

Energy renovations of EU multifamily buildings: do current policies target the real problems?

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Keywords

building refurbishment, actors, policy-mix, market transformation, investment, residential buildings, condominiums, social dynamics

Abstract

Our paper focuses on decision making on energy investments in owner-occupied multifamily housing (condominiums) in Europe. Condominium-type ownership is the dominant form of ownership of apartment buildings in most New Member States. It is also dominant in Southern Europe and widespread in other countries (Austria, Finland). We build on work done in the IEE project ENTRANZE (www.entranze.eu), which develops policy recommendations for increasing the number of nearly-zero energy renovations. Our data include a comprehensive review of the structures of decision making in nine European countries, expert interviews, and detailed analysis of the drivers and barriers of energy investments. We highlight similarities among countries, along with significant differences. These differences are further explored via 3 country studies on the legal, institutional, financial and social aspects of energy investments in condominiums. Finally, we assess the overall relevance of these barriers in selected EU Member States by combining the investigation of barriers with quantitative data on the structure of the building stock, the share of condominiums and related governance structures in different countries.

Introduction

Deep energy renovations of existing buildings are seen as an important way for Europe to reach its 20-20-20 goals. Especially large buildings, such as multifamily apartment buildings, are

very promising from a technical perspective. However, a large share of these buildings are owned by the residents, and they are usually in a poorer condition than professionally owned rental buildings (Itard et al. 2008).

One important aspect of policy design is to understand the perspectives of both the building owners and institutional investors in order to put in place the most appropriate economic instruments able to catalyse the market, to foster its transformation and to finally meet the long term climate and energy goals. On one hand, this is critical because most of the energy investments in buildings will be made with the building owners' money. On other hand, governments can support and stimulate such decisions with grants, but public funds can only cover a small part of the necessary investment. Other measures may be relevant and even more necessary. Many of these relate to how decisions are made.

There are decades of evidence indicating that cost-effectiveness (from an engineering economics perspective) rarely determines investments in energy efficiency (Golove and Eto 1996). Many of the reasons for the "energy efficiency gap" relate to decision making in one way or another (Geller and Attali 2005): to the bounded rationality of building owners, to organisational problems/transaction costs or to imperfectly functioning markets.

When considering decisions to invest in energy efficiency, it is important to recognize that such decisions are not separate from other decisions concerning the building and its users. In contrast, energy investment decisions are embedded in existing structures of decision making, information use and institutional and social norms concerning building maintenance and renovation as well as who is making the decision. Moreover,

they are part of the overall financial, legal and infrastructural context of the building owners and users.

The difficulties of owner-occupants in reaching collective decision is a problem that has until now gained insufficient attention in discussions on energy efficiency in existing buildings, and the current paper aims to address this gap. Decision making is relatively simple if there is one owner per building, but it is more complex if owners are dependent on each other to reach a decision on renovating the building. Therefore, we focus on decision making on energy investments in owner-occupied multifamily housing (condominiums) in Europe. These building types have not been studied much and therefore this paper delivers valuable new insights for decision making and supporting the energy efficiency improvements of this large building stock. We build on work done in the IEE project EN-TRANZE (www.entranze.eu).

In this paper, we first present the structure of condominium ownership in Europe and its relevance for decision making on energy investments. Then we explain the data and methods used for this study. We then focus on decision structures and barriers to investments in the nine European countries and open these issues further in case of Austria, Finland and Romania. Finally, we present some conclusions on whether present policies target the real problems.

Condominium ownership and its relevance for decision making on energy investments

Condominium ownership refers to the collective ownership-occupancy of multi-apartment buildings. It is a dominant feature in some European countries (Lujanen 2010) and is traditional in Southern Europe, Bulgaria and Finland, and has become the norm in many (but not all) post-communist new member states. Moreover, the share of owner-occupied apartment buildings is growing in some other countries due to the privatization of the social housing stock (Tsenkova et al. 2009).

Condominium owners are the main decision makers in the case of energy renovations. They can be supported or hindered in this by other parties, such as house managers or administrators in charge of daily management of the building, external experts such as municipal officials, energy advisors or consultants. They are usually represented by an elected board or chairperson, who prepares decisions (often with the help of the house administrator). However, the ultimate decision and financial responsibility for the investment – and indeed the overall maintenance of the building – lies with the owners themselves. Hence, in the case of owner-occupied multifamily buildings, lay people are ultimately responsible for a very large and complex technical system with a very long lifespan.

The generally low rates of renovation in Europe, and the generally low level of energy improvement accomplished in renovations that are made (BPIE 2011) suggest that condominium owners are not always up to these responsibilities. The problems encountered by condominium owners can be initially approached through the existing literature, which has documented a wide range of barriers to energy efficiency investment (Golove and Eto 1996). The concept of “barriers” builds on the idea of an *energy efficiency gap* (Jaffe and Stevens 1994), whereby investment in energy efficiency is consistently lower than it should be when defined by various technological

or social optimums. There has recently been much criticism of the concept of “barriers” (Guy and Shove 2000, Bartiaux 2009), yet the concept has become conventional and reflects real problems in society, and thus we use it here to depict obstacles to energy renovations encountered by individuals, groups and societies. We broadly follow here a categorization used by Uihlein and Eder (2009), and divide barriers into (1) genuine uncertainties regarding cost-effectiveness, (2) financial barriers, (3) organisational problems, (4) lack of information and skills, (5) transaction costs and (6) other barriers that may be context-dependent.

Genuine uncertainties regarding cost-effectiveness refer to the fact that even though cost-effective solutions can be identified in aggregate and in specific individual cases (de T'Serclaes 2007; Eichhammer et al. 2009), it is not self-evident that the benefits materialize for every type of investment decision (Golove and Eto 1996; Uihlein and Eder 2009). There is often conflicting information on the costs and benefits of energy efficient or renewable energy solutions in buildings. Competition between marketing claims for different solutions can lead to mistrust of information, as can unsuccessful experiences from early experimental applications of solutions (Golove and Eto 1996). “Heterogeneous outcomes” refers to the fact that average savings in energy use may not materialize for individual apartment owners, depending on e.g. building characteristics or usage patterns (Uihlein and Eder 2009). Savings may also depend on interest rates and energy prices, which are difficult to predict. Finally, there may be uncertainties concerning measurement and verification of energy savings, which can be a concern particularly for external financiers of energy efficiency investments.

Financial barriers are widely discussed in the literature. There is significant evidence suggesting that the high initial costs of energy efficiency investments are an overwhelming barrier for many individual homeowners, even for measures that are cost-effective in the long term (IEA 2008; Uihlein and Eder 2009). Moreover, private owners use simple “rule of thumb” measures of cost-effectiveness, such as (relatively short) payback periods. Some building owners may have limited access to capital or a high cost of capital (e.g. because of low collateral values, low expected incomes or previous debt defaults), or they may be unwilling to incur debt due to personal or balance sheet-related reasons. Low or uncertain resale value of the property may also be a barrier to energy renovations in several ways: it may influence the value of the property as collateral for a loan and it also has a direct impact on building owners that anticipate selling their property in the near future. In general, it has been argued that investments in energy efficiency cannot be compared with investments in e.g. financial securities, because the former *usually* have much lower liquidity (Golove and Eto 1996).

Organisational problems serve here as an overall heading for principal-agent issues (de T'Serclaes and Jollands 2007) and problems of decision making on commonly held property. The “landlord–tenant dilemma” is one of the most widely discussed problems of “split incentives” (Sorrell et al. 2004), i.e., tenants would benefit from lower energy costs but landlords make the decisions on investments. On the other hand, as noted above, there are also collective decision problems related to multi-owner housing (Lujanen 2010). This has more relevance in

a case where the building has a mixture of occupants: partly owner-occupants and partly tenants. In these mixed buildings, the organisational problems may gain even more significance. Also a short decision time-frame can be classified an organisational problem, as in this case, the owner might not make the best decision for the building, even though they might make decisions that suit their personal circumstances. For example, elderly people are often not eager to engage in renovations, and the same problem may concern tenants or owners who expect to move soon.

Lack of information and skills constitutes a set of commonly acknowledged barriers. Energy issues are usually not a top priority on apartment owners' and users' agendas; hence, there may be limited customer attention and interest (Golove and Eto 1996; Uihlein and Eder 2009). Apartment owners might not monitor their energy consumption or costs, and might be unwilling to make the effort to learn about renovation options. If they surmount this barrier, there may be a lack of experts and resources or they may find it difficult to understand and process the available information. In addition to the cost of obtaining information, there is also a cost to using information. Thus, apartment owners are usually "boundedly rational", i.e., they try to be rational, but in fact usually follow simple 'rules of thumb' (March and Simon 1958). Because of this, unsophisticated calculation rules (such as short simple payback periods) are often used instead of more sophisticated financial analyses. People may also simplify decision by only considering commonly used solutions (Wittman et al. 2006).

Transaction costs (or "hidden costs") relate to the costs of information and the costs of monitoring and controlling economic exchanges (such as contracted renovation work). Typical examples include the lack of (or difficulty of identifying) skilled service providers (Uihlein and Eder 2009). Searching for the right information (and often employing external experts) to identify the best solution for each individual situation might be prohibitively expensive, especially at a point when outcomes are still uncertain. Moreover, there are switching costs involved in any change. Renovations usually imply some level of disruption and need for relocation and can cause a stressful (and sometimes also expensive) disruption of everyday routines (especially for elderly or disabled people). Furthermore, there are risks in switching to a new solution. Even though there are risks in the *status quo* as well, these are usually not valued to the same extent (Thompson 1997; Tversky and Kahnemann 1979). Even in cases where risks of failure of the renovation are improbable *in aggregate*, they are real for the apartment owners and users: individuals have no way of knowing whether their particular renovation is the one that fails.

As seen in the discussion above, it is difficult to maintain a sharp distinction between various categories of barriers, as they overlap and are often mutually reinforcing. There are genuine risks and uncertainties, but these are often compounded by the apartment owners' higher valuation of the risks of new solutions than the risks of the *status quo*, and further aggravated by the fragmented and underdeveloped market for energy renovations and the related financial services. There are also genuine limits to rational decision making due to the cost of obtaining and using information; because this is the case, many apartment owners use simple heuristics, postpone decisions, or follow the example of others. The overall operating environment

in many European countries – in spite of significant advances in recent years – is not yet very supportive of energy efficiency investments. For example, the decades-long tradition of expecting short payback times from energy investments is not a feature of individual decision-making but a rule that is learned and reproduced in society as a legacy from former times when real energy prices were falling.

It is unrealistic to expect condominium owners to structure problems and make decisions in exactly the same way as energy engineers, however much support and information they might gain. Other factors than energy, which is merely a service and a cost factor, are likely to have a greater weight in decisions on renovations. Moreover, the apartment owners' and users' perspective is fundamentally different from that of the energy engineer (Parnell and Popovics-Larsen 2005). However, even boundedly rational individuals can make decisions on energy renovations when supported by their environment. Alongside the barriers to energy renovations, there are also drivers.

Several studies have investigated drivers for energy renovations. These are here defined as factors stimulating or encouraging apartment owners to make energy renovations (Huber et al. 2011; Thomsen et al. 2009; Nair et al. 2010; Stiess et al. 2009), such as concerns over rising energy costs, environmental concerns, the desire to improve comfort, or particular opportunities to make energy efficiency investments. Drivers also include public policy measures that make energy renovations more popular in society (Cadima 2009).

Policy instruments have sought to overcome barriers and support drivers for renovations in Europe. In particular, the availability of grants for energy renovations or investments is mentioned in several studies as an important stimulus for energy investments (Huber et al. 2011). In some countries, grants are generous enough to make the investments more profitable, but there are studies indicating that grants can make an impact that is larger than their actual financial significance (Aalbers et al. 2009): Grant schemes can also influence the timing of investments and communicate to apartment owners the priorities of society. Similar impacts are expected from energy performance certificates (EPCs), which are intended to make the energy costs visible to new renters and purchasers of apartments, but can also due to their overall visibility increase awareness and discussion on energy issues. Many studies also mention the crucial role of public local advisory agencies or advice events as central stimuli for energy renovation decisions (Jager 2006; Cadima 2009; Stiess 2009).

However, existing experience suggests that current policies are not sufficient to overcome the problems encountered by building owners. Renovation rates in Europe are estimated to be of the order of about 1 % per year (Itard et al. 2008; BPIE 2011). Hence, a more detailed analysis of the specific problems among particular owner groups is necessary in order to devise more effective policy measures.

Data and methods

This paper builds on work done in the IEE project ENTRANZE. The project's overall objective is to assist policy makers in developing integrated, effective and efficient policy packages in order to encourage a fast and strong penetration of NZEB and renewable heating and cooling (RES-H/C) focusing on the re-

furbishment of existing buildings in line with the EU's EPBD and the RED directives to reach long-term energy savings and CO₂-reductions in the building sector. The project provides data that is of crucial relevance for policy making, for example the structure and typology of users and investors in the building sector and their interests, preference, behaviour, and acceptance of nZEB technologies.

The data for this paper has been gathered stepwise to first identify the knowledge base. The initial judgements of project partners on stakeholders, their key barriers and drivers as well as a literature review indicated that even though much is known, some things have changed quite significantly in recent years in many European countries, so some of the knowledge in the literature may be outdated. Therefore, we executed expert interviews to fill in the most important gaps. For each country considered in this paper, at least three experts have been interviewed to fill in the most important data gaps and to gain the experts' views on most important barriers and decision criteria in their country.

The expert interviews were used to complement the qualitative data offered by the literature review and bring in new information on barriers and investor decision making and to get several opinions on what are the "most important" barriers and decision criteria. The expert interviews offered a great deal of data and specific insight from each country. Hence, we gained more and better viewpoints on owner-occupied multi-apartment buildings in the countries where these are common forms of dwelling and tenure. This forms the basis of our identification of what are deemed the "most important" barriers and decision criteria in each country.

There are, however, some limitations to the study. The expert opinions gained through interviews are often based on a limited set of data or experience (at a certain period in time), and may not hence be completely representative. Also, there were conflicting information in the literature and not even all facts could be confirmed. The results are therefore indicative and would merit more research. We, however, consider that the results represent a more advanced view than the initial state of knowledge (where all potential barriers and all decision criteria are equal). In particular, we have tried to highlight the particularities of the situation of this owner group in different countries, rather than drawing on preconceived theoretical viewpoints or highly general opinion surveys of the whole population.

Condominium ownership in nine countries: decision structures and barriers to investments

There are different rules of majority in decision making in different European countries, as well as differences in the rights and obligations of individual apartment occupant-owners, the housing/condominium association or company and its elected representatives, and housing managers employed to take care of the house (Lujanen 2010). Moreover, rules on quorums and majorities needed to make particular decisions, as well as on the rights and obligations of apartment occupant-owners, can significantly influence the possibilities for energy renovations (Guertler and Smith 2006; Lujanen 2010). Table 1 presents the share of owner-occupied multifamily dwellings in nine European countries, the type of ownership and the required majority for decisions on renovations.

There are basically two models of owner-occupation and joint ownership of a building, the condominium association and the unitary model, and these have different implications for the ease of making decisions about renovations as well as for the ease of financing renovations (Lujanen 2010). The unitary system refers to an undivided apartment building/block of flats, of which owners own shares. Condominium ownership refers to a system where the owners own their dwelling and all owners jointly own the common parts and the land.

As we can see from the table, the condominium ownership model is more often used. This has major implications on the decision making and i.e. on the possibilities of getting a loan for the retrofit that concerns the whole building. This fact has not been much discussed in the policy making. We can see in the table also that the share of owner-occupied multifamily buildings forms the majority of buildings in over the half of the countries in question. This issue thus has major significance in designing policy measures and should be taken much more into consideration than in the current practice of policy making.

There are different majority rules in different countries but also for different issues. The most typical is a majority of more than 50 % of shares. In some countries there are, however, also three quarters majority rules for some investments, like in the Czech Republic or Germany. In Bulgaria the majority is 67 % of area of the building. There are however other factors that influence the renovations. In Austria there are minority rules that force the majority to take also the minority opinion into consideration. In Germany, there is mandatory renovation fund (1 % of value of building) to have funds to do renovations. For a comprehensive energy retrofit, this is however usually too little.

There are also different restrictions or rules in the practice of getting a loan from the bank to finance the energy refurbishment. In Bulgaria there are different possibilities: not all buildings have a homeowners' association. When no homeowners' association is established, each owner needs a separate loan for the renovation. In Czech Republic, France, Germany Romania and Spain banks usually require that all apartment owners mortgage their apartments for the loan. Thus, this is a usual way of financing the renovation. In Finland and Austria, however, the housing company can take out a loan of its own, once the majority of owners have agreed to it.

Table 2¹ displays the critical barriers to energy renovations for owner-occupied apartment buildings according to the research literature and expert interviews. A common barrier in all countries is the collective decision problem. High initial costs and/or long payback times are also widespread barriers. In general, there appear to be more barriers and problems for this owner category, because the collective nature of the decision requires more detailed calculations, and directs more attention to uncertainties and transaction costs. Some problems, however, are not critical barriers in certain countries: according to the literature and expert interviews, access to capital

1. The category owner-occupied multi-family buildings includes also buildings with mixed tenure i.e. buildings where some of the apartments are rented and others are owner-occupied. In these types of buildings, the landlord-tenant dilemma plays also a role even though in merely owner-occupied buildings it is irrelevant.

Table 1. Share of owner-occupancy in multifamily housing and required majorities for decisions and investments.

	Share of owner-occupied of multifamily dwellings %	Type of ownership (based on Lujanen 2010)	Required majority for decisions on renovations, %	Other factors influencing renovations
Austria	23	unitary system	>50% of shares, but minority rules	The minority rules. Mandatory renovation fund usually not big enough. Joint loans possible, but administratively complex.
Bulgaria	90	condominium ownership/ unregulated	>67% (of area)	All buildings do not have a homeowners' association. When no homeowners' association is established, each owner needs a separate loan for the renovation.
Czech Republic	79	condominium ownership	>75% of votes	Banks usually require that all apartment owners mortgage their apartments for the loan.
Germany	24	condominium ownership	>75% of shares	Mandatory renovation fund (1% of value of building). Taking out a loan can require a mortgage by all residents.
Finland	50	housing company, similar to unitary system	>50% of shares	The housing company can take out a loan of its own, once the majority of owners have agreed to it.
France	26	condominium ownership	>50% of shares	Taking out a loan can require a mortgage by all residents.
Italy	65	condominium ownership	>50% of shares (for energy investments)	Dissenters can move to delay the implementation of decisions with significant financial consequences.
Romania	96	condominium ownership	>67%	Taking out a loan can require a mortgage by all residents.
Spain	86	condominium ownership	>50% of shares	Can be less for renewable energy (1/3), but those voting against cannot be charged. Taking out a loan can require a mortgage by all residents.

Source: Heiskanen et al. (2012).

is not considered to be a critical issue in Austria, Finland or Germany, where there are provisions for either reserve funds or collective bank financing.

Barriers to energy investments: data from three country studies (Austria, Finland, Romania)

Below, we examine how the various barriers to renovations interact in three different country contexts: Austria, Finland and Romania. While collective decision problems are the key issue in all of these countries, they are influenced by somewhat different factors and stakeholders. Romania here represents a country where there are problems in the structure of ownership, which relates to the legal basis for owners to make collective decisions. However, these are not the only problems, as the Austrian and Finnish cases below show: even when legal situation is more supportive, there are problems in the awareness and the capacity of owners to find a common interest.

AUSTRIA

Owner-occupied multi-family buildings make up 6 % of the total building stock in terms of floor space. About two thirds of the dwellings in multi-family buildings are situated in buildings that were built after the Second World War (Streicher et al.

2004). The share of home-ownership in Austria has increased constantly for the last 30 years. The introduction of rental dwellings with the 'option to buy' scheme is one of the major developments in Austria, resulting in mixed tenure buildings, which increases difficulties in the management of the building (Bedir & Hasselaar 2008.) Hüttler et al. (2006) have found out that the owner-occupied apartments often are in not such a good shape as comparable rental multi-family buildings, and thermal renovations are made much less frequently. This is mainly due to the difficult decision making processes in the owner-occupied apartments according to the residential property law. In particular, in many cases the non-participation of a relevant share of owners in the owners assembly prevent decisions on renovation measures. Another reason is the difficult role of the property management in the owner assemblies. Mostly, they take the role of both the moderator and the property management which leads to conflicts with the owners and negative culture and atmosphere of decision making processes.

The condominium law regulates how public parts of the building have to be administered by the association of owners. The majority of owners must approve the monthly payments to the maintenance reserve and the raising of a loan for renovation activities in the case that reserves are not sufficient to cover investment costs. Earlier it used to be that for any kind of im-

Table 2. Barriers to investments in nine European countries for owner-occupied multi-family buildings.

		AT	BG	CZ	DE	FI	FR	IT	RO	ES
Genuine uncertainties in cost effectiveness	Conflicting information, mistrust of information									
	Heterogeneous outcomes									
	Uncertainty in measurement & verification									
Financial barriers	High initial costs									
	Long payback time									
	Access to/cost of capital									
	Unwillingness to incur debt									
	Low/uncertain resale value of property									
Organizational problems	Landlord-tenant dilemma									
	Collective decision problems									
	Short timeframe of decisions									
Lack of information & skills	Lack of customer attention and interest									
	Lack of customer knowledge									
	Lack of reliable advice									
Transaction costs	Lack of skilled service providers									
	High information search costs									
	Switching costs, concerns over disruption									
	Risks of failures in renovation									

Source: Heiskanen et al. (2012).

provement measures, i.e. investment that goes beyond the pure maintenance of building a unanimous decision of the owners was necessary. (Streicher et al. 2004.) Now, the decisions to improve or maintain jointly owned property are majority decision but there are still minority rules to take into account also the opinions of the minority (Hüttler et al. 2006). A minority group of owners may object to the decision if disproportionate costs would occur or if the measures are not economically effective. Usually, these objections end up at the court which causes substantial delays and procedural costs. According to one of the interviewed experts, this is the reason why property managements usually try to get a very high support of renovation projects (nearly 100 %). Usually, they object to carry out renovation projects in case of a narrow majority of only slightly above 50 % because they know of the possible high transaction costs that could occur during projects which are not supported by a large majority of the owners.

Subsidy schemes for renovation of old buildings differ depending on the part of country, the building type (apartment, single family house, multi-family building) and kind of renovation (small or total renovation). Mainly measures to improve energy efficiency, heating system or materials used in buildings are subsidised. One major measure is a non-repayable grant of 20 % of eligible refurbishment expenses up to a limit of €5,000: however, this has been used mainly by single-family homeowners.

In contrast, the condominium sector shows only low refurbishment rates (Amann et al. 2012).

Collective decision problems are high in the importance and they have influence in all other barriers. According to one of our expert interviewees, when it comes to decision making, this group acts like companies that cannot make any decisions. The owner-occupants of multi-apartment buildings are like single family home owners and their barriers and motives are similar, but they must act collectively. Thus, the single most important problem is the decision making. The practice has shown that it is not necessarily financial or technical issues that hamper investment processes, but the missing acceptance or disagreement between the occupants. (Hüttler et al 2006.) One solution might be changing the legal basis. As one of our expert interviewee from Austria suggests, there should be legislation that forces owners to engage in energy renovation. Another expert suggested that there should be default values of minimum obligatory creation of reserve funds, depending on the energetic quality of the buildings. The owner assembly should be able to change the level of these reserve funds. However, in case that there is no decision, the default levels should apply. According to this expert's opinion, the process of changing only small elements in the Austrian residential property act is very difficult and requires procedures of several years.

Financial barriers such as high initial costs and long payback times are critical barriers when considering refurbishments in owner-occupied multi-family buildings. Here, the occupants are most likely small families or single persons, and in their case financial questions have high importance. Access to or the cost of capital is a contributory barrier that depends on income or age of the occupant/s. Unwillingness to incur debt is also typical for these kinds of occupants and it also depends on income or age. While the condominium association can take out a collective loan, this involves complex administrative procedures.

Lack of information and skills are also critical barriers to energy refurbishment projects in case of owner-occupied multi-family buildings. Lack of customer attention and interest as well as lack of customer knowledge pose critical barriers to energy efficiency refurbishments, which are reflected e.g. in widespread non-attendance at meetings. One expert mentioned that in many cases, the owners do not really feel responsible for the condominium and almost nobody is aware that the owner association commonly owns the whole building together. This makes it difficult to raise awareness for renovation measures.

Transaction costs and genuine uncertainties regarding cost effectiveness are very critical. High information search costs, concerns over disruption and risks of failures in renovation were also considered as critical barriers by our interviewees, whereas the lack of skilled providers is a most critical barrier according to some of our interviewees. Conflicting information, mistrust of information and heterogeneous outcomes are also critical barriers. For example Hüttler et al (2006) suggest that the residents' trust in the house manager is often limited. Uncertainty concerning measurement and verification of energy saving are also critical barriers in case of owner-occupied multi-family buildings. The uncertainties gain a decisive role when the decision making has to be made collectively.

Recent experience suggests that if residents are well informed and are offered a transparent process design, the chance of realising a sustainable energy refurbishment increases. In Austria, a project in the klima:aktiv program called "Bauen & Sanieren" has been launched, which offers a support for property management institutions and communities of residents. This project is based on the idea that improving the planning, information and decision making processes the acceptance of complete and innovative renovation activities could be increased. The project involves all owners prior to the renovation to plan the realisation of the needed retrofit. In a next step, well-organised and independent information will be delivered to the owners. Then a transparent, step-by-step decision making process is organised and moderated to reach acceptability as high as possible. Finally, the decision will be made upon the individual questions about the whole energy retrofit process, financial questions and the interests of the owners. (Hüttler et al. 2006.) The results of this project suggest that the greatest barriers are not legal or financial, but relate to the structure of decision making.

FINLAND

The Finnish building stock is relatively new. More than 40 % of all buildings in Finland were built after 1980; hence after the relatively stringent energy performance standards intro-

duced after the energy crises (Ministry of Environment 2007). However, a large share of the apartment buildings were built in the 1960s and early 1970s, during a major wave of urbanization. They are now approaching the age for major renovations. This offers an opportunity to introduce major energy improvements, yet there are also significant challenges.

Owner-occupied apartment buildings are owned by housing companies, i.e., the owners own shares giving them the right to a certain dwelling or dwellings in the building. Owners make decisions about the building collectively, in the general assembly, and decisions are prepared and legal responsibility is borne by a board elected by this assembly. The housing company is responsible for the maintenance of building structures and insulation, as well as for heating, electricity and other similar systems. The Housing Companies Act (2010) also requires housing companies to make long-term renovation plans, which is expected to facilitate the financing of major renovations. Operative management is the responsibility of the house manager; these are today usually contracted professional companies.

As concerns policy instruments for energy renovation, there is a grant scheme for energy efficiency improvements and renewable energy in apartment buildings. In 2012, grants were awarded for conducting energy audits, for repair and insulation of the building envelope, for improving the ventilation and heating systems, and for switching to renewable heating sources. The grant covers 40 % of the actual costs of the audit and 10–15 % of the other measures and 20 % of certain renewable heating measures. Grants are awarded by the local authority and the scheme is coordinated by ARA, the Housing Development Fund. In 2012, 6,8 MEUR were budgeted for this grant.

Collective decision problems are the most critical barriers for owner-occupied apartment buildings (Vainio 2011a). Decisions on renovations require the agreement of the majority of residents, and collective decisions are difficult to make since the residents often have conflicting interests. Many residents are not well informed and fail to attend annual residents' general assemblies. Preparing decisions can take years (Korhonen et al. 2005; Huhtanen 2011). Elderly residents are usually not eager to renovate (Vainio et al. 2002; Korhonen et al. 2005) and Finns also move fairly often and sell their apartments, in which case renovation costs are not recovered in the sales price (Nikola 2011). Since the mandatory maintenance and renovation plan is only mandatory since 2010, few housing companies have yet saved money for renovations.

Financial barriers relate mainly to long payback times and low resale values in some areas. About 90 % of all apartment buildings in Finland are heated with district heat (Statistics Finland 2012). Because district heat is widely produced in combined heat and power production, it is much cheaper than other fuels; the downside of this is that comprehensive renovations have payback times of about 20 years, whereas the acceptable payback time for residents' boards is about 9 years (Finnish Real Estate Federation 2011). Because loans are usually taken out for about 10 years, major renovations usually lead to significant raises in the maintenance charge (Vainio et al. 2002; KIRA 2012). However, compared to several other countries, access to finance in itself is not so much a problem in Finland, as housing companies can take out loans using the company's

property as collateral (Lujanen 2010). The financial barriers are also very different in different parts of the country. Because the population is continually moving to the metropolitan area, the sales price of apartments in the metropolitan area is double that of comparable apartments elsewhere in the country. Major renovations may thus cost almost as much as the value of the apartment in declining areas.

In terms of lack of attention and knowledge, the situation within housing companies is mixed. The Housing Companies Act (2010) obliges the residents' board to make an annual review of renovation needs and present it at the residents' general assembly. Residents' boards are increasingly aware of their responsibilities in good energy management and upkeep of the building (Nupponen 2010). House managers are increasingly also aware of energy and renovations; however, they usually have a few hours per month for each building and several other responsibilities – hence, the actual amount of attention is usually limited (Huhtanen 2010; Kyrö et al. 2012). However, many 'ordinary' residents – the ultimate decision makers – are not aware of their responsibilities as owners and have other more urgent concerns (Korhonen et al. 2005). Energy costs are not charged separately to residents in buildings with central heating; thus even though they represent about 1/3 of the monthly maintenance charge, they are not visible to residents – who are the final decision makers.

Transaction costs and genuine uncertainties concerning cost effectiveness are also serious problems, because it is not obvious from the outset that every kind of energy renovation will be cost effective. As non-professionals, residents' board members have a difficult time in contracting and planning renovation work and evaluating bids. Disruption is also a major concern: one-third of all apartments experienced problems during the renovation phase, especially as concerns co-operation with contractors and the renovation process (Vainio 2011b). While most renovations are successful, ordinary residents are concerned about risks and delays. According to our interviewees, the quality of renovation work (results and process) is often not good.

In the Finnish context, the diverse barriers interact in at least the following ways: The legal framework is fairly stable and offers a good situation in principle (Lujanen 2010). However, the fact that there is no compulsory renovation fund, and that the renovation plans have not been mandatory until since 2010, has led to a situation where few housing companies have saved up the necessary funds for major renovations. Now that many are facing the necessity of 50-year renovations, it is difficult to include energy improvements in such renovations on a voluntary basis. The renovations have long payback times, and hence, maintenance charges are bound to rise. The owner-occupiers are the ultimate decision makers. They are not widely aware of energy costs, which are paid for as part of their maintenance charge (and in general, are lower than elsewhere in Europe due to cheap district heat). Moreover, since owner-occupancy is so widespread, the owners can include people in very different financial positions. Since not every energy improvement is cost-effective, calculations need to be detailed. Planning requires a great deal of time and a budget to employ a professional. Hence, decisions about renovations take at least two years: one annual general assembly to approve the contract for planning, the second to approve a contractor for the actual work.

The result is a decision process that is a combination of highly formal and techno-economic issues – such as the need to make detailed calculations of payback times – and highly emotional ones, which relate to owners' personal attachment to the building and their own life situation (Korhonen et al. 2005), as well as their relations with other owners in the same building and their trust in the building administrator and the elected representatives on the owners' board. Recent projects to improve renovation rates suggest that restructuring the decision process, e.g. via external moderation and organizational and technical support, is important for further progress in renovation (Kurvinen et al. 2012).

ROMANIA

Owner-occupied multifamily houses are predominant in urban areas. Almost all apartments are owner-occupied. They are governed by a homeowners' association, a non-profit company for improving and managing the building (IIBW 2008). The homeowners' association takes decisions at a general meeting, which among other things approves budgets. It elects an executive committee, which e.g. plans for revenues and cost budgets and prepares general meetings, regulates the maintenance and repairs of common parts, as well as supervises construction activities. The owners are obligated to approve an annual repairation fund for common property (IIBW 2008).

The decision concerning intervention on the building's common parts (including on the building envelope) may be taken with two thirds (67 %) of the owners. However, if the owners disagreeing to the intervention decide to not support the share of costs, then the other owners have to advance the payments and only later on, in court, they can claim to be reimbursed (and it remains to be decided if they are right and how they will be paid back). There are no specific measures in place for overcoming this barrier, which may be enough to stop any investments. Therefore, when the owners' association intends to undergo a high-cost intervention on the building, the decision has to reach complete approval of the owners in order to be implemented in practice. Day-to-day management of housing associations can be contracted to private persons, associations, public agencies or, increasingly, specialised companies, which require a licence or authorization for this task (IIBW 2008). The house managers can also have a role in catalyzing the owners' associations' decision to apply for a renovation grant.

There are fairly generous support schemes available for renovations. The National Multiannual Program of Thermal Building Rehabilitation funds refurbishments reducing the annual consumption for heating below 100 kWh/m², 50 % of the renovation costs being from the state budget, 30 % from local authorities and the remaining 20 % from funds of owner associations. In several cities, the local authorities cover also the beneficiaries' share via grants or by taking out a loan (often EIB loans) for this purpose (Rezessy and Bertoldi 2010). There are also interest-subsidised loans and savings programmes available to cover the remaining 20 % (REC 2012). In November 2012, OUG no 18/2009 was modified by OUG 63/2012 and the scheme had been modified for using EU Structural Funds (under the Regional OP, Priority 1: Sustainable development of cities). Therefore, the new financing scheme has an overall budget of 304 Mln Euro where 150 Mln Euro are coming from the EU and the other from national sources.

Collective decision problems are the most critical barrier according to our interviewees and the literature reviewed (Tel-eche 2012). The required majority for decisions on renovations is high: in practice all residents usually need to agree, although the legal requirement is two-thirds, because mortgages need to be signed by all residents (IIBW 2008). A lesser barrier relates to the relatively short time-frame of decisions, which is linked to the overall uncertainty concerning the future (Danish Ecological Council 2006; BPIE 2012).

Financial barriers are a serious obstacle to energy renovations, due to low income levels and the large share of pensioners, on the one hand, and relatively low and partly subsidized energy prices. While there is a fairly generous grant scheme available, Musatescu and Comanescu (2009) report that residents are often unwilling to pay even 20 % of the renovations themselves. High initial costs are thus a problem, as are relatively long estimated payback times. Access to capital and the cost of capital are also severe barriers, as it is fairly complicated for a homeowners' association to take out a loan (IIBW 2008). Moreover, loan periods are too short to amortize the investment with reasonable repayments (BPIE 2012). A related, but lesser, barrier is the low or uncertain resale value of property.

Lack of information and skills: Since rising energy bills are a concern, lack of customer attention and interest and lack of customer knowledge are not critical barriers, although they still exist. In particular, our interviewees stressed the limited capacity of house managers to manage complex renovations. However, critical barriers in this category include lack of reliable advice and lack of sophisticated financial analysis.

Transaction costs and genuine uncertainties regarding cost effectiveness are major barriers, as well. This is largely due to the quality of renovation services, which is increasingly discussed according to our interviewees (see also Dabija 2010). The lack of skilled service providers is a severe problem in Romania, which has a shortage of workforce in the construction sector and has lost many skilled professionals due to emigration (Luca 2009). A lesser, but still relevant, barrier is created by the circulation of conflicting information and residents' mistrust of information.

According to our interviewees, good examples can be an important driving force for the renovation on apartment buildings. They reported that a significant effort to renovate panel apartment blocks in Bucharest is now ongoing: for example, one of six districts aims to be completely renovated within the following 4 years, primarily funded by public funds (from municipality and state budgets). In general, the renovation activity, according to our interviewees, has "exploded" since 1989. Many of these renovations are done with support from the municipality, which often includes technical support for multifamily apartment buildings, which are not usually capable of organizing renovations on their own.

Conclusions: do existing policies target the real problems?

European policy on buildings and the environment has set very ambitious targets. Reaching these targets will likely require specific policy instruments and national policy reforms for particular groups of building owners. Condominium ownership is widespread in Europe; however, its particular problems are not

very visible in the policy discourse, which focuses on barriers to energy investments on a relatively generic level.

Energy improvements are today mandatory in several countries when major renovations are made, and they are mandatory under other conditions in certain countries. Even in these cases, however, engagement of the owner-occupants is necessary. Our cases show that some owners can block or severely postpone even technically necessary renovations. Moreover, when renovations are finally made, the owners have a large impact on what energy efficiency improvements are included and how well they are implemented.

At present, most of the national policies aim to promote renovations via financial incentives and rather technical information about the benefits of renovation, as well as (still relatively small-scale) efforts to improve the qualifications of the building sector. However, the main problems for condominiums are related to the organization of owners' decision making; financial problems are often closely interlinked with organizational issues (such as loan terms for condominiums or different income levels of residents), rather than to a lack of incentives.

There have also been specific efforts to solve some of the organizational barriers, as our country case studies show. Requirements for majorities have been relaxed and mandatory renovation funds or plans have been instituted. Overall, however, these are far from sufficient to address the magnitude and multiplicity of barriers encountered in owner-occupied multifamily homes. It seems obvious that removing one or two barriers is not sufficient to turn the tables. The collective nature of the decision makes renovation decisions in condominiums very sensitive to both financial, legal and technical, and to more sociological and psychological problems.

Our country case studies demonstrated some possible ways ahead. In general, it seems that many condominiums need an external party to speed up the renovation decision process. Since there are so many barriers and they are closely interlinked, condominiums can benefit from a step-by-step technical and organizational support process that is moderated by external and unbiased professionals. The upscaling of such a process could occur in several alternative (or mutually complementary) ways:

- House managers/administrators could gain support and training for the delivery of such a package of measures in the buildings they serve. This, however, would likely require that either residents are willing to pay for such an intensive service level, or that the service is subsidized with public funding, or is made mandatory.
- Contractors could include a decision support package in their service offering. However, this again requires willingness to pay for such services, and contractors might not be perceived of as unbiased by residents.
- The public sector could take on a more active role, as is the case in Romania, where municipalities both heavily subsidize renovations and are intensively involved in their technical management. Considering public sector personnel cuts due to austerity measures in Europe, this does not seem a very likely development on a large scale. However, there may be some cost-neutral options for offering finance and technical support e.g. via public ESCO funding.

Additionally, there is a need to engage the financial services sector. This is critical because most of the energy investments in buildings are made with loans from private banks. Our country cases revealed several and diverse problems in obtaining finance for a collective energy renovation project, such as bureaucratic difficulties, lack of collective collateral (in Romania and several other countries not discussed in detail here), as well as short loan periods that do not cover the lifetime of the investment. One solution might be if the energy cost savings generated by a comprehensive energy renovation could be accepted as a form of collateral, as was suggested by one of our interviewees.

The development of new instrument packages and policy reforms targeted specifically at owner-occupied multifamily buildings is an urgent priority if Europe is to meet its 20-20-20 targets. Governments can support and stimulate owners' energy investments with grants, but public funds can only cover a small part of the necessary investment. Hence it is necessary to elaborate well balanced and attractive schemes in order to sufficiently stimulate the market and to avoid flooding the market with incentives and thereby blocking the sustainable market transformation. Our country cases suggest that the provision of a structured and moderated decision process and tailored financial services could facilitate the engagement of owner-occupants of multifamily buildings in energy renovations that support European energy and climate policies. Legal and regulatory instruments could provide additional requirements for minimum reserve funds for energetic renovation, depending on the thermal quality of the buildings. The impact of regulatory measures to reach a certain thermal standard in the mid- to long-term future (e.g. a clear pathway from 2015–2030) on different owner groups should be investigated in more detail.

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Acknowledgements

The authors gratefully acknowledge the financial and intellectual support of this work provided by the Intelligent Energy for Europe – Programme with the support of the European Commission. The sole responsibility for the content of this paper lies with the authors. It does not necessarily reflect the opinion of the European Union. The authors would also like to thank following interviewees from Austria: Christof Amann, Armin Knotzer, Michael Ornetzeder and Harald Rohrer; from Finland: Erkki Aalto Petri Pylsy and Pasi Tainio; from Romania: Steven Borcamp, Horia Petran and Mark Velody for their valuable comments and expert insights.