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Multiple transformations: theorizing energy vulnerability as a socio-spatial phenomenon

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Abstract

The on-going transition towards low-carbon forms of energy provision (frequently termed 'energy transitions') has triggered far-reaching material, economic and institutional reconfigurations at the global scale. There is evidence to suggest that energy transitions increase the social vulnerability of actors involved in and affected by them, including entities operating at different scales, from individual households to entire states. However, the link between energy vulnerability and energy transitions

remains poorly understood. We aim to contribute to the formulation of an explicitly geographical perspective on this relationship. The paper is based on an analysis of documentary evidence and 170 expert interviews undertaken between April 2013 and March 2015. This research took place in the post-communist states of Central and Eastern Europe (CEE) where systemic change has fundamentally altered the institutional landscape of the energy sector since the early 1990s. Our findings point to the need for understanding energy vulnerability as an evolving socio-spatial phenomenon embedded in multiple layers of institutional change and organizational practice. We identify urban landscapes as the primary site for the geographic expression and articulation of domestic energy deprivation.

Keywords: energy vulnerability, energy transitions, poverty, Central and Eastern Europe.

Introduction

The need for moving towards low-carbon forms of energy provision is gradually becoming a global policy priority, largely in response to concerns over the deleterious implications of climate change. The deep reconfigurations of patterns of supply and demand required by this process have meant that sustainable ‘energy transitions’ (Bulkeley, Broto, and Maassen 2014) have become a significant point of discussion in the academic literature. While initial interest in the topic was mainly focused on the technical challenges posed by decarbonization dynamics, more recent scholarship has begun to emphasize the social and cultural embeddedness of processes of systemic change (Horta et al. 2014; Seyfang et al. 2014). It has become apparent that technological and infrastructural investment alone cannot provide a sufficient basis for moving towards less carbon-intensive energy circulations; there is a need for addressing the institutional and political underpinnings of energy generation and transmission, as well as the socio-material practices that inform its consumption (Geerts et al. 2014). Geographers have been making an increasing contribution to this field, by highlighting how contingencies of place, space and territory are entangled with the production and articulation of energy transitions (Bridge et al. 2013; Calvert 2015; Moss 2014; Pasqualetti and Brown 2014). Such work is starting to offer a critical corrective to some of the dominant approaches towards the theorization of ‘sustainability transitions’ more generally, by both challenging and enriching existing understandings of the relationship between socio-technical change and spatial contingencies (Coenen, Benneworth, and Truffer 2012; Lawhon and Murphy 2012)

While energy transitions research has been mostly focused on the decarbonization of economic activities, it should be pointed out that wider systemic changes in patterns of energy recovery and distribution have historically always been associated with the emergence of new patterns of socio-spatial inequality (Bridge et al. 2013; Smil 2003). This has entailed the uneven development of regional and urban landscapes (e.g. as a result of the decline of particular forms of energy production and transport, and the rise of others) as well as impacts on the welfare of households and local communities (principally involving distributional effects such as price increases, or shifts in the nature of energy demand and the availability of particular resources). Thus, energy transitions may adversely affect the social, economic and political *vulnerability* of actors involved in and affected by them, including entities operating at different scales, from individual households to entire states. This is particularly true with

respect to the driving forces of energy poverty – a condition characterized by the inability of a household to secure materially- and socially-necessitated levels of energy services in the home. The meaning of the term ‘necessitated’ in this context is normally derived from relative and capabilities approaches, and normally refers to the level of energy services that enables full participation in the customs and practices that define membership in society, while maintaining a healthy indoor environment (Bouzarovski and Petrova 2015; Day, Walker, and Simcock 2016; Simcock, Walker, and Day 2016). There is evidence to suggest that energy transitions may adversely affect the well-being of social groups susceptible to energy poverty, even if such changes lead to long-term decarbonization of the economy, thus allowing for more efficient and affordable energy use (Jerneck and Olsson 2008; O’Brien and Hope 2010; Romero-Lankao and Dodman 2011).

Energy poverty itself is being increasingly conceptualized via a vulnerability matrix (Middlemiss and Gillard 2015). Vulnerability thinking allows for the driving forces of domestic energy deprivation to be captured via a temporally dynamic framework that highlights the pathways and risks that capture a household’s propensity to become unable of securing inadequate heating, lighting and similar services in the home (Bouzarovski and Petrova 2015). However, the link between energy-related vulnerabilities and transitions is poorly theorized in the social science literature – especially when it comes to the manner in which processes of socio-technical change create spatially-embedded forms of inequality. More broadly, the interaction between transition processes and place-based factors in determining the nature and location of energy vulnerability remains unclear, highlighting the need for a geographical conceptualization of the different ways in which household level deprivation both influences and is contingent upon disparities occurring at a wider range of spatial scales.

With such potential lines of inquiry in mind, this paper explores the geographical relationship between energy transitions and social vulnerability. There is a focus on processes based at the urban scale, which we see as the primary locus for the manifestation of energy vulnerability via a set of specific socio-spatial phenomena. The paper does not conceptualize energy transitions within the presently dominant trope of decarbonization (Moss, Becker, and Naumann 2014), but rather sees them as broader processes of systemic change in the patterns of fuel production, transport and demand. As such, the paper has three inter-related aims. First, it investigates the manner in which the relationship between energy transitions and vulnerability is effectuated via dynamics of institutional change, managed by state bodies with the aid of a range of steering and governance activities. Second, we interrogate how such energy sector reconfigurations are both reflected in and shaped by various domains of social organization, especially in terms of creating vulnerability-relevant outcomes that have deviated from the expected neoliberal norm. The third aim of the paper is centred on the urban dimensions of infrastructural change, underlining the material aspects of socio-technical transformations in the context of energy vulnerability.

The paper is based on evidence sourced from field work in the post-communist countries of Central and Eastern Europe (CEE), which have been undergoing fundamental changes to the manner in which energy is regulated, generated and consumed across the economy. This leads us to juxtapose energy transition with theorizations of the ‘post-communist transition’ relevant to the case study context.

Updating and building on the results of earlier work (e.g. Bouzarovski and Tirado Herrero 2016; Petrova 2016), we highlight the institutional tensions and outcomes that arise out of the clash between neoliberal paradigms and entrenched legacies in societies that are transitioning away from a centrally planned economy. This discrepancy has been associated with the institutional remoulding of the energy sector, so as to allow for the unbundling of formerly vertically and integrated monopolies, and the privatization of utility companies in line with the neoliberal model of energy regulation. The neoliberalization of energy activities has also resulted in the emergence of an entirely new range of organizational actors – from nominally independent regulatory bodies, to energy traders and retail suppliers operating on a commercial basis (Kamiński 2012; Padgett 2011). There have been significant price increases in order to remove implicit tariff subsidies, and various structural changes in the nature of production and demand. The social and institutional displacements created by these reconfigurations have led to the rapid rise of energy poverty throughout CEE, creating a situation where this region has Europe’s highest rate of households who are unable to heat their home to an adequate level (Thomson and Snell 2013; Bouzarovski 2014; Bouzarovski and Tirado Herrero 2015; Miazga and Owczarek 2015; Pye et al. 2015).

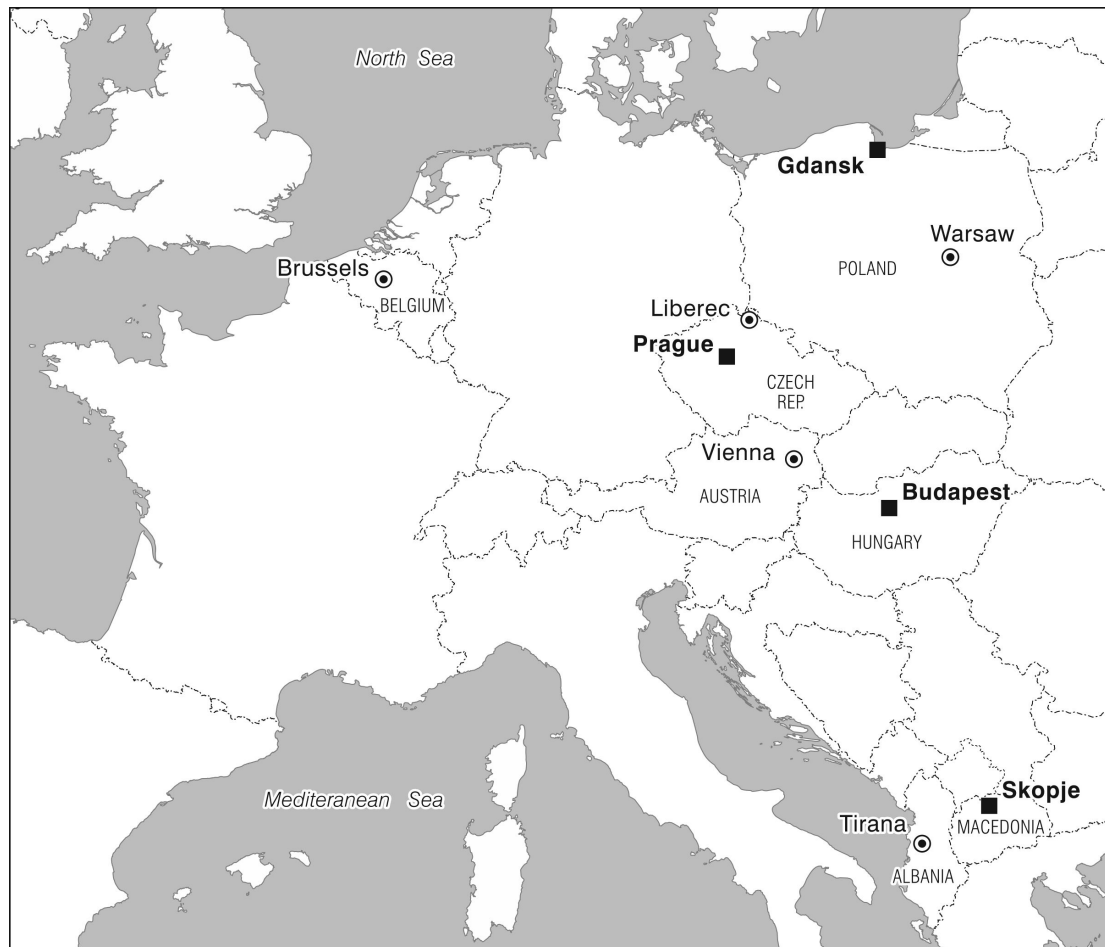
Methodologically, the paper is based on extensive analyses of documentary evidence (legal acts, policy statements, strategy reports, news items), combined with a total of 170 ‘expert’ interviews undertaken between April 2013 and March 2015. The interviews included representatives of various government ministries and agencies, local authority employees, independent regulatory bodies, companies and private enterprise, advocacy and lobby groups, residents’ associations and housing co-operatives, as well as members of parliament, journalists and academics.¹ They took place in nine CEE cities: Gdansk and Warsaw in Poland, Prague and Liberec in Czechia, Budapest in Hungary, Skopje in Macedonia, and Tirana in Albania (Figure 1). Interviews were also undertaken at the European Commission in Brussels and the Energy Community Secretariat in Vienna. There was a particular focus on the situation in Poland, Macedonia, Hungary and Czechia. These four countries were chosen for reasons of representativeness: they embody a range of restructuring pathways, including different ownership models and situations where the reform of specific infrastructures inherited from socialism has created various local tensions.

The embeddedness of energy reforms within broader transformation processes in CEE has prompted us to rely on the ‘multiple transformations’ approach (Sýkora and Bouzarovski 2012), where the focus is on the manner in which the temporal sequencing and organizational layering of energy reforms has been expressed via ‘institutional norms, social practices and urban spatial formations’ (page 2). This paradigm has provided a conceptual framework for analysing the evidence collected in the field – in coding the interview transcripts and documentary material, we highlighted phenomena and processes that could be categorized within its three constituent processes (institutions, social processes and urban landscapes), even if the boundaries between them are messy and contingent. It should be noted that multiple

¹ The interviewees were selected and approached based on the outcomes of the documentary analysis and prior knowledge of the situation on the ground. Interviews were between 1 and 2 hours long. Some of them were recorded while others were not, in line with the interviewees’ preferences.

transformations are also multi-scalar – even if it privileges the urban as the primary nexus through which systemic reconfigurations are manifested and materialized, this framework posits that processes of change may occur at a variety of spatial sites: from households to nation states and beyond. The three ‘transitional’ layers within the multiple transformations model (heretofore: MTA) also correspond to the three ‘core’ empirical sections of the paper. They are preceded by *i*) a discussion of the conceptual links between energy transitions and socio-spatial vulnerabilities, and a *ii*) a review of energy-related challenges in the context of urban and regional change within the empirical setting of the study.

Figure 1. Interview locations – principal case study cities highlighted with black squares.



Revisiting the ‘new energy paradigm’ via a geographical lens

Even though the term ‘energy transitions’ implies that a shift towards a socially desirable end-state, there is no consensus among practitioners or academics as to the exact shape of this future as far as the on-going process of decarbonization is concerned. While such debates have often taken place under the conceptual umbrella of ‘sustainability transitions’ (Frantzeskaki, Loorbach, and Meadowcroft 2012; Lawhon and Murphy 2012), the multi-layered social and technical nature of energy provision means that low-carbon policies inherently involve a complex interplay of political interests, institutional forces and governance practices. The suggestion that

the long-term transformation of energy systems will prove ‘to be a messy, conflictual, and highly disjointed process’ (Meadowcroft 2009, 323) destabilizes the notion that what is at stake is a linear movement towards a pre-defined environmentally sustainable condition. Moreover, even if a certain set of technical requirements is achieved, there may be no underlying change to the regulatory practices that surround energy use: the same type of infrastructural outcome can be achieved via different policy means, and without altering the basic principles of system organization (Bridge et al. 2013). The new ‘energy paradigm’ (Helm 2005), therefore, opens fundamental questions about the manner in which different political interests and social formations interact with technological change. Some of these dilemmas have included the role of the state in exercising different governing capacities in steering socio-technical transitions (Baker, Newell, and Phillips 2014), the ability of ‘community-based initiatives’ to generate innovation (Seyfang and Haxeltine 2012), the manner in which intermediary organizations assist the implementation of low-carbon strategies (Marvin 2012), as well as the historical forces involved in shaping deep-seated structural shifts in systems of provision (Smil 2003).

At the same time, theorizations of on-going energy restructuring processes have been dominated by the transitions management approach – a model of environmental governance based on the suggestion that a desired change in socio-technical systems can be achieved by establishing a set of shared visions, practices and adaptations among all relevant stakeholders (Shove and Walker 2007). Within this framework, the ‘multi level perspective’ (MLP) has often been used as a heuristic tool in explaining the systems and processes that both underpin and drive low-carbon transitions (Verbong and Geels 2007). The MLP is based on the understanding that socio-technical transitions and their associated innovations take place at three levels: ‘regime’ (which capture the established rules, institutions and infrastructures associated with a given system), ‘niche’ (the locus for radical innovations and experimentation can occur due to, in part, decreased regulatory influence or oversight) and ‘landscape’ (the external backdrop against which changes take place, encompassing social, economic and material aspects). Despite using spatial metaphors, however, the MLP has been criticized for failing to provide ‘formal attention to space, place and geographical scale’ (Bridge et al. 2013, 333), resulting in efforts to think about energy transitions through an explicitly spatial heuristic. The notion of ‘energy landscape’ – as a set of interconnected social, material and cultural elements nested in notions of place, community and identity – has been employed to highlight the mechanisms through which energy flows are both spatially embedded while integrating social and physical systems (Blaschke et al. 2013; Bouzarovski 2009; Castán Broto, Salazar, and Adams 2014; Soini et al. 2011); and studies of urban energy policies have highlighted the presence of specific socio-technical constellations and power dynamics within the built structures of cities (Bulkeley, Luque-Ayala, and Silver 2014; Rohracher and Späth 2014).

Historically, energy transitions have been associated with far-reaching shifts in the fundamental underpinnings of resource production and distribution, as well as their associated economic and human development patterns. It is claimed that the adoption of low-carbon technology solutions and mitigation strategies brings about multiple benefits in the form of enhanced social welfare and reduced inequalities, and that synergies exist between climate change, poverty alleviation and economic development agendas (Tirado Herrero and Urge-Vorsatz 2012; Tirado Herrero 2013).

Some of the scholarship in this vein has highlighted the key role of end-use energy services in driving wider socio-technical shifts in society: it has been argued that an improved understanding of energy outputs – rather than the dominant focus on energy inputs – can help explain the relatively slow pace of change in some instances, as well as the emergence of unintended consequences (Grubler 2012). A distinct body of research has explored the political economies of socio-technical transition (Meadowcroft 2009; Baker, Newell, and Phillips 2014): while acknowledging the pivotal contribution of MLP-based theorizations in this context, such authors have also highlighted the MLP's shortcomings in terms of the 'assumptions about the nature of state capacity, markets, institutions and infrastructural systems' (Power et al. 2016, 12) as well as the manner in which the foregrounding of technology places an emphasis on niche innovations without considering the activities of powerful stakeholders 'whose behaviour cannot be easily shaped by the state' (ibid). They argue that diverse energy pathways are fundamentally shaped by dynamics of 'power, capacity and autonomy that states have to secure and negotiate' (ibid, p. 11).

Juxtaposing the literatures surveyed above – particularly the suggestions that energy transitions are spatially contingent, imbued with political power, and driven by end-use energy demand – suggests that economic and social position of actors and formations implicated in such processes may be deeply affected by structural shifts in energy inputs and outputs alike. This can involve different scales: from nation states whose energy supply may be disrupted, to regions that have lost their economic base and consumers who are affected by the decreased availability or increased price of certain fuels (Smil 2003; Bouzarovski and Tirado Herrero 2015; Krishnan 2016). Recent years have also seen a range of contributions focusing on the social vulnerabilities arising the nexus of climate change mitigation, adaptation, and energy policy (Byrne and Portanger 2016). Some of this work has drilled down to the urban scale, to highlight how the governance of metropolitan systems is enmeshed with perceptions and framings of risk (Rocher 2016). It can thus be argued that transitions render some actors more socially and economically *vulnerable* to internal shocks and external pressures, creating new inequalities across time and space.

However, the geographic workings of the energy transitions-vulnerability relationship have received little analytical attention, largely because energy vulnerability itself remains poorly theorized. Recent energy vulnerability scholarship – whose detailed consideration would extend beyond the confines of this paper – has emphasized the importance of considering the problem through a spatial and temporal framework, while highlighting its social construction and the need to consider how why and how a given entity may become or be considered vulnerable (Christmann et al. 2012; Philo 2012; Waite, Valentine, and Lewis 2014). Energy vulnerability has been used in a very wide range of contexts, as it can refer to the infrastructural determinants of resource supply and import dependence at a variety of scales, as well as the systemic conditions that allow some entities to become more socially and technically precarious than others (Christie 2009; Hall, Hards, and Bulkeley 2013; Hiteva 2013). There is a distinctive literature on household energy vulnerability, understood as a set of circumstances that underpin the risk of falling into fuel and energy poverty. Having applied Spiers' (2000) understanding of 'emic' vulnerability to utility services such as heating and cooling, Middlemiss and Gillard (2015) suggest that energy vulnerability can also be articulated via a bottom-up perspective that characterizes experiences of deprivation.

The material embeddedness of energy vulnerability points to the need for considering the condition through a geographical lens. In this paper, we treat energy vulnerability as a 'socio-spatial formation' situated at the nexus of political decisions, economic inequalities, organizational practices, on the one hand, and the physical features of place and space, on the other. Socio-spatial formations have been theorized extensively in the geography literature, although this body of work has been rarely considered the agency of infrastructural systems. Initial use of the term was motivated by the need for exploring how the political and economic shifts associated with globalization gave rise to specific development patterns and practices of contestation at the urban scale (Amin 1994). More recent work on the topic has drawn upon regulation theory approaches to emphasize the institutional and political reconfigurations that have underpinned the emergence of entrepreneurial urbanism and the move from 'government to governance' (McGuirk 2012). At the same time, assemblage thinking has allowed for socio-spatial formations to be considered as heterogeneous and emergent networks involving the interaction of human and non-human entities via a range of distributed agencies (Anderson and McFarlane 2011; Dittmer 2013). The MTA – discussed in further detail in the section below – likewise explores the coming together of multiple spatial components via an evolutionary and processual approach: rather than building on approaches that are not cognizant of the spatiality of infrastructural systems at their core – such as the MLP – this paper uses the MTA as a blueprint to explore the relationship between energy transitions and vulnerability.

Post-communist energy transitions and vulnerabilities

Interpretations of transition processes as dynamics of far-reaching systemic change between two theoretically defined equilibrium states – can be found across a wide range of thematic and geographical contexts. Much has been written about the underlying forces involved in shaping the movement of post-communist societies across CEE and the former Soviet Union from the single-party political system and planned economy that existed before 1989, towards the stated goal of a multi-party democratic system and a market-based economy. Early debates on the subject revolved around the cleavage between the proponents of neoliberal shock therapy, on the one hand, and 'gradualists' and 'institutionalists' advocating a more context-sensitive and embedded approach, on the other (Pickles and Smith 1998). More recent discussions have focused on the reflection of transformation dynamics on everyday life, as well as their role in shaping various sectors of the economy (Petrova et al. 2013; Stenning et al. 2010). A growing number of theorists have tackled the urban implications of post-communist transitions: from efforts to capture the urban structures and models emerging from such processes (Gentile, Tammaru, and van Kempen 2012; Golubchikov and Phelps 2011) to explanations of patterns of socio-spatial divergence and polarization seen both within and across different cities (Kovács and Hegedűs 2014; Marcińczak 2012). Discussion points in this literature have included the extent to which urban and regional change in CEE can be seen as regionally idiosyncratic, as well as its relationship with wider global contingencies, particularly in the domains of post-colonialism and neoliberalism (Akçalı and Korkut 2015; Horschelmann 2002).

The MTA offers one of the more systematic entry points into the theorization of post-communist urban change (other recent approaches include “heteropolitization” and “hybrid spatialities” – see Gentile, Tammaru, and van Kempen 2012; Golubchikov, Badyina, and Makhrova 2014; Sjöberg 2014). As such, it opens the possibility of understanding energy restructuring processes within the context of wider spatial and territorial reconfigurations. Multiple transformations are, in some ways, parallel to the MLP in the transitions management literature, as the notion of three temporally and sectorally distinct layers – institutional reconfiguration, organizational change and urban landscapes – is also present here. However, the MTA is geographically explicit in its focus, with developments at the urban scale being seen both foregrounding and constitutive of socio-material dynamics (as opposed to the spatially indeterminate notions of ‘niche’, ‘landscape’ and ‘regime’). Rather than focusing on innovation and governance processes, the primary aim of the MTA is to capture parallel changes in the organization of the built environment, institutional configurations and decision-making practice, while integrating domains of transformation that have traditionally been seen within relatively separate scientific and policy registers (particularly in terms of how forms of urban differentiation are contingent upon wider political and material reconfigurations). It thus offers an alternative perspective onto the spatial embeddedness of socio-technical transitions.

At the heart of the MTA lies the proposition that processes of urban change in post-communist CEE have hinged upon a sequential chain contingent upon ‘the political application of normative concepts to spontaneously unfolding social changes’ (Sýkora and Bouzarovski 2012, 2). The first step in this array of transformations – itself the precondition for subsequent change – involves the establishment of new ‘political and economic rules’ (ibid) under the umbrella of government-managed institutional restructuring. This set of measures has both allowed for and stimulated the emergence of less formalized processes of economic and social change (‘dynamics of internationalization and globalization, economic-restructuring- induced deindustrialization, the growth of producer services, increasing social differentiation as well as clientelism and social differentiation’, ibid, pages 6-9). In turn, these have been reflected in the evolution of urban landscapes, via processes such as inner city regeneration, commercialization, suburbanization, gentrification and neighbourhood decline. The sequencing logic of the MTA, however, has led some authors to criticize the paradigm’s seemingly descriptive and schematic nature (Grubbauer 2012), although the framework has been frequently invoked in the study of particular transition cases as well as broader theorization of post-communist urban change (Cybriwsky 2014; Frantál et al. 2015; Sjöberg 2014).

The basic tenets of the MTA can be used to uncover the mutual inter-dependencies among restructuring decisions made during processes of systemic change, especially when it comes to the evolution of urban landscapes. Post-communist energy reforms lend themselves to study in this context due to operating at a variety of scales, while involving a plurality of material and institutional landscapes. What is more, CEE energy transitions have shown to be highly spatially contingent, as a result of being shaped by the socio-technical features of regions and places. This is epitomized in the vulnerability of particular countries to the interruption of energy supplies, as a result of the legacies of the region’s past. The dependency of many Eastern European and post-Soviet states on Russian gas resources has been central to the emergence of a number of crises in the region, not the least the on-going military conflict in Eastern

Ukraine. Post-communist energy transitions thus offer a conceptual locus for the integration of post-communist systemic change with wider understandings of energy restructuring.

Energy poverty is one of the theoretical and policy domains that allows for tracing the relationship between energy transitions and vulnerability in an explicit manner. Also known as ‘fuel poverty’ in contexts such as the UK and Ireland, energy poverty typically affects a relatively distinct set of socio-demographic groups that are principally characterized by low incomes, live in inefficient housing or have above-average energy needs. In many post-communist countries, however, energy poverty has become a widespread phenomenon, affecting middle-income strata and resulting in a significant reduction in levels of indoor heating during cold periods of the year. This is evidenced by the above average population shares of individuals who cannot keep their home adequately warm or experience high housing costs (Table 1) – key, if imperfect, indicators of the condition (Thomson and Snell 2013; Bouzarovski 2014). While such figures have not risen uniformly across the region – and in some cases are even lower than the EU average – policy relevant-research in Czechia and Poland alike has shown that urban households in particular are vulnerable to energy poverty, due to above-average numbers of pensioner-only households, as well as issues of unemployment and poor housing (Hrozek 2016; Miazga and Owczarek 2015).

Table 1: Shares of people with energy-poverty related problems in CEE countries. Source: EU Statistics on Living and Income Conditions. Asterisked data refer to 2014.

Country	Unable to keep home adequately warm		Heavy burden of housing costs on household budget	
	2006	2015	2006	2015
European Union (28 countries)	N.A.	10.2*	N.A.	36.7*
Euro area (18 countries)	8.7	8.4	33.7	36.2*
Bulgaria	69.5	39.2	63.1	41.2
Czech Republic	8.9	6.1*	23.3	27.4*
Estonia	2.3	1.7*	22.7	25.3*
Croatia	N.A.	9.7*	N.A.	66.3*
Latvia	25.7	14.5	31.2	31.0
Lithuania	27.6	26.5*	34.1	33.0*
Hungary	14.8	9.6	25.0	31.2
Poland	28.4	9.0*	40.7	55.7*
Romania	N.A.	13.2	42.7	63.7*
Slovenia	3.0	5.6	N.A.	39.1*
Slovakia	9.7	6.1*	33.6	35.8*
Macedonia	N.A.	26.1*	40.4	33.6*
Serbia	N.A.	17.1*	N.A.	55.7*

Post-communist energy poverty can be attributed to rapid increases in energy prices (due to the removal of state subsidies during the past 25 years), in addition to falling or stagnating real incomes and the historic inefficiency of the residential stock, appliances and heating systems. In a number of countries, the expansion of energy poverty has led to the decreased use of district heating and networked gas infrastructures, as a result of the switch towards more affordable fuels such as coal and firewood (Bouzarovski, Petrova, and Sarlamanov 2012; Petrova 2014; Ruggeri Laderchi, Olivier, and Trimble 2013). While energy poverty has rarely received explicit policy and scientific recognition across the region, its causes and effects – particularly the social impacts of high electricity tariffs – have been the subject of significant political attention. This is evidenced by events such as the massive protests over high electricity prices and privatization in Bulgaria, leading to the resignation of the country’s government in 2013 (ibid).

Transition I: Institutional restructuring and reform paths

Energy transitions in the CEE context were originally motivated and justified by the difficult state of infrastructures and regulatory practices in this domain at the end of communist rule. Central planning left countries in the region with highly energy intensive and inefficient economies reliant on fossil fuels, and in dire need of technological investment and upgrading (for a further discussion see Gray 1995; Ürge-Vorsatz, Miladinova, and Paizs 2006). This was also reflected in the composition of urban and regional landscapes: from the low thermal insulation and upkeep of the housing stock, to the high degree of urban compactness and the

presence of district heating systems covering large urban tracts. The fall of communism and the subsequent adoption of neoliberal economic and political reforms – initially under pressure from international financial institutions and subsequently guided by the process of EU accession – meant that the ‘market’ was offered as the panacea to all of the region’s energy-related ills (European Bank for Reconstruction and Development 2001; Gray 1995). It was expected that structural change would occur spontaneously, as a result of the removal of implicit price subsidies, the opening of the energy sector to competition, and the removal of formal regulatory and managerial authority from the central state. This is despite the fact that energy reforms led to increasing utility bills for households, while unfolding against the background of wider economic processes leading to rising inequality and unemployment rates (Stenning et al. 2010).

The energy landscape that currently characterizes the post-communist states in CEE is a far cry from the conditions found in the region only two decades ago. Generation, distribution and retail supply functions within formerly-integrated electricity and gas companies are now formally unbundled, with separate legal entities responsible for transmission activities. Each country possesses a nominally independent regulatory body in charge of operations such as licencing and price setting. However, this broad picture hides a much more intricate and complex regulatory architecture, in which the presence of an energy market that would work along the lines of initial policy prescriptions (as outlined for example in Gray 1995) is more often the exception than the rule. The role of the state in this largely understudied policy domain remains strong – even if the channels for the exercise of its power have been altered – as does the ability of material legacies to assert themselves over present and future reform paths (Bouzarovski, Šykora, and Matoušek 2016).

Within the study region, Czechia and Poland have undertaken the most extensive set of energy sector reforms relative to initial neoliberal prescriptions, even if efforts to decarbonize the economy have not featured prominently on the public agenda. Both countries have now fully transposed the provisions of the EU’s ‘Third Energy Package’ in their national legislation. This requires the legal and functional separation of transmission and distribution operations – themselves natural monopolies – from the economically competitive activities of energy generation and supply (Nowak 2009). Unbundling the transmission of gas and electricity implies that ‘system operators have effective and independent decision-making rights as well as independent management structures’ (ibid, 144) in addition to existing as separate legal undertakings. At the same time, both countries have been functioning as parts of broader ‘market coupling’ structures, allowing for the synchronization of cross-border transmission capacity allocation. Poland joined the ‘Market Coupling North West Europe’ system in 2014 (this network extends from Finland to France), while Czechia currently participates in the ‘4M Market Coupling’ together with Slovakia, Hungary and Romania. The technical and organizational integration of these systems with those of neighbouring ‘non-coupled’ countries is foreseen as one of the key preconditions towards the establishment of a single European electricity market.

Nevertheless, the legacies of previous regulatory, organizational and infrastructural arrangements are still present in the energy landscape. The wholesale markets for power generation remain highly concentrated, especially in Czechia, where the predominantly state-owned CEZ (České Energetické Závody) accounts for

approximately 70 per cent production capacity. This is less true for the Polish electricity market, where three companies – the state-owned PGE (Polska Grupa Energetyczna), as well as TAURON and EDF – are jointly responsible for generating 60 per cent of the country's electricity. Yet Poland has a highly concentrated gas sector, with the state-owned PGNiG (Polskie Górnictwo Naftowe i Gazownictwo) dominating the wholesale gas market with over 90 per cent. Both countries are highly dependent on Russian gas imports for their gas supply, largely owing to the absence of significant technical alternatives (although this is less true of Czechia, which has a strong interconnection to Germany and is becoming increasingly infrastructurally integrated with its neighbouring states). Wholesale prices of gas in both countries are thus highly dependent on 'long term contracts' between local gas suppliers and Gazprom. The development of gas markets – assisted by measures such as the establishment of virtual trading points in both countries and the improvement of infrastructural and institutional preconditions for cross-border transmission – is helping diversify the supply patterns and price structures that characterize this sector. Nevertheless, retail household electricity and gas prices remain regulated in Poland, while the Czech electricity market remains de facto vertically integrated and controlled by the company that replaced the incumbent monopoly inherited from communist central planning: the different subsidiaries of CEZ own more than 50 per cent of the lignite mining, electricity generation and distribution sectors, in addition to maintaining a 40 per cent stake in retail supply. At the same time, the transmission grid is wholly owned and operated by the Czech state.

While Hungary initially implemented reforms along a similar path, recent political engagement in the management of the electricity and gas sectors has resulted in the emergence of a more complex policy landscape. Hungary's energy sector is also functionally and legally unbundled, having undergone a series of liberalization, privatization and deconcentration measures in the 1990s and 2000s. But the country's gas and electricity markets have been increasingly dominated by the state since the election of the second Viktor Orbán government in 2010. Thus, the state-owned energy wholesaler Hungarian Electricity Works (MVM) purchased the company E.ON Földgáz Trade – formerly a major player on the gas wholesale and storage market in October 2013. By including the long-term gas purchase contract with Gazprom, this rendered MVM responsible for supplying 90 per cent of imported gas in Hungary. It should be noted that MVM also accounts for most of the electricity generation market. The company has expressed a desire to buy E.ON's two gas distribution firms, as well as other privately-owned gas and electricity service providers (Budapest Telegraph 2014). At the same time, the Hungarian state controls 15 per cent of the gas supply market, having purchased RWE's stake in the Budapest gas distributor Főgáz in 2014. Recently, GDF Suez of France transferred its electricity retail division to a Swiss-based company with significant Hungarian state ownership. The involvement of individuals with close ties to the prime minister in this company triggered accusations of corruption and money laundering (Hungarian Spectrum 2014).

The government has also announced plans to create a state-run, non-profit public utility holding company. This would initially distribute power, gas, and district heating, subsequently covering water supply, sewage, and household solid waste collection. Electricity and gas prices remain regulated for the majority of Hungarian households – a fact that became apparent in 2013, when the government mandated 20

per cent cuts in the prices of district heating, gas and electricity; further cuts ranging from 3 to 7 per cent were implemented in 2014 (Budapest Times 2014). These measures have been accompanied by a series of levies on the assets and operations of energy companies. As a whole, they have resulted in financial losses for the utilities concerned (European Commission 2014, 106). The general reversal in policy direction was noted by the expert and decision-makers interviewed for the purposes of this study, who emphasized that the current government is much more favourable of government ownership as opposed to the early 1990s. While noting that ‘Hungary was particularly ambitious in the privatization of the public utility and energy sector’ having transferred an unprecedented 100 per cent of the gas market into private hands, it was frequently emphasized that the policy of the current government amounts to the statement ‘we like private sector in industry and manufacturing, but we don’t like private investments in utilities’, where the ‘intention is to recover ownership’ (Personal communication, expert in energy markets and regulation, 24th February 2015). One of our interviewees, otherwise an expert in environmental sciences and policy, pointed out that:

‘Hungary is moving away from a market-based system to a centralized model controlled by the government. Private universal providers of electricity and gas are losing money, especially gas providers’ (personal communication, 29th January 2015).

The reform of the Macedonian electricity sector has also been motivated by the same neoliberal principles outlined above, and has been unfolding in a similar general direction. The process has been guided by international financial institutions such as the World Bank, International Monetary Fund as well as the European Bank for Reconstruction and Development, who have used the conditionalities associated with lending activities as leverage towards the implementation of local reforms. In recent years, Macedonia’s accession towards the European Union has required the legal transposition of a wide range of relevant directives, including the provisions of the Third Energy Package. This process has been steered and monitored by the Energy Community – a transnational organization aimed at facilitating the integration of energy sector in Southeastern Europe, and the transfer of EU energy policy into the markets of neighbouring countries. The documents issued by the Energy Community allow for benchmarking the progress of its affiliated countries (termed ‘contracting parties’) in achieving the stated reform objectives. Thus, the Community now states that Macedonia ‘used to be a front-runner not only in transposing the *acquis* but also in effectively tackling energy reforms’ (Energy Community Secretariat 2014, 90) within the region. However, reforms have been slower ‘over the last few years’, while ‘the gas sector still requires fundamental restructuring before a true market can come into existence’ (ibid).

Macedonia’s former vertically and horizontally integrated electricity monopoly was unbundled during the 1990s (Tieman 2010), creating separate legal entities for the generation, transmission, distribution and supply of electricity. The distribution and supply activities of the two companies with a public service obligation, however, have still not been legally and functionally unbundled, leading to a lack of transparency in this sector. The country has been reluctant to open its electricity market, while regulating both wholesale and retail prices. While the market for large consumers has already been liberalized – leading to competition, lower prices and the emergence of

new retail suppliers – the country’s government recently reneged on a formal commitment to undertake the same set of measures for residential consumers, triggering a legal dispute with the Energy Community. There have also been concerns over the rudimentary state of the gas sector, and the *de facto* independence of the regulatory body – particularly with respect to the legal terms for the election of its governing members, as well as the regulation of its financing mechanisms. It has been pointed out that this body ‘does not take the active role necessary for tackling competition barriers in the energy market’ (Energy Community Secretariat 2014, 97).

Thus, while initial policy trends in the energy sector across all of CEE were motivated by the Anglo-American approach that encompasses ‘ownership unbundling, less market concentration, less public ownership and more private capital in the industry’ (Nowak 2009, 141) recent years have seen a trend towards the ‘continental model’, involving a greater degree of ‘concentration and vertical integration and more state or public ownership in the energy field’ (ibid.). A number of our interviewees suggested that the initially-expected benefits brought about by market liberalization have failed to materialize: this includes lower energy prices, supplier switching and improved customer service.

Transition II: Organizational practices triggered by systemic shifts

The general movement towards a market based economy in the energy sector has been accompanied by a series of more ‘spontaneous’ transformations, emerging as a result of the broader shifts implemented in the basic principles of economic and political orders. Rather than being strategically orientated towards a politically-determined societal goal, such changes have either entailed or been the product of policy decisions stemming from the institutional restructuring process. This is despite the fact that, as demonstrated above, the departure from the legacies of central planning and the one-party system can hardly be described as unidirectional. In the energy sector, this second layer of transition has come to be associated with a wide range of organizational practices and societal articulations motivated by the antecedent decision to adopt neoliberal logics of economic regulation. Based on energy poverty scholarship as well as the evidence collected in the field, we would single out two sets of institutional drivers that operate across all four case study countries: i) the manner in which energy efficiency policies are formulated and implemented in the housing sector; ii) the entanglement of multiple political and economic interests in practices of energy price setting and regulation. In the remainder of this section, the two contingencies are explored with reference to a review of the empirical evidence.

As was pointed out above, low levels of residential energy efficiency have been identified as one of the key drivers of domestic energy deprivation in CEE and northern-hemisphere countries more generally. Paradoxically, however, the rise of energy poverty in post-communism has unfolded against the background of a significant drop in the energy intensity of most CEE economies. While the decline in energy intensity has largely been driven by wider structural shifts such as the closure of large industrial enterprises and the movement towards a service-based economy (essentially components of ‘Transition I’), direct improvements of the efficiency of energy supply and demand have also played a role in this context. In Poland, Hungary and Czechia, the latter has involved extensive efforts to improve the thermal

insulation of the housing stock via a range of housing improvement programmes, often relying on funding from the EU and central state budgets (Bouzarovski and Tirado Herrero 2016).

Our interviews in Poland, Hungary and Czechia underscored the importance of housing ownership structures in facilitating the implementation of residential energy efficiency retrofit programmes. Overall, this process has been easier in countries with a longer tradition and higher prevalence of co-operative dwellings, and instances where the privatization process did not lead to a fragmentation of housing tenure. Also of relevance in this context have been incentives from municipalities during privatization, as well as ‘do-it-yourself’ upgrading by home-owners (Bouzarovski, Gentile, and Salukvadze 2010). Economic factors have also mattered: a member of the Polish Energy Efficiency Fund pointed out that even though their ‘programmes have supported all stakeholders’, the main beneficiaries have been ‘housing co-operatives, recently also housing associations – organizations that have creditworthiness’ (personal communication, 19th December 2014). A think tank and public policy expert had the impression that thermal efficiency investment has created a situation where energy poverty has either been completely eliminated or is marginal in co-operatives from a ‘technical point of view’ (personal communication, 19th December 2014).

At the same time, however, there was a common perception that energy efficiency programmes have neglected a number of important demographic and residential categories, such as social housing, low-income groups, and single family homes. Thus, it was emphasized that as Polish thermal renovation programmes were not designed to address energy poverty, they have benefited mostly ‘relatively rich households’ who were sufficiently creditworthy to qualify for a loan. A similar situation was found to exist in Hungary, where interviewees emphasized the need:

... ‘to support refurbishment in a way that [allows] low income households access to funds. In the past, people could get 30 per cent of costs in the form of a grant. But 70 per cent or even 50 per cent would still have meant the project was unaffordable’ (personal communication, member of an energy efficiency company, 25th August 2014).

Overall, our Hungarian interviewees expressed disappointment with current residential energy efficiency policies in the country, a fact evidenced by the country’s on-going delay in transposing relevant EU legislation in this domain and the prioritization of price based measures over energy efficiency in state budgets. It was frequently emphasized that policies for efficiency improvement are mutually disconnected, as infrastructures such as windows, doors, insulation and boilers are covered under separate schemes. Interviewees highlighted the lack of sufficient financing for this purpose, despite far-reaching societal change regarding energy efficiency and renewable energy sources.

In Macedonia, energy efficiency ‘is not encouraged in any way and the decision whether to be energy efficient or not is left to the household’ (personal communication, member of an environmental NGO, 23rd January 2014). There have been plans for establishing an energy efficiency fund for residential retrofits but these have yet to come to fruition. The term ‘energy poverty’ has managed to enter public

debates in Macedonia writ large (Stojilovska and Zuber 2013), resulting in the institution of a government policy aimed at aiding the payment of electricity bills among households who are recipients of social welfare support. Yet one of our interviewees pointed out that ‘this measure does not help reduce neither their general poverty, nor their energy poverty - it is just a form of temporary relief’ (personal communication, environmental advocacy group, 23rd January 2014).

Beyond the organizational practices associated with energy efficiency programmes, it is worth noting that broad-level restructuring processes in CEE have also affected the articulation of political interests and economic relations within a wider range of policy domains. The reform of electricity prices and utilities, in particular, has been enmeshed with the vested interests of local elites in the coal extraction and labour sectors. Such groups have aimed to move policies and the energy-inequality nexus towards the domain of social policy rather than energy efficiency. In Czechia, the national debate on energy issues is dominated by strategic decisions needed by large players – issues of new nuclear power plants to extend/replace existing sources owned by CEZ and of extension of coal mines to secure cheap coal for CEZ power plants and for the large providers of district heating (personal communication, NGO activist, 18th March 2015).

At the same time, interviews in one of the main Polish trade unions pointed to a strong preference for measures that would address social equity and poverty issues, while expressing strong scepticism about the anthropogenic drivers of climate change. Yet one of our interviewees in the Polish environmental NGO sector underlined that unions are primarily interested in ‘maintaining jobs, the status quo and the “privileges” of their affiliates’ (personal communication, 18th November 2014). While noting that miners deserve appropriate remuneration for their work, this informant emphasized that ‘even if a mine is bringing losses ... they will fight to keep it running for keeping jobs ... even if there’s no coal in the mine they would still keep on digging’ (ibid). An interviewee from an energy company thought that ‘management staffing in the main electricity utilities institutions is political’ and depends on the personal relations among the executives of large electricity and gas companies, on the one hand, and the government, on the other (personal communication, 3rd February 2015). He underlined that regulation and policy is designed to satisfy the generic interests of ‘big players of the energy market’ rather than providing tailor-made solutions.

The intimate link between state policy and electricity utility management was a frequent theme in our Macedonian interviews. They revealed an extensive set of rent-seeking practices revolving around the state owned power generation company, while pointing to the widespread presence of clientelism and corruption. One of our NGO interviewees thought that the reasons for the country’s decision to delay electricity price liberalization was principally motivated by the existence of ‘various internal debts in the energy sector’ – whereby the state has provided ‘hidden’ loans to the electricity generation utility – as opposed to the ‘official excuse that vulnerable families needed to be protected’ (personal communication, 27th December 2014). At the same time, there is widespread secondary evidence to suggest that state-owned electricity utilities are operating in a highly clientelistic manner, involving state capture and hidden overemployment (Analytica 2015; Ralchev 2012). The use of state-owned enterprises as reservoirs for the employment of party cronies was

recently revealed by the main opposition party in the country, which obtained wiretapped recordings (allegedly recorded illegally) in which a reported government official is heard requesting that the CEO of the electric generation company create 9 new job posts for members of his political party (Radio Slobodna Evropa 2015).

While some of the Hungarian interviewees had similar impressions about the relationship between the Hungarian state and the electricity sector, in this case the main focus was on the manner in which reduction of a wide range of regulated services and utility bills – including gas, electricity and district heating (*rezsicsökkentés*) – is being used as an electoral tool with unfavourable long-term consequences. It was emphasized that this approach benefits well-off households, because ‘the few hundreds of thousand forints that poorer people save do not seem to make a big difference at the end of the day’ (personal communication, representative of a community action group, 10th February 2015). There was a common impression that together with increasing state control of banks, the *rezsicsökkentés* was a propaganda tool aimed at sending a distinct message to the electorate (personal communication, member of the Hungarian Parliament, 23rd February 2015). Moreover, as was pointed out by an NGO advocate active in housing issues:

‘Utility cuts had an undramatic effect on fuel poverty ... they reduce investment in the energy sector and may also make them unprofitable which could pave the way for a takeover by the government then a sale further down the line’ (personal communication, 29th August 2014).

The dynamics uncovered under Transition II, therefore, show what happens when declarative commitments for a neoliberal restructuring of the energy sector are faced with the realities of day-to-day decision making in domains where the lack of decisive and co-ordinated action by state authorities has a direct impact on household welfare. Throughout the four study countries, energy efficiency policies have been hampered, accelerated or steered in particular directions in line with the interests of large utility players as well as entrenched political elites. The same applies to energy pricing policies, which have often deviated from the neoliberal prescription. The continued persistence and entanglement of these circumstances with existing path-dependencies further complicates the notion of a smooth transition between two end states.

Transition III: Embedding energy vulnerability in the urban landscape

Understanding the emergence of post-communist energy vulnerability in specific locales requires moving beyond the broad scale commitment to change (Transition I) and socio-organizational dynamics (Transition II) the reconfiguration of urban landscapes under the influence of a ‘myriad of political, economic, social and cultural transformations’ (Sýkora and Bouzarovski 2012, 9). This process lies at the heart of the rise of energy vulnerability as a socio-spatial phenomenon, since it hinges upon the interaction between the legacies of past systems, the material landscapes that characterize the grain of the city, and the social and organizational dynamics that were described in the previous section. Transition III therefore, cannot happen without the general movement towards a market economy and the socio-political changes that accompany it. At the same time, it is enrolled and reflected in the spatial structure of urban and regional fabrics. In the background research leading to this paper, we uncovered several clear instances where Transitions I and II had interacted

with the social and built features of the urban environment to create distinct place-based typologies of energy vulnerability. These include *i)* neighbourhoods affected by the restructuring of district heating operations, *ii)* inner-city areas containing high proportions of pensioners and Roma, as well as *iii)* low-income suburban areas that lack networked energy provision. While this list is far from exclusive, the given cases illustrate that vulnerabilities to energy poverty are relational and dynamic, while being present in a variety of urban configuration.

District heating systems extend across large parts of CEE urban areas (Bouzarovski 2010), including the cities encompassed by this study. These networks have faced major restructuring issues in post-communism, as a result of the need to introduce meters at the level of buildings and apartments (such devices did not exist during communism), as well as improving the efficiency of production and distribution systems. The institution of commercial imperatives in the district heating sector has decreased the affordability of the energy services that it provides. This has combined with the material legacies and physical inertia of heat networks in the built environment and energy-related social practices to create a specific imprint on the urban landscape. It was highlighted that households living in Gdansk's inner-city district of Wrzeszcz, where approximately 20 per cent of homes are municipally owned, have often given up 'electric heating, gas or district heating and returned to stoves' (ibid) and are choosing to rely on coal or fuelwood due of the comparatively lower price of such resources. The movement away from centralized forms of energy provision is creating severe air pollution problems in periods of cold and stagnant weather.

An overall decline of district heating use is also evident in the evidence sourced from Czechia, Hungary and Macedonia – this applied to the interviews and secondary evidence alike. However, utilities in all three states have placed all kinds of administrative barriers on disconnection efforts. This has included the use of planning regulations and property laws, as well as legal stipulations that require that only entire blocks (rather than individual apartments) can be disconnected. Some of our Macedonian interviewees were strongly critical of the Skopje district company, which 'charges households who have decided to disconnect themselves from the network a fixed monthly fee for an indefinite period of time' (personal communication, energy expert and investment bank employee, 27th December 2013). Interviewees suggested that the post-communist restructuring of district heating systems is also affecting property values and residential migration in the city, as prospective owners and tenants actively choose not to purchase dwellings where such networks have already been installed (or alternative heating methods are not available), for fear of future financial repercussions.

While the decline of district heating in post-communism has created socio-spatial formations that are difficult to physically trace and identify in the urban landscape, other aspects of energy poverty have been expressed in locales with specific typologies. The position of the Roma ethnic minority is emblematic of this development. Roma throughout Eastern Europe inhabit low-quality housing and have lower-than-average incomes, which makes them particularly vulnerable to energy poverty. They have historically been subject to a wide range of discriminatory practices, having remained outside the principal remit of formal employment and social welfare policies. In Hungary, the Roma are disproportionately concentrated in

suburban areas, smaller towns and villages, where they have faced high rates of unemployment and social exclusion. Many of our interviewees highlighted that the energy price reductions implemented by the government have not benefited the Roma, as this social group either does not have access or cannot afford to pay for gas or electricity services. The Roma have been further hit by the ‘criminalization of fuelwood collection via national laws and other measures to police people in rural areas’ (personal communication, Roma expert, 3rd February 2015). This has resulted in the a situation where the Roma are living in ‘deep energy poverty’ and are often forced to burn everything they can find, ‘including clothes’, in order to survive (ibid). It was also emphasized that: ‘the complicated administrative procedure to apply for benefits in Hungary prevented the Roma from applying (personal communication, academic researcher at the Central European University, 29th January 2014).

The rise of post-communist energy vulnerability has also been influenced by the emergence of patterns of urban development that are characteristic to CEE cities. In some cases, inner-city areas have become pockets of deprivation as a result of the combination of suburbanization dynamics (marked by the outflow of younger and more affluent residents towards the outskirts of the cities), capital flight, and inadequate urban regeneration policies. This has left the existing residents of such areas – primarily pensioners who had the capital to buy their apartments in the early 1990s – facing a downward spiral in property values, alongside the lack of capital to renovate the dwellings, which ‘are not well maintained, despite being more than 100 years old’ (personal communication, Critical Urban Workshop, 29th January 2015). In Gdansk and Prague, we found that legally unresolved tenure patterns or the presence of municipal housing ownership affected the ability of households to invest in the energy efficiency of their homes, creating a vicious circle in cases where rents and energy bills are unaffordable ‘and the city must cover the difference itself’ so that ‘there is no money for repairs and renovations’ (personal communication, project coordinator from charitable organization, 23rd January 2015).

In all four study cities, it was highlighted that pensioners often have a favourable financial effect on family budgets when they share their dwellings with extended families who may contain unemployed adults or the working poor. But instances in which older people live on ‘their own in very big homes’ (Personal communication, Advisor of the National Energy Agency, 19th November 2014) mean that energy and other housing costs consume a lion’s share of the household budget. This situation causes severe hardship when combined with this demographic group’s high levels of residential attachment – resulting in an unwillingness or inability to move to smaller dwellings – as well as their diligence in paying bills. Increases in housing costs as a result of the privatization process (Sýkora 2005) have also played a role:

‘There was a privatization in the early 1990s and whoever was able to buy their flat became a millionaire. The rest who were not able to do so now have a problem due to high rents. Often people spend half of their income for rent ... We have a lot of pensioners living in this area and they are really struggling. This is particularly the case when they have to pay high rents – it places them in a situation where they have to heat or eat. The liberalized market is not helping much; the selling of energy involves the same tricks as used for loans, cold selling at front doors’ (personal communication, official in the Prague 7 local authority, 5th March 2015).

Socio-spatial formations contributing to the rise of energy vulnerability are also located at the urban outskirts. Much of the housing that was constructed as part of the intense process of suburbanization that took place in the early 1990s was not accompanied by the necessary technical and social infrastructure. In places like Gdansk, one of the crucial challenges has revolved around the lack of district heating networks in areas with new housing developments at the fringe of the city – many of our interviewees felt that this has increased the energy costs of households living in such areas, as it was felt that this source of energy can provide the most cost-effective method of heating in newer dwellings, despite rising tariffs and the more general contraction of the network. The new set of circumstances often supplements earlier difficulties with the lack of services and amenities in suburban housing settlements – communism also saw periods of poor quality informal housing construction at the urban outskirts, particularly in Macedonia, Hungary and Poland. Thus, interviewees in Gdansk’s Welfare Centre thought that vulnerability to energy poverty is overrepresented in ‘areas that are peripheral’ to the three urban cores of their agglomeration (personal communication, 19th January 2015). The ‘dispersed and substandard urban structure’ and the ‘lack of district heating’ were identified as some of the main reasons for this situation (personal communication, Agency of Regional Air Quality Monitoring, 9th January 2015).

Moreover, decentralization processes, which in Hungary have recently (since March 2015) transferred social welfare competences to municipalities, are creating patterns of social unevenness in settings where local authorities have the ability to affect social equality issues:

‘Your location matters in terms of social injustice as more power is being given to municipalities. If the mayor is [not horrible] and there is an NGO, then things are OK. The ‘fragility’ [i.e., vulnerability] of households depends on their geographical location’ (personal communication, representatives of the Hungarian Anti-Poverty Network, 25th February 2015).

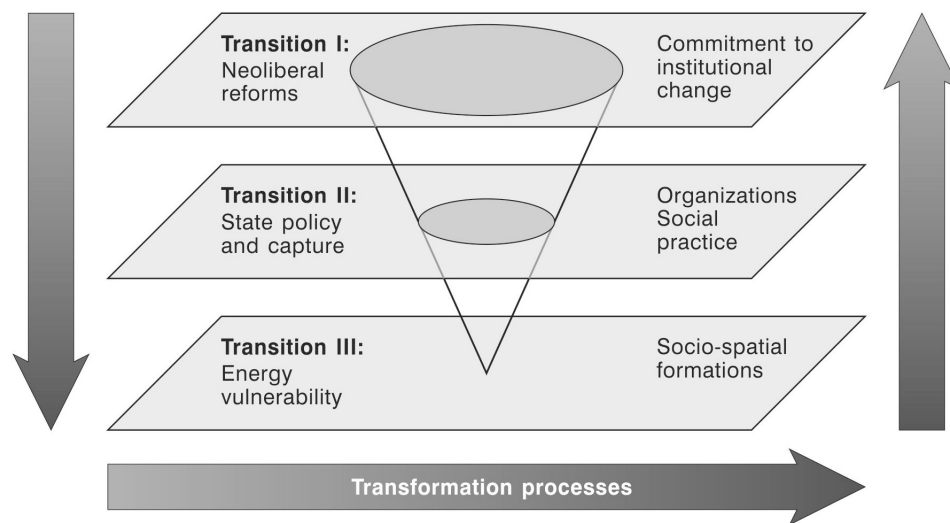
Spatial disparities in local policies to address energy vulnerability are also reflected in the government’s ‘social firewood’ programme, which provides in-kind benefits in the form of free firewood via municipal authorities. The initiative thus depends on the local governments’ willingness or ability to provide this resource, resulting in situations where citizens of neighboring settlements find themselves receiving widely divergent levels of assistance. Like the other examples reviewed in this section, it highlights the multi-faceted geographies of energy vulnerability in ECE, as well as their emergent and complex nature – in line with the assemblage approach that has been recently proposed as a method for studying cities in the region (Grossmann and Haase 2015). The ubiquitous, messy and emergent nature of Transition III also means that it is contingent upon elements that do not always involve policies in the energy domain – making its consequences all the harder to tackle.

Conclusion

This paper has explored the multiple layers of systemic change implicated in the emergence of energy poverty. We have sought to highlight the embeddedness of vulnerability to domestic energy deprivation in wider dynamics of organizational and

social transformation. Of particular importance to our argument has been the need to understand how energy vulnerability is both rooted in and arises out of the material and infrastructural features that underpin urban locales. Thus, and in line with the ‘multiple transformations’ approach, the paper has identified three layers that allow for the emergence of energy vulnerability as a socio-spatial phenomenon. In the first instance, this process is conditioned by the societal consensus to move towards a particular mode of political and economic regulation. The adoption of broad-level restructuring policies subsequently triggers a wide set of social and organizational practices that modify the course of economic and political developments, while creating new path-dependencies. The first and second layers of transition find their expression in a third, spatial layer, which has the longest duration and highest level of complexity. This is the site where vulnerability arises as a distinct spatial formation: it involves the interplay between concurrent processes of social change on the one hand, and the tangible and intangible features of particular places, on the other. At the same time, the dynamics involved in the emergence of energy vulnerability within specific material sites also shape wider social and organizational practices – as well as the process of institutional change itself – via a second feedback loop. Thus, the driving forces of energy vulnerability in socio-spatial terms are multi-directional and multi-scalar (see Figure 2). They occur on three parallel planes with different temporal and spatial horizons, with each subsequent transition both lasting longer and being a result of changes in the previous layer, while demonstrating the ability to shape broader dynamics.

Figure 2: Energy vulnerability as a socio-spatial phenomenon: applying the MTA.



As for the specific aims of the paper, the reviewed evidence indicates that the decision to move towards a market-based regulation of the energy sector in CEE – involving, inter alia, the liberalization of energy trade, the rebalancing of energy prices, the unbundling and privatization of energy utilities and the creation of new institutions to facilitate competition – was a crucial component of the institutional driving forces of energy poverty. Although it has been argued that ‘the formal remodelling of the institutional landscape has now been largely completed in many former communist countries’ (Sýkora and Bouzarovski 2012, 53) a tendency to reverse the movement towards market-based policies has been observed in the energy domain. There is evidence to suggest that has further increased the risks that vulnerable groups face, by

denying them the potential benefits of liberalized energy markets despite removing the universal support and subsidy mechanisms that characterized the centrally planned economy. Modifications of neoliberal policies are even more concentrated at the level of organizational and social practice, where corruption, clientelism and price regulation policies have contributed to the rise of a series of hybrid regulatory outcomes. Thus, and in response to the second aim of the paper, it can be concluded that the inability of many CEE states to implement comprehensive, targeted and custom-built energy efficiency policies aimed at retrofitting entire dwellings – or homes with non-standard forms of ownership – has disadvantaged households inhabiting this type of housing stock (Bouzarovski 2015). Tenure patterns have played an important role in influencing housing upgrade, considering the central influence of co-operative housing in facilitating energy efficiency investment in countries like Poland and Czechia.

The urban scale provides a material site for amalgamating the multiple dynamics of change described within the first and second layer of transition into specific spatial formations. In analysing the available evidence from the CEE context – so as to address the third aim of the paper – we have highlighted several types of socio-spatial dynamics via which energy vulnerability is imprinted in the urban landscape. The fact that some of these configurations extend beyond areas that would be typically considered low-income once again points to the cross-sectoral nature of energy vulnerability, as well as its deep connections with metropolitan processes that evolve and develop over long periods of time. In a broader sense, therefore, the findings of the paper – as well as the broader theoretical approach we propose concerning the driving forces of energy vulnerability within a socio-spatial context – imply that transitions create displacements that are reflected within multiple spatial scales, temporal horizons and thematic areas of activity. Vulnerability to domestic energy deprivation thus cannot be considered as a household issue, but rather a phenomenon that is distributed throughout the ‘energy chain’ (Chapman 1989) – an issue that warrants further research in the expanding field of energy geographies (Calvert 2015). This also points to the need for re-thinking the conceptual assumptions that inform sustainability transitions frameworks, by considering the material and infrastructural characteristics of place and space as contingencies that deserve customized conceptual attention.

Word count: 10594 not including abstract and references.

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