to the Rijksdienst voor Ondernemend Nederland (RVO) (2024), almost 1.5 million dwellings remain in lower label classes (D to G).

Within the residential stock, 1.4 million dwellings are part of co-owners associations (CBS, 2024). These associations make collective decisions on maintenance and investments. Because the energy label improvements in these buildings depend on the associations decisions, accelerating energy label upgrades and deep renovations runs through co-owners associations (Ministerie van Economische Zaken en Klimaat, 2019). Figure 2 compares the energy label distribution of dwellings that are part of a co-owners association with the

distribution for those dwellings that have a valid energy label. It shows that the co-owners association distribution is characterised by 35% unknown labels and around 50% of lower energy labels (CBS, 2023).

This creates both a challenge and an opportunity. The challenge is to deliver deep energy renovations that cut minimum 60% of the primary energy use, while the opportunity is in improving energy efficiency across the building stock to meet the Dutch climate targets (BPIE, 2021).

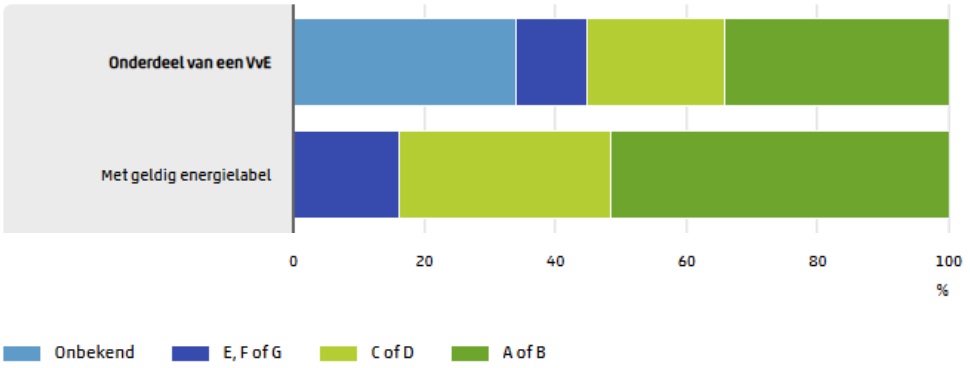


Figure 2: Valid energy labels dwellings (CBS, 2023).

Regulatory developments make it more urgent for co-owners associations to take action. Since 1 January 2023, the Netherlands has already applied a minimum energy performance requirement of at least energy label C for most office buildings (> 100m2). This shows how label-based standards can become compulsory and be implemented (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 2024). In the housing sector, a minimum energy performance requirements are being developed for rental properties (minimum label D from 2029) (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025a). Although there is currently no mandatory label restriction, the trend is towards stricter performance standards over time.

1.2 Research context

This thesis is informed by experience gained through work and an internship at BKT-advies/Brik VGM, an engineering company specialised in project management within the built environment, with a particular focus on co-owners association management. Co-owners association management refers to the administrative, financial, and operational processes by which a co-owners association governs and maintains its shared property, including decision-making, financial planning, contracting, and compliance with legal and technical standards (Ministerie van Algemene Zaken, 2024).
In addition, BRIK VGM supports this research by facilitating research opportunities and sharing knowledge from its repository.

Scope
This thesis focuses on all Dutch co-owners associations that aim to undertake deep energy renovations but do not have the financial resources to execute the deep energy renovations.

According to Elgendy et al., co-owners associations face several barriers in undertaking energy renovations (2024a). These barriers could be categorised into technical, financial, social and legal challenges as presented in the table below.

Category	Barrier
Financial barriers	High-upfront costs (FB1) Difficult collection of funds (FB2) Lack of sufficient funding (FB3) Split incentives (FB4) The financial burden for individual homeowners (FB5) Condominium managers Business case (FB6) Higher service costs after renovation (FB7) Pre-existing Physical defects in buildings (which leads to extra costs for repair) (FB8)
Legal barriers	Complex ownership structure (Division of the deed) (LB1) Limited access to financing due to complex regulations (LB2) Limited enforcement of regulations (LB3) Complex and multilevel regulations (LB4) Animal policies (ecological regulations) (LB5) Unregistered HOAs (LB6) Limited municipal resources (due to the legal structure of the municipalities) (LB7)
Social barriers	Collective decision-making is complex and lasts long (SB1) Lack of awareness and interest (SB2) Homeowner's behaviour towards renovation (different interests) (SB3) Lack of transparency and communication (SB4) Disturbance during renovations (SB5) Management by volunteer co-owners (SB6)
Technical barriers	Lack of technical know-how (TB1) Lack of Consistent and standardized solutions (TB2) Safety and seismic risks (TB3) Lack of quality assurance (TB4) Differences between predicted and actual savings (TB5) Technical challenges in older buildings (TB6) Limited storage and power grids (TB7) Lack of qualified advisors (TB8)

Table 2: Summary of barriers faced by COA during the ET (Elgendy et al., 2024b)

5.540 interviews with European co-owners association members (co-owners) in '*D6.1 Evaluating the development of integrated home renovation services for condominiums' were* held during the Condereno project (Elgendy et al., 2025), indicate that financial barriers are

most often identified as barriers related to the renovation of co-owners associations (Elgendy et al., 2025). This is shown in figure 3.

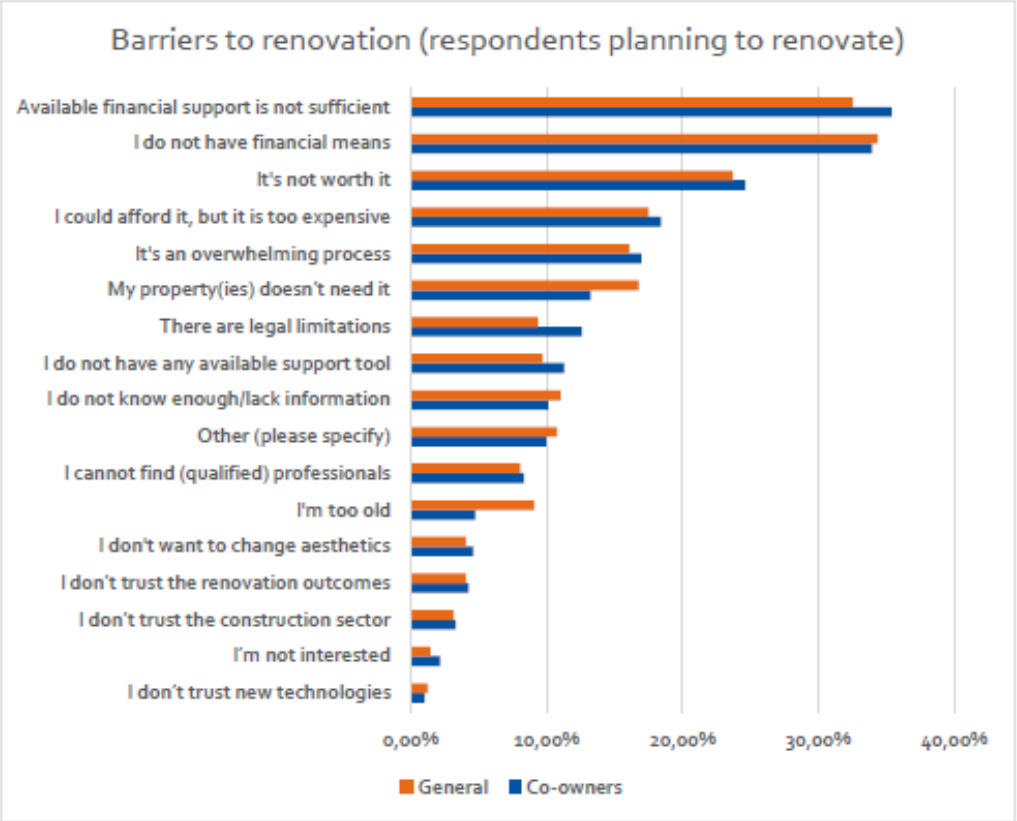


Figure 3: Barriers to renovation (Elgendy et al., 2025)

Therefore, this thesis will focus on the financial barriers faced by co-owners associations in implementing energy efficiency measures. Financial challenges, such as high upfront costs, difficult collection of funds, and lack of sufficient funding, are the most common challenges to energy renovations (Boza-Kiss et al., 2021). Without feasible financial solutions and opportunities, many co-owners associations cannot proceed with the necessary energy transition.

Financial resources are mechanisms that enable co-owners associations to fund deep energy renovations, which costs average €70.000-€100.000 per apartment (Warmtefonds, n.d.). This depends on the current condition of the apartment. Public finance includes government support such as subsidies. Repayments are typically added to monthly co-owners association contributions. Private finance may include reserve funds and bank loans. These options lower the high costs (Vereniging Eigen Huis, n.d.c).

Given the implementation pathway in the Dutch context, the study aligns its outputs with the Co-owners Association Acceleration Agenda. The Co-owners Association Acceleration Agenda is a national programme to accelerate the sustainability of co-owners associations by removing regulatory and financing hurdles (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025).

1.3 Research gap and problem statement

Dutch co-owners associations are expected to play a role in achieving national climate and energy targets, but deep energy renovations in this sector are progressing slowly. Existing studies highlight common barriers: high upfront costs, complex collective decision making, regulatory constraints, limited internal expertise to organise and manage such projects (Elgendy et al., 2024c). At the same time, lenders and public funds apply risk assessments. When the risks are high, access to financing becomes limited, making deep energy renovations projects difficult to realise (Steenkamp, 2024).

Recent research suggests that well designed and structured financial instruments and support structures can help mitigate financial barriers for co-owners associations (Steenkamp, 2024). However, in practice the guidance available to boards on how to prepare and use public and private financing routes is fragmented. This information is fragmented across separate instrument webpages such as the SVn of RVO. Existing sources describe for example only individual instruments or schemes, or provide information for co-owners in general. Existing information is rarely translated into an integrated, step-by-step approach that matches how co-owners associations actually prepare decisions and documentation. What is missing is an operational bridge between instrument design and the co-owners association practice:

- A clear overview of the requirements that public and private instruments impose on co-owners associations
- A translation of those requirements into concrete steps for boards to prepare a financing-ready dossier
- An assessment of whether such a framework is actually usable and meaningful for boards and the experts who support them

The problem is therefore not only that the financing conditions can be strict, but also that co-owners associations lack an integrated framework that helps them understand and meet these conditions, and that aligns with how they actually take decisions about deep energy renovations.

1.3.1 Research gap

The innovation of this research lies in producing two complementary outputs:

1. A financing instrument framework for co-owners associations that structures how boards can identify relevant public and private instruments, understand and meet the requirements, and assemble a finance-ready dossier for deep energy renovation.
2. Policy recommendations that translate these empirical findings and framework requirements into actionable measures for policy makers, lenders and sector organisations.

Together, these outputs provide an evidence based bridge between the financial supply side (public and private investment instruments) and the demand side (co-owners associations). They are intended to contribute to ongoing programmes such as the Co-owners Association Acceleration Agenda by supporting implementations and policy alignment (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025).

This leads to the main research question: "*How can co-owners associations in the Netherlands overcome financial barriers to their energy transition with the support of public-private financial models?".*

In this research, public-private financial models refer to structured financing routes that use public or private instruments to enable deep energy renovations in co-owners associations. A

financial model is understood as ‘a structured way to fund, organise and allocate risks’, specifying who pays upfront, how payments are made/collected, how cash flows back, who carries which risks, and for how long.

1.4 Research structure

This thesis starts with an introduction, including the research context, problem statement and the research structure. This provides the basis for the research.
After the introduction, the research design and methodology is explained. It describes how the research questions are answered and details the data collection through desk research and semi-structured interviews with co-owners association boards.
Chapter 3 presents the literature review, including the Dutch co-owners association context and the current energy performance of their building stock. It also discusses the relevant stakeholders, risks, and project timeline of the energy transition, because these aspects influence how renovation financing can be structured in practice. The chapter concludes with an overview of the main public and private financing instruments available in the nNetherlands. Chapter 4 outlines the theoretical framework used in this thesis.

In order to answer the main question, chapter 5 to 8 will address four gaps. From each gap follows a sub-question:

1. What are the financial barriers for Dutch co-owners associations to undertake energetic renovations to their condominiums?
2. What are the financial opportunities available for Dutch co-owners associations to undertake energetic renovations to their condominiums?
3. What data, regulatory, and operational requirements must Dutch co-owners associations meet to access public and private financing to undertake energetic renovations?
4. How do co-owners associations and financial experts perceive the usability and adoption of the proposed financing framework?

This thesis closes with a conclusion and reflection.
The research outline is visualised in the figure below.

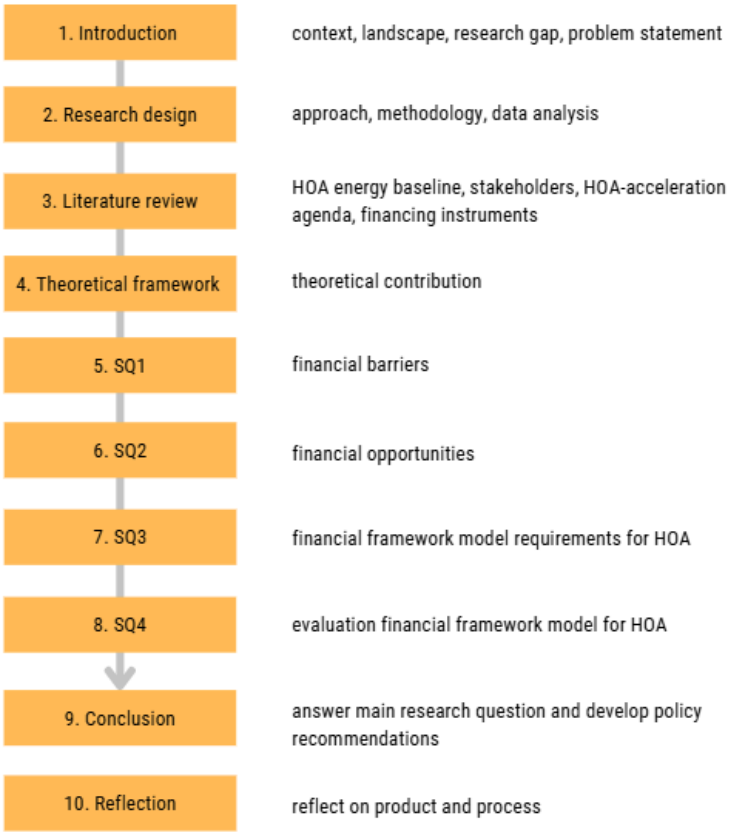


Figure 4: Research outline (own figure, 2025)

1.5 Research landscape

Figure 5 positions the research between the co-owners associations that demand for deep energy renovations as part of the energy transition. This is put out as the demand side of this research landscape.
Sub-question 1 identifies the financial barriers that hinder co-owners associations from realising deep energy renovations. These barriers create a gap between the demand for renovation and the availability for financing.
Sub-question 2 examines the financial opportunities for co-owners associations by identifying the financial models currently available in the Dutch context.
Sub-question 3 builds on these insights by developing a concept financing framework that links the financial supply side with the needs of the co-owners associations.
Sub-question 4 validates this framework with the co-owners association board members and translates the findings into an assessed framework, which aims to support decision making for co-owners associations when undertaking energetic renovations.

The financing framework positions financial models as a connection between supply and demand. On the supply side, public and private investments define the available financial models. On the demand side, co-owners associations express the need for deep energy renovations.

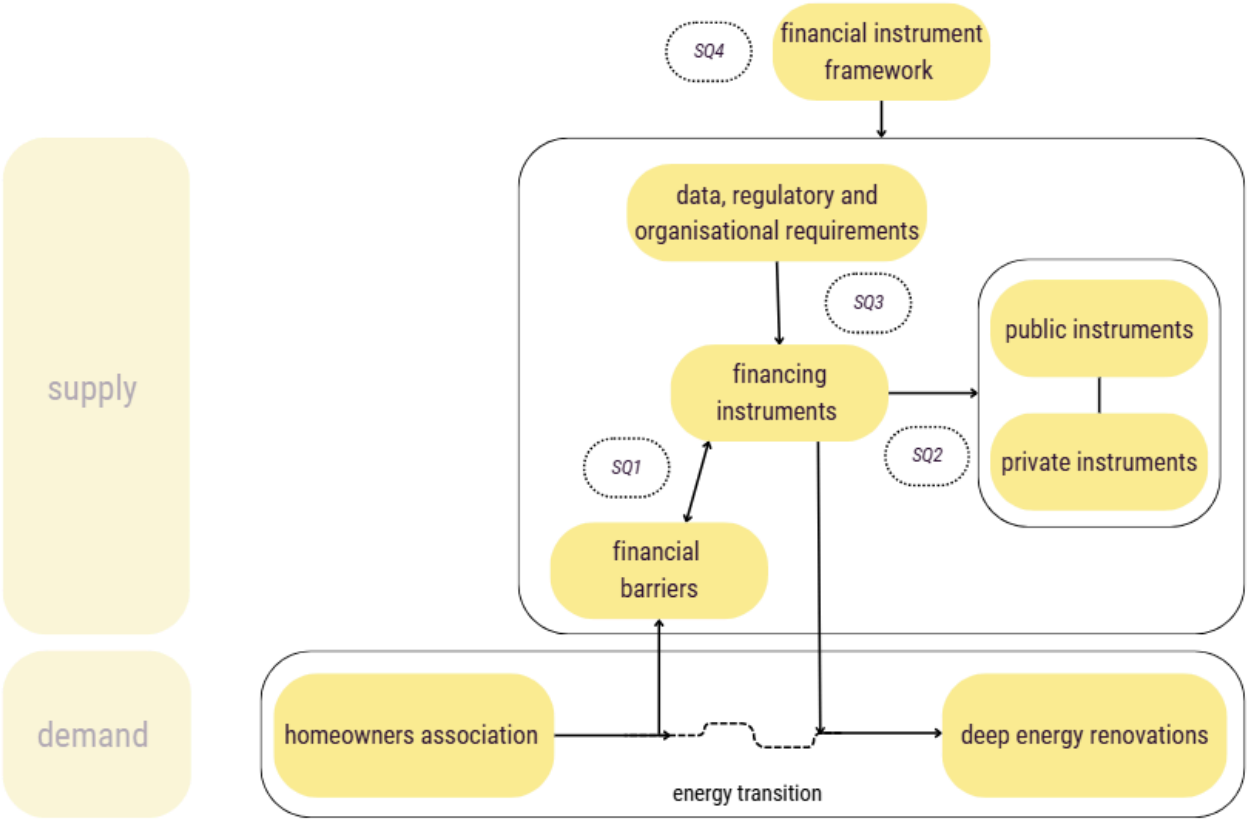


Figure 5: Conceptual framework (own figure, 2025)

The definitions in figure 5 involve:

- Co-owners association: Legal body of apartment-right owners that manage and maintain the common property. Membership is standard when buying an apartment right (Ministerie van Algemene Zaken, 2025).
- Deep energy renovation: Renovation aiming at least 60% of energy use reduction compared to the current energy use (BPIE, 2021).
- Financial barriers: Barriers for co-owners associations related to not sufficient available financial support to implement deep energy renovations (Elgendy et al., 2025).
- Financial model: A structured way to fund, organize and allocate risks to execute deep energy renovations. A financial model specifies who pays upfront, how payments can be done, how cash flows back, who carries risks, and for how long (BASE, 2019).
- Financial requirements: data, regulatory, operational and organisational requirements needed in order to create and operate a financing instrument framework.
- Public instruments: financial resources from government institutions which provide affordable debt (Vereniging Eigen Huis, n.d.c).
- Private instruments: loans from banks (Vereniging Eigen Huis, n.d.c).
- Financing instrument framework: a framework that acts as guidelines to support co-owners associations by overcoming financial barriers in their energy transition.

Based on this research landscape, this study supports co-owners' associations in their energy transition by developing a financing instrument framework that guides decision-making on financing routes, with the expectation that this will reduce financial barriers and enable progress towards deep energy renovations.

1.6 Societal and scientific relevance

1.6.1 Social relevance

This thesis is socially relevant because it translates climate and energy ambitions into concrete, achievable actions for Dutch co-owners associations. Instead of adding yet another general list of obstacles or instruments, it develops a framework for financing instruments that helps boards to:

- Gain insight into what data, documents and decisions are needed for financing,
- Create a “finance-ready file” for deep energy renovation, and

By making the financing process more transparent, the framework can help associations move from exploratory discussions to actual implementation. In doing so, it supports the objectives of national programmes such as the Co-owners Association Acceleration Agenda for co-owners associations and contributes to broader national climate objectives.

The expected social benefits go beyond CO_2 reduction. Better prepared and financed renovation projects can improve comfort, build quality and maintenance levels, while clearer information on monthly costs and the distribution of charges helps to protect vulnerable owners from disadvantages or surprises due to increasing contributions. The framework is explicitly designed to be practical for boards, managers and advisors who need to explain complex financial structures to residents in simple, concrete terms.

In short, the research aims to translate the energy transition into an understandable route for co-owners associations that have to make collective decisions.

1.6.2 Scientific relevance

From a scientific perspective, this research contributes to the literature on energy renovation and housing finance in several ways. First, it provides a structured, empirically grounded analysis of how Dutch co-owners associations experience financial barriers and incentives for deep energy renovation, using the Theory of Planned Behaviour as a sensitising concept. This adds nuance to existing work by showing how attitudes, subjective norms and perceived behavioural control are shaped not only by costs and payback periods, but also by governance arrangements, the quality of dossiers and concerns for vulnerable owners.

Secondly, the thesis empirically develops and tests a financing instrument framework that connects the demand side (associations and their decision-making processes) with the supply side (financial models, lenders and advisors). By translating instrument requirements into concrete dossier, regulatory and organisational conditions, it offers a conceptual model for how finance-ready renovation projects can be prepared in a multi-owner context.

Thirdly, the research provides new empirical evidence on the role of public lenders, technical advisers, process facilitators and housing associations in enabling or limiting financing. By examining their perspectives alongside those of the boards, the research shows how risk assessments, documentation practices, regulatory constraints and role descriptions interact in practice.

2. Research design

In the research design is the methodology, data collection, data analysis, data plan, ethical considerations and research output elaborated.

2.1 Research approach

This research consists of qualitative research, since it is focussing on qualitative aspects and does not take into account numerical data. The objective is to enhance the energy transition for co-owners associations with the support of financial investment models to overcome the financial barriers.
Figure 6 provides an overview of the research methodology. It is divided into the research sub-questions, their approach, and the expected outcome.

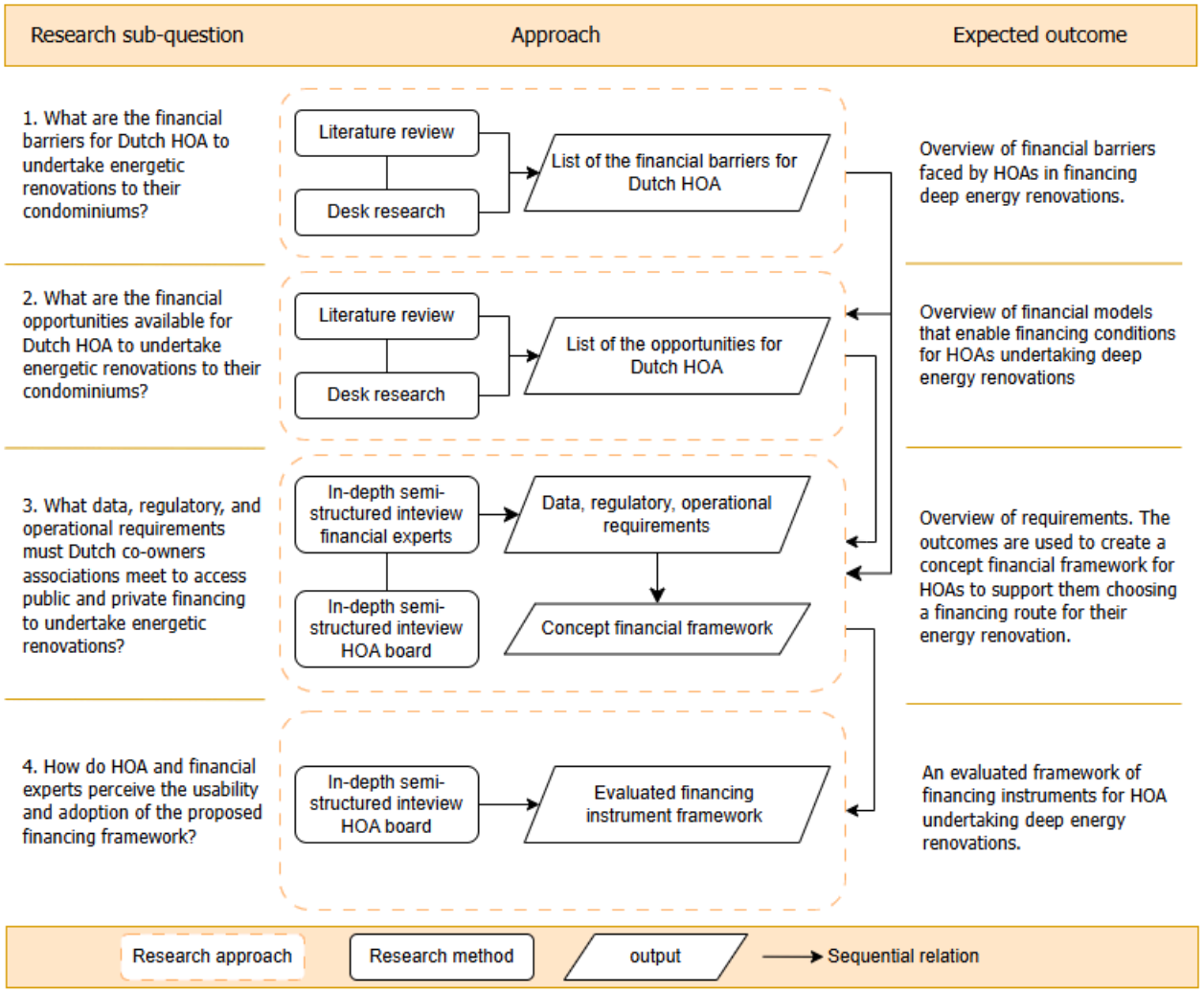


Figure 6: Research methodology (own figure, 2025)

The structure can be divided into a four-phase research design, following a double diamond structure: discover, define, develop, and deliver. Phase 1-2 scope the problem and evidence by opening up the research work, and phase 3-4 specify and validate the financial model requirements by narrowing down (British Design Council, 2005). How the double diamond Theory is applied, is explained in the theoretical framework 4.2.

2.1.1 Theoretical study

The literature review in chapter 3 establishes the initial situation, which represents the context and current state of Dutch co-owners associations. Through literature review and desk research, this phase maps:

1. Co-owners association management
2. The current stock profile and energy performance
3. Stakeholders in the energy transition
4. Co-owners associations acceleration agenda
5. Financial models during the energy transition

The outputs are an overview of the co-owners association practices in the Dutch context, the current state of the co-owners association building performances, and an overview of existing Dutch private and public instrument investments available for co-owners associations to fund their deep energy renovations.

2.1.2 Phase 1 & 2: Desk research

Desk research applied in phase 1 and 2, analyses what blocks the energy transition for co-owners associations related to the financial aspect and which practices can overcome it. Through deductive-inductive literature and desk review, this phase maps:

- Through sub-question 1, the financial barriers for Dutch co-owners associations. The high upfront costs, limited access to credit, reserve fund gaps, arrears risk, transaction/coordination costs, information gaps, and collective decision hurdles.
- Sub-question 2 examines the financial opportunities in the Dutch context. The opportunities concern financial models such as subsidies, loans, and other supportive funding instruments.

Hypothesis: co-owners associations face financial constraints, while public and private investments options are underused due to low awareness, process complexity, and unclear eligibility/documentation requirements. Phase 1, representing the divergent stage, uses a deductive evidence synthesis to specify these barriers. Phase 2 represents the convergent stage, in which opportunities are identified in the Dutch context. The first diamond translates the broad insights into concrete inputs and design principles that guide the subsequent empirical validation and framework development.

2.1.3 Phase 3 & 4: Empirical research

Phase 3 consists of empirical research addressing sub-questions 3 and 4. Sub-question 3 explores which data, regulatory and operational requirements enable Dutch co-owners associations to access public and private financial models and to progress deep energy renovations. In the first round of interviews with the board members, an initial set of requirements is identified. In addition, interviews with financial experts are conducted to add requirements derived from the experts' perspectives.

In this phase, the insights from phase 1 and 2 are refined through inductive analysis of the interview data. The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is used as a sensitising concept. The output of sub-question 3 is a conceptual financing instrument framework designed to support co-owners associations in selecting an appropriate financing route for deep energy renovation.

Sub-question 4 examines whether the concept financial instrument framework, developed after the first round of interviews with board members and financial experts, is usable and feasible for Dutch co-owners associations. Evaluation sessions are held with the same

boards through a second round of interviews and two relevant financial experts, in which the concept framework is presented and discussed. In this phase, two theoreties are applied. First, the Theory of Planned Behaviour is applied more explicitly to code. Second, Rogers' Diffusion of Innovation theory (1962) is used to assess the framework.

The output of sub-question 4 is a validated framework of financing instruments that supports co-owners associations undertaking deep energy renovations in identifying a suitable financing route. The structure of the framework is based on existing renovation service models such as WNR (WNR, 2024) and Oktave (Oktave, 2025). These models were used as design inspiration and then simplified and adapted based on the requirements derived from the interviews and the Dutch financing instruments for co-owners associations.

2.1.4 Conclusion

The 4 sub-questions are integrated to answer the main research question.
After the empirical research, the deliverables are:

- An overview of financial barriers and opportunities specific to Dutch co-owners associations.
- An evaluated financing instrument framework that supports co-owners associations choosing their financing options in their energy transition.
- A policy recommendation brief that lists concrete actions to reduce co-owners associations' financial barriers and to increase the volume and speed of financing for deep energy renovations. The brief specifies the problem addressed, the responsible body, implementation steps, timeline, and success metrics.

2.2 Research methodology

2.2.1 Data collection

The used data collection techniques are desk research and semi-structured interviews.

Sub-question	Desk research	Semi-structured interviews
1	x	
2	x	
3	x	x
4		x

Table 3: Overview data techniques per sub-question (own table, 2025)

2.2.2 Desk research

In order to set the basis of this research, desk research was conducted. Academic literature, (technical) reports, and policy documents are used to describe the situation of Dutch co-owners associations. Private and public financing mechanisms are examined.
The insights from desk research are used to set the theoretical framework which is the basis for the research design and the empirical research.
The list below gives an overview of how and why desk-research is used for each sub-question:

Sub-question 1:

- Scan of academic and policy literature on barriers for co-owners associations regarding (deep) energy renovation and financing.

Sub-question 2:

- Scan of academic and policy literature on financial opportunities and enabling conditions for co-owners associations.

Sub-question 3:

- Use insights from sub-question 1 and 2 to translate financial barriers and opportunities into concrete requirements for the framework.

Sources were conducted through databases such as Google Scholar, Tu Delft Repository, Elsevier, complementing by national services such as Rijksdienst voor Ondernemend Nederland and Nationaal Warmtefonds.
Search terms included: co-owners associations, VvE, energy transition, deep renovation, financial barriers, financial models, public-private investment models, European financing models, governmental policies for COA, and a combination of the terms.

2.2.3 Semi-structured interviews

Semi-structured interviews were chosen as a qualitative data collection method for sub-question 3 and 4. A semi-structured interview is a research technique that combines pre-defined guiding questions with the flexibility to explore new themes as they arise during the interview (Adams, 2015).

The purpose of these interviews for sub-question 3 is to establish the perspective of co-owners association board members and selected experts in the private and public investment field. The goal is also to investigate to what extent the board members are aware of existing financing options, how they perceive private and public instruments, and whether they would consider applying these options in practice. The experts are interviewed to explore what they, as experts, face during the sustainability processes of co-owners associations. In addition, a housing association manager, who also has the role of a professional co-owners association manager, was interviewed to share their experience regarding the deep energy renovations and its financing options within the co-owners associations.

The semi-structured interviews will take approximately 45-60 minutes. The interview questions were formulated in English, but all interviews were conducted in the participants native language to express themselves more freely. All interviews will be transcribed with consent. The collected transcription will be analysed after the interviews. Because of the semi-structured format, the discussion topics may change depending on the input of the participants, therefore the data will be manually analyzed after conducting the interview.

To answer sub-question 4, a second round of semi-structured interviews with the co-owners association board members and financial experts will be carried out. The aim of these interviews is to validate the financial instrument framework developed after implementing the input from sub-question 3. During the second round of interviews, their perception of the tool is assessed by using the TPB and the five attributes of Rogers Diffusion of Innovation theory (1962). The interviews will focus on how well the framework supports decision-making, whether the requirements and practices included are complete and relevant, and how the board members perceive the model.

2.2.4 Sampling strategy

A purposive sampling of co-owners association boards and finance experts was drawn from the project networks within BRIK vastgoedmanagement and BKT-advies.
This approach was chosen to include participants with direct experience of financing deep energy renovations. A detailed case description is included in chapter 7.

Co-owners association boards:
Board members were interviewed as proxies for their associations. Criteria were:

- Dutch co-owners associations
- Active intention to undertake deep energy renovations. It does not matter in what stage the project is at. It is also possible that the association has already implemented energy saving measures.
- Willingness to share in the research. Consent for interview and availability for the interview.
- Variation target of size bands: small to large co-owners associations, energy label is not relevant, as long as they have the ambition to undertake deep energy renovations.
- Ownership mix noted. Cases with a housing corporation as largest owner are eligible, the board must still consist of private owners.

Four co-owners associations were selected that together cover different phases in the renovation process:

Participants VvE	Case selection
COA board Amsterdam (16 co-owners)	Intends to enter the energy transition and is in the exploratory phase.
COA board Amsterdam (108 co-owners)	Participating in the energy transition and awaiting permits and contractors' total estimated costs.
COA board Zoetermeer (28 co-owners)	Intended to implement sustainability measures, but has been postponed due to insufficient support within the COA.
COA board Zoetermeer (20 co-owners)	Has implemented sustainability measures (PV-panels) in the past.

Table 4: Overview case selection/participants COA-boards semi-structured interviews (own table, 2025)

Two of the four associations are mixed-ownership associations in which a housing association holds a large ownership shape. This affects the decision making, but does not change the financial constraints or eligibility criteria for instruments analysed in this research. Therefore, the ownership mix is reported as a characteristic of the case and discussed when it helps to interpret differences between cases, rather than being treated as a separate analytical focus.

Because financial barriers occur across associations in all sizes, no size-based limits were applied. Size effects are discussed in the results only where they appear to be relevant. The associations are located in Amsterdam and Zoetermeer. In one case (Zoetermeer 20), only the first round interview could be used. The second round interview was cancelled due to circumstances.

Financial experts

To complement the boards' perspective, financial experts were selected based on variation in organisational and functional roles related to co-owners associations financing. Criteria were:

- Direct related with COA and their financing decisions
- Active involvement and experience in the financing process of COA
- Able to speak, consent for interview, and availability for the interview

Four financial experts were selected:

Participants: financing experts	Case selection
Participant 1	Advisor at SVn
Participant 2	Project manager at BKT-advies related to COA and their energy transition
Participant 3	Professional manager at housing association for social housing and co-owners associations
Participant 4	Financial advisor at VvE-Transitie related to COA and their energy transition

Table 5: Overview case selection/participants financing experts semi-structured interviews (own table, 2025)

This combination of four experts provides variation across lenders, advisors, the housing association and professional management.

For the second round interviews with three of the four board members and two of the four experts were conducted. BKT-advies and VvE-Transitie were included in this second round because they directly guide co-owners associations through renovation and financing processes and could assess how the framework fits their practices. SVn was not interviewed again, as it primarily acts as a lender rather than a process supervisor, and the QuaWonen association manager indicated that in-depth project guidance lies outside his mandate and is outsourced to external parties.

2.3 Data analysis

This research applies a qualitative data analysis approach to interpret the semi-structured interviews conducted with co-owners association boards and financial experts. The goal is to identify patterns, perceptions, and factors that influence the financing process for deep renovations, as well as to evaluate the usability of the developed framework model.

2.3.1 Analytical process

The interview data will be analysed in 6 steps adapted from Braun and Clarke (2006).

Phase	Description of the process
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Table 6: Clarke and Braun's Six-step thematic data analysis process (Braun & Clarke, 2006)

1. All interviews are conducted online or by phone and audio-recorded with consent. Recordings are automatically transcribed and then manually checked for accuracy, and anonymised. With the help of AI, the transcripts have been made readable and 'stopwords' and 'filler words' have been removed.
2. In the second step, transcripts are coded manually by highlighting short phrases or sentences. Coding is TPB-informed and uses intention as an outcome to interpret how these factors combine; codes remain flexible to capture context specific requirements and constraints for finance-ready dossiers (Ajzen, 1991). An adapted version of the same categories is made for the co-owners association and financial experts.
3. Once all the transcripts are coded, the codes are grouped by frequency to discover patterns. The codes are connected to short phrases or sentences to avoid long coded segments.
4. The frequency reveals a pattern. These patterns translate the information from the interviews into concrete output for the framework model.
5. This data from the interviews will be used to create a (concept) framework as a product for the co-owners associations.

6. The last step links the empirical findings to the overall aim of the thesis. The financial instrument framework is created by conducting an assessment based on the Planned Behaviour Theory of Ajzen (1991) and Roger's Diffusion Theory (1962).

2.3.2 Analysis for empirical research

Sub-question 3:
The first round of in-depth-semi-structured interviews aims to discover data, regulatory, and operational requirements for the framework model. The analysis will identify recurring challenges, information needs, and process gaps mentioned by the participants. The outcomes will be summarized as functional requirements for the framework model that sets the concept of the framework.

Sub-question 4:
The second round of interviews focuses on validating and evaluating the developed framework model. The analysis will examine how participants perceive the usability and usefulness of the framework. The goal is to assess the extent to which the framework supports decision-making.

2.3.3 Coding and variable types

All interviews will be conducted by phone or Teams according to the six steps analysis of Braun and Clarke (2006).

From the first round of interviews with the co-owners association board members, the Theory of Planned Behaviour (Ajzen, 1991) is used as a sensitising concept to understand how attitude, subjective norm, and perceived behavioural control together shape the intention of boards to initiate and finance deep energy renovations. The intention is treated as the central outcome of interest for sub-question 3, because co-owners associations typically pass through a long preparation phase before observable renovation behaviour occurs.
The TPB is therefore not treated as independent attributes. The analysis looks for patterns. For example, a positive attitude toward renovation may still result in weak intention when perceived control is low or when norms are divided. This interpretive use of the theory supports the main goal of sub-question 3: translating factors influencing intention into actionable requirements for a finance-ready dossier and for the design of supportive financing routes.
Table 7 presents the main thematic categories for co-owners association boards and indicates how these themes correspond to the TPB concepts, including positive and negative codes.

Category themes	Description for COA	Coding notes
Attitude towards behavioural	How COA evaluates financing and carrying out energy renovations as positive (A+) or negative (A-). - Financial barriers - Financial opportunities - Complexity	A+
		A-
Subjective norm	COA referring to pressure, expectations, or lack of support from others: Owners pushing or blocking investments Expectations from external stakeholders	N+
		N-

Perceived behavioral control	How the COA perceive the organisation of the renovation: - Information gaps - Process barriers - Level of help	C+
		C-
Intention	Description of clear plans and commitment to apply financing/subsidies and to start renovation measures	I+
		I-
Behaviour	Any concrete action taken in relation to financing or renovation. Or taking a step back.	B+
		B-

Table 7: TPB informed thematic categories for COA-board according to Ajzen, 1991 (own table, 2025)

For the interview with financial experts and lenders, similar TPB informed thematic categories are used. Table 8 summarises these expert related categories and their TPB informed themes.

Category themes	Description for financial experts	Coding notes
Attitude towards behavioural	Attitude towards DEP for the COA	FA+
		FA-
Subjective norm	Perception that others factors influence COA to undertake DEP	FN+
		FN-
Perceived behavioral control	Statements that the COA has the capabilities and resources to finance COA projects effectively	FC+
		FC-
Intention	Clear commitment to increase involvement in financing COA renovations	FI+
		FI-
Behaviour	Concrete actions that enable or promote financing of COA DEP.	FB+
		FB-

Table 8: TPB informed thematic categories for financial experts according to Ajzen, 1991 (own table, 2025)

In sub-question 3, TPB is primarily used to explain variation in intention to proceed with deep renovation financing and to identify what would increase perceived control and collective support; in sub-question 4, the behavioural focus shifts to the intention and planned behaviour to use the developed framework.
In the second round of interviews, during sub-question 4, the focus shifts to the evaluation and intended use of the developed framework. In this phase, TPB is applied more specifically to interpret how attitudes towards the framework, perceived social norms and perceived control shape the intention to adopt the instrument in practice. Table 9 summarises these categories and their TPB informed themes.

Category themes	Description for COA-boards and financial experts	Coding

		notes
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+
		HFA-
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+
		HFN-
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+
		HFC-
Intention	Expression of willingness to use the framework	HFI+
		HFI-
Behaviour (future-oriented)	Planned concrete steps	HFB+
		HFB-

Table 9: Operationalisation of TPB for evaluation for the framework round 2 (own table, 2025)

At the same time, Rogers' Diffusion of Innovation theory is applied only in the second interview round because it is used as an evaluative lens to rate the adoption potential of the developed framework. In the first round, the framework did not yet exist and the aim was exploratory rather than adoption assessment. Rogers' theory is used to structure the assessment of the framework along the five adoption attributes: relative advantage, compatibility, complexity, triability, and observability. The interview data is rated based on the Likert-scale (1-5) for each attribute, see table 10. In the transcript, the suggestions for the framework and the evaluated rating are coded in orange.

Financial instrument model	Relative advantage (1-5)	Compatibility (1-5)	Complexity (1-5) 5 = not complex	Triability (1-5)	Observability (1-5)
Case					

Table 10: Evaluation of the financing instrument framework based on Rogers' attributes (own table, 2025)

In other words, the same TPB constructs (attitude, subjective norm, perceived behavioural control, intention and behaviour) are used in both rounds, but with a different emphasis: in round one they sensitise the inductive coding of broad perceptions of energy renovation, while in round two they are explicitly applied to statements about the intended use of the framework.

2.3.4 Cross-case comparison and validation

To synthesise the findings across the different interviews and cases, cross-case pattern sections are made. The codes make it possible to compare how the same theme appears in different co-owners associations and financial experts cases.
The findings and its patterns are then integrated to finalise the framework which links the retrieved requirements into a (concept) financial instrument framework.

2.4 Data plan

The date used in this research will be managed according to the FAIR principles (Findability, Accessibility, Interoperability, Reusability) (Wilkinson et al., 2016). The data management plan is attached in the appendix 2.4.
F: The research will be uploaded to the TU Delft repository and data is referenced according to the guidelines of APA 7.
A: The research can be accessed by the TU Delft repository after removing the raw data/private information, such as transcripts. The full research will only be shared with the supervisors in order to safeguard participants confidentially. The TU Delft repository promotes accessibility (TU Delft repository, n.d.).
I: The research product will be conducted in English, as this is the official language of the Master's programme. This ensures that the material can be understood and reused by the academic community. The interviews and focus groups will be conducted in the participants' preferred language for their convenience. The results will be translated into English.
R: The deposited thesis will be made available under the TU Delft repository's default open license. Participants' personal data will be handled according to the GDPR-compliant handling.

2.5 Ethics

This study involves co-owners association board members and financial experts. It is important to be aware of these ethical risks regarding human participants. Participants might represent different interests, and also discussions about financial resources and governance decisions can be sensitive. In order to avoid ethical risks, participants will remain anonymous in the reporting of the results. This includes removing the name of the individuals and their addresses.

Participants in this research will only be voluntary, and they will be asked to provide a completed consent form, distributed by the researcher. The consent form (appendix 2.5) will include information about the research objectives, type of data collected, how it will be used, and the interview questions structure. Participants have the right to withdraw from the interview at any time without consequence.

As mentioned in the data plan, confidential information will be handled according to the GDPR-rules. Only processed and anonymized data will be uploaded in the TU Delft repository. Special attention will be given to maintaining a respectful and transparent relationship with the participants by communicating clearly about the goals of the research.

AI tools, such as ChatGPT were used to support the processing of interview materials and the readability of the thesis text. Audio of the interviews were directly transcribed using an automated transcription function in Word or Teams and edited to improve readability and anonymised. All transcripts were manually checked against for accuracy. AI was not used to generate empirical findings, fabricate data, or create references. Interpretation, coding decisions, and conclusions are self made based on knowledge and experience.

2.6 Research output

2.6.1 Goals and objectives

The aim of this research is to develop and evaluate a financing instrument framework that supports Dutch co-owners associations in overcoming financial barriers to deep energy renovation. The framework structures how public and private instruments can be used and what conditions co-owners associations need to meet to make projects financeable.
The objectives are:

- Explore and synthesise the financial barriers that co-owners association face in their energy transition
- Identify opportunities and relevant public and private instruments, and analyse their main eligibility and data requirements.
- Determine the concrete financial needs and capacities of co-owners associations, with a focus on data, regulatory and organisational requirements for a finance-ready dossier.
- Develop a financing instrument framework that supports boards in preparing this dossier and in making informed decisions about financing routes for deep energy renovation.
- Formulate policy recommendations, aligned with the Co-owners Association Acceleration Agenda, for those barriers that can not be addressed by co-owners associations alone, in order to improve the conditions under which co-owners associations can use public and private instruments effectively.

This will provide insights and strategies for the energy transition in the Dutch co-owners building sector aligned with the Co-owners Association Acceleration Agenda.
The primary audience consists of co-owners association boards. Secondary audiences include financial experts, and policymakers.

2.6.2 Deliverables

The deliverables are:

- An overview of financial barriers and opportunities for Dutch co-owners associations
- An overview of data, regulatory, and operational user requirements
- An evaluated financing instrument framework developed based on the requirements
- The policy recommendations aligned with the Co-owners Association Acceleration Agenda.

3. Literature review

This literature reviews the academic and policy literature relevant to financing deep energy renovation in co-owners associations. Chapter 3 maps the organisation of Dutch co-owners association, current situation regarding the energy transition, the role of the co-owner association acceleration agenda, and which public and private financial instruments are currently used to support renovation for co-owners associations. Together, these provide the conceptual basis for the research and for the financing instrument framework developed in later chapters.

3.1 Co-owners associations

3.1.1 Definition and basis

co-owners associations in the Netherlands are a legal body that is managed by the shared parts of a building that has been divided into apartment rights by notarial deed. An apartment right is a share in the common property that gives the owners the right to use a private part, such as an individual apartment (Burgelijk Wetboek Boek 5, 2024). Membership of the co-owners association (in Dutch: VvE), is standard for every apartment owner. The association is responsible for managing, maintaining, and insuring the common elements such as the roof, facade, stairwells, and main installations. In practice this means that almost every buyer of an apartment becomes part of a co-owners association with rights and duties fixed in the deed of division and the attached regulations (Ministerie van Algemene Zaken, 2024).
The deed of division (splitsingsakte) and the regulations (modelreglement 2017, 2006, 1992) set the internal rules: voting rights, cost allocation, use rules, and the exact division between private and common parts. These documents are decisive when questions arise about who pays, who decides, and what majority is needed for specific actions (VvE-Belang, 2024).

3.1.2 Ownership structure and finances

Ownership in a co-owners association is collective for the shared parts and individual for each apartment. Each apartment right has a share in the common property, which usually determines both the owner's financial contribution to common costs and, in many associations, the weight of the vote. Some deeds instead give one vote per apartment. The deed and regulations specify which rule applies in each building (VvE-Belang, 2024).

The finances are shared costs via monthly service charges that are laid down in an annual budget approved by the general assembly meeting (GAM). By law, every co-owners association must also save for big maintenance in a reserve fund. Since 1 January 2018, the ‘Wet verbetering functioneren VvE’s’ requires a minimum annual reservation based on either an approved multi-year maintenance plan (MYMP), or 0,5% of the buildings rebuild value if there is no MYMP (Vereniging Eigen Huis, n.d.b). The MYMP-based saving is usually more accurate than the percentage method. The reserve fund must be kept in a separate account in the name of the co-owners association and is meant to pay for predictable capital works (Ministerie van Algemene Zaken, 2025).
Day-to-day operations are not paid from the reserve fund, but come from the co-owners associations’ operating budget. This is funded by the monthly service charges and approved each year by the general meeting. That operating budget covers smaller projects such as leakages, lift service contracts, management fees (VvE.nl, 2022).

Since 2018, Dutch law allows a co-owners association to take out a loan. Even though the co-owners association is the legal loaner, lenders usually assess the payment capacity of the individual co-owners. This is because debt service is covered by their monthly service payments to the co-owners association. Loans are relevant for financing larger projects such as the roof, facade or energy upgrades (Staatsblad, 2017).

3.1.3 Decision-making

The general assembly meeting of owners (GAM) is the highest body. All owners can attend and vote. As a basic rule in the Civil Code, decisions are taken by an absolute majority of votes cast, unless the deed or regulations set a different threshold. Many deeds add quorum rules and qualified majorities for important matters, such as major improvements or changes in use (Burgelijk Wetboek Boek 5, 2024).

Dutch law imposes stricter requirements on projects that involve changing the building, adding installations or altering the cost allocation. Changing the deed of division requires either the unanimous approval of all co-owners owners or at least four-fifths of all votes with the cooperation of the board, to be followed by a new notarial deed and registration (Vereniging Eigen Huis, n.d.a). These rules guarantee property rights and at the same time make it possible to update old deeds with a large majority.

In daily practices, this combination of regular and qualified majorities determines the feasibility and timing of major projects. Day to day maintenance is usually approved by a regular majority. If the quorum is not reached, decisions may be declared invalid (Vereniging Eigen Huis, n.d.a).

3.1.4 Roles and responsibilities

The association must manage and maintain the common areas of the building. This includes following safety rules and planning large maintenance projects. These basic tasks apply to all co-owners associations, regardless of their size (Ministerie van Algemene Zaken, 2024).

Owners are members of the co-owners association. They pay contributions, attend meetings, and vote on the budget, maintenance, insurance, and projects. Owners can also be elected to committees.

In renovation projects, the general assembly (owners) is accountable for the main go/no-go decisions, while the board remains accountable for executing these decisions and legally representing the association in contracts. Operational preparation (documentation, coordination and communication) is typically carried out by the manager and/or external advisors within their mandate.

When a housing corporation owns one or more apartments in the building, it is a regular member of the co-owners association with voting rights according to the deed (Ministerie van Algemene Zaken, 2024). The corporation also pays contributions for their part, attends the general meeting through an authorised representative, and complies with the regulations of the co-owners association. Even if the corporation holds a large share of the votes, they are not the decision maker on its own. Decisions are taken in the general assembly meeting under the deed’s quorum and majority rules.

The board executes the meeting’s decisions. Tasks of the board are contracting and supervising maintenance, managing and keeping the bank accounts, preparing the annual budget, proposing the MYMP, arranging insurance, and enforcing house rules. The board is

accountable to the general meeting, which approves the annual accounts and can grant for refuse discharge. Many co-owners associations in the Netherlands appoint a professional manager to assist the board with administration, financial management, technical management (Vereniging Eigen Huis, n.d.a). The legal responsibility remains with the board unless the deed assigns specific mandates.

The professional manager supports day-to-day operations under a service agreement with the co-owners association. Tasks include preparing meetings, keeping the financial and technical records, coordinating repairs. The scope of the service agreements depends and could vary between the types of managers. It also depends on the needs of the association. In energy projects, the manager helps gather documents for lenders and subsidies agencies, keeps the project dossier, and coordinates access and communication with the board. The manager acts as a processor and is not a decision-maker. The mandates are limited to what the general meeting or the deed allows (Vereniging Eigen Huis, n.d.a).

Financial control is supported by an internal audit committee (kascommissie). This committee consists of owners. Model regulations require an internal audit committee to review the annual statements and advise the meeting on approval. This low-cost check improves the transparency and trust within co-owners associations (Nederlandvve.nl , 2023).

3.1.5 The MYMP and reserve fund

A MYMP is the association's multi-year maintenance plan that translates the technical condition of shared components into a time-phased schedule of works and costs. It identifies the common elements such as the roof, facade, balconies, stairwells, lifts, and main installations. And assigns predicted maintenance or replacement years with cost estimation (Blaker et al., 2024). This plan translates those estimations into annual contributions to the reserve fund. This enables the co-owners association to meet expected capital requirements without making ad hoc short-term withdrawals. The MYMP links technical priorities to a savings plan, which improves predictability for co-owners (Blaker et al., 2024).
The MYMP also reduces conflicts because the plans and budget have been discussed and approved during the annual general meeting.

Dutch co-owners associations are obliged to maintain a reserve fund for big maintenance (Staatsblad, 2017). The annual contribution can be based on an approved MYMP, or if no current MYMP exists, at least 0,5% of the insured rebuild value per year (Vereniging Eigen Huis, n.d.b).

From an energy transition perspective, the MYMP could play an important role because it can combine energy efficiency measurements with planned maintenance. For example, roof renovations can be linked to insulation improvements, and the end of a boiler's service life can be an opportunity to evaluate other sustainable installation systems and heat pump options. By including sustainable choices in the MYMP, it is called a sustainable multi-year maintenance plan (SMYMP) (Blaker et al., 2024).

The reserve fund is meant for bigger maintenance projects and planned replacements. Not for day to day operating costs. When those major projects exceed the available balance, the meeting may decide to adjust the contribution, carry out the work in phases, or approve a special charge, or allow a co-owners association loan (Blaker, 2024). The choice depends on affordability, the MYMP timeline and the preferences of the owners.

3.2 Co-owners association buildings and energy baseline

3.2.1 Stock overview co-owners associations

Properties managed by co-owners associations includes different types:

- Multi-family residential blocks, which forms the biggest part of the co-owners association stock in the Netherlands (CBS, 2023).
- Multi-tenant business buildings, where multiple commercial units share ownership of common areas
- Mixed-use buildings, combining residential and commercial units within one association.

January 2022, the Netherlands had 1.6 million properties that belonged to a co-owners association. Only 8% consists of multi-tenant business buildings, which is 130.000 addresses (CBS, 2023).
As shown in the figure below, the provinces Noord-Holland and Zuid-Holland represent 65% of all associations in the Netherlands.

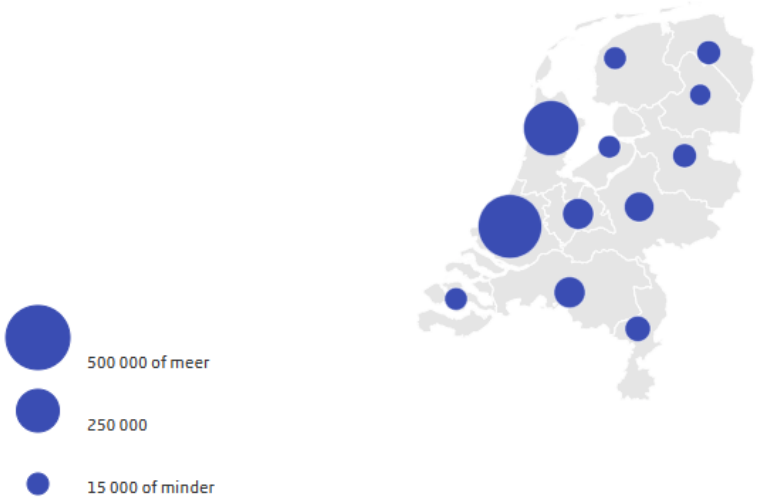


Figure 7: Quantity of co-owners associations in the Netherlands (CBS, 2023).

Many of these buildings are older. According to the figure from CBS (2023), an average of more than 50% of the Dutch co-owners association dates from before 1945.

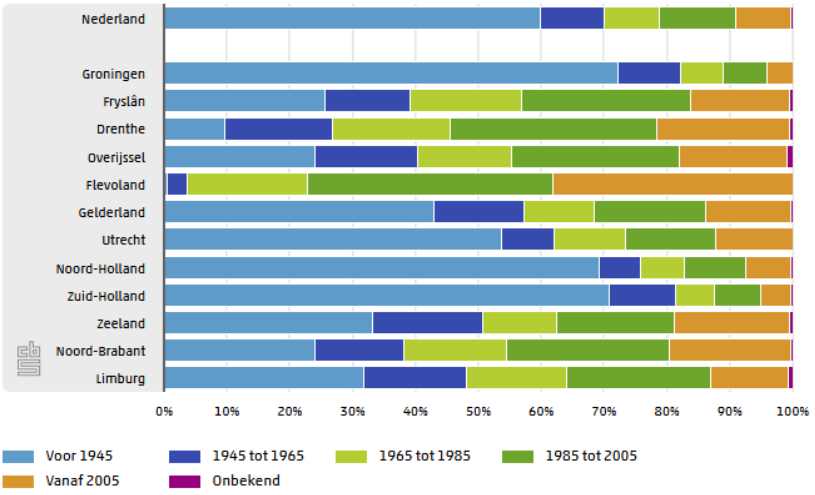


Figure 8: Year of construction for Dutch multi-owner housing (CBS, 2023).

co-owners associations face challenges for the energy transition due to the complexity of decision-making processes which often results in delayed or insufficient action towards energy efficiency improvements (Ministerie van Algemene Zaken, 2025). More than 1.4

million dwellings are part of a co-owners association (CBS, 2023). Most multi-owner housing consists of 1 to 3 addresses, see figure below.

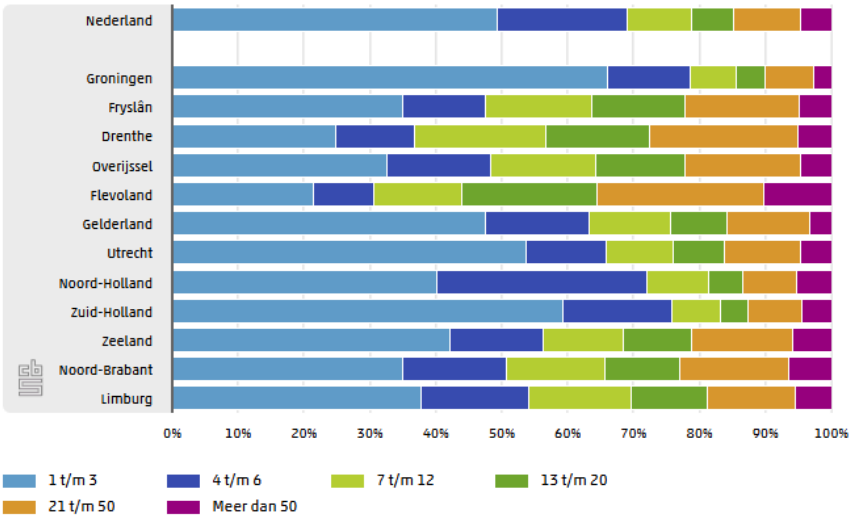


Figure 9: Addresses per co-owners association (CBS, 2023).

3.2.2 Size effects of co-owners associations on decision-making

Small co-owners associations, 3 to 12 apartments, can assemble quickly and reach consensus, but face high fixed transaction costs per apartment and more limited volunteer capacity (Schünemann et al., 2025). In addition, some financiers require additional procedural steps on small associations, which increases the administrative burden (Warmtefonds, n.d.). With super majority voting requirements, a single negative vote can block energy transition projects. The Dutch guidelines indicate that advanced financial decisions require qualified majorities and special conditions that go beyond the majority vote of 50% + 1 (Vereniging Eigen Huis, n.d.a).

Medium to larger co-owners associations, 13+ units, spread the fixed preparation costs across more homes and can benefit from economies of scale in buying, making extensive renovations, and bundled financing generally more feasible (Teye et al., 2017). However, the diversity of owners profiles, and quorum requirements for advanced decisions make coordination more complex. Voting weight is based on shares rather than owners, which means that achieving the required quorum may require multiple meetings (Teye et al., 2017).

Practical implications

Small co-owners associations face coordination and quorum challenges. A single vote carries more weight, and (board) members bear heavier coordination load for energy transition projects (Schünemann et al., 2025). However, larger co-owners associations have more administrative capacity, often through professional managers who can handle preparation of these projects. Their main barrier is communication by ensuring that diverse owners are well informed. In practice this often means multiple general assembly meetings are needed to reach a decision because turnout is low or owners are insufficiently informed (Schünemann et al., 2025).

In small associations, the barrier is administrative because of the small number of volunteers. For small associations, a concise and practical support, helps to remove the barrier to a super majority in a general assembly meeting. This barrier is related to the effort of the board members.
Larger associations experience barriers regarding coordination and quorum.

Small co-owners associations benefit from simplified, pre-completed dossiers and active facilitation to overcome super majority decision-making. Large co-owners associations need upfront

3.2.3 Energy label and current performance

Figure 10 visualizes the year of construction of a co-owners association related to the distribution by association size (CBS, 2023). Small to medium-sized associations are dominated by pre-1945 and 1945-1965 buildings. Larger buildings are characterised by 1965 and newer buildings. This size and age figure matters for the energy transition (Donarelli, 2021). The smaller segment is disproportionately older, and therefore more likely to have limited insulation, older glazing, and outdated heating systems. These factors reduce the energy performance and raise cost and complexity of deep renovations.

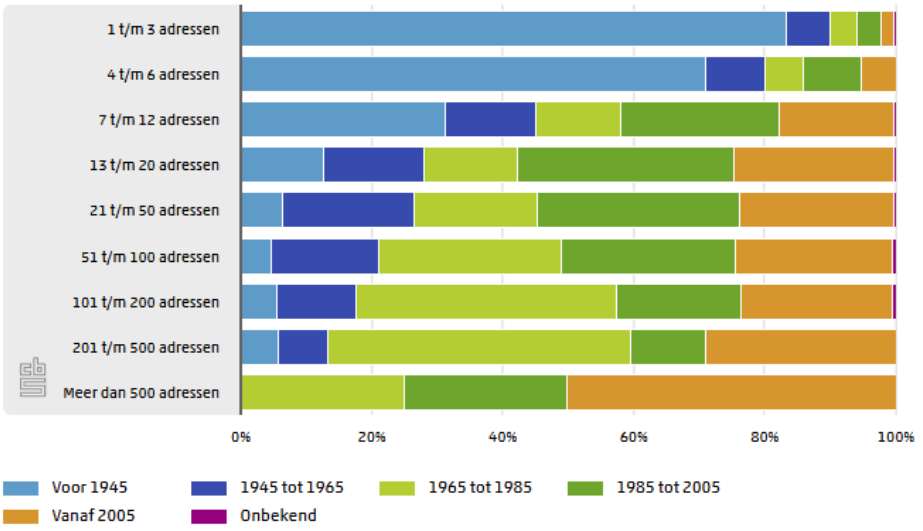


Figure 10: Year of construction distribution by association size (CBS, 2023).

Statistics show that dwellings within co-owners associations have mixed energy performance (CBS, 2023). Figure 11 shows the (valid) division of energy labels within co-owners associations.

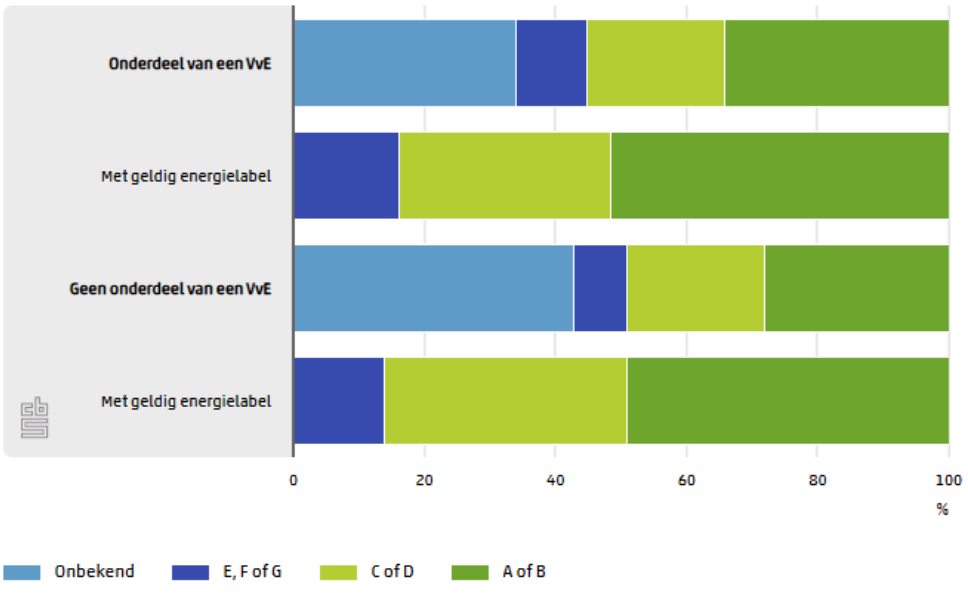


Figure 11: Valid energy labels dwellings (CBS, 2023).

Within co-owners associations, label performance differs by ownership mix. Rental dwellings show a higher share of energy label A-B, where owner-only have lower A-B shares. The figure indicates that still a big part of the co-owners associations requires deep renovations.

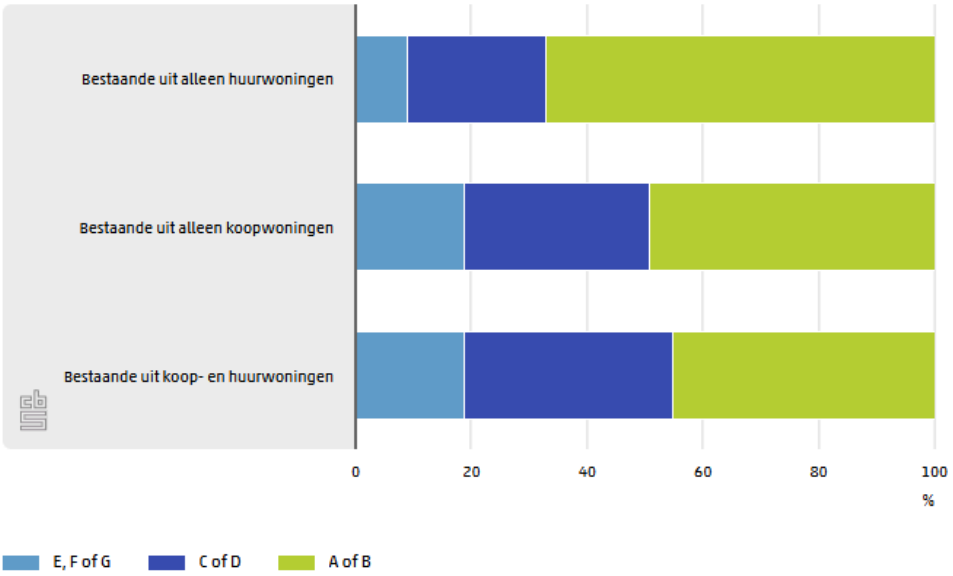


Figure 12: Energy labels dwellings, mixed-ownership (CBS, 2023).

In table 11 is a summary made of typical energy-label performance and additional technical weaknesses by association size and construction period (CBS, 2023). It explains the size and age pattern shown in figure 10. These patterns help explain what to prioritize when planning financing and implementation.

Association size	Construction period	Typical energy labels	Key weaknesses
3-7 dwellings	Most pre-1945/1945-1965	E-G	Solid walls with little/no insulation, uninsulated roof/floors, single glazing, gas boilers, moisture issues, heritage facade constraints
8-12 dwellings	Mix 1945-1985	D-E	Uneven shell measures, outdated boilers or mixed individual systems, limited space for electrical capacity for heat pumps or PV-panels, uneven willingness to pay
13-20	1965-2005	C-D	Less facade/roof insulation, outdated boilers, metering/ownership issues in mixed-use
21<	1985-2005	> D	Aging installations (gas, mechanical ventilation), older double glazing,

Table 11: Addresses x year of construction x energy label x weaknesses (based on CBS, 2023).

3.2.4 Data availability in co-owners practices

Building on 3.1, this paragraph examines what data co-owners associations keep, how this data supports deep renovations and financing, and where gaps occur. In practice, documentation is fragmented and of uneven quality, which affects feasibility of subsidies and fund submissions.
For this research, the following data is tracked per association to establish a baseline level of administrative and financial readiness.

Data	Primary purpose for energy/finance	Location	Common gaps/issues
Deed of division (splitsingsakte) & model/internal regulations	Determines decision limits, cost allocation, and scope of common parts relevant to energy works	Notary records/ CA archive/ CA manager	Outdated versions/ unclear cost allocation for new installations (heat pump/PV-panels) (Burgelijk Wetboek Boek 5, 2024)
MYMP / SMYMP (multi-year maintenance plan)	Maintenance plan, links sustainability measures to scheduled maintenance and reserve planning	CA manager/ board/ consultant	Missing SMYMP/ cost estimates not indexed/ no integration of energy measures (Ministerie van Algemene Zaken, 2025)
Operating accounts & reserve-fund (≥3 yrs)	Proven creditworthiness and co-financing capacity for loans/grants	Annual accounts/ bank	Incomplete histories/ reserve below MYMP target (Ministerie van Algemene Zaken, 2025)
Utility bills (gas/electricity, ≥12 months)	Baseline consumption, M&V input	Owners/ CA manager/ supplier portal	Missing common-area meters (Warmtefonds, n.d.)
Energy label (NTA 8800) & maatwerkadvies	Performance baseline and upgrade process for subsidy/loan eligibility	EP-advisor report/ RVO registration	Expired label/ advice not building-wide (RVO, 2025a)
Subsidy/loan dossiers	Evidence of prior decisions, eligibility, and documentation standards	Board/ CA manager/ funding portals	Missing attachments/ unclear follow-up conditions (RVO, 2025b)
GAM minutes & resolutions	Formal approval trail for scope, budget, financing, and contractor selection	Secretary/ CA manager	Decisions not specific enough for funders/ quorum not met (Burgelijk Wetboek Boek 5, 2024)
Installation reports (boiler/ PV-panels)	Technical basis for scope and risk/ electrical capacity check	Contractor/ maintenance files	Missing data or MV documentation (Warmtefonds, n.d.)
(Digital) communication tool	Evidence of member engagement and informed consent	CA Manager/ portals/ newsletters	No multilingual/ No accessible formats (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025)

Table 12: Data of co-owners associations regarding their energy transition (own table with mixed references).

3.3 Stakeholders and roles in the energy transition of co-owners associations

The energy transition is a complex challenge for owners of Dutch co-owners associations. Joint decision-making, ownership structures and the involvement of multiple stakeholders make deep renovations more complicated than in single-family homes (Elgendy et al., 2024b). The success of energy-efficient renovations in associations depends on the involvement of multiple stakeholders throughout the entire renovation process (Mlecnik et al., 2023).

3.3.1 Energy transition process and project timeline for co-owners association

The table below is based on the case studies from Steenkamp (2024), the insights from Mlecnik et al., (2023) and the selected cases of the empirical research confirms the process. It gives a summary from the phases and gives an indication of the duration.

Phase	Activities	Required data
1. Pre-phase: awareness & urgency	Rising energy bills, visible defects, MYMP replacement moment, interest check owners/GAM	Utility bills, MYMP/SMYMP, installation reports, copy of deed, model regulations
2. Transition & organisation	Form committee, engage advisor	GAM minutes
3. Tailored advice	Energy reports, location study, baseline definition, set up (S)MYMP	Utility bills, installation reports, maatwerkadvies/energy label, (S)MYMP
4. Scenarios & plan-making	Bundle measures, link the (S)MYMP, plan budget	Maatwerkadvies results, SMYMP with proposed integration, operation accounts and reserve fund documents, budget cash-flow memo, risk overview
5. Engagement & community	Owner study, info sessions, access questions,	Communication plan, draft information documentation
6. GAM 1 - get mandate	**Mandate from co-owners association members to prepare specifications, procurement and financing and subsidy applications**	**GAM agenda, GAM minutes, draft subsidy/loan dossier**
7. Tendering	Specification criteria set-up (incl. Performance agreements and M&V),	Specification criteria document, M&V-plan, data room for available data
8. Procurement & selection	Evaluate offers, select supplier/contract model	Quotations contractors
9. GAM 2 - budget & finance structure	**Approve budget ceiling and financing route (reserve fund + subsidy + loan)**	**GAM agenda, GAM minutes, financing memo**
10. Financing & approvals	Submit subsidies, finalise loan terms, prepare final approvals	Complete loan dossier, subsidy application file, permit applications, legal check
11. GAM 3 - final contract	**Contract supplier, approve final price, adopt binding financing solutions, contract signature**	**Final offer, contract, binding finance resolutions, GAM minutes**

approval		
12. Execution	Work on site	Contract
13. M&V & settlement	Handover, M&V reporting where applicable, subsidy claim, start loan	M&V-report, subsidy claims, loan pay out schedule, delivery document

Table 13: Overview of deep renovation project timeline based on input from (Steenkamp, 2024) (Elgendy et al., 2024b, 2024a)

In this timeline several moments could be linked to go/no-go moments. These go/no-go moments are formal decisions where the association decides to proceed, pause or stop the renovation track based on the available data and knowledge (Gunduz & Lutfi, 2021). The moments are important because they control risk and transaction costs and they prevent the co-owners association from spending time and financial resources on setting up the project.

The decision-moments can be connected to the phases of the timeline in table 13, because each phase corresponds to separate information and external requirements.
Phase 1 to 3 is the first gate that checks whether there is enough owners interest and intention to continue the work.
The first formal decision is taken at the GAM - 1: get mandate (phase 6). At this point, owners authorise detailed specification, tender preparation, and pre-checks with lenders and subsidy agencies. During the GAM the owners within the co-owners association give the board a mandate to execute further preparations.
After phase 9, the owners again vote for the approval of the budget ceiling and financing route, because indicative prices, subsidy eligibility and draft loans are now available. After this second GAM, the project has more legal and financial basis. Only after this moment, the project is bankable and buildable.
The last GAM in this process gives the final approval on contract, financial resources, and a budget plan. The contractor and the client; the board on behalf of the co-owners association, sign the contracts in order to go to phase 12.
If the project can not proceed at a go/no-go moment, the stakeholders must pause and re-evaluate the gap that blocked the progress. This could entail: improve data/baseline/owners communication, adjust technical specifications, or change financing and budget plan (Gunduz & Lutfi, 2021).

3.3.2 Stakeholders and responsibility

It must be noted, in the stakeholders-responsibility table, that the professional manager primarily handles the communication and administration of the co-owners association. These activities consist of preparing agenda and minute, maintaining the owners register and data room, owners communication, and administrative support. The board may mandate the manager to prepare the energy efficiency projects, but all go/no-go decisions lay in the general assembly meeting or the board, depending per the deed.
Board and manager's responsibilities are closely linked. It is common to mandate the manager to execute the preparations for the energy efficiency projects. However, go/no-go moments are decided by the board.
The term lender is overarching for private (banks, investment funds) and public financiers (Warmtefonds, SVVE or municipality facilities).
When a housing association owns apartments within the co-owners associations, it participates as a regular member according to the deed and other regulations. The housing association can not finance other owners' private costs in the energy transition and does not determine decisions alone.

The table below shows what stakeholders are involved in what stages of the project time line and what their responsibilities are.

Phase timeline	Activities	Stakeholders & responsibilities
1. Pre-phase: awareness & urgency	Rising energy bills, visible defects, MYMP replacement moment, interest check owners/GAM	Board: signal issues Manager: collect data
2. Transition & organisation	Form committee, engage advisor	ALV/board: appoint committee Manager: organise advisor, organise GAM Advisor: proposal for scope and process
3. Tailored advice	Energy reports, location study, baseline definition, set up (D)MYMP	Advisor: set baseline, (D)MYMP Manager: retrieve reports and data Board: validate findings
4. Scenarios & plan-making	Bundle measures, link the (D)MYMP, plan budget	Advisor: plan scenarios & costs board/manager: plan budget
5. Engagement & community	Owner study, info sessions, access questions,	Manager: communications Owners: express preferences Advisor: explain technical details
6. GAM 1 - get mandate	Mandate from CA members to prepare specifications, procurement and financing and subsidy applications	Manager: organise GAM ALV: vote mandate Board: authorised Advisor: proceed to specifications
7. Tendering	Specification criteria set-up (incl. Performance agreements and M&V),	Advisor: set up specification and M&V-report Board/manager: validate findings Lender: pre-checks
8. Procurement & selection	Evaluate offers, select supplier/contract model	Board/advisor: evaluation on documentation Contractor: submit quotation
9. GAM 2 - budget & finance structure	Approve budget ceiling and financing route (reserve fund + subsidy + loan)	Manager : organise ALV ALV: vote on budget & scenario Board: mandate to finalise loan/subsidies Lender: propose payment schedule Subsidy agency: checks eligibility
10. Financing & approvals	Submit subsidies, finalise loan terms, prepare final approvals	Manager/board: application subsidies and loan Lender: share payments schedule and conditions in contract Subsidy agency: eligibility
11. GAM 3 - final contract approval	Contract supplier, approve final price, adopt binding financing solutions, contract signature	Manager: organise GAM ALV: final mandate and binding finance Board: sign contract Contractor: sign contract Lender: sign contract
12. Execution	Work on site	Contractor: deliver Board/advisor: supervise Manager: communication
13. M&V & settlement	Handover, M&V reporting where applicable, subsidy claim, start loan	Advisor: start-up M&V-plan Manager: administration and documentation Lender: pay out

Table 14: Overview of deep renovation project timeline + stakeholders and responsibilities based on input from (Steenkamp, 2024) (Elgendy et al., 2024b, 2024a) (Warmtefonds, n.d.) (RVO, 2025b)

RACI-matrix

A RACI-matrix has been created based on the project timeline and the associated stakeholders and tasks, this according to table 13 and 14. This matrix describes:

- R = who is responsible
- A = ultimately responsible, accountable
- C= consulted
- I = informed

RACI was used because it provides a clear allocation of decision authority and task responsibility for co-owners association renovation projects. Support, according to a RASCI model, differs across associations and are addressed descriptively rather than as a separate formal category.

This applies to each phase of the deep energy renovations of a co-owners association. With this matrix, roles and communication are clear (Friedman, 2008). The RACI-matrix is an ideal representation derived from literature. In chapter 7 and 8, co-owners association board members are interviewed to assess their experience and perspective regarding their own responsibilities and the responsibilities of, for example, the associations' manager in practice.

There is a difference between accountability and responsibility. In legal terms, the co-owners association board, on behalf of the association, remains ultimately responsible for decisions and contracts. In the RACI-matrix, the board remains accountable for contracting and legal representation, while the general assembly is accountable for the key owner decisions.

The operational execution of tasks can be delegated to the manager or an external advisor, who are often labeled as 'R' in the matrix. This is also in line with practice, since the board remains administratively responsible but outsources the day-to-day execution.

In some phases, the RACI-matrix has multiple 'R' roles. These involve different types of implementation. The contractor is responsible for the physical work, while the manager is responsible for communication and administration and the advisor for technical content. Legal responsibility lies with the board, but practical implementation is divided among multiple stakeholders.

In the case studies, this ideal distribution took many forms, depending on the size of the association and its administrative capacity. In larger associations, the preparatory work was sometimes organised by committees (sustainability/technical affairs) which acted as an additional "responsible" party for these specific tasks, with the mandate to collect input and draw up proposals, for example. In all cases, the most important lesson to be learned from the process is that phases with multiple "R" roles require internal coordination (appointing a chair and setting a mandate in advance) in order for the committee to function as efficiently as possible.

Stakeholder → Stage ↓	COA	COA -board	COA manager	COA advisor	Contractor	Lender	Subsidy agency
1. Pre-phase: awareness & urgency	I	A	R	C	I	I	I
2. Transition & organisation	I	A	R	C	I	I	I
3. Tailored advice	I	A	R	R	C	I	I
4. Scenarios & plan-making	C	A	R	R	C	C	C
5. Engagement & community	C	A	R	C	I	I	I
6. GAM 1 - get mandate	A	R	R/C	C	I	I	I
7. Tendering	I	A	R	R	C	I	I
8. Procurement & selection	I	A	R	R	C	I	I
9. GAM 2 - budget & finance structure	A	R	R/C	C	I	C	C
10. Financing & approvals	I	R	R	C	I	A/R	A/R
11. GAM 3 - final contract approval	A	R	R/C	C	I	I	I
12. Execution	I	A	R	C	R	I	I
13. M&V & settlement	I	A	R	R/C	R	I	A/R

Table 15: RACI matrix (own table, based on Friedman, 2008)

3.3.3 Housing associations in mixed-ownership co-owners associations

Over 50% of Dutch co-owners associations are part of a social housing association that owns a large proportion of the condominiums (CBS, 2023). In these cases, the housing association is both a co-owner and often an influential stakeholder in the general meeting. Compared to private owners, housing associations generally have more financial capacity and policy objectives regarding maintenance and sustainability, driven by national regulations and their own strategies (VvE-belang, 2025c).
Their position does not differ from that of individual owners in the general meeting. Housing associations are formally represented as owners and practice voting rights based on their share in the deed of division (VvE-belang, 2025c). This can accelerate decisions on deep energy renovations when their sustainability goals align with the project, but can also cause tensions when private owners are more sensitive to short-term affordability than to the long-term quality of the complex.
In addition, housing associations have access to more financing options than private owners, which means that they experience fewer financial barriers than individual members within the association (VvE-belang, 2025c).

Two of the four co-owners association cases selected for the empirical study have this mixed ownership structure, with the housing association being the largest owner. This has no direct impact on the financing of the energy measures. However, it does influence decision-making within the association. Given the limited number of cases, mixed-ownership is not analysed as a separate explanatory variable, but it is considered where it shapes decision-making and financing readiness in the empirical findings and related policy recommendations.

3.3.4 Role of the association manager in deep energy renovation

In deep energy renovation projects, the association manager operates as the process and information manager rather than a decision maker. Day-to-day operations include organising ALVs, maintaining the member register and database, retrieving technical and financial documents, and assembling lender- and subsidy-ready dossiers for the application of financial resources. Their mandate is administrative and communicative, while go/no-go decisions remain with the board and the assembly meeting.

In the future, the role of the manager will be expanded. The Co-owners Association Acceleration Agenda emphasizes advice and process support. This implies higher expectations for proactive communication with owners, facilitation of governance, and basic administration of M&V (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025). It does not change the legal responsibility of the manager, but professionalises the working conditions, which consist of for example: clearer scope of services, time-budgeted coordination between phases and skills in the areas of financial suitability.

3.3.5 Risk and opportunity

This paragraph provides an overview of 10 key risks in table 16 that co-owners associations face during their energy transition. The risks are linked to the financial barriers, such as high upfront costs, limits on borrowing, the impact on monthly charges, complex subsidy application, and exceeding budgets.

In addition to providing conceptual background information, these ten risks also operate as awareness raising concepts for the empirical part of the research. They are translated into interview topics for boards of co-owners' associations and financial experts, and into codes that are used next to the categories of the Theory of Planned Behaviour. This examines the extent to which the risks identified in the literature are recognized in practice, which risks dominate decision-making, and whether additional risks emerge.

Financial risk	Relevance	Mitigation/opportunity
1. High upfront costs reserve fund too low	Many COA have MYMPs that do not provide sufficient resources for replacements. Deep renovations bring extra high upfront costs.	Combine: subsidies, loans, reserve fund (RVO, 2025)
2. Affordability risk	Owners pay a monthly service charge. It increases when you lend money	Assess cash flow before and after using the loan in order to make the right balance (Paradies et al., 2017)
3. Barriers to accessing credit	Lenders require qualitative MYMP, late payments within COA control, GAM minutes, Maatwerkadvies	Prepare a tender-ready dossier (Wetten.nl | Regeling, 2025)
4. Subsidy complexity	Eligibility, attachments for application are complicated	Early eligibility check, prepare documents in advance (RVO, 2025)
5. Small COA finance gap	Smaller COA struggle with quorums	Use advice and guidelines from RVO and Warmtefonds (RVO, 2025) (Warmtefonds, n.d.)
6. Performance uncertainty	Weak baseline and measurements is bad for the EPC	M&V plan (Tanguay, n.d.)
7. Exceeding tender budget plan	Market fluctuations can change budgets. Bids also expire if GAM delays.	Include unforeseen circumstances into account (+10%), switch quickly between ALV-2 and ALV-3
8. Permit and regulatory delays impacting budget	Façade/heritage renovations can delay start dates. Risk is missing subsidy and loan deadlines	Early permit screen, parallel applications, keep lenders informed to avoid expired loan applications.
9. Exceeding the budget during implementation period	If works exceed budget, owners face additional costs	Set up fixed price, site supervision.
10. Overdue payments to lenders/credit risk during repayment period	Higher monthly service charges can raise overdue payments	Overdue management plan (Team & Admin, 2018)

Table 16: Overview of risks and financial barriers for co-owners associations in their energy transition (RVO, 2025) (Paradies et al., 2017)(Wetten.nl | Regeling, 2025) (Warmtefonds, n.d.)(Tanguay, n.d.)(Team & Admin, 2018)

3.4 Co-owners Association Acceleration Agenda (VvE-versnellingsagenda)

The Co-owners Association Acceleration Agenda is the national programme that aims to accelerate the sustainability of apartment buildings governed by co-owners associations. It addresses barriers that are specific to multi-owner governance, where investment decisions must pass collective voting rules and where financial capacity and process expertise are often limited. The programme therefore focuses on making decisions easier, improving access to finance, and standardising the information that lenders and public schemes require (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025).

The agenda's objective is to reduce the regulatory and financial barriers in order to execute deep energy renovations for co-owners associations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025). At national level, the agenda distinguishes five themes:

- Large co-owners associations
- Non-functioning associations
- Decision making rules
- Information and relieving
- Financial support.

The ministry has developed this agenda to encourage the sustainability of co-owners associations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025). These include financial measures that make it easier, faster, and more accessible for more residents to become more sustainable. These agenda lines mainly cover:

- Decision-making simplification: adapting the co-owners association voting and quorum regulations for implementing sustainability measures. Mandates and procedures for boards are clarified.
- Finance availability: improving the use of public and private financing investments available for co-owners associations. And clarifying how these instruments can be combined.
- Lender-ready dossiers: creating common templates and checklists for co-owners associations to reduce processing time and risk.
- Advisory and process support: guidance and coaching for boards and association managers, including practical tools and guidelines.

The agenda is coordinated at national level and implemented through existing delivery ways (municipality programmes e.g.). This links the policy measures to the day-to-day practice of co-owners association boards and managers (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025).

Aligning with the Co-owners Association Acceleration Agenda increases practical feasibility of the proposed sustainability measures (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2025). It lowers transaction costs, reduces perceived risk, and clarifies from decision-making to financing. For this thesis, the agenda provides policy context into which the result can be implemented: the requirements indicate what co-owners associations and lenders need to proceed, while policy recommendations map directly onto the agenda's action lines.

3.5 Financing instruments

This section sets the scope for financing and support options existing in the context of Dutch co-owners associations undertaking deep energy renovations. It provides an overview of the public and private instruments that are relevant for this context and indicates how each instrument can play a role in mitigating financial barriers.

Three related concepts are used:

- Financing instrument: refers to the specific contract or programme that provides capital with defined terms, eligibility criteria, and documentation requirements.
- Financial model: integrates more instruments with a procurement structure into a coherent financing plan that defines cash flows and risk distribution for renovation projects.
- Procurement and contracting structures describe how renovation projects are organised and how responsibilities, risks, and ownership are allocated between the association and external parties.

At European level, various studies show that a large number of public and private schemes already provide support for the decarbonisation of residential buildings. Conforto and Hummel (2024) show that there are 597 active schemes across the EU, with public support mainly consisting of grants and soft loans, and private support mainly in the form of green loans or mortgages. Bertoldi et al. (2021) makes a distinction between traditional and commonly used instruments, ‘proven and growing’ instruments, and ‘new innovative’ instruments and tools. The studies highlight that, despite the appearance of newer models, traditional instruments still dominate. In addition, information about instruments is fragmented and often changes, which creates research and transaction costs for property owners.

A complete overview of all possible instruments is beyond the scope, as it would require a detailed and regularly updated inventory of national and international schemes that goes beyond what is necessary to answer the research questions. This will also shift the focus from the specific context of Dutch co-owners associations. For this research, two sub-groups are made:

1. Instruments that are currently available to Dutch co-owners associations
2. A small group of innovative instruments that are not yet common in the Netherlands but have potential for co-owners associations

Within this group, the analysis focuses on three models that are more discussed in the international literature and are applied in neighbouring countries: one-stop-shops, EScos and on-bill financing. These models have been selected because they directly address the main barriers identified and offer concrete input for the financing instrument framework in section 7.15. Other innovative instruments might play a role in specific markets, but are less directly applicable in the Dutch context or do not add organisational features that are relevant tot co-owners associations.

Therefore chapter 3.5 describes the most important public instruments relevant to co-owners associations and then discusses the private instruments, including the innovative models mentioned above.

3.5.1 Public instruments

Energie bespaarlening - Nationaal Warmtefonds (Warmtefonds, n.d.).
The Warmtefonds provides a public loan, the ‘Energie Bespaarlening’, designed for co-owners association energy investments. Nationaal Warmtefonds also offers an Energiebespaarlening for individual owners-occupiers. However, this research refers to the Vve Energiebespaarlening, in which the co-owners association is the borrower and repays the loan through the members’ contributions. It supports by closing the financial gap for deep energy renovations, often in combination with subsidies and the reserve fund of the association itself. The Warmtefonds distinguishes three main financing routes for co-owners associations:

1. Individual measures: for single energy saving interventions, such as insulation, glazing, or heating system upgrades.
2. Zeer Energiezuinig Pakket (ZEP): for combined renovation packages achieving high efficiency standards. ZEP is also known as deep energy renovations, which targets at least 60% reduction in energy use.
3. ZEP+: includes full electrification measures.

The packages entail strict technical requirements, but allow higher loans per apartments than the individual measures. To assess which packages are possible for the co-owners association, a Maatwerkadvies will be provided (Warmtefonds, n.d.).

VvE Ledenlening (VVE Ledenlening Nationaal Warmtefonds - Warmtefonds, n.d.).
The ledenlening allows individual co-owners association members to finance their share in the energy renovation project when their personal liquidity would block the collective decision. It complements co-owners association loans by improving affordability within the association.

SVVE - Subsidieregeling Verduurzaming voor VvE’s (RVO, 2025).
SVVE is a national subsidy for co-owners associations that invest in eligible efficiency and renewable measures and preparation for the project. In practice, it lowers the upfront cost of renovation packages and can be added to loans. Typical eligibility conditions refer to the legal status of the association, the scope of the measures, and the minimum technical standards. The SVVE is structured into several modules. This approach enables associations to apply measures gradually.

1. Preparation module: funding for energy advice, feasibility studies regarding undertaking energy renovations, and project coordination.
2. Implementation module: grants for eligible energy saving and renewable measures.
3. Comprehensive renovation module: higher subsidy rates for associations conducting deep energy renovations that meet predefined energy performance thresholds.

TOF- Toekomstbestendig Onderhoudsfonds (SVn, n.d.c).
TOF is the specific fund from the institution SVn, and links planned maintenance with sustainability by financing measures aligned to the SMYMP. By coordinating maintenance and energy packages, the fund enables phased financing and reduces execution risk. TOF improves reserve-plan alignment and supports the sequencing of measures. In practice, the TOF enables co-owners associations to borrow against future maintenance reserves, aligning cash flows with the timing of renovation works and reducing the need for one-time special contributions.

Stimuleringslening kleine VvE - (SVn, n.d.b)
The Stimuleringslening Kleine VvE is a soft loan that is offered via participating municipalities through SVn and meant for small co-owners associations. It lowers the access-to-credit

barrier and the affordability gap by offering standardised terms and simplified processing for eligible renovation measures.

Duurzaamheidslening (SVn, n.d.a)
This individual loan from SVn has a fixed interest rate and term. The loan can also be used to finance energy saving measures in your home. These measurements consist of insulation, solar panels or heat pumps. The loan is deposited into a building fund from which you pay the invoices for the measurements. The loan is only available if the local municipality has an arrangement with SVn.

SPOR - Subsidieregeling Procesondersteuning Opschaling Renovatieprojecten (RVO, 2025)
The SPOR subsidy helps groups of co-owners scale up renovation and sustainability projects by providing financial support to hire a professional process facilitator who prepares and guides a collective renovation plan for existing homes. This enables larger, coordinated projects to improve energy efficiency. The subsidy only covers the process support and not the actual energy saving measures and is aimed at collaborations of multiple co-owners, such as private owners, housing corporations, landlords and owners' associations who intend to undertake energy renovation measures.

ISDE - Investeringssubsidie Duurzame Energie en Energiebesparing (RVO, 2025)
The ISDE is a subsidy for individual co-owners and business users who intend to invest in energy saving and sustainable measures in their home or commercial property. The subsidy focuses on financial support for heat pumps, solar boilers, connections to a heat network, and electric cooking facilities. Since ISDE is a national subsidy, it cannot be combined with other governmental subsidies such as SVVE.

3.5.2 Private instruments

Reserve funds (Burgelijk Wetboek Boek 5, 2024)
Statutory reserves are the first financing source and should follow the SMYMP. They usually do not cover full deep energy renovation, but they are a sign of financial stability and reduce dependence on debt. The reserve position and savings plan demonstrate liquidity and strengthen the confidence of lenders.

Third party financing (European PPP Expertise Centre, 2012)
Third-party financing models are private financial arrangements in which an external provider finances energy saving measures and recovers its investment through payments from the co-owners association over time. Instead of the homeowner association making a large upfront capital investment, the costs are transformed into returning operating expenses, often combined with long-term service and maintenance.

- Energy-as-a-Service (EaaS) (EaaS, n.d.)
  In an Energy-as-a-Service model, a private provider finances, installs and operates the energy-related systems and remains owner of the installations. The association pays a monthly service fee that typically covers capital costs, operation, maintenance and monitoring (opex). The focus is on purchasing an energy service, such as heat, comfort or energy savings, rather than buying assets (capex). Contracts are often performance-oriented. The technical and performance risk lies at the provider.

- Leasing (Solvari, 2025)
  Leasing is a third-party asset financing arrangement in which a provider purchases and owns equipment, while the user pays for the right to use it over time. For co-owners associations, an external financier or service company purchases and owns the installations, and the association pays a returning fee for their use. The lease spreads the investment costs over the contract period and is primarily experienced by co-owners associations as asset financing. The investment is translated into periodic payments. Maintenance can be included in the lease price, but does not have to be performance-based. Unlike EaaS, lease payments are usually linked to the duration of the contract and not directly to realized energy savings. Leasing therefore focuses more on the financing and ownership structure of assets, while the service component is less of a focus.
  In addition, a leasing arrangement with a buy-out option combines third-party financing with the possibility of eventual ownership for the co-owners association. During the contract period the provider finances and owns the installations and the co-owners pay a monthly fee. At the end of the term the association has the option to acquire the assets at pre-agreed residual value. This model reduces the initial investment costs and makes the decision to start the project easier, while allowing the co-owners association to become full owner of the installations after repayment, with only regular operation and maintenance costs remaining. Compared to the EaaS, the emphasis is again on financing and transfer of ownership of the assets, but with the advantage that the association does not remain structurally dependent on the third party once the buy-out has taken place.

Private bank loans (De VvE En Banken - VvE-Belang, 2025b)
In the Dutch market, it is not possible for co-owners associations to lend directly from commercial banks for their (deep) energy renovation projects. Loans are processed through the Warmtefonds and other parties, because the fund provides standardised eligibility, documentation, and servicing that lower transaction costs and credit risk for small loans (Warmtefonds, n.d.). At European level, there are commercial banks that grant loans to the co-owners associations. These loans are against market interest rates, which are relatively much higher than public loans.

3.5.3 Upcoming innovative models

Crowdfunding (VvE-Belang, 2025a)
Crowdfunding can finance energy renovations of co-owners associations by raising small amounts from many investors or individuals. Each contributor invests a small amount in the associations' energy renovation project. Investors or individual lenders are repaid through a small surcharge added to the monthly service contribution paid by association members, which serves as the primary repayment source. Advantages are access to credit when bank lending is limited, but an additional disadvantage is higher cost of capital than public loans. A crowdfunding works best as additional finance to top up subsidies and public loans, rather than a complete source for full deep energy renovation projects.

In the Netherlands, Collin Crowdfunding currently offers the most accessible crowdfunding financing option tailored to co-owners associations. Collin Crowdfunding is recommended by VvE-Belang, which is an independent national interest organisation and knowledge centre that provides information, advice and support to Dutch co-owners associations on issues such as maintenance, finance and sustainability.

One-Stop-Shop (OSS) (STUNNING et al., 2020)
A one-stop-shop based on public-private partnerships and semi-public entities is described in STUNNING as a renovation platform owned collectively by local authorities and private partners such as banks. However, one-stop-shops differ in governance and scope. They can be public (provide information, advice, and process coordination), or private (service models that offer more integrated delivery) and may include contracting and financing. In practice, the scope ranges from ‘’advice only support’’ to end-to-end project development.
Traditional PPPs already exist in the construction sector, where a private party renovates a public building and assumes significant financial, technical and operational risks under a long-term contract. The OSS differs in that the semi-public body does not carry out a single project, but offers an ongoing range of services to private co-owners associations. It develops a network of contractors, provides technical and administrative support and, if desired, can act as the main contractor. Also, the renovation platform can take on the financing role. It finances subsidies in advance and, in some cases, offers third-party financing for the initial investment itself, while maintaining partnerships with commercial banks for further loans. Its own business model is typically supported by public funding combined with fixed fees from the co-owners association and annual fees from participating contractors on the platform. In this way, the semi-public OSS reduces the perceived risk and complexity for owners by bundling project development, technical support and access to financing into a single publicly supported service.

On-bill financing - OBF (Bertoldi et al., 2021)
On-bill financing is described by Bertoldi et al. (2021) as an innovative debt instrument that links the repayment of investments in energy efficiency directly to the customer's energy bill. Instead of taking out a separate bank loan, customers repay part or all of the renovation costs through an additional fee on their electricity or gas bill, which helps to overcome the barrier of initial costs. Because repayments are linked to the energy bill rather than a traditional loan contract, OBF can also provide a solution to split incentives in multi-owner buildings and is therefore considered suitable for investments in co-owners associations .
The capital used for these programmes can come from the utility companies themselves, the state or third parties such as commercial banks. On-bill financing schemes are typically designed so that bills after renovation (energy costs plus repayment costs) do not exceed bills before renovation. Bertoldi et al. make a distinction between on-bill loans, where the repayment obligation remains with the customer and must be met when the property changes ownership, and on-bill tariffs, where the obligation is linked to the property or meter and can be transferred to the next occupant or owner. Although OBF exists in the United States for some time, European initiatives have faced challenges such as high administrative costs, relatively high interest rates, regulatory changes required to place repayment on the energy bill, and competition from more attractive subsidies and low-interest loans.

Energy Service companies - ESCO (Bertoldi et al., 2021)
Energy service companies are described by Bertoldi et al. (2021) as specialised companies that finance and implement energy-saving measures and are repaid from the energy savings realised. In an energy performance contract (EPC), the ESCO and the customer agree on a package of efficiency measures and the ESCO provides a performance guarantee: its compensation is directly linked to the verified savings, and if the savings are lower than promised, the ESCO must compensate the customer. The investment can be financed in

several ways: from the co-owners associations own resources, from the ESCO's own resources, or by a third-party provider using the EPC and the guaranteed savings as credit security. Because the ESCO assumes significant technical and sometimes credit risks, the transaction costs are relatively high. For this reason, ESCO projects are mainly used for large energy consumers, such as industry, commercial buildings and large housing projects. Case studies from Italy, France, Germany, Latvia and other countries show that ESCO/EPC models can help overcome technical and financial barriers, even in the renovation of co-owners associations, but they remain a niche solution that requires sufficient project size, confidence in long-term contracts and a supportive policy and regulatory framework.

3.5.4 Procurement and contracting

After financing is arranged, co-owners associations still need to procure and contract the works. Selecting contractors, defining the scope and aligning technical specifications with subsidy and lender requirements need to be taken into account when preparing deep energy renovation projects (European PPP Expertise Centre, 2012). Procurement and contracting structures describe how renovation projects are organised and how responsibilities, risks, and ownership are allocated between the association and external parties. Most co-owners associations work with competitive bidding or tendering and rely on their professional manager or an external advisor to coordinate the scope and tender process.

Procurement methods are not treated as financial instruments, but they are relevant because they influence transaction costs, governance complexity and the way risks are perceived by lenders. Three basic forms are commonly used in the Dutch context (European PPP Expertise Centre, 2012):

1. Traditional contracts (design-bid-build): design and works are separated, the scope is explicit, but the costs and risks remain with the co-owners association.
2. Integrated contracts (design-build): combines design and construction in one contract, which can reduce coordination effort and transfer more technical risk to the contractor.
3. Performance-based contracts (EPC): payment is linked to results and a larger share of performance risk is transferred to the contractor. These contracts usually have a longer duration and require more complex monitoring and verification. Needed elements for lenders are fixed prices or maximum contract prices, clear scope and planning, and M&V overview.

More complex variants such as DBF/DBFM, in which design, construction and financing responsibilities are bundled and most risks lie with a market party, are mainly applied in large public infrastructure projects and fall outside the practical options for Dutch COAs.

3.5.5 Overview of instruments

To conclude, the table summarises the main instrument types discussed in 3.5, following the classification of Bertoldi et al. (2021) into non-repayable support, own funds, debt and service/performance models.

	Traditional	Innovative
Non-repayable	Grant/subsidies	-
Own funds	Reserve fund	-
External financing	Private bank loans	Crowdfunding , OBF , Third-party financing
Service & performance models		ESCO , OSS

Table 17: Summary of financial instruments to finance energy renovations (own figure based on Bertoldi et al., 2021, 2025)

3.6 Summary literature review

Co-owners associations are legally mandated to manage and maintain shared property but operate under collective decision-making and regulatory constraints. Their ability to undertake deep energy renovations depends on administrative capacity, financial resources, and cooperation of individual members. The board and professional manager are the operational factor within the association, but they still need to obtain approval from the general assembly meeting. External actors, such as housing corporations, lenders and subsidy agencies play a role by providing capital, technical guidance, and regulatory support. This structure explains why collective decision-making, financial risk perception, and documentation quality are common barriers to energy transition projects.

The literature identifies multiple financial barriers faced by co-owners associations. These barriers align with those highlighted in the Co-owners Association Acceleration Agenda, which seeks to accelerate collective renovation through regulatory simplification, improved financing instruments, and professionalisation of association management. Studies point out that the challenge lies not only in increasing financial availability but also in structuring financing to match the needs, risk profiles, and governance characteristics of co-owners associations.

The literature review also identified a distinction between public and private investment instruments, instruments for the co-owners association and for the individual co-owners within the association. Public instruments aim to reduce perceived risk and improve affordability through subsidised interest rates, grant structures, and integration with long-term maintenance planning. Their packages reward higher energy performance ambition but require advanced documentation and compliance. Private instruments could play a complementary role by providing additional capital and by offering different risk- and repayment structures. In addition to standard bank loans and the use of the reserve fund, the literature highlights innovative models where investments are translated into service or energy costs rather than traditional loans.

Procurement and contracting are linked to financing availability for implementation. Traditional design-bid-build contracts leave risk with the association, whereas integrated approaches such as design-build or performance-based contracting transfers risks to the contractor. Structures such as design-build-finance and design-build-finance-maintain, include financing directly within the contractual framework. This shifts operational and financial responsibilities to the market party. Energy service companies and energy performance contracts are examples of such integrated approaches, where the ESCO finances and implements measures and is compensated based on the energy savings achieved.
One-stop-shops models go one step further by bringing together technical, administrative and financial coordination. This reduces the transaction and coordination costs for co-owners associations with limited capacity.

The insights from the literature review form the foundation of this research. The sub-questions in chapter 5 to 8 build on these findings by identifying the financial barriers and opportunities, data, regulatory, and operational requirements that determine whether financing models are feasible and effective for Dutch co-owners associations.

4. Theoretical framework

The theoretical framework addresses the Theory of Planned Behaviour and the Diffusion of Innovation theory. These theories evaluate how financing energy renovations is perceived and evaluates the adoption of the financing instrument framework.
Section 4.1 gives an overview of the used theories and what the theory entails. Section 4.2 explains why and how this theory applies to this research.

4.1 Theory overview

The theoretical framework integrates two theories that correspond to the subquestions and phases of the study. An overview is given in the table below.

Sub-questions	Theory	Reference
Process framework to the structure of the research.	The Double Diamond Framework	British Design Council , 2005
Sub-question 3: What data, regulatory, and operational requirements must Dutch co-owners associations meet to access public and private financing to undertake energetic renovations?	Planned behaviour theory (TPB)	Ajzen, 1991
Sub-question 4: How do co-owners associations and financial experts perceive the usability and adoption of the proposed financing framework?	Diffusion of Innovation (Roger's)	Rogers, 1962

Table 18: Overview of sub-questions and used theoretical framework with source (own table, 2025)

4.1.1 The Double Diamond Framework (British Design Council, 2005)

The Double Diamond is a process model from design research that treats innovation as two cycles of divergence and convergence: first the problem, then the solution (British Design Council, 2005). The phases of the diamond can be linked to the four sub-questions in this research:

1. The first phase discovers the financial barriers related to the co-owners associations when financing their energy renovations.
2. 'Define phase' identifies the available financial opportunities for co-owners associations in the Dutch context.
3. In the second diamond, the process is repeated: through in-depth interviews, diverse variables and perspectives are explored (divergence) and subsequently developed into the concept financing instrument framework.
4. The last phase delivers a framework evaluated by the co-owners association board.

The double diamond theory framework supports the process through divergent exploration and convergent synthesis of information and is visualised in figure 13.

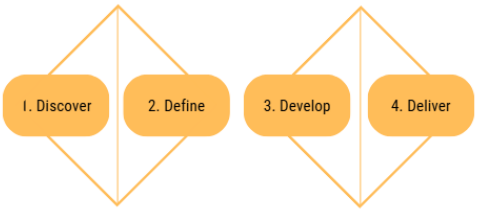


Figure 13: Double diamond framework (own work based on British Design Council, 2005).

4.1.2 Planned Behaviour Theory - (Ajzen, 1991)

The Theory of Planned Behaviour (TPB) explains how intention and behaviour are formed from three aspects:

1. Attitude (expected benefit) ← towards behaviour
2. Subjective norm (perceived expectations of important others) ← descriptive beliefs
3. Perceived behavioural control (perceived capabilities, resources, and barriers) ← control beliefs

These aspects shape intention, when actual control is imperfect, the perceived behavioural control may affect behavioural directly, each determinant is underpinned by corresponding behavioural, descriptive beliefs, and control beliefs, which can be measured with brief scales and prompts. The aspects are visualised in the theoretical framework of Ajzen (1991) in figure 15. The curved arrows, among the first three aspects, indicate that these determinants can be correlated rather than independent (Ajzen, 1991). The solid arrows to intention shows that more favourable attitudes, stronger supportive norms, and greater perceived behaviour control, increase the intention to act. The intention predicts behaviour.

The theory is used to analyse adoption and compliance decisions because it separates motivation (attitude) from capability (perceived behavioural control). This makes it suitable for organisational contexts such as co-owners association decision-making.

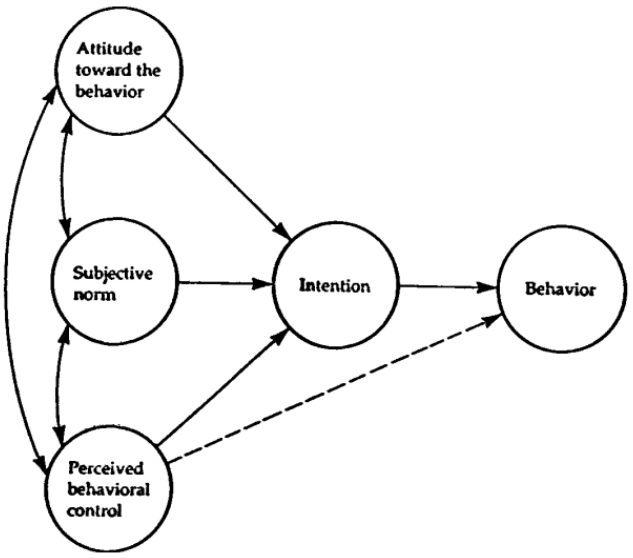


Figure 14: Theory of Planned behaviour (TPB) (Ajzen, 2009)

4.1.3 Diffusion of Innovation Theory - (Rogers, 1962)

Rogers' Diffusion of Innovation explains how a new idea, tool, or way of working (innovation) spreads through a social system over time (Rogers, 1962). Adoption of the research group follows an S-curve and involves a decision process with five stages:

1. Knowledge
2. Persuasion
3. Decision
4. Implementation
5. confirmation

The research target group can be divided into: innovators, early adopters, early majority, late majority, and laggards. These categories differ in risk tolerance, information needs, and reliance on evidence from others. The strongest predictors, whether and how quickly an innovation will be accepted, are its perceived characteristics (Rogers, 1962):

- Relative advantage: the degree to which it seems better than the currency practice
- Compatibility: fit with existing values, needs, rules, and workflows
- Complexity: how hard it is to understand and use (should be low)
- Trialability: the ability to test on a small scale before full commitment
- Observability: how visible and credible the results are

Higher perceived attributes, lead to faster and broader uptake (Rogers, 1962).

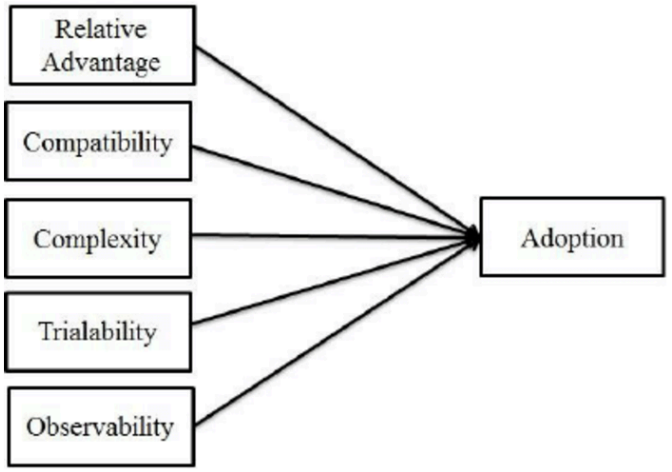


Figure 15: Diffusion of Innovation Theory (own figure, based on Rogers, 1962)

4.2 Theoretical contribution

4.2.1 Contribution of the Double Diamond

In the first diamond, the discovery and defining phase involves exploring and understanding the financial barriers and opportunities for Dutch co-owners associations in their energy transition.
The second diamond focuses on solution creation. The developing phase generates and refines potential solutions. The output is a concept financing instrument framework. Lastly, the delivery phase evaluates the framework for the co-owners association boards and experts.

The Double Diamond model thus supports the general research logic by finding a balance between exploration and validation, allowing the theoretical and empirical components to be matched throughout the research process.

4.2.2 Contribution of the Planned behaviour theory

To identify the behavioural, regulatory, and operational requirements that enable co-owners associations to access public and private finance, this sub-question applies the Theory of Planned Behaviour developed by Ajzen (1991). The theory explains that intention is the most immediate predictor of behaviour and is shaped by three interrelated determinants: attitude, subjective norm, and perceived behavioural control.

These determinants are not independent attributes. They jointly form an intention. Boards may have a positive attitude towards renovation but still show low intention if perceived control is low or if norms are unsupportive. Intention then translates into behaviour, while perceived behavioural control can also constrain or enable behaviour directly when practical resources or barriers are decisive. Therefore, in sub-question 3 this thesis focuses on intention formation as the key outcome, because many associations remain in a long preparation phase before renovation behaviour becomes observable.

In the context of co-owners associations, these determinants shape how board members perceive the feasibility and desirability of engaging in financing processes for deep energy renovations. A positive attitude towards sustainable investments, supportive social norms within the association, and control over procedural and financial decisions increase the likelihood that boards will progress from discussion to finance-ready preparation (Ajzen, 1991). See the conceptual framework below.

Because the three determinants can reinforce or constrain each other, the analysis focuses on how changes in information, process support, documentation requirements, and governance arrangements could increase perceived behavioural control and strengthen supportive norms, thereby improving intention to proceed with financing and renovation decisions. In the empirical research, the arrows in figure 16 and 17 are used to interpret the cases: how attitudes, norms and control combined to produce intention, and whether intention did or did not translate into observable preparatory actions.

Applying the theory translates each identified requirement and barrier into interview prompts related to attitude, subjective norm and perceived behavioural control. The behavioural insights connect the practical design requirements, which ensures that the framework model will address the financial barrier within co-owners associations. This allows to assess the intention and observed steps taken towards a financial model, and identify where the model overview and policy recommendations should provide support.

In this research, the Theory of Planned Behaviour is applied in two related but distinct ways. In the first interview round, TPB serves as a sensitising concept to explore how association boards perceive deep energy renovation and its financing, with intention to proceed as focus.

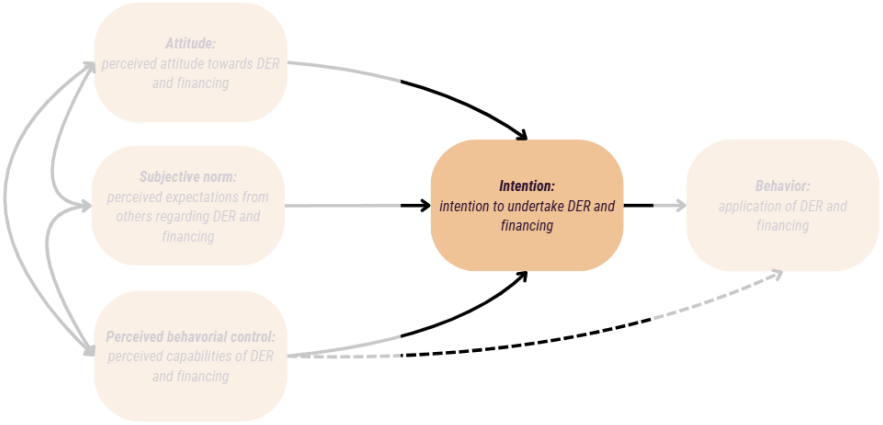


Figure 16: Conceptual framework of the TPB for SQ3 (own figure, 2025)

In the second interview round (sub-question 4), the behavioural object shifts from renovation/financing to using the developed framework. TPB is therefore used more explicitly to interpret intention to adopt the tool and the conditions under which boards expert to use it in practice.

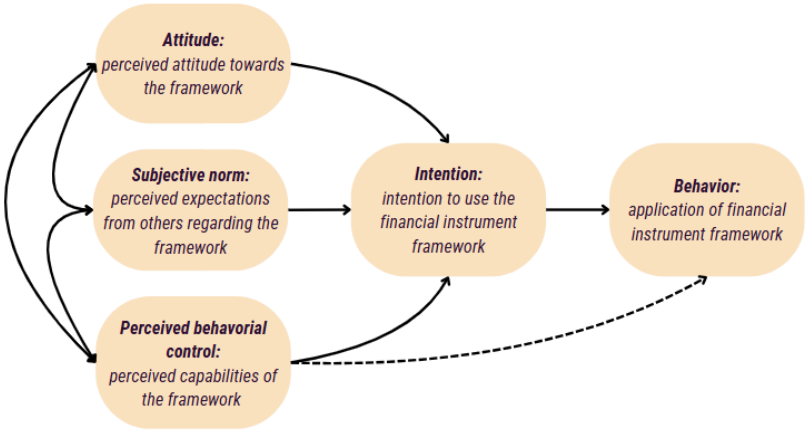


Figure 17: Conceptual framework of the TPB for SQ4 (own figure, 2025)

4.2.3 Contribution of the Diffusion of Innovation Theory

Sub-question 4 uses Rogers' Diffusion of Innovations to evaluate the adoptability of the proposed framework model for co-owners associations. The aim is to determine whether this framework model is usable and feasible for boards and whether adjustments need to take place.
The innovation is defined as the framework model that boards would use to structure deep energy renovations by using financial resources. The framework consists of the set of data, regulatory, operational requirements from sub-question 3, guidelines for public and private financial models, and policy measurements intended to reduce effort, risk, and time.
The board assesses the package on the five aspects from the theoretical framework of the theory, see figure 15.
The validation interview sessions for the second round of interviews with the same co-owners association boards, include: Likert scale items, targeted prompts, and preference tasks/rank models.

Synthesis of the Diffusion of Innovation Theory regarding the thesis context:

- Relative advantage: the framework and documents must beat current practices
    - Faster approvals, lower costs, lower effort
- Compatibility: fit existing GAM rules, workflows,and documentation
- Complexity: must be easy to understand and apply with current capacity and tools
- Trialability: boards need a safe way to pilot on a small scope
- Observability: credible results and examples from others must be visible so it will be recognisable what a succeeded adopted innovation looks like.

4.3 Theory integration

This subsection clarifies how each theory informs the research design, data collection, and analysis. It directly links the theoretical choices in Chapter 4 to the four sub-questions and the overall framework model.

Sub-questions	Theory	Operationalization in study	Outputs
Process framework to the structure of the research.	The Double Diamond Theory (British Design Council, 2005)	Research into 4 stages: P1/4: diverge-converge cycles	Organised research process work
SQ3: Data, regulatory, and operational requirements	Theory of Planned Behavior (Ajzen, 1991)	Semi-structured interviews; code themes around attitudes, subjective norms, and perceived behavioral control of boards.	Requirements list for 'finance-ready' dossiers; process constraints
SQ4: Framework usability and adoption	Diffusion of Innovation Theory (Rogers, 1962)	User testing interviews on perceived usefulness and ease of use; intent to use; improvement backlog.	Validated framework model; usability report, hypothesis verdict

Table 19: Overview of operationalisation (own table, 2025)

Figure 18 illustrates how the Theory of Planned Behaviour (Ajzen, 1991) forms the basis for the decision making process of co-owners association boards when considering financing options for deep energy renovations, and how this is connected to the Diffusion of Innovation theory (Rogers, 1962).
The model creates a bridge between two theories. The theories were combined. TPB is applied to assess how the framework is perceived based on attitudes, and perceived social norms. Rogers' five adoption attributes were used to assess the usefulness of the framework as an innovation. Together they offer a comprehensive perspective for analysing both the motivational and practical factors that influence acceptance and adoption.

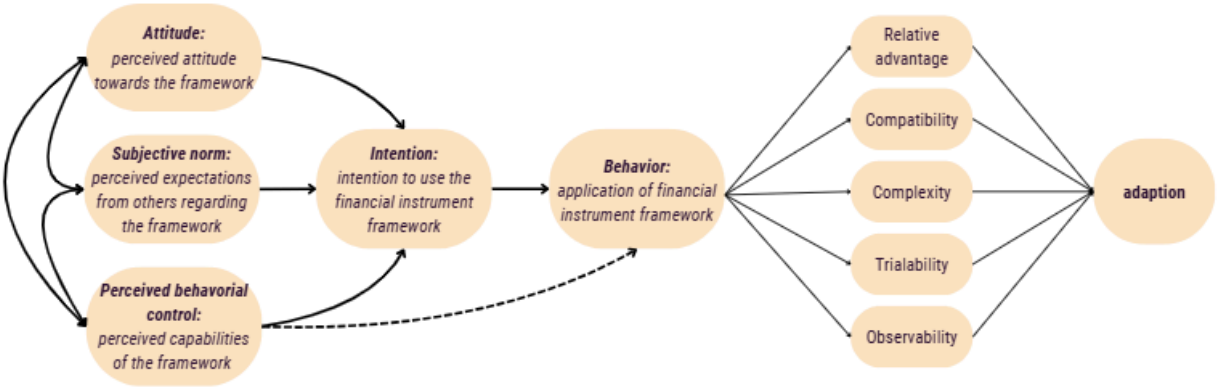
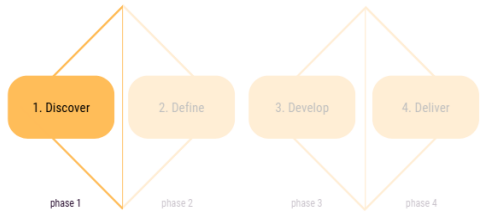


Figure 18: Theory Ajzen and Roger linked according to sub-question 3 and 4 (own figure, 2025)

5. Financial barriers



Discover the financial barriers to deep energy renovation and the opportunities to overcome them.

This chapter answers the first sub-question: *What are the financial barriers for Dutch co-owners associations to undertake energetic renovations to their condominiums?*

5.1 Financial barriers overview

The financial barriers are discovered according to the synthesized evidence from Elgendy et al. (2024a), whose findings are results from the workshops, interviews, and observations, and Bertoldi et al. (2021) on European studies regarding renovation finance. These are shown in table 20.
Figure 19 is based on the Condo Reno regional survey among condominium co-owners in the Netherlands and Flanders (Elgendy et al., 2025). It indicates that the most frequently cited obstacles by respondents planning to renovate are financial constraints, and the report's analysis focuses on 339 responses.
According to both studies, the three main financial barriers for co-owners associations are high upfront costs, difficult collection of funds, and lack of sufficient funding.
Table 20 gives an overview of all financial barriers according to Elgendy et al. (2024a).

Barrier	Code	V	Proposed solutions and recommendations	P	Stakeholder
Financial barriers					
High-upfront costs	G-2	✓	– Combination of Financial Instruments and Pre-Financing of High Upfront Costs – Creation of Collective Upfront Funds – Increasing Reserve Funds of HOAs – Clear Communication of Long-Term Benefits – Utilize Scale and Neighbourhood Approach (cost-effective strategies) – Planning and Support by Semi-Public Institutions – Reflection by G-1: – Clear living Costs and Maintenance Plans – Integrated Approach for Retrofit Projects – Coordination and Alignment of stakeholders is crucial to eliminate transaction costs	5	– Financial advisor – Building cost specialist – HOA Manager – Maintenance specialist – IHRS providers
Difficult collection of funds	G-2	✓	– Subsidizing or Pre-financing Process Guidance – Simplification of financing collection	3	– Financial advisor – Finance institutions
Lack of sufficient funding	G-2	✓	– Creation and stimulation of the financial market to offer an attractive offer – Offering governmental incentives for ambitious label improvements – Creating trust between financial providers and HOAs	4	– Municipality – National governments
Split incentives	G-2	✓	– Motivation of HOAs to increase the total building value – Exploration of legal options to combine subsidies	3	– HOA Manager – Legal expert
The financial burden for homeowners	G-2	✓	– Optimizing incentives to support small HOAs and vulnerable groups – Reflection: – Many existing policies and programs do not prioritize small condominiums (mostly managed by homeowners) – Importance to prioritize training for individuals – Raising professional awareness of retrofit project potential in small condominiums	4	– Municipality – Policy makers
CMs Business case	G-2	✓	– Revising the contractual agreements between HOAs and CMs – Including future renovation plans in the contracts with CMs	3	– Legal expert – HOA board – Sustainability commission
Investors hesitancy	G-2	x	– The group mentioned that the reluctance of investors to engage in loans with extended payback periods is not a significant barrier for HOAs	2	–
Added barriers					
Higher service costs after renovation	G-2		– Paying special attention to vulnerable groups by providing additional subsidies Reflection: G-1 Considered this more of a social barrier	5	– National governments
Pre-existing Physical Defects in Buildings	G-2		– Conducting feasibility studies to assess the benefits of renovating such buildings – Integrating energy renovations in the infrastructure upgrade plan	1	– Architect/ construction engineer

Table 20: Overview of financial barriers according results of workshop, interview, (Elgendy et al., 2024)

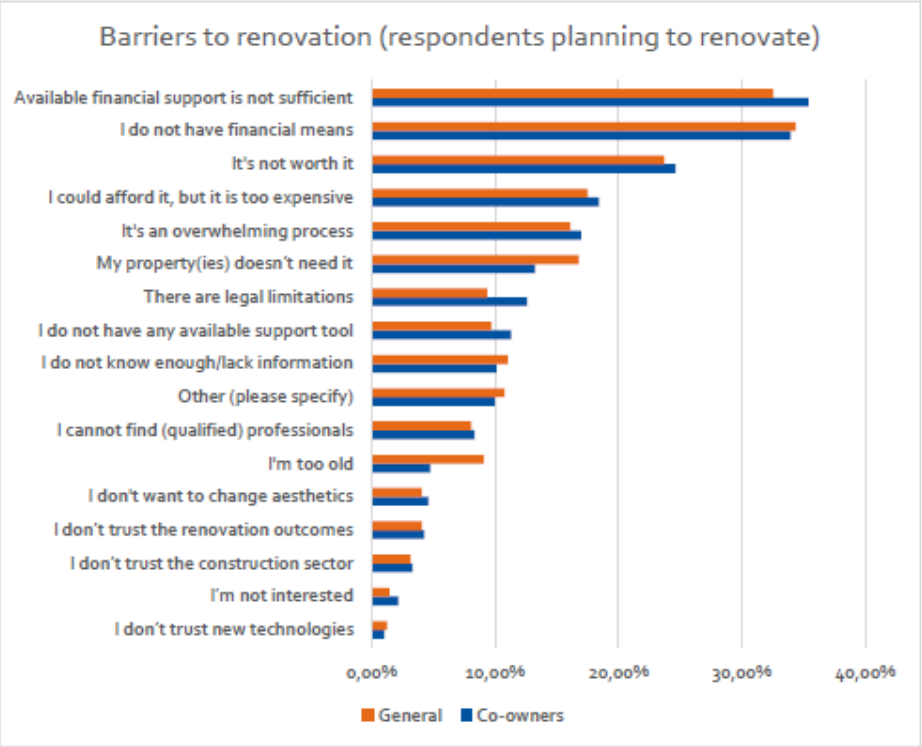


Figure 19: Barriers to renovation (Elgendy et al., 2025)

5.1.1 High upfront costs

Deep energy renovations involve high costs (Elgendy, 2024a). Co-owners associations need to agree collectively on the financing, when undertaking deep energy renovations on the common areas. This makes barriers of initial costs significant. Bertoldi et al. (2021) identifies high upfront investment costs and lack of access to finance as primary causes of low adoption. The combination of limited project size and perceived performance inflates transaction costs. This reduces the availability of long term loans that match renovation paybacks (Bertoldi et al., 2021).
Common consequences among co-owners associations with insufficient financial resources is the elimination of measures to reduce costs, postpone the maintenance cycle, and the implementation of only less expensive sustainability measures and/or maintenance measures instead of the deep energy renovation measures (Elgendy et al., 2024a).

For small co-owners associations, fixed preparation and transaction costs per dwelling are high and reserve funds are relatively smaller. Deep energy renovation projects for smaller associations feel more expensive compared to larger associations, where economies of scale can improve pricing. However for larger associations, budgets become very large, quorum and consent requirements slow decision making, and lenders may require more stricter due diligence, which adds costs (Elgendy et al., 2024b).

5.1.2 Difficult collection of funds

According to Elgendy et al., (2024a) the difficult collection of funds refers to the fragmented process of assembling funds from multiple sources. Associations need to select between the possibilities between subsidies, loans, and other instruments. These issues entail complex applications and difficulties in accessing subsidies in arranging funding (Elgendy et al., 2024).

Larger co-owners associations typically often have more access to professional management and advisors, but face stricter documents in order to meet the requirements for funding. Smaller co-owners associations struggle often with limited administrative capacity to prepare applications (Elgendy et al., 2024b).

5.1.3 Lack of sufficient funding

Lack of sufficient funding describes the gap between the total renovation budget and what the co-owners association can assemble from subsidies, loans, and third parties (Elgendy et al., 2024).
Public investment models do not cover all the energy renovation costs. Grants and subsidies ease costs, but often do not fully cover comprehensive packages.
Also private investment resources are not always aligned with the co-owners association needs when undertaking energy renovations. Lenders face high transaction costs on smaller associations, and uncertainty regarding savings, which increases the supply or shortens the loans (Elgendy et al., 2024a).
In practice, associations also reduce the scope, phasing works to chase funding windows or postpone projects.
The size of the co-owners association is related to the available financial resources. There are subsidy caps per association. Larger associations have access to larger loans. Some financing models set requirements that small associations can not meet (Elgendy et al., 2024b).

5.1.4 Split incentives

Collective willingness declines due to split incentives, because stakeholders who carry the costs of energy renovation are not the same as those who benefit most from the advantages (Elgendy et al., 2024a). In co-owners associations, owners who plan to sell their apartment in the short term, may resist measures with a long payback period whose benefits mainly will be for future residents. Also landlords may prefer higher rental income over energy savings on the tenants' energy bills (Elgendy et al., 2024a). This mismatch reduces support for comprehensive energy renovations. In small associations, a single owner can block or delay progress in their energy renovation. In larger associations, a more diverse mix (landlords/housing) increases the difficulty in agreeing on sustainability decisions. This makes it challenging to retrieve quorum (Elgendy et al., 2024b).

5.1.5 Financial burden for individual co-owners

Even when collective financing is available, the distribution of contributions can place an unequal burden on individual co-owners (Elgendy et al., 2024a). Differences in income, and mortgage capacity mean that a one-time increase in fees or a one-time charge is not affordable for all members. These differences lead to resistance during voting. This demands for phasing, or insistence on the cheapest options, which can undermine the level of ambition for the renovation (Elgendy et al., 2024a).

When one-time charges are needed, the amount of this contribution is relatively large for small co-owners association members. For larger co-owners associations, the burden is spread over more members (Elgendy et al., 2024b).

5.1.6 Condominium managers Business case

Condominium managers often lack a strong business case to initiate deep energy renovations (Elgendy et al., 2024a). In practice, acceptance depends on convincing co-owners and boards to use these services and take action based on the recommendations. This process is often hindered by limited financial resources. Although support to finance advice can lower management barriers, progress depends on the decisions and the willingness of the association to allocate resources to project development and implementation (Elgendy et al., 2024a).

5.2 Output sub-question 1

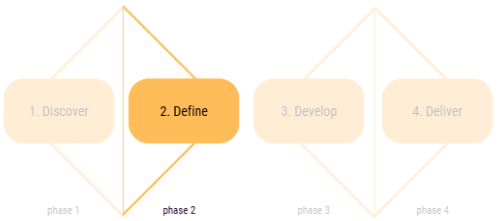
This chapter answers the first sub-question: ‘What are the financial barriers for Dutch co-owners associations to undertake energetic renovations to their condominiums?’.

5.2.1 Answer to sub-question 1

Based on Elgendy et al. (2024b, 2025), seven related financial barriers are discovered as most relevant for the Dutch co-owners associations context.

1. High upfront costs: deep energy renovation requires initial investments that exceed the reserve fund and regular contributions.
2. Difficult collection of funds: assembling a complete financing package regarding loans, subsidies, and own resources is administratively complex. Fragmented application procedures and documentations particularly challenge small associations.
3. Lack of sufficient funding: existing public and private instruments often do not fully cover the renovation packages. This leaves a financing gap.
4. Split incentives: the distribution of costs and benefits across different owner types decreases the collective willingness to commit to long-term investments.
5. Financial burden for individual co-owners: differences in income, borrowing capacity, and risk tolerance, mean that higher contributions or special charges are not equally affordable, which reduces support for sustainable measures in the general assembly meeting.
6. Condominium managers’ business case: professional and volunteer managers have limited incentives, time, and resources to initiate renovation projects without a specific business model.

6. Financial opportunities

	Define the available opportunities to overcome the financial barriers.

This chapter answers the second sub-question: *What are the financial opportunities available for Dutch co-owners associations to undertake energetic renovations to their condominiums?*

6.1 Scope and selecting financing instruments

Building on the financial barriers discovered in chapter 5, this chapter defines the available instruments that can (partly) mitigate these constraints by financing deep energy renovations for Dutch co-owners associations. This research only focuses on the instruments that can be used to finance common energy saving measures from the co-owners association. Therefore not all instruments from 3.5 are discussed.

Two choices regarding the scope need to be made clear. Firstly, the detailed tables of public instruments in section 6.2 only relate to schemes that are currently operational for Dutch co-owners associations as legal entities and directly finance energy saving measures in the common parts of the building or the renovation package as a whole. Instruments such as Duurzaamheidslening, ISDE and SPOR are therefore not elaborated on further here. The Duurzaamheidslening and ISDE are a national loan/subsidy for individual co-owners and commercial users and cannot be combined with the SVVE subsidy, which is specifically aimed at co-owners' associations. SPOR only subsidises process support by a professional facilitator and does not finance the energy-saving measures themselves. The schemes are relevant as part of the broader policy framework, but do not function as key financing instruments as they are not part of the scope.
Secondly, the overview of private instruments in section 6.3 makes a distinction between instruments that are already used in Dutch practice by co-owners associations (reserve fund, private bank loans, crowdfunding and third-party financing) and a small group of innovative models from international literature (one-stop-shop approaches, ESCO/energy performance contracts and on-bill financing). These innovative instruments are not yet common in the Netherlands and there are no standardised Dutch product specifications similar to those for public loans and subsidies. For this reason, they are discussed in this chapter at a more conceptual level. They serve as potential mechanisms for the future development of instruments and to provide input for the framework for financing instruments.

Public and private financial instruments have the potential to reduce the initial investment needs and improve access to external credit. Figure 20 presents co-owners associations' preferred types of financial support, illustrating a demand for direct cost-reducing instruments, followed by preferential loans, and free advice (Elgendy et al., 2025). These preferences emphasise the importance of instruments that both lower upfront costs and simplify decision-making, directly reflecting the main barriers identified in chapter 5. This chapter therefore provides a structured overview of relevant Dutch public and private instruments and assesses their potential to address financial barriers faced by co-owners associations.
In addition to loans and subsidies, fiscal rules can directly reduce the gross investment amount that needs to be financed. Because these measures do not provide upfront capital, they are not treated as separate financing instruments in this research. They are included as cost-reducing parameters in the total investment assumptions and where relevant, in the net monthly impact calculation.

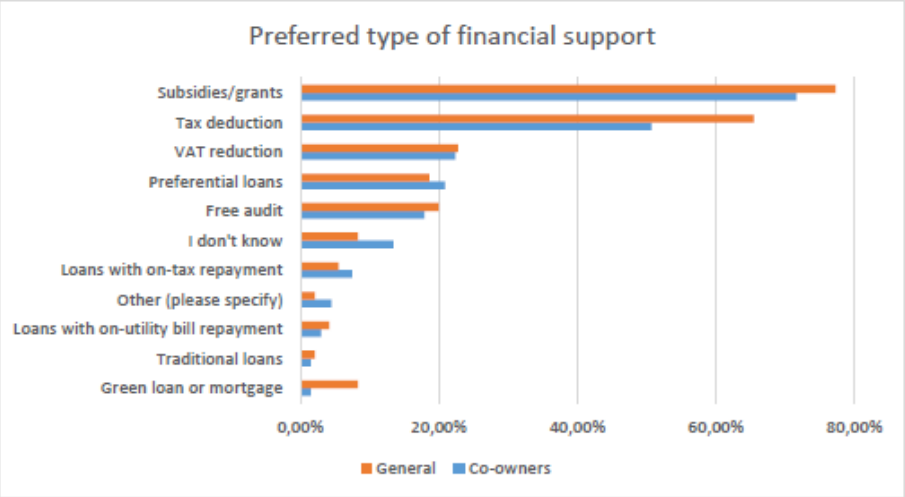


Figure 34: Respondents preferred type of financial support

Figure 20: Respondents preferred type of financial support (Elgendy et al., 2025)

6.2 Public instruments

Each table below gives an overview of the available public instruments and their specifications related to the Dutch co-owners associations context.

6.2.1 Energie bespaarlening

Instrument	**Energie bespaarlening - Nationaal Warmtefonds**
Purpose	Finance collective (deep) energy renovation measures, overcome upfront costs and align cash flows with long term savings (Warmtefonds, n.d.) can be combined with maintenance works when measures qualify under the eligible list
Borrower	COA as legal entity
Repayment	- Fixed rate - Amortizing monthly payments per members to their shares per the deed
Eligibility	- COA with GAM minutes authorising loan, scope and decision - Intended measures must be on Warmtefonds' eligible measures list - Deed allows external borrowing - Up to date COA regarding administration and annual accounts - Documentation aligns with Warmtefonds
Terms and conditions	- Public loan granted to the COA - Expenditures against approved inspection - product -specific maximums per apartment and minimum project size → caps
Required data	- Customized co-owners association energy advice - Defined scope and quotes - GAM minutes with budget and financing decision making - SMYMP - COA annual accounts and arrears overview - Financing plan and regulations for COA internally - Permits when applicable - Quotations
Decision timeline	13 week assessment and decision period
Risks for COA	- Higher monthly COA payments to cover debt service - Non payment by single co-owners - Coordination risk if scope or price changes
Risks for lenders	- Small project economics - Consumer credit risk
Primary barriers mitigated	- High upfront costs - Difficult collection of funds - Contributes to insufficient funding
Risks reduced	- Liquidity constraints (payments over time) - Execution risks
Sources of capital	Government + co-financiers (Rijksoverheid, banks, European banks)
Co-funding	- COA reserve fund - Subsidies - External lender financing
Caps	- Max €35.000 per apartment (standard). - Exception: up to €70.000 (Zeer Energiezuinig Pakket) - Up to €91.000 (Nul-op-de-meter).

	- Minimum facility €25.000 per COA.
Interest rates	Fixed, according to figure 23 (may 2025).
Term	7-10-15-20 years. Duration depends on package, scope and loan amount.
Deadline	Rolling intake

Table 21: Specifications Energie bespaarlening - Warmtefonds (Warmtefonds, 2025)

Figure 21 represents the current effective annual interest rates for the Energiebespaarlening offered by the Nationaal Warmtefonds. The rates vary by loan duration, starting at 3,61% for 7-10 year terms, rising to 4,11% for 15 years and 4,16% for 20 years. A 20-year term is only available for loans exceeding €15.000, in combination with Combinatielening, which integrates multiple eligible measures into a single package.

Effectieve jaarrente bij 7 jaar	Effectieve jaarrente bij 10 jaar	Effectieve jaarrente bij 15 jaar	Effectieve jaarrente bij 20 jaar*
3,61%	3,61%	4,11%	4,16%

* Een looptijd van 20 jaar is alleen mogelijk bij leningen van meer dan € 15.000 en bij een Energiebespaarlening met een Combinatielening.
Deze tabel is voor het laatst bijgewerkt op 16 mei 2025.

[Translation]
Effective annual interest rate (7-year term): 3.61%
Effective annual interest rate (10-year term): 3.61%
Effective annual interest rate (15-year term): 4.11%
Effective annual interest rate (20-year term*): 4.16%
*A 20-year term is only possible for loans of more than €15,000 and for an Energiebespaarlening combined with a Combinatielening (combination loan). This table was last updated on 16 May 2025.

Figure 21: Current rate Energiebespaarlening (Warmtefonds, 2025).

6.2.2 VvE Ledenlening

Instrument	**VvE Ledenlening (through Warmtefonds) (VVE Ledenlening Nationaal Warmtefonds - Warmtefonds, n.d.)**
Purpose	Enable individual owners to finance their personal share of the COA energy renovation project, so affordability does not block collective decisions.
Borrower	Individual apartment owner within COA that intends to implement (deep) energy renovations
Repayment	When the apartment is sold, the outstanding debt is repaid.
Eligibility	Members of COA undertaking an eligible project, individual creditworthiness, alignment with COA project timeline.
Terms and conditions	- COA applied for the 'Energie bespaarlening' - Homeowner of the apartment within the COA - COA of > 7 apartments - COA monthly contribution increases because of the 'Energie bespaarlening'.
Required data	- Application number of 'Energie bespaarlening' COA - Income statement - Proof of payment of monthly contribution to COA - Copy of personal identification
Decision timeline	Weeks
Risks for COA	-
Risks for lenders	Consumer credit risk
Primary barriers mitigated	Financial burden for individual co-owners
Risks reduced	Affordability in order to avoid non-payment risk
Sources of capital	Nationaal Warmtefonds
Co-funding	VvE energie bespaarlening, COA reserve fund, external lender financing, subsidies
Caps	- Single household: max income €28.250/year - Multi person household: max income €39.500/year - Apply within 3 months after start date of the 'Energie bespaarlening' - Monthly support: minimum €25/month - Monthly support: maximum €150/month - Monthly support: not higher than the part of the contribution increase related to the 'Energie bespaarlening'. - Payout period is fixed at 10 years. The amount decreased annually.
Interest rates	0%. Each year, the amount you receive per month decreases. The amount withdrawn is determined depending on the increase in the contribution by the loan from the Energiebespaarlening.
Term	Maximum 10 years
Deadline	Application within 3 months after start date of 'Energie bespaarlening'.

Table 22: Specifications VvE Ledenlening - Warmtefonds (Warmtefonds, 2025)

6.2.3 SVVE

Instrument	**SVVE - Subsidieregeling Verduurzaming Voor VvE's (RVO, 2025)**
Purpose	Non repayable subsidy to lower upfront costs of collective energy saving and renovation measures in COA.
Receiver	COA as legal entity
Repayment	-
Eligibility	- measures on the SVVE list - quality conditions - timing window
Terms and conditions	- Application after implementation (1. Sustainability audits, 2. Sustainability measurements, 3. Charging point advice and charging infrastructure) - One time grant - At least 1 privately owned apartment - State support declaration per landlord when rental properties are involved - Execution by professional contractors - Execution within 2 years after receiving the subsidy - Fragmented execution of measurements should be combined when applying for the subsidy. - Request before implementation of measures - No commercial real estate - No extension and general renovations of dwellings - Not in combination with other subsidies
Required data	- Application form - GAM minutes - Invoices - Requirements invoices and reports in figure 22. - Required insulation value, see figure 23.
Decision timeline	- RVO decides within 13 weeks after completion - For grants > €25.000 a 70% advance payment is provided after approval.
Risks for COA	- Award uncertainty - Rejection if conditions or technical requirements are not met - Timing risk
Risks for lenders	-
Primary barriers mitigated	- High upfront costs - Lack of sufficient funding - Difficult collection of funds (by simplifying and standardising support) - Partially support overcoming split incentives by improving collective payback - Individual burden
Risks reduced	- Liquidity pressure - Decision and knowledge risk
Sources of capital	National government budget administered by RVO
Co-funding	- COA reserve fund - Warmtefonds - VvE ledenlening - Private financing.

Caps	- Max. 75% of costs - €20,000 for 1-10 homes. - €30,000 for 11-30 homes. - €40,000 for >30 homes.
Interest rates	-
Term	Execution within 2 years
Deadline	Open 01-01-2025 to 31-12-2027

Table 23: Specifications SVVE (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025b)

Soort advies	Opgesteld door	Certificering	Certificaat-nummer verplicht?	Datum advies
Energie-advies	EPA-adviseur	BRL9500-02	Ja	Tot 01-07-2024
	EP-adviseur	BRL9500-MWA-W	Ja	Geen einddatum
Maatwerk-advies	EP-maatwerk-adviseur	BRL9500-MWA-W	Ja	Geen einddatum
DuMo-advies	ERM-adviseur	BRL ERM 2000	Nee	Geen einddatum

Figure 22: Requirements of energy audits (RVO, 2025).

Minimale isolatiewaardes en oppervlaktes			Monument
Maatregel	**Minimale isolatiewaarde[1]**	**Minimale oppervlakte[2]**	**Afwijkend**
Spouwmuurisolatie [4]	Rd ≥ 1,1 m^2K/W	10 m^2 per woning	
Gevelisolatie	Rd ≥ 3,5 m^2K/W	10 m^2 per woning	Minimale isolatiewaarde [1]: Rd ≥ 2,5 m^2K/W
Dak-/zoldervloerisolatie [4]	Rd ≥ 3,5 m^2K/W	70% hele dak of zoldervloer van het gebouw	Minimale isolatiewaarde [1]: Rd ≥ 2,5 m^2K/W
Vloer-/bodemisolatie	Rd ≥ 3,5 m^2K/W	70% hele vloer of bodem van het gebouw	
HR++ glas	Ug ≤ 1,2 W/m^2K	3 m^2 (zie [5])	
Isolerende panelen in het kozijn met HR++ glas	Up ≤ 1,2 W/m^2K	Zie glas [6]	Zie glas [6]
Isolerende deuren	Ud ≤ 1,5 W/m^2K (deur)		
Triple-glas in combinatie met nieuw isolerend kozijn	Ug ≤ 0,7 W/m^2K (triple-glas)		
	Uf ≤ 1,5 W/m^2K (kozijn)		
Isolerende panelen in het kozijn met triple-glas in combinatie met nieuw isolerend kozijn	Up ≤ 0,7 W/m^2K (paneel)		
	Uf ≤ 1,5 W/m^2K (kozijn)		
Isolerende deuren in combinatie met nieuw isolerend kozijn	Ud ≤ 1,0 W/m^2K (deur)		
	Uf ≤ 1,5 W/m^2K		
Hoogrendementsglas of voor-/achterzetbeglazing	Ug ≤ 3,0 W/m^2K	3 m^2 (zie [5])	
Isolerende panelen in het kozijn met bovenstaand glas Ug ≤ 3,0	Up ≤ 3,0 W/m^2K	Zie glas [6]	
Hoogrendementsglas of voor-/achterzetbeglazing	Ug ≤ 2,0 W/m^2K		
Isolerende panelen in het kozijn met bovenstaand glas Ug ≤ 2,0	Up ≤ 2,0 W/m^2K		
Isolerende deuren	Ud ≤ 2,0 W/m^2K (deur)		

Figure 23: Requirements insulation measurements (RVO, 2025)

6.2.4 TOF

Instrument	**TOF - Toekomstbestendig Onderhoudsfonds (SVn, n.d.c)**
Purpose	Finance building maintenance and sustainability upgrades in one fund. A share of the loan must go to the energy saving measures.
Borrower	COA as legal entity > 7 apartments
Repayment	- Fixed rate - Amortizing monthly payments per members to their shares per the deed
Duration and repayments	- 10-15-20 years - fixed upfront - Early repayment possible
Eligibility	- Mixed-ownership possible - Updated SMYMP available - COA with 8+ apartments - GAM minutes authorizing the loan - Measures must be on the fund's eligible measures list - Deed allow external borrowing
Terms and conditions	- Delivered by SVn - Minimum loan €50.000 per COA - Maximum loan €65.000 per apartment - Payments through COA bank account - Funds offer valid for 3 weeks - 20% of planned measurements must be energy-saving - In-and out option for landlords
Required data	- Application form SVn - (S)MYMP - Scope + quotations - Affordability plan - GAM minutes + decision - reserve-fund overview - Financial statements - planning/permits if applicable
Decision timeline	Rolling intake, funds available within 3 weeks
Risks for COA	- Higher monthly contributions to cover debt service - Risk of late monthly payments by individual owners
Risks for lenders	- Execution risk during works - Small/medium projects increase transaction costs
Primary barriers mitigated	- Misalignment between the reserve plan and actual project timing - High upfront costs - Liquidity constraints
Risks reduced	- Liquidity risk (spreading costs over time) - Execution risk (controlled audits)
Sources of capital	Governmental BNG Bank, Invest-NL
Co-funding	- COA reserve fund - Warmtefonds - External lender financing

	- Private instruments
Caps	- €50.000 minimum per COA - Up to €65.000 per apartment.
Interest rates	5,80% for 20 year term
Term	10-15-20 years
Deadline	Rolling intake. Offer valid 3 weeks after issue.

Table 24: Specifications TOF (SVn, n.d.c)

6.2.5 Stimuleringslening kleine VvE

Instrument	**Stimuleringslening kleine VvE (SVn, n.d.b)**
Purpose	Finance building maintenance and sustainability upgrades in one fund. A share of the loan must go to the energy saving measures.
Borrower	COA as legal entity < 8 apartments
Repayment	- Fixed rate - Amortizing monthly payments per members to their shares per the deed
Duration and repayments	- 10-15-20 years - fixed upfront
Eligibility	- COA located in a municipality that offers the loan via SVn - 2 building improvement measures - At least 1 energy-saving measure - Deed allows external borrowing
Terms and conditions	- Loan available via municipality and executed by SVn - Minimum loan per COA is €2.500 - Maximum loan per apartment is €25.000 - Maximum loan per COA is €175 - NHG guarantee - 1% closing fee (minimum €1.500) - Payment via construction payment based on invoices
Required data	- Application form SVn - (S)MYP - Scope + quotations - Affordability plan - GAM minutes + decision - reserve-fund overview - Financial statements - planning/permits if applicable
Decision timeline	- Municipality allocation - SVn loan assessment - SVn offers construction payment
Risks for COA	- Higher monthly contributions to cover debt service - Risk of late monthly payments by individual owners
Risks for lenders	- Dependence on COA governance - Execution risk during works - Small projects increase transaction costs - NHG takes on part of the risk of default for loans with a guarantee
Primary barriers mitigated	- Misalignment between the reserve plan and actual project timing - High upfront costs - Transaction hurdle - Liquidity constraints
Risks reduced	- Liquidity risk (spreading costs over time) - Non payment risk for small COA when NHG is used
Sources of capital	Municipal funds executed by SVn
Co-funding	- COA reserve fund

	- National subsidies - Additional private financing
Caps	- Min €2.500 per COA - Max €175 per COA
Interest rates	- Fixed at offer - Dependent on municipality - Lower rate when NHG is used
Term	- 10-15-20 years - Application before execution
Deadline	- Rolling intake

Table 25: Specifications Stimuleringslening kleine VvE (SVn, n.d.b)

6.3 Private instruments

Building on the conceptual overview of private instruments in section 3.5.2, this section applies those instruments to the Dutch context. Private financing complements public instruments by adding non-government capital. Section 6.3 elaborates on the ‘money products’ used by co-owners associations, and how they are used with public instruments described in 6.2.

6.3.1 Reserve fund

Statutory savings of the COA, built up via monthly contributions and linked to the (S)MYP. First line in finance, often insufficient for full deep energy renovation but important as co-funding and signal of financial stability to lenders (Burgelijk Wetboek Boek 5, 2024).

Instrument	**Reserve fund**
Purpose	Statutory savings buffer for major maintenance and replacements of common parts.
Who provides it	All apartment owners via their monthly contribution to the association. This contribution is paid into a separate reserve-fund account in proportion to their shares in the deed.
What gets financed	- Big maintenance - Part of energy renovation package
Typical terms	- Internal collective savings - Annual contribution based on a (S)MYMP, or if absent 0,5% rebuild value - Not for day-to-day operation costs - Use of the fund must be decided by the general assembly in line with the deed and (S)MYMP
Eligibility	- Legal obligation for all Dutch COA - Linked to the SMYMP
Risks for COA	- Depletion of reserve - Leaving insufficient buffer for unexpected maintenance and future obligations
Risks for lenders	- Indirect risk: less reserve during/after project, lenders face higher perceived liquidity and default risk because the COA has less buffer for unforeseen costs.
Primary barriers mitigated	- High upfront costs - Lack of sufficient funding (co-funding next to loans) - Condominium manager’s business case (financial stability factor) - Reducing transaction risk for external financiers

Table 26: Specifications reserve fund (Burgelijk Wetboek Boek 5, 2024)

6.3.2 Third-party financing

Table 25 summarises the main characteristics of the common third-party financing instruments in the Dutch co-owners association context. EaaS is service oriented and performance based. The co-owners association pays for the delivered energy services, while providers finances, owns and operates the systems and carriers most technical and performance risk (EaaS, n.d.). Leasing is asset oriented and finance based. The co-owners association pays fixed lease instalments for the right to use the specific installations, carriers

more performance and usage risk itself, and may become owner of the assets through a buy-out at the end of the contract (Solvari, 2025).

Instrument	EaaS	Leasing
Purpose	Transforms upfront investment (capex) in energy systems into returning service payments (opex). The COA buys an energy service instead of assets, while transferring most technical and performance risk to the provider.	Spread the investment in specific installations over the contract period. The COA mainly finances assets through periodic lease payments, with less emphasis on performance guarantees and services.
Who provides it / typical providers	- ESCOs - Installers - EaaS companies	- ESCOs - Installers - Leasing companies
What gets financed	Integrated energy systems. Financing includes both hardware and long-term operation and maintenance.	Technical installations/tangible assets
Typical terms	- Long-term (10-20 years) with periodic fee that covers capital costs, operation, maintenance, and monitoring - Payments are linked to M&V - Provider keeps ownership of the installations during contract	- Fixed lease (5-15 years) with regular rental payments based on the asset value and contract length - Payments are time-based - Ownership and often maintenance stay with the leaser during lease
Eligibility	- COA with sufficient scale and predictable energy demand - Stable payment record and acceptable creditworthiness - M&V-plan	- COA that meet the credit requirements of the leasing company - Technically suitable within the association - Asset should have clear resale value
Risks for COA	- Long term dependence on one provider - Indexation risk over time - Limited flexibility to change systems or suppliers during the contract	- Obligation to pay lease instalments even if actual energy savings or use are lower than expected - Risk of unclear responsibility if maintenance is not included - Residual-risk when COA buys-out at the end of the term
Risks for lenders	- Performance and technology risk - Credit risk on the COA monthly payments - Contract or measurement complexity that increases transaction costs	- Credit risk on the COA lease payments - Asset risk if COA does not meet the payments and the installation must be removed - Regulatory changes affecting return on residual values
Primary barriers mitigated	- High upfront costs - Lack of sufficient funding - Liquidity constraints - Split-incentives by linking payments to delivered savings	- High upfront costs - Liquidity constraints - Lack of sufficient funding - Condominium managers's business case more attractive (buy-out)

Table 27: Specifications third-party financing (EaaS, n.d.) (Solvari, 2025)

6.3.3 Crowdfunding

In the Dutch context, the research focuses on the Collin Crowdfundings, as this is the most accessible crowdfunding financing option for co-owners associations.
Crowdfunding is often added to a package that already includes loans from Warmtefonds, and it is not used as stand alone deep energy renovation financing. In addition, co-owners associations borrow directly from the crowdfunding platform. These platforms do not design, build or operate the measures, in contrast to other third-party financing instruments. (VvE-Belang, 2025a).

Instrument	**Collin Crowdfunding**
Purpose	External financing for COA that find it difficult to obtain bank loans.
Who provides it	Platform Collin Crowdfunding in cooperation with VvE-Belang
What gets financed	- (deep) energy renovations by implementing energy saving measurements. - Regular maintenance
Typical terms	- Market-driven interest rates - Duration maximum 10 years - Annuity loan with monthly payments
Eligibility	- Healthy COA - MJOP
Risks for COA	- Higher financing cost than public loans - Long-term obligation to pay interest and repayments which possibly increase the service charges - Reputation risk towards investors if the project of payment performance is poor
Risks for lenders	- Credit risk that the COA can not meet its monthly payments
Primary barriers mitigated	- Lack of sufficient funding - Investors' hesitancy, because co-investment is structured and professionally screened

Table 28: specifications Collin Crowdfunding (VvE-Belang, 2025a)

6.3.5 One-stop-shop

An OSS bundles project development, technical support and access to finance into a single platform for co-owners associations. Table 29 summarises the main characteristics of the OSS concept, including its purpose, typical terms and key risks for co-owners associations and lenders.

Instrument	**One-stop-shop**
Purpose	Single integrated renovation platform that organises project development, technical and administrative support, contractor coordination and access to financing for deep renovation.
Who provides it	Semi-public renovation platform based on public-private-partnership platforms or private renovation service.
What gets financed	- (deep) energy renovations by implementing energy saving measurements - Pre-financing of subsidies - Third party financing of the initial investment
Typical terms	- Fixed service fee on project costs - Follows contract from OSS - Market-driven interest rates
Eligibility	- COA - Minimum project size - Committed to a measure package
Risks for COA	- Dependence on single platform and its contractor network - Higher financing cost than public loans - Long-term obligation to pay interest and repayments which possibly increase the service charges
Risks for lenders	- Credit risk that the COA can not meet its monthly payments
Primary barriers mitigated	- Limited board capacity and process knowledge - High transaction costs - Fragmented responsibilities between advisors, contractors and financiers - Difficulty of collecting funds

Table 29: specifications OSS (Bertoldi et al., 2021)

6.3.5 On-bill financing

In this instrument, energy measures are financed and repaid via the energy bill rather than through a separate loan taken out by the co-owners association. Table 30 summarises the main characteristics of on-bill financing, including its purpose, providers, typical terms, eligibility criteria, risks and the primary barriers it aims to address.

Instrument	**On-bill financing**
Purpose	Finance energy upgrades and repay them via the energy bill instead of a separate loan payment
Who provides it	Utility or energy supplier often in partnership with public funds or commercial lenders
What gets financed	- Energy efficiency measures and installations
Typical terms	- Fixed monthly on-bill charges based on less costs after applying measurements
Eligibility	- COA
Risks for COA	- Obligation linked to contract - Risk that savings are lower than expected or that charges feel inflexible
Risks for lenders	- Credit risk that the COA can not meet its monthly payments
Primary barriers mitigated	- High upfront costs - Split incentives by linking repayment to energy consumption rather than to individual loans.

Table 30: specifications OBF (Bertoldi et al., 2021)

6.3.6 Energy service company/Energy performance contracts

This mechanism shows that a specialised company takes responsibility for implementing energy measures and is remunerated based on the realised or guaranteed energy savings. Table 31 summarises the key characteristics of ESCO/EPC contracts, including their purpose, typical terms, eligibility, risks and the main barriers they are intended to address.

Instrument	**ESCO/EPC**
Purpose	Implement energy measures with guaranteed performance and repay costs from realised energy savings.
Who provides it	ESCO or contractor specialising in performance-based renovation
What gets financed	- Energy efficiency measures - Technical installations
Typical terms	- Long term contracts - Compensated via a share of verified savings or fixed fee with savings guarantee
Eligibility	- Large projects with sufficient energy use
Risks for COA	- Lower technical and performance risk - Contractual complexity - Obligation linked to contract
Risks for lenders	- Performance and credit risk concentrated on ESCO - Project development and monitoring costs relatively high
Primary barriers mitigated	- Lack of technical expertise - Performance uncertainty - High upfront costs

Table 31: specifications ESCO/EPC (Bertoldi et al., 2021)

6.4 Output sub-question 2

Chapter 5 identified 7 financial barriers that prevent deep energy renovation. Chapter 6 describes the main public and private financial instruments that are currently available, and answers the second sub-question. This section brings both perspectives together by matching the barriers to the instruments that can mitigate them.

6.4.1 Overview of public financing instruments

The public and private instruments described in chapter 6 are summarised in the tables. Each table groups the instruments by type of financing, using the same categories as the typology in section 3.5.5. The application in the timeline links the instruments to the phases in the timeline of section 3.3.1. This shows when the instruments are approved and used.

Instrument	Type of financing	Source of capital	Repayment mechanism	Supporting measures	Level	Applicable when in timeline
Energie bespaarlening	Soft loan	Nationaal Warmtefonds	Annuity via service charge	(deep) energy renovation packages	National	Phase 4, 10-11. Loan starts at 13.
VvE ledenlening	Consumer loan	Nationaal Warmtefonds	Monthly instalment to Warmtefonds	(deep) energy renovation packages specifically linked to Energie bespaarlening	National	Phase 9-11. Payments start from 13.
SVVE	Subsidy	RVO budget	-	Advice, energy renovation measures	National	Phase 3-4, 10-13
TOF	Soft loan	SVn	Annuity via service charge	Overdue maintenance + energy renovation	National implemented by municipalities	Phase 4, 10-11. Loan starts at 13.
Stimulerings-lening kleine VvE	Soft loan	SVn	Annuity via service charge	Overdue maintenance + energy renovation	National implemented by municipalities	Phase 4, 10-11

Table 32: Overview of public financial models based on 3.5 (own table ,2025)

Table 32 shows that the public instruments fall into two functional categories:

1. Upfront capital instruments (Energie bespaarlening, VvE Ledenlening, TOF, SLKV) which provide liquidity before or during execution and are repaid via the monthly service charge
2. Cost reducing instruments (SVVE) which lower the net investment but typically require execution first before full disbursement.

Even if subsidies are available, co-owners associations still need to bridge funding upfront to start measurements and later use the subsidy to reduce the outstanding financing need or monthly burden.
The VvE Ledenlening is designed as a complementary route for individual members and is used alongside collective financing so that members who cannot pay the increased monthly service charges, can still participate.
The instruments differ in verification requirements. Loans mainly require governance and financial documentation, while subsidies additionally require proof of execution to trigger

payment. Explicit measurement & verification of realised energy savings is associated with performance-based contracts.

6.4.2 Overview of private financing instruments

Instrument	Type of financing	Source of capital	Repayment mechanism	Supporting measures	Level	Applicable when in timeline
Reserve fund	Own funds	COA long-term reserves	Monthly contribution per owner	Measures from MYMP	National	Phase 4, 10-11
EaaS	External financing via third-party	Service provider/ investor	Monthly service fee	Long term service contracts for energy performance measures	international, limited in NL	Phase 4, 10-11. Payments during 12-13
Leasing	External financing via third-party	Leasing company	Monthly lease payments from service charge	Maintenance / service agreements/ installations. with the option to buy out at the end of lease.	NL and international	Phase 4, 10-11. Payments from 12-13
Crowd-funding	External financing via small investors	Private investors	Fixed interest paid by contribution of COA	All projects that require funding	NL and international platforms	Phase 4, 10-11. Repayments from 13.
OSS	Service model	Commercial banks, public funds, ESCO (OSS is coordinated platform)	Service fee for OSS next to loan/lease/ EPC	Integrated technical, administrative support, project development, contractor network	International, no standard Dutch product	Phase 2-5, financing in 10-11
OBF	External financing via utility companies	Utility, public fund, third-party financing	Extra charge on energy bill	Energy costs	International, no standard Dutch product	Phase 4, 10-11. Repayments from 13
ESCO/ EPC	Performanc e based contracting	ESCOs own capital/ external lenders using EPC	Monthly payments funded from realised/ guaranteed energy savings	EPCs	International, niche applications in NL	Phase 4, 7-8, 11. Payments 12-13

Table 33: Overview of private financial models based on 3.5 (own table ,2025)

The private instruments in table 33 differ in when money is made available and what evidence is required. Regarding cash-flow timing, instruments such as the reserve fund provide upfront internal capital before execution, while leasing, crowdfunding and EaaS provide external capital upfront that enables procurement and installation, with repayment occurring through monthly service payments. In contrast, On-bill financing and ESCO/EPC models are typically structured around payments after operation, where repayment is tied to realised service delivery or energy cost cash flows rather than a one-off disbursement at the end.

Explicit measurement and verification is most characteristic of performance-based models, especially ESCO/EPC, where payments are linked to realised performance and therefore require ongoing monitoring and verification. In EaaS and some OSS/EPC, M&V may also be included contractually, depending on whether the agreement is performance-based. By

contrast, reserve funds, leasing, and crowdfunding generally do not require M&V, since repayment is not conditional on measured energy savings.

6.4.3 Matching barriers to financing instruments

Table 34 summarises which instruments can (partly) mitigate each barrier. Most instruments operate at the level of the association, by increasing financing capacity or spreading costs over time.

Financial barrier	Relevant public instrument	Relevant private instruments	Critical assessment
High upfront costs	- Energie bespaarlening - SVVE - TOF - Stimuleringslening kleine VvE	- Reserve fund - Crowdfunding - Third-party financing (leasing EaaS, ESCO) - OBF	Grants and soft loans cut upfront cost but rarely close the gap. Additional private funding helps, but increases complexity and requires proper project preparation
Difficult collection of funds	- Energie bespaarlening (single COA loan) - SVVE (Standardised subsidy) - TOF - Stimuleringslening kleine VvE	- Crowdfunding (platform has standard process) - Third-party financing (ESCOEaaS bundles capex and and operation) - OBF (repayment via energy bill) - OSS (organises process)	Collective loans and subsidies simplify collection, but still require a well-functioning owners' association. Private models reduce individual payments, but require legal clarity, scale and trust in new intermediaries.
Lack of sufficient funding	- Energie bespaarlening - SVVE (grant on top of loans) - TOF - Stimuleringslening kleine VvE	- Reserve fund - Crowdfunding (addition) - Third-party financing (from capex to opex via EaaS/ESCO)	Stacking instruments can increase total funding, but the administrative efforts and limitations of the scheme remain significant. Service-based models increase funding capacity but raise long-term payment obligations.
Split incentives	- Energie bespaarlening - SVVE (improves collective payback) - VvE ledenlening (individual top-up)	- Third-party financing (payments linked to service rather than individual cash position) - OBF - ESCO/EPC (repayment from energy savings)	Instruments can mitigate split incentives, but they cannot eliminate them. Linking payments to service or savings helps, but requires having the ability to make decisions when residents change.
Financial burden for individual co-owners	- VvE ledenlening	- Reserve fund (instead of one-time payment) - Third-party leasing/EaaS (capex to opex)	Individual loans and subsidies offer protection to some low-income owners, but not everyone is eligible. Lowering payments through a reserve fund or service contracts helps, but limits flexibility in the future.
Condominium managers business case	- SVVE (funds for advisors and project development) - TOF - Stimuleringslening voor kleine VvE (linking maintenance and energy in one product)	- Reserve fund (signal of financial stability) - ESCO/EPC (developer takes on performance and part of financial risk) - OSS (provides process management and structuring)	Advice and process subsidies lower the barrier, but do not solve the capacity constraints. ESCO/OSS models take tasks off your hands, but involve contractual complexity and are mainly feasible for larger owners associations.

Table 34: Overview of complementary instruments according the barriers (own synthesis, 2025)

6.4.4 Answer to sub-question 2

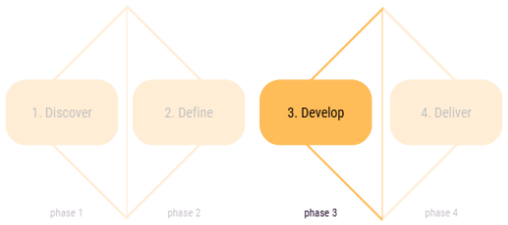
Sub-question 2 answers the second sub-question: ‘What are the financial opportunities available for Dutch co-owners associations to undertake energetic renovations to their condominiums?’. The analysis in 6.4.3 shows that a broad set of instruments is already available, but that they address the barriers at different levels.

At the association level, high upfront costs, difficult collection of funds and lack of sufficient funding can be mitigated by combinations of public loans (Energie bespaarlening, SVVE, TOF, and Stimuleringslening voor kleine VvE) and private instruments (reserve fund, crowdfunding, and third-party financing capacity of the co-owners association and spread costs over time. They can also reduce the overall project budget through subsidies and favourable loan conditions, but they do not automatically solve distributional issues between individual owners.

At the level of individual co-owners, the barrier ‘financial burden for individual co-owners’ is directly targeted only by the VvE ledenlening. This instrument is explicitly designed to support vulnerable owners so that affordability does not block collective decisions. Other instruments, such as building up a reserve fund or third-party instruments which uses investments from capex to opex, can indirectly ease the burden, but they do not guarantee that all owners can participate.

Barriers such as split incentives and the condominium manager’s business case are only partly mitigated by financial instruments. They rely on specific combinations of products (for example SVVE preparation subsidies with long-term loans and third-party models) and on non-financial measures such as advice, and governance arrangements.

7. Requirements to enable financing for COA

	Develops data, regulatory, and operational requirements with co-owners association boards and financial experts based on the theory of Planned Behaviour, resulting in an overview of requirements.

Chapter 7 addresses sub-question 3: *What data, regulatory, and operational requirements must Dutch co-owners associations meet to access public and private financing to undertake energetic renovations?*

This chapter builds on the financial barriers and financial opportunities from chapter 5 and 6. Chapter 7 turns the practices of co-owners association boards and financial experts into data requirements. It investigates the perception of co-owners association boards, and which information lenders and subsidy institutions actually require, and which procedural or governance constraints shape the feasibility of deep energy renovation projects.
Existing decision support and one-stop-shops initiatives already aim to support co-owners associations in this process. For example, the WNR calculation tool, which focuses on calculation renovation scenarios and affordability impacts. Oktave represents a broader one-stop-shop approach that bundles process guidance and a contractor network. These initiatives show the value of structuring information and reducing complexity, but they also highlight that boards still need clarity on which data and documents are required by financiers and subsidies agencies. This chapter therefore identifies the requirements that a practical framework must address.

Two groups of stakeholders were interviewed through semi-structured interviews:

1. Co-owners association board member that intent to undertake or have already undertaken deep energy renovations
2. Financial experts from public and private institutions involved in financing such projects.

The interview with the board members explores how boards currently organise their decision-making and documentation, which financial barriers they face in practice, and what they perceive as available financial models. From the experts' side, the interview clarifies how financiers assess co-owners association energy renovation projects, which documents and guarantees they consider significant, and where they see room for more flexible or supportive arrangements.

The chapter can be divided into 2: co-owners associations and the financial experts. Both sections consist of a case description and TPB-sensitised analysis of the interviews. After comparing the perspectives of the co-owners association board and the financial experts separately, a synthesis and cross-case patterns are made with a set of data, regulatory, and operational requirements that are both necessary from a financing perspective and feasible from the co-owners association side. These findings form the input for the concept financing instrument framework that is developed at the end of the chapter and further validated and assessed in chapter 8.

7.1 Interview co-owners association board

Four semi-structured interviews were conducted with board members of co-owners' associations who intend to undertake deep energy renovations or have already implemented energy-saving measures. In the following sections, each case is presented, TPB constructs were used only as sensitising concepts to organise themes about how boards perceive deep energy renovation and its financing (Ajzen, 1991).

7.1.1 Interview questions

The interview questions for co-owners association boards were developed to translate the concepts of the Theory of Planned Behavior (Ajzen, 1991) into practical questions that reveal how boards perceive financing deep energy renovations within their association. Questions about the context of the association, experiences with renovations, and perceived barriers are linked to the perceived behavioral control of board members; questions about internal decision-making, member support, and external influence relate to subjective norms and administrative constraints; and questions about the actual use of financial instruments, documentation, and support needs focus on intentions, behavior, and the operational and information requirements for obtaining financing. The interviews with the boards of co-owners associations and financial experts were analyzed using thematic analysis according to the six stages of Braun and Clarke (2006), as described in section 2.2.3.

Context
1. Where is the co-owners association located and roughly how many apartment owners are involved?
2. What is the current status of energy renovation plans?

Current situation
2. What energy-related themes or goals are on your COA's agenda for the next 3-5 years?
3. How urgent do the members consider the sustainability ambition to be? (scale 1-5, and why?)

Financial barriers
4. Which financial barriers are currently the most pressing for your COA? Can you rank the following barriers?
- High initial costs
- Monthly affordability
- Reserve fund/MYMP gap
- Access to external financial resources
- Uncertainty about savings
- Risk of non-payment
- Something else?

5. Has the COA encountered this before? Has the COA already tried to prevent these financial barriers?

Decision-making
6. How does the COA make financing decisions? And where in the sustainability process does it get stuck?
8. What would help to mitigate these risks? (Guarantees, fixed-price contracts, maintenance contracts, extra reserves, anything else?)

Experience with financing resources (public/private)

9. What financial resources have you already explored as a director? (Heat fund, subsidies, leasing, crowdfunding, bank loans)
10. How clear were the conditions and required documents for the financing options? (please rate each resource on a scale of 1-5)
11. What do you see as the main advantages and disadvantages of public financing for your COA? (Heat Fund, subsidies)
12. What do you see as the main advantages and disadvantages of private financing for your COA? (leasing, crowdfunding, bank loans)
13. If you had to choose one financing option now, which one would it be and why?
14. Under what conditions would you combine instruments?

Data

15. What documents does the COA currently have? (MYMP, reserve balance sheet, arrears %, recent energy bills, structural reports, quotes, member register, minutes)
16. What data is difficult to provide and who can help with this? (manager, advisor, accountant)

Support
17. Suppose there is a tool that produces a loan-ready file. What should it be able to do? (checklist, threshold values, compare offers, simulate monthly costs, add supporting documents, export to financiers)
18. What would prevent you from using such a tool?

Case study
19. Suppose your co-owners' association has to undergo €250k worth of sustainability measures. The co-owners' association has €120k in reserves, 8% in arrears. There are two options for financing the sustainability project. Which option would you choose and why?
a. Public loan with subsidies, among other things. The application process is slow.
b. Private loan with bank loans. This has a higher interest rate, but the only waiting time in the process is for the permit for implementation.

Conclusion
20. If one rule/requirement could be changed to make financing faster and more attractive, what would it be?
21. May I present you with a prototype of the COA financing tool for feedback?
22. Would you be willing to do another interview to go over the feedback and refine the tool?

7.2 Amsterdam (16)

Figure 24: Condominiums of Amsterdam (16) (own picture, 2025)

7.2.1 Case description

The co-owners association in Amsterdam with 16 apartments was selected because it is a typical but strategically relevant example of a small to medium-sized Dutch owners association that is actively exploring opportunities for energy transition, but at the same time faces several barriers. They experience uncertainty about where to start undertaking energy saving measures. The association consists of four pre-war buildings in which a housing association has a big share. An energy study has been undertaken to investigate options such as gas phase-out and solar energy, which align with the research focus. At the same time, the board is facing several technical and financial challenges, such as the fragmented roof layout makes collective solar energy networks not feasible, the governmental central heating is not a possibility, and new regulations for flue gas systems are forcing expensive replacements. The board relies on external advisors for subsidies and financing and is considering solutions such as individual investors through crowdfunding, but there is no clear starting point for putting together a complete financing package.
The case is managed in this research as an example of a mixed-ownership association in an exploratory phase, phase 5 according to 3.3.1.

Theme	Case description	Input
Building	Year built	1910
	Units	16
	Mixed-ownership %	56,25% housing corporation [woningcorporatie A] (majority, regular owner) 43,75% individual owners
Governance (advanced decision making)	Quorum	66,67%
	Voting rule	66,67% + 1
	Managed by professional manager	Yes, BRIK vastgoedmanagement
Financial situation	Reserve fund	€25k + (2024)
	Monthly COA contribution	€200
Measures planned		- Technical heating system - Flue pipe replacement (regular maintenance) - Window frames and glass
Incentives		Implementing energy saving measures (not defined as DER) in line with government targets. Energy label has not been determined.
Barriers observed	Financial	- High upfront costs - Difficult collection of funds - Lack of sufficient funding - Split incentives (housing corporation) - Investors hesitancy (lack of interest of installers for PV-panels) - Financial burden for individual co-owners - Condominium managers' business case (dependent on [woningcorporatie A] from housing corporation, but not manager BRIK vastgoedmanagement)
	Technical	- Fragmented installation PV-panels - Central heating not available - Old building, more risks
	Social	- Dependence on [woningcorporatie A] as big share holder
	Regulatory	- Mandatory replacement of flue pipe when replacing (individual) heating installation - Presence of [woningcorporateie A] as big shareholder
Likely financial route		- Reserve fund - Warmtefonds - SVVE - Crowdfunding by individual co-owners within the COA (under consideration)
Required investment for (deep) energy renovations		To be determined

Financing instrument eligibility	- Energie bespaarlening - VvE ledenlening - SVVE - TOF - All private instruments
Missing data	- Quotations to get an indication of the price of the measures to be carried out - Involvement of [woningcorporatie A]/difficulties to reach [woningcorporatie A]
Timeline	Phase 5 according to table 11 (Engagement & community)
Advisors/stakeholders named in interview	BKT-advies: external advisor (inhouse advisor from BRIK vastgoedmanagement

Table 35: Case description COA-board Amsterdam (16) (own table, 2025)

7.2.2 TPB-sensitised analysis of financing energy renovation

From the perspective of the Theory of Planned Behaviour, Amsterdam (16) is a well-motivated co-owners association when it comes to implementing sustainability measures, but it has a low perceived level of control and a hesitant attitude towards actually committing to a financed renovation project. The board is faced with mandatory replacement of flue gas outlets, fragmented PV opportunities and dependence on the housing association, which makes energy renovation seem risky and difficult to organise. Owners differ in financial capacity and desired payback period, so even if the board recognises the need for measures, there is no agreement yet on costs and debts. As a result, the case remains in an exploratory phase. Options are being studied and advisors are being consulted, but concrete renovation and financing decisions are being postponed until the feasibility, risks and position of [woningcorporatie A] become clearer.

The common attitude is mostly careful or negative. The benefits of energy renovation are recognised (alignment with policy objectives, potential energy savings), but are overshadowed by concerns about costs, debt, technical uncertainty, and legal risks. Most attitude codes are negative (A–), with only one positive attitude code (A+). This indicates that concerns about feasibility dominate the evaluation of deep energy renovation and its financing.

Co-owners associations perceive social expectations. The board acts under conflicting norms. On the one hand, the government's objectives and the involvement of [woningcorporatie A] and external advisers provide an incentive to improve safety and sustainability. On the other hand, many individual owners prefer low and predictable monthly contributions. This tension is reflected in the coding. There is one positive standard code (N+) and five negative standard codes (N–), indicating that perceived public support for large, financed renovation measures is fragmented.

The perceived control is limited. Legal obligations regarding flue gas pipes, fragmented technical solutions and unclear responsibilities between [woningcorporatie A] and the board reduces the feeling that the association can manage the project on its own. Although there are some positive control elements (use of advisors, idea of a mandated committee), more codes point to control limitations (C–) than to facilitating factors (C+).

There is no clear intention (I+) or concrete financing behaviour (B+) has yet emerged from the coded material. The board is analysing options, consulting advisors and investigating public instrument possibilities, and possible crowdfunding, but formal decisions are being postponed until important uncertainties have been resolved.

Amsterdam 16 is perceived as hesitant to take large external loans, even though public instruments are available. The patterns are quantitative summarised in the table, which represents the coding frequencies for each theme in the interview. The codes support the interpretation that negative attitudes and constrained perceived control dominate, while clear intentions and actions regarding financing deep energy renovations are still missing.

Category themes	Description for COA	Coding notes	Frequency
Attitude towards behavioural	How COA evaluates financing and carrying out DEP. - Financial barriers - Financial opportunities - Complexity	A+	1
		A-	7
Subjective norm	COA referring to pressure, expectations, or lack of support from others: - Owners pushing or blocking investments - Expectations from external stakeholders - Supportive norms	N+	1
		N-	5
Perceived behavioral control	How the COA perceive the organisation of the renovation: - Information gaps - Process barriers - Level of help	C+	2
		C-	3
Intention	Description of clear plans and commitment to apply financing/subsidies and to start renovation measures	I+	0
		I-	0
Behaviour	Any concrete action taken in relation to financing or renovation. Or taking a step back.	B+	0
		B-	0

Table 36: TPB-sensitising analysed for Amsterdam (16) interview (own table, 2025)

Some key insights from the interview with the board member of Amsterdam (16) are presented in the table below, together with example citations interpreted through the lens of the TPB. Together, they show how external constraints, internal diversity among owners, and governance dependencies translate into attitudes, norms, and perceived control with regard to energy renovation financing.

Key insight	Example citation from transcript	TBP
Gap in the market for technical solutions	“Solar panels seem logical, but in our street no installer wants to do it. Too fragmented, technically complex, every connection has to go back to the individual resident. For installers that is too expensive and complicated. The heat network is also not realistic here.”	Perceived behavioural control and attitude. The board would like to take energy measures but experiences external constraints (market and technical barriers). This lowers their perceived behavioural control and leads to a more negative evaluation of the feasibility of certain renovation behaviours.
Different financial capacity and return expectations among owners	“Individuals only invest if they get something back. One person wants a payback time of five years, another is fine with ten. Some can easily pay a higher contribution, others really cannot.”	Attitude and subjective norm. The quote shows different behavioural beliefs about acceptable returns and different financial situations. This shapes individual attitudes toward the investment and creates social tensions within the group, which influence the overall subjective norm in the COA.
Regulatory obligations (flue gas channels) push maintenance before energy measures	“If you replace a boiler you also have to replace the flue gas channel now. In our 1900 building that often means replacing the entire channel. Our boilers are already over their lifetime, so flue gas replacement has priority. We even have to move other maintenance in the plan.”	Perceived behavioural control. New legal requirements are seen as non-negotiable control factors. They force the VvE to reprioritise within the maintenance plan, which reduces the perceived freedom to choose the timing and scope of energy renovations.
Dependence on majority owner [woningcorporatie A] for decisions	“We cannot take decisions without [woningcorporatie A]; we simply do not reach quorum. That makes decision making harder.”	Subjective norm and perceived behavioural control. [woningcorporatie A], as majority owner, acts as a powerful member whose presence is necessary for any decision. This reduces the board’s perceived control over the decision process, because outcomes depend strongly on one actor.
Use of small mandated committee and external advisors to speed up process	“Ideally you give a small board or committee a budget framework and the mandate to decide within those boundaries, instead of doing everything in full meetings. We also brought in INAX and BKT/R. because they have the expertise we lack.”	Perceived behavioural control and intention. The board consciously designs governance (mandate, expert support) to overcome process barriers. This reflects that these structures increase their capability to act and expresses an intention to make the renovation and financing process more controllable.

Table 37: Key insights and examples interview Amsterdam 16 linked to TPB (own table, 2025)

7.3 Amsterdam (108)

Figure 25: Condominiums of Amsterdam (108) (own picture, 2025)

7.3.1 Case description

The co-owners association in Amsterdam with 108 apartments was selected because it is a large, mixed-ownership association that is already far in a concrete deep energy renovation process, and therefore offers a broad setting to study how financial barriers are perceived in practice. [woningcorporatie B] has the biggest share (86%) within the association. The individual owners differ in income and financial resilience. On the basis of an EPA-advice and detailed technical survey, several renovation packages have been prepared, with an indicative investment of €34.000 per apartment. This will be financed via multiple private instruments and partly by the reserve fund.
The board also has to deal with concerns about individual affordability for vulnerable owners, possible monthly contribution increases of €100+, and the risk that some households will be forced to move. Despite the support of professional advisors and a clear decision making phase in the general assembly meeting, there are still gaps in data and uncertainty about long-term heating solutions. The advanced planning, dependence on majority property owner, high investment per dwelling and strong concerns about individual financial burden makes Amsterdam (108) a relevant case. The case is positioned in phase 8, the package is defined, financing routes are under preparation and contracting is in progress.

Theme	Case description	Input
Building	Year built	Around 1900
	Units	108
	Mixed-ownership %	86% owned by housing corporation (majority, regular owner) 14% individual owners
Governance (advanced decision making)	Quorum	66,67%
	Voting rule	50% + 1 for regular 66,67% for structural changes
	Managed by professional manager	Yes, [woningcorporatie B] as external manager
Financial situation	Reserve fund	-
	Monthly COA contribution	-
Measures planned		Packages based on EPA-advies: Floors, roofs, facades, some installations where replacement is necessary. Energy labels are between F and D. The planned measures are considered deep energy renovation.
Incentives		- Expected reduction in energy demand and improvement of energy label - Potential increase in property value - Access to available public loan
Barriers observed	Financial	- Financial burden individual owners - Lack of sufficient funding
	Technical	- old building - Insufficient space and technical constraints for installing heat pumps
	Social	- Concern among vulnerable owners - Fear of having to move because of increasing monthly costs
	Regulatory	- Mortgage and housing-market rules do not consider future mandatory COA monthly contribution sufficiently
Likely financial route		- Energie bespaarlening - VvE ledenlening - SVVE subsidies - Reserve fund
Required investment for (deep) energy renovations		€34.000 per apartment
Financing instrument eligibility		- Energie bespaarlening - VvE ledenlening - SVVE - TOF - All private instruments

Missing data	- No baseline on current energy consumption per dwelling - No quantified savings per package yet - No long-term vision for future heat source
Timeline	Phase 8 according to table 11 (procurement & selection)
Advisors/stakeholders named in interview	- VvE-Transitie: external advisor - BKT-advies: external advisor - Contractor

Table 38: Case description COA-board Amsterdam (108) (own table, 2025)

7.3.2 TPB-sensitised analysis of financing energy renovation

Amsterdam (108) is defined as a strong positive attitude and clear intention to implement a deep energy renovation, combined with significant concerns about affordability and limited perceived control over the impact on vulnerable owners.
The renovation is largely driven by [woningcorporatie B]'s policy objectives and national energy label requirements, and is professionally facilitated, but the board is well aware that the high investments and monthly cost increases are not feasible for everyone.
In general, the board views the renovation positively. The initiative is considered preferable, particularly because it aligns with [woningcorporatie B]'s sustainability objectives and national policy. The expected reduction in energy demand, the improvement in energy labels, and the potential increase in property value are cited as significant advantages. At the same time, the attitude is mitigated by concerns about the financial consequences for low-income owners and the elderly, who may struggle with higher monthly contributions. These split incentives are reflected in the coding: nine positive attitude codes (A+) and four negative (A–), showing that although the overall assessment of renovation and the use of government loans is favourable, concerns about equity remain.
The subjective norm around Amsterdam (108) is shaped by both external pressure and internal moral considerations. Externally, [woningcorporatie B]'s majority position and its obligation to meet label targets create a strong expectation that the association will carry out a deep energy renovation. National climate and housing policy strengthens this direction. Internally, however, the board also feels a responsibility towards vulnerable owners and wants to prevent people from being driven out of their homes by higher monthly contributions. This combination is visible in the coding pattern of eight positive normative codes (N+) and four negative ones (N–): there is considerable normative support for the project, but also conflicting norms regarding fairness and social protection that the board is trying to meet.
The perceived control over the financing and implementation of the renovation is mixed and fragile. On the positive side, the board can benefit from external advisors, particularly for scenario calculations and the application to the Warmtefonds, which increases the sense of control. On the negative side, complex loan and subsidy procedures, incomplete data on energy consumption and savings, and the limited financial capacity of some owners make the project feel uncertain and vulnerable. This is reflected in the codes: two positive control codes (C+) versus nine negative ones (C–). The board believes that certain factors, such as future heating solutions, exact savings and the borrowing capacity of owners, remain beyond its direct control.
In contrast to Amsterdam (16), the Amsterdam case (108) shows a clear intention and already some concrete action with regard to the financing of renovation. There are two intention codes (I+) and one behaviour code (B+), which correspond to the decision to implement the deep energy renovation package and the steps already taken towards financing, such as drawing up an application for an Energie bespaarlening from Warmtefonds with the advisor. The board prefers government loans over commercial bank loans because

of more favourable interest rates, and considers subsidies to be a small but welcome addition that cannot form the basis of the financing plan. At the same time, the exact scope and phasing of the renovation remain negotiable, as the board is weighing up different packages against what is still affordable for all owners.

The patterns indicate that Amsterdam 108 is much further in their energy transition compared to Amsterdam 16, yet still constrained perceived control issues. The case can therefore be interpreted as an attempt to balance a positive, policy-driven approach with the moral obligation not to place a burden on vulnerable owners. Their perspectives were coded using sensitising concepts based on the themes of the TPB. The table shows the frequency of each theme.

Category themes	Description for COA	Coding notes	Frequency
Attitude towards behavioural	How COA evaluates financing and carrying out energy renovations as positive (A+) or negative (A-). - Financial barriers - Financial opportunities - Complexity	A+	9
		A-	4
Subjective norm	COA referring to pressure, expectations, or lack of support from others: - Owners pushing or blocking investments - Expectations from external stakeholders - Supportive norms	N+	8
		N-	4
Perceived behavioral control	How the COA perceive the organisation of the renovation: - Information gaps - Process barriers - Level of help	C+	2
		C-	9
Intention	Description of clear plans and commitment to apply financing/subsidies and to start renovation measures	I+	2
		I-	0
Behaviour	Any concrete action taken in relation to financing or renovation. Or taking a step back.	B+	1
		B-	0

Table 39: TPB-sensitising analysed for Amsterdam (108) interview (own table, 2025)

Some key insights from the interview with the board member of Amsterdam (108) are presented in the table below, together with example citations interpreted through the lens of the TPB. Together, they show how external constraints, internal diversity among owners, and governance dependencies translate into attitudes, norms, and perceived control with regard to energy renovation financing.

Key insight	Example citation from transcript	TBP
Initiative driven by housing association and policy goals	“The trigger really came from [woningcorporatie B]. They own about 86% of the apartments. Housing associations now have targets for energy labels they must meet. I suspect that is why they chose this VvE to actively start a sustainability project.”	Subjective norm and attitude. [woningcorporatie B] functions as a strong actor whose institutional obligations create social pressure in the COA. Their initiative frames energy renovation as important and legitimate, which supports more positive attitudes among private owners.
Affordability concerns for vulnerable owners	“The biggest risk is that some people simply cannot afford it. One older lady was really upset when she heard the contribution might go up by a hundred euros per month, and even in the cheapest scenario it will probably be more… For some apartments it could be five hundred euros extra per month.”	Attitude and perceived behavioural control. The board views the financial impact on low-income owners as a serious negative consequence of the renovation, which shapes a more cautious attitude. At the same time, perceived behavioural control is reduced because the board feels constrained by the limited financial capacity of some members.
Reliance on expert advisor for Warmtefonds and calculations	“R. helps us enormously with that. He is really the expert, I am not. He guides the application at the Warmtefonds and does the calculations with us.”	Perceived behavioural control and behaviour. The board acknowledges its own knowledge limits but increases perceived control by engaging an expert who performs actions (loan application, modelling scenarios). This fits Ajzen’s idea that external resources can enhance perceived control and enable behaviour.
Preference for public loans over bank loans, limited value of subsidies	“F. and R. both said: we should not want a bank loan. Interest is much higher there than at the Warmtefonds… Subsidies are possible but on a loan of five hundred thousand you maybe get five to seven thousand euros. Nice, but you cannot base the plan on it.”	Attitude and behavioural beliefs. The board holds specific beliefs about the outcomes of different financing options: public loans are evaluated positively because of lower interest; commercial loans and small subsidies are seen as less attractive. This informs their overall attitude and choice intention for financing behaviour.
Desire for more transparency and broader social protection	“The application process at banks and the Warmtefonds is really a black box. It should be more transparent and simpler. And there should be more attention for people in a weaker financial position… Also when you buy a house, they should check whether you can pay the maintenance and VvE contributions.”	Perceived behavioural control and subjective norm. The procedure is experienced as a process barrier that lowers perceived control.At the same time, the board formulates an opinion on how banks and policymakers should behave, indicating desired changes in social norms regarding mortgage assessment and support for vulnerable owners.

Table 40: Key insights and examples interview Amsterdam 108 linked to TPB (own table, 2025)

7.4 Zoetermeer (28)

Figure 26: Condominiums of Zoetermeer (28) (GoogleMaps, 2025)

7.4.1 Case description

Zoetermeer (28) was selected because it is a medium association, fully private association with limited reserves that tries to implement energy saving measures while dealing with financial barriers. The 28 apartments are relatively well-maintained and the building is not as old as the associations in Amsterdam. The ambition of the board is to go further than only maintenance, and implement a package of glass, roof and floor insulations. The initiative started after the energy price shock following the war in Ukraine. The monthly contribution has already been raised several times from €95 to €150 in order to keep up with the savings for major maintenance. This increase affects the low-income households, and owners are unable to pay higher contributions. The association's board therefore spends effort on self-study, process and availability of different public loans. Their professional manager facilitates where necessary, but does not take the lead.
Zoetermeer 28 has explored their options and has had a customized co-owners association energy advice drawn up, but the actual proceeding of the process has been postponed.

Theme	Case description	Input
Building	Year built	1979
	Units	28
	Mixed-ownership %	100%
Governance (advanced decision making)	Quorum	66,66%
	Voting rule	75% + 1
	Managed by professional manager	Yes, Totaalvve
Financial situation	Reserve fund	-
	Monthly COA contribution	€150/month
Measures planned		- Window frames - Insulating roof
Incentives		- Increased gas prices due to the war in Ukraine - Expected reduction in energy demand - Current energy label of D-G The ambition is to increase the energy performance, and with the preferred measurements, the transition is not considered a deep energy renovation.
Barriers observed	Financial	- High upfront costs - Lack of reserve fund - Split incentives, uncertain payback - Unknown payback from subsidies
	Technical	-
	Social	- Concern among vulnerable owners
	Regulatory	- Unknown payback from subsidies
Likely financial route		- Energie bespaarlening - SVVE - Reserve fund
Required investment for (deep) energy renovations		€25.000 for pre-study
Financing instrument eligibility		- Energie bespaarlening - VvE ledenlening - SVVE - TOF - All private instruments
Missing data		Not specifically mentioned
Timeline		Phase 3 according to table 11 (tailored advice) Execution postponed due to financial barriers and lack of reserve fund.
Advisors/stakeholders named in interview		BKT-advies: external advisor

Table 41: Case description COA-board Zoetermeer (28) (own table, 2025)

7.4.2 TPB-sensitised analysis of financing energy renovation

From a sensitised perspective of the TPB, Zoetermeer 28 is seen as a mixed attitude and strong problem awareness combined with substantial perceived constraints and careful conditional intention towards financing deep energy renovation. The shock of high prices has created a sense of urgency, but high preparation costs, limited reserves and concerns for vulnerable owners makes the board hesitant to proceed without strong external support.
The board's attitude is mixed, but tends towards concern. On the one hand, the board recognises the need for renovation. Energy prices have exposed the vulnerability of owners, and there is widespread recognition that insulation measures can reduce gas consumption and future energy costs. On the other hand, several factors lead to a negative assessment of the financing challenge. This is reflected in the coding frequencies. There are four positive attitude codes (A+) and eleven negative ones (A–). Positive codes relate to recognising the benefits of renovation and the value of government loans. Negative codes relate to high costs, complexity and perceived unfairness to vulnerable owners. Overall, concerns about feasibility and cost distribution dominate attitudes towards financing renovation.
The subjective norm in Zoetermeer (28) is shaped by two important elements. Firstly, the high increase in energy prices is acting as a shared experience that is putting pressure on people to take action. Owners feel that doing nothing is not an option when gas is becoming unaffordable for some neighbours. Secondly, the board expresses a strong moral norm of solidarity and emphasises that it does not want people to be forced to move because of higher contributions. In the coding, this results in six positive norm codes (N+) and three negative ones (N–). Positive norms refer to the shared concern about energy costs and the expectation that the association should take responsibility. Negative norms emerge when policy and subsidy design are considered useless or when external actors (such as the governmental support) are seen as insufficient. Overall, there is a moderate, supportive normative pressure to take action, but this is limited by internal considerations.
Perceived behavioural control is the most constrained component in this case. This mixed perceptions are visible in the coding. Six positive control codes (C+) but thirteen negative (C-). The board experiences multiple barriers:

- High upfront costs for studies (SMYMP, different quickscans, additional research).
- Lack of sufficient reserve fund result in lack of financial resources to take preparation steps for the energy renovations.
- Uncertainty about subsidy rules and payback makes it difficult to build on an investment regarding energy savings.
- Information gaps regarding limited external guidance and therefore the need for self-study to understand the process and its requirements.

Despite the obstacles, Zoetermeer (28) does show the intention to make progress, mainly through low-risk instruments such as public loans and subsidies. The board has formulated a preferred package of measures, is actively seeking advice and has already taken preparation steps. This is reflected in three codes of intent (I+) and one code of conduct (B+), indicating that both the intention and some preparatory actions are in place.
However, the intention is explicitly conditional, concrete implementation will be postponed until more support within the association has been created by gaining more insight into the total costs, financing options and affordability for all owners. The likely financing route consists of a combination of the Energie bespaarlening from Warmtefonds, subsidies from SVVE, and partly the reserve fund. Vulnerable owners are advised to look into possibilities for support from the government or local authorities, such as the VvE-ledenlening.

The coding frequencies are summarised in the table and support the interpretation that problem awareness and desire to act are high, but perceived control is low and equity concerns are strong.

Category themes	Description for COA	Coding notes	Frequency
Attitude towards behavioural	How COA evaluates financing and carrying out energy renovations as positive (A+) or negative (A-). - Financial barriers - Financial opportunities - Complexity	A+	4
		A-	11
Subjective norm	COA referring to pressure, expectations, or lack of support from others: - Owners pushing or blocking investments - Expectations from external stakeholders - Supportive norms	N+	6
		N-	3
Perceived behavioral control	How the COA perceive the organisation of the renovation: - Information gaps - Process barriers - Level of help	C+	6
		C-	13
Intention	Description of clear plans and commitment to apply financing/subsidies and to start renovation measures	I+	3
		I-	0
Behaviour	Any concrete action taken in relation to financing or renovation. Or taking a step back.	B+	1
		B-	0

Table 42: TPB-sensitising analysed for Zoetermeer (28) interview (own table, 2025)

Some key insights from the interview with the board member of Zoetermeer (28) are presented in the table below, together with example citations interpreted through the lens of the TPB. Together, they show how external constraints, internal diversity among owners, and governance dependencies translate into attitudes, norms, and perceived control with regard to energy renovation financing.

Key insight	Example citation from transcript	TBP
High energy prices triggered strong motivation to renovate	“When the war in Ukraine started we suddenly paid five euros per cubic metre of gas. For some owners that was simply impossible. From there the initiative to start sustainability measures was born.”	Attitude, subjective norm and intention. The shock of high energy prices created shared concern and a more positive attitude toward energy renovation as a solution. This common experience also functions as a social driver that supports collective intention to act.
Large upfront study costs seen as major barrier	“You first need a DMJOP for €5,000 and an energy advice for €5,000. Then a quick scan for €2,500 and maybe extra research between fifteen and twenty-five thousand euros. It is not made easy in the Netherlands; it costs a lot of money while you still have nothing.”	Attitude and perceived behavioural control. The board evaluates the required investigations as costly and partly unnecessary, which leads to a negative attitude toward the current system. These high fixed costs are experienced as strong barriers that reduce perceived behavioural control, because money must be spent before any visible improvement occurs.
Concern for neighbours with limited income when contributions rise	“We have neighbours who really do not have much. You can say it is only twenty-five euros extra per month, but for them that is a lot of money, half a week of groceries. We want to be solidary, we do not want people to be forced to move.”	Subjective norm and attitude. The board expresses a moral norm of solidarity and fairness within the COA. These social considerations influence how far they are willing to push contributions and shape a more cautious, empathetic attitude toward expensive measures.
Preference for public loans and need for subsidies at the front	“You can apply for a relatively cheap loan, which spreads the costs over ten, fifteen or twenty years… I would give the 20–30 thousand euros subsidy for studies at the front, not at the back. That removes the threshold. If you do not renovate within four years you pay it back.”	Attitude, perceived behavioural control and intention. Public loans are viewed positively because they increase affordability and therefore perceived control over financing. The proposal for upfront subsidies reveals a belief that such support would reduce barriers and an intention about how policy should be designed to facilitate COA behaviour.
Heavy reliance on self-study and process facilitator	“It is a lot of self-study, really. You read everything, including horror stories, and you learn where the pitfalls are. Our process facilitator also advised us: do not just look at the costs you must make, but also at what it yields.”	Perceived behavioural control and behaviour. The board recognises knowledge gaps but compensates through self-education and hiring a facilitator. These actions increase perceived control and are examples of preparatory behaviour that support later renovation decisions.

Table 43: Key insights and examples interview Zoetermeer 28 linked to TPB (own table, 2025)

7.5 Zoetermeer (20)

Figure 27: Condominiums of Zoetermeer (20) (GoogleMaps, 2025)

7.5.1 Case description

Zoetermeer (20) was selected because it represents a medium-sized, entirely private association of co-owners that has already taken collective energy-saving measures. The association has installed PV-panels but has not yet committed to any new energy renovations due to the good condition of the complex. A professional manager handles the financial administration. Individual co-owners financed the investment by paying a one-time additional contribution. The technical committee, consisting of two people involved in technical aspects within the association, also took on the task of investigating financing options. It became clear that they did not have sufficient knowledge to successfully obtain a subsidy. The successful implementation, but failure to apply for external financing instruments, makes this case relevant for gaining insight into their perception of financing instruments and the extent to which they are aware of the financial possibilities.

Theme	Case description	Input
Building	Year built	1996
	Units	20
	Mixed-ownership %	100% individual owners
Governance (advanced decision making)	Quorum	66,67%
	Voting rule	66,67% + 1
	Managed by professional manager	Yes
Financial situation	Reserve fund	-
	Monthly COA contribution	€195
Measures planned		Solar panels (already executed in 2021)
Incentives		- Energy savings - Building improvement
Barriers observed	Financial	- Difficult collection of fund - Condominium managers business' case
	Technical	- Current energy label A-C
	Social	- Split incentives - Low involvement but
	Regulatory	-
Likely financial route		- Reserve fund - Additional individual contribution
Required investment for (deep) energy renovations		€21.000
Financing instrument eligibility		- SVVE - TOF - Private instruments
Missing data		- Inhouse knowledge about financing energy saving measures
Timeline		Finished
Advisors/stakeholders named in interview		Technical committee

Table 44: Case description COA-board Zoetermeer (20) (own table, 2025)

7.5.2 TPB-sensitised analysis of financing energy renovation

The pattern of Zoetermeer 20 shows a limited ambition for further energy renovations. The PV-panels project shows that the association can act collectively when a measure is concrete and familiar, but knowledge gaps and perceived complexity around subsidies and loans reduce motivation to take larger steps.

At the board level, the attitude towards sustainability is positive, but within the association, the general attitude is more sceptical. A small group in the technical committee recognises the value of measures such as PV-panels, but many owners struggle with understanding and label the projects as 'too much effort' or 'too expensive'. Subsidies in particular are viewed negatively. They are seen as administratively demanding and not worth it given the uncertain outcome, as they are only available after pre-financing. This is reflected as one positive attitude code (A+) and eight negative ones (A-). The only A+ relates mainly to the successful PV project and its perceived benefits, while the A– codes focus on the perceived complexity, costs and limited added value of subsidies and more extensive renovations. In general, concerns and scepticism dominate over enthusiasm when it comes to financing additional energy measures.

The subjective norm in Zoetermeer (20) is weak and fragmented. The board member describes that only a few people believe sustainability is important, but they are ‘overpowered’ by others who care less and mainly want low effort and low costs. A small group takes the lead, while most owners attend meetings but rarely speak up or take initiative. This means that there is no strong collective expectation that the association should carry out additional energy renovations in addition to the already implemented PV-panels. In the coding, this results in 1 positive norm code (N+) and 7 negative (N–). The positive norm represents the supportive attitude of the small active group, while the negative norms represent the passivity, resistance to higher costs, and limited interest in sustainability among the majority.

In this case, the perceived control is divided. The board feels capable of organising small projects, such as the PV installation, with the help of the reserve fund and one-time contributions, and of making decisions through standard general meeting procedures. But, the board feels it has little control over more complex financing options. Knowledge of options such as the Warmtefonds is limited, and the manager is not seen as an active sustainability partner. This mixed perception is visible in the coding: 6 positive control codes (C+) and 7 negative (C–). Positive codes relate to the existence of a technical committee, clear voting procedures and the experience that owners can agree when a proposal is simple and well prepared. Negative codes relate to a lack of knowledge about financing options, dependence on one or two people from the technical committee, the lack of active support from the manager, and the perceived complexity of subsidy procedures.

During the interview, there was a positive behaviour regarding the implementation of PV-panels. The measurement was discussed in the general assembly meeting, everyone agreed and the mixed financing (reserve + individual contribution) was accepted by all owners. This is coded as four positive behaviour codes (B+) and no negative behaviour (B–). However, the intention to carry out additional or more extensive renovations is low. There is only one positive intention code (I+) and three negative ones (I–). The positive intention relates to the idea that owners may be more willing to invest if someone explains the options, costs and benefits in a simple way. The negative intentions reflect hesitation to start new projects due to low engagement, fear of higher costs, and the perceived complexity of financing. At this phase, the association has no intention for new energy renovations.

The table below summarises the coding frequencies for the interview of the co-owners association board member of Zoetermeer (20).

Category themes	Description for COA	Coding notes	Frequency
Attitude towards behavioural	How COA evaluates financing and carrying out energy renovations as positive (A+) or negative (A-). - Financial barriers - Financial opportunities - Complexity	A+	1
		A-	8
Subjective norm	COA referring to pressure, expectations, or lack of support from others: - Owners pushing or blocking investments - Expectations from external stakeholders - Supportive norms	N+	1
		N-	7
Perceived behavioral control	How the COA perceive the organisation of the renovation: - Information gaps - Process barriers - Level of help	C+	6
		C-	7
Intention	Description of clear plans and commitment to apply financing/subsidies and to start renovation measures	I+	1
		I-	3
Behaviour	Any concrete action taken in relation to financing or renovation. Or taking a step back.	B+	4
		B-	0

Table 45: TPB-sensitising analysed for Zoetermeer (20) interview (own table, 2025)

Some key insights from the interview with the board member of Zoetermeer (28) are presented in the table below, together with example citations interpreted through the lens of the TPB. Together, they show how external constraints, internal diversity among owners, and governance dependencies translate into attitudes, norms, and perceived control with regard to energy renovation financing.

Key insight	Example citation from transcript	TBP
Mixed interest in sustainability, small active minority	“There are a few people who find sustainability very important, but they are in fact snowed under by others who care less. There are always just a few who pull the cart; the rest come to the meeting but you do not hear them.”	Subjective norm and perceived behavioural control. The quote shows a weak pro-sustainability norm: supporters are a minority and feel overruled by indifferent members. This reduces perceived social support and makes it harder for the board to feel capable of pushing ambitious measures.
Solar panel project succeeded without external financing but no subsidies used	“Solar panels were discussed in the members’ meeting and everyone agreed. Part came from the VvE fund and the rest members paid themselves… We never applied for a subsidy, maybe they just did not think of it. You first have to pay a big amount yourself and then hope you get something back; for many people that is a reason to say ‘forget it’.”	Behaviour, attitude and perceived behavioural control. The COA did carry out a concrete sustainable measure, showing positive behaviour once a decision is made. At the same time, attitudes toward subsidies are negative because they are seen as more effort than gains, and perceived control is low due to the need for pre-financing and knowledge to apply.
Strong preference for simple, clear information and tools	“It starts with knowledge. If someone just explains what is possible and what it costs, you can get people on board… A tool would be useful if it shows what it costs, what you can borrow and what it yields. Simple. No difficult tables.”	Perceived behavioural control and attitude. The board believes that clear, accessible information would make members feel more capable of making decisions, which is about perceived behavioural control. They also evaluate such support positively, indicating a favourable attitude toward tools that reduce complexity.
Limited proactive support from manager or municipality	“The manager is good for standard things but does little with sustainability; they are too busy… The municipality does nothing as far as I know. There is not really anyone who actively supports the VvE with sustainability.”	Perceived behavioural control and subjective norm. The absence of active support from their manager is experienced as a lack of external facilitation, which lowers perceived control. It also indicates weak mandatory standards among these actors, as they do not stimulate or encourage sustainability.
Preference for public loans with lower interest despite longer process	“I would choose the public loan. Even if it takes longer, the interest is lower and more stable. Private loans are too risky, and people here want certainty.”	Attitude, intention and subjective norm. Public loans are evaluated more positively because they are cheaper and safer. This belief shapes the respondent’s intention to choose that option. The reference to other owners ‘wanting certainty’ indicates a shared norm in the COA that stability is more important than speed, which supports preference for public financing.

Table 46: Key insights and examples interview Zoetermeer 20 linked to TPB (own table, 2025)

7.6 Findings interview co-owners association board

This section synthesises the first round of interviews with the four co-owners association boards. First, the cases are compared in 7.6.1 on key contextual and financial characteristics. Second, the TPB-informed coding is summarised in a case-by-theme matrix and an overall synthesis in 7.6.2. Finally, these results are translated in 7.6.3 into cross-case patterns that explicitly link each case to the theoretical framework and the research question.

7.6.1 Case comparison

The four co-owners association cases are described in order to synthesise the main findings from the interviews. The table highlights common circumstances and finance related barriers. The comparison provides the basis for identifying which constraints and needs are most occurring across the co-owners associations. Despite clear contextual differences in ownership structure and process phase, the four associations face similar financial challenges. In all cases, high upfront and preparation costs, limited reserves and uncertainty about subsidies and future energy savings constrain the willingness to invest.
Mixed-ownership co-owners associations from Amsterdam, struggle with dependence on the housing association and distributional concerns between owners. The cases from Zoetermeer mainly highlight the impact of low reserves and the need to pre-finance studies. Across all cases, public instruments such as Warmtefonds and SVVE are seen as potentially attractive, but their perceived complexity regarding procedures reduce perceived control.

Case	Amsterdam 16	Amsterdam 108	Zoetermeer 28	Zoetermeer 20
Building year & units	1910 16	1900 108	1991 28	1996 20
Ownership	Mixed: majority of individual owners	Mixed: 86% housing association	100% individual owners	100% individual owners
Process phase (according to table 11)	Phase 5 (engagement & community) orientation on options, external studies via [woningcorporatie A]/[adviseur 1], but no concrete decision on investment yet.	Phase 8 (procurement & selection) Large renovation package defined, scenarios and Energie bespaarlening (Warmtefonds) application prepared with expert	Phase 3 (tailored advice) Energy advice and scenarios discussed with the process facilitator, but execution postponed due to financial barriers and lack of reserve fund.	Completed
Main energy measures	Replacement of flue gas pipes, technical heating system, window frames and glass	Package of building-shell and installation measures	Ambition for glass, roof and floor insulation, plus mechanical ventilation if affordable	PV-panels for common objectives within the COA
Key data gaps for finance	No quotations yet for planned measures. Unclear total investment and distribution over owners. Limited insight into involvement	No baseline on current energy use per dwelling. No quantified savings per package. No long-term vision for future heat sources.	Uncertainty about payback periods and actual effects of subsidy	Lack of in-house knowledge about financing options and subsidies for energy measures. No structured overview of monthly costs and benefits.

	[woningcorporatie A].			
Regulatory constraints relevant for finance	Legal obligation to replace flue gas pipes when individual boilers are replaced. Safety measures > energy measures.	Mortgage and housing market rules do not structurally account for future COA contributions Limiting owners' borrowing capacity: Warmtefonds and other loans are still considered expensive by vulnerable owners	Post subsidy support creates uncertainty about eventual public contribution and increases perceived risk of pre-financing.	Main barrier is about the complexity of subsidy application
Operational conditions	Quorum 66,67% Voting DEP: super majority 66,67%	Quorum 66,67% Voting DEP: super majority 66,67%	Quorum 66,67% Voting DEP: super majority 66,67%	Quorum 66,67% Voting DEP: super majority 66,67%
Public-private financing route(s) considered	1. Reserve fund 2. Warmtefonds (Energie bespaarlening) 3. SVVE subsidies 4. Crowdfunding	1. Warmtefonds (Energie bespaarlening 2. SVVE subsidies 3. Reserve fund Preference public loans	1. Warmtefonds (Energie bespaarlening) 2. SVVE subsidies 3. Reserve fund	→ executed via reserve fund and one-time individual contribution.
Main finance-related barriers	High upfront costs and insufficient reserves Difficult collection of funds Different financial capacities and payback expectations among owners Limited engagement from Housing association Lack of attractive technical/market solution for installing PV-panels	Large investment (€34k/dwelling) and perceived risk of steep increases in monthly contributions Lack of complete funding package Difficult collection of funds Financial burden for individual co-owners	High upfront study costs Lack of sufficient funding (reserve fund) Uncertainty about subsidy and payback Financial burden for individual co-owners Complexity of process requiring self-study Financial burden for individual co-owners	Difficult collection of additional subsidies Condominium manager's business case (limits willingness to support project) Negative attitude towards subsidies (administrative burden) Lack of knowledge and low owner involvement (reduce willingness to explore loans or new measures)

Table 47: Case comparison (own table, 2025)

7.6.2 TPB-sensitised cross-case synthesis

The co-owners associations interviews show mixed attitudes and norms, and limited perceived behavioural control regarding deep energy renovation and its financing. The table below summarises their perception.
The attitude (A) is double edged. Boards recognise advantages such as lower energy bills, comfort and future-proof buildings, but these positive aspects are constantly weighed against high initial costs, long payback periods and unequal burdens on owners. This is reflected in the TPB synthesis table, where negative attitude codes outweigh positive ones.

Subjective norms (N) are mixed. External actors (housing associations, local authorities, national policy) indicate that implementing energy savings measures is expected, while within the associations only a minority of owners are actively supportive. Many owners are hesitant, meaning that boards do not experience strong, consistent social pressure to undertake deep renovation projects.
Perceived behavioural control (C) is mostly negative. Information is fragmented across maintenance plans, energy studies and advisory reports. Subsidy and loan procedures are perceived as complex, and boards feel dependent on external advisors, installers and lenders. Concerns about the ability of more vulnerable owners further decrease the perception that large projects are feasible.
Intentions (I) and behaviour (B) remain careful. Boards are exploring options, obtaining studies and discussing scenarios, but often delay formal decisions until there is more certainty about costs, subsidies and owner support. When action is taken, it usually focuses on smaller, manageable measures rather than comprehensive large renovation packages.

Case	Attitude A		Norms N		Control C		Intention I		Behaviour B	
Amsterdam 16	1+	7-	1+	5-	2+	3-	0+	0-	0+	0-
Amsterdam 108	9+	4-	8+	4-	2+	9-	2+	0-	1+	0-
Zoetermeer 28	4+	11-	6+	3-	6+	13-	3+	0-	1+	0-
Zoetermeer 20	1+	8-	1+	7-	6+	7-	1+	3-	4+	0-
Average	15+	29-	16+	19-	16+	32-	6+	3-	6+	0-

Table 48: TPB-coding synthesis (COA-boards) (own table, 2025)

Interpreted through TPB, the cases suggest that moving from discussion to action requires interventions that increase perceived behavioural control by reducing uncertainty , strengthen subjective norms through better GAM communication and legitimacy, and stabilise intention by translating options into transparent apartment-level affordability impacts and mitigation for vulnerable owners. Where boards lack capacity, process support from managers/advisors can function as an enabling condition that helps convert intention into concrete preparatory steps.

7.6.3 Cross-case patterns

Building on the comparison and TPB-synthesis, three cross-case patterns are particularly relevant for the design of the financing instrument framework. These provide input for the requirements in section 7.13.

1. Financing is not the main constraint: feasibility is (mentioned by 3 COA)
   Boards are hesitant to even consider loans or complex financing models when the fundamental feasibility appears uncertain (technical options, legal restrictions, owner support). The framework should therefore be based on the structuring of the project and its feasibility, rather than on a list of instruments.
2. Perceived behavioural control is the weakest TPB element (occurred by 4 COA)
   In all four cases, the boards report limited availability of data, complex procedures and dependence on external experts. The framework should address these control

issues directly by clarifying what data is essential, how it can be collected and how the documentation can be organised into a file that is ready for lending.

3. Distributional and affordability concerns dominate decision making (mentioned by 2 COA).
   Boards are concerned about low-income owners and the impact on monthly contributions. Any financing model must make the distribution of costs and benefits at apartment level transparent and reflect monthly affordability.

7.7 Interview financing experts

Four semi-structured interviews were conducted with financial experts involved in co-owners' associations and financing their energy transition. The following sections presents an explanation of their roles, TPB constructs were used only as sensitising concepts to organise themes about how boards perceive deep energy renovation and its financing (Ajzen, 1991).

7.7.1 Interview questions

The interview questions for the financial experts were designed to uncover how institutions that provide or advise finance actually assess and shape renovation projects by co-owners associations. The questions target their professional role in credit assessment, risk management, and policy implementation. Experts are first asked to describe their organisation's involvement with the co-owners association renovations and the types of products or models they work with, which clarifies the institutional context in which requirements are set. Follow-up questions probe how they evaluate the financial position of an association. Other questions address perceived bottlenecks in working with co-owners associations and explore what kinds of support, standardisation, or new instruments could make such projects more financeable.

Start

1. Where do you work and what is your position?

Context

2. What is your role in making owners' associations more sustainable?
3. How do you view the current energy transition for owners' associations?
4. How do you view the current market for owners' association financing of energy renovations?
5. In your experience, which types of COAs (small/medium/large; year of construction; mixed ownership) are the least financeable? And why?
6. What types of measures do you see being financed most often?

Risk and acceptance

7. What are the main risks in your/a credit assessment?
8. How does project size factor into financing and the terms and conditions?
9. How are mixed owners' associations handled?
10. Does this affect the conditions?

Documentation

11. What are the minimum documents required for an owners' association file? (General Meeting resolutions, DMJOP, annual accounts, etc.)
12. Which files are most often incomplete?

13. What quality criteria do we need to consider for a DMJOP/customized advice in order to obtain financing for sustainability measures?

Terms and conditions

14. What are the typical terms, interest rates, and maximum terms that are used?
15. How is the relationship between the term and the expected payback period of measures determined?
16. What agreements or thresholds are used?

Initial costs

17. In your opinion, which instruments effectively reduce the investment costs for sustainability for COAs? (subsidies, heat funds, private loans, performance-based contracts)

Bundling of instruments

18. Where do most COAs run into the most problems when combining public and private instruments? (application times, burden of proof, etc.)
19. What process proposals do you have to simplify or synchronize applications?
20. How do you see timing being handled? (submission of documents and the associated deadlines)

Insufficient financing

21. Which combinations do you see working most often? And which combinations do not?

Small vs. large

22. What are the main differences in the assessment and conditions for small COAs compared to larger ones?
23. What can help small COAs overcome financial barriers?

Process

24. What is the average turnaround time from information request to write-off?
25. Where are the longest waiting times and how can COAs reduce them?

Innovation and policy

26. Are you familiar with structures such as ESCO/EPC, performance-based, crowdfunding?
27. Which structures do you consider promising for COAs?
28. What policy changes do you think would reduce the three barriers most quickly?

Conclusion

29. Can you describe one successful and one unsuccessful case, including the deciding factor?
30. If you could give co-owners' associations (boards) one piece of advice to increase their chances of obtaining financing, what would it be?

7.8 SVn

SVn (Stimuleringsfonds Volkshuisvesting Nederlandse gemeenten) is a non-profit financial institution that develops and manages financing schemes to improve housing and living conditions in the Netherlands. It offers sustainable loan products for different target groups in the built environment. Not only they provided tailored loans to co-owners associations, they also have the Stimuleringslening kleine VvE and the national Toekomstbestendig onderhoudsfonds VvE's. These loans are set up in collaboration with local authorities. For this research, an interview was conducted with an SVn co-owners association manager, who directly supports associations in preparing and financing their energy transition projects. Because SVn designs, administers and evaluates these financing models, it has a role between government, co-owners associations and the financial market. Their perspective offers insights into how financing instruments are applied in practice, under which conditions they are used, and which constraints associations come across.

7.8.1 TPB-sensitised analysis of financing energy renovation

From the perspective of the TPB, the interview with SVn highlights an encouraging but also careful lender. SVn considers deep energy renovation of co-owners associations to be part of its public purpose, but emphasises the many procedural, documentation, and decision-making barriers that limit the possibilities in practice. TPB is used here as a sensitising concept to organise the expert's views on attitude, social norms, perceived behavioural control, intention and behaviour with regard to the financing of renovations by co-owners associations.

Three positive attitude codes (FA+) and three negative ones (FA–) are shown towards attitude. On the positive side, SVn considers public loans to be an essential instrument that 'steps in where the market fails' and enables associations to finance both overdue maintenance and sustainability measures. At the same time, the expert of SVn is critical of gaps in the market, the vulnerability of owners associations and the risk of overcrediting, which explains the negative attitude codes. In general, loans are seen as a necessary facilitator, but never as a simple or risk-free solution.

Subjective norms surrounding SVn are dominated by external expectations and the absence of commercial players. The coding reveals five positive norm codes (FN+) and eight negative ones (FN–). National and municipal policy explicitly expects SVn to support sustainability and maintenance and to fill financing gaps that commercial banks are unwilling to cover. Municipalities want to help, but are also faced with political constraints, which is reflected in the negative norm codes.

The observed behavioural control is clearly limited by the quality of the co-owners associations' file and the decision making process. The coding identifies four positive control codes (FC+) and ten negative ones (FC–). SVn itself has the expertise and instruments to grant loans, but its ability to act depends on the quality of the associations' file. Incomplete or incorrect documentation, high quorum requirements, blocking by large owners and weak financial positions are repeatedly cited as reasons why loans cannot be granted. In Ajzen's terms, these external circumstances limit SVn's perceived control over the realisation of deep renovation projects, even when there is willingness on both sides.

In contrast, codes of intent and behaviour are predominantly positive. The interview contains five positive codes of intent (FI+) and only one negative (FI–), as well as four positive codes of behaviour (FB+) and no negative behaviour. SVn clearly intends to continue and expand its role in financing for co-owners associations. It is developing new funds such as the TOF, helping municipalities to design local schemes and is actively involved in structuring products that combine maintenance and sustainability. It also puts these intentions into practice by supporting applications, recommending the most suitable instrument to associations and sometimes advising associations not to take out a loan when the risks are too high.

All in all, the coding pattern for SVn reveals a proactive, facilitating financial expert with a realistic view of limitations. A positive attitude and clear actions to support associations, but also a clear understanding of the structural and procedural barriers that limit what can actually be financed. This contrasts with the boards of co-owners associations, where the attitude and perceived control are often more negative and the intentions less clear. Their perception is summarised in the table with the coding frequencies.

Category themes	Description for financial experts	Coding notes	Frequency
Attitude towards behavioural	Positive attitude towards DEP for the COA	FA+	3
		FA-	3
Subjective norm	Perception that others factors influence COA to undertake DEP	FN+	5
		FN-	8
Perceived behavioral control	Statements that the COA has the capabilities and resources to finance COA projects effectively	FC+	4
		FC-	10
Intention	Clear commitment to increase involvement in financing COA renovations	FI+	5
		FI-	1
Behaviour	Concrete actions that enable or promote financing of COA DEP.	FB+	4
		FB-	0

Table 49: TPB-sensitising analysed for interview SVn (own table, 2025)

Some key insights from the interview with the financial expert of SVn are presented in the table below, together with examples of citations from the TPB perspective. They show how market gaps, policy expectations and practical file restrictions translate into attitudes, norms and perceived behavioural control with regard to the financing of energy renovations for co-owners' associations.

Key insight	Example citation from transcript	TBP
Gap in market and role of SVn	“We step in where the market fails or does not want to act. That includes financing COAs, because no banks want to finance them, it is too complicated.”	Subjective norm, perceived behavioural control and attitude. The quote shows that commercial banks perceive COA financing as too complex and therefore do not want to act, which reflects low perceived behavioural control and a negative norm in the regular banking sector. At the same time SVn evaluates this gap positively as its own task and opportunity, which shows a favourable attitude toward taking on the behaviour of financing COAs.
Need to combine maintenance and sustainability	“Many COAs say: we want to renovate energetically, but first the roof or pipes must be replaced. With our Futureproof Maintenance Fund eighty percent of the loan can go to maintenance, which makes it possible for them to start at all.”	Attitude toward behaviour and perceived behavioural control. The quote expresses a belief that combining maintenance and energy renovation in one loan is necessary and helpful, which is a positive evaluation of this way of working. The loan allows 80% for maintenance, this reduces the key barrier for COAs and this increases their perceived ability to start a project.
Quality of documentation as bottleneck	“The most important thing is the decision in the minutes. Without a concrete, legally correct decision we simply cannot provide a loan. Sometimes we have to ask three or four times for the same documents.”	SVn emphasises that COA often lack the administrative quality and legal accuracies required for a loan application. These missing or incorrect documents act as control variables over which SVn has no direct influence and reduce the perceived convenience with which COA can obtain financing. This directly illustrates Ajzen's idea that perceived behavioural control is shaped by beliefs about such barriers.
Cooperation with municipalities and advisors	“We actively approach municipalities when we hear that COAs run into problems and have no suitable financing. Together we look at which schemes they can set up. Sometimes we also advise COAs to hire a professional party to guide them.”	Intention and behaviour to create an enabling environment. The quote describes concrete actions that SVn takes (approaching municipalities, advising COAs to work with professionals) based on a clear intention to improve conditions for COA financing. These behaviours aim to change the broader context of norms and control around COAs, which fits Ajzen’s view that intentions lead to behaviour that can in turn influence others’ attitudes, subjective norms and perceived behavioural control.

Table 50: Findings examples interview SVn linked to TPB (own table, 2025)

7.9 BKT-advies

BKT-advies is an independent construction engineering consultancy that provides construction and project management, technical inspections and long-term maintenance planning for residential and non-residential real estate. They also offer managing co-owners associations regarding technical, financial, and administrative practices. BKT-advies was selected because it combines co-owners association practices with an independent engineering role. The project managers provide objective external advice on energy renovation projects. Next to organising and supervising such projects, BKT-advies can assist clients with obtaining permits for building changes resulting from the energy saving measures. With a client base that includes co-owners associations, individual owners and investors, BKT-advies offers a broad perspective on how sustainability projects are initiated, managed and financed in the Dutch co-owners associations context.

7.9.1 TPB-sensitised analysis of financing energy renovation

The expert of BKT-advies has a mixed but committed attitude towards deep energy renovation and its financing. The project manager sees renovation as necessary and believes that the co-owners association sector needs a major upgrade, but at the same time is critical of structurally high house prices, rising service costs and the additional monthly expenses that co-owners association loans entail for owners who are already struggling. This combination results in a supportive but cautious attitude. Energy renovation is desirable, but must remain affordable and be based on realistic long term financial planning.
The subjective norm regarding co-owners associations is perceived as strong and mixed. External actors such as the national government, housing associations and local authorities are creating an expectation that buildings must become more sustainable and that overdue maintenance must be addressed. At the same time, BKT-advies observes that some professional managers and owners primarily pursue their own interests, for example by prioritising short-term revenue models (kickback fees from contractors) or individual preferences in the general meeting. This increases the feeling that professional standards in the association sector need to be improved and that stricter standards are needed to serve the collective interests of the association.
The observed behavioural control is limited by vulnerabilities in many associations. The interview highlights incomplete or outdated MYMP, missing elements in files, high initial project and research costs, and repeated postponement of decisions in general meetings. BKT-advies can draw up technical and financial scenarios, and combine the necessary documentation, but the feasibility of a project and the decision to loan remain beyond its direct control. The expert therefore sees itself as a facilitator operating within a context of limited possibilities for associations.
In terms of intention and behaviour, BKT-advies shows a clear commitment to continuing to assist associations with maintenance and renovation projects and to supporting their financing routes. In practice, this translates into feasibility checks, updating MYMPs, drawing up different scenarios, coordinating subsidy and loan applications, and advising boards to put the long-term interests of the association above individual preferences.
The coding frequencies in the table reflect this pattern. Attitudes are mixed, perceived norms and control are strongly present and often problematic.

Category themes	Description for financial experts	Coding notes	Frequency
Attitude towards behavioural	Positive attitude towards DEP for the COA	FA+	2
		FA-	4
Subjective norm	Perception that others factors influence COA to undertake DEP	FN+	9
		FN-	6
Perceived behavioral control	Statements that the COA has the capabilities and resources to finance COA projects effectively	FC+	1
		FC-	5
Intention	Clear commitment to increase involvement in financing COA renovations	FI+	1
		FI-	0
Behaviour	Concrete actions that enable or promote financing of COA DEP.	FB+	1
		FB-	0

Table 51: TPB-sensitising analysed for interview BKT-advies (own table, 2025)

Key insights from the interview with the project manager of BKT-advies are presented in the table below, together with examples of citations from the TPB perspective. They show how market gaps, policy expectations and practical file restrictions translate into attitudes, norms and perceived behavioural control with regard to the financing of energy renovations for co-owners' associations.

Key insight	Example citation from transcript	TBP
Critical view on current COA practice	“There are many managers who do not master their profession or mainly seek self-enrichment for example through kickback fees. Often they do not have the knowledge for proper maintenance in house.”	Negative attitude toward current practice and perceived behavioural control. The experts express a clearly negative evaluation of current COA management practices, which reflects unfavourable attitudes towards how COA are run. At the same time the lack of knowledge among managers is seen as a limitation in available skills and resources, which lowers perceived behavioural control over proper maintenance and renovation decisions.
Impact of individual interests and delays	“The biggest delays are in decision making and postponing. Personal interests are put above the COA interest and agreements take months to sign while nothing changes in the content.”	Negative perceived behavioural control and subjective norms. The quote shows that internal conflicts and postponement are experienced as obstacles that make it hard to move projects forward, which reduces perceived control over collective action. It also reveals social norms in which it is accepted that personal interest dominates the common COA interest, which decreases intentions to act for the association.
Financial pressure on owners	“In the end the burden falls back on the individual owner. Some people already borrowed at their maximum for the house and then the higher COA contribution and repayment start to hurt.”	Behavioural beliefs and subjective norms about affordability. The expert describes perceptions about the consequences of renovation financing for individual owners, namely about the consequences of renovation financing for individual owners, namely higher financial barriers and stress. Which may lead to a more negative attitude towards participating. There is also an expectation that owners should carry these costs, which reflects a social norm about who is responsible for paying.
Difference between housing associations and private owners	“Housing associations understand the importance and have an obligation and money. If they join, that can speed things up a lot. Private owners are much more diverse and you really see that in decision making and financial capacity.”	Subjective norms and perceived behavioural control. Housing associations are presented to be important references whose participation supports COA and puts social pressure on the COA to make progress, which is linked to subjective norms. Their financial strength and obligations also increase the perceived feasibility of projects, while the capacities of private owners reduce perceived behavioural control when housing associations are absent.
Importance of serving the COA interest	“My main advice is: stick to the basics and serve the COA interest, not just your own. Listen to advisors, you pay them to help you, not to slow things down.”	Intention and behaviour aimed at collective rather than individual interest. The advisor expresses a preferred way of acting, focused on the collective interests of the COA and following professional advice, which reflects a normative standard and recommended pattern of behaviour. This advice is intended to influence the intentions and actual behaviour of owners, so that decision making becomes more effective and better aligned with the common goal of a renovation.

Table 52: Key insights and examples interview BKT-advies linked to TPB (own table, 2025)

7.10 QuaWonen

QuaWonen is a Dutch social housing association that also acts as a professional co-owners association manager. This housing association also offers rental housing in multi-owner apartment buildings. As a professional co-owners association manager within a housing association, you are responsible for the administrative support, financial management, maintenance coordination, and advisor to the boards. For this research, an interview with a co-owners association manager of QuaWonen was conducted. He is currently supervising one association that intends to undertake deep energy renovation measurements. Although his direct experience with energy related renovation and its financing is limited to this case, his position adds value since the position of the professional manager, as well as the influence of the housing association, also plays a role in the energy transition of co-owners associations. His own role and influence within the association, and the capacity to initiate, coordinate, and supervise sustainable projects are discussed during the interview.

7.10.1 TPB-sensitised analysis of financing energy renovation

From the perspective of the Theory of Planned Behaviour, QuaWonen appears to be a practical positive player . The manager supports deep energy renovation where necessary and sees the benefit of allowing the Groenendaalflat, example case, to 'ride along' on QuaWonen's own renovation programme. However, he also emphasises the limits of his mandate and capacity and does not aspire to a more extensive role as a financial advisor for associations in general.
In general, the attitude is neutral to positive. Most of the associations in the portfolio are recent, efficient buildings where extra sustainability is not urgent. In the Groenendaalflat, however, the manager values the opportunity to link the overdue replacement of the windows to QuaWonen's own renovation project, and next to this to take advantage of extra subsidy and loan conditions in the ZEP-package. This results in three positive attitude codes (FA+) and no negative codes (FA–) in the table. In this case, deep-renovation is assessed positively because it can be integrated into an existing renovation project.
Subjective norms are positive. At the policy level, national EFG-label regulations put pressure on QuaWonen to take action with regard to its rental housing stock. Once QuaWonen renovates its three rental blocks, it is considered logical and desirable for the Groenendaalflat to participate. The municipality also encourages the sustainability of the co-owners associations and participates in meetings to explore additional local support. Within the association, the information meeting revealed that there is broad support among the owners to join the project. This dynamic is reflected in eight positive standard codes (FN+) and no negative ones (FN–). The norms encourage renovation and use the combined renovation project as an opportunity.
The observed behavioural control is mixed, but low. Quawonen has important resources, such as a sufficient reserve fund, a recently updated MYMP, access to professional advisors, and support from the local authority. The manager experiences his own role as overburdened and insufficiently defined, because there is no clear division of tasks between project leader, financial advisor and manager, and one contact person is missing because no one is formally in charge. In TPB sensitising coding, this results in one positive control code (FC+) and six negative ones (FC–). The positive code relates to the intentional use of reserves to pre-finance costs while maintaining a buffer. The negative codes reflect perceived role conflicts, administrative burdens and dependence on external advisers for the actual financing structure.
In terms of intention, QuaWonen's association manager is committed to bringing the Groenendaalflat project to a successful conclusion, but he explicitly does not intend to develop a permanent role as financial advisor or process manager for co-owners associations. This is reflected in two positive intention codes (FI+) and one negative (FI–).

The positive codes relate to involving the association in the renovation project and advising on the ZEP package from Warmtefonds. The negative code refers to the hesitation to take on a broader, more permanent advisory role.
In terms of behaviour, there are no explicit positive or negative codes of conduct (FB+ / FB–), because the interview mainly concerns ongoing coordination and preparation rather than completed financing actions. The manager initiates and coordinates meetings, collects documents for advisers, draws up agendas and ensures that GAM decisions meet the formal requirements of lenders.
The coding frequencies in the table reflect this pattern.

Category themes	Description for financial experts	Coding notes	Frequency
Attitude towards behavioural	Positive attitude towards DEP for the COA	FA+	3
		FA-	0
Subjective norm	Perception that others factors influence COA to undertake DEP	FN+	8
		FN-	0
Perceived behavioral control	Statements that the COA has the capabilities and resources to finance COA projects effectively	FC+	1
		FC-	6
Intention	Clear commitment to increase involvement in financing COA renovations	FI+	2
		FI-	1
Behaviour	Concrete actions that enable or promote financing of COA DEP.	FB+	0
		FB-	0

Table 53: TPB-sensitising analysed for interview QuaWonen (own table, 2025)

Key insights from the interview with the co-owners association manager within QuaWonen are presented in the table below, together with examples of citations from the TPB perspective. They show how market gaps, policy expectations and practical file restrictions translate into attitudes, norms and perceived behavioural control with regard to the financing of energy renovations for co-owners' associations.

Key insight	Example citation from transcript	TBP
Groenendaalflat rides along with corporate project	“Because of the national obligation on low energy labels QuaWonen had to do something with three identical rental blocks next to the Groenendaalflat. Then the question arose whether the COA could join, and owners reacted almost unanimously positively.”	Subjective norm and resulting intention. An external obligation on QuaWonen creates a strong signal that renovation is necessary. QuaWonen functions as a reference whose expectations influence the private owners. This social pressure and example lead to a collective positive intention in the COA to join the project (subjective norm shapes behavioural intention).
Diffuse roles in project management	“My role is mainly coordinating but in practice much bigger than expected. I guard progress, chase parties for documents and coordinate between the financial advisor, contractor and internal project leader. Because nobody is really in the lead, owners come to me with their questions.”	Perceived behavioural control and role conflict. The manager experiences that the task and responsibilities are larger and more complex than anticipated, which makes the project feel difficult to manage. The absence of a clear project leader and the fact that all questions end up with her reduce its perceived control over the process.
Need for clear documentation and division of tasks	“It is still unclear where the task of the project leader starts and ends and what the role of the external advisor is. For the general meeting the documents will have to meet all kinds of formal requirements and I expect ready-made texts that I can just add.”	Perceived behavioural control: administrative workload and procedural clarity. The manager emphasises that unclear task distribution and strict formal requirements are seen as obstacles, which reduces the perceived convenience of implementing the project.

Table 54: Key insights and examples interview QuaWonen linked to TPB (own table, 2025)

7.11 VvE-Transitie

VvE-Transitie is a specialised consultancy that supports boards of Dutch co-owners associations in planning and organising energy renovation projects. They guide co-owners association boards before, during, and after the general assembly meeting, helping them to elaborate on the financial, technical, and legal issues related to their energy transition. Their core business is preparation of subsidy applications and arrangements for loans such as the Energie Bespaarlening from the Warmtefonds. Because they are involved in multiple financing routes for energy saving measures for associations, they have experiences of the daily practices regarding barriers and opportunities for co-owners associations.
The interview is conducted with one of the company's owners, who works with these cases on a daily basis. This makes VvE-Transitie an important expert case study for understanding how perceived barriers at the co-owners association level can be reduced through guidance, structuring, and financial support.

7.11.1 TPB-sensitised analysis of financing energy renovation

The VvE-Transitie interview reveals a pattern of positive but realistic support for deep energy renovation in co-owners associations, using the Theory of Planned Behaviour as a sensitising concept. VvE-Transitie emphasizes the added value of combining maintenance and sustainability with a simple view of processes, timetables and limitations in decision-making.
They have a positive attitude towards deep energy renovation and combining overdue maintenance with sustainability in one integrated project. He is critical of unrealistic expectations among boards and warns that very high quotes can push associations back to maintenance only instead of complete renovation. This is reflected in eight positive attitude codes (FA+) and three negative ones (FA–). The positive codes indicate a clear belief in deep energy renovation as achievable with the right support, while the negative codes relate to concerns about owners underestimating the costs, timelines and organisational efforts involved.
The perceived subjective norm is divided. On the one hand, national policy and subsidy structures explicitly encourage sustainability, process guidance and the use of instruments such as the Energie bespaarlening. On the other hand, many owners lack basic knowledge about co-owners association rules and are unwilling to accept higher contributions or long-term loans. VvE-Transitie observes that small, well-managed associations often have a stronger internal norm to undertake energy saving measures, than large associations with mixed ownership, where divergent interests and low involvement weaken the norm for ambitious renovation. This mix is reflected in four positive norm codes (FN+) and four negative ones (FN–).
The perceived level of behavioural control at co-owners association level is generally low. They describe long processing times, often 1.5-2 years instead of the six months that many boards expect. Also maintenance delays, limited knowledge of finance and renovation, and quorum requirements are seen as structural obstacles. At the same time, they emphasise that good guidance, up-to-date (S)MYMPs and early member surveys can improve control over the process. In TPB coding terms, this results in one positive control code (FC+) and six negative ones (FC–). The negative codes reflect the many obstacles, while the positive code reflects the belief that specific guidance can increase the perceived control.
VvE-Transitie demonstrates an explicit intention to guide associations through the entire renovation and financing process and to further professionalise this approach. This is reflected in two positive intention codes (FI+) and four negative ones (FI–). The positive codes relate to their commitment to support boards from the initial orientation to the applications, while the negative codes reflect frustration with system-related limitations, such

as subsidy rules that require pre-financing, and the realisation that not all associations can or will go through the entire renovation process.
In terms of behaviour, the interview reveals five positive codes of conduct (FB+) and two negative ones (FB–). Positive behaviours include organising surveys and information meetings, updating (S)MYMPs, combining subsidies and loans into packages, and experimenting with new forms of communication. Negative codes of conduct relate to situations in which, despite guidance, measures are removed from the package or projects are scaled back to basic maintenance due to costs. In general, VvE-Transitie acts as an active facilitator that translates positive intentions into concrete actions, even though systemic obstacles sometimes limit the results.
The table summarises the sensitising codes from TPB.

Category themes	Description for financial experts	Coding notes	Frequency
Attitude towards behavioural	Positive attitude towards DEP for the COA	FA+	8
		FA-	3
Subjective norm	Perception that others factors influence COA to undertake DEP	FN+	4
		FN-	4
Perceived behavioral control	Statements that the COA has the capabilities and resources to finance COA projects effectively	FC+	1
		FC-	6
Intention	Clear commitment to increase involvement in financing COA renovations	FI+	2
		FI-	4
Behaviour	Concrete actions that enable or promote financing of COA DEP.	FB+	5
		FB-	2

Table 55: TPB-sensitising analysed for interview VvE-Transitie (own table, 2025)

Key insights from the interview with the process manager of VvE-Transitie are presented in the table below, together with examples of citations from the TPB perspective. They show how market gaps, policy expectations and practical file restrictions translate into attitudes, norms and perceived behavioural control with regard to the financing of energy renovations for co-owners' associations.

Key insight	Example citation from transcript	TBP
Mismatch between expected and actual process length	“Many COAs think everything will be arranged within six months but in practice you need at least one and a half to two years. Our role is to manage expectations and say from the start that it is a long process.”	Perceived behavioural control and subjective norm. Shows that COA overestimates how easy/quick the process will be (low awareness of barriers, thus unrealistic perceived control). The advisor then actively corrects this and sets a new time frame, which shapes the social expectation of how long such a project should take (subjective norm).
Similar process costs for small and large COAs	“We work for COAs of four apartments and for more than two hundred. What stands out is that the process and guidance costs are basically the same everywhere. Only the number of windows or square metres of roof changes.”	Attitude and perceived behavioural control. It expresses that small COAs are at a disadvantage because the fixed process costs make projects relatively expensive for them, which can lead to a more negative attitude towards starting a project. At the same time these high fixed costs act as a barrier that lowers the perceived feasibility of action for small COAs (perceived behavioural control).
Importance of guidance and knowledge building	“I think the biggest gain is in better guidance and training of COA members. Boards and owners must understand much better what an COA is, what the financial responsibility is and what renovation means.”	Perceived behavioural control and planned behaviour change. The experts assumes that more knowledge and guidance will make boards feel more capable of making decisions and carrying projects through (increase in perceived behavioural control). This reflects Ajzen’s idea that changing underlying control can change future intentions and behaviour.
Advise to involve all owners early	“My advice is: guide everyone in the whole COA. Collect in advance what residents find important, for example with a survey and an information evening. Then you can prevent a lot of resistance in the general meeting.”	Intention and behaviour aimed at improving attitudes and norms. The experts describes a concrete planned action (own behaviour based on their intention) to involve all owners early. This is meant to influence owners’ attitudes (by addressing what they find important) and subjective norms (by creating shared understanding and support before the meeting).

Table 56: Key insights and examples interview VvE-Transitie linked to TPB (own table, 2025)

7.12 Findings interview financing experts

This section synthesises the first round of interviews with the four financial experts. First, the cases are described in 7.13.1. Second, the TPB-informed coding is summarised in a cross-case synthesis in 7.13.2. Finally, these results are translated in 7.13.3 into cross-case patterns that explicitly link each case to the theoretical framework and the research question.

7.12.1 Case comparison

The four expert cases represent different positions in the co-owners association financing landscape. A public lender (SVn), a technical advisor (BKT-advies), a housing association that acts as owners and professional manager (QuaWonen), and a process financing advisor specialised in co-owners associations (VvE-Transitie) are interviewed. Because their roles differ, the case comparison table is not intended to compare organisations, but to show how each is linked to the financing part of co-owners associations. In the next sections, the cross-case patterns are analysed next to the TPB elements to identify where their perceptions align, and how these common patterns translate into concrete requirements for finance-ready dossiers for associations.

Organisation	Role	Type of organisation	Link to COA financing
SVn	Accountmanager COA	Public municipal housing and financing fund	Develops and provides loans and municipal schemes for COA maintenance and energy renovations.
BKT-advies	Advisor and projectmanager	Engineering and advisory company	Prepares technical and financial scenarios for COA renovation projects and supports loan and subsidy applications
QuaWonen	COA manager	Housing association	Acts as owner and manager in mixed COAs and initiates or coordinates (renovation) projects and their financing.
VvE-Transitie	Process and financing advisor	Process and financing advisors	Guides COAs through renovation processes, arranging subsidies and loans.

Table 57: Comparison financial experts overview (own table, 2025)

7.12.2 TPB-sensitised cross-case synthesis

The TPB synthesis table for experts shows a clear majority of positive attitude and enabling behaviour, combined with a focus on control barriers related to co-owners associations cases.
The attitude (FA) is predominantly positive. Experts consider deep energy renovation to be necessary and see loans and subsidies as essential incentives. They describe their role as supporting associations to combine maintenance and sustainability in feasible projects.
Subjective norms (FN) reflect strong external expectations. National and local policies, housing associations and subsidy programmes all promote sustainability and offer incentives to take action. At the same time, experts note hesitant and fragmented norms within the associations themselves, where many owners prioritise low short-term costs.
Perceived behavioural control (FC) is the main concern. All experts point to incomplete or outdated maintenance plans, missing documents, weak management capacity and unclear

division of roles as the main obstacles. According to them, the willingness and products to finance projects are there, but many associations are unable to meet the procedural and risk requirements.
The intention and behaviour (FI/FB) are very positive. SVn continues to develop and manage specialised products, BKT-advies and VvE-Transitie guide associations through technical, financial and procedural steps, and QuaWonen initiates and coordinates mixed co-owners association projects where required by law. Compared to the co-owners association boards, experts take a much more proactive and facilitating stance with regard to the financing of deep energy renovations.

Case	Attitude FA		Norms FN		Control FC		Intention FI		Behaviour FB	
SVn	3+	3-	5+	8-	4+	10-	5+	1-	4+	0-
BKT-advies	2+	4-	9+	6-	1+	5-	1+	0-	1+	0-
QuaWonen	3+	0-	8+	0-	1+	6-	2+	1-	0+	0-
VvE-Transitie	8+	3-	4+	4-	1+	6-	2+	4-	5+	2-
Average	16+	10-	26+	18-	7+	27-	10+	6-	10+	2-

Table 58: TPB-coding synthesis (financial experts) (own table, 2025)

7.12.3 Cross-case patterns

Across the expert cases, three cross-case patterns are particularly relevant for the design of the financing instrument framework. These provide input for the requirements in section 7.14.

1. Main constraint is dossier quality, not product availability (mentioned by 3 FE)
   Public and private instruments exist, and experts are generally willing to finance or support projects. However, due to incomplete documentation, inadequate maintenance planning and unclear general meeting decisions, files are often not eligible for financing. This means that the framework must give a clear checklist for finance-ready-dossiers.
2. Guidance and role clarity are important to increase perceived control at co-owners association level (mentioned by 4 FE)
   Experts emphasise the need for better guidance, a clearer division of tasks and realistic timetables. They see it as their task to translate positive intentions into concrete steps, but highlight that without clear responsibilities and templates, administrations quickly lose control. The framework must therefore also indicate who can/must provide what support.
3. External norms are supportive, but internal co-owners association norms remain mixed (mentioned by 3)
   The government, local authorities and housing associations are aiming for sustainability, while many co-owners associations are hesitant or passive. Experts are navigating this tension by trying to align financial structures with social acceptance. The framework should make these distribution choices explicit for boards.

7.13 Output sub-question 3

All the findings from the first round of interviews with the co-owners association boards and financial experts can be translated to answer sub-question 3. Chapter 7 has shown that both target groups recognize the importance of (deep) energy renovations, although many associations are still in the exploratory phase. High investment and preparation costs, fragmented documentation, complex subsidy and loan procedure, and limited organisational capacity to reduce the perceived behavioural control of boards and make it difficult to translate the intentions into financing projects.
In addition, financial experts emphasise that their willingness to finance or support co-owners association projects is not the main constraint. Instead, they highlight the gap between their procedural and risk requirements and what associations can offer with their current capacity and support.

Based on these converging perspectives, the results of sub-question 3 have been structured into design requirements for the conceptual financing instrument framework. The framework is intended to support boards in selecting a financing route for deep energy renovation. This is structured in three groups of requirements. The first section discusses the data requirements and gaps that determine whether an association can prepare a ‘loan-ready file’. The second section summarises the legal requirements and restrictions that determine the design and sequence of financing. The next section identifies the operational and organisational requirements within the association. The last section integrates these elements into the answer to sub-question 3. Section 7.14 concludes with the concept framework for financing instruments.

The requirements below are derived from a cross-analysis of the two respondent groups. The boards explained what they can realistically organise, while the financial experts clarify what is required for eligibility and risk assessment. Requirements are included when they emerged in both perspectives or explain a clear mismatch between what experts require and what the board can deliver. This synthesis builds on the barrier patterns identified in chapter 5 and the instrument conditions in chapter 6, translating them into actionable requirements for a finance-ready dossier and financing route selection.

7.13.1 Data requirements and gaps for finance-ready dossier

From a financial point of view, the key issue is not only what a co-owners association wants to renovate, but also whether the association can provide a coherent set of data that lenders and subsidy providers can use to assess the risk, suitability and affordability. Boards mainly described the data gaps they struggle with, such as missing SMYMP, quotations, unclear costs, while experts emphasised that these items are essential for credit and subsidy assessment. In all cases, both boards and experts indicate that many projects get stuck because this financing dossier is incomplete.

Project and data cost for credit assessment
For any collective loan or subsidy, financiers need a clear, verifiable insight of the investment and cash flows. Without the data on this specific financial detail, lenders cannot offer a loan.

- Up to date SMYMP. Energy measures must be integrated with regular maintenance in order to see the relation between investment and long-term asset quality.
- Renovation package scenarios with cost estimations and quotations.
- Transparent allocation of costs over common and individual components in line with the deed of division. This determines which parts of the investments can be financed collectively.

- A calculation of the investment per dwelling and the resulting annual/monthly co-owners association contribution. Lenders use this data to verify repayment capacity and which owners need to understand the financial consequences.

Energy performance data
Energy data matters financing because many energy saving measurements link their condition to the expected energy performance. Co-owners associations often have outdated or fragmented energy information.

- Building-level energy labels and/or customised energy advice are required to access SVVE-subsidies.
- Expected energy label improvements influence interest rate discounts and eligibility for the Energie bespaarlening from Warmtefonds.
- Before- and after overviews of expected energy savings to explain owners why higher contributions can still be considered affordable in net terms.

Affordability and distributional information
Financing has to be repayable and socially acceptable within the association. Boards are concerned about vulnerable owners. The requirement is not to collect detailed personal financial data, but to have enough information to map affordability for loan providers and owners, who need to agree on financing.

- Test whether planned contribution increases are reasonable given the perceived income range in the co-owners association.
- Identify where additional instruments are needed to avoid exclusion.
- Communicate clearly what the different scenarios mean in euros per month for each dwelling type.

Bringing the 3 elements together, sub-question 3 indicates the need for a standardized financial dossier for co-owners associations. This dossier bundles the legal, technical, financial and governance information needed for internal GAM decisions, loan applications and subsidy applications.

7.13.2 Regulatory requirement and constraints shaping financing feasibility

Even with complete data, financing options are limited by the regulatory framework. Regulations and their requirements determine what types of financing are available, and under what conditions. Boards experience these constraints as rules and timing barriers, where experts frame them as eligibility conditions and risk controls that determine whether funding can be offered.

Safety and environmental obligations
Legal obligations, such as safety of flue gas pipe systems, fire safety, asbestos removal, have priority over the financial capacity of the co-owners association. They must be taken into account before or in parallel with energy saving measures and will take up some of the scope for loans or increasing contributions. For the financing framework this means:

- Mandatory measures must be included in the financial planning
- When assessing a loan, lenders will check whether these legal risks are sufficiently mitigated
- The available financing scope for energy measures is the remaining amount after these obligations

Design of public financing schemes
Public loans and subsidies come with detailed eligibility and documentation requirements:

- Specification of minimum and maximum loan amounts, interest rates, terms and types of measures that can be financed
- Requirements co-owners associations to first spend their own reserves or pre-fund studies before grant is paid out
- Application deadlines and budget ceilings create timing risks.

From a financial perspective, associations therefore need:

- Clear guidelines on which instruments they can use
- Insights into when bridge financing or high initial contributions from the co-owners associations are needed to meet the pre-financing requirements.

Mortgage and housing market regulations

Individual mortgage rules indirectly influence the scope that co-owners associations have to finance collective renovations. When buyers take out a mortgage, their co-owners association contributions and future increases for renovation are often not included in the affordability assessment or explained in the advice. As a result, new owners may have limited financial space for higher contributions, which later limits collective loans.
this creates the need for better information integration:

- Important financial information about the co-owners association must be available during the transaction process
- Advisors and lenders should treat the co-owners contribution more explicitly as part of the housing costs.

7.13.3 Operational and organisational requirements to obtain and manage financing

Finance can only become effective when the co-owners association has the operational capacity and governance structures to prepare, obtain, and manage it. Boards emphasised time/ capacity limits and internal decision dynamics, while experts have the need for clear mandates, role division and continuity to manage financing over multiple years.

Capacity to organise the financing process

Arranging finance for energy renovation is a process that consists of several steps: investigating the current situation, putting together a financing dossier, negotiating with lenders, applying for subsidies, and making changes to contributions. All of this takes time and expertise. Requirements are either:

- the co-owners association have sufficient internal capacity to coordinate financing,
- or it must be carried out by external processes and financing advisors and be able to afford them.

Financial management and communication

Once the loan is obtained, the association must manage this over time. This entails tracking repayments, adjusting contributions, and deciding what to do with interest rate changes or additional investments. Owners will only agree to financing if they understand the implications. Operational requirements include:

- Basic financial management skills within the co-owners association or the manager to handle loans over several years
- Clear communication tools that translate complex financing structures into simple overviews in euros per month per dwelling.
- Strategies to address the concerns of vulnerable owners and prevent financial exclusion

7.13.4 Answer to sub-question 3

To answer sub-question 3: What data, regulatory, and operational requirements must Dutch co-owners associations meet to access public and private financing to undertake energetic renovations? These requirements operationalise the main barriers from chapter 5 within the instrument landscape and eligibility conditions mapped in chapter 6.

1. A finance-ready dossier: structured, standardised information on technical measures, costs, energy performance, distribution of costs and affordability at apartment level.
2. Regulatory -aware financing design: consideration of obligations, maximise public instrument schemes.
3. Governance and process capable co-owners associations: sufficient organisational capacity, clear roles and communication, and the ability to engage external advisors where needed.

These findings show that financing the energy transition of co-owners associations is less about inventing more instruments, but about ensuring how co-owners associations can meet the data, regulatory, and organisation requirements attached to those instruments more. They form the empirical basis for the design of the financing framework and provide important input for the policy recommendations formulated in the conclusion of this thesis.

7.14 (Concept) financing instrument framework

The financing instruments framework combines the results from chapter 5 (financial barriers), chapter 6 (public and private instruments) and section 7.14 (data, regulatory and organisational requirements) into a single decision-support overview for co-owners association boards. The framework is intended to help boards structure their preparation and select an appropriate financing route for deep energy renovation.

The literature and the 13-phase project timeline from section 3.3.1 showed that financing decisions follow a sequence: defining the project, checking feasibility and preconditions, selecting instruments, and assessing affordability. Building on this, the interviews with the boards and experts highlighted what is most needed in practice: a clear checklist of conditions for financing, and a simple overview of the monthly consequences per dwelling for different scenarios. In these interviews, public instruments such as Warmtefonds and SVVE were generally preferred over commercial products, due to more favourable conditions and better perceived protection for owners. For that reason, the framework is designed to prioritise public instruments, and only consider private instruments once public options have been assessed.
Service models, such as the WNR calculation tool and one-stop-shop practices like Oktave, were used as a design inspiration and then adapted to the specific decision processes and instruments relevant for Dutch co-owners associations. The framework does not aim to optimise complex, stacked financing constructions. Instead, it enables an initial comparison. Its main purpose is to translate the total investment into an indicative credit volume and the associated monthly housing costs per dwelling, rather than to produce a fully specified financing design.

This led to a framework with four sequential steps that mirror the way boards actually work towards a decision:

1. Describe project and barrier profile
2. Check finance-ready dossier and eligibility
3. Select mix of instruments
4. Calculate and compare net monthly impact

Each step is accompanied by a table that can be filled in by the co-owners association boards. The steps support instrument selection and the calculation of monthly costs and expected energy savings per dwelling. The first version of the financing instrument framework is included in the appendix 7.15.

7.14.1 Project and barrier profile

The first step is to define a compact project and barrier profile for the co-owners association. This allows the board to link the planned renovation to the financial situation and the main barriers identified in chapter 5. The first step identifies which barrier the framework should help to solve and forms the basis for the instrument selection in step 3.

Item	Description	Completed by COA
Building	Aantal appartementen	
Renovation scope	Brief description of the proposed renovation programme	
Total investment required (including VAT)	In € for common areas in accordance with SMYMP/Customised COA energy advice	
Expected energy savings	Annual savings for the entire building (€/year)	
Current reserve fund	Stand and annual contribution for all owners together	
Biggest financial barriers (check)	High upfront costs Difficulty to collect funds Insufficient total funding Split incentives	

Table 59: Project and barrier profile COA (own table, 2025)

7.14.2 Finance-ready dossier

The second step assesses whether the association has a funding-ready dossier. Chapter 7 showed that financiers and subsidy administrators require not only technical information, but also legal decisions and organisational guarantees. Section 7.14 divided these into data, regulatory and operational requirements. The framework assumes that this checklist has been completed for (5/6) before a final financing mix is chosen.

Category	Required information/document	Why is this necessary for funding?	Status (✔/ X)
Data	Approved SMYMP and Customised COA advisory report	Basis for scope, costs and financing options for the measures	
Data	Detailed cost estimate / quotations from contractor(s)	Confirms investment amount and planning	
Data	Overview of reserve fund + arrears list	Insight into financial strength and payment discipline	
Legal	GAM decision list (mandate, budget ceiling, choice of financing for phases 6, 9, 11)	Legal proof that owners agree to loan + measures	
Operational	Appointed contact person on behalf of the COA	1 point of contact for external advisers, financiers, and contractors	
Operational	Overall project planning linked to a 13-phase timeline (Appendix 1)	Enables coordination with payments, subsidies and M&V	

Table 60: Checklist finance-ready dossier (own table, 2025)

7.14.3 Instrument selection

In the third step, the board links the barriers selected in step 1 to the instruments available in chapter 6. The barrier-instrument matrix from section 6.4.3 has been translated into a compact selection table that shows which public and private options are logical for a particular barrier profile. In line with the interview findings, the framework is designed to prioritise and maximise the use of public instruments first, and to consider private instruments only for any remaining financing gap. To determine the content of the public/private instruments, an overview has been added to the appendix of the document, as shown in the tables of section 6.4.1 and 6.4.2.

Financial barriers	Recommended public instruments	Recommended private instruments
High upfront costs	Energie bespaarlening (Warmtefonds) SVVE (subsidies) TOF (maintenance + energy renovation) (8≥ apartments) SKV (maintenance + energy renovation) (8< apartments)	Reserve fund Crowdfunding Leasing EaaS ESCO OBF OSS
Difficult collection of funds	Energie bespaarlening (Warmtefonds) SVVE (subsidies) TOF (maintenance + energy renovation) (8≥ apartments) SKV (maintenance + energy renovation) (8< apartments)	Crowdfunding (platform collects) EaaS (bundles capex + operation) ESCO (bundles capex + operation) OSS (organises process)
Lack of sufficient funding	Energie bespaarlening (Warmtefonds) SVVE (subsidies) TOF (maintenance + energy renovation) (8≥ apartments) SKV (maintenance + energy renovation) (8< apartments)	Reserve fund Crowdfunding Leasing EaaS ESCO OBF OSS
Financial burden for individual co-owners	Energie bespaarlening (Warmtefonds) VvE Ledenlening (Warmtefonds) SVVE (subsidies)	Leasing (smaller monthly contribution) EaaS (smaller monthly contribution) ESCO (repay costs from realised energy savings) OBF (less costs after measurements)
Investors' hesitancy	Energie bespaarlening (Warmtefonds) TOF (maintenance + energy renovation) (8≥ apartments) SKV (maintenance + energy renovation) (8< apartments)	Reservefonds (buffer) Crowdfunding ESCO OSS

Table 61: Connection barriers and instruments (own table, 2025)

For example:

- In the case of high initial costs, the Energie bespaarlening for co-owners associations, SVVE, TOF and Stimuleringslening kleine VvE's are recommended, possibly supplemented by a reserve fund, crowdfunding, leasing/EaaS, ESCO/EPC, OBF and support from an OSS.
- In the case of affordability pressure for low-income owners, the combination of a collective loan with individual VvE member loans and smart use of the reserve fund is the obvious solution. Subsidies support this as well.
- In case of mistrust on the part of financiers, instruments with public guarantees (TOF, Stimuleringslening) and structures in which risks are partly assigned to an ESCO, or OSS are helpful.

The aim of this step is not to dictate one correct outcome, but to help the board put together two or three realistic financing options that are in line with their barriers and with the instrument descriptions in Chapter 6. Within this research, the options are kept simple to maintain it is understandable and accessible for all members of the association. More complex stacking or sequencing of multiple loans and third-party models falls outside the scope of the framework and requires project-specific financial advice.

7.14.4 Financing mix and monthly costs

In the fourth step, the chosen combination of subsidies, own funds and loans is translated into a concrete financing mix and an overview of the monthly effects per unit. This step is inspired by one-stop-shop practices such as Oktave, in which residents receive a single overview of investments, subsidies, loans and net monthly costs.

1) Financing mix

The co-owners association board can fill in this table for multiple instruments.

Component	**Amount €**	**Explanation**
A. Total investment costs		From SMYMP/quotations
B. Subsidies		Total of all subsidies
C. Use of reserve fund		Extraction from fund
D. Public loans		Total of all public loans
E. Private loans		Sum of other financing
Net to be financed through loans (D+E)		= A-B-C

Table 62: Financing mix for (deep) energy renovation (own table, 2025)

2) Monthly costs and savings

The annual costs and savings are then translated into monthly costs per apartment.

Post	COA (€/year)	app. (€/year)	app. (€/year)
1. Annual repayment + interest on all loans			
2. Additional annual reserve			
3. Total additional COA-costs after renovation (1+2)			
4. Expected energy savings			
4. Expected energy savings			
6. Energy expenses for renovation			
7. Total housing costs after renovation (energy + COA contributions)			
8. Total housing costs for renovation (0-6)			
9. Difference in housing costs after/before (7-8)			

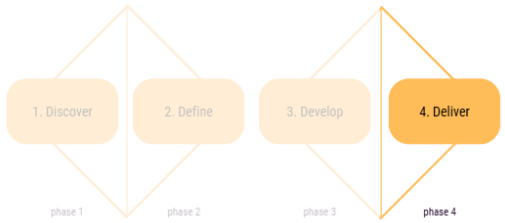
Table 63: Monthly costs per apartment (own table, 2025)

The table shows what additional annual co-owners association charges will result from interest and repayments, how much the building is expected to save in energy costs, and what the net effect per month per apartment will be and how this compares to current housing costs.

This last step translates the abstract discussion about borrowing into a concrete picture of housing cost developments, a recurring topic in the interviews with the association boards. It helps the board and owners to compare variants in a more transparent manner and supports decision making in the general assembly meeting.

The conceptual framework is presented to co-owners association boards in a second round of interviews in chapter 8. Based on Rogers' (1962) adaptation characteristics, an assessment is made of the extent to which the framework is understandable, usable, and compatible for the co-owners associations. The feedback from that round is used to further refine the framework into the final version.

8. Framework financial resources



Deliver validates the requirements, model overview, and policy measures. This is done by a second interview round using Rogers' five adoption attributes. The final output is an assessed financial instrument framework.

Chapter 8 addresses sub-question 4: *How do co-owners associations and financial experts perceive the usability and adoption of the proposed financing framework?*

Chapter 7 focused on identifying data, regulatory and operational requirements for financing deep energy renovation projects. Chapter 8 examines how the financing framework developed on the basis of those requirements is perceived by its intended users, the co-owners association boards and financial experts. Chapter 8 investigates how this instrument is perceived in terms of usability, fit with existing decision-making processes and willingness to adopt it in real-life projects.

A second round of semi-structured interviews was conducted with the co-owners association board members and two financial experts who guide co-owners associations in through renovation and financing projects (BKT-advies and VvE-Transitie).
In this second round,The first version of the framework for financing instruments (appendix 7.15) is used for the second round of interviews in the form of four tables corresponding to the four steps. If possible, they could apply it to their own situation. During the interviews, the framework was briefly introduced and participants were asked to evaluate it based on the five attributes of Rogers' Diffusion of Innovation theory (1962). The attributes are used to structure and evaluate the usability of the framework. The Theory of Planned Behaviour is applied to investigate how the co-owners association boards and financial experts perceive the framework and its potential adoption.

Chapter 8.1 briefly introduces the second round interviews and its focus. Section 8.2 to 8.6 presents the evaluation results per case. 8.7 synthesises the findings across cases using the theory of Planned Behaviour and Rogers perspectives. Section 8.8 the output of sub-question 4, including the main adjustments that follow from the evaluation during the interviews. Section 8.9 then presents the resulting evaluated financing instrument framework.

8.1 Interview co-owners association (second round)

This chapter presents the findings from the second round of interviews with three co-owners association boards and two financial experts. In this round, the focus shifted from general perceptions of energy renovations and financing them, to the evaluation of the developed financing framework. The Theory of Planned Behaviour is applied to interpret how these evaluations translate into attitudes, perceived norms, perceived behavioural control and intentions regarding the actual use of the framework. In addition, Rogers' Diffusion of Innovations theory is used to structure how respondents assess the framework on the five adoption attributes.

8.1.1 Interview questions

In addition, the perception of the financial instrument framework is assessed by the co-owners association board members through five attributes that influence adoption behaviour according to the Diffusion of Innovation theory of Roger (1962).

1. Relative advantage
On a scale of 1 to 5, where 1 = no advantage and 5 = significant advantage: how much added value does this financial instrument offer your co-owners association compared to how you currently operate?
    a. What is the biggest advantage of this instrument for you?
    b. Does the instrument help with the things you currently struggle with the most?

2. Compatibility
On a scale of 1 to 5, where 1 = does not fit at all and 5 = fits very well: how well does this instrument fit in with the way your owners' association currently makes decisions and is organised?

3. Complexity
On a scale of 1 to 5, where 1 = very difficult to understand/use and 5 = very easy: how easy do you find this tool to understand and use?
    a. Which parts of the tool do you find unclear or complicated?
    b. Do you see any concepts that you think other owners will not understand?
    c. If a new board member joins, do you think that person will be able to use the framework?

4. Triability
On a scale of 1 to 5, where 1 = almost impossible to try and 5 = very easy to try: how easy would it be for your co-owners association to use this tool?
    a. What do you need to test it?

5. Observability
On a scale of 1 to 5, where 1 = hardly visible and 5 = very visible: how visible and tangible are the results of using this tool for you and other owners?
    a. What concrete outcomes would you have liked to see?
    b. What do you think would be the most convincing way to persuade sceptical owners to use this tool?

8.2 Amsterdam (16)

As introduced in Chapter 7, Amsterdam (16) is a small-to-medium, mixed-ownership association with 16 units in Amsterdam, with [woningcorporatie A] as majority owner and a relatively modest reserve fund. The association is in an exploratory phase regarding energy renovation, with plans for flue gas pipe replacement, window frames and glass, and technical heating system work, but without final investment decisions or quotations. The board experiences high upfront costs, split incentives with the housing corporation and limited interest from installers, and is therefore searching for tools that make financial implications understandable for a diverse group of owners.

8.2.1 TPB-based evaluation of the framework

From a TPB perspective, the case shows a clear positive attitude towards using the framework. The board member states that it would be a useful standard document for every general meeting.
The subjective norm is also largely supportive. The board expects owners and the housing association to appreciate a clear and transparent overview of the financial position.
However, perceived behavioural control is conditional. The board feels able to work with the framework, but only if an advisor helps with subsidy rules and if the necessary input data are available.
As a result, the intention is to use the framework in the next GAM, once the instrument is refined and the data are complete. This adds a behavioural layer to the Rogers evaluation. The tool is seen as good, but adoption remains dependent on guidance and data.

The table below summarises the coding frequencies based on TPB for the interview of the co-owners association board member of Amsterdam (16).

Category themes	Description for COA-boards and financial experts	Coding notes	Frequency
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+	6
		HFA-	0
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+	1
		HFN-	0
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+	6
		HFC-	5
Intention	Expression of willingness to use the framework	HFI+	2
		HFI-	0
Behaviour (future-oriented)	Planned concrete steps	HFB+	1
		HFB-	0

Table 64: TPB-based evaluation from Amsterdam 16 (own table, 2025)

The theory of planned behaviour helps to understand how the framework instrument is perceived in practice by the co-owners association. Rogers' attributes focus on how the framework itself is evaluated and improved.

8.2.2 Roger-based evaluation of the framework

The assessment based on Rogers' shows that the board sees high relative advantage in the framework. The most valued element is the "one-pager" that summarises the size and composition of the association, the reserve fund, the project scope and the financing gap in one view for the general assembly meeting. This helps to summarise the current financial situation of the association at the start of the meeting and reduces confusion about the financial position. The board member indicates that, compared with current practice, the framework offers a much clearer basis for explaining why additional contributions, loans or subsidies are needed.

Compatibility is assessed as moderate. The way the framework structures information fits well with how decisions are prepared for the general assembly meeting, but the board highlights that the instrument must be incorporated into a broader process. It works best after there is an interest among owners in renovation and once technical options and cost estimations are available. The interview suggests that the framework should be positioned as a decision-support document alongside formal minutes and quotations, not as a stand-alone decision document.

In terms of complexity, the board finds the steps and tables understandable for the board. The perceived difficulty lies less in the structure of the framework itself and more in the financial terms and definitions around public loans and subsidies. Without additional explanation, these terms can be confusing for owners who only see the documents once a year. This leads to a concrete design suggestion from the case: include a short legend of key financial terms and clearly distinguish "public" versus "private" financing options in plain language.

Trialability is judged as feasible but conditional. The board expresses a clear willingness to try the framework in the next general assembly meeting, but mentions that this requires preparation of the input data. The instrument itself is seen as easy enough to use. The practical barrier is the effort needed to gather inputs.

For observability, the initial rating is low as long as the framework remains theoretically. The board argues that the real impact only becomes visible after a project is implemented and changes in energy bills and monthly contributions can be monitored. However, the fictional example makes the results much more concrete. The board suggests that examples per apartment "old vs. new total monthly housing costs" are essential features to strengthen observability.

Overall, the Rogers-based assessments for Amsterdam 16 indicate that the framework is considered very useful but still somewhat abstract, and that its acceptance depends on better positioning in the process, clearer terminology and very concrete output pages for owners.

The table below summarises the scores for the framework based on the five attributes according to Rogers' theory, using the Likert scale.

Financial instrument model	**Relative advantage (1-5)**	**Compatibility (1-5)**	**Complexity (1-5)** 5 = not complex	**Triability (1-5)**	**Observability (1-5)**
Amsterdam 16	5	4	5	3	5

Table 65: Roger-based evaluation from Amsterdam 16 using a Likert scale (own table, 2025)

Based on the evaluation, the main design implications for the framework in the case of Amsterdam 16 are summarised in 8.2.3.

8.2.3 Implications for the financial instrument framework

All suggestions and comments that could be used to improve the framework were coded in the transcripts (appendix 8.2). Using the table below, the most important suggestions are cited and summarised. These have been translated into concrete design adjustments.

Key insight	Example citation from transcript	Translation to framework
It is unclear what the role of the housing association is. Owners do not know what the responsibilities are.	‘’because I would also like to see something about the housing association.’’	Add a section that clearly states the role and responsibilities of the housing association so the division of tasks and benefits is transparent in the framework.
To really use the tool for financing questions, COAs need expert help on regulations, subsidies and energy savings.	‘’You need someone who knows the regulations, or a customised advice report listing the possible subsidies and energy savings.’’	Integrate a check into the framework step 2 that asks whether specialists advice on subsidies and regulations has been obtained, and advises the COA to obtain external supervision.
Jargon and abbreviations form a barrier; users need simple explanations to understand the financial and technical content.	‘’A brief legend or explanation of the abbreviations would be helpful.’’	Integrate a legend next to the tables explaining all abbreviations, financial instruments and technical terms in plain, non-technical language.

Table 66: Key insights and design implications Amsterdam 16 (own table, 2025)

8.3 Amsterdam (108)

Amsterdam 108 is a large mixed-ownership co-owners association in a 1900s building with 108 apartments. Approximately 86% is owned by the housing association [woningcorporatie B]. The association is already far in the renovation process. A deep energy renovation package based on the customized co-owners association energy advice has been prepared. An indicative investment of €34.000 per apartment is initial needed. External advisors support the project. The main concern of the board relates to affordability for vulnerable owners, the complexity of subsidy and loan procedures and the risk that higher monthly contributions could force some households to move.

8.3.1 TPB-based evaluation of the framework

The interview with the board member of Amsterdam 108 shows a positive attitude towards the framework. No negative codes were assigned in this interview part.
The subjective norm plays a limited role in this specific evaluation round. The focus in the interview lies on the internal board use of the framework.
The perceived behavioural control is more mixed. On the one hand, the board member experiences the steps and structure as clear and feels capable of working with the instrument. On the other hand, there is a dependency on accurate input data and on external expertise for subsidies and regulations. The need to gather all the information first and to have someone who knows the rules, reduces the feeling that the board can use the framework independently.
The interview contains a clear intention to use the framework in practice. The board members indicated that the tool would work particularly well after an interest survey among owners.

The table below summarises the coding frequencies based on TPB for the interview of the co-owners association board member of Amsterdam (108).

Category themes	Description for COA-boards and financial experts	Coding notes	Frequency
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+	3
		HFA-	0
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+	0
		HFN-	0
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+	1
		HFC-	3
Intention	Expression of willingness to use the framework	HFI+	1
		HFI-	0
Behaviour (future-oriented)	Planned concrete steps	HFB+	0
		HFB-	0

Table 67: TPB-based evaluation from Amsterdam 108 (own table, 2025)

The theory of planned behaviour helps to understand how the framework instrument is perceived in practice by the co-owners association. Rogers' attributes focus on how the framework itself is evaluated and improved.

8.3.2 Roger-based evaluation of the framework

From a Rogers perspective, the board member sees clear relative advantage in the framework. The instrument is valued because it brings everything together and translates the combination of subsidies, reserve fund and loans into one overview. This is currently missing in the association.
Compatibility is rated as moderate (3/5). The way the instrument structures information fits with how the board prepares decisions, because some elements are still missing (legend and contextual guidance).
Regarding complexity, the steps and tables are perceived as straightforward. The structure reaches a 5 in terms of ease of use. The main complexity lies again in the financial terminology and in uncertainties around annual savings. The respondent points out that owners might hold the board accountable if theoretical savings are not realised, and suggests working more with percentages and explaining behavioural effects (higher comfort use) next to the potential savings.
Trialability is evaluated positively. The board member indicates that using the framework in practice should be easy, and gives it a 4 out of 5. The limiting factor is not the instrument, but the effort needed to collect the required data, such as the exact reserve fund balance and quotations. The interview explicitly mentions that these figures are not readily available and need preparation before the framework can be tested.
For observability, the respondent sees the tool as strong in the early phase of a project. By completing the first step (context) and the checklist, many associations without external guidance will realise that they still need professional support. The board member therefore rates observability as 4 out of 5 and highlights that the value of the instrument lies especially in step 1 (context) and step 2 (checklist). In addition, the case highlights operational details that become visible when using the tool, such as the importance of checking whether the Chamber of Commerce registration is still correct.
To summarise, the Rogers-based assessment for Amsterdam 108 shows that the framework is considered a valuable translation tool that clarifies complex financing questions, but that it must be better positioned in the process and supported by clear definitions and disclaimers on savings.

The table below summarises the scores for the framework based on the five attributes according to Rogers' theory, using the Likert scale.

Financial instrument model	**Relative advantage (1-5)**	**Compatibility (1-5)**	**Complexity (1-5)** 5 = not complex	**Triability (1-5)**	**Observability (1-5)**
Amsterdam 108	4	3	5	4	4

Table 68: Roger-based evaluation from Amsterdam 108 using a Likert scale (own table, 2025)

Based on the evaluation, the main design implications for the framework in the case of Amsterdam 108 are summarised in 8.3.3.

8.3.3 Implications for the financial instrument framework

All suggestions and comments that could be used to improve the framework were coded in the transcripts (appendix 8.3). Using the table below, the most important suggestions are cited and summarised. These have been translated into concrete design adjustments.

Key insight	Example citation from transcript	Translation to framework
Users perceive more value in the instrument when financial jargon is explained clearly, for example through a simple glossary of grants and loans.	‘’I would just add a glossary of terms for grants and loans.’’	Integrate a legend next to the tables explaining all abbreviations, financial instruments and technical terms in plain, non-technical language.
The instrument fits best in the COA process when it is used after an initial survey of interest among members, as a follow-up and deepening step.	‘’I therefore see this instrument working primarily after a survey of interest among members.’’	Integrate a clear introduction with the goals and ambition of the financial framework.
Trial use of the instrument is limited by the need to first gather all relevant data; data collection is a practical barrier rather than the tool itself.	‘’Although I do need to gather all the information first.’’	The board member/owners should gather the information. Therefore, this can not be integrated or adjusted in the framework.
Administrative issues such as an incorrect Chamber of Commerce registration can block financing and therefore need to be visible and checked in the process.	‘’Another issue we encountered recently was that the Chamber of Commerce registration turned out to be incorrect.’’	Integrate a check in step 2 into the framework that the Chamber of Commerce registration of the owners' association must be checked.

Table 69: Key insights and design implications Amsterdam 108 (own table, 2025)

8.4 Zoetermeer (28)

Zoetermeer (28) is a medium co-owners association with 28 privately owned apartments. The association has the ambition to undertake energy renovation measures, but experience high preparatory costs and limited reserves. Because of this, the board is hesitant about starting the project again and is looking for tools that help explain scenarios and affordability to other owners in a clear and non-technical way.

8.4.1 TPB-based evaluation of the framework

Zoetermeer (28) shows a mainly positive attitude towards the framework. The board sees it as a helpful supporting tool to create insights for co-owners and new board members, even though the current version feels incomplete on some parts.
The subjective norm is modest but supportive. The board member expects that owners generally appreciate clear, structured explanations of the process and financial consequences, but there is no strong explicit pressure yet to use such an instrument.
Perceived behavioural control is mixed. The board feels that they can work with the framework once the basic data is available, but they also experience dependencies on preparation and explanation for less engaged owners.
Despite the conditions, there is a clear positive intention to use the framework in future projects. The respondent expresses interest in working with a complete version of the instrument and suggests including the framework as process description or as part of a co-owners associations manual. Actual use is therefore assumed as ‘yes, but once the tool is final and the inputs are gathered.’.

The table below summarises the coding frequencies based on TPB for the interview of the co-owners association board member of Zoetermeer (28).

Category themes	Description for COA-boards and financial experts	Coding notes	Frequency
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+	6
		HFA-	1
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+	1
		HFN-	0
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+	3
		HFC-	4
Intention	Expression of willingness to use the framework	HFI+	0
		HFI-	1
Behaviour (future-oriented)	Planned concrete steps	HFB+	1
		HFB-	0

Table 70: TPB-based evaluation from Zoetermeer 28 (own table, 2025)

The theory of planned behaviour helps to understand how the framework instrument is perceived in practice by the co-owners association. Rogers’ attributes focus on how the framework itself is evaluated and improved.

8.4.2 Roger-based evaluation of the framework

For relative advantage, the board member gives the framework a 3 out of 5. The main added value lies in the way the tool structures data and makes the financial situation visible for co-owners. It is described as a supporting tool that helps to explain the situation, rather than as a formal decision document. The respondent emphasises that it makes things concrete and clear for owners, but also mentions that for their association it will not replace existing decision documents. It is a tool for insight, not the formal basis for voting.
Compatibility is also rated 3 out of 5. The framework is in line with the board's desire to offer a process description with recognisable steps, but the interview clearly shows that a few elements are still missing before it can be fully integrated. The respondent sees the framework as part of an owners' association manual or process file, which helps owners who do not want to delve into all the details but still need a basic overview. At the same time, they miss a clear introduction explaining why, when and by whom the framework should be used, and find the current mix of Dutch and English in the planning table distracting.
In terms of complexity, the tool scores very positively (5-5). The layout and forms are described as “intuitive”, clear and easy to follow. However, the interview makes an important distinction: for many owners, the calculation of the “annual savings in euros” is difficult to interpret. The board member notes that savings are often misunderstood or taken too literally and suggests that more explanation and context is needed so that owners with less background knowledge can interpret the figures correctly.
The trialability is also rated 5 out of 5, assuming the necessary data is available. The board member suggests that the framework can be effectively applied in practice, as long as the key inputs (such as reserve fund, cost estimates, and subsidy information) are known. They express a clear interest in working with a complete version of the tool after the study and explicitly state that the co-owners association would like to test it as a supporting document.
The framework receives a 4 out of 5 for observability. The tool provides concrete insight into the financial impact and is therefore suitable for convincing owners, but the visible results are highly dependent on individual behaviour. They point out that actual energy savings are influenced by the way residents heat and ventilate their homes and argue that the framework should explicitly reflect this. They suggest adding a clear note explaining that the savings presented are indicative and depend on the behaviour of the residents.
Zoetermeer 28 shows that the framework overall is seen as a clear and practical supporting tool that structures information and supports communication, but which needs a stronger process introduction and better explanation around savings assumptions to be fully compatible with the co-owners association decision making practice.

The table below summarises the scores for the framework based on the five attributes according to Rogers’ theory, using the Likert scale.

Financial instrument model	**Relative advantage (1-5)**	**Compatibility (1-5)**	**Complexity (1-5)** 5 = not complex	**Triability (1-5)**	**Observability (1-5)**
Zoetermeer 28	3	3	5	5	4

Table 71: Roger-based evaluation from Zoetermeer 28 using a Likert scale (own table, 2025)

Based on the evaluation, the main design implications for the framework in the case of Zoetermeer 28 are summarised in 8.4.3.

8.4.3 Implications for the financial instrument framework

All suggestions and comments that could be used to improve the framework were coded in the transcripts (appendix 8.4). Using the table below, the most important suggestions are cited and summarised. These have been translated into concrete design adjustments.

Key insight	Example citation from transcript	Translation to framework
The instrument is most valuable as an explanatory and communication tool, rather than as a formal decision-making document.	‘’It helps to explain the situation clearly, without it immediately becoming a heavy decision-making document.’’	Explicitly state that the framework is not intended as a decision-making document, but to inform the owners' association where they stand and what is possible.
Users need a clear introduction and consistent wording to understand why, when and how the instrument should be used.	‘’I think the process description needs a clear introduction. It should explain: why you use this tool, when in the process and by whom. The timetable could also be improved: currently, English and Dutch are mixed together, which makes for awkward reading.’’	Integrate a clear introduction with the goals and ambition of the financial framework.
Board members prefer to work with a complete, refined version of the instrument.	‘’So I prefer to work with a complete set of this instrument that incorporates feedback.’’	Share the final financial instrument framework with the board member of Zoetermeer (28).
Explanations must be tailored to both individual and collective motivations, linking personal impact to the broader sustainability and legal context of co-owners’ associations.	‘’That is why you need to tailor the explanation and examples to their motivation: show them what it means for their own situation, but also involve them in the greater importance of the co-owners association and the legal direction in which we are moving as a whole.’’	This falls outside the scope of the framework. The framework is intended to provide an initial insight into the possibilities and not to elaborate on specific cases in detail. By completing the framework, the co-owners association tailors it itself. However, the introduction must indicate why this framework is important for the sustainability ambitions of co-owners associations in the Netherlands.

Table 72: Key insights and design implications Zoetermeer 28 (own table, 2025)

8.5 BKT-advies

As mentioned before, BKT-adives is an engineering and consultancy company that supports multiple co-owners associations in preparing maintenance and renovation projects including financial planning. They are involved in technical studies, cost estimations and the preparation of loan and subsidy applications. Their work is often fragmented across reports, spreadsheets and meeting minutes. For this reason, they are interested in tools that structure information and help communicate scenarios clearly to boards and owners.

8.5.1 TPB-based evaluation of the framework

BKT-advies also show a clearly positive attitude towards the framework. The instrument is described as useful, practical and in line with how they like to structure conversations with boards. No negative attitudes were identified.
The subjective norm is also supportive. Within the professional context, advisors are expected to use clear, structured tools to support their recommendations. BKT-advies assumes that boards will generally follow their advice when such tools are introduced, rather than demanding their own alternatives.
The perceived behavioural control is high. As an experienced consultancy firm, BKT-advies feels fully capable of applying the framework in its current form, provided that the basic data for the project is available. The main control issue does not lie with them, but with co-owners associations that do not yet have the necessary input data.
Finally, the interview reveals a clear intention and emerging behaviour to apply the framework. BKT-advies indicates that it intends to apply elements of the framework in its projects and already works in a way that is consistent with its logic. The framework is therefore seen as something that can be gradually integrated into current advisory practice, rather than as a completely new way of working.

The table below summarises the coding frequencies based on TPB for the interview with the financial expert of BKT-advies.

Category themes	Description for COA-boards and financial experts	Coding notes	Frequency
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+	7
		HFA-	0
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+	1
		HFN-	2
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+	2
		HFC-	2
Intention	Expression of willingness to use the framework	HFI+	1
		HFI-	0
Behaviour (future-oriented)	Planned concrete steps	HFB+	0
		HFB-	0

Table 73: TPB-based evaluation from BKT-advies (own table, 2025)

The theory of planned behaviour helps to understand how the framework instrument is perceived in practice by the financial expert. Rogers' attributes focus on how the framework itself is evaluated and improved.

8.5.2 Roger-based evaluation of the framework

From Rogers' perspective, BKT-advies rates the relative advantage of the framework as high. The tool is also described as a 'talking point' that brings together important financial and technical information in one place and makes it easier to discuss scenarios with a board. Compared to working with separate spreadsheets and reports, the framework is seen as a clear improvement for structuring discussions and explaining the financial side of projects to a non-expert audience.
Compatibility is assessed as moderate. The framework is consistent with the way in which BKT-advies already documents projects, but does also not replace formal decision making documents such as GAM minutes, contracts or MYMP reports. Instead, it is used as a supporting document within a broader project or can be included into a co-owners association manual. It fits well into the advisory workflow, but must be presented as a supplementary tool and not as the formal decision making document.
On complexity, BKT-advies gives the framework a high score. The tables and steps are seen as clear and logical, and for professionals used to associations' documents it is straightforward to work with. Any complexity is attributed more to the subject matter, than to the design of the instrument itself. They do note that many boards and owners will still need explanation of what the numbers mean, but this is not seen as a flaw of the tool.
Trialability is assessed positively, provided that the basic data is available. BKT-advies expects that the framework can be easily tested in ongoing projects where a (S)MYMP, an overview of measures, data on the reserve fund and rough cost estimates already exist. However, in situations where this input is lacking (for example when a co-owners association does not have a recent MYMP), the framework cannot be applied and it becomes clear that a first step (having an MYMP) is still necessary.
In terms of observability, BKT-advies clearly sees potential in the framework. By filling in the tables, advisers can show how monthly contributions and reserve funds develop under different scenarios and can make the considerations transparent. This is seen as useful for convincing boards and structuring discussions, even though the actual energy savings will only become tangible after implementation.
To conclude, BKT-advies indicates that the framework is a highly useful, low-complexity support tool that fits well into advisory practice and supporting documents when its data requirements are clearly defined.

The table below summarises the scores for the framework based on the five attributes according to Rogers' theory, using the Likert scale.

Financial instrument model	**Relative advantage (1-5)**	**Compatibility (1-5)**	**Complexity (1-5)** 5 = not complex	**Triability (1-5)**	**Observability (1-5)**
BKT-advies	5	3	5	4	4

Table 74: Roger-based evaluation from BKT-advies using a Likert scale (own table, 2025)

Based on the evaluation, the main design implications for the framework in the case of BKT-advies are summarised in 8.5.3.

8.5.3 Implications for the financial instrument framework

All suggestions and comments that could be used to improve the framework were coded in the transcripts (appendix 8.5). Using the table below, the most important suggestions are cited and summarised. These have been translated into concrete design adjustments.

Key insight	Example citation from transcript	Translation to framework
The instrument is perceived as an informal guideline rather than a formal assessment tool, so it should be positioned as a supporting document instead of the official decision document.	‘’This instrument feels less formal; it is more of a guideline than an assessment framework. That is not negative, but it means that you should position it as a supporting document rather than “the official document to be voted on”.’’	Explicitly state that the framework is not intended as a decision-making document, but to inform the owners' association where they stand and what is possible.
The absence of a short, clear introduction about user, timing and intended output makes it harder to adopt or test the tool within existing processes.	‘’From my perspective, I would be missing a brief, clear introduction explaining who the intended user is, at what stage of the process you would incorporate this, and what the end product you wish to create with it is.’’	Integrate a clear introduction with the goals and ambition of the financial framework.
By presenting everything in a single overview, the tool can make it easier to involve and start a conversation with sceptical owners.	‘’This tool can be very helpful in this regard, as it allows you to present everything in a single overview. If you explain it properly, it becomes a lot easier to at least get sceptical owners to engage in conversation.’’	Keep structure and explanation clear.

Table 75: Key insights and design implications BKT-advies (own table, 2025)

8.6 VvE-Transitie

VvE-Transitie is a specialised process manager that supports co-owners associations throughout the entire financing process. VvE-Transitie is responsible for preparing subsidy applications, arranging loans from the Warmtefonds and guiding the association in its decision making and implementation. From this perspective, the respondent assesses the framework as both a practical working tool and an instrument that is intended to fit into their existing advisory process.

8.6.2 TPB-based evaluation of the framework

Viewed from the Theory of Planned Behaviour, VvE Transition shows a predominantly positive attitude towards the framework. The expert sees it as a useful addition to his toolbox and as an efficient way to link technical plans, public instruments and decision-making within associations.
At the same time, the subjective norms surrounding the energy renovation are mixed. Policy expectations and available subsidies encourage action, but resistance from owners, long processing times and high initial costs often delay projects.
The observed behavioural control is limited by structural factors: many co-owners associations underestimate the duration of the process, struggle with incomplete documentation and face significant upfront costs before visible improvements occur.
Despite these limitations, VvE-Transitie indicates that it is intending to use the framework in practice where it can reduce duplication of work and improve the quality of credit applications.
This is already reflected in behaviour. The expert combines RVO subsidies, Warmtefonds loans and process subsidies and sees the framework as a promising way to present this combined financing structure and guidance more clearly to boards and owners.

The table below summarises the coding frequencies based on TPB for the interview with the financial expert of VvE-Transitie.

Category themes	Description for COA-boards and financial experts	Coding notes	Frequency
Attitude towards behavioural	Evaluation attitude of the financing framework itself	HFA+	6
		HFA-	0
Subjective norm	Perceived expectations from other owners/associations about using the framework.	HFN+	0
		HFN-	0
Perceived behavioral control	Perceived ability to apply the framework (time, data, skills, mandate)	HFC+	1
		HFC-	5
Intention	Expression of willingness to use the framework	HFI+	1
		HFI-	0
Behaviour (future-oriented)	Planned concrete steps	HFB+	0
		HFB-	0

Table 76: TPB-based evaluation from VvE-Transitie (own table, 2025)

The theory of planned behaviour helps to understand how the framework instrument is perceived in practice by the financial expert. Rogers' attributes focus on how the framework itself is evaluated and improved.

8.6.2 Roger-based evaluation of the framework

VvE-Transitie rates the relative advantage of the framework as very high (score 5). The main advantage is that it brings together all relevant documents for a large owners' association into one consistent financial narrative. More importantly, the framework explicitly translates a technical plan into cash flows over time, showing what happens to co-owners association contributions, loans and reserves. This makes it easier to provide evidence for decisions in the general meeting and to reuse the calculations in applications to the Warmtefonds, thereby avoiding repeated recalculations in different formats.
Compatibility with the VvE-Transitie method is rated 4. In practice, they first use their own tools to calculate and compare technical variants. Once two or three serious options have been identified, this framework works well as a "second layer" tool for comparing the financial scenarios and translating them into consequences for owners. The only drawback is that the current version implies a relatively average association. For mixed associations or buildings with very different apartment sizes, VvE-Transitie indicates that additional fields are needed to make ownership shares and distribution effects more explicit, so that the framework is even better aligned with actual decision making.
In terms of complexity, the expert gives the framework a 4 for personal use, but only a 3 from the perspective of a new board member. The internal logic of the tables is clear, but there is a lot of information on a single page. VvE-Transitie therefore proposes a layered design. A simplified overview with only the key figures for the board and the general meeting, supplemented with more detailed tables for people who want to zoom in.
Trialability is given a score of 3. The instrument itself is relatively easy to test, but only becomes meaningful once a number of basic conditions have been met. VvE-Transitie therefore also makes a distinction between an exploratory phase, in which a simplified version with rough assumptions is used to illustrate the direction of cash flows, and a later phase in which the framework is filled in once the co-owners association decides to proceed.
The expert gives observability a score of 5. The framework is particularly powerful when used to derive a small number of clear visualisations for the general meeting, such as:

- a bar chart comparing the current total housing costs (energy + COA contribution) per apartment type with those after renovation, and
- a simple table comparing three scenarios: doing nothing, necessary maintenance only, and maintenance plus renovation.

These outputs show how the reserve fund and energy costs develop in each scenario and help to convince sceptical owners. In addition, the completed framework can be saved and later compared with the actual results, which can build confidence in the calculation methodology over time.
Altogether, the Rogers-based evaluation by VvE-Transitie shows that the framework offers clear added value for large and complex owners' associations and can be directly linked to credit and subsidy applications. At the same time, it emphasises the importance of better support for non-standard ownership structures, layered presentation and staged use throughout the renovation process.

The table below summarises the scores for the framework based on the five attributes according to Rogers' theory, using the Likert scale.

Financial instrument model	Relative advantage (1-5)	Compatibility (1-5)	Complexity (1-5) 5 = not complex	Triability (1-5)	Observability (1-5)
VvE-Transitie	5	4	4	3	5

Table 77: Roger-based evaluation from VvE-Transitie using a Likert scale (own table, 2025)

Based on the evaluation, the main design implications for the framework in the case of VvE-Transitie are summarised in 8.6.3.

8.6.3 Implications for the financial instrument framework

All suggestions and comments that could be used to improve the framework were coded in the transcripts (appendix 8.6). Using the table below, the most important suggestions are cited and summarised. These have been translated into concrete design adjustments.

Key insight	Example citation from transcript	Translation to framework
For decision-making, ownership structures and roles (housing association vs. private owners) must be made explicit within the instrument.	''I am still missing a few fields to make those kinds of ownership relationships explicit; this would improve the connection to decision-making even further.''	Add a section that clearly states the role and responsibilities of the housing association so the division of tasks and benefits is transparent in the framework.
Users experience overload when too much information is displayed at once.	''The logic of the tables is correct, but there is a lot of information on one page... If you were to change one thing to reduce the complexity, I would work with layers.''	Design the instrument so that page 1/step 1 is a standardised summary.
The usefulness of the instrument depends on certain preconditions (data, documents).	''The instrument itself is not complicated to play, but you do need a number of preconditions before it becomes useful.''	Information should be gathered beforehand by the COA. Therefore, this can not be integrated or adjusted in the framework.

Table 78: Key insights and design implications VvE-Transitie (own table, 2025)

8.7 Findings interview co-owners association boards

This 8.7 brings together the results from the second round of interviews with three co-owners association board members and two financial experts. It synthesises how respondents perceive the implementation of the financing framework and intend to use it (TPB). Then it uses Rogers' Diffusion of Innovations' five attributes to understand how the perceived characteristics of the framework as an innovation support or hinder its adoption.

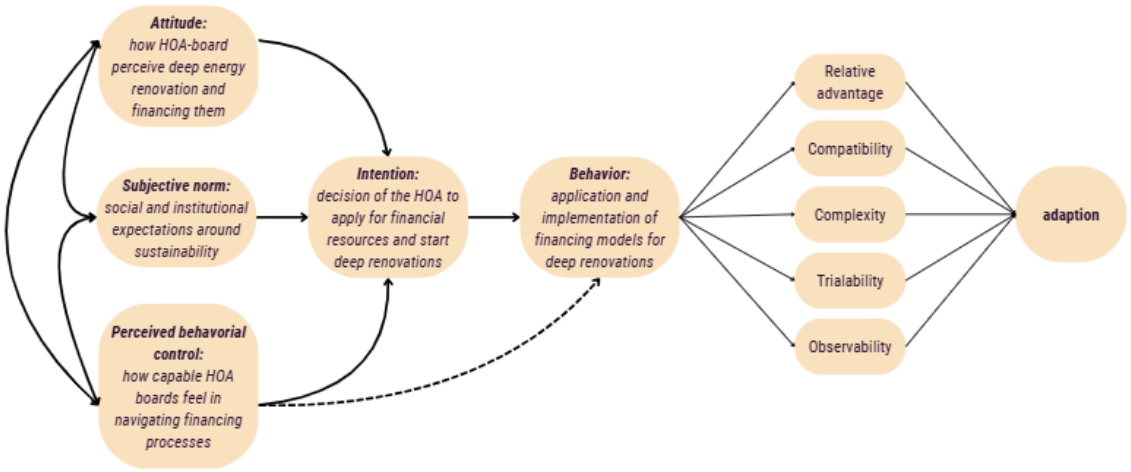


Figure 28: Theories TPB and Roger linked according to interviews (2) (own figure, 2025)

8.7.1 TPB-based cross-case synthesis

The table summarises the TPB-based coding for the five cases in the second interview round. The codes make a positive and negative attitude towards the framework, perceived social norms around the use, perceived behavioural control over applying it in practice, and intention to use it and emerging behaviour.
Across all cases, attitudes towards the framework are positive. Boards and experts see it as a useful, clear tool that helps structure financial discussions. Subjective standards are supportive but moderate. Transparent financial reasoning is valued by owners, local authorities and lenders, but there is little pressure to use this specific tool.
The weakest component is perceived behavioural control. Boards only consider themselves capable of working with the framework if certain conditions are met. Experts themselves feel in control, but highlight that many associations do not meet these conditions. Despite this, the intentions are positive in all cases. Boards want to use the framework in future projects and experts plan to integrate it into their advisory practice.

Case	Attitude FA		Norms FN		Control FC		Intention FI		Behaviour FB	
SVn	3+	3-	5+	8-	4+	10-	5+	1-	4+	0-
BKT-advies	2+	4-	9+	6-	1+	5-	1+	0-	1+	0-
QuaWonen	3+	0-	8+	0-	1+	6-	2+	1-	0+	0-
VvE-Transitie	8+	3-	4+	4-	1+	6-	2+	4-	5+	2-
Average	16+	10-	26+	18-	7+	27-	10+	6-	10+	2-

Table 79: Synthesis of TPB-based evaluation (own table, 2025)

Together the TPB-based synthesis shows the following overarching patterns:

- Attitude towards framework is strong and positive. Respondents see the framework as a helpful and supportive tool for decision making.
- Subjective norms are supportive but not concluding. External policy and professional expectations encourage structured working, while internal norms within the association remain mixed.
- Behavioural control is the main barrier. Time, data quality, documentation and governance capacity limit boards' ability to apply the framework independently, even when the attitude and intention are favourable.

These behavioural patterns form the setting against which the Rogers-based evaluation of the characteristics of the framework is interpreted in the following section.

8.7.2 Rogers-based cross-case synthesis

The table presents the Rogers-based Likert scale scores for the five cases on the five attributes. These attributes reflect how respondents rate the framework as an innovation compared to their current practices.

Case	Average	Relative advantage	Compatibility	Complexity	Triability	Observability
Amsterdam 16	4,4	5	4	5	3	5
Amsterdam 108	4	4	3	5	4	4
Zoetermeer 28	4	3	3	5	5	4
BKT-advies	4,2	5	3	5	4	4
VvE-Transitie	4,2	5	4	4	3	5

Table 80: Synthesis of Roger-based evaluation (own table, 2025)

In all cases, the framework scores highly in terms of perceived relative advantage. Most respondents rate this feature with a 4 or 5 on a scale of 5. Boards of co-owners' associations appreciate that the tool bundles fragmented financial information into a single coherent overview and makes an explicit link between loan repayments, contributions to reserve funds and expected energy savings, and monthly housing costs per unit. This helps them to explain suggestions to owners and compare scenarios in a transparent way. The experts also emphasise that the framework is an improvement over spreadsheets and fragmented reports, as it provides a consistent structure that can be reused for different projects.
Compatibility with existing processes is generally positive. Respondents agree that the framework fits with their current management and administrative routines if it is positioned as a supporting document rather than a formal decision-making document. Boards see it as a preparation tool that can be used next to maintenance plans, quotations and official minutes in the general meeting. Experts indicate that the framework fits well with the way they already structure files for lenders and grant providers, but emphasise that some additional fields are needed to fully meet the requirements of large, mixed associations.
The complexity of the framework is perceived as not complex. The scores for this characteristic are consistently high (4-5) and comments on complexity mainly relate to the

difficulty of the underlying financial and technical content, rather than the design of the instrument itself. Respondents find the order of the steps logical and the tables readable, especially when the framework is introduced with a brief explanation and by adding a legend for financial terms. Suggestions for improvement therefore mainly focus on simplifying the language, clarifying terms and working with layered displays to avoid information overload on a single page.
Trialability and observability receive positive but conditional assessments. Respondents indicate that the framework is easy to try out once certain conditions are met: an up-to-date (S)MYMP, reliable data on the reserve fund and contributions, quotations for measures and insight into relevant subsidies and loans. If this input is missing, the framework cannot yet be applied usefully and trialability is limited by the maturity of the project rather than by the instrument. Observability is considered one of the framework's main strengths: concrete outputs, such as an overview per unit of the total monthly housing costs before and after the renovation and simple scenario comparisons, make the consequences of financing choices tangible for owners and boards. At the same time, respondents emphasise that uncertainty about actual energy consumption and future energy prices requires communication that these results are indicative and not guaranteed.
In summary, the Rogers-based synthesis shows that the framework is consistently seen as a high-quality, low-complexity support tool that aligns with existing practice when integrated into the broader renovation and financing process. Limitations in testability and observability are mainly related to data conditions and the maturity of the project, rather than the framework's own features.

8.7.3 Cross-case patterns

By combining the TPB-based and Rogers-based syntheses, several patterns emerge that explain how co-owners association boards and financial experts perceive the framework's usability and application potential.

Firstly, the framework is primarily seen as a translation and communication tool. The high scores for relative advantage and the strongly positive attitude result from its ability to transform financing packages into concrete overviews per unit and simple explanations that can be used in the general meeting. Respondents do not expect the tool to replace formal documents, but rather to serve as a talking point that brings together a checklist, loan terms and owners' concerns into an understandable overview. This explains why compatibility is rated positively when the framework is included as a supporting document.
Secondly, the application of the framework depends on certain conditions in terms of processes and data. Although the tool itself is considered user-friendly and easy to try, both boards and experts highlight that its usability depends on the availability of key inputs: an updated MYMP, clear reserve funds and contribution levels, quotations, and clarity on subsidy and loan options. When these elements are missing, perceived behavioural control over the use of the framework decreases and trialability is effectively blocked, even though attitudes remain positive. This pattern emphasises that strengthening data preparation and dossier quality is a precondition for wider use.
Thirdly, a layered presentation and clear introductions are important for both behavioural control and perceived innovation characteristics. Respondents request a short introductory page explaining why, when and by whom the framework should be used, a legend of financial terms and a clear distinction between public and private instruments. They also advocate layered outputs. A concise summary page with key figures and scenarios for the general assembly meeting, supported by more detailed tables for advisors and board members. These design elements increase observability and reduce perceived complexity, thereby strengthening both perceived behavioural control and the intention to use the instrument.

Fourthly, the combination of a strongly perceived relative advantage and a positive attitude with limited perceived behavioural control leads to a pattern of “enthusiastic but dependent” users. Boards of co-owners associations are motivated to work with the framework and also intend to do so, but rely on external experts to prepare data, subsidy regulations and explanations to owners. The financial experts are willing and able to integrate the framework into their practice, but emphasise that its success depends on investments by associations in documentation, governance, and realistic timelines.
In general, these patterns show that the framework is seen as a useful and valuable tool that can be used in real projects. Whether it is actually used depends on improving perceived behavioural control at board level through better data preparation, and professional guidance. In section 8.8, these insights are summarised as the result of sub-question 4.

8.8 Output sub-question 4

This section summarises the main outcomes of sub-question 4. First it describes the concrete adjustments to the concept financing instrument framework based on the second round of interviews. Then it formulates a concise answer to sub-question 4.

8.8.1 Adjustments to the financing instrument framework.

The cross-case synthesis of the interviews resulted in a number of specific adjustments to the concept framework. Together, these adjustments resulted in the evaluated financing instrument framework presented in section 8.9. The most important changes are:

Positioning and purpose

- The framework is explicitly positioned as a decision support and communication tool for the board and the general assembly meeting, not as a formal decision document.
- A short introduction with ‘how to use this framework’ is added. This explains the purpose, the main steps, who should use it, and in which phase in the renovation and financing process.

Input and dossier preparation

- The fields in step 1 have been refined so that this step can serve as a basis document for the general assembly meeting.
- A Chamber of Commerce-check is added to step 2 to ensure that the legal status and registration of the co-owners association match the requirements of lenders.

Calculation and instrument strategy

- The method for determining the total loan requirement is made clear: investment costs minus subsidies and available reserve funds, followed by an assessment of whether this can be fully covered by public instruments or whether a funding gap remains.
- A strategy rule is added to steps 3 and 4: first make maximum use of public instruments (1. Warmtefonds/subsides 2. Other public schemes) and only then supplement with private loans or higher contributions if necessary.

language, structure and outputs

- A legend of terms is added to reduce perceived complexity for non -expert users

8.8.2 Answer to sub-question 4

Sub-question 4 asked: How do co-owners associations and financial experts perceive the usability and adoption of the proposed financing instrument framework?

Co-owners association boards and financial experts perceive the financing framework as a useful, simple and compatible tool with clear added value for structuring financing decisions and communicating with owners. They are willing and intend to apply it in practice, on condition that basic information about the project and the file is available and that some guidance is provided on how to use the tool. The adjustments resulting from the assessment improve its usability and contribute to the development of an evaluated framework that can be implemented in real renovation projects.

8.9 Evaluated financing instrument framework

The adjustments needed to improve the financing instrument framework was identified in 8.8.1 and grouped in 4 themes: positioning and purpose, input and dossier preparation, calculation and instrument strategy, and language, structure and outputs. This section explains how these suggested changes have been included into the final version of the framework in the appendix 8.9.
On the basis of the evaluation interviews, all proposed adjustments from 8.8.1 have been implemented in the framework.important to note that the instrument remains a simple comparison tool, and does not attempt to optimise complex stacked combinations of multiple instruments.

1. Positioning and purpose
The framework now begins with a short page entitled ‘How to use this framework’, which explains its supporting role, intended users and place in the renovation and financing process.

2. Input and file preparation
Step 1 has been created so that it can be used as a basic document for the general meeting, and step 2 includes an explicit Chamber of Commerce check and a more clear grouping of file requirements.

3. Calculation and instrument strategy
The method for retrieving the net loan amount (investment minus subsidies minus reserve fund) is clarified, and a rule has been added to steps 3 and 4 whereby appropriate public schemes are maximised first and only private loans or higher contributions are considered if there is still a gap.

4. Language, structure and output
A legend has been added, the distinction between public and private instruments has been clarified, and step 4 now includes a standard note stating that energy savings are indicative. The framework also offers layered output. A concise summary for use in the general meeting and more detailed tables for boards and advisors is presented separately.

9. Conclusion

This research aims to answer the question of: ‘How can co-owners associations in the Netherlands overcome financial barriers to their energy transition with the support of public-private financial models?’. Based on literature, an analysis of existing instruments and interviews with boards of co-owners associations and financial experts, a framework for financing instruments has been developed and validated, on the basis of which policy recommendations are formulated in Section 9.5.
The main conclusion is that deep energy renovations become financially feasible for many, but not all, co-owners' associations when three conditions are met: (1) the specific financial barriers faced by the association are made explicit at the project level, (2) these barriers are translated into a tailor-made overview of public and private instruments, and (3) this overview is included in a financing dossier and a capable management process. The proposed framework translates these conditions into a four-step plan that helps boards structure their project, check if the dossier is ready, select suitable instruments, and gain insight into the net monthly impact per flat. Boards and experts consider the framework to be realistic and useful, on condition that sufficient data and advisory support are available.

9.1 Answer to sub-question 1

What are the financial barriers for Dutch co-owners associations to undertake energetic renovations to their condominiums?

Dutch co-owners associations face high initial costs, limited reserve funds and difficulties in putting together a complete financing package for deep energy renovations. Even when they combine their own resources with loans and subsidies, a financing gap often remains. Within the association, differences in income, savings and time perspectives create resistance to higher service costs or long-term debt, while diverging interests weaken collective commitment. Furthermore, the time and effort required of managers is not always matched by a clear financial incentive, and lenders may be reluctant to work with small, diverse associations. All these factors together make thorough energy renovation a financial challenge.

9.2 Answer to sub-question 2

What are the financial opportunities available for Dutch co-owners associations to undertake energetic renovations to their condominiums?

The study shows that there is no uniform solution, but that a combination of public and private instruments can support energy renovation. At association level, long-term loans, public loans and subsidies can increase total financing capacity and spread costs over a longer period when combined with reserves and adjusted contributions. At the owner level, options for vulnerable owners exist and can offer a solution for those who are able and willing to take on additional debt. Together, these instruments can improve the affordability of projects, but they do not solve distribution tensions automatically, nor do they completely close the funding gap, especially for financially vulnerable associations.

9.3 Answer to sub-question 3

What data, regulatory, and operational requirements must Dutch co-owners associations meet to access public and private financing to undertake energetic renovations?

From the perspective of co-owners associations, initiating the energy transition and exploring financing options first requires clear insight into their own situation. Boards need accessible data on the technical condition of the building, planned measures, investment costs and expected energy savings, translated into concrete scenarios and monthly costs per flat. They also need a clear and understandable overview of the available financing options, such as their own reserves, loans, subsidies, and how these can be used in practice.
Secondly, associations need regulatory certainty. Boards need to know what is legally permitted in terms of loans, service charge adjustments and decision-making, and how these rules apply to specific financing structures. This includes simple explanations of majority requirements, legal restrictions and the conditions attached to government support schemes.
Thirdly, associations need sufficient operational capacity and guidance. Templates for a finance-ready dossier, step-by-step procedures and support from advisers who can help draw up documents and explain the options to owners are valuable.

9.4 Answer to sub-question 4

How do co-owners associations and financial experts perceive the usability and adoption of the proposed financing framework?

Both co-owners association boards and financial experts consider the proposed framework for financing instruments to be a useful and realistic decision-making tool, as it provides structure to the complex process of putting together a financing set. They appreciate the step-by-step approach: from clarifying the project and the obstacles to checking the readiness of the file, selecting instruments and assessing the monthly effects. At the same time, they emphasise that successful implementation depends on good input data, clear explanations and integration with existing advisory support. With the adjustments made during validation, the framework is considered suitable for guiding many associations in the use of available public-private instruments for deep energy renovation.

Taken together, these findings show that Dutch co-owners associations can overcome many of their financial barriers to deep energy renovation by using the proposed framework to translate their specific barrier profile into a tailored financing route of public and private instruments, included in a finance-ready dossier and a clear decision process. For co-owners associations this makes deep renovation financially feasible. However, additional targeted policy measures remain necessary, because financial resources alone are not sufficient enough to overcome financial barriers in their energy transition.

9.5 Policy recommendations

The policy recommendations below are based on the data, regulatory and operational requirements identified in sub-question 3 and on the adoption and usability findings from sub-question 4. Together, these results reveal several gaps between what is required by the co-owners associations to use financing instruments and what the current institutional context offers. The recommendations focus on which actors can address these needs and which policy instruments they can use. To keep the overview readable, the column 'key actors' groups these actors into four categories:

- National government (for example: Ministry BZK/Finance/Justice)
- Implementing agencies (for example: Warmtefonds, RVO, SVn)
- Local government (for example: COA-desk, local support, municipalities)
- Sector and market actors (for example: COA-managers, mortgage advisors, banks, financial advisors, real estate agents)

Based on the interview results with the co-owners associations, four problem areas come up as relevant for financing deep energy renovations:

1. Decision-making rules that delay or obstruct project approval processes
2. Fragmented financing routes and unclear eligibility
3. Non-standard documentation, which raises transaction costs and perceived risk for lenders
4. Limited advisory capacity for boards and co-owners association managers.

The table summarises six requirements. These requirements are translated into SMART policy recommendations which are listed below the table to maintain clarity.

Requirement	Evidence from cases	Key actors	Policy instrument
1. Standardised finance-ready dossier for COA loans and subsidies	All COA cases show fragmented documentation (unclear investment per home, missing quotations, outdated (S)MYMP, limited overview of monthly costs and benefits) Financial experts mention incomplete GAM minutes (no concrete credit decision, no amounts/conditions) and missing documents.	National government Implementing agencies Sector and market actors	Standardisation & guidance: national templates, checklists and minimum requirements for COA dossier, integrated and loan schemes.
2. Clearer, coordinated financing routes and sequencing of loans and subsidies	COAs perceive public instruments as attractive but complex. Cases report high upfront study costs, uncertainty about subsidy approval, and confusion about when to apply for what. Complexity and pre-financing requirements lead to postponement or downsizing of renovation plans.	Implementing agencies National government Local government	Scheme design & soft regulation: integrated guidelines, route maps, and adjustments to timing and pre-financing rules.
4. Structural advisory and process support for COAs arranging finance	Boards indicate limited proactive support from their manager or municipality and feel they have to self-study complex procedures. Small COAs in particular lack capacity, while financial experts stress that specialised advisors are important to translate positive intentions into financeable projects. The acceleration agenda highlights advisory and process support	Local government Sector and market actors Implementing agencies	Support programmes & funding: vouchers, subsidised process management, strengthened COA-desk, professional standards for managers.

	as a key action line.		
5. Better integration of COA finances in mortgage and housing advice	When buying an apartment, buyers are insufficiently informed about current and future COA contributions and upcoming investments. Mortgage advice focuses on individual affordability and treats COA costs as side information, leading to later resistance when contributions must increase for renovation. Interviewees stress that new owners often underestimate this responsibility.	National government Sector and market actors (financial sector)	Information & suitability rules: mandatory publication of COA financial position; integration in mortgage affordability assessment and consumer information.
6. Instruments and safeguards for vulnerable owners within COAs	Across cases, boards are worried that low-income owners will not be able to afford higher monthly contributions, even when loans and subsidies exist. Warmtefonds' VvE-ledenlening already supports individual owners, but awareness and use are limited. Affordability concerns are a key reason why boards hesitate to take collective loans.	Implementing agencies Local government Sector and market actors (housing sector)	Targeted financial instruments & guarantees: expanded individual top-up loans, interest support, guarantee schemes linked to COA projects.

Table 81: Policy recommendations based on the requirements (own table, 2025)

9.5.1 SMART policy recommendations

1. National government and implementing agencies (Warmtefonds, SVn, RVO) introduce a shared standardised finance-ready dossier template for COAs (including (S)MYMP, scope and quotations, GAM decision, energy data, and affordability overview) and integrate it as a mandatory digital format in the main national COA loan and subsidy portals. Now, all national schemes use this template so COAs compile the dossier only once and can re-use it across instruments.
2. Implementing agencies, in cooperation with national and local government, publish standard financing route maps for different co-owners association profiles (small/large, and mixed/owner-occupied) that show step-by-step how to combine SVVE, Warmtefonds, TOF and local schemes. These route maps are integrated into public websites and COA-desk procedures and are updated at least annually. Where possible, subsidies can cover preparatory studies and application timelines are aligned with loan procedures to reduce timing risk.
3. National government is reviewing relevant legislation and model statutes to introduce a specific decision category for sustainability and associated financing, with tailored quorum/majority rules and explicit room for mandates to renovation committees. Model GAM decision templates for deep energy renovation and loans are developed and distributed. The aim is that by 2030, most associations undertaking deep renovation can rely on simplified, clearly framed decision procedures.
4. Each municipality hosts an COA-desk that offers targeted support on financing deep energy renovation. A national or regional voucher scheme funds a minimum number of hours of specialised process support per association preparing deep renovation with loans/subsidies.
5. A standard co-owners association financial fact sheet is required as part of every apartment transaction and mortgage advice. National mortgage advice guidelines are updated so that future association contribution increases for planned renovations are structurally included in affordability assessments and explained to buyers.

6. Implementing agencies and local government expand and actively promote individual support instruments (e.g. ‘VvE-ledenlening’ products) and link them explicitly to co-owners association renovation loans.

9.5.2 Policy recommendations in relation to the Co-owners Association Acceleration Agenda

The Co-owner Association Acceleration Agenda already identifies decision making simplification, improved financial support, lender-ready dossiers, and advisory and process support as main themes. The recommendations above are aligned with these themes but sharpen and operationalise them specifically from the perspective of financing deep energy renovation in co-owners associations.

1. Standardised finance-ready dossier:
   Current regulations already require multiple documents from owners' associations, but in a fragmented and government-specific manner. The recommendation goes one step further than these fragmented requirements by proposing a single nationally standardised file format that is directly integrated into the main public portals for loans and subsidies. This reduces transaction costs and uncertainty for boards and financiers and makes the concept of a ‘finance-ready file’ concrete and reusable for all instruments.
2. Clearer, coordinated financing routes and sequencing of loans and subsidies:
   Information is available about individual instruments but boards find the overall financing route fragmented and difficult to navigate. The recommendation does not introduce any new instruments, but bundles existing instruments into standard roadmaps for typical co-owners association profiles, clarifying combinations, sequence and timing. In this way, fragmented information is translated into practical pathways from intention to financed renovation.
3. Decision-making simplification for sustainability investments
   Legal changes to facilitate decision-making by co-owners associations often remain general and are not explicitly linked to energy renovation and financing. The recommendation strengthens the agenda by proposing that sustainability and related financing decisions be recognised as a specific decision-making category, with tailored quorums and clearer mandates for renovation committees. This directly addresses the delays identified in the cases.
4. Structural advisory and process support for co-owners associations arranging finance
   The existing support is valuable, but not sufficient to guide boards through the entire financing process. The recommendation shifts the focus from general information provision to practical process management, through extended co-owners association helpdesks, vouchers for process managers and clearer expectations for professional association managers. This addresses the operational capacity gap raised in sub-question 3.
5. Better integration for co-owners associations finances in mortgage and housing advice
   Although financial information about associations is often available in practice, it is not presented in a standardised, user-friendly format during transactions and mortgage advice. The recommendation builds on existing practice, but makes it systematic by proposing a national financial information sheet for associations and explicitly integrating future contribution paths into affordability assessments. This helps to align buyers' expectations with the association's long-term investment needs.
6. Instruments and safeguards for vulnerable owners within co-owners associations
   Individual support instruments exist, but awareness of them is low and they are not clearly presented as a tool for managing distributional tensions within owners' associations. The recommendation adds value by linking such tools to collective renovation loans and positioning them as explicit guarantees for low-income owners. This supports boards in making socially acceptable financing decisions in associations with mixed incomes.

In summary, the policy recommendations translate the empirical requirements for financing deep energy renovations in co-owners associations into concrete actions for national government, implementing agencies, local authorities and sector actors. Together, they aim to create an institutional framework in which the financing framework developed in this thesis can be applied on a large scale, while ensuring that financially vulnerable owners are not structurally excluded from the energy transition.

9.6 Discussion and limitation

9.6.1 Discussion

The aim of this thesis is to understand how Dutch co-owners associations can overcome financial barriers to deep energy renovation through public–private financial models, and how a practical decision-support framework can help boards to translate intentions into finance-ready action. Rather than proposing entirely new financial products, the research examined how existing instruments, procedural rules and support structures function in practice, and where the main breakdown occurs between policy intent and project execution. The findings confirm that financial barriers remain significant, but they also show that barriers are often produced by the interaction between instrument design, dossier requirements, governance constraints, and behavioural dynamics within the association.

Theory of Planned Behaviour: how it can be steered

Interpretation through the Theory of Planned Behaviour, the stagnation of deep renovation in many associations is best explained by intention formation rather than a lack of sustainability awareness. Boards frequently express positive attitudes towards renovation, yet intention remains fragile when subjective norms and perceived behavioural control do not support its implementation. In these cases, subjective norms are shaped by municipal and National ambitions and by expectations within the general assembly meeting. However, these norms often remain mixed because boards anticipate resistance to higher contributions and debt, and feel responsible for protecting financially vulnerable wonders. Perceived behavioural control emerges as the most critical determinant. Boards report that fragmented information, complex procedures, and uncertainty about data and eligibility requirements reduce their sense of control and delay decisions.

The main contribution to this research is that the TPB can be used not only to explain behaviour, but also to identify ways to steer it. The findings suggest three practical steering routes.

1. Attitudes can be strengthened when benefits are made concrete at apartment level (comfort, maintenance co-benefits, and net monthly impacts)
2. Supportive norms can be fostered by improving the collective narrative in the general assembly meeting through scenarios, examples, and distributional transparency, reducing the expectation of conflict.
3. Perceived behavioural control can be increased through clearer requirements, templates and step-by-step preparation of a finance-ready dossier, combined with process support when board capacity is limited.

In this way, both the framework and policy measures function as behavioural interventions: they lower perceived complexity, reduce uncertainty, and convert supportive intentions into feasible next steps.

Diffusion of Innovation: adoption depends on embedding

The evaluation results align with Diffusion of Innovation theory in showing why financing opportunities and tools can remain underused even when their relative advantage is recognised. For boards, the relative advantage of the framework lies in providing structure. It translates fragmented requirements into a coherent preparation route and makes affordability implications visible. However, adoptions depend on compatibility with existing routines. Trialability and observability also matter. Boards are more likely to use the framework if they can apply it first to a smaller step and if they can compare their situation to real examples of other associations.

Across interviews, perceived complexity appears to be the most persistent adoption barrier. Not only the complexity of the framework as a tool, but especially the complexity of the

financing environment around it. This helps explain why opportunities can remain underused, even if relative advantage is clear, high process complexity undermines perceived behavioural control and discourages action. The framework addresses part of this by simplifying and sequencing tasks, but full adoption still depends on reducing the surrounding process complexity through clearer standardisation and support.

Taken together, the findings indicate that barriers should be addressed through a combination of standardisation, sequencing and bridging, capacity and intermediaries, and affordability protection. These measures target the two dominant mechanisms identified in the cases: low perceived behavioural control and high perceived process complexity.

Positioning within the Co-owners acceleration agenda
The findings in this research connect to the Dutch Co-owners Acceleration Agenda, which targets acceleration through decision making rules, financial support, information and guidance, specific approaches for large associations, and support for inactive or small associations. Since the empirical data were collected, several policy developments have moved in directions that correspond with barriers and needs identified in this research. The 2025 Chamber letter on the agenda announces a legislative trajectory to enable decision making on maintenance, sustainability measures and related financing based on a simple majority (50%+ 1), regardless of older regulation requirements, while retaining quorum safeguards. In addition, revisions to the SVVe aim to improve accessibility, including an extension of the scheme and higher subsidy ceilings, with changes taking effect from 1 January 2026. The same policy updates also highlights strengthened affordability support through the Warmtefonds VvE Ledenlending, intended for owners who struggle with increased monthly contributions.

At the same time, from the perspective of this research, several practical issues remain only partly addressed. First, while the agenda emphasises information provision and process support, there is still limited standardisation of finance-ready dossiers that is consistently recognised across lenders and subsidy providers as a common basis for eligibility and risk assessment. Second, pre-financing requirements and timing risks remain important bottlenecks. Even with improved loans and subsidies, associations often need bridging solutions or clearer sequencing to cover upfront studies and early projects costs. Third, although the agenda recognises the relevance of information in the housing transaction chain, operational integration between transaction advice, mortgage affordability assessments, and expected association contribution increases remains limited in everyday practice. Overall, the findings suggest that acceleration depends not only on expanding financial support but also on making financing workable through standardisation sequencing, and sufficient support capacity.

Social justice and mixed affordability profiles
The results further highlight the tension between climate targets and distributional fairness within co-owners associations. Boards frequently describe affordability concerns, partly for low-income or elderly owners, as a decisive factor in postponing, downsizing or avoiding collective loans. The framework contributes by making distributional impacts more transparent, but transparency alone does not resolve affordability constraints. The broader implication is that collective renovation finance needs to be complemented by targeted individual support and clear rules that prevent financing exclusion in mixed-income associations.

Cost of inaction as an overlooked baseline
A further implication concerns the cost of inaction. Postponing investment is not cost neutral, as insufficient reserve and weak maintenance planning can contribute to increasing long term

financial pressures and conflict, and MYMP quality is a recurring concern in the association's contexts. More generally, maintenance literature indicates that delayed interventions can shift projects from planned rehabilitation towards more expensive corrective works, with total life-cycle costs influenced by inflation and financing conditions (Janaki et al., 2024). In specific risk areas, physical risks may further increase the long-term costs of delay. For example, induced seismicity has required significant spending on damage repair and strengthening measures in affected regions. For future research and policy evaluation, this suggest that renovation decisions should be compared not only to an investment now scenario, but also explicit delay maintenance routes that incorporate deterioration, energy costs, financing conditions, and where relevant physical risk exposure.

9.6.2 Limitation

The findings of this thesis should be interpreted in the context of a number of limitations relating to the research design, the data, the scope and the validation of the framework.

Firstly, the research is based on a limited number of cases and interviews with boards of co-owners associations and financial experts. This qualitative, in-depth approach was suitable for investigating complex financing processes and for developing a practice-based framework, but it also means that the results are indicative rather than statistically representative. The identified barriers, requirements and perceptions may not provide a complete picture of the diversity of co-owners associations in the Netherlands, particularly those that are less organised or motivated or are not yet considering carrying out a deep energy renovation. There may be selection bias. Boards and experts who were willing to cooperate may be relatively involved in or already interested in sustainability and financing.

Secondly, the analysis is mainly based on self-identified information from board members and experts and on available documentation from the selected co-owners associations. This implies the usual limitations of interview-based research. The respondents may misremember details, emphasise certain aspects at the expense of others, or strategically frame their narratives. Internal dynamics within associations, such as conflicts or informal power relations, may not be fully reflected in interviews.

TPB and Rogers were mainly applied as sensitising and interpretative frameworks in a qualitative design. This supports a structured analysis of patterns (how perceived control and perceived complexity limit intentions), but it does not allow for statistical testing of the predictive relationships between predictors, intentions and behaviour, nor does it measure the extent of steering effects. Furthermore, the concepts are linked in practice. By coding them into categories, there is a risk of simplifying dynamic interactions within associations (how perceived control and norms develop during the process). Future research could supplement these insights with a survey-based TPB design or longitudinal observation to test whether the framework measurably increases intention and actual adoption.

Also, the scope of the study is limited in several ways. Geographically, the study is limited to the Dutch context, with its specific legal framework for co-owners' associations, its mix of public and private instruments, and its national acceleration agenda. The financing framework and policy recommendations are therefore not directly transferable to other countries without adaptation. In terms of content, the focus is on the financing of deep energy renovations, rather than on the technical, architectural or long-term performance of renovation projects. Technical feasibility, implementation risks and post-renovation outcomes are only considered to the extent that they influence financing decisions and affordability. Other important aspects of the energy transition in buildings with multiple owners, such as

detailed comfort impacts, health impacts or long-term maintenance strategies, are outside the primary focus of this thesis.

Fourthly, the validation of the framework is limited to post-usability and perceived acceptance. Experts and boards assessed the framework in interviews and feedback rounds, but the study did not conduct long-term follow-up to observe how the framework influences concrete decisions, implementation processes or project outcomes. As a result, conclusions about its usefulness and acceptance are based on expectations and early experiences. In addition, SVn and the housing association manager were not primary evaluators in the framework, as their role in process guidance is relatively limited. Their perspectives on the operationalisation and adoption of the framework may be underrepresented.

Lastly, the policy framework and instruments within which the research takes place are dynamic. Loan schemes, subsidy programmes, regulations and advisory structures evolve in response to climate policy and housing challenges. The analysis and recommendations reflect the situation at the time of data collection and writing. Changes in policy priorities, new financial products or institutional reforms may change the relevance or feasibility of some elements of the framework and recommendations. This means that both the framework and the proposed measures should be seen as temporary and adaptable, rather than a fixed plan.
Since the data collection, several policy developments are already underway which may alter decision making dynamics and instrument conditions. For example the announced legislation trajectory towards a 50%+1 voting rule for sustainability and financing decisions, and revisions to key subsidy schemes such as the SVVE effective from 1 January 2026.

Finally, two analytical elements were outside the scope but couldmaterially affect future financing assessments and decision making:

1. A quantified cost of inaction baseline
2. More detailed treatment of fiscal measures (VAT/tax effects) as cost-reducing parameters in affordability comparisons.

Future research could incorporate these elements to test whether they change the attractiveness and social acceptability of deep energy renovation transition.

10. Reflection

Choice of scope
The decision to focus this thesis on the financing of deep energy renovations in co-owners associations is related to my job. I work at BKT-advies as a project manager, where I provide assistance to co-owners associations with sustainability and renovation projects. BKT-advies also has its own co-owners association management service: BRIK Vastgoedmanagement. For BRIK, I am the first point of contact for members. This position has allowed me to have many relevant conversations with boards and owners, and I have noticed that there is an interest in making buildings more sustainable.

In practice, I often meet boards that want to take steps towards sustainability but do not know how to organise this within the context of a co-owners association. The idea of implementing energy efficiency measures usually comes up when regular maintenance is needed, such as painting the window frames. At that point, many board members feel it is a waste to reinvest in wooden window frames, when they would actually prefer to replace them completely, improve comfort through better insulation and reduce long-term maintenance. The attitude can be summarised as: if we do something, we should do it properly.

As a project manager, this experience has made me look more widely: what do owners really need and how can I make the process easier for them? In exploratory research during the first six months of graduation lab, it became clear that the biggest constraints in these sustainability projects are often financial. This was also confirmed in the interviews conducted. For this reason, I chose a scope that focuses on the financial dimension and the use of instruments for co-owners associations. With this research, I wanted to create something of added value: a product that can support both owners associations and myself in my role as project manager in structuring and financing energy renovation.

10.1 Process

Graduation timeline
I started my graduation programme in February 2023/2024 . During the first six months, I worked on my P2 and at the same time did a full-time internship (15 ECTS) and the RM2 course (5 ECTS). This combination left me with very little time, and I only passed P2 on my second attempt, but with a lot of motivation. I managed to complete 30 ECTS in Q4, with many short nights. That period set the tone for the hard work that followed to complete P4. In between, I took a break from my studies due to personal circumstances and had to resit one master's course before I could schedule P4. Which was also not easy, but in the end I passed. From September 2025/2026 to December 2025, I am working to complete my P4. Looking back, this route was not easy, but it taught me a lot about persistence, realistic planning and what my own limits are in terms of working under little sleep and stress.

Planning
In practice, the research process was anything but linear. I continued to conduct interviews while already sketching out parts of the framework, drafting chapters and sometimes completely rewriting earlier sections. This way of working also meant that important changes were still being made late in the research process. In addition, many thematic changes were made during the process. Initially, the focus was more on ESCOs rather than the co-owners associations themselves, then it shifted explicitly to the co-owners associations, later changing to a broader view of financial instruments instead of ESCOs, and eventually housing associations also came into the picture. Given the balance between the time

available and the expected added value, I also decided to remove a more detailed European section from the research. From a practical point of view, one respondent also withdrew from the research due to personal circumstances and was unable to participate in the second round of interviews. Given the time pressure, I was unable to find a replacement.
If I were to plan the project again, I would first try not to combine it with an intensive job alongside my studies. That combination made it more difficult to cope with delays and design changes. At the same time, I would also like to mention that it was exactly this workplace that added a lot of value to the research and provided research resources and respondents.

I would also aim to set the general research structure earlier. Because the structure changed several times, I postponed some interviews until I was sure I had formulated the right questions. This created a lot of time pressure at the end, and if I had had this input and structure earlier, I could have adjusted the design choices and focus of the research sooner. Also, this would have given me more opportunity to use and test the framework itself.

10.2 Product

Framework
Looking at the end product, one of its strengths is that the framework provides structure and overview in a financing process that many respondents described as confusing. It has been found useful to start from the project and barriers profile. The step-by-step approach was recognised as logical by both boards and experts.
During the second interview round, boards emphasised the explicit link between barriers and instruments, and the monthly costs per apartment, as useful. This helps them explain scenarios to owners. Experts appreciated the fact that the framework links financial, legal and organisational requirements rather than treating them separately. In this sense, the product manages to transform a fragmented set of rules and regulations into a coherent decision-making support tool.
At the same time, I recognise that financing support is only one part of the broader challenge. Deep energy renovations in co-owners associations are also shaped by technical constraints, contractor capacity, internal conflicts, governance dynamics, and wider housing market and policy developments. The framework does not solve these structural issues on its own, or it does not replace professional advice or project management. Its contribution is more specific. It helps boards and advisors navigate the financing related complexity by clarifying requirements, structuring dossier preparation, and making affordability and distributional impacts transparent. In that way, the framework supports progress even when other constraints remain present.
Looking back, the framework can be seen as a practical response to the two main mechanisms identified in the study: low perceived behavioural control (TPB) and high perceived complexity (Rogers) in the financing of major renovations. By structuring the requirements in a financing dossier and translating financial choices into a net monthly impact per dwelling, the framework aims to increase the ability to act and support convincing communication in the general meeting. At the same time, the analysis also confirms that reducing complexity at the instrument level is not sufficient when the surrounding process remains complex. Broader acceptance will still depend on the availability of data, guidance capacity and stable policy and instrument conditions.

Further development
If the framework were to be further developed, I see several possibilities for enhancing the product:

- Developing a digital web version that can automatically integrate updated instrument conditions and interest rates

- Integrating the cost allocation formula to map out the co-owners association contribution per owner in accordance with the deed of division
- The ability to automatically combine instruments. Currently, this has to be entered and determined manually.

These steps would not change the basis, but they would make the product easier to maintain and use, and less dependent on manual calculations.

Overall

Looking back, this graduation project was more than just doing research. I learned how my professional world and my studies complemented and enhanced each other.
The long days, numerous tables and sometimes annoying settings in Word showed me that research is not always complex in terms of investigation, but also that structure and confusion can turn into something useful. I hope that the framework will help colleagues and fellow students to take concrete steps in their own projects. The co-owners participating in this research are already waiting for me to share and implement the framework with them. Knowing that the results will be used in practice makes this project feel worthwhile to me.

10.3 Reflection P4

1. What is the relation between your graduation project topic, your master track?

The energy transition and co-owners associations deal with financial, operational and policy related aspects in the built environment on a daily basis. Sustainability measures relate not only to buildings themselves, but also to decision-making and financing. In that context, these topics are linked to the theoretical frameworks of management in the built environment.

2. How did your research influence your design/recommendations and how did the design/recommendations influence your research?

The starting point for this project was the existing sustainability objectives and policy goals for co-owners associations. There are many tools available, but in practice, deep energy renovation often stagnates. My research investigated where the gaps remain between this policy and the financial reality in associations, and those findings guided the framework's design. Developing and evaluating the framework also revealed which gaps it cannot resolve on its own (such as limited support for vulnerable owners), and these remaining gaps formed the basis for the policy recommendations.

3. How do you assess the value of your way of working (your approach, your used methods, used methodology)?

I consider my approach to be valuable. By combining literature research, case studies and semi-structured interviews, I was able to link theoretical insights to the real-life experiences of administrators, managers and experts. This approach helped me to base the design on actual needs and the language used in practice. At the same time, I also experienced the disadvantages of this approach. As the scope and structure were refined along the way, some choices and interviews had to be revisited under time pressure. Overall, my methodology proved effective enough in producing a framework and recommendations that are recognisable and useful, but it also taught me how important it is to establish key design decisions earlier in the process. After all, there is always room for improvement and elaboration.

4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

Academically, the research adds value by bringing together financial, organisational and behavioural perspectives on the energy transition in co-owners associations. It translates discussions about barriers and instruments into a concrete, structured framework and shows how public-private financial models actually work/or fail.
From a societal perspective, the project is relevant because it addresses a very practical problem: associations that want to take action but get stuck on financing. The framework and policy recommendations can help them make more informed decisions between the potentially complex instruments.
Ethically, the research has made me more aware of the tension between climate goals and affordability for low-income owners. The results indicate that transparency about monthly costs and targeted support for vulnerable owners are important. Such a framework can help clarify choices, but it can not on its own solve questions about who should bear what share of the financial burden of the energy transition.

5. How do you assess the value of the transferability of your project results?

The project results are most directly transferable within the Dutch context. The structure of the framework, the barrier categories and the decision-making steps are relevant to many Dutch co-owners associations and can be used by local authorities, advisors and managers in different regions.

The underlying logic, which is based on a barrier profile and working towards a financing-ready dossier and matching instruments, is more broadly applicable. However, the specific content is highly dependent on the context. Outside the Netherlands, or in other forms of collective ownership, the framework would need to be adapted to local legal structures and instruments.

6. What are the most important lessons from this research that policymakers designing new financial instruments for co-owners associations should take into account, beyond more clear guidelines on how to use them and combine them? (own question)

One of the most important lessons learned from this research is that developing new financial instruments for co-owners associations is not just a technical or financial matter, but also a question of governance and timing. In addition to clearer guidelines for the use and combination of instruments, policymakers must also recognise that co-owners association boards struggle primarily with capacity and risk issues. Instruments work better when they are stable over time, predictable in terms of budget and conditions, and aligned with the long decision-making processes of co-owners associations. Regular policy changes make boards hesitant to commit to long-term projects. A second lesson is that new instruments must explicitly address distribution within the association. Without targeted options for low-income owners, boards will continue to hesitate, no matter how attractive the collective loan may seem on paper. Finally, this project has shown me that instruments must be incorporated into a broader support system so that boards are not left alone to translate abstract rules into concrete decisions.
In short, the key message for policymakers is that more money or new products are not enough. Instruments only become effective when they are reliable, socially responsible and practically usable within the real constraints of co-owners associations.

7. How does the concept of a finance-ready dossier change the relationship between co-owners associations, advisors and lenders, and what are the risks of shifting too much responsibility to the association boards? (own question)

The idea of a finance-ready dossier changes the relationship between associations, advisors and lenders in several important ways. It makes expectations more explicit. Boards know in advance what documents, calculations and decisions they need, advisors have a clear checklist to work with, and lenders can assess applications in a more standardised way instead of reinventing the process for each association. In this sense, the dossier concept can give boards more control, as they are no longer dependent on vague instructions or informal contacts, but can work towards a concrete goal and speak the same language as lenders and implementing bodies. It also gives advisors a clearer role as process facilitators who help to collect and translate the required information.
At the same time, working with a finance-ready dossier also involves risks if too much responsibility is placed on the boards of co-owners associations. Most board members are volunteers, not financial or legal professionals. The administrative and coordination workload can quickly become too heavy, especially if each scheme and lender adds its own additional requirements to a basic template. In my opinion, the file should therefore be seen as a shared responsibility. A tool that clarifies what is needed, but which must be supported by advisors, COA-desks and lenders who are willing to help fill in the gaps, rather than as a way of shifting all the work and risk to the boards as a self-help measure.

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