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THE ROLE OF FINANCIAL INTERMEDIATORS IN REDUCING ENERGY
POVERTY: AN EXAMPLE OF KREDEX FOR RENOVATION OF MULTI-
APARTMENT BUILDINGS IN IDA-VIRUMAA

Master's Thesis

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I have written this Master's independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

More than 220 million buildings in the European Union were built before 2001 and this is 85% of the total number of buildings in the EU (European Commission, 2020). It is predicted that by 2050 about 85-95% of existing buildings will be still standing. Today buildings consume about 40% of the EU's total energy consumption, because most of the existing buildings are not energy efficient (European Commission, 2020). A non-energy efficient building is also more expensive for the occupants, as they have to pay for more energy consumption. High energy bills can lead to debt and welfare problems in the household which, in turn, leads to energy poverty – “a situation in which households are unable to access essential energy services and products, thus affecting health, living standards and the levels of heating, cooling, and lighting of homes” (European Commission, 2023).

In defining the focus of building refurbishment, the European Commission has already identified one of the main areas of focus for 2020: low-energy refurbishment (European Commission, 2020), and in recent years, the issue of housing refurbishment has become more and more relevant, especially when it comes to low-income families living in poorly insulated houses, whose heating and other energy bills can account for a significant part of the family budget.

In 2022, Estonia was hit harder than other EU countries by the energy crisis and inflation. According to European Commission data, “Estonia was the euro area’s hotspot of inflation throughout 2022, when inflation reached 19.4%, mainly driven by rising energy and food costs” (European Commission, 2023). The poorest 20% of Estonian households paid 25% more for energy, while the richest 20% paid only 14% more (Celasun, Iakova and Parry, 2022). Improving the energy efficiency of residential buildings can reduce the amount of consumed energy and thus energy costs, thereby protecting less affluent households.

According to the long-term strategy for building reconstruction adopted in 2000, Estonia plans to renovate the housing stock built before 2000 by 2050 (TalTech and Ministry of Economic Affairs and Communications, 2020). When it comes to apartment buildings, Estonia currently has about 14,000 multi-apartment buildings built before 2000. Ida-Viru is one of Estonia's 15 counties, located in the north-eastern part of the country. Ida-Viru is the county with one of the lowest income levels in Estonia and the highest relative poverty level (Statistics Estonia, 2022, 2023).

According to the data of the Estonia Building Register, there are 2271 apartment buildings in Ida-Viru County, of which 2232 were built before the year 2000 and are subject

to renovation. According to data from KredEx¹, in the period 2013-2023, 52 multi-apartment buildings have been renovated in Ida-Viru County, of which only 4 buildings have been completely renovated, and 48 buildings have had only one or more insulation and renovation works done and need further renovation works (KredEx printed material, 2024). The activity of apartment associations in Ida-Viru County is very low compared to other counties. In Ida-Viru County, the allowance rate for complete renovation of a house has always been the highest at 50 percent, but even this has not encouraged residents to renovate their houses. For example, in April 2023, 212 applications were submitted to the KredEx for the allowance for complete renovation of the house and the entire grant was distributed during eight hours from the start of the application process. But at the same time, not a single application was submitted in this tour from the Ida-Viru County (KredEx press release, 2023).

In order to increase the awareness of Ida-Viru County residents about renovation opportunities and benefits offered by KredEx, as well as to increase the residents' activity in the renovation of their apartment buildings, KredEx created the position of a flat association counsellor in Ida-Viru County in summer 2022. This specialist offers both personal and group counselling to flat associations and building residents, has information hours, and participates in general meetings of flat associations, where building residents discuss the current problems of their building and make plans for the future, as well as make important decisions regarding the future of their building, including whether and to what extent they will renovate their building or not.

At the end of January 2024, KredEx opened a separate round of 9,4 million euros for granting the allowance in the Ida-Viru County with unprecedentedly high allowance rates: in case of complete renovation of the house - 70%, in case of partial renovation - 40%. According to KredEx, only 13 applications have been submitted in the middle of April, of which 5 are for full renovation (KredEx internal data, 2024). A large amount of work has been done in the last two years: 54 general meetings of flat owners in flat associations, more than 20 informational seminars for flat association managers, more than 600 personal and group consultations for flat managers and flat owners have been held. In addition to the general increase in energy prices in Estonia, the cost of central heating has increased in Ida-

¹ KredEx is a fund established by the Ministry of Economic Affairs and Communications in 2001 with the aim of providing financial solutions based on the best international practices. Among other services, KredEx offers grants for improving the energy efficiency of residential buildings. In particular, a grant can be received by a flat association for renovation of an apartment building. Enterprise Estonia and KredEx were merged in 2022. The legal name of the new united organisation is Estonian Business and Innovation Agency.

Viru. For example, in 2022 the cost of central heating in Kiviõli, Püssi and Narva-Jõesuu increased by about 40 per cent (Kriis, Põhjarannik, 2022). In Alutaguse, the increase was by about 65 per cent (Kriis, Põhjarannik, 2022) and the heating price in Narva, the biggest town in Ida-Viru, increased by 84 per cent in 2023 (ERR news, 2023). But at the same time the residents of Ida-Viru County still have little desire to renovate their apartment buildings in cooperation with KredEx.

Previous studies on energy efficiency and energy poverty in Estonia have looked at the process of applying for a renovation grant (Kuusk and Kalamees, 2016), the system of distributing the percentage of renovation allowance for apartment buildings by region (Lihtmaa, Hessb and Leetmaac, 2018), the impact and scope of the measure of support for the renovation of apartment buildings (Lauri, 2014) and the factors hindering mass renovation in Estonia (Lihtmaa and Kalamees, 2024). However, the factors that favour and hinder the renovation of apartment blocks in Ida-Viru County through the lens of the experiences and opinions of potential and actual participants of the renovation process have not been studied yet, especially since the renovation market in Ida-Viru is just being formed and the experience of all participants of the process in this region is still very limited.

Therefore, in light of the current situation, the thesis aims to uncover the factors which favour and hinder the renovation of multi-apartment buildings in Ida-Viru County. This will help to reveal what can be done to make buildings in Ida-Viru County more energy efficient and reduce energy poverty in the region.

To attain the aim, the following research tasks have been formulated:

- to define ‘energy poverty’
- to provide literature review on factors affecting renovation decisions
- to prepare the list of questions for the interview and survey
- to collect data for content analysis: feedback from general meetings of housing associations, comments from residents of housing associations and buildings on social media and on the online-portals
- to conduct the interviews and content analysis and to analyse the results.

The thesis is organized as follows: theoretical chapter (Chapter 1) of the master's thesis provides an overview of the concept of energy poverty, as well as factors affecting renovation decisions in multi-apartment buildings. In the empirical chapter of the thesis, evidence from Ida-Viru County is presented. The work analyses the interviews with the flat

association leaders and residents, technical consultants, representatives of local authorities and other participants of the renovation process. An overview of the feedback from the residents of multi-apartment buildings received by the KredEx consultant during the meetings with the flat associations is discussed as well. In addition, the feedback from the participants of the flat association meetings are reviewed, as well as the comments on articles about the renovation in Ida-Viru County left by residents on online portals and social media are in-depth analysed in Chapter 2.

Keywords: energy poverty, renovation, multi-apartment buildings, Estonia, Kredex, financial intermediators

CERCS classification: S191

1. Theoretical background of energy poverty reduction via renovation decisions

1.1. Defining energy poverty

As early as 2009, the European Parliament identified energy poverty as a growing problem and set a target to reduce the number of citizens living in energy poverty (Official Journal of European Union, 2009). The number of EU citizens living in energy poverty has been growing in recent years. Thus, in 2021, 6,9% of the EU population could not provide sufficient heat in their homes, and in 2022, 9,3% of the EU population is already in this situation. In 2020 researchers pointed out that even before the pandemic, around 80 million households in Europe were struggling to keep their homes warm enough. According to the study, the risk of energy poverty in Europe is twice as high as the risk of usual poverty² (Bouzarovski et al, 2020).

In recent years the European Union has moved from defining the phenomenon of energy poverty to studying it more closely, and also to developing criteria for measuring and tackling energy poverty (Commission Recommendation, 2023).

In 2018, the European Parliament requires member states to decrease the number of citizens living in energy poverty and to set a target and develop measures to reduce energy poverty. Although energy poverty is recognised as a growing problem and the European Union and the rest of the world are trying to tackle it, there is still no clear and unified

² Poverty is the state of one who lacks a usual or socially acceptable amount of money or material possessions. Poverty is said to exist when people lack the means to satisfy their basic needs. (Encyclopedia Britannica, 2024)

definition of energy poverty (EU guidance on energy poverty, 2023). The term 'energy poverty' is often considered as an identical term to 'fuel poverty' (Thomson, 2016), and energy poverty and fuel poverty both can be labelled as a household's inability to: 'achieve a socially and materially necessary level of household energy services' (Bouzarovski & Petrova, 2015).

Reddy (2000) defines energy poverty as 'the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe, and environmentally benign energy services to support economic and human development'.

The European Parliament recommendations in 2020 and in 2023 define a set of key indicators of energy poverty based on the principles of validity, reliability and accessibility of EU data (Commission Recommendations, 2023). All criteria are summarised in three aspects or main reasons of energy poverty: low income, high share of energy costs in total household expenditure and low energy efficiency of residential buildings and appliances. No single criteria alone can determine the level of energy poverty, so defining energy poverty it is important to note that this is a multidimensional phenomenon. In addition, the level of energy poverty can also be influenced by such factors as geography and climate, household characteristics, health status and gender, and the specific energy and transport needs of the household (European Commission, 2023).

Kryk and Guzowska (2023) analysed the level of energy poverty in 24 EU countries in the period from 2010 to 2020. They developed a synthetic multidimensional energy poverty index based on 4 indicators out of 13 recommended by the European Commission indicators for the study of energy poverty (2020), and the authors have added 1 indicator. As a result, Kryk and Guzowska (2023) use 5 criteria to measure the level of energy poverty: 3 objective variables (electricity and gas prices for household consumers and the level of household final energy consumption per capita) and 2 subjective variables (percentage of population unable to provide sufficient heat in the house due to poverty; percentage of population living in dilapidated housing).

Thomson, Bouzarovski and Snell (2017) consider one of the most obvious indicators of energy poverty to be a household's inability to pay its home maintenance bills, which defines that household as energy poor. They use three general approaches for measuring energy poverty: expenditure approach (analysis of expenditure against absolute or relative thresholds), consensus approach (self-assessment of indoor housing conditions and access to

basic necessities compared to the community) and direct measurement (comparison of the achieved level of energy services in the house with the established standard).

At the same time, Igawa and Managi (2022) used three indicators for identifying energy poverty in 37 countries located on different continents: accessibility (the availability of energy services, measured by the number of electrical appliances available); reliability (the stability of the electricity network) and affordability (the share of energy expenditure as a percentage of monthly household income). They found out that the most important factors in determining energy poverty are family income, presence of children, and mental illness.

Cheikh, Zaied and Nguyen (2023) use next factors on energy poverty in Europe to construct an energy poverty index: inability to keep home adequately warm, arrears on utility bills and faulty non-energy efficient housing. They conclude that a more efficient distribution of income among households and efficient use of energy resources are needed to reduce energy poverty.

Kashour and Jaber (2024) in their study note three factors (causes) of energy poverty: 'high energy cost, poor energy efficiency and low income'. In addition, they name three consequences (effects) arising from these factors: 'insufficient warmth within dwellings, energy arrears and dwelling quality issues'.

The EU is planning to renovate buildings, to develop financing mechanisms and to implement targeted energy poverty protection methods for reducing energy poverty (DellaValle & Czako, 2022). Besides energy poverty, DellaValle and Czako (2022) also mention the term 'energy vulnerability', which is used in the EU to identify and reduce the risks of energy poverty. Energy vulnerability, unlike energy poverty, does not describe a state at a point in time, but a fluid state that a household may fall into or out of if political, economic, social or housing conditions change. DellaValle and Czako (2022) attempt to identify mechanisms that will assist the energy poor on their journey from passive consumer to active energy citizen. In their work, they distinguish three levels of 'energy citizenship': passive consumer, consumer with needs, and energy citizen, and provide recommendations for increasing the level of energy citizenship. DellaValle and Chacko (2022) conclude that to reduce energy poverty it is not enough to only improve the energy efficiency of buildings, households living in energy poverty must also be empowered to become energy citizens. This may require knowledge, time and financial resources for all parties involved.

To summarise, it should be noted that energy poverty is a multi-component term and it includes several factors that determine energy poverty and may look different in each

household. Some people will not be able to pay their household bills, some will not be able to keep the house warm enough, and some will not be able to do both. And the inability to pay energy bills can be both a cause and a consequence of energy poverty. The level of energy poverty is not even so much influenced by the amount of household income as by the percentage of household income spent on energy bills. Among other things, energy poverty is also influenced by the condition of the dwelling, its quality, and the level of energy efficiency. Moreover, the poor condition of housing and the inability of residents to improve the energy efficiency of housing can also be a consequence of household's energy poverty. In this study the compiled definition of energy poverty will be used, which also describes the main factors of energy poverty. Energy poverty is an economic situation in household when it is not possible to heat the house sufficiently or to consume energy services at reasonable prices. Energy poverty is formed by three factors - low income, high energy bills and low thermal efficiency.

1.2. Factors affecting renovation decisions in multi-apartment buildings

The factors influencing the decision to renovate multi-apartment buildings are not yet sufficiently studied. For the analysis of renovation decision-making models, previous authors often take into account the experience of both multi-apartment and private buildings (Friege & Chappin, 2014; Liu et al., 2020). It should be understood that in any case it is easier to make a decision on renovation of a private building, because this decision is made only by the homeowner and his family members. Therefore, when deciding whether to renovate an apartment building, it is important to consider all the factors that influence the homeowners' decision one way or another.

Baumhofs et al. (2018) studied the experience of one- and two-family houses in Germany and assessed the influence of the motivation, capability and ability of the occupants according to the Motivation-Opportunity-Ability framework on the scope of energy efficiency renovation works. They found that there was a direct correlation between motivation and ability of occupants and the amount of energy related renovation work. However, there is an inverse relationship between opportunity and the amount of energy related renovation work. These findings may suggest that the more comprehensive solutions are offered to residents, the less likely residents are to choose comprehensive renovation. People approach simpler and less risky renovation solutions less critically and more easily make positive decisions. In addition, following the regulatory requirements in the case of

renovation allowances is more complex than if to deal with individual, simpler renovation works.

Zundel and Stieß (2011) studied the renovation activity of homeowners in Germany. They found that for homeowners who carried out renovation for improving energy efficiency of their home, the most important factors were (more than 80 per cent of respondents reported this as important): reduced energy consumption for heating the building, reduced long-term energy costs and reduced home maintenance costs. In addition, 75% of homeowners “consider refurbishment an investment, increasing their home’s monetary as well as immaterial value”. Also, 75% of respondents noted the importance of having modern technology in the house, as well as creating a more comfortable microclimate in the house. Homeowners who did not undertake renovations to improve the energy efficiency of their home stated that negative attitudes towards credit were a major obstacle. Zundel and Stieß (2011) conclude that the economic factor is very important in renovation, but the decision to invest in renovation is often made by homeowners on the basis of the precautionary principle. The desire to protect themselves from economic risks is often the reason for renovation. In addition, confidence in the result of renovation and a positive attitude towards obtaining a loan are important factors. In the authors’ view, negative factors are lack of knowledge about energy efficiency, negative attitudes towards the loan, and concerns about the complexity of the renovation process (Zundel & Stieß, 2011).

According to Organ, Proverbs and Squires (2013) existing instruments to incentivise renovation rates are only partially successful and even regulations and subsidies alone do not lead to a big result because they do not remove all obstacles to homeowners' decision to renovate. They recommend an improved approach, taking into account the complex decision-making process of homeowners, and as the result of literature review they propose their "motivation model for energy efficient refurbishment (ERR)". According to the authors' idea, the model consists of internal and external factors that are interrelated (Organ, Proverbs and Squires, 2013). The internal factors as well as the motivation to renovate and the renovation actions themselves depend on the external factors or context. For example, internal factors are trust, role of “home”, attitude, belief and values, priorities and a lot of others. Internal factors affect not only the motivation to act, but also the sort of the action. Internal factors influence other internal factors and are also influenced by external factors, such as events in society, the real estate market or the construction market. External factors change faster than internal factors, but affect internal factors, motivation and action. According to Organ,

Proverbs and Squires (2013) homeowners renovate for energy efficiency rather for three reasons: to save on home heating costs, to increase comfort, and to reduce negative environmental impacts. "Whether individuals have a more "egocentric" or "altruistic" attitude influences the strength of these principal motivations" (Organ, Proverbs & Squires (2013), p. 116). This knowledge should be considered when choosing arguments to motivate residents to renovate the house.

Figure 1.

Factors in the motivation for energy efficiency refurbishment.

Internal factors	External factors
<ul style="list-style-type: none"> • Attitude, beliefs and values • Decision making • Locus of control • Sense of responsibility • Trust • Role of "home" • Self • Social norms • Fashions and tastes • Priorities • Expectations • Loss aversion 	<ul style="list-style-type: none"> • Current incentives • Penalties • Social norms • Housing market • Property condition • Cost of works • Regulation • Economic motivation • Government policies

Source: compiled by the author based on Organ, Proverbs and Squires (2013)

Collins and Curtis (2018) evaluated the use of the Better Energy Homes building renovation programme in Ireland. According to their findings, the financial situation of the residents of a house directly affects their activity in renovating their house, i.e. the more affluent people live in the house, the more likely they are to use the renovation programme. They also found out that the houses that have already been renovated before are willing to pay more for the next renovation project. This indicates that they have already realised the benefits of renovation by example and have had a positive experience. Thus, Collins and Curtis (2018) emphasise the importance of information and its sources to stimulate the renovation process. Also, they suggest that the percentage of subsidy may be lower for repeated renovation, whereas the percentage of support may be higher to incentivise initial renovation.

Even in China the researchers find similar problems hindering the popularisation of renovation. For example, Liu et al. (2020) in a review of China's existing modernisation

strategy conclude that the process of applying for a subsidy and the renovation process itself is quite complex and requires a lot of effort, time and certain knowledge. They also note a lack of specialists in the field of energy efficiency in buildings, as well as a lack of information platforms and events to promote renovation. It is also mentioned that the level of public awareness of renovation opportunities is low.

According to Dadzie et al. (2018), Australian households report that one of the negative factors is the high cost of building renovation works, as well as the unclear payback period of the investment made. For example, in case of full renovation in Estonia, according to KredEx requirements, the multi-residential building must also install ventilation with heat recovery (Riigi Teataja, 2023), which is quite expensive. In contrast to insulation of the facade or roof, which will obviously save heat, the benefits of heat recovery ventilation are not always clear to the inhabitants of the building. Dadzie, Runeson, Ding and Bondinuba (2018) mentioned long payback period as one of the factors that hinder the decision to renovate a house.

Based on the experience of Dutch households, Broers et al. (2019) divide the renovation process into four stages:

- Getting Interested - interest in renovation may arise due to some external events, physical factors, socio-demographic or environmental problems.
- Gaining knowledge - the stage of gaining knowledge about renovation measures, which can be influenced by the homeowner's personal experience, as well as by the advice of acquaintances and experts.
- Forming an opinion - the stage of forming an opinion about the reconstruction. Financial factors such as energy bills, the payback period of the renovation project, and the availability and size of the government subsidy are crucial at this stage.
- Making a decision - making a positive or negative decision about the renovation.

The authors note that in the last two stages, the homeowner develops a positive or negative attitude that will influence what they will tell others about renovation in general.

Nair, Gustavsson and Mahapatra (2010) reported several influencing factors based on feedback from homeowners in Sweden and describe their impact. For example, energy efficiency measures are more popular among younger, more educated homeowners with higher incomes. Homeowners who perceived their energy costs to be high were more likely to invest in renovation, and were more likely to undertake works requiring more investment. The authors note the importance of effective communication and raising homeowners'

awareness of the cost-effectiveness of renovation. In their view, information on the losses that homeowners may incur if energy efficiency measures are not implemented can be particularly effective. Less awareness of energy efficiency measures among homeowners more often leads them to adopt only non-investment measures. To work with such homeowners, it is necessary to involve opinion leaders who have made the decision to renovate to share their experience. The authors point to the importance of drawing up building energy audit documents, which contain proposals for improving the energy efficiency of the building. By communicating with the specialist preparing this document, as well as in the process of familiarising with the energy audit data, the homeowner's awareness of energy efficiency measures is increased.

Friege and Chappin (2014) identified the main motivators and barriers for energy efficient renovation and divided them to economic and noneconomic ones through the analysis of literature. Based on this analysis, the authors highlight positive and negative economic and non-economic factors (as shown in Table 1) influencing the decision to undertake energy efficient renovation.

Table 1

Main positive and negative factors influencing the decision on energy efficient renovation

ECONOMIC FACTORS		NON-ECONOMIC FACTORS	
Positive		Positive	
- renovation payback	- increasing the value of the house;	- increased thermal comfort, status and resilience to climate change;	- reduced energy demand, environmental impact, risk of future supply problems and dependence on fossil fuels.
- lower energy bills and protection against price fluctuations.			
Negative		Negative	
- lack of necessary financial resources	- reluctance to take out a loan for renovation	- no confidence that renovation is needed;	- lack of time to undertake renovation
- lack of confidence in the return on investment		- lack of willingness to renovate more than necessary	- concern that renovation causes a lot of dirt and stress

Source: compiled by the author based on Friege and Chappin (2014)

An overview of the studies conducted on the factors affecting energy efficient renovation is given in Table 2 below.

Table 2

Factors influencing the decision on energy-efficient renovation

Author	Region	Methodology	Conclusions
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Friege, Chappin (2014)	Europe and China	Quantitative analysis (citation network analysis)	<p>The analysis suggests that the potential energy savings and profitability from energy-efficient renovation measures are not as high as commonly believed, possibly due to overlooking the influences of energy-consuming behavior in assessments.</p> <p>Homeowners consider both economic and non-economic factors when deciding whether to renovate, making current incentives focused solely on financial viability less effective. To address this issue, it is crucial to gain a deeper understanding of homeowner decision-making processes.</p> <p>Authors propose developing a simulation model that maps these processes, which could lead to refining existing strategies or creating new mechanisms for addressing this situation more innovatively.</p>
Liu, Li, Tan, Zhang (2020)	China	Critical review of existing retrofit policies in China.	<p>It is essential to develop a comprehensive policy framework for green building retrofits in China, increase public understanding of the importance of energy conservation, promote the growth of organizations and experts focused on green building retrofits, create an effective evaluation system, offer diverse financial</p>

			assistance options, allocate greater resources to research and development initiatives, and foster innovative energy contracting approaches.
Baumhof, Deckerb, Rödera, Menrad (2018)	Germany	Survey conducted among 218 German owner-occupiers of single and two-family houses.	Energy cost reduction, a strong social network, the inclination to seek a loan, or the desire to enhance a building's structural integrity were identified as factors that positively influence owner-occupiers of single and two-family houses in implementing or planning energy-efficient renovation measures.
Zundel, Stieß (2011)	Germany	Qualitative survey and computer-aided personal interviews.	Homeowners decide to renovate based on a variety of factors including comfort, convenience, status, sense of belonging, and economic considerations. The economic aspect is particularly significant as it reflects the precautionary principle - safeguarding against financial risks such as fluctuating prices or future supply challenges. Attitudes towards energy efficient refurbishment greatly influence decision-making. Confidence in realizing long-term benefits supports the choice for an energy efficient home retrofit; while positive attitudes towards obtaining a loan improve financial

flexibility and expand opportunities for action. Conversely, lack of interest in energy efficiency, aversion to taking out loans, and concerns about stress or negative effects diminish the likelihood of pursuing an energy efficient retrofit - barriers that cannot be easily addressed with more information or additional funds alone. Many homeowners underestimate their home's potential for energy savings; therefore access to information and professional guidance on energy efficiency can prove helpful in this context.

Organ, Proverbs, United Kingdom Literary review
Squires (2013)

The research discovered that numerous elements impact the incentive to refurbish owner-occupied housing. The primary drivers for energy-efficient renovation can be classified into economic, social, and environmental incentives. These motivations are affected by various interconnected internal and external factors as well as individual emotions. The model presented illustrates the complex relationship between multiple influences on energy efficiency enhancements within a particular setting.

Collins, Curtis (2018)	Ireland	Quantitative analysis of data from a national grant programme Better Energy Homes of over 28,000 households for residential energy efficiency improvements.	<p>One of the key findings indicates that larger homes are less inclined to invest in energy efficiency on a per square meter basis compared to smaller homes. Properties with lower energy efficiency levels show the most significant improvements because of their higher potential. However, the subsidy amount remains constant regardless of these improvements. The authors recommend adjusting the subsidy based on energy efficiency enhancements or ideally, carbon emissions, for optimal impact.</p> <p>The analysis of willingness-to-pay revealed that households who had previously undertaken energy efficiency upgrades were more willing to pay. This suggests that those who understand retrofitting benefits are willing to spend more, indicating a lack of information among first-time retrofitters about its advantages. This implies that offering lower grant aid may be enough to encourage repeat modernization investments and providing bonus payments might be necessary for first-time upgraders. These conclusions underscore the importance of</p>
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			reliable information sources for households considering investing in energy efficient upgrades.
Dadzie, Runeson, Ding, Bondinuba (2018)	Australia	Semi-structured interview conducted among sustainability/energy efficiency professionals, building services engineers, project managers, architects and facility managers.	The findings of the research indicate that obstacles to the acceptance and utilization of sustainable technologies comprise perceived advantages related to demolition and construction, building age, expenses, perceived limited return on investment periods, uncertain energy savings forecasts, current design constraints, hidden and overall refurbishment expenses, as well as the cost of sustainable technologies.
Broers, Vasseur, Kempb, Abujidi, Vroon (2019)	Netherlands	Interviews and questionnaires completed by private homeowners who received an energy audit for their home.	The study findings indicate that various factors play a role at different phases of the decision-making process. During the initial stage, interest in energy renovation measures can be sparked by external events, physical aspects, socio-demographic factors, and environmental concerns. Subsequently, homeowners acquire knowledge about these measures and personal information along with advice from their social network or professionals may sway their decisions. In the third stage, financial and economic considerations hold significant weight as homeowners form

			their stance on energy renovation measures. Furthermore, upon implementing these measures, homeowners are able to influence others within their social circles and advocate for additional energy-saving changes. The results culminate in recommendations aimed at boosting the adoption of energy renovation measures among private homeowners.
Nair, Gustavsson, Mahapatra (2010)	Sweden	A survey of 3,000 individual house owners.	Most homeowners favoured reducing energy use in the home and preferred low-cost strategies over more investment options. Personal characteristics such as income, education, and age, as well as contextual factors such as the age of the home, discomfort from temperature fluctuations, previous energy efficiency investments, and perceived energy costs, influence homeowners' preferences for specific types of energy efficiency measures.

Source: compiled by the author

To summarise, factors in favour of energy efficient renovation include lower energy bills, a comfortable and modern building environment, increased property values and protection against volatile energy prices, and reduced environmental impact. The barriers to renovation are the high cost and the need to take out a loan, complexity and length of the process itself, the unclear payback time of renovation and the risks, lack of knowledge and expertise.

To overcome the obstacles, it is most often suggested to give more information to households, which is important at all stages of renovation (Collins & Curtis, 2018; Liu et al.,

2020; Nair, Gustavsson & Mahapatra, 2010). According to the four stages proposed by Broers et al. (2019), the renovation process and influencing factors are as follows. In the initial stage, external events, physical and social factors are important. In the stage of gaining knowledge about renovation, personal experiences of other homeowners are important, as well as data about the renovation process and support measures (Broers et al., 2019). Here it is possible to introduce people both to the positive experiences of renovated houses and to openly talk about possible negative scenarios that may await the house in a few years if renovation is abandoned (Nair, Gustavsson & Mahapatra, 2010). Financial factors and calculations play a crucial role in the opinion-forming phase of renovation, as households need to understand how their energy bills will change, what financial support the state or local authorities will provide, and what the payback period for renovation investments will be (Broers et al., 2019). It is important to provide homeowners with all the necessary information and knowledge at each stage, so that people do not get lost in the large amount of different information and do not lose faith in the effectiveness of renovation.

2. Empirical evidence from Ida-Viru County

2.1. Description of methodology and data

In order to identify the factors that influence the decision-making process for energy-efficient renovation of residential buildings in Ida-Viru, it is necessary to select an appropriate methodology and data. This sub-chapter will provide an overview of the data and research methods that were chosen for the analysis.

Methodology of this thesis consists of 5 elements, as illustrated in Figure 2.

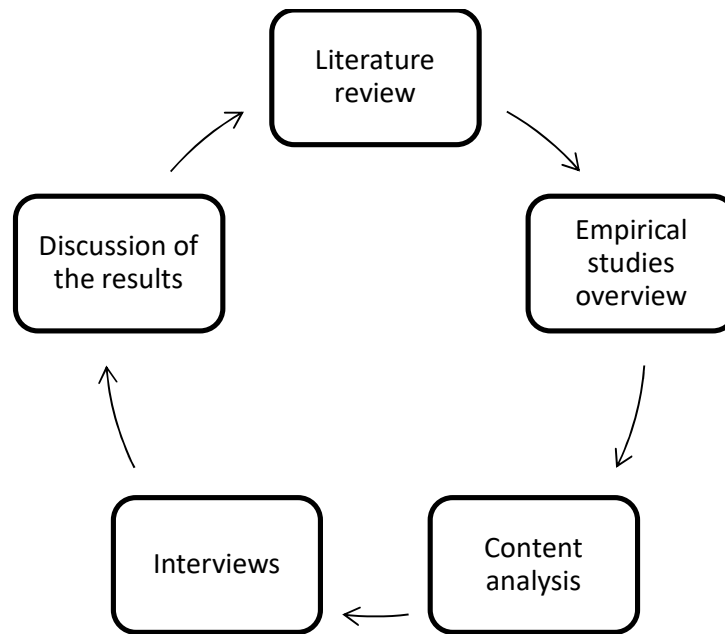


Figure 2. Methodological framework of the thesis

Source: compiled by the author

In Estonia, for renovation of multi-apartment buildings, a decision of the general meeting of the owners' association is required, which must record the consent to renovation of more than 50% of the flat owners who simultaneously own more than 50% of the flat area in the building (Korteriomandi- ja korteriühistuseadus, 2022). In the experience of the author, who has participated in more than 50 flat association meetings, making such a decision is by far one of the most difficult tasks for every flat association manager. For this reason, it is very important to consider the factors in favour of and barriers hindering renovation to examine the issue from different perspectives and to look at positive and negative experiences.

Most of the previous studies that have been reviewed explore the theme of influencing factors using qualitative methods, as among them the analysis of literature and different documents (e.g., Friege and Chappin, 2014; Organ, Proverbs and Squires, 2013; Liu et al., 2020) or conducting surveys (e.g., Baumhof et al., 2018; Zundel and Stieß, 2011). To investigate the influencing factors, some authors also used an interview method (e.g. Dadzie et al, 2018) or a mixed method from interview and survey (Zundel and Stieß, 2011; Broers et al, 2019). The approach of this study is unique since the influencing factors will be explored applying a combination of methods such as interviews and content analysis. This is needed to obtain answers to the questions about experiences, opinions, fears and prejudices from the participants' perspective (Hammarberg, Kirkman., de Lacey, 2016).

According to Rutledge and Hogg (2020), in-depth interview is a qualitative research method that allows to conduct a research without involving a lot of respondents. The authors write about the advantage of the in-depth interview method - it allows to spend enough time with each participant, talking to them in a conversational format, and thus obtaining a more detailed and informed opinion of the respondent (Rutledge & Hogg, 2020). The main aspects of an in-depth interview include (Rutledge and Hogg, 2020):

- Conducted on a one-on-one basis
- Consist mainly of open-ended questions (semi-structured)
- Relies on interpersonal contact with the respondent to create a comfortable and trusting atmosphere during the interview.

Kuusk and Kalamees (2016) give a description of the process of applying for renovation grants in Estonia and the process consists of three stages: preparation, grant application and renovation work. Following this idea, the author has selected participants from all stages of renovation process. The total number of interviews is 18 which includes from the household side (flat owners and heads of flat associations), from the market side (technical consultants, construction firm and bank representative), and local government representative who coordinate the process (see Table 4).

Qualitative analysis requires processing large amounts of data, from reducing the amount of information and eliminating irrelevant details to searching for and identifying patterns and building a visual structure for the data (Patton, 2002). To analyse and identify patterns in the interviews conducted, Sheppard (2020) suggest trying to identify codes and collocate data while reading interview transcripts. "A code is a shorthand for a more complex set of questions or ideas" (Sheppard, 2020, p. 259).

According to Sheppard (2020), here is two ways of coding: deductive and inductive. The deductive way of coding is based on predetermined interests and the researcher identifies "relevant" passages or quotations. In this way, the author develops an analysis of the interview according to these codes. The inductive method begins by identifying the main ideas and themes that emerge as the researcher reads the interview (Sheppard, 2020). The researcher then narrows or combines the themes and categories identified during the coding process to arrive at a clear structure, and uses a data table to illustrate the findings, which includes the final concepts and categories (Sheppard, 2020). The data in the table can provide a good basis for writing the analysis.

The thesis used an inductive research method to analyse the interviews, resulting in a table with the main findings: factors influencing the decision to repair and possible ways to overcome the negative factors. Quotes from participants were also added to help clarify the nature of some of the factors.

All the interviews were conducted as semi-structured in-depth interviews. Semi-structured interviews are a research method often used in qualitative research. Semi-structured interviews usually start with a set of predetermined questions that cover the main topics of interest (DeJonckheere & Vaughn, 2019). But at the same time, the interviewer has the opportunity to ask additional questions or ask the participant to elaborate (Ragab & Arisha, 2017). The advantage of semi-structured interviews is the ability to compare and analyse data from different participants, as all participants are asked the same core set of questions (Ragab & Arisha, 2017).

The interview questions are based on the structure of the theoretical part of the paper (see Table 3) and they first give a brief overview of what the interviewee has and understands about energy efficient renovation. Then the questions are related to the problem of energy poverty and its relevance in Ida-Viru County in the participant's opinion. The remaining questions deal directly with the factors affecting the renovation and the possibilities to overcome negative factors, as well as the factors directly related to the Kredex-supported renovation.

Table 3

The list of interview questions

	Purpose	Questions
Introductory information	The influence of a participant's lack of experience or knowledge on the occurrence of obstacles. ⇒	1. What experience do you have in improving the energy efficiency of buildings? 2. Do you have enough information about the possibilities to improve the energy efficiency of the apartment building with support of KredEx or without it?
Subchapter 1.1	Energy poverty definition. ⇒	3. In the master's thesis, I refer to the term "energy poverty". It is an economic situation when it is not possible to heat the house sufficiently or to consume energy services at reasonable prices. In your opinion, how relevant is the problem of energy poverty to Ida-Viru County in last years? Do you meet with energy poor households in your work/life?

		4. How, in your opinion, energy poverty of households can influence the decision to renovate multi-apartment buildings?
Subchapter 1.2	Economic motivations and barriers	5. In your opinion, what economic factors (e.g., cost of renovation) may have an impact on the decision to renovate an apartment building?
	⇒	
	Noneconomic motivations and barriers	6. In your opinion, what noneconomic (knowledge, experience, support) factors may have an impact on the decision to renovate multi-apartment buildings?
		7. What would help/helps you most to overcome barriers to renovation?
	Purpose	Questions
Additional factors relating to Kredex-supported renovation	Complexity of the application process or lack of information about the benefit in the Kredex as separate barriers.	8. How do you assess the level of complexity of the process of application and renovation of the house with the support of KredEx? What instruments or support could help to make the process clearer for you?
	⇒	
		9. Are you satisfied with the information support from KredEx in the renovation of apartment buildings? What kind of support do you miss?

Source: compiled by the author

In addition to the interviews the following data will be analyzed:

1. author's personal notes with feedback from tenants, obtained by the author during flat association meetings (54 meetings were held). This data allows to give an overview of the main arguments for and against renovation given by tenants at the flat association meetings.
2. comments of Ida-Viru County residents to articles and Facebook posts on the topic of renovation, in which the main arguments can also be seen.

Analyzing these sources will provide a comprehensive understanding of the arguments and perspectives related to renovation voiced by the residents of apartment buildings in Ida-Viru County. In this context, the use of the author's personal notes with residents' comments is a valuable source for analyzing arguments and factors related to renovation (Svinhufvud, 2016). Moreover, the inclusion of these sources in the content analysis provides a better understanding of the main arguments for and against renovation voiced by people who participated in flat association meetings.

To analyze the data collected during the study, a content analysis method will be applied, which will allow to make generalisations on the factors influencing the decision on apartment building renovation based on the analyzed data. The methodology used for the

content analysis of user comments involves a systematic approach to data collection and analysis (Reimer et al., 2021). It involves sampling comments from different online platforms, coding them according to predefined categories and analysing the patterns and themes that emerge (Lim, 2010). The results of content analysis can identify several key themes and trends in user comments, providing valuable information about audience perceptions and attitudes towards the content being analysed.

2.2. Analysis of the results and discussion

Interview findings

In total, 18 interviews were conducted with participants or potential participants in the housing renovation process (see Table 4): 2 ordinary residents, 8 chairpersons of housing associations from Narva, Sillamäe, Jõhvi and Kiviõli, 3 technical consultants, a representative of the local government, a representative of a construction company, a representative of a commercial bank, a representative of the Estonian Union of Housing Associations and a representative of the Narva Union of Co-operative Housing Associations. Before the interview the authors asked for informed consent from all the participants to get a permission to use the results of interviews for the current thesis.

Interviews were conducted in three formats: online interviews on Teams and Zoom platforms, face-to-face interviews, and telephone interviews. Teams and Zoom were used to record the online interviews, while the face-to-face and telephone interviews were tape recorded. The author also took notes during all the interviews. The interview recordings were then transcribed into text using Good Tape Transcription software. Inaccuracies in the interview texts were then corrected by the author and the interviews were analyzed.

The interviews were first analysed using the inductive method that helped to identify the main ideas and themes and organise them into categories that identify the underlying factors (Sheppard, 2020). Then constructive answers and solutions proposed by the participants to solve the problem of low activity of apartment buildings in the renovation zone were identified. In addition, interesting quotations from the participants were added to give a more detailed picture.

Table 4

The list of interviews conducted

Interview	Participant	Date	Duration	Type of interview
Representatives of apartment associations				
1	Representative 1 (Narva)	18.04.24	20 min	online
2	Representative 2 (Sillamäe)	28.04.24	51 min	online

3	Representative 3 (Kiviõli)	01.05.24	51 min	online
4	Representative 4 (Sillamäe)	02.05.24	47 min	online
5	Representative 5 (Narva)	02.05.24	1 h 33 min	in-person
6	Representative 6 (Narva)	02.05.24	42 min	in-person
7	Representative 7 (Jõhvi)	06.05.24	48 min	online
8	Representative 8 (Narva)	10.05.24	1 h 24 min	in-person
Technical advisors				
9	Technical advisor 1	02.05.24	1 h 02 min	in-person
10	Technical advisor 2	05.05.24	1 h 12 min	online
11	Technical advisor 3	07.05.24	43 min	phone call
Apartment block residents				
12	Resident 1 (Narva)	05.05.24	18 min	in-person
13	Resident 2 (Narva)	05.05.24	17 min	in-person
Representatives of other organizations				
14	Local government representative (Narva)	07.05.24	59 min	in-person
15	Representative of the Estonian Union of Co-operative Housing Associations	03.05.24	1 h 09 min	online
16	Representative of the Narva Union of Co-operative Housing Associations	10.05.24	57 min	in-person
17	Representative of a construction company	29.04.24	1 h 08 min	online
18	Commercial bank representative	07.05.24	1 h 02 min	phone call

Source: compiled by the author

Regarding the experience in improving the energy efficiency of buildings, among the interviewed persons, 2 building residents have no experience, 8 building managers have experience in small works or partnership meetings on improving the energy efficiency of the building, 2 chairpersons have already submitted applications to Kredex. Three technical consultants, a construction company representative and the local government representative have a lot of experience in improving the energy efficiency of blocks of flats. The bank representative has over 20 years' experience of working with partnerships and dealing with loans for residential building refurbishment.

When asked if they have enough information about the possibilities to improve the energy efficiency of residential buildings, 10 participants answered that they have enough information and 8 people answered that they have information but there is a lack of more substantive practical information, specific model renovation solutions. It was noted that information is often given at the level of slogans and appeals, but people receive few concrete solutions and answers. One of the presidents of a housing association remarked: "*The*

chairmen are given information, but the simple fact is that among the same chairmen, I assure you, there are only 20 per cent who are ready to go for renovation. All the rest do not want to do it because it is extra work." - Representative of apartment association.

When asked whether the issue of energy poverty was relevant to Ida-Viru County and whether they encountered cases of energy poverty in their work and lives, the vast majority of participants replied that this issue had become relevant to Ida-Viru County in recent years due to the sharp increase in the price of central heating, low income levels, as well as the increase in the general price level in the country and the unemployment rate in the region. Participants note that there are many uninsulated homes in the region with low energy efficiency ratings, and in some homes heating costs are becoming very high. Some residents, struggling to pay their heating bills in winter, are forced to shift their heating bills to the summer when energy costs are lower. For example, in the city of Narva, where central heating has always been the cheapest, heating costs have risen by 88%, and the city's residents were not prepared for this: *"As far as heating is concerned, we actually became hostages of the situation when we had cheap heat and we did not think about insulating our houses, now heating has become much more expensive and nowadays it is much more expensive to insulate."* - Representative of apartment association.

The interviewees identified the principal economic and non-economic factors influencing the decision to renovate an apartment building. These were divided into positive and negative factors as a result of the analysis shown in Table 5.

Table 5

The list of economic and non-economic factors that have an impact on the decision to renovate an apartment building in Ida-Virumaa based on the interviews

ECONOMIC FACTORS	NON-ECONOMIC FACTORS
Positive	Positive
<ul style="list-style-type: none"> • lower energy costs • lower house maintenance costs • renovation allowance percentage • property value appreciation 	<ul style="list-style-type: none"> • positive examples of renovated houses • beautiful renovated house • good microclimate • Ida-Viru county counsellor support
Negative	Negative
<ul style="list-style-type: none"> • need to take out a renovation loan • unemployment rate • economic and political situation • very high renovation costs for small residential buildings 	<ul style="list-style-type: none"> • not enough positive examples of renovated houses are shown • negative examples of renovated houses • no system of house maintenance and renovation plan • lack of construction companies willing to work in Ida-Viru County

-
- difficulties in calculating the monthly payments of the residents after renovation
 - many myths and rumors about renovation
 - low level of financial literacy of the population
 - insufficient level of competence of chairpersons of housing associations
 - low level of activity of local self-government representatives
 - high percentage of elderly people among the residents
 - little information about renovation among ordinary residents
-

Source: compiled by the author

People are motivated to renovate by economic factors such as lower energy and maintenance costs, a good percentage of the Kredex allowance and the fact that the value of the home will increase after renovation.

“When the renovation takes place, there will be much less repair work. All the costs will be much less. And it will not leak anymore, because you have a guarantee. The façade has a guarantee, the windows and window sills, everything has a guarantee. It turns out that all the pipes have been changed, the heating system is under warranty. And the warranty is for 5 years at least and you don't have to worry about anything.” - Representative of a construction company.

However, despite all the positive aspects, there are also negative factors, the most important of which is the need to take out a renovation loan. The most significant drawback of the loan is the elevated Euribor, which necessitates the payment of considerable interest rates.

“People don't want to pay huge interest to the bank when you have an offer of 200 thousands to borrow for twenty years and pay back 370 thousands, for example. Well, they realise that this is all bad” - Representative of apartment association. Residents are disconcerted by the obligation to make monthly repayments, while the primary savings on heating will only be realised during the colder months. Furthermore, residents of the region are less accustomed to taking out loans to purchase property than those in the capital, as the cost of doing so is relatively low. Consequently, they are more reluctant to take out loans, and even in the case of a renovation loan, they often fail to appreciate that the loan is taken out by the flat association and not the flat itself. The difficult economic and political situation in the country and the world, rising prices and unemployment, including the fear of losing one's job, do not give people confidence in the future.

“This fear of my family's economic situation, this insecurity and uncertainty about my job - that's what I felt in Ida-Viru County, and I've never encountered such fear anywhere else in Estonia, Ida-Viru is so special. And it is not even the relatively high energy poverty of the population in terms of current income, but this uncertainty about the future that affects how people vote at the general meeting of the cooperative.” - Representative of the Estonian Union of Co-operative Housing Associations. It is also difficult to obtain accurate calculations of the monthly obligations of the residents after the renovation, which does not allow an accurate picture to be given to the residents of the house at the planning stage.

“Two things are important first of all. Firstly, how much energy costs today for heating and hot water, and secondly, what will be my benefits and costs from this solution.” – Technical advisor. In addition, it should be noted that the cost of renovation is often unaffordable for residents of small houses, not to mention the fact that banks often refuse to lend on small houses or lend only with Kredex's guarantee, which increases the cost of the loan for the residents of the house.

“I believe that if the house is so un-creditworthy in such a bad region, then there should be 90 per cent or at least 80 per cent support, that is, more help is needed. And it turns out that the house is still being penalised for high credit risk and taking away part of the allowance that you were given by the interest on the guarantee.” - Technical adviser.

In addition to economic factors, the positive influence of examples of renovated houses and the support of the consultant in Ida-Viru County, as well as the desire of the residents to live in a beautiful renovated house with a good microclimate, were noted.

“For example, the ventilation system is being renovated. Even if they just put in fresh-air valves. This is a big plus for the elderly, they will have fresh air, because they don't go outside that often. Without good ventilation they get acidity levels and that's not good for their health. It's also very bad for the children.” - Representative of a construction company. Obstacles to renovation include the lack of positive examples of renovation and negative examples of renovated neighbouring houses. It was observed that houses with negative experiences did not utilise Kredex support, and thus were not oriented towards the fulfilment of serious technical requirements and a significant increase in the energy efficiency of the building during the construction process. However, the experience of these houses prevents ordinary people from recognising the benefits of improving the energy efficiency of a building with Kredex support.

“Yes, even if we have negative examples, they are also not analysed. So we know that there are negative examples. Or not, it's not clear either, but people are immediately afraid. And these examples they are loud, and so of course they are heard. And the rest of the good stuff is heard less.” - Representative of apartment association. Furthermore, participants noted the complete absence of a building maintenance system and renovation plan, both at the state and local government level and at the level of each house. Additionally, there is a dearth of expertise among the chairpersons of flat associations.

“The competence of chairpersons in Ida-Viru County varies considerably. They lack the necessary information and training to perform their roles effectively. It is therefore clear that they require further training and qualifications.” - Technical advisor. Some chairpersons are reluctant to address the topic of renovation, while others lack the requisite economic, legal, or technical knowledge. Furthermore, some chairpersons require training in group dynamics or conflict resolution.

“The Estonian Union of Apartment Associations previously organised informative and engaging training sessions. These provided valuable insights and a sense of belonging and unity among participants. However, the sessions were abruptly discontinued, leaving many feeling frustrated and unsupported.” - Representative of apartment association. Many participants have observed a lack of financial literacy among the general population, as well as a dearth of knowledge about energy efficiency and renovation. This has led to the circulation of misinformation and rumours, which has in turn contributed to a heightened level of apprehension among residents regarding renovation.

“At the last meeting of the flat association on my calculations they said that it's all a lie, it will all fall apart later and they can't do everything, so they don't need it. And still it is expensive and it is necessary to take a loan. So there is a certain part of the population that does not agree with anything. And they're the noisiest. The rest of the inhabitants of the house listened attentively and quietly, of course they asked a lot of questions, but they listened. Well, these two people were really losing their temper. And they were running the whole meeting.” - Technical advisor. Additionally, the prevalence of elderly individuals in the housing stock has been identified as a negative factor, as these individuals are often reluctant to consider investing in renovation, let alone taking out a loan for such works.

“Let's say the same young people who work. Well, as young people, let's say, up to 45 years old. We have such a generation. It is actively trying to move and promote the idea of renovating the house. But at the same time, the elderly are sinking to the bottom of

everything. That is, as if they have to die already. They've been saving for funerals for 10 years. They don't die, and they don't let us live.“ - Representative of apartment association. Furthermore, participants observed that local governments lacked adequate support for such initiatives, with the exception of a few pioneering municipalities.

“It is necessary for local governments to work more, maybe to organise some round tables. For example, I know that in Tallinn, in Maardu, in Tartu they organise various round tables, invite specialists and tell them about the conditions. And they offer some help from their side.“ - Commercial bank representative.

In response to the question of what might facilitate the overcoming of obstacles to renovation, participants offered a plethora of suggestions, which will be divided into subtopics for the purposes of analysis (see Table 5).

Table 5

The list of proposals that could help to overcome obstacles to the decision on renovation of apartment building in Ida-Viru County

Informing
<ul style="list-style-type: none"> – More articles about renovated houses. – Regular columns in newspapers on renovation and financial matters – Booklets containing practical information (figures, calculations, steps). – Regular renovation fairs and events. – Round tables to exchange of experience and collaboration among the participants in the renovation process, including the chairpersons.
Enlightenment
<ul style="list-style-type: none"> – Information on the potential savings in heating costs that can be achieved through renovation. – Presentation of data on the potential impact of renovation on the value of a property. – Information on the negative consequences of inadequate renovation. – Database containing information on the energy efficiency of renovated residential buildings.
Training
<ul style="list-style-type: none"> – Free courses for chairpersons on: <ul style="list-style-type: none"> ○ finance and costing; ○ legal and technical issues; ○ working with people; ○ the working culture of the chairperson of a housing association.
Support
<ul style="list-style-type: none"> – Permanent measure and percentage of support for several years – Prescribed instructions for the maintenance and renovation of buildings – Typical building projects and solutions.
Provision of key specialist
<ul style="list-style-type: none"> – Expanding the list of construction firms.

-
- Offering a list of reliable construction firms and designers.
 - Expanding the list of tenant consultants in Ida-Viru County.
-

Source: compiled by the author

All interviewees emphasise the importance of disseminating information to all target groups about the benefits and necessity of renovation. This includes the regular publication of columns in the media, the dissemination of articles about renovated houses accompanied by pre- and post-renovation data, the organisation of follow-up events and fairs, the convening of round tables for the exchange of experiences, and the distribution of brochures containing practical information.

“The media doesn't talk enough about renovation. Information should be in every issue of newspaper. Not just once a month. You read an article and forget it. Here it's a column in every newspaper. You read this issue, then at the bottom write "to be continued". Then print the opinions of different experts.” - Representative of apartment association.

The significance of education is also highlighted, encompassing information regarding the energy savings of the renovated building and a general vision of what residents desire their building to look like in the future. Participants emphasise the importance of providing residents with a multitude of examples to facilitate comparisons between their own and renovated apartment buildings.

“There's a house on Hariduse Street and one on Rahu, but we don't know anything about them. How much heating costs and how uncomfortable it is for residents. It would be good to analyse this and share the results.” - Representative of apartment association. It is crucial for residents to develop an understanding of how the cost of a flat will change following a renovation. In addition to positive examples, it is important to acknowledge and discuss negative examples of renovation. This allows for the identification of potential mistakes that can be avoided in future projects. Several participants have highlighted the value of creating a database of renovated houses based on Kredex data.

“The Kredex renovation database should be available to everyone, so that every house can find a similar house in the database and draw conclusions about the potential of their house.” - Representative of apartment association.

Many participants noted the need for training for chairpersons on topics ranging from economic and legal issues to psychological issues.

“In fact, the leader of the co-operative needs to be taught how to hold a successful general meeting, how to manage relations between members, how to be the first in the co-operative, how not to quarrel with anyone, how to resolve conflicts, how to deal with debtors

and how to manage the house peacefully. “ - Representative of the Estonian Union of Co-operative Housing Associations.

A significant number of participants have highlighted the necessity of implementing a long-term support measure for renovation projects.

“It is essential to provide support measures that are in place for several years, as soon as the economy improves and people are ready to borrow and renovate. “ - Local government representative.

Several participants note that the presidents of the associations do not have a system in place to clearly see and make decisions on the renovation of the building.

“When chairmen come to work, they do not see the house as a system. That is this haphazardness. Here they patched it up, there they patched it up. “ - Representative of apartment association. Participants note that we do not have such a system at the state level, so it is strange to expect a systematic approach from the chairmen.

“For example, in Finland and Sweden, there are written instructions on what a flat owner can, cannot and must do with their property. There is a clear plan for each house. They collect a certain amount of money for the repair fund, because it is necessary to change something during the life of the house. The management company has competent specialists in working with real estate. And there, if, as we said about the fact that, yes, if after 15 years it is supposed to change the seams on the house, they will not assess what condition they are in. They'll come and change them. And we have so many houses in disastrous condition now. That is, now people have to take millions and make it 30 years in advance so that there will be no investments. “ – Technical advisor. In addition, participants note the importance of having model building designs and solutions that could simplify the decision-making and preparation process for renovation.

The topic of skills shortages was also a significant concern, with numerous participants emphasizing the necessity to expand the list of technical consultants and construction firms. A representative of a construction firm highlighted the challenges encountered in participating in the supply of Kredex houses for renovation:

“Instead of requiring an ISO standard, construction firms should rather be asked for proof of experience. Then not only the biggest construction companies could come to work, but also experienced smaller firms that are interested in working in the region. “ The chairmen of the associations noted that a list of reliable construction firms and designers would be beneficial.

Assessing the complexity of the process of applying for and renovating a house with the support of Kredex, some of the participants noted that they do not have such experience yet and for them the most difficult thing now is to get a decision on the renovation of the house at the meeting of the flat association. However, participants who are familiar with the process noted that the process is becoming more and more complicated every year and it is almost impossible for associations to cope with renovation without the help of a technical consultant. Important suggestions for simplifying the process came from the participants:

- Pre-filled forms on the Kredex website
- Checklists for carrying out actions and preparing documents for applications, tenders for supplies, and finding builders, among other things
- Free initial consultations with a technical advisor for the initial renovation package for the house.

When asked whether they were satisfied with the level of support from Kredex for the renovation of apartment buildings, the participants positively noted the high interest rates of support in the region this year. Experienced participants noted that if such a percentage of support is allocated for the purpose of several pilot buildings, it is important that these pilot buildings are very well renovated. The quality of work on these houses will have a very strong influence on the development of the further renovation process in the region. In addition, some of the chairpersons noted that the terms of the new round are being prepared for a very long time and they are worried that the start of the round is postponed from summer to autumn, while the completion date cannot be postponed. The conditions of quarterly renovation are still unknown and it is difficult for houses to negotiate with neighboring houses and prepare to submit an application when no information is available. The long application review period of 60 working days was also noted by negative feedback.

To summarize, all participants note the importance and relevance of improving the energy efficiency of apartment buildings in Ida-Viru County. However, they all noted that we are at the very beginning of the journey and there is still a lot of work to be done. And it is important to work not only with the chairpersons, but also with the residents of the buildings, providing information in a continuous and targeted manner. In addition to information and awareness-raising, it is important to raise the level of competence of the chairmen of associations, as well as to work on simplifying the application and renovation process so that the system would be understandable to all participants of the process and that the outcome of the renovation is optimal.

Feedback from tenants, obtained by the author during the flat associations' meetings

The author attended 55 meetings of flat associations, of which 5 associations applied for renovation. Following the meeting, 18 associations decided to order an energy passport and calculations, which will allow them to understand how much renovation work they should do. Approximately 10 associations immediately decided not to renovate the building, while approximately 17 decided to wait with the decision and look at the experience of other houses. It should be noted that the figure provided by the author represents an approximate estimate, based on his own assessment. The final decision regarding renovation is made by the householders themselves, without the consultant's input at the meeting.

Table 6

The list of economic and non-economic factors influencing the decision to renovate an apartment building in Ida-Viru County at flat association meetings.

ECONOMIC FACTORS		NON-ECONOMIC FACTORS	
Positive		Positive	
<ul style="list-style-type: none"> energy bills will be significantly reduced; Kredex offers high benefit rates; the house will not collapse and will remain standing for a long time. 	<ul style="list-style-type: none"> people want to live in a renovated house; positive examples of renovated houses. 		
Negative		Negative	
<ul style="list-style-type: none"> need to take out a renovation loan; very high Euribor rates; need to pay a large sum for the work of a technical consultant; no money saved in the house, no money even to draw up a construction project; high unemployment rate and unemployed people at the association meeting; some residents struggle to pay today's flat bills; low property values (Kohtla-Järve, Kiviõli); very high renovation costs for small residential buildings. 	<ul style="list-style-type: none"> the chairman of housing association has insufficient knowledge and competences; many myths and rumors about renovation; negative examples of renovated houses; some people are afraid that they will not be helped to sell the flat with a renovation loan; some people don't believe that Kredex will actually give benefits; some people don't believe any experts or calculations; danger of war, people are afraid to invest in renovation. high percentage of elderly people among the residents; low level of financial literacy of the population; little information about renovation among ordinary residents. 		

Source: compiled by the author

The main factors prompting the owners' meeting to discuss the topic of renovation are the high cost of heat, the emergency condition or dilapidation of the house, the high percentage of the renovation allowance offered this year, or simply the desire of the residents to renovate their house (see Table 6). The primary obstacles to renovation are, of course, the necessity to obtain a loan for the renovation, unemployment in the region and among the participants of the meeting, the large number of pensioners in the house and, most notably, at the meeting who are opposed to renovation. In addition to these factors, there are also individuals' beliefs that influence their perception of information, which in turn affects their willingness to engage with the Kredex proposition. For instance, some individuals do not believe that Kredex will provide a tangible benefit, nor do they believe that the renovation will result in a superior living environment. Furthermore, some individuals do not believe that the cost of a renovated flat will be higher.

Comments of residents to articles and Facebook posts on the topic of renovation

When analysing comments to articles about renovation on Facebook and on the online portal *stena.ee*, the main factors influencing the decision on renovation were coded to divide factors into economic and non-economic, and then in turn into positive and negative.

Table 7

The list of economic and non-economic factors influencing the decision to renovate an apartment building in Ida-Viru County, identified from residents' comments

ECONOMIC FACTORS	NON-ECONOMIC FACTORS
Positive	Positive
<ul style="list-style-type: none"> • energy bills will be reduced; • Kredex offers high benefit rates; • the house will not collapse and will remain standing for a long time. 	<ul style="list-style-type: none"> • people want to live in a renovated house; • positive examples of renovated houses.
Negative	Negative
<ul style="list-style-type: none"> • need to take out a renovation loan; • very high Euribor rates; • high unemployment rate; • some residents struggle to pay today's flat bills. 	<ul style="list-style-type: none"> • many myths and rumors about renovation; • people are afraid of being deceived; • negative examples of renovated houses; • the chairman of housing association has insufficient knowledge and competences;

-
- some people don't believe in success of renovation;
 - danger of war, people are afraid to invest in renovation.
 - high percentage of elderly people among the residents;
 - low level of financial literacy of the population;
 - little information about renovation among ordinary residents.
-

Source: compiled by the author

The analysis revealed almost the same main factors, among which the fear of loans and generally the fear of being cheated can be highlighted, as well as people's uncertainty about the future. Looking at the comments in general, it is clear that the topic is interesting and relevant to people, but they still have very little knowledge and experience in this area, so there are many fears and prejudices.

“They are cheating the residents out of money. According to the results of renovation, the cost of heating will not go down. There have been so many materials on this topic. It's a scam.” - Comment on online-portal gazeta.ee

“Here is an example, my house is not insulated, the price for heating is 3.03 eur/m²; my friend's house is insulated on all sides, the price is 3.10eur/m². And where is the benefit? Another scam on people's money. Do not think all people are fools, many also have a head on their shoulders.” - comment on Facebook.

“In Lithuania and Latvia there is no such agony and Kredex adverts. All cities in Estonia refuse such a scam on the sidelines. Only the Ida-Viru region is diligently engaged in it. The proof of not paying off is the calculation of the whole sum for repairs without 80% subsidy. What's the payback if the house takes 100 per cent? There is no payback. How will the 20% spent be payback? It's a sham.” – Comment on online-portal stena.ee

There were a few comments left where people were positive about the renovation, but you have to admit they were in the minority. *“Typical Soviet Union attitude - give me everything for free, I will not pay a penny myself. Everyone around me is evil and bad, everyone wants to profit from me and/or cheat me. Heating bills are huge, but I do not agree to invest in insulation of my home, let the state pay for everything. Read "let other people, taxpayers, invest in my property for nothing". Although here and so it turns out that to pay a maximum of 20% of the cost of all the work.”* - Comment on online-portal stena.ee

It was clear from the comments that the idea of renovation is close to people and they understand the need to renovate their apartment buildings and improve the energy efficiency of the building, but people deliberately refuse support from Kredex and are very afraid to take a loan for renovation. To give an example, there is a dispute between two participants in Facebook comments:

Commenter 1: *„What's the alternative? You have an alternative to offer to renovation and modernization?“*

Commenter 2: *“Save up money in a flat association and without loans, carry out routine repairs. Usually associations start with the roof, heating system, ventilation, windows/doors, basement insulation and replacement of the screed and then the facade.”*

Commenter 1: *“Saving for 20 years? Well, well, well. That's an option. Just as if after 20 years the house did not collapse.”*

Commenter 2: *“Why 20 years? All the flat associations with which I worked saved up in the region of 5 years “*

Commenter 1: *“But you do not do all the work at the same time, but only individually. You yourself have to look for construction firms and monitor the quality of the work performed, it is quite possible that the fees from the association will have to be increased. But the alternative is Kredex.”*

Commenter 2: *“Very funny. The complete renovation of a standard five-storey building with five entrances costs more than 1 million euros. That's how much monthly rent you have to pay to save up for 5 years. And where did I say complete renovation? I just specified that the renovation will to be done in stages “*

Commenter 1: *“The resident will still pay for 20 years, with or without a loan. Only with a loan he will get the service immediately, and without a loan will get the service for the same money, but after 20 years. And the third option is not so good. After about three all payments will grow at least twice, and those who have not insulated the house, will shed tears.”*

As a result of analyzing comments on the Internet, it can be concluded that people do not know much about energy efficient renovation, but are ready to actively discuss this topic, as the problem of energy inefficient houses and high heating bills is actual in the region, especially in the last winter. Due to the lack of information and knowledge, as well as the negative experience of those apartment associations that have done some renovation works on their own without Kredex support and did not achieve the desired result, people have a lot

of fear and prejudice about renovation in general. More work needs to be done so that people start to listen, understand the topic and possibly change their prejudices.

Table 8

Summary list of economic and non-economic factors influencing the decision to renovate an apartment building in Ida-Viru County

ECONOMIC FACTORS	NON-ECONOMIC FACTORS
Positive	Positive
<ul style="list-style-type: none"> • lower energy costs;³ • percentage of reconstruction allowance from Kredex; • the house will not collapse and will remain standing for a long time;⁴ • <i>lower house maintenance costs;</i>⁵ • <i>property value appreciation.</i> 	<ul style="list-style-type: none"> • positive examples of renovated houses; • beautiful renovated house; • <i>good microclimate;</i> • <i>Ida-Viru county counsellor support.</i>
Negative	Negative
<ul style="list-style-type: none"> • need to take out a renovation loan; • high unemployment rate; • very high Euribor rates; • some residents struggle to pay today's flat bills; • very high renovation costs for small residential buildings; • some residents struggle to pay today's flat bills; • economic and political situation; • <i>difficulties in calculating the monthly payments of the residents after renovation.</i> • <i>need to pay a large sum for the work of a technical consultant;</i> • <i>no money saved in the house, no money even to draw up a construction project;</i> • <i>low property values (Kohila-Järve, Kiviõli).</i> 	<ul style="list-style-type: none"> • negative examples of renovated houses; • the chairman of housing association has insufficient knowledge and competences; • many myths and rumors about renovation; • high percentage of elderly people among the residents; • low level of financial literacy of the population; • little information about renovation among ordinary residents, not enough positive examples are shown; • some people don't believe any experts or calculations; • some people don't believe that Kredex will actually give benefits; • it will be impossible to sell a flat on which a renovation loan has been taken out; • <i>no system of house maintenance and renovation plan;</i> • <i>lack of construction companies willing to work in Ida-Viru County;</i> • <i>low level of activity of local self-government representatives;</i>

³ **Factor (Bold)**– factor, mentioned in three sources: interview, on flat association meetings and in comments on Internet.

⁴ Factor – factor, mentioned in two sources.

⁵ *Factor (Italic)* - factor, mentioned in one source.

Source: compiled by the author

Combining the factors highlighted by respondents, participants in housing association meetings and commentators in social networks and online portals, we obtain a summary table of factors influencing the decision to renovate (see Table 8).

According to the results of the analysis, the predominant positive economic factors are the reduction of energy costs, the significant share of Kredex grants for reconstruction and the preservation of the strength of buildings. In contrast, negative economic factors include the need for renovation loans and high Euribor rates, increased unemployment and problems with utility bills due to the tense economic and political environment. Common negative non-economic factors include the lack of knowledge and skills of housing association presidents; common myths associated with renovation; large numbers of elderly tenants and low levels of financial literacy; limited awareness of renovation among the general population; and fears of being cheated.

Conclusion

This study investigated the factors that favour and hinder the renovation of apartment buildings in Ida-Viru County. The results of analysing interviews with participants and potential participants of the apartment building renovation process, feedback from the participants of homeowners' association meetings, as well as comments of residents on the internet about the renovation reflect the difficulties and challenges of the apartment building renovation process in Ida-Viru County. It is evident that comprehensive training of the chairpersons of homeowners' associations is needed, including not only economic, technical and legal aspects, but also interpersonal communication and conflict resolution skills. The importance of long-term measures to support renovation projects is emphasised, and there is an urgent need for a systematic approach to decision-making and planning for renovation at both local and national levels.

The shortage of technical consultants and construction firms has been identified as a serious problem and there is a call to expand the pool of reliable expertise available for these projects. Simplifying the application and completion of Kredex-supported refurbishments is

also crucial, and participants suggested measures such as pre-filled forms, checklists and free initial technical advice.

Overall, while the importance of improving the energy efficiency of apartment buildings in Ida-Viru County has been recognised, it is clear that much more needs to be done. It is very important not only to focus on the technical aspects, but also to engage with building occupants by providing them with continuous and targeted information. Feedback emphasises the importance of simplifying the process and ensuring that both chairmen and house residents are kept informed and sensitised at all times.

However, it is clear that the topic of renovation is of great interest and relevance in the community, as evidenced by the active discussions and debates around the issue. High heating bills and low energy inefficiency of houses in the region emphasise the urgency of addressing these problems. It is obvious that there is a need for targeted information dissemination and awareness raising to provide the population with the necessary knowledge and understanding of energy efficient renovation.

In addition, the quality of the renovation of the pilot houses and the level of support for the process itself is very important, as the results of the renovation of these houses will be critically evaluated by the residents of the region and their experience will be used as a basis for decision making and renovation. Given the small experience of technical advisors from the region and the lack of competence of housing association chairs, they may require a higher level of support. Positive experiences from pilot renovated houses will help to dispel misconceptions and build confidence in the renovation process, thus creating a more positive attitude towards energy efficient renovation in the region.

Further research could include the effectiveness of educational campaigns and outreach programmes in changing attitudes towards renovation, evaluation of the impact of financial incentives and support schemes on renovation decisions, and positive experiences of renovation, such as the city of Rakvere.

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Appendix A

Interview questions

1. What experience do you have in improving the energy efficiency of buildings?
2. Do you have enough information about the possibilities to improve the energy efficiency of the apartment building with support of KredEx or without it?
3. There is such a concept as "energy poverty". It is an economic situation when it is not possible to heat the house sufficiently or to consume energy services at reasonable prices. In your opinion, how relevant is the problem of energy poverty to Ida-Viru County in last years? Do you meet with energy poor households in your work/life?
4. How, in your opinion, energy poverty of households can influence the decision to renovate multi-apartment buildings?
5. In your opinion, what economic factors (e.g., cost of renovation) may have an impact on the decision to renovate an apartment building?
6. In your opinion, what noneconomic (knowledge, experience, support) factors may have an impact on the decision to renovate multi-apartment buildings?
7. What would help/helps you most to overcome barriers to renovation?
8. How do you assess the level of complexity of the process of application and renovation of the house with the support of KredEx? What instruments or support could help to make the process clearer for you?
9. Are you satisfied with the information support from KredEx in the renovation of apartment buildings? What kind of support do you miss?

Resümee**FINANTSVAHENDAJATE ROLL ENERGIAVAESUSE VÄHENDAMISEL:
KREDEXI NÄIDE KORTERELAMUTE RENOVEERIMISEL IDA-VIRUMAAL**

Ljudmila Peussa

Resümee

Käesoleva magistr töö eesmärk on selgitada välja Ida-Virumaa korterelamute renoveerimist soodustavaid ja takistavaid tegureid. See aitab selgitada välja, mida saab teha Ida-Virumaa hoonete energiatõhususe suurendamiseks ja piirkonna energiavaesuse vähendamiseks.

Töös analüüsitakse intervjuusid korteriühistu juhtide ja elanike, tehniliste konsultantide, kohalike omavalitsuste esindajate ja teiste renoveerimisprotsessis osalejatega. Samuti antakse ülevaade KredExi konsultandi poolt korteriühistutega toimunud kohtumistel saadud tagasisidest korterelamute elanikelt ja analüüsitakse Ida-Virumaa elanike poolt internetiportaalides ja sotsiaalmeedias renoveerimist puudutavate artiklite kohta jäetud kommentaare. Ida-Virumaa hoonete renoveerimist mõjutavate majanduslike tegurite hulka kuuluvad energiakulude vähenemine, Kredexi toetused renoveerimiseks ja hoonete struktuurilise tugevuse säilitamine. Mittemajanduslike tegurite hulka kuuluvad positiivsed näited renoveeritud majade ja esteetiliste paranduste kohta. Majanduslikud tegurid, nagu vajadus renoveerimisläenude järele ja kõrged intressimäärad, mõjutavad renoveerimist negatiivselt, samas kui mittemajanduslike tegurite hulka kuuluvad korteriühistute haldajate teadmatus ja renoveerimisega seotud müütide levik. Uuringus rõhutatakse vajadust ühingute juhtide igakülgse koolituse järele. Lisaks sellele on puudus tehnilistest konsultantidest ja ehitusettevõtjatest, millega tuleb tegeleda.

Ida-Virumaa korterelamute energiatõhususe parandamine nõuab suuremat tähelepanu elanike osalusele ja protsessi lihtsustamist. Elanike huvi renoveerimise vastu on suur, kuna küttearved on kõrged ja hoonete energiatõhusus on madal. Renoveerimisprotsessi usalduse suurendamiseks on vaja levitada sihipärast teavet ja tagada piloohoonete kvaliteetne renoveerimine.

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