ENERGY RETROFITTING THE DOMESTIC BUILT ENVIRONMENT. A HOMEOWNERS PERSPECTIVE
A CASE STUDY OF DEVA, ROMANIA

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ABBREVIATIONS AND ACRONYMS

**BPIE** - Buildings Performance Institute Europe

**CEE** – Central and Eastern Europe

**EC** – the European Commission

**EED** - Energy Efficiency Directive

**EER** – Energy efficiency retrofits


**ERDF** - European Regional Development Funds

**EU** – European Union

**RED** - The Renewable Energy Directive

**UNDP** – United Nations Development Programme

**UNWCED** - United Nations World Commission on Environment and Development

**USAID** – United States Agency for International Development
ABSTRACT

Improving the energy efficiency of the existing building stock has been in the spotlight of academic and policy debates in the last decades. Discussions on this topic have been even further increased since the EU has set stringent energy consumption and CO₂ emissions reduction targets to be reached by all Member States until 2020. Regardless of the fact that the transition countries from Central and Eastern Europe are confronted with the greatest challenges in achieving these targets due to various reasons, academic research in this geographic context is still scarce. In order to tackle the existing energy efficiency gap, policy instruments need to be more effective. This study seeks to contribute to the better understanding of the energy efficiency retrofitting developments within owners’ occupied multi-family housing estates, by investigating the factors that influenced the homeowners’ decisions to retrofit, through a Romanian case study. The study focuses on the experiences and the decision making processes of homeowners who have successfully carried out energy efficiency related works. The findings on motivations and barriers that drive or hinder the retrofitting process from the homeowners’ perspective can be used as a lens for analysing the existing policy instruments available. Overall, Romania needs to adopt a more comprehensive and coherent policy package in order to address the difficulties in accelerating the retrofitting process.
1. INTRODUCTION

1.1 Background and rationale for the study

The maintenance and regeneration of multi-family housing has been in the spotlight of research for a long time. This is mainly due to the extensive existing building stock represented by large housing estates completed after the WWII across Europe. Scholars have established a set of shared problems that these estates now present and among them, the ones identified more often are: physical decay, low energy efficiency, concentration of low income households, anti-social behaviour, conflicts among residents, alienation and individualisation, decreased social cohesion and participation (Power, 1997; Murie et al.; 2003, van Kempen et al.; 2005; Rowlands et al., 2009). Ever since the concept of sustainability has been officially mentioned in the 1987 report from the World Commission of Environment and Development, *Our Common Future* (UNWCED, 1987), also known as the Brundtland report, issues related to all three pillars of sustainability – environmental, economic, social – have made their way into the housing sector as well. Thus, achieving low energy, ecological and sustainable housing has become one of main directions in urban sustainable development (Edwards, 2000: 9).

As part of the sustainability discourses, energy retrofitting of the existing buildings has become a popular topic at global level, but especially at the EU level, since the buildings account for about 40% of the EU’s final energy consumption and for a third of the CO$_2$ emissions (EC, 2010) and since discussions about climate change and energy security and poverty have intensified (Szalay, 2007). The Energy Efficiency Plan (EC, 2011) has identified the building sector as having the greatest potential for energy savings. As part of its ambitious goals related to tackling climate and energy issues, the EU has set three main targets to be achieved by 2020: to reduce by 20% the primary energy use (relative to a projected baseline value), to reach a 20% share of renewable energies in the energy supply and to cut by 20% the greenhouse gas emissions (compared to 1990 levels) (Ó Broin et al., 2013). At the same time, the EU has produced numerous documents, roadmaps for achieving its goals and has introduced a set of directives and initiatives in order to guide the Member States through the process (Szalay, 2007).

Furthermore, the residential segment comprises the biggest share in the existing building stock (Golubchikov & Deda, 2012), representing about 75% of the total at the EU level, with 36% of this being multi-family apartment buildings. This share accounts for 68% of the final energy consumption in the building sector and for about 22% of the total energy use at the EU level (BPIE, 2011). Thus, the residential sector and especially the multi-family apartment
buildings have attracted a lot of attention from policy makers and researchers, especially in the context of the energy efficiency retrofitting programme.

To this date, numerous studies have concentrated on technical and architectural issues related to housing energy retrofitting (Krimmling 2007; Ma et al., 2012; Jones et al., 2013). Others have taken an interest in analysing how the EU directives related to energy efficiency have been implemented and what policy instruments different countries use to support the transition to renewable energy production and consumption (Casals, 2006; Andaloro et al., 2010; Weiss et al., 2012, Swan & Brown, 2013). Furthermore, a great deal of attention in recent academic research has been given to both the barriers for a successful retrofitting of existing housing stock and to the environmental, economic and social benefits resulting from it (Stieß & Dunkelberg, 2012; Tuominen et al., 2012; Dowson et al., 2012; Galvin & Sunikka – Blank, 2013). Although most of the actions are left in the hands of homeowners, especially in the countries where owners-occupied buildings represent the majority of the building stock, still little is known about the motivations that drive apartment’s owners to undertake energy efficiency improvements or retrofits (Organ et al., 2013). The uptake of energy efficiency measures is mostly seen as a top-down process, with policies, technical solutions and materials being decided upon at “upper” levels, with the homeowners characterised as passive recipients or enforcers of these decisions (Galvin & Sunikka – Blank, 2014). As it has been recognized that this top-down model is insufficient for understanding the slow uptake of energy efficient retrofits, recent studies have given more attention to the homeowners (Haines & Mitchell, 2014; Vergragt & Brown, 2012).

The scale of the action needed in order to meet the sustainability targets related to CO₂ emission and energy consumption in the domestic built environment is unprecedented (Berry et al., 2014), however it has been acknowledged that the present pace of activities would not ensure achievement of these (Fawcett et al., 2013). As stated above, previous studies have identified the homeowners to be crucial actors in the domestic energy retrofitting activities, yet, as Fawcett and Mayne (2012) have stated:

"Very little is known about why individual owner occupiers choose to undertake eco-renovation, who those people are, the influences on that choice, the role of professionals in guiding renovations, whether and how inhabitants live differently post-renovation and so on."

Heiskanen et al. (2012) have conducted a complex study related to barriers and drivers to energy efficiency retrofits in different European countries (Romania included) and the findings have
been derived from literature review and expert interviews. Still, although a major player in the process, the homeowners’ perspective on this matter has still not been in the focus of academic research and needs further attention in order to accelerate the diffusion of domestic energy efficient retrofits.

Furthermore, although the problematic aspects of the multi-family housing estates seem to be even more acute in Central and Eastern Europe, in the post-socialist countries, where 40% of the population of cities live in large housing compounds, built between the 1950s and the late 1980s (Dekker et. al, 2005: 2), many of the previous studies have mainly focused on countries from Western Europe, due to the longer experience in energy efficient housing retrofitting and due to more funding opportunities. In the context of the transition process that the CEE countries have experienced in the last two decades, with decentralisation and massive privatisation, the mass housing compounds pose great challenges to sustainable urban development and housing (Tosics, 2004) and policy intervention is more difficult than ever before (Buckley & Tsenkova, 2006). Thus, although the European Commission and other institutions like the International Energy Agency (IEA) and the Building Performance Institute Europe (BPIE) have conducted numerous studies and elaborated recommendations and roadmaps for countries in the Central and Eastern Europe, the newest Member States are still lacking a sufficient attention from academic and scientific researchers.

Romania provides a rich context for researching energy efficiency retrofitting diffusion in owners-occupied multi-family buildings, as it represents a typical case of a post-socialist transition country. Like in other former socialist countries, mass housing constitutes a large proportion of the domestic building stock in Romania (Tosics, 2005 in Kovács & Herfert, 2012), being the result of the socialist model of central planning (Gentile & Sjöberg, 2006) and a response to the rapid growth of urban population and industrialization (Kovács & Herfert, 2012). In order to understand the scale of apartment building and mass housing estates, we should say that, for example in Romania, there were 340000 units built between 1956 and 1960 and 1.12 million flats between 1960 and 1975 (Ionescu, 1969: 57, Lăzărescu, 1977:52). These staggering numbers were also accompanied by an impersonal and standardised architecture, as a result of the communist regimes modes of representation (Maxim, 2009), with a focus on quantity and norms. Moreover, after the fall of the Iron Curtain, Romania was faced with a massive residential privatisation, reaching a share of 96 % owners-occupied dwelling units in multi-family estates (Matschoss et al., 2013), raising social dilemmas related to collective rights and responsibilities (Soaita, 2012).
The household sector in Romania accounts for 37% of the energy consumption by end users. At the same time, Romania has made progress in increasing energy efficiency in the domestic built environment at a national level, achieving a decrease of energy consumption by dwellings and by useful area of dwellings as compared to 1992 levels (Odyssee, 2012), and the national legislation context provides a great variety of instruments for accelerating the renovation process. Nevertheless, the transition is still slow and the current rates at which energy efficiency retrofits are adopted by homeowners still pose a threat to achieving the sustainability targets set, unless the process is accelerated (Atanasiu et al., 2014).

Therefore, considering all the factors and issues identified above, this study will focus on the experiences of homeowners that have decided to energy retrofit their apartments in multi-family buildings in Romania and have undertaken works in this direction, in order to understand what motivated them in their decisions, what barriers they encountered and how were these overcome. Understanding the homeowners’ perspectives and practices related to energy efficiency retrofitting can provide useful input and informed recommendations for policy makers in Romania, but also at a broader European scale. At the same time, it can serve as an important information source for homeowners that are interested in undertaking future energy efficiency retrofitting actions.

1.2 Research aim and questions

As stated previously, energy retrofitting the existing housing stock plays a crucial role in achieving the sustainability goals in the built sector, through large scale energy efficiency renovations measures (Atanasiu & Kouloumpi, 2013). Moreover, homeowners’ motivations have been identified as key elements for shaping national and local policy (Organ et al., 2013). Considering these facts, this paper seeks to contribute to the better understanding of the energy efficiency retrofitting (EER) developments within owners’ occupied multi-family housing estates, by investigating the factors that influenced the homeowners’ decisions to retrofit, through a Romanian case study. The study focuses on the experiences and the decision making processes of homeowners who have successfully carried out EER, by their own innovative, in order to evaluate the efficacy of the policy instruments in place.

Energy efficiency retrofitting is a complex process, influenced by a variety of factors related to institutional setups, the technical qualities of the building stock, location and personal users behaviours among others (Dixon & Eames, 2013), thus a “one size fits all” solution is nearly impossible to find. Therefore, given that the topic is place and context specific, the focus of this study is Deva, a medium size locality situated in the western part of Romania.
Identifying the energy efficient retrofit activities as an opportunity to tackle a complex environmental issue (e.g. climate change, resource depletion), this research project will try to answer the following exploratory overarching question:

**What are the main motivation factors and the main barriers for Romanian homeowners to improve the energy efficiency of their home and what are the implications of these issues for the policy framework in Romania?**

The research objectives of this study, derived from the main research question are as follows:

- To understand the characteristics of the multi-family housing building stock in Romania, and particularly in Deva
- To understand and evaluate the policy and political context in which EER interventions occur
- To better understand the homeowners’ motivations for and perceived barriers in carrying up energy efficiency retrofits to their apartments
- To analyse if current policy instruments respond to the challenges that the homeowners face in deciding on and in taking up EER measures
- To forward some practical or policy related recommendations, according to the main findings of the study, in order to enable a greater uptake of EER by homeowners

In order to answer the main research question and to achieve the above mentioned objectives, the study will relate to the following research sub-questions:

**Q1. What is the legislation context and which are the main policy instruments currently in place at national and local level in Romania that are related to the EER of multi-family buildings?**

**Q2. What are the main motivations of homeowners to carry out EER?**

**Q3. What are the main barriers identified by the homeowners while deciding upon and carrying out energy efficiency improvements to their home?**

**Q4. Which policy instruments are the most effective in supporting home owners to retrofit their home, and which improvements to the current policy framework in Romania should be considered in order to accelerate the uptake of energy efficiency measures?**
1.3 Societal and scientific relevance

This section outlines the societal and scientific relevance of this study. Potential audience for this paper might include academics and researchers with a technical or a social science background, national governments policy makers that are drafting and coordinating retrofitting policy, local administration actors that are responsible for implementing national policies, professionals, but also non-government organizations and the general public.

1.3.1 Societal relevance

The research topic and the geographical focus stems firstly from a personal interest, but it also presents a research and policy relevance, as it tackles wide, contemporary societal problems, which need immediate intervention (Bryman, 2012: 88-89), such as climate change, energy poverty, energy security and in general, sustainability.

As showed above, the transition to an energy efficient built environment is still a slow process both in Romania and elsewhere in Europe, thus “business as usual” cannot be considered as an option anymore, if energy consumption and CO\textsubscript{2} emissions level targets are to be met. New and innovative instruments and arrangements are needed. By better understanding the context and the factors that drive homeowners to energy retrofit their homes, better policy decisions can be made related to domestic energy retrofitting and the findings of the paper might contribute to changes of norms and behaviours of those involved, whether they are policy makers, market actors or homeowners. As policy instruments have the main underlying objective to “promote the opportunities for energy retrofitting” (Bartiaux et al., 2014), linking these instruments with homeowners decision making processes and their previous experiences can provide a new point of view for analysing the efficiency of the existing policy context. Thus, the value of researching this topic in this particular chosen context lies in the fact that it brings new knowledge and the findings can contribute to informed decision making.

The findings of this research will be made available to both local and national authorities that are involved in drafting and drawing up policy recommendations, if they express an interest in it. Moreover, the homeowners that participated in the data collection (the interviewees) will also be informed of the findings of the study and they will be provided with a copy of the study. Considering the fact that Deva is a small locality, with a relative close knitted community, it is expected that the findings of this paper will also contribute to raising residents’ awareness related to the opportunities available for energy retrofitting their homes.
1.3.2 Scientific relevance

As, at the moment, Romania lacks a comprehensive system for evaluating policy instruments for energy efficiency, the scientific contribution of this study lies in the fact that it offers a critical perspective on the existing Romanian policy framework, from the homeowners’ point of view, contributing to the limited body of knowledge in this area. At the same time, the study adds knowledge to the emergent sustainability scientific field, by pointing out potential future directions of development for accelerating the EER process. This has a scientific, but also a practical significance, since society still lacks a critical understanding of “which kinds of programs, institutional arrangements, and ‘knowledge systems’ can most effectively harness science and technology for sustainability” (Cash et al., 2003). Moreover, as the focus of the study is on homeowners and their practices, it can contribute to a better understanding of consumers’ behaviour and their role in policy-making, in general.

Furthermore, until very recently, most of the research related to energy efficiency policy has been governed by a technical – economical perspective, with few studies considering a socio-anthropological approach of this matter. Therefore, this research study will contribute to filling this research gap. Still, most of these sociological studies have been conducted in Western Europe or North America, therefore the geographical focus of this research is also scientifically relevant, with Central and Eastern Europe, and Romania in particular, still not attracting enough academic attention, although they offer a rich ground for research.

1.4 Structure of the thesis

This study is organised in five main chapters, each having a particular focus. The first chapter provides the general background of the study and justifies the topic and the location focus which are addressing a research gap in the current academic debates. Furthermore, it exposes the main aim of the research and the research questions and provides some information on the societal and scientific relevance of the study.

The next chapter provides the theoretical background, by reviewing the existing scholarly literature on the topic. It thus shows the current knowledge on the subject and how it has been previously approached by scholars. This section also includes the conceptual framework that will guide the research.

Chapter 3 discusses and presents the research strategy and the methodological approach used for deriving the findings of the study. It makes reference first to the philosophical approach
and the research strategy chosen, with a justification of the case study selection. It then explains the choice of research methods and presents the validity and reliability of the study and identifies possible limitations of the methodology and methods used.

The following chapter represents the empirical part of the study, starting with an outline of the general context for the study in terms of both the building stock and the policy instruments available for energy efficiency retrofits at national and local level. It then shows the findings derived from the analysis of the interviews conducted with the homeowners.

Chapter 5 summarizes the main findings of the study, in response to the research questions and draws some conclusions. At the same time, it provides some policy recommendations that could become useful for accelerating the domestic energy retrofitting, at local level, but also at a broader national or European scale. In the end, some possible directions for future research are indicated.
2. ACADEMIC LITERATURE REVIEW

As domestic energy retrofitting is not a new topic in academic research, there is a wide variety of studies on this topic, discussing different technical, financial or institutional aspects of it. An extensive account of the current state of the scientific literature available can be found in Friege and Chappin (2014) which have identified four major core areas of interest: technical options, understanding decision, incentive instruments, models and simulations. Here, the focus will be on the topics related to the subject of this research, starting with an attempt to define what energy retrofit means and how it is understood in the literature. It then continues with discussing the motivations of homeowners to undertake home energy retrofit and which elements can act as barriers, finishing with a conceptual framework.

2.1 Defining energy efficiency retrofit

Understanding what energy efficiency retrofitting means and entails is seen as an important first step for this study, especially since various authors have underlined the confusion in terms and the fluidity of the language that surround this topic (Douglas, 2006; Dixon et al., 2014; Fawcett, 2014). As Douglas (2006:1) observes ‘in the world of building the terms “rehabilitation”, “conversion”, “remodeling” “restoration”, “reinstatement” and so forth are unhappily confused’ which denotes that the topic is still in its early stages of development and still evolving. Both scholars and actors that are involved in these activities use these terms interchangeably, taking into account the extent of the intervention, the level of energy and CO₂ emissions reduction achieved and the time span of the activities.

The Oxford English Dictionary defines retrofit as: “to provide (something) with a component or feature not fitted during manufacture; to add (a component or feature) to something that did not have it when first constructed”. Thus, extending this definition to interventions that are targeting the reduction of energy consumption and CO₂ emissions level, energy (efficiency) retrofits would refer to improvements done to a building or to buildings in order to achieve a better energy performance, in accordance with new requirements or regulations in this field, often related to a process of adaptation as well (Dixon & Eames, 2013).

Some authors consider energy retrofitting as part of a more complex refurbishment or renovation activity (Bernier et al., 2010). Similarly, others have underlined the clear distinction between “renovation” and “retrofit” taking into account the extent of the works involved. Thus, renovations have been defined as extensive interventions which require longer time, larger costs and professional technical expertise (Maller & Horne, 2011), in contrast with “retrofits” which
refer to smaller, sometimes DIY works undertaken by the homeowners, normally though during a home renovation process (Wilson et al., 2014). Much in the same line, although related to commercial properties, Dixon et al. (2014) pointed out that “retrofitting” mainly referred to “lighter”, non- intrusive interventions which could be performed while occupants were still using the property, whilst “refurbishment” meant a “deeper” alteration or improvement of the exterior and interior characteristics of the building.

Even if less discussed in the academic literature, another point of view that has been debated is related to the time span and the repetitive pattern of the energy related measures and interventions to a home. Although energy related domestic improvements have been seen as a one-off event targeted at reducing energy use and CO₂ emissions level, Fawcett (2014) observed and stressed the benefits of the “over-time” intervention model, with works being performed in different stages. She has advocated that this type of approach would better fit the owners’ financial and logistical means and opportunities. Furthermore, Thorpe (2010: 2) makes reference to the necessity of having a clear vision and strategy for home improvements done by homeowners that should span over 10-15 years, although his recommendation is based on the opinion of building professionals, not on that of homeowners. Thus, although Fawcett (2014) mentions the possible limitations and disturbances caused by such approach and the fact that different people might have different opinions on this, the homeowners’ perspective on the implications of this long-time process is not explored.

Although depending on a great variety of internal and external factors such as age, type and state of the building, availability of financial and technological means, homeowners’ will, motivation and other socio-economic characteristics, researchers have identified a common set of practices and measures that people undertake in order to improve the energy performance of their homes (Weiss et al., 2012; Fawcett, 2014; Fawcett & Killip, 2014; Wilson et al., 2014). These activities are mainly related to the improvement of the building’s envelope, to changing the ventilation system, the heating source and the heating controls for both space heating and hot water, to internal and external reconfiguration of space and replacement of appliances and fixtures. These measures are summarized in Table 1.

### Table 1. Energy related practices and measures

<table>
<thead>
<tr>
<th>Measure</th>
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<tbody>
<tr>
<td><strong>Building envelope</strong></td>
</tr>
<tr>
<td>• External wall insulation</td>
</tr>
<tr>
<td>• Change of frames and windows</td>
</tr>
</tbody>
</table>
| **Loft/roof insulation** | • Loft/roof insulation  
• Ground floor/ basement insulation  
• Under – floor insulation  
• Draught proofing  
• Other insulation works |

| **Ventilation and heating** | • Change of boiler  
• Change of heating system – possibly with renewable energy sources  
• Change or addition of ventilation system  
• Installation of heating controls: smart meters, timers, thermostats, boilers interlocks, etc |

| **Internal and external space reconfiguration** | • Addition of attic for flat roof structures  
• Addition of greenhouse  
• Closing of balconies and porticos |

| **Replacement of appliances and fixtures** | • Kitchen refit with energy efficiency appliances (stoves, refrigerators, washing machines, etc)  
• Change of light fixtures |

*Source: Author’s own compiled from Weiss et al., 2012; Fawcett, 2014; Fawcett & Killip, 2014; Wilson et al., 2014*

Given the various terms used in the literature and considering that assessing the choice or the efficiency of the measures that the homeowners have undertaken to improve the energy efficiency of their home is not within the scope of this study, for the purpose of this research the umbrella term “energy efficiency retrofits” (EER) will be used in order to describe any activities that the homeowners have performed on their apartments. This term will include any alteration or improvement done to the exterior or the interior characteristics and elements of the home, in order to achieve a better energy performance, and in general will refer to any other related activity that goes beyond the definition of maintenance and have been identified above as energy related common practices or measures.
2.2 The energy efficiency gap

Investments in energy efficiency have been recognised as a valuable tool for reducing energy consumption, CO\textsubscript{2} emissions and for saving money (Alcott & Greenstone, 2012). Nevertheless, the rate at which these investments are carried out is said to still be hampered by various internal and external causes and this creates the need for academic and policy – relevant research that could help tackle this problem. The hypothetical level of energy savings that could be acquired through EER and the actual rate at which these measures are taken up by homeowners has raised many debated in the academic and policy circles and it has been called the energy paradox or the energy efficiency gap (Gates, 1983; Jaffe & Stavins, 1994, Zundel & Stieß, 2011).

Although numerous studies have sought to understand the motives for which this energy gap still exists, from both technological and economical perspectives, there is still need for further research on how this can be addressed through policy instruments (Backlund et al., 2012). Moreover, previous research has stressed the importance of multi-disciplinary collaboration and the need for reconciliation between different theoretical perspectives adopted by various academic traditions. These four main discipline approaches that have been dealing with understanding the energy efficiency gap were identified by Wilson & Dowlatabadi (2007) as being: traditional and behavioural economics, technology adoption theory, attitude-based decision making, social and environmental psychology and sociology.

Most of the studies from the ‘90s that dealt with this subject have adopted a conventional economic perspective. One of the most cited studies related to the analysis of the energy efficiency gap is the one written by Jaffe and Stavins (1994), which has sought to understand why different energy efficient materials and appliances were adopted at a slower pace than predicted. They classified the reasons for this slow uptake into two categories: market failures - such as lack of information or imperfect information, and non-market failures with uncertainty about future energy prices and the irreversible nature of the investments being mentioned (Jaffe & Stavins, 1994). Much in the same line of the economic interpretation, Stern (2006) pointed out that the energy efficiency gap might be explained by the barriers that affect rational behaviour of those who are supposed to make investments in energy efficiency measures. Besides imperfect information and hidden transactions costs that has been previously identified in the literature, the novelty of this study consists of the fact that motivational factors of the actors involved are taken into account. Others explaining factors for the energy efficiency gap identified in the literature have been, to name but a few: limited access to capital, unsuitable market structure, aversion to change and innovation, high discount rates, split incentives, purchase decision criterion,
misplaced incentives and so on (USAID, 1991; Saunders, 1997; Weber, 1997; Clinch & Healy, 2000).

Although these studies have revealed valuable findings, they have also raised criticism, as the consumers or homeowners have been seen as rational actors, disregarding subjective, sociological and psychological factors. Moreover, it is often considered that the decision to invest in energy efficiency measures is driven by pure economic considerations and this has been another subject of debate (Zundel & Stieß, 2011). Thus, in the more recent years, the conventional economic perspective literature has been complemented with a large body of research that has been looking into the psychological and socio-psychological factors that contribute to the pervasive energy efficiency gap. Therefore, non-monetary issues such as perceived feeling of comfort, convenience and pride related to property have made their way into the academic discussions (Gram – Hanssen et al., 2007; Jakob, 2006; Pelenur & Cruickshank, 2012).

Following the line of these studies, this research paper will evaluate the potential solutions for overcoming the present energy efficiency gap through policy response, based on the exploratory analysis of the homeowner’s motivations for and barriers to investing in EER.

2.3 Homeowners’ motivation for domestic energy efficiency retrofit. Internal and external factors

Motivation has been defined as the reason for which people do what they do (Turner, 2006), preceding action, supporting willingness to undertake an action and driving the efforts into a certain direction (Pittman & Heller, 1987). Motivation influences homeowners in various stages of the decision – making process and retrofitting the owner-occupied housing stock is dependent on individuals being motivated. Thus, analysing and understanding this concept into more depth can be a useful tool in assessing the effectiveness of policy measures in driving individual towards the uptake and implementation of EER measures and in overcoming barriers (Novikova et al., 2011). Previous scholarly studies have found out that decision to undertake domestic EER works is always the result of a combination of interlinked motivations (Bartiaux et al., 2006). Authors have identified several motivations and drivers for homeowners that can be categorised into three main groups: economic, environmental and social motivational factors (Organ et al., 2013). Moreover, researches conducted in different geographic locations have revealed that the factors influence homeowners’ decisions to retrofit are context dependant. This section will
therefore make an account of the motivations that drive homeowners in undertaking EER works, based on this classification, according to previously published studies.

2.3.1 Theories on motivation

The motivation theories in the last centuries have been driven by different and sometimes radical perspectives on the human nature and the more recent ones have tried to reconcile these and to use a more complex combination of elements to define what motivate people in undertaking or not a certain action (Ford, 1992). Organ et al. (2013) provide a useful account of the main motivation theories that might have an application, even if not in their whole, for understanding homeowners’ motivation in doing EER works to their apartments. The five theories that they identified as introducing possible elements are: Maslow’s theory of needs and desires, Vroom’s expectancy theory, Festinger’s cognitive dissonance theory, expected – value theory and self – discrepancy theory. By selecting different concepts from these theories, the authors created a motivation model for EER in owners – occupied buildings, as shown in Figure 1.

Figure 1. Motivation model for EER

Source: Organ et al. (2013)
The model underlines the importance that both internal factors, such as attitudes, beliefs, trust, priorities, expectations, loss aversion and external factors, as financial incentives or penalties, have in homeowners’ motivation to undertake EER works to their apartments. The internal factors are characteristic to each homeowner and they might change over time, but also be affected by contextual, external conditions (Organ et al., 2013). While external factors have been widely discussed as barriers to a faster uptake of EER measures, the internal ones have rarely been discussed in relations to what motivates people in deciding to retrofit their apartments.

A detailed and full account of the existing motivation theories and the factors affecting it is provided in Organ et al. (2013). The next sub-chapter will make a review of existing academic literature on EER motivations.

2.3.2. Economic motivations

Regardless of the location or other contextual and socio-demographic factors, economic motivations seem to be a reoccurring topic in various studies on EER (Stieß et al., 2009; Novikova et al., 2011; Heiskanen, 2012). These motivations can act either as internal triggers, when they are related to setting priorities, loss aversion or norms or as external factors, when they are related to availability of capital, access to grants and subsidies and so on. At the same time, economic factors can work as both motivations or drivers and barriers to EER.

Economic motivations can be related to various aspects, such as: reducing cost of energy bills, reduce vulnerability to volatile energy prices, increasing the market value of the apartment, possibility of quick return of investment, quick access to financial capital and so on (Organ et al., 2013; Huber et al., 2011). The study performed by Heiskanen et al. (2012) on barriers and drivers in 9 European countries has revealed that indeed economic motivation play a central role when homeowners decide to retrofit. Reducing energy bills has been identified as a motivation factor in Austria, Bulgaria, Czech Republic, Italy, France and Spain. An exception from this is Finland, where most of the EER works are done by taking up a loan. This finding has been also confirmed for Romania, due to the low average incomes. Payback time has also been mentioned as a factor influencing the decision to retrofit, but with less frequency and in many cases using not very sophisticated calculation method. Furthermore, the steadily rising costs of energy and the need to save money on the energy bill is an omnipresent factor that influence the decision to uptake EER measures (Heiskonen et al., 2012).

Zundel & Stieß (2011) have also emphasized the importance of the economic motivation in their study conducted with homeowners in Germany. The reduction of long term energy costs and the general cutting down of the costs associated with their home was mentioned by 87% and
respectively 84% of the respondents of the study. In some other cases, other economic motivations have been brought up, such as increasing the market value of the apartment, with the EER works seen as an investment. Such was the case for homeowners in Austria (Heiskonen et al., 2012).

The availability of financial schemes, government grants and subsidies also appear to play a decisive role in motivating homeowners to perform EER works to their apartments, irrespective of the financial situation of homeowners or the general economic environment of the country (Heiskonen et al., 2012). Several studies have been conducted on the implications and impact of this sort of policy instruments on homeowners’ decision making and in general, findings were consistent for Sweden (Nair et al, 2010), the UK (Shorrock, 2001) and Belgium (Bartiaux et al., 2014), with many homeowners deciding to retrofit due to availability of public financial scheme support. The only exception reported by a study was found in the Netherlands, where the possible access to grants for wall insulation did not have an impact on speeding up the EER uptake (Kemp, 1997). One limitation of these studies lies in the fact that some of them are outdated and little newer research on this particular correlation has been conducted recently.

Although economic factors have been proven to play a major role in homeowners’ decision on energy related renovations, they are never isolated from other factors such as environmental concerns, social practices, and comfort improvement.

2.3.3. Environmental motivations

Although the EER of existing buildings has been promoted as an important tool for environmental protection and reduction of resources consumption, previous studies on homeowners’ motivations have shown that environmental concerns rarely play an important role in the decision – making process, except for a few cases. Moreover, in many cases people were not even aware of the environmental benefits of the works they have undertaken or were planning to do. Although environmental concern is generally seen as an internal motivational factor, driven by attitudes and beliefs, it appears that in some cases it acts as a contextual factor, due to building regulations norms or penalties imposed by external regulatory bodies.

Heiskanen et al. (2011) have conducted an extensive trans-national study, as part of the European ENTRANZE project, on the barriers for and drivers of EER in 9 European countries – Austria, Bulgaria, Czech Republic, France, Italy, Germany, Finland, Romania and Spain – based on various building types. The findings of the studies have revealed that environmental concerns were not a motivation for homeowners in multi-family buildings in any of the participating countries. In some cases, such as the Czech Republic, saving energy was mentioned as a motivational factor, but still related to monetary saving, not due to environmental protection.
concerns. In Finland, although common people were aware of climate change and environmental issues, these were rarely a real driver for conducting EER. The findings for Romania have shown that environmental issues were not a trigger in deciding upon retrofitting in any of the building types analysed.

Similar findings have been shown by Bartiaux et al. (2014) and Bartiaux et al. (2011), which conducted studies in both western and eastern European countries. In Wallonia, for example, although people acknowledged the importance of environmental protection, there were still contradictions and confusions on how they are related to performing EER. At the same time, in transition countries from the former communist bloc – Latvia and Bulgaria – reducing their environmental impact was not mentioned at all as a decision factor in multi-family buildings.

In contrast to this, in some particular countries or specific groups of homeowners, environmental motivations appeared to play a very important part in deciding to perform EER and also on the types of measures to be adopted. Such an example is the study conducted by Fawcett and Killip (2014) with owners of so called “superhomes” in the UK, thus with owners that retrofitted their homes to reduce with more than 60% their CO₂ emissions. Reducing energy use and carbon emissions have been chosen as a motivation by 96% and respectively 94% of the respondents. But the limitation of this study resides in the fact that it targeted a very particular category of people, with particular social and economic profiles, thus not having a significant statistical relevance. In another case, in a Swiss context, Alberini et al. (2013) found through a survey conducted with 473 homeowners that 55% of their respondents were motivated by climate change and environmental concerns. One drawback of these two latter studies is derived from their choice of research methods. Both of them used surveys based on closed ended questions, which creates little room for more in-depth analysis.

2.3.4. Social and technical motivations

Besides economic and environmental motivations, there is a large array of other factors that influence homeowners’ decision in energy retrofitting their homes. Some factors appear to dominate the existing academic literature and among them, some of the most cited ones are: improving comfort, increasing the level of living standards, social or personal norms and believes, but also the physical conditions of the building, aesthetic reasons or interest in the adoption of technological innovative solutions.

The importance people place on their living environment as being their “home” and the desire to improve the comfort and the living standards are between the most cited motivations in the social literature (Pellegrini Masini et al., 2010; Organ et al., 2013; Gram – Hansen, 2014). In
many cases, it appeared that achieving a desired level of comfort overrode even the importance of economic factors, but this has been observed especially in higher income households (Pellegrini Masini et al., 2010). Nevertheless, Heiskanen et al. (2012) stated that one of the findings of their study showed that improved comfort was not a major driver in performing EER in some countries (such as Austria), as people were not even aware of the benefits related to comfort that energy improvements can bring about. At the same time, the results of the same study confirmed what Gosselain et al. (2011) previously found, namely that improving comfort was a main driver for homeowners in Bulgaria. So, it appears that perception of comfort, but also how this is related to improving the energy performance of homes is seen differently in different contexts. On the other hand, this can also be interpreted as showing the differences between the existing building stock, with the one in Eastern European countries being in a more advanced state of degradation.

The link between EER and the sense people place on “home” and how it is closely related to everyday domestic life has also been discussed by Karvonen (2013). He stresses the fact that undertaking EER works cannot be seen as a process disconnected from the daily life of people and from their social norms and believes. This approach picks up on theories forwarded previously by other studies which have seen home renovations as activities that unfold as part of the daily life and cannot be disconnected from living environment conditions and the expectations of the homeowners (Hand & Shove, 2004).

Subjective factors related to aesthetic considerations are more difficult to understand and to analyse, but they have been named in some studies as being part of the major drivers that motivate homeowners in doing EER works, especially those concerned with façade insulation. Both Wilson and Dowlatabadi (2011) and Novikova et al. (2011) has found that there is aesthetical values have a direct bearing on homeowners’ decisions. Nevertheless, this factor was mostly found in quantitative studies, which gave the respondents the option of picking between multiple answers. Moreover, Heiskonen et al. (2012) showed the same results related to aesthetic considerations as those for improved comfort, with these factors having been given a much more importance in transition countries from Eastern Europe, relating back to the quality of the buildings.

The studies discussed in the above sections show that the decision to renovate is a complex process, driven by a combination of internal and external factors, which are in many cases also context and location specific. Moreover, since the findings of different research studies have been sometimes contradictory, investigating this topic still provides a rich ground for research. The following table (Table 2) summarises the main motivation factors discussed.
Table 2. Motivation factors for EER

<table>
<thead>
<tr>
<th>MOTIVATION THEME</th>
<th>MOTIVATION FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECONOMIC</td>
<td>• Reducing costs of energy bills</td>
</tr>
<tr>
<td></td>
<td>• Availability of public grants, subsidies</td>
</tr>
<tr>
<td></td>
<td>• Increasing the property value</td>
</tr>
<tr>
<td></td>
<td>• Initial cost of works</td>
</tr>
<tr>
<td>2. ENVIRONMENTAL</td>
<td>• Reducing resources consumption</td>
</tr>
<tr>
<td></td>
<td>• Environmental protection</td>
</tr>
<tr>
<td></td>
<td>• Reducing CO₂ emissions</td>
</tr>
<tr>
<td></td>
<td>• Climate change</td>
</tr>
<tr>
<td>3. SOCIAL AND TECHNICAL</td>
<td>• Improving comfort</td>
</tr>
<tr>
<td></td>
<td>• Making a home</td>
</tr>
<tr>
<td></td>
<td>• Social norms and believes</td>
</tr>
<tr>
<td></td>
<td>• The physical condition of the building</td>
</tr>
<tr>
<td></td>
<td>• Aesthetic values</td>
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</tbody>
</table>

Source: Adapted from Organ et al. (2013)

2.4 Barriers for homeowners in undertaking domestic energy efficiency retrofit

Understanding how homeowners perceive barriers to performing EER works and how they have experienced and overcome them is an important step in providing better policy instruments that could further support the speeding up of energy efficiency uptake in the domestic sector. The existing academic literature on barriers to EER has revealed numerous brakes that are country, location, context specific or common to almost every place. Thus this leaves room for exploring these barriers in the Romanian context, rather than just proving or confirming them.

Previous studies have provided various classifications of barriers to EER. From an economics perspective, Weber (1997) has identified four main categories of barriers: a) institutional, b) market, c) organisational and d) behavioural. A more recent study conducted by Neme et al. (2011) proposed a different classification of barriers, using four typologies: a) information or awareness barriers, b) financial ones, c) risk related and d) other types of barriers. Further on, Economidou et al. (2011) have mentioned a) financial barriers, b) institutional and administrative, c) awareness, advice and skills barriers and d) separation of expenditure and benefit. What can be observed is that financial barriers have been an omnipresent theme in all the studies, regardless of the time when they were performed, while the information and awareness ones have emerged more recently in the literature. For the purpose of this study, the
barriers to EER are classified into: a) economic or financial barriers, b) information and advice related barriers and c) institutional barriers and they will be further on discussed.

2.4.1 Economic or financial barriers

Not surprisingly, most of the authors that studied this topic have identified economic barriers to be a major hindering factor homeowners are facing while deciding on conducting EER to their homes. Some of the issues that have surfaced from various studies are related to the high initial cost of works, general financial constraints, aversion to debt, expectation of subsidies, uncertainty related to cost-benefit, long payback time (Levine et al., 2007; Neme et al., 2011; Zundel & Stieß, 2011; Heiskanen et al., 2012; Wilson et al., 2014).

As in the case of homeowners’ motivation, the cross-national study conducted by Heiskonen et al. (2012) provides valuable information related to barriers that hinder the uptake of EER measures in multi-family apartment buildings in several European countries. Financial issues have been identified as major brakes for EER in almost all the countries studied, less so in Finland. As, in general, the occupants of this type of buildings are either pensioners (in Germany and Spain) or people with low income (Spain and Austria), access to capital and long payback time are seen as severe barriers. Such is also the case with taking up a loan, although the discussions on this theme are more nuanced, depending on the context. Thus, for France, the main issue that has been mentioned was related to the impossibility to take up a loan as a condominium association, with each owner being responsible for her or his arrangements on this. The only case study where access to capital and financing opportunities have not been named as some of the main hindering factors was Finland (Heiskanen et al., 2012).

In their study on past experiences of homeowners that have conducted EER works to their homes in the UK, Mallaband et al. (2013) also identified cost of works as a hindering factor, based on the participants’ answer to their qualitative study. Lack of sufficient funds let homeowners to either perform the works in different stages or to give up some of the more expensive solutions they intended to use or were recommended to them. Moreover, some of the respondents identified cost of works as a barrier in relation to prioritising investments, stating that they might be more inclined in spending their money on something else, even if they were not a necessity “like extravagant holidays or buying a load of books.” (Mallaband et al., 2013: 191).

As suggested by various studies, the homeowners’ willingness to raise a loan or the limited access to a loan in agreeable terms, factors which are in fact strongly correlated with the
availability of funds, are often seen as an economic barrier (Zundel & Stieß, 2011; Economidou et al., 2011; Heiskonen et al., 2012). This situation is strongly connected with the location specific factors, thus particular for each country. Nevertheless, although specialised loans programmes for EER and loan conditions vary across countries, in many cases, the homeowners are reluctant to obtaining a loan for refurbishing their home, possibly also due to the lack of understanding of potential long-term economic benefits that EER works might bring. This particular barrier has been identified also in the Romanian context by Zimling and Nielsen (2006) in their report done for the Danish Ecological Council.

2.4.2 Information and advice related barriers

The lack of adequate information and advice has been acknowledged as a common barrier that hinders the uptake of EER in the domestic sector (Heiskanen et al., 2012). These information or advice might be related to various topics, ranging from energy saving matters, price of energy, environmental or economic benefits, technical solutions or availability of funding and grants for EER. The studies that have analysed the information gap as a barrier have taken different approaches on this, seeing it as a market failure, as a technical barrier, as a cognitive or psychological factor or as a combination of different perspectives.

Stieß et al. (2009) have stressed the importance of information availability and its trustworthiness in their empirical study that investigated homeowners’ attitudes towards EER in Germany. They mentioned the complexity of the technical aspects of EER, which is often difficult to grasp by people that had no technical education or interest. Moreover, having no technical background made the process of assessing and choosing from the available information difficult. As a result, the authors have identified the social networks to play a major role in the decision process. When people are faced with conflicting official information, they would rather turn for advice to people in their immediate social environment or to recommended craftsmen or builders.

The same finding was mentioned by Beillan et al. (2011), with slight variations depending on the country and on the maturity of the local EER market. Due to the fact that homeowners are not sufficiently informed about the energy performance of their home, about the benefits that EER measures, or about the technical and financial option available, the process of carrying out energy saving measures was slowed down. In some countries, like for example Switzerland, the public authorities had put a great effort in raising awareness on EER and especially on relating it not only to economic benefits, but also to comfort issues.
Similarly, in their qualitative study on EER barriers, Tambach et al. (2010) pointed out that missing information and knowledge have been identified as barriers by all their interviewees, which in this case, were not only homeowners, but also municipal employees and market actors involved in EER. Although Fawcett and Killip (2014) targeted their research to homeowners of “superhomes”, the ones that performed EER measures that exceeded legal requirements in the UK, still availability of information and receiving conflicting information from tradespeople were identified as barriers in the decision making process. Another finding of their study that is worth mentioning was that most of the “superhome” homeowners had a technical background or previous experience with EER. Thus, as pointed out also by Stieß et al. (2009), understanding the technical aspects of EER plays a major role in deciding upon renovation.

In general, all the studies related to the factors that explain the under - investments in EER mention the lack of information as a major barrier. More views and findings on this theme can be found in Heiskanen et al. (2012), Alberini et al. (2013), and Wilson et al. (2014).

### 2.4.3 Institutional and organisational barriers

This category of barriers mainly refers to the way the decision making process takes place in commonly held properties, but also to how public institutions facilitate the EER investments through financial, logistic and administrative support.

Reaching a collective agreement on the retrofitting process has been often mentioned by the studies analysing barriers to the speeding up of the EER. One of the main findings that emerged from Heiskanen et al. (2012) was that collective decision problems were identified by the interviewees as a ubiquitous barrier in all participant countries, because, in most of the cases, a big majority of the owners needed to agree with the renovation. As it was mentioned, in Austria, one single opponent could impede the whole process. Such was the situation in Romania as well as, although legally speaking only two thirds of the owners must agree with the retrofit works, in practice, all owners needed to sign up for a loan or to apply for a building permit. Similar results were pointed out by Gosselain et al. (2011) in their study on Latvia and Bulgaria, where in many cases, the inability to obtain the legally required quorum either stopped the retrofit altogether or created undesired results, with only partial and ununiformed works performed in owners occupied buildings. In fact, this is a situation that is visible in Romania as well. Besides identifying the collective decision barrier, Cadima (2009) also discussed the issues raised by the privatisation processes and by the mix of high and low income families in
collective dwellings buildings, especially in the former communist countries from CEE. In some cases, where homeowners associations were better organised or had more initiative, decision making process were often easier.

Another barrier identified by previous studies refers to the long administrative process required to approve a EER project. Both Heiskonen et al. (2012) and Wilson et al. (2014) discussed this problem. One possible solution advanced by both study was the organisation of a “one – stop – shop” that would shorten the red tape procedures and ease the administrative burden that acted as a de-motivational factor for homeowners. The same excessive bureaucracy was mentioned in the research conducted by Bartiaux et al. (2011) in Belgium, but in this case related to accessing public funding for performing energy related improvements. This was mentioned to constitute a problem especially for the lower educated people, which found it difficult to go through the complex paper work needed.

As shown by previous studies, although sometimes context dependant, the speeding up of EER uptake can be impeded by an interplay of barriers which influence homeowners’ decision making process. The main barriers identified from the studied literature are summarised in Table 3 below.

Table 3. Barriers to EER uptake

<table>
<thead>
<tr>
<th>BARRIER THEME</th>
<th>BARRIER FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECONOMIC OR FINANCIAL BARRIERS</td>
<td>• High initial costs of work</td>
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<td></td>
<td>• Financial constraints</td>
</tr>
<tr>
<td></td>
<td>• Aversion to debt</td>
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<td></td>
<td>• Uncertainty related to cost-benefit</td>
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<td></td>
<td>• Long payback time</td>
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<tr>
<td>2. INFORMATION AND ADVICE RELATED BARRIERS</td>
<td>• Lack of information</td>
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<td></td>
<td>• Lack of reliable advice</td>
</tr>
<tr>
<td></td>
<td>• Missing or conflicting information</td>
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<tr>
<td></td>
<td>• Uncertainty/ contractor risk</td>
</tr>
<tr>
<td>3. INSTITUTIONAL AND ORGANISATIONAL BARRIERS</td>
<td>• Collective decision making</td>
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<tr>
<td></td>
<td>• Long red tape procedures</td>
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<td></td>
<td>• Bureaucracy</td>
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<tr>
<td></td>
<td>• Corruption</td>
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Source: Author’s own compiled from the literature review
2.5 Conceptual framework

As shown above, the energy efficiency gap can be explained by a series of motivations or drivers and barriers and by the way these are addressed by the legal and policy framework in various contexts. Analysing homeowners’ motivations and the barriers they have encountered has been acknowledged to be a valuable tool in providing informed policy recommendations. In this way, the energy efficiency gap discussed in Chapter 2.2 can be addressed. Based on the previous studies and theories reviewed above, a conceptual framework could be derived, that, first of all, contributed to the writing up of the interview guide, and secondly, could further on guide the analysis of the results derived from the qualitative interviews that were conducted with homeowners in Romania. This conceptual framework is presented in Figure 2.

Figure 2. Conceptual framework

Source: Author’s own
3. RESEARCH STRATEGY AND METHODOLOGY

3.1 Philosophical approach

The research philosophy constitutes the assumption a researcher makes about the nature of science and the nature of society (Burrell & Morgan, 1979), assumptions that will guide the whole research process. These are consequential and they refer to three main components: ontology, epistemology, and methodology.

Ontology is concerned with the way researchers see reality (Bryman, 2012: 32). Given the nature of the research questions posed and the focus on the homeowners’ perspective and interpretation of the research topic, the ontological stance adopted in this study will be a social constructivist one. Thus, the subjects (the interviewees) of the research will most probably interpret situations in various ways, influenced by their own perception of the world (Saunders et al., 2009: 118).

Epistemological considerations shape the way researchers study the social world, defining what is considered acceptable knowledge (Bryman, 2012: 6, 27). As the main objective of this study is to gain an in-depth understanding of homeowners’ motivations and barriers in taking up EER works and the study does not intend to be an explanatory one, the study will adopt an interpretivist epistemological position. As the whole approach of the study is not a value–free one (Saunders et al., 2009: 114), due to both the researcher’s background and to the context dependant nature of the study, a positivist approach has not been seen as a suitable one.

3.2 Research strategy

The ontological and the epistemological approaches described in the previous section trace the guidelines for the way the research will be conducted, through methodology, in order to answer the research questions (Sarantakos, 2005: 30). Furthermore, as studies about this topic in Romania are still scarce, this research will adopt an exploratory approach, trying to gain a deeper understanding of the EER phenomenon in the Romanian context (Saunders, 2009: 139). As stated by Hakim (2000, in Saunders et al., 2009: 127), the process of designing a research project is very similar to that of an architect designing a building. This process is generated and guided by the interplay between the philosophical stance of the researcher, the strategies used for conducting the research and the specific methods considered appropriate for deriving the findings (Creswell, 2009: 5).

Considering these issues, in order to achieve the aim of this research project, a single-case study will be used, based on a qualitative strategy, having as a starting point the social
constructivist stance acknowledged above. The nature of the research sub-questions support this choice of research strategy, as the focus is on a specific topic, namely domestic EER, seen from the homeowners’ point of view. The first research question lends itself to a more descriptive approach, the objective being to identify and to analyse the policy context that supports the EER phenomenon in Romania. In order to answer the following two research sub-questions, interviews will be conducted with homeowners, which will be prompted to discuss about their experience with implementing EER measures to their homes. Finally, the fourth sub-question will be answered by deductive reasoning, based on the literature reviewed in Chapter 2 and on the findings of the previous 3 sub-question.

3.3 Case study

3.3.1 General considerations
Case study is a recommended strategy when the research aims at an in-depth analysis of a contemporary phenomenon in a real-life context (Yin, 2014:16). As Saunders et al. (2009: 145) have noted this type of research strategy is employed in exploratory and explanatory research studies and it is particularly useful for gathering detailed information through various data collection methods (Stake, 1995 in Creswell, 2009: 13). A single-case study allows an intensive analysis that can increase the quality of the theoretical reasoning (Bryman, 2012: 66). As previous studies has revealed that there are differences on how and why the EER phenomenon is developed and understood in different contexts, the case study strategy is seen as suitable for this research. Although having a common ground in the European directives related to energy efficiency, different countries employ different policy instruments to support EER. Moreover, since the study relies on the homeowners’ subjective perspective and experiences, social and economic specificities also play an important role in understanding and gaining a deeper insight on the chosen topic. Thus, a single and holistic case study approach will be employed, with the unit of analysis being the town of Deva, a medium size locality in the western part of Romania.

3.3.2 Case study selection
Based on the rationale stated above, Deva was selected as the case for analysis. Although it may probably not be justified to call it a “critical” case (Yin, 2014: 51) within the CEE context, Deva can be seen as an exemplifying case, providing a suitable background for the research (Bryman, 2012: 69). Although the choice can be seen as an “opportunistic” one (Hakim, 2002), as Deva is the researcher’s home town, it also has academic and policy value, as noted earlier, and the results can inform local and national decision makers.
One reason for choosing Deva as a case study is that it represents a typical medium sized town in Romania, with a decreasing and ageing population in the last 20 years, but also with a decreasing economy after the fall of the Curtain Wall. Its spatial development and building stock are also characteristic of Romanian medium sized town, presenting a mix of low rise historic buildings and a medium and high rise post World War II constructions, representing mainly multi-family buildings.

The second reason for this selection is that, by visiting the town, it has become obvious that more and more people are starting to undertake energy efficiency retrofitting measures – applying thermal insulation to exterior walls, changing old windows with high thermal performance ones. While some of these works have been done, in some cases, for the whole building, in other cases, only some of the apartment owners have performed works. At the same time, the City Hall of Deva has started the thermal rehabilitation of a number of multi-family buildings with European funding, as part of the Regional Operational Plan. Given these developments, the findings of this study could be of interest for both public and private actors that are acting in the EER field.

3.4 RESEARCH METHODS: DATA COLLECTION AND DATA ANALYSIS

Data collection methods

In order to answer the research questions, this study will make use of both primary and secondary data. For answering the first research question, a policy documents analysis has been conducted, in order to assess the status quo of the policy context in Romania, related to the improvement of the energy performance of buildings, at different levels – European, national and local. For an in-depth understanding of the homeowners’ motivations and the barriers encountered while up taking energy efficiency measures to their apartments, interviews in a semi-structured format have been chosen as a data collection method. As Moloney et al. (2008) have noted, this is considered an ideal method for understanding homeowners’ attitudes and practices, in a “real life” context.

3.4.1 Secondary data collection

In order to understand the Romanian policy context related to EER, the secondary data was collected from European and national policy documents, but also from sustainability and energy related strategies and roadmaps and reports. These documents have been used in order to obtain a general overview of the available instruments supporting domestic EER investments. As they mainly reflect the policy makers and the public authorities’ point of view and vision on the topic,
they will provide an interesting and useful background for comparison and analysis of the homeowners’ perspective.

### 3.4.2 Primary data collection

For collecting the primary data, qualitative semi-structured interviews have been chosen as a method, providing an interpretative background for the research, through direct and intensive contact (Creswell, 2009:177). The interviews were conducted in the homeowners’ apartments, giving thus the opportunity to observe the executed works, but at the same time ensuring an informal and familiar environment. The flexible format of the semi-structured interviews allowed for variations in questions and wording according to each participant characteristics, giving the opportunity to ask probing questions and to elicit interviewees to recall and to talk freely about their personal experiences. This type of data collection method has been identified as the one that offers a greater opportunity to gather significantly higher amounts of systematic and deeper information (Bryman, 1988). Qualitative semi-structured interviews have been named by other scholars as an appropriate research method for collecting in-depth data on homeowners’ motivations, experiences, decisions and practices (Silverman, 2010; Crosby & Baker, 2010). The flexible, semi-structured interviews allow new issues of exploration to emerge (Saunders et al., 2009: 117). The main aim is to gain insight into what the interviewees see as important and relevant (Bryman, 2012: 380).

**The participants sampling**

A purposive sampling strategy was used for selecting the participants for the interviews (Bryman, 2012:418), searching for people that might have relevant information related to the research questions. The main selection criterion was that the participant has undertaken EER measures in their apartments, which was determined either by direct field observation (visible exterior EER works such as application of thermal insulation to exterior walls) or by discussing with contacts that the researcher had within the community.

In order to achieve data consistency, qualitative studies should employ an appropriate number of responds that should ensure theoretical and data saturation, while at the same time maintaining the possibility to conduct an in-depth case oriented analysis (Onwuegbuzie and Collins 2007: 289 in Bryman, 2012). Due to time and financial constraints, the participants sample could not reach theoretical saturation. Nevertheless, without intending to create a statistically significant sample, the selection of the participants was done in such a way as to cover a wide range of socio-economic profiles and household types. The characteristics that
were considered were related to the age and sex of participants, their income, employment status and education level, the household composition (number of adults and number of children still living at home), but also the characteristics of the apartments of the buildings the interviewees were residing in (See Appendix 1, sections 1 and 2). This selection strategy has been employed by other scholars in similar studies (Haines & Mitchell, 2014) and has proven to add value to the findings.

Furthermore, previous studies found it useful to categorise the people that conducted renovations to their apartments, into particular archetypes, based on their motivations, preferences and goals. These aspects were used for identifying opportunities and barriers to energy retrofit and to inform the design of targeted EER measures and instruments (Haines & Mitchell, 2014). Although difficult to cover all the personas established by the literature, the participants’ selection was also informed by the homeowners’ types classification proposed by Haines & Mitchell (2014). The categories that were not relevant for the multi-family building type were excluded (such as The Affluent Service Seeker, which were more likely to live in an older building, with more character and architectural value). A simplification of their classification is presented in Table 4 below, including the characteristics of the archetypes and the possible implications for EER policy instruments.

<table>
<thead>
<tr>
<th>Homeowner persona</th>
<th>Main characteristics</th>
<th>Implications for EER policy instruments</th>
</tr>
</thead>
</table>
| **The Idealist Restorer:** the property is a project | • Interested and open to EER measures  
• Wants to preserve the character of the building  
• Interested in increasing the comfort, the convenience, but also the aesthetic  | • Extensive information on different options must be made available  
• Policy measures must allow flexibility in the way the works are undertaken, as the persona wants to remain in control of the retrofit |
| **The Property Ladder Climber:** the property is a step up | • Sees renovation as an opportunity to increase the property value  
• Willing to borrow money for renovations that pay back in a short time  
• Financial gain is the main motivation  
• Energy efficiency beyond regulations is not sought | • Financial instruments must ensure short term benefits  
• Instruments must encourage minimization of the costs (DIY opportunities)  
• Building codes and regulations must be mandatory, otherwise they will not be pursued |
| **The Pragmatist:** Functional subtype: The property is a place to live | • Home improvements are seen as a hassle  
• Convenience is the main motivation | • Financial schemes must be competitive with other loans options |
Concerned about environmental and climate change issues
- Works must be undertaken as a complete package, under professional supervision that can ensure quality and timeliness of works
- More interested in improving the appearance of the home
- Not interested in taking up loans
- Interested in a quality job well done
- Little tolerance to extended periods of disruption
- More interested in improving the appearance of the home, without any extravagancy
- Frugal and interested in saving energy primarily for saving money
- Might not heat up unused space in the home
- Not in a position to renovate without outside support
- Wants to feel secure and comfortable at home, without any extravagancy
- Frugal and interested in saving energy primarily for saving money
- Might not heat up unused space in the home
- Not in a position to renovate without outside support
- Policy instruments should cover the whole or a substantial part of the costs of works
- Professional support should be provided throughout the whole project
- Renovations packages should include only essential works

Source: Adapted from Haines & Mitchell (2014)

Table 5 presents a list of the interview participants, together with their brief description, based on their responses to the first section of the interview. Although there are not ethical issues that might arise from the study, the participants’ full name will not be disclosed and they will be identified by their initials.

Table 5. Overview of respondents’ characteristics

<table>
<thead>
<tr>
<th>Initials</th>
<th>Sex</th>
<th>Age group</th>
<th>No. of people in the household</th>
<th>Employment status</th>
<th>Education level</th>
<th>Income level (Lei)</th>
<th>Persona archetype</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.V.</td>
<td>F</td>
<td>35-44</td>
<td>1</td>
<td>Employed</td>
<td>University</td>
<td>15-20000</td>
<td>The Pragmatist: Functional subtype</td>
</tr>
<tr>
<td>R. P.</td>
<td>M</td>
<td>65+</td>
<td>2</td>
<td>Retired</td>
<td>University</td>
<td>20000+</td>
<td>The Idealist Restorer</td>
</tr>
<tr>
<td>L.T.</td>
<td>F</td>
<td>65+</td>
<td>1</td>
<td>Retired</td>
<td>University</td>
<td>15-20000</td>
<td>The Pragmatist: Functional subtype</td>
</tr>
<tr>
<td>M. B.</td>
<td>M</td>
<td>65+</td>
<td>2</td>
<td>Retired</td>
<td>Secondary school</td>
<td>20000+</td>
<td>The Pragmatist: Aesthetic subtype</td>
</tr>
<tr>
<td>F. A.</td>
<td>F</td>
<td>45-54</td>
<td>2</td>
<td>Fully employed</td>
<td>University</td>
<td>15-20000</td>
<td>The Idealist Restorer</td>
</tr>
<tr>
<td>M. T.</td>
<td>F</td>
<td>65+</td>
<td>1</td>
<td>Retired</td>
<td>University</td>
<td>9-15000</td>
<td>The Pragmatist: Functional subtype</td>
</tr>
<tr>
<td>I. B.</td>
<td>M</td>
<td>35-44</td>
<td>4</td>
<td>Self employed</td>
<td>University</td>
<td>15-20000</td>
<td>The Pragmatist:</td>
</tr>
</tbody>
</table>
### The interview process

The interviews were conducted based on an interview guide (Patton, 2002), using themes that were identified in the literature review as being important for the chosen topic (Appendix 1). In order to elicit the exploration of particular points of view and to allow full flexibility, open ended questions were used, which allowed for expanding on new emerging topics of discussion and interests according to each interviewee’s own experience with EER.

The interview commenced with a short introduction on the topic and the reason for conducting the research, followed by an explanation of the ethical issues that might arise and the presentation of the consent form and its implications. Then, the interview guide was provided to the participant. Thus, after the 2 structured sections that had the purpose of gathering socio-demographic and economic information about the participants and data about the apartment, the next two sections focused on themes such as the actual works undertaken to the homes, the motivations and the reasons that drove the homeowners to conduct those works, the barriers they encountered and how they were solved, closing with a set of questions related to the participants’ knowledge about policy and policy instruments relevant to EER and the information and support they sought for or used during their home refurbishments.

The interviews were carried out face-to-face, in the participants’ homes, in April – May 2015 and lasted about 15 to 30 minutes. Ten out of the eleven conducted interviews were digitally recorded and then transcribed, while for one of them notes were taken, as the participant did not agreed to be recorded.

### The data analysis

In order to analyse the data collected through the process described above, thematic analysis was employed which was considered one of the most common approaches in qualitative studies.
(Bryman, 2012: 578). After the interviews were transcribed, the main themes were identified by searching for words or topics that recurred in interviews and that were considered relevant for the study, exploring for similarities and differences between responses, but also taking into consideration the theory on barriers and motivations for conducting EER (Bryman, 2012: 580). The topics were then coded in the original language of the interview and grouped in order to provide the structure for the presentation of the findings in the empirical chapter.

Table 6. Summary of research strategy

<table>
<thead>
<tr>
<th>Research sub-question</th>
<th>Ontology/ epistemology</th>
<th>Method</th>
<th>Data type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. What is the legislation context and which are the main policy instruments currently in place at national and local level in Romania that are related to the EER of multi-family buildings?</td>
<td>Social constructivist/ Interpretivist</td>
<td>Document analysis</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Q2. What are the main motivations of homeowners to carry out EER?</td>
<td>Social constructivist/ Interpretivist</td>
<td>Semi-structured interviews + thematic analysis</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Q3. What are the main barriers identified by the homeowners while deciding upon and carrying out energy efficiency improvements to their home?</td>
<td>Social constructivist/ Interpretivist</td>
<td>Semi-structured interviews + thematic analysis</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Q4. Which policy instruments are the most effective in supporting home owners to retrofit their home, and which improvements to the current policy framework in Romania should be considered in order to accelerate the uptake of energy efficiency measures?</td>
<td>Social constructivist/ Interpretivist</td>
<td>Deductive reasoning</td>
<td>Qualitative</td>
</tr>
</tbody>
</table>

3.5 RELIABILITY, VALIDITY, AND LIMITATIONS OF THE STUDY

Reliability refers to the consistency of findings that has been derived through the data collection and data analysis techniques (Saunders et al., 2009: 156), while according to Bryman (2012: 47) validity is “concerned with the integrity of the conclusions that are generated from a piece of
research”. In order to strengthen the reliability and the validity of this piece of research, the findings were based on multiple data sources and on multiple research methods, the results being verified through triangulation which was defined by Denzin (1978: 291) as “the combination of methodologies in the study of the same phenomenon”. Thus, as underlined by Silverman (2011: 369), similarities and common themes found in the academic literature review, policy discourse analysis and thematic analysis of interviews ensured a higher validity of the findings.

One limitation of the study stems from the choice of the case study as a research strategy. This has raised many criticisms and debates related to generalisation of the findings, rigour and objectivity (Denscombe, 2003). Nevertheless, researchers have acknowledged that the case study, even if a single one, can generate invaluable and practical findings that can contribute to the development of knowledge and of the society, that can further be compared, interpreted and translated to a wider context (Van Wynsberghe, 2007). In order to overcome this limitation, this research, although placed in a single geographical location, made use of a wide variety of respondents in terms of social and economic backgrounds, ensuring the relevance and the diversity of the results. This above mentioned strategy also mitigated another limitation of this study, which resulted from the restricted amount of time and financial resources for conducting the research.

Although the interviews were conducted in Romanian which was the native language of both the researcher and the respondents, another limitation of the study resulted from the translation of the interviews and of the codes used to analyse the data into English. This limitation was resolved by having a professional Romanian – English translator checking the interview guides and the code books in both languages.

### 3.6 ETHICAL CONSIDERATIONS

This research study will raise no particular ethical issues, as it can inflict no harm on the participants or on the researcher (Bryman, 2012: 135). Still, anonymity of the respondents was respected and the statements and questions in the interview were formulated in such a way as to avoid privacy invasion. The research project did not use language that was biased against any of the respondents (Creswell, 2009: 92) and as much as possible, the results of the research would be made available to the participants (Creswell, 2009: 90).

Furthermore, the participants were asked to sign a consent form (see Appendix 2), which included relevant information about the project and through which the interviewees were given the opportunity to choose what information obtained through the interviews could be used by the researcher (e.g.: their names, direct quotes). Furthermore, the respondents were given the option
to skip questions towards which they did not feel comfortable or to withdraw from the study at any point. The research was conducted according to the ethical guidelines stipulated by the Cardiff University Ethics Committee.
4. CASE STUDY DEVA: A HOMEOWNERS’S PERSPECTIVE ON DOMESTIC ENERGY EFFICIENCY RETROFITS

This chapter represents the empirical part of this research, starting with a brief description of the chosen location of the study, including some statistical data concerning buildings and dwellings, followed by the findings of the analysis in relations to the research questions presented in chapter 1.

4.1 Location specific context. Introduction to the study area

Location
Deva is a municipality located in the western part of Romania, in the historical region of Transylvania, situated on the left bank of Mures River, at 45º 53’ North latitude and 22º 54’ East longitude. Having an area of 34 km² (61 km² including all the extra administrative territories), it is the capital of Hunedoara county – the county with the highest degree of urbanization in Romania (77%) (Radoslav et al., 2010) and the distance to Bucharest, the capital of Romania is 395 km (Agarici et al., 2007). It includes four additional component localities: Archia, Barcea Mica, Cristur, Santuhalm. One of its main strength is its position on a strategic infrastructure corridor, connecting Bucharest and the eastern part of Romania to the western part of Europe through both railway and road infrastructure. Hunedoara county is situated in the easternmost part of the West Development Region, having direct and close links to the Central Development Region (in close proximity to Alba Iulia and Sibiu), to the North West Development Region (Oradea) and to the South West Development Region, as it is shown in Figure 3, balancing the polycentric national network (Radoslav et al., 2010).
Climate

Like most of the Romanian western region, Deva is characterized by a transitional continental temperate climate, with sub-Mediterranean influences, with an average multi-annual temperature of 10-12° (Radoslav et al., 2010). Being situated in a small depression, between 2 mountain ranges – Apuseni and Poiana Ruscai, the city is protected of extreme climatic phenomenon. The maximum temperatures during summer can reach 32°, while during winter, the minimum ones can get to -14°, but these are rather rare phenomena and are not characteristic for the area. Nevertheless, these characteristics can influence the decisions related to adopting EER measures and they must be taken into account when designing technical solutions.

Population

Deva has been inhabited since prehistoric times. The statistical data collected in the last 100 years show a constant growth and development of the population, until 1998 when the number of inhabitants started to decline, due to the economic crisis and to changes in life and family patterns. Figure 4 show the number of inhabitants of Deva starting with 1920, according to the official populations and dwellings censuses. It is interested to note that the highest population growth occurred between 1956 and 1992, a period coinciding with the high rate of
industrialization during the communist period, which also brought changes to the planning system and to the inhabitation patterns through the mass production of multi-family buildings.

**Figure 4. The evolution of population in Deva 1920-2011**

![Evolution of population in Deva 1920-2011](image)

*Source: Hunedoara County Statistical Unit*

**The built environment and the urban development**

The origin of Deva as an inhabited area dates back from prehistoric times. In terms of urban structure, the city has developed in a linear pattern from north to south, along two major boulevards – one dating from the 19th century, the other one, from the communist era, with the public amenities concentrated around these and the residential neighbourhoods spreading on the east and west outskirts (Figure 5). In terms of urban development and evolution of the built environment, after the Second World War, Deva followed the same route as many other medium sized Romanian localities. Its evolution is characterized by two major stages of development: the communist period and the transition period that followed the fall of the Iron Curtain. During the communist period, the major interventions to the urban structure were the insertion of the new centre (Figure 6) and the rapid development of the collective dwellings neighbourhoods (Figure 7), necessary to accommodate the increasing population (Radoslav et al., 2010). After 1989, the interventions in the built environment of the locality became fewer in number, but they also lacked urban planning coherence and quality (Radoslav et al., 2010).
Figure 5. General urban plan of Deva

Figure 6. The new centre of Deva

Source: https://www.flickr.com/photos/cameliatwu/4023411777/in/album-72157622487539533/

Figure 7. Collective dwellings neighbourhood in Deva

Source: http://www.panoramio.com/photo/67421692
In what housing is concerned, there is a lack of data at the city level, but the national data allows for an understanding of the development path of the residential building stock, by type of building (Figure 8), age band of construction (Figure 9) and occupant profile (Figure 10). These data can be translated and scaled down at a local level as well, as the process of urbanization has been rather similar throughout the country. It is important to mention that according to the Population and Housing Census ran in 2011 in Romania, approximately 71% of the urban residential housing units were multi-family apartment blocks, representing about 66% of the total usable residential area (Botici et al., 2013).

**Figure 8. Breakdown of the residential building stock by building type and area – national level**

![Pie chart showing breakdown of residential building stock by type and area](http://www.buildingsdata.eu/data-search-results)

**Source:** BPIE: [http://www.buildingsdata.eu/data-search-results](http://www.buildingsdata.eu/data-search-results)

**Figure 9. Breakdown of the residential building stock by age band – national level**

![Graph showing breakdown of residential building stock by age band](http://www.buildingsdata.eu/data-search-results)

**Source:** BPIE: [http://www.buildingsdata.eu/data-search-results](http://www.buildingsdata.eu/data-search-results)
Energy consumption in the building sector

At the EU level, in 2010 buildings accounted for about 41% of the total energy consumption, with the residential buildings representing about 2/3 of this (Enerdata, 2012). In 2009, Romania had the highest share of energy consumption from the domestic sector, with about 80% of the total buildings consumption been related to households (Figure 11), although the energy consumption per dwellings has gradually decreased since 1997, due to changes in living patterns and adoption of energy efficient solution (Figure 12).

Figure 10. Breakdown of the building stock by age band – national level

Source: BPIE: http://www.buildingsdata.eu/data-search/results

Figure 11. Share of residential buildings in total buildings consumption

Like in many other European countries, except for the Southern European ones, the largest share of the energy is consumed for space heating, with a much smaller share represented by appliances, due to lower income level and thus a lower uptake of high energy consumption appliances (Figure 13) (Enerdata, 2012).

**Figure 13. Breakdown of household energy use by end-use for EU-countries (2009)**


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**4.2 The legal context and available policy instruments for EER in Romania**

This sub – chapter will present an account of the policy framework that supports investments in EER in Romania. The results have been derived by analyzing European and national policy and
legal documents. Its main purpose is to offer an objective description of the status of EER policy context and the available policy instruments.

After the fall of the Iron Curtain, Romania has started the first political efforts in the domain of energy efficiency with the regulation of the heat supply and use from the district heating system, approved by the Government Decision 425/1994, amended by GD 168/2000) (MURE, 2008). In parallel with the accession process to the EU, Romania has intensified its effort to address the energy efficiency issues and to align itself to the European regulations and targets. A special attention has been given to renovating the existing building stock and this has been acknowledged by authorities as being on top of the policy agenda (BPIE, 2013).

As part of the EU, Romania had to align itself with the European provisions and targets for reducing energy consumption and CO₂ emissions from the building sector. The national legislative framework in this domain is mainly based on the transposition of the following EU directives Directive 2012/27/EU on energy efficiency (Energy Efficiency Directive - EED), Directive 2009/28/EU on the promotion of the use of energy from renewable sources (The Renewable Energy Directive – RED) and Directive 2010/31/EU on the energy performance of buildings (EPBD) (BPIE, 2014a). As stated by various reports, Romania quickly transposed the European directives into the national policy framework, but it did not succeed yet to centralise the provisions of the three main directives mentioned above, adopting a more compartmentalised approach to the implementation process, due to legal and administrative difficulties (ADENE, 2013). Moreover, an experts’ survey pointed out that the Romania’s National Energy Efficiency Action Plan, although set in place, showed a rather weak commitment, leaving thus room for potential improvements in many directions (EEW, 2013).

The policy measures and instruments utilised by EU Member States have been classified into seven main categories: legislative/ normative (e.g. building codes and standards, legislative/ informative (e.g. labels, performance certificates), financial (in the form of subsidies, grants), fiscal (tax deduction), information/ education (open home events, pilot projects), co-operative (voluntary agreements) and taxes (for example on energy or CO₂ emissions) (Boonekamp, 2009). In this direction, Romania has taken several steps, having various instruments in place. Table 7 shows an overview of the national measures that target the energy efficiency in the residential building sector. What can be noted is that the instruments are mainly focused on the legislative and financial support, while the education/ information measures are not covered by any instrument.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Type</th>
<th>Starting year</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation of heat supply and use</td>
<td>Legislative/ normative</td>
<td>1994</td>
<td>Medium</td>
</tr>
<tr>
<td>Individual billing of the consumers supplied by public district heating systems</td>
<td>Legislative/ normative</td>
<td>2009</td>
<td>High</td>
</tr>
<tr>
<td>EU-related: Revised Directive for Labelling of Energy-related Products (Directive 2010/30/EU) - Energy efficiency improvement of heating-cooling systems on individual housing</td>
<td>Legislative/Informative</td>
<td>2008</td>
<td>Medium</td>
</tr>
<tr>
<td>EU-related: Revised Directive for Labelling of Energy-related Products (Directive 2010/30/EU) - Promotion of performing householder appliances</td>
<td>Legislative/Informative</td>
<td>2001</td>
<td>Low</td>
</tr>
</tbody>
</table>
The type of instrument that has been given the most attention has been that related to financial support, by providing loans, grants and subsidies. Nevertheless, financial support mechanisms have mostly relied until now on international bodies and organisations (the EU, World Bank, UNDP), with little domestic financial intake (Stuggins et al., 2013). One of the main fiscal instruments that support the energy efficiency investments in the multi-family residential buildings is the National Thermo-Renovation Programme, which aims at the reduction of at least 40% of the energy used for space heating. It has been lately amended to incorporate European Regional Development Funds (ERDF) and up to now about 80,000 apartments (representing 3% of the residential building stock) has benefitted from this (Atanasiu et al., 2013). In the same line, another instrument in the form of loans has been started in 2010, providing financial support through government guaranteed bank loans for performing EER (Atanasiu et al., 2013).

At the local level, there are no specific instruments set in place and in most of the cases, as seen from the field work, most of the works are solely the initiative of homeowners, which have received little support from public bodies and had little knowledge of public programmes related to EER. Nevertheless, starting with 2014, some pilot projects have been started under the National Thermo-Renovation Programme, using external funding from ERDF.

The available policy instruments will be discussed further in the following sub-chapters, in relations to the finding from interviewing homeowners on their EER experiences.

### 4.3 Overview of the interviewed homeowners apartments and performed works

The first questions of the interviews were related to the characteristics of the apartments and the buildings and to the renovation works that the homeowners conducted inside or outside of their apartment. Table 8 presents an overview of the characteristics of the apartments. One finding that is worth mentioning is that the propensity of moving out of the apartment was very low.
Except for two respondents, all others mentioned that they had no intention to ever leave their apartment, thus the improvements that they made could be interpreted as long-term investments. The responses of the participants revealed that there were several works that had been performed in almost all cases, regardless of the physical condition of the building, the motivational factors that drove the actions or of the socio-economic profile of the respondents. Thus, external wall insulation and the changing of the existing windows and external doors were performed by all, respectively by ten out of the eleven participants. The installment of an individual boiler and disconnecting from the public heating system was also a preferred measure by 9 homeowners. On the other hand, none of the respondents mentioned to have adopted more radical and costly measures such as changing to renewable energy sources or building additional areas or greenhouses. The complete overview of the works performed is shown in Figure 14.

Table 8. The characteristics of the apartments

<table>
<thead>
<tr>
<th>Question</th>
<th>Responses % (N=11)</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many years have you been living in this home?</td>
<td>0</td>
<td>Less than 1 year</td>
</tr>
<tr>
<td></td>
<td>9.1</td>
<td>1 - 5 years</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>5 – 10 years</td>
</tr>
<tr>
<td></td>
<td>27.2</td>
<td>10 – 20 years</td>
</tr>
<tr>
<td></td>
<td>63.7</td>
<td>More than 20 years</td>
</tr>
<tr>
<td>When was your home built?</td>
<td>0</td>
<td>Before 1919</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1919 - 1944</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1944 - 1964</td>
</tr>
<tr>
<td></td>
<td>81.8</td>
<td>1965 - 1980</td>
</tr>
<tr>
<td></td>
<td>18.2</td>
<td>1980 - 1990</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>After 1990</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Don’t know</td>
</tr>
<tr>
<td>How many bedrooms does your home have (including bedrooms used for other purposes, e.g. home office)?</td>
<td>36.4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>36.4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>27.2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>4+</td>
</tr>
<tr>
<td>What is the floor area of your home?</td>
<td>27.2</td>
<td>Less than 50 sqm</td>
</tr>
<tr>
<td></td>
<td>27.2</td>
<td>50 – 69 sqm</td>
</tr>
<tr>
<td></td>
<td>36.5</td>
<td>70 – 89 sqm</td>
</tr>
<tr>
<td></td>
<td>9.1</td>
<td>90 – 109 sqm</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>More than 110 sqm</td>
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<td></td>
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<td></td>
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<td>10 – 20 years</td>
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<td></td>
<td>0</td>
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<tr>
<td></td>
<td>81.8</td>
<td>No plans to ever move</td>
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<tr>
<td></td>
<td>9.1</td>
<td>Don’t know</td>
</tr>
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</table>
4.4 Homeowners’ motivations to perform EER. Findings

As previously shown in Chapter 2, the homeowners’ decision to perform EER works is driven by a combination of various motivational factors. These factors generally fall into three main categories: economic, environmental, social and technical issues, which will subsequently be discussed based on the findings derived from the qualitative interviews.

4.4.1 Economical motivations

Similarly to the findings of previous research conducted in various locations, the economic benefits that EER works might bring was a strong motivational factor for the homeowners that participated in this study. The reduction of energy bills was a driver for most of them, although not for all the works performed. Also in most of the cases, this was not the sole motive, but the decision is influenced by a combination of various factors:

“In what the exterior insulation of the walls is concerned, yes, for that there were economic reasons, I hoped that the bills would be lower after that. For the roof insulation, being on the last floor, I knew that the neighbour that lived in the apartment underneath mine was paying 100 Lei (25 Euros) less for heating. So I had to do something about that, my heat was getting wasted up in the air.” M.V.
“Firstly and foremost, we wanted to decrease the costs for heating. And we are pleased.”

F.A.

“We first thought about the expenses for heating the apartment and about the electrical energy bills. So, yes, there were mostly economic, financial reasons.”

I.B.

“One of my motivations was to reduce the bills for heating. I was paying way too much for that.”

M.T.

“The heating of the apartment became more and more expensive in time and moreover, I was paying for something that I was not receiving in a satisfactory way. Some of the rooms were never warm. So I was paying for something I didn’t have.”

L.T.

Out of all the respondents, only one said the he never, at any point during deciding on or performing the works, thought about reducing the bills. His decision was driven by other factors.

“No, why would I want to reduce the bills?”

I.F.

Knowing about the availability of subsidies and grant schemes was only an indirect motivation that made people think about the option that they had, even if in the end they did not benefit from any such scheme:

“We followed the news on the TV and they were saying that the state will contribute on parts of the works costs. We waited for a while to see what would happen in this direction. But when we saw that this was delayed, we took matter into our own hands, because the apartments were not warm enough.”

L.T.

Increasing the value of the property was not mentioned by any of the respondents, so none of the interviewees corresponded to the “property ladder climbing” persona identified by Haines and Mitchell (2014) in their study. This is also related to the fact that, as shown above, most of the homeowners had no intention to move to a different place in the coming future.
4.4.2 Environmental motivations

As was the case also in other studies related to countries from the former communist bloc, such as Bulgaria and Latvia in Bartiaux et al. (2011), the environmental motivations were rarely acknowledged by the homeowners. This relates back to the limited amount of information available on this topic. Some respondents thought about reducing the CO$_2$ emissions and the energy consumption while deciding on what appliances and fixtures to install, but still this was perceived as a secondary reason:

“Yes, when I bought the boiler I checked which one has the lowest CO$_2$ emissions and I chose that one. And this was all related to environmental protection. But yes, for the boiler this fact mattered.”

M.V.

“We changed all the light bulbs with the energy efficient ones, for reducing the energy consumption, and thus reducing the costs.”

I.B.

Although still seen as a less important motivation, one respondent justified some of his decisions related to EER based on his knowledge related to environmental protection and climate change:

“Yes, environmental protection was also a reason, although not a very important one. But I think that the fact that I did not disconnect my apartment from the public heating system was the best option in what the environment is concerned. Of course, there is still the problem that the source of the heat for the public system is still a very big polluter, because they did not install filters.”

I.F.

In general, environmental protection was not a major concern for the interviewed homeowners in Deva and the works that they performed were perceived as being disconnected from climate change and the reduction of resource consumption, although some people were more aware of the ongoing debates related to these issues. This was the case for one respondent that was conducting business in Belgium, where he came in contact with various discussions and public programmes targeted to environmental protection:

“Yes. Outside of Romania the environment is highly valued and there are a lot of public programmes that support this. There, it is clear that the motivations are related to environmental protection.”

I.B.
Another respondent mentioned that, although she did not take into account any environment related issues when she decided to retrofit her apartment, she would have appreciated to have access to more information on this matter from public institutions:

“At that time, when I did the works, I knew nothing about this. And also no one from the public institutions informed us about these benefits.”

M.T.

4.4.3 Social and technical motivations

Although the economic motivations were cited by most of the respondents, these were never in isolation from other factors and most of the times, they were not prevalent in the decision making process. Such topics as improved comfort, the physical conditions and aspect of the building, achieving independence from the public heating system, becoming an example for neighbours or in the neighbourhood emerged more often from the responses of the interviewed participants.

Improving comfort and increasing the quality of the inside environment and of the life quality at home, in general, was a reoccurring theme during the interviews, confirming findings of previous studies:

“My motivation was mainly related to improving comfort in my home. We wanted a warmer place.”

R.P.

“My main motivation was improving the comfort.”

M.B.

“First of all, we thought about our comfort inside our home, but then, of course, we also thought about reducing the expenses for heating.”

M.O.

“Yes, achieving a higher level of comfort was one of our main aims. And we also achieved it. There was also a period of time when we needed more warmth in the apartment, because my husband was ill.”

L.T.

“We changed the windows because the other ones were very old and you could hear all the noise from outside, they were neither soundproofing, nor insulating thermally anymore. So we decided to change them and get a more quiet and a warmer home.”

B.F.
On the other hand, in one case, the situation was the opposite from what was mentioned by other interviewees. The heating received from the public system was too much compared to the homeowners’ needs. This situation was also concurrent with the construction system of the building, as stated by the respondent:

“The heat we were receiving was exceeding our needs (it was from the public heating system). The block is built up of masonry, so it is already quite energy efficient. We also had energy efficient windows, so we were with our windows open all winter long. We were throwing the heat (and the money) out the window.”

M.O.

Much in the same line of discussion related to the interior comfort, another topic emerged which was related more to personal psychological and sociological factors, namely achieving independence and being able to control the amount of heat received and paid for:

“Besides installing the boiler, we also did some improvements inside the apartment. We installed thermostats on each radiator. When we are in a certain room, we can heat only that one, while the others are disconnected from heating. I have independence in every room. I can control everything according to my necessities.”

R.P.

The more technical aspects of the building and of the apartments themselves were a motivational factor for many respondents. The discussions were mostly related to the degradation and age of the building and its components. This finding is backed up also by the age band of the buildings, with 81.8% of them being built between 1969 and 1980. Another observed factor that had a bearing on the homeowners’ decision was the orientation of the apartment (facing north) and its position within the building (at the last floor, for example). These factors have been observed in previous studies in transition countries from CEE and are mainly related with the poor maintenance of the buildings, especially after the massive privatization process that followed the fall of the iron Curtain (see Heiskonen et al. (2012) for Bulgaria and Romania, Bartiaux et al. (2011) for Bulgaria and Latvia).

“One of the main works we did was changing all the windows, which was also a necessity as the rain hit the side of the building, the windows (wooden ones) were degraded.”

L.T.
“The building has been built around 40 years ago and the plaster from the facades started to fall.”

B.F.

“As I was saying, the bedrooms are facing north and there was a big difference in temperature compared to the other rooms that had sun all the time. This is how the apartment is oriented, there is nothing you can do. But its orientation had an important bearing on the decisions.”

M.V.

“We wanted to save a bit of money from heating, it was cold during winter, the apartment also has a lot of outside walls (positioned on the corner) and it was cold all the time and we had mold.”

B.F.

“Regarding our motivation to do the EER works, sure, the main reason for doing them was the necessity. The apartment was in a bad shape, we needed to do something. We considered that we can cover the costs without major problems. So there you go – necessity and having the financial possibility.”

I.F.

Although mentioned as a motivation for homeowners in other studies in different locations, such as by Novikova et al. (2011), improving the aesthetic of the building did not seem to have importance for the interviewed homeowners in Deva. This aspect was highlighted by only one respondent and not related to the actual decision to retrofit, but more in relation with the end result of the works. Becoming an example of good practice for others also fitted in this participant’s response:

“You know, a lot of people are very pleased with the way the building looks now. And we are very proud of it, because you can see people stopping to look at it. The initial decoration of the building was reproduced exactly the same with the new works. Others just apply insulation and put some colour on it. There are many buildings where there are different colours applied. Here, our building looks the same as it was. So we kept its initial architectural character, but now it looks much better because everything is new and fresh. But, in general, our living conditions are better than they were.”

R.P.

There were other factors pertaining to all three categories that were isolated indicated by homeowners. This section has presented an overview of the findings related to what are the motivations of homeowners to undertake EER measures in Deva, Romania and it represents the findings related to the second research question of this study.
4.5 Barriers for homeowners in undertaking domestic energy efficiency retrofit.

Findings

As in the case of the homeowners’ motivations, previous studies found various barriers that impede and slow down the uptake of EER. The main categories that other authors have defined are: economic and financial barriers, information and advice related barriers and administrative and organisational ones. The following section will present the barriers identified during the interviews by homeowners that did EER works in Deva, Romania.

4.5.1 Economic or financial barriers

Since the interviewed homeowners already performed EER works, most of the barriers had been overcome. Nevertheless, it appeared that some economic barriers played a role in the technical solutions that they adopted and also on the timing of the works. Most of the interviewees acknowledged that due to financial constraints, the works were done in various stages, spread across a few years. This finding was in line with Fawcett’s (2014) analysis of an over-time low carbon retrofit model that could be more attractive for homeowners. Although the total costs of all works done over time might be higher due to logistic extra costs, the high initial costs of works might still a strong barrier for a one-off EER. This was the case for all the respondents from Deva.

“No, we did not change the radiators. We could not afford this as well. All the retrofitting works were done over a period of some few years. Everything was done with our own money and that’s why we did not have enough resources to do everything at once. We could only afford to perform the works in different stages.”

L.T.

Some participants mentioned financial constraints to be the main reason for which their neighbours could not participate in a collective action for retrofitting the whole building. In some cases, the works were performed individually by each apartment, creating aesthetical issues due to incomplete works to the façade:

“It is very important that the works be done for the whole building. Now, about three quarters of the building has a new façade, the rest is left as it was. It would be good if the City hall would get involved because the rest of the people don’t have money for the works. On the outside it looks very bad. It is sad…”

M.T.
“Sure, we have also talked to all the neighbours, although I was not the one that had this initiative, but when the financial issues were raised, the discussions stopped. The decision was based on the costs of works – whoever had the necessary resources did the works, the rest…So this was the main reason for those who did not retrofitted their apartment – the financial one.”

I.F.

One of the respondents mentioned that some people could not even contribute with the 20% share that homeowners had to pay in the case of works done with public funds, thus the building could not participate in the national retrofitting programme. While Musatescu and Comanescu (2009) reported that residents were unwilling to pay even those 20% themselves, the homeowners’ perspective was more nuanced and perceived this situation as an inability to pay:

“I know that the decision has to be a collective one. Considering the financial situation of some of the families in the building, we did not apply for this programme, because even in collaboration with the City hall, the homeowners need to participate with a certain amount of money.”

M.O.

Just in some isolated cases there were no financial barriers and the decisions were taken collectively. But this situation mostly happened in cohesive communities of homeowners, in more gentrified areas. Not surprisingly, this situation happened in the same case where the respondent also mentioned their interest in the aesthetic of the building and their desire to be considered as an example in their neighbourhood:

“I took the initiative and we consulted all the neighbours, everybody agreed on it, wanted and were also able to participate financially, so we started the works.”

R.P.

During the interviews no discussions related to cost-benefit or long payback time emerged. This finding is in contrast to the results from the study conducted by Heiskanen et al. (2012), but this could be explained by the fact that they interviewed experts, which had more knowledge related to this field of expertise.
4.5.2 Information and advice related barriers

Lack of available technical information was not perceived as a strong barrier by the homeowners. Most of them declared that they prior to starting the works they consulted different sources of information, people in their network that had technical knowledge or that had performed similar works before or experts in the field. They did not seem to mistrust the information they received and the fact that after the works there were no major flaws and, in general, people were pleased, was a confirmation that the received advice was competent.

“We obtained information from people that we knew had done this sort of works before, they recommended us who to talk to, who to contact. We discussed with specialists, but we did not leave everything in someone else's hands. We were all the time informed.”

L.T.

“No, there were no problems in this direction. Before we started to document ourselves and we checked what other people had done before, then we collectively decided what to do.”

R.P.

“We talked to acquaintances that had done similar works, but also with specialists in this field.”

M.B.

These statements, together with the fact that most of the people performed the works with companies that were recommended by others, stressed the importance of the personal network in acquiring necessary information.

The only dissatisfaction was related to the access to information related to the public funding schemes:

“We heard about it after we did the works. But at that time the programmes were not popularized.”

F.A.

“In the first place, at the moment when we did the works (2009-2010), there was no implication from the public administration.”

R.P.

4.5.3 Institutional and organizational barriers

These categories of barriers were the most cited by the interviews, whether the issues were related to public administration or to collective decision making. The finding is in line with what Heiskanen et al. (2012) have concluded in their report on various European countries, where this
has been seen as one of the major barrier for up taking EER. These issues arose especially in relation to works that should be done in the common areas. Besides the financial issues discussed above, what was also mentioned related to common decisions was lack of cohesion, lack of interest or initiative:

“We have difficulties on agreeing on what should be done in the common areas. We have been discussing for several years now, because the windows need to be replaced, they are not insulating, they are old. We have tried to talk to the neighbours, to start these repairs which are absolutely necessary. Well, people are not interested.”

L.T.

“You can see that there is nothing done in the common areas. Two – three families want to do something and the rest doesn’t. Others said that even if we do some works, they will not last anyway. If you have this attitude, then you will never get anything done. People complain we are paying too much for electricity and heating for the common areas, but they also don’t want to do anything about it.”

A.P.

Surprisingly, some of the respondents mentioned that having many pensioners in their homeowners’ association acted as a positive factor in the process of collective decision making, with communities being more cohesive and enterprising related to EER works. This can be explained by how everyday life issues are prioritized by different age groups. But the views were different on this subject:

“We have started these works very early because there were a lot of retired people in our building and they were the first to take interest in this. We never had any problems in this concern.”

F.A.

“In the building next door they already did the renovation, although there are a lot of pensioners there, they were more cohesive and had more initiative.”

A.P.

“It is difficult to reach a common decision, since there are pensioners in the building or people with children. You have to think very well what you are able to do.”

M.V.

The excessive bureaucratic procedures, the lack of interest or professional knowledge in the public administration or even corruption were topics that reoccurred in many of the interviews. In general, people showed a lack of trust in the public funding opportunities for EER and in the authorities and preferred to carry the works by themselves, even if they initially had the intention to apply for the national retrofitting programmes:
“Everything got delayed for 3 years already. The project was approved by the national agency, but the people at the City hall don’t know what to do. They sent some papers and we couldn’t make anything out of them. Maybe the civil servants that need to put the project in practice are confused, not well informed or they lack interest. They are not sufficiently trained to handle this. I think this is one aspect that has been overlooked.”

M.O.

“Yes, it is very complicated. You need an approved project, you need a lot of papers and what is worse is that the project must be approved by the Local Council. It is a political decision. So if you know one, two councilors you building might also get into the programme. […] We tried, but we did not know anyone. Then I went to the urban planning department and someone from there told us that we live in a rich neighbourhood, so chances to access public funding are slim.”

M.V.

One participant pointed out a surprising thing related to the costs of works, when doing the retrofit through a public funding scheme:

“In theory, the contribution of the homeowner should be between 10 and 20% of the total costs of works. But even this amount was higher than if I just paid the costs of the whole works and do them independently.”

I.F.

This, of course, can also be related to the quality of works and materials used and to the technical solutions involved. Nevertheless, the homeowners were mostly reluctant to participate in public EER programmes. There was one exception, a respondent that owned a second apartment and was retrofitted through the national programme. And although, she acknowledged the bureaucracy and the excessive length of the procedures, she declared herself satisfied with the works:

“After what I know, approving the project took 2 years. […] I installed my windows, not the ones from the City hall, because I was not pleased with their quality. […]I am pretty pleased with the project, they did a lot of works in the common areas as well and everything turned out nicely.”

B.F.

The previous sections provided an overview on the main motivation and barriers that the interviewed homeowners in Deva highlighted as to influencing their decisions related to EER. Table 9 presents all these factors and their perceived strength.
Table 9. Overview of motivations and barriers for homeowners in Deva *(the darker colour represents the strongest factors)*

<table>
<thead>
<tr>
<th>MOTIVATION THEME</th>
<th>MOTIVATION FACTOR</th>
<th>STRENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ECONOMIC</td>
<td>• Reducing costs of energy bills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Availability of public grants, subsidies</td>
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<td></td>
<td>• Increasing the property value</td>
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<tr>
<td></td>
<td>• Initial cost of works</td>
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<tr>
<td>• ENVIRONMENTAL</td>
<td>• Reducing resources consumption</td>
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<tr>
<td></td>
<td>• Environmental protection</td>
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<td></td>
<td>• Reducing CO₂ emissions</td>
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<td></td>
<td>• Climate change</td>
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<tr>
<td>• SOCIAL AND TECHNICAL</td>
<td>• Improving comfort</td>
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<td></td>
<td>• Making a home</td>
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<td></td>
<td>• Social norms and believes</td>
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<td></td>
<td>• The physical condition of the building</td>
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<td></td>
<td>• Aesthetic values</td>
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<table>
<thead>
<tr>
<th>BARRIER THEME</th>
<th>BARRIER FACTOR</th>
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<tr>
<td>• ECONOMIC OR FINANCIAL BARRIERS</td>
<td>• High initial costs of work</td>
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<tr>
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<td>• Financial constraints</td>
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<td></td>
<td>• Aversion to debt</td>
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<td>• Uncertainty related to cost-benefit</td>
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<td>• Long payback time</td>
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<tr>
<td>• INFORMATION AND ADVICE RELATED BARRIERS</td>
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<td></td>
<td>• Lack of reliable advice</td>
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<td>• Missing or conflicting information</td>
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<td></td>
<td>• Uncertainty/ contractor risk</td>
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<tr>
<td>• INSTITUTIONAL AND ORGANISATIONAL BARRIERS</td>
<td>• Collective decision making</td>
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<td>• Long red tape procedures</td>
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<td></td>
<td>• Bureaucracy</td>
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<td>• Corruption</td>
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*Source: Author’s own*
4.6 Addressing the energy efficiency gap through policy measures

The energy efficiency gap can be addressed by improving the policy instruments that stimulate EER investments. Understanding the current situation through the homeowners’ past experience with EER works can provide a valuable framework for assessing the efficiency and effectiveness of the current policy instruments.

Although the EU directives regarding energy efficiency have been quickly transposed in the national legislation and Romania has in place a comprehensive renovation strategy that complies with the European requirements (BPIE, 2014b), the results in practice have been disappointing. This is mainly due to the misalignment between the EER policy instruments and the market power and needs.

The available financial instruments might address the economic barriers related to the high initial costs and financial constraints. Nevertheless, the government guaranteed loans scheme introduced in 2010 stipulated a short reimbursement period, which has been proven to be unrealistic, as the monthly instalments amounted to too high sums which could not be afforded by homeowners. Thus the rate of up taking this sort of loans was low. This was also backed up by people’s aversion to taking up loans (BPIE, 2012). As the interviews showed, people preferred to spread works across a longer period of time and use their own available financial means, than relying on bank financing. Thus, in order to have positive results, this type of instrument still requires alignment between its provisions, the market’s economic power and the capability of lending banks. The National Thermo-Renovation Programme which now also allows accessing ERDF funding has been used for renovating existing buildings built between 1950 and 1990. At the moment, there are several buildings that are renovated in Deva through this programme, but critics pointed out that the generous grant offered (homeowners must contribute with 10 - 20 % for the entire works costs) does not offer a long term solution (BPIE, 2013). Thus, a more commercially oriented policy instrument should be sought for the future, in order to avoid lock-in.

Moreover, one of the barriers identified by homeowners, when elicited to talk about their knowledge related to available financial instruments was the lack of transparency and available information on this type of instruments. Some of them mentioned a combination of various hindering factors, related to both lack of information and civil servants’ lack of interest. In order to be effective, homeowners must be aware of these instruments, of their provisions, advantages and disadvantages. Therefore, all other types of instruments should be accompanied by information and awareness campaigns, because as shown above, the Romanian EER policy set does not include at the moment any information and communication instrument. These can take
the form of public campaigns or open homes events that could stress the economic, environmental and social benefits of increasing the energy performance of buildings. Since reducing energy bills is one of the homeowners’ main motivations, the information available should stress more the economic benefits that energy related improvements might bring about, based on clearer cost-benefit analysis. Furthermore, capacity building at the national and especially local level should be a top priority for policy makers in the field of EER. Since the administrative barriers were the most conspicuous during the interviews. Increasing knowledge in the public administration and reducing bureaucratic burden should be addressed urgently. As shown in other studies (Heiskanen et al., 2012), the setting up of a “one-stop-shop” for acquiring information and for dealing with the administrative procedure might be a possible solution.

At this moment, the building codes that stipulate energy efficiency standards for renovations work do not include minimum requirements for the energy performance of the whole building, instead they provide minimum requirements for each element of the building’s envelope. Although the requirements are stringent, this approach might lead to adopting technically inadequate solutions that would eventually not ensure a proper energy performance level of the building. Nevertheless, since most of the homeowners prefer and choose to do various EER works in different stages due to lack of financial means, this approach provides an appropriate solution. Still, in the same context, some reports suggested that a tightening of the minimum energy performance standards should be kept in mind (EEW, 2013).

The Energy Performance Certificates are expected to be an effective tool for improving the energy efficiency of the existing building stock. Since 2007, Romania has introduced the coerciveness of EPC for commercial transactions (rentals, selling/ buying of apartments or buildings). They should provide accurate information of the energy performance of the apartments or building, making owners or buyers more conscious of their property characteristics. Moreover, since a property with a better energy performance should theoretically have a bigger market value, homeowners should be more motivated to invest in EER works. Yet, since the real estate market has been slow in the recent years and the interviewed homeowners expressed little interest in selling their apartments after performing the energy efficiency improvements, this assumption has not been confirmed. Furthermore, these hypothesis have not yet been tested in practice and like in the case of public funding opportunities, homeowners are not aware of this instruments existence or content. Moreover, since the EPC provides solely technical information related to the building, without including any financial data, such as estimated spending on energy, consumers might not be influenced by it in their decision to renovate.
The weak environmental motivation that was observed during the interviews might be also explained by the lack of information and communication EER instruments. Although improving the energy performance of the existing building stock is high on the political agenda, just as in other CEE transition countries’ case, knowledge and awareness regarding the environmental benefits of energy efficiency improvements has not gain popularity among homeowners, although they expressed interest in such topics.

In conclusion, although there are several EER related policy instruments in place in Romania, their effectiveness has been questioned and there is little evidence that, at this moment, they are really addressing the market and behavioural failures that act as barriers for the acceleration of the EER investments rates. In order to achieve the energy and CO₂ emissions reduction targets, Romania should set up a more coherent roadmap. Since most of the decisions related to EER are in the hands of the homeowners, policy formulation should be more sensible to their motivations and to the potential barriers that need to be overcome.
5. CONCLUSIONS AND RECOMMENDATIONS

This last chapter discusses the main findings in relation to the research questions, it gives some overall conclusions and provides some recommendation for the possible acceleration of the EER uptake in Romania. It also discusses possible future research directions.

5.1 Summary of the main findings and conclusions

In order to reach the targets set by the EU related to reducing energy use and CO₂ emissions in the building sector, in general, and in the multi-family housing sector, in particular, various improvements to the energy efficiency policy framework should be performed. Understanding the EER process from the homeowners’ perspective, in a bottom-up manner, has been proven to provide valuable insights for experts and policy makers in the EER field. By adopting this approach, this thesis has sought to scrutinize the homeowners’ motivations and the barriers that they encountered while deciding upon and performing energy retrofits and to use these insights for understanding the efficiency of the current policy instruments in place in Romania. The main findings in relation to the research questions of this study are presented below.

Q1. What is the legislation context and which are the main policy instruments currently in place at national and local level in Romania that are related to the EER of multi-family buildings?

At the moment, in Romania, the EER related legislative context is mainly set by the transposition of the European Union directives at the national level. The three main directives that stipulate provisions related to the energy retrofit of multi-family buildings are Directive 2012/27/EU on energy efficiency (Energy Efficiency Directive - EED), Directive 2009/28/EU on the promotion of the use of energy from renewable sources (The Renewable Energy Directive – RED) and Directive 2010/31/EU on the energy performance of buildings (EPBD). In order to accelerate and support investments in domestic EER, the authorities are employing a set of instruments which are mainly legislative normative or legislative informative and financial. Education and information related instruments are not covered by any measure. Although Romania has set in place its National Energy Efficiency Action Plan, this has been criticised to be lacking commitment and coherence. Moreover, at the local level, there is a lack of public initiative and commitment and the only undertook actions were generated by the amendment of the National Plan to include financial support from ERDF.
Q2. What are the main motivations of homeowners to carry out EER?

One of the main aims of this study has been to understand what drives or hinders the EER process from the homeowners’ perspective, in order to formulate policy recommendations. The findings of the second and third research questions were derived from the interviews conducted with homeowners from Deva, Romania, which was used as a case study.

The findings related to the motivation factors that drive homeowners to perform energy related works to their apartments show that the economic and the social – technical factors have the most impact on their decisions. Reducing the energy bills, but also the physical state and position of the building and of the apartment itself have the most bearing in deciding to invest in EER measures. Improving the comfort of their home and achieving better living conditions and a better image or status in the community are also strong motivations, according to the interview participants. Environmental concerns are hardly a driver for the EER decision making process, although people show interest in environment related knowledge and feel that the public authorities should have provide more support in acquiring this sort of information.

Q3. What are the main barriers identified by the homeowners while deciding upon and carrying out energy efficiency improvements to their home?

The barriers that are frequently identified by homeowners are related to economic and financial issues, but also to administration and organisational matter. One of the main hindering factors in multi-family buildings remains the difficulty in reaching collective decisions related to EER. This relates back to the economic barriers, as in most cases, this sort of buildings present a mix of people from various backgrounds and with various levels of income. Many times, this situation leads to the adoption of economically inefficient and not aesthetical solutions, with exterior works performed only partially. The initial cost of works is a strong barrier and most of the homeowners performed the EER works in different stages, across several years. Findings also suggest that mistrust in public administration is a major hindering factor, with respondents mentioning too long administrative procedures, high bureaucracy, corruption and lack of knowledge as governing their relations with public authorities. This, of course, is a reoccurring topic in studies across transition countries from CEE, whether they are related to EER or to various other topics. Although homeowners are pleased with the results of the performed works and the support, advice and information they received from construction experts, there is little control over the actual technical quality of works. Findings also suggest that the homeowners’
own informal network of acquaintances is often more valuable in gathering information and advice than the official channels.

**Q4. Which policy instruments are the most effective in supporting home owners to retrofit their home, and which improvements to the current policy framework in Romania should be considered in order to accelerate the uptake of energy efficiency measures?**

At the moment, the EER process in Romania is supported by several policy instruments, but their effectiveness in practice has yet to be proven. If Romania is to reach the set energy and CO₂ emissions reductions targets from the building sector, the policy framework needs to be improved and be more focused on homeowners’ needs and encountered barriers.

In order to stimulate homeowners in up taking EER measures, one potential direction is to increase the information and awareness level, stressing the social, economic and environmental co-benefits of improving the energy performance of buildings. At the moment, the focus is set on normative and financial measures that can temporarily support investments in EER, but do not provide a clear future roadmap. Building capacity in the public administration at both the national and the local level can address the administrative barriers that were identified as strong hindering factors by most of the interviewed homeowners. Reducing the bureaucracy and the length of the red-tape procedures can be supported by setting up local “one-stop-shops”, where people can acquire technical, financial and administrative information pertaining to EER.

**5.2 Recommendations for policy makers and for future research**

In addition to the guidelines for future policy improvement formulated in sub-chapter 4.6, this section will provide more general and conceptual recommendations. By analyzing the homeowners’ perspective on EER related issues and energy practices and the existing policy instruments that attempt to encourage and accelerate investments in EER, it appears that there is a disjunction between policy intentions and what happens in practice. Thus, in order to address the energy efficiency gap, a policy shift in how EER is conceptualized is required. By putting the policy instruments in the light of the findings from the interviews conducted with homeowners, it has become apparent that there is a need for an alignment between policy makers strategies and homeowners practices, adopting a more user - centered approach. This calls for a more flexible approach, with the possibility to adapt to specific contextual factors, focusing more on homeowners’ social practices. This direction of development has already been suggested by other authors (Gram – Hansen, 2010; Bartiaux et al., 2014). In general, more coordinated actions
should be undertaken between different government levels, but also between different actors involved in the EER.

Although the first steps have been made in solving the statistical data scarcity related to both the state of the existing building stock and to the energy retrofits that have already been performed, setting up a comprehensive database on these matters is also a future development that can support appropriate policy interventions. At the moment, since many works have been performed by homeowners, by their own will and with their own financial means, there is no clear picture on possible feasible technical solutions and on the savings obtained by adopting different measures. Independent post renovation monitoring should be considered as an important tool that can inform future decisions.

As pointed out also in Chapter 3, one of the limitations of this study stems from the limited number of respondents, due to time and financial constraints. Therefore, in order to ensure the generalizability of the findings, future studies should target a larger sample of homeowners in Deva and in other locations across Romania, as some of the findings might be context specific, related to the size of the town or city, its public administration capacity and so on. Thus, a comparative analysis of different locations could provide valuable insights on what triggers or hinders the EER process. Furthermore, since this study relied mostly on a qualitative approach, further qualitative research can be conducted. This can help identifying other indicators that have a bearing on EER investments.

As the energy efficiency is a multi-actor, multi-level field, which includes stakeholders from different levels of government, market and private actors and since the focus of this study has been to understand the homeowners’ perspective on EER, further research can investigate the interactions between these various actors in Deva or in general in the Romanian context. Since improving the energy performance of the existing building stock is high on the European political agenda, but studies in the Romanian context are still scarce, research funding opportunities should also be sought.
6. REFERENCES


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INTRODUCTION

Dear Madam/ Sir

My name is Ruxandra Aelenei and I am now writing my master thesis as part of the Erasmus Mundus Master programme – Planet Europe. The aim of this study is to explore the energy efficiency retrofits (EER) developments within owners occupied multi-family housing estates, by investigating the factors that influenced the homeowners’ decisions to retrofit. The study focuses on the experiences and the decision making processes of homeowners who have successfully carried out EER, by their own initiative, in order to evaluate the efficacy of the policy instruments in place. Your participation, as stated also in the consent form, is voluntary and you may withdraw at any stage or you may choose not to answer questions that you are not comfortable with. Your identity will remain strictly confidential and the responses to the questions will be used exclusively used for academic purposes.

This interview will be organized in four sections. While the first two sections will require you to choose and tick the answer you believe best suits your situation, the following two will contain open questions to which I will invite you to answer freely, based on your experience and knowledge. Please bear in mind that there are no right or wrong answers to these questions. The purpose of this study is to get as accurate a picture as possible of how homeowners experienced energy efficiency retrofits works made to their homes, focusing on the motivations and barriers. Your answers will be recorded, transcribed and then analysed together with the responses of other participants to this study. I expect this interview to last maximum 45 minutes.

Thank you for your most valuable participation!

Name of participant:
Place and date of the interview:
### SECTION 1. HOUSEHOLDER BACKGROUND

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Please state your gender</td>
<td>Female, Male</td>
</tr>
<tr>
<td>Q2. Please state your age group</td>
<td>18-24, 25-34, 35-44, 45-54, 55-64, 65+</td>
</tr>
<tr>
<td>Q3. How many adults usually live in your household, including you?</td>
<td>1, 2, 3, 4, 5+</td>
</tr>
<tr>
<td>Q4. How many children under 16 usually live in your household?</td>
<td>1, 2, 3, 4, 5+</td>
</tr>
<tr>
<td>Q5. Which of the following best describes your current work position?</td>
<td>Full time paid work, Part-time paid work, Independent activities, Retired, In full time higher education, Unemployed (seeking work)</td>
</tr>
<tr>
<td>Q6. What is the highest education qualification obtained?</td>
<td>Primary school, Secondary school, High school, University</td>
</tr>
<tr>
<td>Q7. What was your overall HOUSEHOLD income from all sources in the last year (before tax)? This includes earnings from employment or self-employment, income from benefits and pensions, and income from other sources such as interest and savings.</td>
<td>Less than de 4500 LEI, 4500-9000 LEI, 9000-15000 LEI, 15000-20000 LEI, 200000+ LEI</td>
</tr>
<tr>
<td>Q8. If there is anything else you would like to tell us about yourself or your household, please use the box at the right</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 2. DETAILS ABOUT YOUR HOME

Q 9. How many years have you been living in this home?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td></td>
</tr>
<tr>
<td>1 - 5 years</td>
<td></td>
</tr>
<tr>
<td>5 – 10 years</td>
<td></td>
</tr>
<tr>
<td>10 – 20 years</td>
<td></td>
</tr>
<tr>
<td>More than 20 years</td>
<td></td>
</tr>
</tbody>
</table>

Q 10. When was your home built?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 1919</td>
<td></td>
</tr>
<tr>
<td>1919 - 1944</td>
<td></td>
</tr>
<tr>
<td>1944 - 1964</td>
<td></td>
</tr>
<tr>
<td>1965 - 1980</td>
<td></td>
</tr>
<tr>
<td>1980 - 1990</td>
<td></td>
</tr>
<tr>
<td>After 1990</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
</tr>
</tbody>
</table>

Q 11. How many bedrooms does your home have (including bedrooms used for other purposes, e.g. home office)?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4+</td>
<td></td>
</tr>
</tbody>
</table>

Q 12. What is the floor area of your home?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50 sqm</td>
<td></td>
</tr>
<tr>
<td>50 – 69 sqm</td>
<td></td>
</tr>
<tr>
<td>70 – 89 sqm</td>
<td></td>
</tr>
<tr>
<td>90 – 109 sqm</td>
<td></td>
</tr>
<tr>
<td>More than 110 sqm</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
</tr>
</tbody>
</table>

Q 13. For how long into the future do you think you will live in this home?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td></td>
</tr>
<tr>
<td>1 – 5 years</td>
<td></td>
</tr>
<tr>
<td>5 – 10 years</td>
<td></td>
</tr>
<tr>
<td>10 – 20 years</td>
<td></td>
</tr>
<tr>
<td>More than 20 years</td>
<td></td>
</tr>
<tr>
<td>No plans to ever move</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 3. THE ENERGY EFFICIENCY RETROFITTING WORKS. MOTIVATIONS AND BARRIERS (start recording)

Q 14. What renovations works have you generally performed in your apartment? Please mention them and give some details about them.

Q 15. Which ones of these works were specifically related to energy efficiency retrofitting?

Q 16. What did you wanted to achieve by these works? Were you aware of any specific benefits that these works might bring (economic, social, environmental)?

Q 17. How did you decide about doing these works? What prompted you in undertaking these works?

Q 18. What motivated you in doing these particular specific works (financial issues, previous experiences, previous knowledge, environmental concerns, etc.)?

Q 19. Did you encounter any difficulties in seeking to improve energy performance (financial, administrative, technical)? How were these resolved? When were these difficulties encountered, while:
• You were deciding on doing the works
• Planning the works
• Undertaking the works?

Q 20. How long ago were works completed? Have there been any issues or problems since?
Q 21. Are you happy with the works done? Would you do anything different now?

SECTION 4. KNOWLEDGE ABOUT ENERGY EFFICIENCY RETROFITTING
Q 22. Did you seek for advice from specialists/professionals/acquaintances or from any specific places or sources? If so, was this done while:
• You were deciding on doing the works
• Planning the works
• Undertaking the works?

Q 23. Where did you get your information from? Was it useful? Did you receive contradictory information?
Q 24. Do you know about any incentives, subsidies or any other instruments (national or local ones) for energy efficiency retrofits projects?
• What is your opinion about such instruments?
• Did you benefit from any?
• What was your experience with it?

Q 25. Are you aware of the European and national legislation related to energy efficiency retrofitting the domestic built environment? If yes, did this influence your decisions in any way?
Q 26. Is there anything more you would like to add that might be relevant to the topic discussed?
Appendix 2 – HOMEOWNERS’ CONSENT FORM

TITLE OF THE STUDY: ENERGY RETROFITTING THE DOMESTIC BUILT ENVIRONMENT. A HOMEOWNERS’ PERSPECTIVE – A CASE STUDY OF DEVA, ROMANIA

You have been asked to participate in this research study conducted by RUXANDRA AELENEI, master student of the Eramus Mundus Master Programme – PLANET EUROPE. The purpose of the study is to better understand the energy efficiency retrofits (EER) developments within owners occupied multi-family housing estates, by investigating the factors that influence the homeowners’ decisions to retrofit, through a Romanian case study. The results of this study will be part of the master thesis. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

• This interview is voluntary. You have the right not to answer any question, and to stop the interview at any time or for any reason. I expect that the interview will take about 45 minutes.

• Unless you give me permission to use your name, title, and/or quote you in any publications that may result from this research, the information you tell us will be confidential.

• I would like to record this interview so that I can use it for reference while proceeding with this study. I will not record this interview without your permission. If you do grant permission for this conversation to be recorded, you have the right to revoke recording permission and/or end the interview at any time.

This project will be completed by June 15, 2015.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Please check all that apply:

[ ] I give permission for this interview to be recorded.

[ ] I give permission for the following information to be included in publications resulting from this study:

[ ] my name  [ ] my title  [ ] direct quotes from this interview

Name of Participant

Signature of Participant _______________________________ Date ____________

Signature of Researcher __________________________ Date ____________

Please contact Ruxandra Aelenei (tel: +40729835760, ruxandraaelenei@gmail.com) with any questions or concerns.