Routledge
Taylor & Francis Group

Building Research & Information

ISSN: 0961-3218 (Print) 1466-4321 (Online) Journal homepage: http://www.tandfonline.com/loi/rbri20

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To cite this article: Catalina Turcu (2016): Unequal spatial distribution of retrofits in Bucharest's apartment buildings, Building Research & Information, DOI: 10.1080/09613218.2016.1229894

To link to this article: http://dx.doi.org/10.1080/09613218.2016.1229894

Published online: 15 Sep 2016.

BUILDING RESEARCH & INFORMATION
2016
http://dx.doi.org/10.1080/09613218.2016.1229894

RESEARCH PAPER

OPEN ACCESS

Unequal spatial distribution of retrofits in Bucharest's apartment buildings

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ABSTRACT

This paper argues that the current spatial patterns of energy retrofits in post-socialist apartment buildings are unequally distributed across municipalities in Bucharest, Romania. In addition to the dominant techno-economic and social framing of this type of retrofit action, an institutional and political perspective can provide useful insights into why this occurs. By drawing on secondary analysis of statistical data, grey literature and 20 semi-structured interviews in Bucharest, three important findings emerge. First, the institutional complexity of energy retrofit of apartment buildings in Romania is underestimated and the interaction between various institutions is poor, explained by lack of trust and collective action. Second, the spatial distribution of the retrofit of apartment buildings is unequally distributed across Bucharest's six municipalities. Third, current action for retrofit does not reach municipalities with the greatest need and potential. A more bottom-up and decentralized institutional landscape exists than is currently acknowledged in public policy and the research literature. Findings show an unequal and unfair spread of retrofit action within and between cities – raising wider implications for the potential shortcomings of European Union retrofit programmes in Central and Eastern Europe.

KEYWORDS

apartment buildings; energy efficiency; governance; inequality; institutions; multi-family housing; public policy; retrofit; Romania

Introduction

The importance of energy efficiency in buildings is rapidly emerging in Central and Eastern Europe (CEE),[1] fuelled by the urgent need to respond to climate change and the ensuing European policy and regulation, but also by the legacy of long-term neglect of the built environment. Buildings are responsible for 40% of Europe's total energy demand, and energy-efficiency measures can save up to 17% of that by 2050 (EC, 2006). In turn, residential buildings comprise the biggest segment of the European Union's (EU) heated building stock (75%) and, thus, are responsible for most of the sector's energy consumption, with a 68% share of that in 2009. This can be reduced by 41.5% via various building retrofit[2] measures (EC, 2006). However, the current European building retrofit trends do not look encouraging: only 1.2% of the existing stock is renovated every year compared with a 2–3% yearly rate needed to meet the 80% target by 2050 (Renovate Europe, 2014).

The CEE's residential sector is highly dependent on fossil fuel energy: coal (41%), gas (7%) and oil (3%) (BPIE, 2011, p. 10). In addition, 83% of its buildings were built during the socialist regimes between 1960 and 1990 (BPIE, 2011, p. 9), when the mass production of large-scale prefabricated housing estates, the so-called apartment buildings,[3] was the norm and the original building regulations were lenient in terms of energy efficiency. Only small parts of this stock have been retrofitted so far, and so most of it has low energy performance; dated and poorly performing electricity, heating, water and waste systems; and major structural problems. The retrofit of the post-socialist housing is, thus, one of the largest problems facing municipalities in the CEE (UNECE, 2013).

An estimated 100 million people across the CEE still live in these buildings, in approximately 34 million apartments (IIASA, 2012). EU directives, such as the Energy Performance in Buildings Directive (EPBD) and Energy Efficiency Directive (EED), require CEE countries to reduce energy consumption in this type of housing. This is done through national programmes and initiatives including the programme for 'Thermal Rehabilitation of Apartment Buildings' in Romania; 'PANEL' and 'Green Saving' in the Czech Republic; 'Renovation of Apartment Buildings' in Estonia; 'Renovation of Prefabricated-Panel Residences' in Hungary; and 'Thermal Modernisation and Renovation' in Poland. There is wide consensus within

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the EU that building energy retrofit (hereafter, referred to as retrofit) has multiple benefits, *e.g.*, enhanced living conditions and reduced energy bills, reductions in fuel poverty and mitigation of greenhouse gas (GHG) emissions, while creating employment. These co-benefits are increasingly employed to justify climate change investment (Bouzarovski & Herrero, 2015).

The evidence for establishing how many apartment buildings have been retrofitted across the CEE is difficult to compile. For example, of 80,000 eligible apartment buildings in Romania, even the most positive estimates did not exceed 3000 (a mere 4%) being retrofitted by 2009 (Pasztor & Peter, 2009). At this pace, it would take Romania 120 years to retrofit all its apartment buildings (Liga Habitat, 2010). Other reports suggest that 360,000 apartments have been retrofitted in the Czech Republic, the equivalent of 16% of the total of 2.2 million apartments requiring retrofit (OECD, 2011); 190,000 apartments in Hungary (EC, 2008); and 350 apartment buildings and 11,000 apartments in Estonia (Arup, 2013). Some of these data are outdated; however, progress over the last five years has been reported as being slow by many reports. The explanation for this is twofold. First, there is a techno-economic explanation. CEE countries do not access enough of the EU's building retrofit-earmarked funding. This has been a direct consequence of the recent economic downturn, which has impacted on citizens' purchasing power and the CEE countries' ability to match funding and provide suitable financial frameworks, but also economic capital to deliver technological development and innovation (EC, 2012; EuroACE, 2009; McKinsey, 2010). Lack of access to 'finance' is perceived as a main barrier to roll out 'renovation trains' across Europe (Rovers, 2014).

Second, the recent literature suggests that retrofit programmes fail to attract enough apartment owners, despite their generous terms. This is partly related to the characteristics of this type of housing which has seen mass privatization and the emergence of 'super homeownership' throughout the 1990s. This entailed transferring the ownership of the apartments to individual households while the ownership of common parts and land remained unclear. Additionally, the region's social capital remains weak (Raiser, Haerpfer, Noworthy, & Wallace, 2001) and the recent impoverishment of homeowners has reduced their ability to invest in their homes. Thus, the social aspects of retrofit is slowly gaining momentum within the region's political and academic circles (Bouzarovski, Salukvadze, & Gentile, 2011 Cirman, Mandič, Zorić, Cirman, & Mandič, 2013; Djourdjin & Yotova, 2004; Gram-Hanssen, 2014; Schweber & Leiringer, 2012; Vlasova & Gram-Hanssen, 2014).

Two other observations point to a third possible explanation of an institutional–political nature which is not extensively developed in the literature. First, some studies highlight the role that institutions play in shaping retrofit processes in the CEE, including a bias towards large-scale, top-down financing institutions; the complex institutional settings; and unclear post-1990 management of apartment buildings. They also note the centrality of local government in delivery, and the 'rigidity' of municipal institutions in adopting new energy-efficiency frameworks, technologies and financial mechanisms (Altmann, 2013; BPIE, 2011; EC, 2013; UNECE, 2013). Also, the literature notes the importance of stakeholders and institutions in developing and implementing sustainable building practices (Feige, Wallbaum, & Krank, 2011; Klinckenberg Consultants, 2010). However, there is little mapping of the institutions for retrofit at different levels and little discussion of institutional interaction. This raises the paper's first research question:

> What are the institutions for energy retrofit of apartment buildings and how do they interact?

Second, CEE countries struggle against and overcome similar challenges across their national territories. This includes the legacy of central planning, socialist architecture, and the cost of social and economic change. They also share similar physical conditions (prefabrication, large-scale buildings, ageing and deterioration etc.) and socio-economic conditions (*i.e.*, lack of finance, super-homeownership, lack of socio-economic polarization etc.) for this type of housing. However, there is significant variation in the delivery of housing retrofit between countries (BPIE, 2011; Klinckenberg Consultants, 2010). For example, Stefan Buzarovski's work examines energy transitions/retrofitting and subsequent variation between European/CEE countries through the lens of energy vulnerability, especially in relation to household energy poverty and deprivation (Bouzarovski, 2014; Bouzarovski & Herrero, 2015; Buzar, 2007). Lankina, Hudalla, and Wollmann (2008) consider within-country variation in municipal performance in the CEE, explained not only by structural factors but also by institutional–cultural–political factors. In fact, anecdotal evidence suggests that in Bucharest, Romania, the delivery of retrofit in apartment buildings is uneven across its six municipalities, *i.e.*, some have retrofitted most of their housing stock, others very little (Ungureanu, 2014; Vrabie, 2014). This raises three research questions that are addressed in this paper:

- What are the spatial patterns of energy retrofit of apartment buildings at the municipal level in Bucharest?
- Why does spatial inequality in delivery occur (*i.e.*, what are the factors that explain, produce and re-

produce current patterns of energy retrofit of apartment buildings in Bucharest?)
- Does current action for the energy retrofit of apartment buildings in Bucharest reach to the municipalities with the highest need and potential?

By answering these questions, three important contributions are made. First, the institutional complexity of energy retrofit of apartment buildings in Romania is underestimated and the interaction between various institutions is poor, explained by lack of trust and collective action. It is argued this impacts on the institutional design and good governance of retrofit action. Second, the spatial distribution of retrofit of apartment buildings is unequally distributed across Bucharest's six municipalities. Third, municipalities with specific characteristics are better performers and take most of the public funding. (These characteristics are shown to be strong municipal leadership, comparatively wealthier municipalities, municipalities with a smaller and 'easier' stock to retrofit.) Thus, current retrofit action in Bucharest and Romania does not reach municipalities with the highest need and potential for housing retrofit. These findings have wider implications for the potential shortcomings of energy-efficiency initiatives in the CEE and the EU. They also suggest the possibility of an unequal (and unfair) spread of energy-retrofit funding and action within and between cities, which might occur in other CEE countries.

This paper also puts forward an original theoretical contribution. It provides a basis for understanding the retrofit of housing through the lens of an institutional analysis, drawing on different classifications of institutions, their interaction and the effect that these have on the energy retrofit performance at the local level. This is linked to a wider discussion of local performance and unequal spatial development in post-socialist Europe. First-hand empirical data from Bucharest are used to describe current retrofit practice of apartment buildings.

The paper is structured as follows. First, a discussion of what determines municipal performance at the urban level is undertaken, with a specific focus on institutions and the CEE. Second, findings are presented using as a case study the National Programme for the Thermal Rehabilitation of Apartment Buildings in Bucharest. Finally, the institutional framework for the retrofit of apartment buildings is considered, particularly the variation in municipal performance in Bucharest. Wider lessons are drawn for the retrofit of apartment buildings and the policy implications for energy efficiency buildings in the CEE.

What determines local performance

The literature discusses what generally influences urban performance at the local level.[4] Moreover, recent research argues that in some CEE countries, despite relatively similar socio-economic and institutional frameworks, there is significant within-country variation in municipal performance (Lankina et al., 2008; Turcu & Tosics, 2015). How can this be explained? Three types of explanations are advanced: structural factors, local 'politics' and institutions.

Most studies argue that structural aspects matter. These include a city's geographical location, and economic, social and institutional capacity. For example, proximity to good road and transport infrastructure is important. Studies have also looked at the 'civilizational division' and argued that social capacity is inexistent or weaker in East than West (Aberg & Sandberg, 2003; Raiser et al., 2001), and more Western locations are more likely to leap-frog transition steps due to Western influence (Kopstein & Reilly, 2000). The size of local economies and financial resources are also important. Large economic engines are more likely to enhance a city's economic performance by providing employment and other economic benefits. This is particularly relevant for the CEE where whole cities were established around industrial activity (Lankina et al., 2008).

Lankina et al. (2008), however, argue that not only structural 'givens' but also political factors and cultural traditions can explain variation in local performance in a CEE context. For them, local performance is a function of political and civil society actors that influence local governance processes (Lankina et al., 2008). Political factors such as the political affiliation of municipal government can determine resource allocation and change policy priorities when power changes hands, while political stability and local leadership, such as mayoral support and political prioritization, can drive better local performance and long-term planning.

Institutions have received a great deal of attention, especially in political and economic geography studies where they are seen as a key variation factor for urban performance (OECD, 2012; Tomaney, 2013). For North (2005), institutions are the 'scaffolding that shape human interaction' (p. 48) and 'the rules of the game in a society' (North, 2005, p. 48), where human interaction can be shaped by 'formal constraints – such as rules that human beings devise – and informal constraints – such as conventions and codes of behavior' (p. 4). This definition acknowledges a diversity of institutions that can be driven by clearly defined rules, but also by politics and norms, which are less clear and determine whose rules matters.

Formal versus informal institutions: interaction and trust

The distinction between *formal* and *informal institutions* draws on North's (1990) discussion of formal–informal constraints which frame human interaction. Formal institutions are defined by clearly laid rules, policy dependent and driven by legislators, judges, markets, bureaucrats and other rule-makers (Pejovich, 1999). Informal institutions, in turn, refer to implicit and socially derived understandings including customs, traditions, religious beliefs, routines and norms that have endured the test of time. While formal institutions are related to the 'top', to legal or state power dynamics, informal ones strive to establish parallel areas of competence and influence legal and state power dynamics from the 'bottom' (Lauth, 2000).

Formal and informal institutions have mostly been analyzed independently. However, their interaction is also important. Farole, Rodriguez-Pose, & Storper, (2011) argue that the interaction between formal and informal institutions determines the process of economic growth, also argued by Pejovich (1999) in his 'interaction thesis'; while Platje (2008) notes the importance of 'institutional equilibrium' between informal and formal institutions, attained on the basis of reciprocal trust, which sits at the basis of a sustainable institutional design. This is similar to the notion of institutional 'congruence', whereby no matter how good formal institutions are, they can be ineffective if they are not supported by the informal institutions such as wider society cultural patterns and existing social capital capacity (Lankina et al., 2008).

Institutions in the CEE is a complex and emergent area of research and has mainly focused on institutional change from a macro-societal perspective (Mihaylova, 2004), but also on differences between countries in local institution building (Lankina et al., 2008). Existing research focuses mainly on formal institutions and less on their informal counterparts, which, some argue, has led to a distorted understanding of post-socialist institutional change pathways (Matthiesen, 2002). Post-1990 formal institutions are not seen as interacting with prevailing informal institutions and this, it has been argued, plays a major role in delaying the transition from socialism to capitalism (Pejovich, 1999).

Limited trust in formal institutions is seen as a main cause of this and understanding how to change it could foster further development in the region (Raiser et al., 2001). The socialist state discouraged free associations of people and replaced them by 'forced' ones (Nichols, 1996), which led in turn to a generalized state of social distrust and cynicism in institutions difficult to reverse (Lovell, 2001; Raiser, 2003). Institutional trust is seen as an expectation of fair treatment and low levels of trust as well as public sector corruption can have a significant effect on institutional trust (Miller, Koshechkina, & Grodeland, 1997).

Hard versus soft institutions: interaction and collective action

The debate around *hard* and *soft institutions* is rooted in planning and governance studies and draws on Healey's work on collaborative planning and institutional capacity. Healey (1997) notes that urban governance processes should be interactive and involve various institutions. She argues that in governing urban processes attention should be paid to institutional structures at two levels and outlines a 'structure of challenges' in the interaction between hard infrastructure (such as city- and nationwide agencies or institutions) and soft infrastructure (such as neighbourhood-based and/or civil society groups).

The integration between hard and soft institutions is key to sustainable institutional design and good urban governance. Building on this, Healey argues that improving urban areas depends on the 'quality of governance' or institutional capacity frameworks in those areas because:

> Some are well integrated, well connected, and well informed, and can mobilize readily to act to capture opportunities and enhance local conditions. Others are fragmented; lack the connections to sources of power and knowledge, and the mobilization capacity, to organize to make a difference.
>
> (Healey, 1998, p. 1531)

The quality of governance, thus, depends on the agency involvement with various types of institutions and can be seen as an urban area's ability to act as a collective actor, which in turn determines its future in economic, social and environmental terms (Healey, Cars, Madanipour, & De Magalhaes, 2002). In other words, collective action is the gel for interaction between hard and soft institutions and determines good governance; lack of it, in turn, leads to poorly governed urban processes. This points to the link between institutions and collective action as a manifestation of social capital, which has been discussed at length in relation to the transition from 'government' to 'governance' and the democratization of traditional government. For example, Gualini (2002) argues institution building is an issue of collective action that is catalyzed at the interface between agency and structures and which is the result of incremental, self-transforming and self-policing processes.

However, the role played by collective action in creating institutional capital, and subsequently good governance processes, can be questionable on three accounts when the focus of this paper is considered. First, the literature is generally sceptical about the role that collective action can play in achieving institutional capital to deliver better environmental policy goals (*i.e.*, energy retrofit), as these are too wide to allow for a clear image of costs and benefits associated with them and the likelihood to influence outcomes, but also require certain levels of knowledge (Rydin & Pennington, 2000).

Second, CEE is perceived as having weak social capital, and so potential for collective action (Aberg & Sandberg, 2003; Raiser et al., 2001). This is related to previous socialist discourses of collectivism and egalitarianism. Pejovich (1999) interestingly argues that the ethos of collectivism and egalitarianism in the CEE differs from that of classical liberalism in the Western world. In other words, individuals in the CEE do not expect to interact with others to pursue a common and equal end. In contrast, in Western Europe individuals interact with others in the pursuit of their private ends.

Finally, there seems to be an interaction problem in the CEE countries between hard and soft institutions, which in turn bear an impact on the quality of governance processes. Hard institutions are interacting and relatively successful, but this happens largely outside people's everyday lives; hence, there is a mismatch between the city- and/or nationwide institutions and those claimed by citizens and civil society at the local level which fosters distrust and undermines the quality of governance processes (Matthiesen, 2002).

Case study

Romania has an estimated 8.2 m dwellings (National Institute of Statistics, 2011). Of these, approximately 40% (3.2 m) are situated in urban areas (BPIE, 2012). A total of 72% (2.3 m) of dwellings in urban areas are situated in large apartment buildings, averaging 40 apartments per building; over 60% of apartment buildings are four storeys high, while 16% are 10 storeys high (BPIE, 2014). A total of 37.3% of Romanians live in apartment buildings compared with Latvia (70% of the population) and Estonia (25% of the population) (BPIE, 2011). A total of 98.2% of apartments in Romania are privately owned and only 1.5% publicly owned (National Institute of Statistics, 2011). There are 109,194 buildings with privately owned apartments in Romania (National Institute of Statistics, 2011), managed and administrated by condominium associations. Their energy performance is poor, with an estimated annual energy consumption of 180–240 kWh/m^2 (BPIE, 2012).

Romania has focused on apartment building energy retrofit since 2002 under the National Programme for the Thermal Rehabilitation of Apartment Buildings. Its aim is to reduce energy consumption to under 100 kWh/m^2 mainly via thermal improvement, *e.g.*, wall insulation, double-glazing and pipe insulation (MDRAP, 2010). It has been estimated that the programme can save up to 25% of total energy demand for this type of housing, reduce heating bills by 40% and CO_2 emissions by 30–40% (MDRAP, 2010; Rotariu, 2012).

Costs were initially covered under a 33:33:33 regime, *i.e.*, national government, municipalities and apartment owners paying one-third each (GEO 174/2002). This, however, changed in 2010 to a 50:30:20 regime (OUG nr. 18/2009), *i.e.*, half being paid for by the national government, 30% by municipalities and 20% by apartment owners, with flexibility at the municipal level to cover the residents' share fully or partially. In 2012, another change occurred, this time encouraging municipalities to take state-backed loans, but also including single-family housing in the programme (OUG 63/2012).

From the 80,000 apartment buildings in Romania in need of energy retrofit, with a total of 3 m apartments (Pasztor & Peter, 2009), only 144,000 apartments (4.8%) had been retrofitted by 2015 (Vrabie, 2015). Performance is patchy and little documented at the municipal level, with anecdotal evidence suggesting that performance varies significantly across the country. Cities such as Bucharest, Brasov, Cluj-Napoca, Timisoara and Arad are seen to be at the forefront of energy retrofit action, while the rest of the country lags behind (Vrabie, 2014).

Methods and data collection

Bucharest is a good case to investigate for a number of reasons. It is the largest capital city in the CEE with approximately 1.7 million residents and it holds the largest number of apartment buildings as a share of its housing stock (70%) among CEE capital cities, compared with the lowest in Sofia (Bulgaria) at 45% (UNECE, 2013). Anecdotal evidence also suggests that variation in the delivery of retrofit occurs at the municipal level and, thus, a closer look at its six municipalities can test this assumption and explain some of this variation.[5]

The approach of using one city case departs radically for the more recent trend towards multi-city studies, which are based on the premise, recently challenged by McCann and Ward (2011), that what works in one context can be readily transferred to another. This study's focus on one city has allowed for more detailed probing that would have otherwise been possible and advocates

the importance of local context and conditions which yield deeper insights into the complexity of the urban energy problematic, more specifically, and urban sustainability, more generally (Turcu, 2012; Turcu, Rydin, & Pilkey, 2014).

Two methods of data collection were employed in researching Bucharest: secondary analysis of census data, municipal statistics and the grey literature; and semi-structured interviews. National Institute of Statistics (2011) data (http://statistici.insse.ro/shop/) were used to extract information at the city and national levels on housing stock tenure, age, typology; population; and densities. The author has also accessed the ministerial statistical information on public budgets and funding and allocation, and numbers of retrofitted apartment buildings. Data were relatively complete for 2009 and 2010 but incomplete for the following years; census data were not available at the municipal level in Bucharest. To source some of this missing data, the author used municipal documents and information from interviews.

Municipal public reports and websites were employed to collect information on local budgets, expenditure per municipality and allocated to energy retrofit; the total and retrofitted number of apartment buildings; and the political affiliation and longevity of the mayor in power. Public information was not available at the municipal level on a number of topics, which could have enhanced a fuller understanding, including: average income per inhabitant; a breakdown of the housing stock and apartment buildings earmarked for energy retrofit by tenure, age, size and energy performance; and the number and size of resident associations.

Moreover, municipal strategy documents were analyzed to understand leadership for energy retrofit at the municipal level, which is defined here as the mayor's support (*i.e.*, mayoral political manifestos, public statements) and how high on the list of municipal priorities retrofit was ranked. Most of the data collected are from 2009 to 2010 (ministerial statistics) and 2014 (municipal statistics). Not all municipalities have had previous to 2014 or up-to-date 2015 data on their websites during data collection; and little data have been available for S5 which, at the time of writing, was battling with the national government over making public its municipal budgets and strategies.

The secondary analysis was complemented by 20 semi-structured interviews with key players involved in the energy retrofit of apartment buildings in Bucharest, between December 2014 and January 2015. Interviewees included municipal officers responsible for energy retrofit (S2, S4, S6) and one officer from City Hall (SG), energy auditors (AAEC, UTCB01, UTCB02), building research and higher education institutions (INCERC, ICEMENERG, UAUIM01, UAUIM02), civil society groups (ATU, LHR), construction firms (PBG, IPCT), and representatives of condominium associations (RS1, RS2, RS4, RS6) (Table 1).

Table 1. Characteristics of the interviewees.

Interviewee type	Code	Total
Municipality	S2, S4, S6, SG	4
Energy auditor	AAEC (Association of Energy Auditors) UTCB01, UTCB02 (Technical University of Civil Engineering)	3
Building research and HE institution	INCERC (National Institute for Building Research) ICEMENERG (National Institute for Energy Research) UAUIM01, UAUIM02 (University of Architecture and Urbanism 'Ion Mincu')	5
Non-governmental organization (NGO)	ATU (Association for Urban Transition) LHR (Liga Habitat Romania)	2
Design/construction/real estate firms	PBG (Bucharest Project Group) IPCT (Institute for Design of Standardized Buildings)	2
Resident associations	RS1, RS2, RS4 and RS6	4
	Total	20

Source: Author.

Although it was relatively easy to identify interviewees, interviewing them was challenging and time-consuming. People were reticent at first and would agree to an interview following a friend's recommendation. Only two interviewees agreed to be recorded and on a number of occasions comments were offered 'off the record'. Thus, this study relies on the researcher's notes, taken in Romanian during the interview and translated in English thereafter. Drafts of this paper were circulated to all interviewees, but only three (ATU, AAEC, SG) gave feedback. Most difficult to interview were the municipalities; in fact, three out of the six municipalities (S1, S3, S5) declined to participate in the study.

Interviews were semi-structured and conducted face to face. Some interviewees were 'short and to the point'; others elaborated on at length; interviews lasted between 45 min and two hours. The interview questionnaire consisted of 50 questions, structured in eight sections, as follows: general information (timelines, related initiatives); statistics and mapping (numbers, typology, maps); funding (local budgets, access to/distribution of finance); costs (operational regimes; cost/m^2); contracting and public procurement (process, partnerships and contracts); performance (local monitoring); institutions (type of actors and relations; synergies and tensions; patterns of work; resources; training and skills); and trust (trust within the interviewee's institution; trust between different actors; sanctions). In addition, the municipalities were asked via e-mail in December 2015 to

supplement missing information (from secondary analysis) on local strategy and priorities, and mayoral leadership for energy retrofit.

The possible limitations of this study include the relatively small sample of interviewees and restricted access to municipal-level data. With only 20 interviews and one city, it is difficult to make generalizations about other municipalities in Romania or other cities in the CEE. However, the findings here draw an accurate picture for energy retrofit performance in Bucharest. Moreover, previous studies suggested that a CEE city can have more in common with its counterparts elsewhere in the CEE than its next-door national neighbours (Lankina et al., 2008). Thus, it is hoped that this study is of relevance to energy retrofit in other cities, and to other countries in the CEE.

Key findings

Institutions of energy retrofit: from 'handlers' to 'non-governmentals'

Three types of institutions stand out at first in relation to the energy retrofit of apartment buildings in Romania: two 'hard' institutions: the Ministry of Regional Development and Public Administration (MDRAP) and municipalities (S1–S6); and one 'soft' institution: the condominium associations. Their roles and interaction seem straightforward: the MDRAP 'sets the tone' and approves annual budgets; municipalities manage the programme and link with condominium associations; and condominium associations secure agreement among residents and register with the programme.

This draws a picture of a centrally steered and linear process, drawing on top-down guidance and legislation from central government to municipalities, and some collaboration at the local level between municipalities and condominium associations. It also portrays two families of institutions: formal-hard institutions at the government level and formal-soft institutions at the building level. Interviews in Bucharest, however, have identified six types of institutional groups/families: 'handlers', 'controllers', 'clients', 'intelligence gatherers', 'deliverers' and 'non-governmentals' (Figure 1).

'Handlers'

Municipalities are the programme's 'handlers'. They are hard institutions and occupy a central role in the delivery of energy retrofit; directly interact with the other institutional groups/families; and their role is clearly defined by current policy documents and legislation (MDRAP, 2010, 2013; MDRT, 2012). There is no platform for interaction or mechanism for knowledge transfer between Bucharest's six municipalities. Municipalities manage energy retrofit on a daily basis; finance and/or secure funding; appoint auditors, designers and constructors; connect with condominium associations; and provide data for monitoring purposes. Furthermore, since 2012, S1, S2 and S6 have financed the residents' share, while S3 has taken a more progressive approach by weighting its contribution in relation to residents' income (see the following section).

> In theory, the cost should be covered 50/30/20 from national, local and resident shares. However, most residents cannot afford to cover their share and so, our municipality has decided to step in and cover their part. The programme is now covered 50/50 by national and municipal funds. (S1)

'Controllers'

'Controllers' are hard institutions that enact control via finance, monitoring and special permits. They arbitrate funding (EU, EBI and MDRAP) and energy performance monitoring (MDRAP and INCERC), but also issue special permits for buildings located in areas of historic value or high seismic risk (City Hall).

> We have to keep a close relation with MDRAP, mainly for funding reasons, but also, they ask for data and information about the programme and we have to comply with their requirements if we want to stay in the game. However, with the City Hall, we do not work very closely; we only need them when there is a need to work in heritage or seismic areas; that means that if we need to thermally rehabilitate a building which is already on their lists, we cannot touch that building without their permission. (S6)

'Clients'

Condominium associations are the programme's 'clients'. They are soft institutions and represent apartment owners in a building. There are an estimated 12,000 condominium associations in Bucharest (http://www.fapr.ro/); however, there is no information about their size or distribution by municipality. The condominium association appoints an administrator who manages its day-to-day affairs such as rent collection and utility payments. Administrators can be one resident from the building or a 'professional administrator' who manages a portfolio of buildings. Condominium associations managed by the latter and/or larger were seen as being more powerful, *i.e.*, having a 'bigger voice with the municipality' and more resources. For example, one such condominium association employed a secretary, accountant, financial adviser and administrator. However, smaller condominium associations with an 'in-house' administrator were seen as having their advantages, too – *e.g.*,

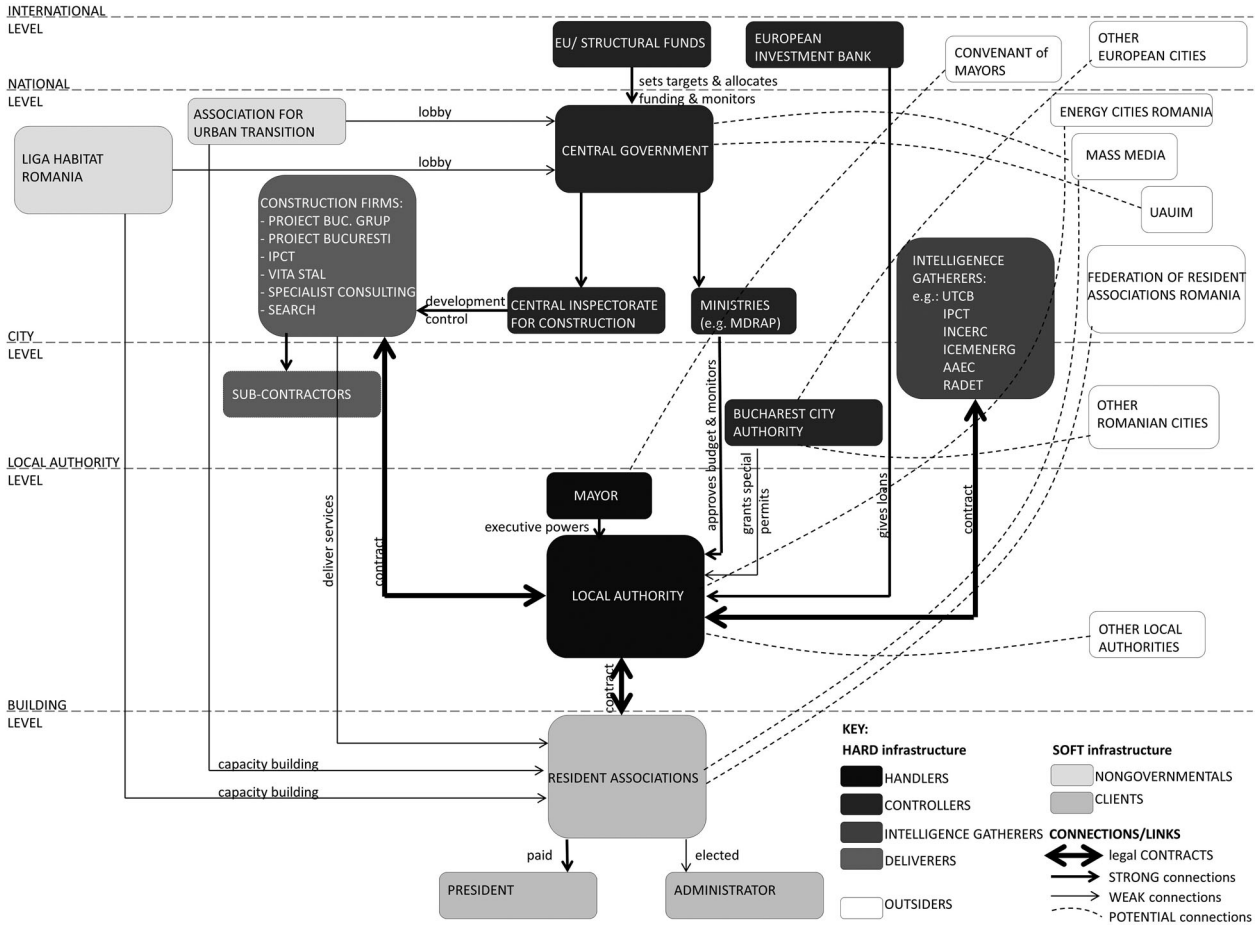

Figure 1. Institutions for energy retrofit of apartment building in Bucharest, Romania.

they reached resident agreements faster and guaranteed the administrator's personal attention and involvement during construction works. However, condominium associations were little consulted and/or aware of the works planned for their building.

> From what I've heard on TV, the works include the roof terrace insulation, basement insulation, double glazing, changing entrance doors and closing off of balconies. I hope this is what we are going to have, because these will solve many problems and this is what we used to convince our residents. I am not sure, though. … However, we heard about problems with some works, for example in Rahova. They've shown it on TV. (RS4)

'Intelligence gatherers'

The 'intelligence gatherers' are hard institutions such as HE institutions (UTCB, UAUIM), research organizations (IPCT, INCERC, ICEMENERG and PBG) and professional associations (AAEC). They play a role in energy auditing, design and building specification, and are formally appointed by municipalities. They can also deliver the works, especially in the case of large organizations such as the PBG and IPCT which have a range of in-house expertise in design, engineering and construction.

> The municipalities work with different experts. On the one hand, the designer/engineer and, on the other hand, the auditor. The latter, however, does not do just auditing; they usually hold other positions, too. For example, some can be at the same time municipal employees and auditors and/or designers and/or developers. (UTCB01)

'Deliverers'

The 'deliverers' are construction firms, hard institutions. They deliver the works and are directly appointed by municipalities, following a public tendering process. Construction firms can vary in size and scope, *i.e.*, they can be big or small, undertake all work or subcontract some of it.

> The winning firms are both big and small. There is a technical document ['*caiet de sarcini*'] on the basis of which the contract is signed … Some firms come with their sub-contractors, others don't. There are also associations of firms to deliver the works, as well as 'supporters' of these firms, also big or small. We also work with a Spanish firm. (S2)

'Non-governmentals'

The 'non-governmentals' are soft institutions such as non-governmental organizations (NGOs) and other civil society organizations. They can establish a common space for dialogue between the agency and state and can act as important agents for collective action. Their activity can range from active collaboration, through campaigning and lobbing residents needs and rights, to pressuring the energy and housing agenda more widely. The number of 'non-governmentals' involved in the energy retrofit of apartment buildings in Bucharest is limited and only two were identified and interviewed: ATU, an urban think-tank; and LHR, an NGO concerned with housing issues.

'Outsiders'

There is, however, a seventh institutional group/family: the 'outsiders'. They form a group made of both soft and hard institutions that do not have a direct interaction with the programme, but were associated with it by interviewees. It includes other municipalities and condominium associations in Romania and abroad; 'intelligence gatherers' (UAUIM, Romanian Order of Architects); and 'non-governmentals' (Federation of Resident Associations Romania, Energy Cities Romania and Covenant of Mayors Romania).

Explaining municipal performance in Bucharest

Bucharest consists of six municipalities (or '*sectoare*'), numbered S1–S6, which have their own elected mayors. The municipalities have an operational role and oversee local affairs such as planning, development control, energy retrofit, schools, waste management, public realm and green space maintenance etc. Bucharest also has a city hall with its own elected general mayor, which oversees wider city affairs such as strategic planning, heritage conservation, transportation, water and power management etc. Bucharest holds some 8000 apartment buildings in need of energy retrofit across its six municipalities, 10% of this type of housing at the country level (author's primary data).

Municipal finance and funding

The biggest proportion of municipal income is allocated by the national government as a share of local household income and business GVA. To top that up, municipalities can also raise council tax and other income coming from selling of public land or public development. The municipal budget is spent on various municipal duties ranging from energy retrofit of apartment buildings, to green space maintenance and social assistance. For example, Figure 2 shows that in 2014, S1 and S2 allocated significant shares of their income to energy retrofit (17% and 25%, respectively) compared with S3 at 5%, S4 at 0% and S6 at 7%.

There are, however, some important differences between the six municipalities, which are summarized in Table 2. S1 is the 'wealthiest' (defined as 'municipal budget per inhabitant in 2014', *i.e.*, 6170 RON/inhabitant), least densely populated (3139 inhabitants/km^2) and least dense in terms of apartment buildings earmarked for energy retrofit (18 buildings/km^2). This is followed by S2 and S6, both similar in terms of 'wealth' and population density. Compared with S2, however, S6 has a much higher density of apartment buildings to be energy retrofitted (56 compared with 35 buildings/km^2 respectively).

S3, S4 and S6 have seen rapid mass construction of large housing estates (Balta Alba, Drumul Taberei, Militari, Berceni) made entirely of apartment buildings to support adjacent industries. In fact, they were transformed from suburban locations into Bucharest's new urban quarters in less than two decades (Panaitescu, 2012). This, together with factors such as lack of energy retrofit prioritization at the municipal level, discussed below, might explain some of the weak performance of these municipalities when compared with S1 and S2. Moreover, S1 and S2 are located in the north of Bucharest in the path of the city's natural urban growth, driven by milder climatic conditions and natural beauty spots such as lakes and forests; they were well developed when plans for new urban quarters during 1950–89 were laid out and so are less appealing for fast mass production of housing (Bouzarovski, 2014).

An estimated 2000 apartment buildings (25%) have been rehabilitated to date across Bucharest's six municipalities, compared with 5% at the national level (Vrabie, 2014). Bucharest has its own customized funding regime for the energy retrofit, a variation of the 50:30:20 regime at the national level (Table 3). Only two (S4, S5) out of the six municipalities use 50:30:20 regimes. In S1, S2 and S6 a 50:50:0 regime is applied, with the mayor's strong support in S1 and S2. S3 has a higher national contribution (60%), but it applies a more 'progressive' model for the remaining 40% whereby the 'wealthier' is the condominium association, the less money the municipality will contribute.[6]

In addition, Table 4 shows that Bucharest had received (for its 10% share of apartment building stock) almost half the funding available at the national level in 2009–10, an estimated €51.1 million out of the total of €115 m spent by Romania (BPIE, 2014). This indicates an unbalanced allocation of energy retrofit funding at the national level. Moreover, variation exists in the 2009–10 funding allocation across the six municipalities, with, once more, S1 and S2 claiming the most

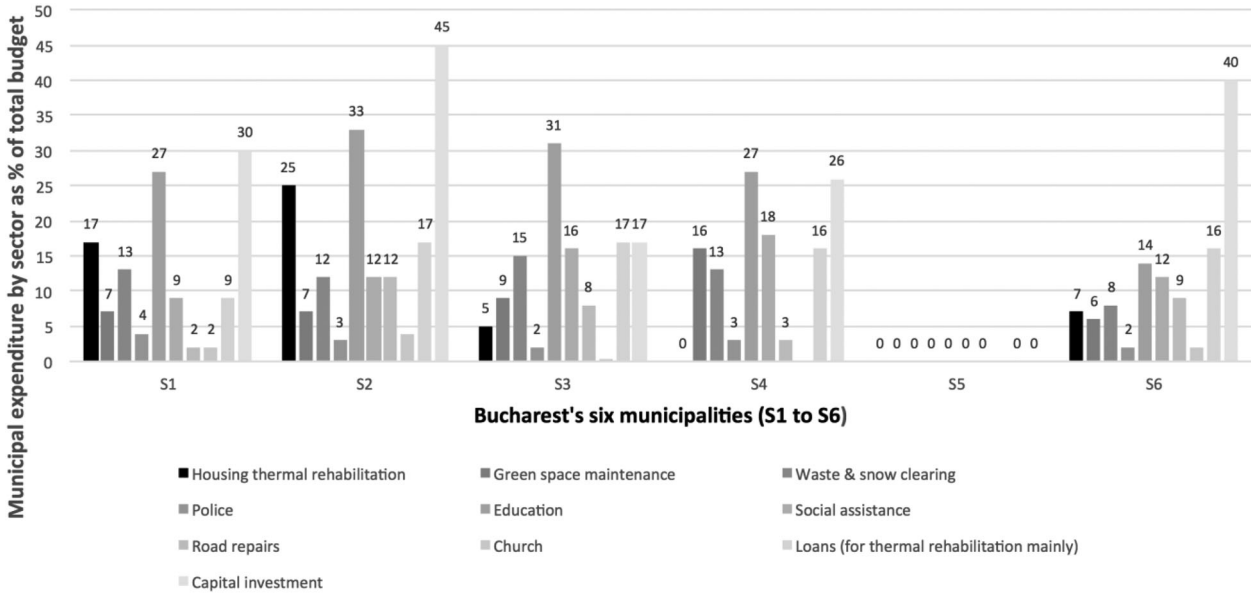

Figure 2. Municipal expenditure per sector across Bucharest's six municipalities in 2014 (as a percentage of the total municipal budget).
Source: Information collected by the author from individual municipal budgets; no data available for S5.

and being allocated a quarter each (26% and 27%) over the 2009–10 period.

Politics: party affiliation, mayor continuity and leadership

Romania has a multi-party system that dwindles between a centre-left and a centre-right orientation. At the moment, the following parties are present: Social Democratic Party (PSD), seen as a far left party of 'old-timers'; four centre-right/far-right historic parties: National Liberal Party (PNL), Conservative Party (PC), Democratic Party (PD) and Democratic Union of Hungarians in Romania (UDMR); and two newer parties, mainly constituted from fractions of the parties above: Liberal Democrat Party (PDL), fractions of PD and PNL since 2007; and National Union for the Progress of Romania (UNPR), fractions of PSD and PNL, since 2010.

Table 5 describes the relation between public funding received by each municipality in 2009–10 and their mayor's continuity and political affiliation between 2004 and 2016, compared with Bucharest and Romania. It does not support a clear link between the amount of public funding received by each municipality and a 'match' between municipal mayors' political affiliation and the country's political majority. Both S1 and S2 received the biggest shares of funding in 2009–10, but they were not associated with the party in power in Romania at the time. Table 5 also shows that all municipalities benefited mayor continuity in 2004–16 with one exception, S6, which changed its mayor in 2012, which

Table 2. Main characteristics of Bucharest's six municipalities (S1–S6).

Municipal characteristics	S1	S2	S3	S4	S5	S6	Bucharest
Population (number of inhabitants)[a]	194,608	304,523	342,541	261,306	241,585	333,422	1,677,985
Area (km^2)[a]	62	32	32	34	30	38	228
Population density (inhabitants/km^2)	**3,139**	**9,516**	**10,704**	**7,685**	**8,053**	**8,774**	**7,359**
Municipal budget 2014 (million RON)[b]	1,200	892	683	644	n.a.	993	n.a.
Municipal budget per inhabitant in 2014 (RON/inhabitant)	**6,170**	**2,960**	**1,990**	**2,470**	**n.a.**	**2,980**	**n.a.**
Number of apartment buildings earmarked for thermal rehabilitation[b]	1,100	1,110	1,425	1,600	1,023	2,114	8,372
Density of apartment buildings earmarked for energy retrofit (buildings/km^2)	**18**	**35**	**45**	**47**	**34**	**56**	**37**
Very large apartment building estates built in 1965–84 (number of apartments)[c]	–	–	Balta Alba (90,000)	Berceni (70,000)	–	Drumul Taberei (63,000); Militari (40,000)	n.a.

Notes: [a]See http://bucurestiul.info/populatia-bucurestiului/.
[b]Information collated by the author from individual municipal websites.
[c]Panaitescu (2012); RON is the Romanian currency – 'ROmanian New leu'.

Table 3. Bucharest's six municipalities: total and retrofitted by 2014 apartment buildings; municipal budged and percentage budget per total buildings; Bucharest's customized funding regime (since 2012).

Municipality	Buildings retrofitted by 2014	Total buildings for retrofit	Percentage retrofitted by 2014	Municipal budget in 2014[b]	Percentage of municipal budget per total buildings for retrofit	Customized funding regime
S1	628	1,100	57%	1,200 m RON	1.1	50:50:0
S2	511	1,110	46%	892 m RON	0.8	50:50:0
S3	309	1,425	21%	683 m RON	0.5	60:30:10 (< €150) 60:20:20 (< €350) 60:10:30 (< €500)
S4	117	1,600	7%	477 m RON	0.3	50:30:20
S5	215	1,023[a]	21%	n.a.	n.a.	50:30:20
S6	244	2,114	11%	993	0.5	50:50:0
Bucharest	2,024	8,372[c]	25%	n.a.	n.a.	n.a.

Notes:
[a]No statistics were available for S5; the current value was calculated by deducting from Bucharest's total.
[b]Budgets were compiled by the author from each individual municipality website.
[c]Ivanov (2015).
Source: Compiled by the author from Ungureanu (2014) and Vrabie (2014).

might explain the municipality's slower progress and drive on energy retrofit. However, one cannot argue that variation in municipal performance on energy retrofit can be explained by a lack of continuity in mayoral leadership.

Table 6, in turn, looks at wider municipal leadership for energy retrofit, defined here as mayor's support for energy retrofit via political manifestos and public statements, and the prioritization of energy retrofit at the municipal strategy level. It shows that some municipalities, alongside their mayors, place a greater emphasis on energy retrofit than others. It is first in a list of five priorities in S1 and strongly supported by a mayor's public statement. It is also a priority in S2:

> Priorities are decided at the municipal level and on the basis of priorities agreed during the electoral campaign. Rehabilitation has been one of our Mayor's priorities and it has stayed as such during his mandate. He has a 'masterplan' which establishes short-, medium- and long-term priorities. All political forces support this programme; there is agreement within our municipality. (S2)

Table 4. National funding by municipality in Bucharest, 2009–10 (under a 50:30:20 regime).

Municipality	National and European Union allocation	Percentage of total funding per Bucharest
S1	€13.3 million (59,209,473 RON)	26%
S2	€14 million (62,944,320 RON)	27%
S3	€5 million (21,291,768 RON)	9.8%
S4	€1.3 million (6,001,099 RON)	2.5%
S5	€7.7 million (33,999,541 RON)	15.6%
S6	€9.8 million (43,351,993 RON)	19.1%
Total for Bucharest[a]	€51.1 million	100%

Note: [a]BPIE (2014).
Sources: Author's secondary analysis of primary data from MDRAP lists from 2008 to 2010 (MDRAP, 2009, 2010a, 2010b).

However, energy retrofit does not seem to be ranked very highly among municipal priorities in the other four municipalities, despite being acknowledged on their websites as an important area of action. It is ranked third out of five in S3, not a top-three priority in S4, not mentioned at all in S5, and ranked 13th out of 14 in S6.

Institutional interaction, trust and collective action

The 'handlers' (municipalities) are at the centre of informal interaction between the various institutions of retrofit. This is, however, a one-way interaction, from municipalities to the other institutions. For example, condominium associations do not play an active role in shaping the retrofit action and have no formal mechanism of interaction with any other institution but the municipality; they do not even have a say in the selection of contractors or building works reception/audit.

Some formal interaction exists, however, between municipalities, 'intelligence gatherers' and construction firms. This is established via legal agreements and contracts but also emerging informal partnerships, as municipalities prefer to work with the same 'intelligence gatherers'. Despite 'knowing' each other, however, 'intelligence gatherers' do not interact with each other and compete for resources.

> We have only worked with X municipality and Y municipality so far; the whole procedure is transparent and we work well together. That's why, I think, they keep coming back to us. (AAEC)

Table 5. Bucharest's municipalities: percentage of national funding 2009–10 (under a 50:30:20 regime); mayor's continuity and political affiliation 2004–16, compared with Bucharest and Romania.

Municipality	Percentage of total funding allocation (in 2009 and 2010)	Major/political affiliation		
		2004–08	2008–12	2012–16
S1	**26%** (€13.3 m)	Chiliman PNL	Chiliman Independent	Chiliman[a] Independent
S2	**27%** (€14 m)	Onteanu PSD	Onteanu UNPR	Onteanu UNPR
S3	**9.8%** (€5 m)	Negoita L PSD	Negoita L PSD	Negoita R PSD
S4	**2.5%** (€1.3 m)	Inimaroiu PNL	Popescu-Piedone UNPR	Popescu-Piedone[a] UNPR
S5	**15.6%** (€7.7 m)	Vanghelie PSD	Vanghelie PSD	Vanghelie[a] PSD
S6	**19.1%** (€9.8 m)	Poteras (PDL)	Poteras PDL	Manescu PNL
Bucharest	**100%**	Oprea Independent	Oprea Independent	Oprea[a] Independent
Romania	**200%**	PNL + PDL	PDL + UNPR + UDMR	PSD + PNL + PC (May–December 2012) PSD + UNPR + PNL + PC (2012–14) PSD + UNPR + PC + UDMR (2014–15) Apolitical/technocrat (2015–present)

Note: [a]Suspended in 2015 and investigated for corruption in relation to 'favouritism' in public procurement and pocketing 10% commission.
Source: Individual municipal websites.

Construction firms also have direct and strong interaction with the municipality and with 'intelligence gatherers' when their roles overlap, but have no formal channel for interaction with condominium associations to which works are delivered. Concerns have also been voiced about wider lack of interaction between the various institutions of energy retrofit.

> There is a generalised lack of dialogue between us – one could work more across Bucharest's six municipalities, with other cities in Romania or abroad or other interested parties, but there is no interest to do that! Also, there are cities in Romania that are better at thermal rehabilitation than Bucharest, for example Brasov, Alba Iulia, Topoloveni, Mioveni – some, fully done! In the end, all is down to how interested and connected is the Mayor. (ICEMENERG)

It is argued that the interaction between formal and informal institutions is facilitated by trust in institutions, *i.e.*, the more trust in institutions, the better the interaction (Raiser et al., 2001). Interviews revealed relatively good levels of trust within individual institutions, but not within and between institutional families.

> We all compete for the same resources. If their building is done, the municipality might not have the money to do ours. Also, I am not sure who they know and what connections they have which might put them at an advantage. It is always best to keep yourself to yourself. (RS1)

In other words, membership to an institutional group/family does not carry 'default' trust among the members of that institutional group/family. Institutional group/family members trust in isolation and are divided by trust from other members in their institutional group/family, but also other institutional groups/families.

'Default' trust was found between three pairings of hard institutions, enforced via legal agreements: 'handlers' and 'clients'; 'handlers' and 'intelligence gatherer'; and 'handlers' and 'deliverers'. However, that did not pave the way for mutual exchanges of knowledge or 'favours' between these institutions.

> I don't like contributing ideas and advice for free – we are forbidden to do that! People either steal them and go on to make money, or blame us if something goes wrong. I like to have my back covered and so, I follow the books and only get involved under contractual agreements. (PBG)

'Calling on favours' was generally associated with institutional corruption and people were weary of talking about it. When asked whether any kind of reciprocal exchange or favour helped or can be of help in the delivery of energy retrofit in one municipality, the interviewee answered:

> Favours? What favours? Miss, we don't have this type of 'ballet' here! We would have the EU accusing us of corruption in no time! We follow what is written and approved and don't ask for favors! … and after a moment of silence, he added. … However, it would be good to call on favours from time to time. … At least in that way, one could hope that something might come his way one day …. (S4)

Little evidence of collective action was found at the level of soft institutions of energy retrofit: 'clients' and 'non-

Table 6. Wider municipal leadership for energy retrofit across Bucharest's six municipalities as a priority in the municipal strategy and the mayor as a driving force.

	Priority?	Municipal strategy	Mayor as a driving force?
S1	First of six	1. **Thermal rehabilitation** 2. Building of social housing 3. Urban regeneration 4. Culture and education 5. Tourism 6. Local economic development (http://www.primariasector1.ro/)	Yes (stated on website)
S2	'[A] priority'	No municipal strategy available. '… Rehabilitation has been one of our Mayor's priorities and it has stayed as such during his mandate …' (S2)	Yes (S2 interview)
S3	Third of five	1. Building of social housing 2. European projects 3. **Thermal rehabilitation** 4. Waste 5. Efficient administration (http://www.primarie3.ro/)	Not clear
S4*	Not in top three	No municipal strategy available. 'The programme for thermal rehabilitation is part of the municipal wider strategy and most of the time a local priority. However, local priorities are decided by elected councillors on the basis of electoral promises which for S4 are: improvements to parks and roads and better social services' (S4)	No (S4 interview)
S5	Not a priority	1. Education 2. Urban infrastructure improvement 3. Markets upgrade 4. Park improvement	Not clear
S6	13th of 14	1. Green space 2. Leisure and culture … 10. Local markets 11. Environmental protection 12. Snow clearing **13. Thermal rehabilitation** 14. Health 'Our mayor has so many other priorities and there are so many other things to do in our municipality, that the energy retrofit of apartment buildings is not a priority' (S6)	No (S6 interview)

Source: Secondary analysis of publicly available individual municipal strategies, complemented with data from the interviews.

governamentals'. Condominium associations had a passive role, while the two NGOs interviewed were only indirectly involved and had a rather negative view about the programme:

> The programme is more about 'image' than reducing energy consumption. It is a lot of 'green washing'! This programme is like a 'gift from your municipality', the residents do not have to give or do anything in return … and this, of course, leads to low levels of involvement and responsibility on the resident side. (ATU)

> This can be seen as an indication of little interaction between hard and soft institutions of energy retrofit and so, problematic institutional design and poor urban governance.

Moreover, nobody seemed willing to engage 'for free'. 'Handlers' pursued targets and electoral leverage, 'clients' free improvements to their homes, 'intelligence gatherers' paid fees and 'deliverers' profit margins. Even 'non-governmentals' seemed generally to be disinterested to engage with the programme at no cost.

> In principle, the Order of the Romanian Architects (OAR) has called itself 'a disinterested player' in the name of architectural aesthetics and a coherent style for Bucharest. However, some are of a different opinion because OAR wants to get involved as a 'paid advisor'! As regarding other organizations like NGOs … of course they have to be paid! Nothing is for free in this country! (LHR)

Conclusions

Following from the above discussion and the initial questions raised at the beginning of this paper, three answers are put forward. First, the institutional complexity of energy retrofit of apartment building in Bucharest is significantly underestimated. The formal institutional landscape is dominated by hard institutions, which is characterized by weak interactions (1) between formal and informal institutions (where limited trust is seen as a main explanation); and (2) between hard and soft institutions (where lack of collective action is seen as a main cause). Second, spatial disparities were found to exist in the distribution of Bucharest's apartment buildings. There is an uneven distribution of buildings in need of renovation and the currently retrofitted buildings. There is also uneven spatial distribution of public subsidy and municipal investment for retrofit. Third, the spatial disparities accompany the variation in the energy retrofit performance at the municipal level. This can be explained by a combination of factors including municipal leadership (*i.e.*, mayor's support and municipal prioritization), 'wealth' (*i.e.*, municipal budget per inhabitant and energy retrofit spending), and public subsidy, and, potentially, characteristics of the housing stock such as typology, size and layout.

Institutional complexity

In a broad sense, institutions can be understood and classified along formal–informal and hard–soft lines of

distinction. The focus here is on the informal institution of trust, as the gel for interaction between formal and informal institutions. Six types of formal institutions were identified for their involvement in of apartment building retrofits: four hard (*i.e.*, 'handlers', 'controllers', 'intelligence gatherers' and 'deliverers') and two soft (*i.e.*, 'clients' and 'non-governmentals'). However, only two out of six institutions ('handlers' and 'clients') were acknowledged in policy and legislative documents, while four ('controllers', 'intelligence gatherers', 'deliverers' and 'non-governamentals') were not. This yields a more complex and finely grained institutional landscape, with institutions that are active at all levels from international, through national, city and municipality, to building level. It also suggests a more bottom-up and decentralized institutional landscape where retrofit processes are shaped and delivered locally, rather than from the top as currently portrayed by the literature.

Non-acknowledged institutions were left outside the current national framing for energy retrofit and so their roles and responsibilities were often unclear and/or questionable. For example, some institutions wore two hats (*i.e.*, they could be both 'intelligence gatherers' and 'deliverers'), which suggested a conflict of interests. Moreover, tensions existed between various institutions such as, for example, between 'clients' and 'delivers' due to the fact the 'clients' did not have a say in the choice of 'deliverers' and the quality of their work. These aspects should be reconsidered in the future shaping of energy retrofit policy and legislation in Romania, but probably also in other CEE countries as well, as all relevant institutions and stakeholders should play an important role in the shaping and, thus, delivery of renovation processes (Feige et al., 2011).

The interaction between formal and informal institutions was poor in Bucharest. This was determined by little trust between institutional groups/families – whereby, for example, 'clients' did not trust 'deliverers' – but also between the members of the same institutional group/family – whereby one 'intelligence gatherer' did not trust another 'intelligence gatherer'. 'Default' trust was an exception, guaranteed by the rule of law and associated with an expectation of fair treatment (Miller et al., 1997). Bucharest also revealed an imbalance between hard and soft institutions, with the former overpowering the latter; and lack of collective action, seen as a cause of weak interaction between hard and soft institutions of energy retrofit (Healey et al., 2002).

The research confirms that poor institutional interaction between institutions leads to a lack of institutional 'equilibrium' (Platje, 2008) and 'congruence' (Lankina et al., 2008) of energy retrofit; energy retrofit action mainly takes place 'outside people's lives' (Matthiesen, 2002) in Bucharest/Romania. This, in turn, impacts negatively on the institutional design and good governance of energy retrofit processes and subsequently on energy retrofit performance at the local level. This institutional interaction, however, needs further research to understand better how it affects variation in municipal performance.

Spatial disparities

Spatial variation in the municipal delivery of energy retrofit of apartment buildings in Bucharest does exist. Factors associated with this variation (*i.e.*, 'percentage retrofitted by 2014' in Table 3) across Bucharest's municipalities and high municipal performance in S1 and S2 were primarily political – municipal leadership (*i.e.*, 'prioritization within municipal strategy' and 'mayor support' in Table 6) – and, to a certain extent, economic – municipal 'wealth' (*i.e.*, 'budget per inhabitant' in Table 2), municipal spending (Table 3) and public subsidy (Table 4). However, the high-performing municipalities had a smaller stock of apartment buildings in need of energy retrofit as a share of their total stock, no large housing estates and better city locations historically (Table 2). Thus, built environment factors such as the typology, size, layout and location of this type of housing, which were not examined in the current research, might also influence variation in performance at the local level, as well as explain poorer performance in S3–S6.

Bucharest was allocated 50% of energy retrofit public funding in 2009–10 for its 10% share of apartment buildings at the national level. This indicates that 'equalization' mechanisms did not work well in Romania (Lankina et al., 2008). Capital cities in the CEE used to be centres for economic, cultural and, most importantly, political power under previous socialist regimes. Closely associated with the party apparatchik, they consumed large amounts of human and monetary resources and enjoyed centre-stage attention. Bucharest, as perhaps other CEE capital cities, seemed still to enjoy some of its former primacy at the national level and claimed most of the available public funding for energy retrofit at the expense of other cities. This is significant as 90% of Romania's apartment building stock in need of retrofit is outside Bucharest in areas of sometimes severe deprivation and disadvantage (Bouzarovski, 2014).

Inequality of energy retrofit

The current action for the retrofit of apartment buildings in Bucharest did not reach municipalities with the highest need and potential. The findings uncovered an unequal distribution of energy retrofit action across

Bucharest's municipalities, and suggested a similar course of action at the national level, between Bucharest and other cities in Romania. A combination of factors (*e.g.*, municipal leadership, wealth and retrofit spending, and public subsidy) seems to progress retrofit performance for some municipalities at the expense of others. At the same time, not all apartment buildings in one municipality might need public subsidy or the same level of public subsidy to undertake energy retrofit, *i.e.*, the 'ecological fallacy' of urban programmes. Between- and within-municipality unequal distribution of energy retrofit action needs to be addressed by future housing retrofit policy and initiatives in the CEE.

This, however, raises questions about the current geography and 'fairness' of retrofit actions in the CEE and highlights the existence of interrelated factors which can place some municipalities and cities in a position of disadvantage beyond their control. Current debates in the CEE region focus on 'how much' and 'how quickly' the retrofit targets can be delivered rather than on 'where' and 'for whom' these can be achieved. This has implications for the wider European housing retrofit agenda but also for national programmes in the CEE, which should reflect and address existing imbalances between cities and within cities for a fairer and more efficient energy retrofit of apartment buildings.

The institutional and political framing of energy retrofit of apartment buildings in the CEE has been less addressed and little related to the wider agendas and institutional framing of energy efficiency at the EU level. It is well known that the CEE lacks institutional capital and that institutional interaction is weak as a result of limited trust and collective action. However, this needs a better understanding. The case of Bucharest showed that municipalities can employ multiple models for institutionalizing and governing energy retrofit, with a potential for more decentralized roles and responsibilities. Soft institutions are important as pressure groups to 'control' hard institutions but also to influence municipal leadership and political commitment to energy retrofit. This can build more institutional capital for retrofit which, in turn, can mediate conflicts between specific urban policies such as retrofit and other local social, economic and environmental priorities at the municipal level.

Finally, two further observations should be made. First, tensions can surface between the role of municipalities and that of other institutions involved in the delivery of retrofit. This means that the 'centrality' of the municipality in delivering energy retrofit in the CEE imposed via legislation and access to funding can be problematic, and it has been argued in relation to other areas of energy efficiency in buildings that it can lead to an 'inadequate functioning' of municipalities in relation to these policy areas (Poputoaia & Bouzarovski, 2010). Second, the current energy performance targets for energy retrofit of apartment buildings aim for annual consumptions of 100 kWh/m^2, which are not overly ambitious when compared with passive house standards of 15 kWh/m^2. Thus, the current retrofit action in the CEE only achieves a smaller proportion of the potential for energy saving that buildings hold (Bouzarovski, 2015; IIASA, 2012).

Notes

1. CEE refers to the following eleven EU-28 countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. This classification is used by the Building Performance European Institute (BPEI) and is based on 'the climatic, building typology and market similarities' of the region (BPIE, 2011, p. 8).
2. Building retrofit does not have a consistent definition. A full building retrofit approach refers to energy, water and waste systems in buildings. It can involve light or deep measures, ranging from double-glazing to a 'whole building' approach. At present, apartment building retrofit in the CEE does not address a building's water and waste systems and focuses on improving its energy performance via measures such as wall, loft, roof and basement insolation; windows and door air tightening; double-glazing etc.; and sometimes heating system optimization. This type of energy-led retrofit comes under names such as 'retrofit', 'thermal efficiency retrofit', 'thermal improvement', 'thermal renovation' or 'thermal rehabilitation'. This paper will use the term 'energy retrofit' due to its main focus on improving energy performance.
3. Apartment building housing is the equivalent of condominium housing, housing in multi-occupation which consists of groupings of individual households owning an apartment each in a shared building. Condominium housing is different from cooperative housing (which builds and administers housing for their members) and housing associations (which build and/or administer social housing).
4. Local urban performance is defined in the literature mainly in relation to a city's economic performance; however, this paper takes a broader view and defines it as a city's/municipality's ability to achieve urban policy goals.
5. The author has worked and conducted research in Bucharest and speaks Romanian. This has helped with data collection and access to information, but also has added a richer and longitudinal understanding of the urban problematic.
6. The municipality pays 30% and the condominium association 10% if 50% plus one residents have a monthly household income < €150 per household member; the municipality pays 20% and the condominium association 20% if 50% plus one residents have a monthly household income < €350 per household member; and the

municipality pays 10% and the condominium association 30% if 50% plus one residents have a monthly income < €500 per household member.

Acknowledgements

The author is indebted to the Bartlett School of Planning at University College London for seed-corn funding that has made possible this research. For encouragement and detailed reviews on earlier drafts, the author is also grateful to Yvonne Rydin and John Tomaney at UCL, and Andy Jordan at UEA. My thanks also go to the four anonymous reviewers of this paper - they have provided very detailed and constructive feedback; without their dedicated help over two rounds of revisions this paper would have not been possible. My special thanks go to Richard Lorch, the editor of this journal, who has been extremely thorough, positive and efficient throughout the process. My final thanks have go to Elisabeta Ilie who has helped with primary data collection in Bucharest, a lengthy and challenging process.

Disclosure statement

No potential conflict of interest was reported by the author.

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