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BETWEEN EFFICIENCY AND DEMOCRACY: Explaining support and resistance towards energy transition and prosumer solutions in Polish and Czech housing cooperatives•

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Abstract

The paper examines attitudes and perceptions surrounding collective energy investments in multi-family buildings, applying an institutional framework and drawing on sixty interviews with key policy stakeholders and housing cooperative representatives in Poland and the Czechia. Our findings indicate that housing cooperatives are well-positioned to implement renewable energy technologies as top-down, techno-economic investments focused on reducing energy costs. However, such initiatives rarely evolve into participatory or resident-driven models. The prospects for energy democratisation are limited by institutional barriers, regulatory and financial instability, and the erosion of local community structures due to ongoing socio-demographic shifts. Where energy transition occurs, it tends to follow a centralised, efficiency-oriented logic, with limited resident engagement. Experiences with more advanced prosumer energy models raise serious challenges about establishing energy communities in multi-family residential buildings under the current legal and policy frameworks, as well as socio-cultural conditions for bottom-up energy engagement.

Keywords: housing cooperatives, energy transition, institutional theory, Central Europe

JEL: D02, O18, Q48, R31

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1. Introduction

Energy transition in multi-family buildings is progressing more slowly than anticipated. Market failures in the housing sector and persistent socio-technical barriers make it challenging to achieve ambitious climate goals (Heinz et al., 2025). Strong local communities and effective institutions are more essential than ever to accelerate this process in the residential sector. While a substantial portion of the multi-family building stock has undergone basic modernisation, particularly in insulation, window replacement, and heating systems, many buildings still require further improvements to enhance their energy efficiency. Successfully advancing this process requires reconciling various stakeholder interests and implementing coordinated investment strategies. However, policy and research studies often neglect the role of intermediaries, which can serve as catalysts that accelerate change (Kivimaa et al., 2019) and break existing institutional lock-in (Matschoss and Heskainen, 2017). In the residential sector, their roles can be taken by homeowners' associations, managers or cooperatives, as entities that can enable and coordinate collective investments in the energy transition.

The article aims to understand how formal rules, normative structures, and cognitive expectations constrain or enable energy transition in multi-family residential buildings. Based on collected research materials in Poland and Czechia – two countries with distinct post-socialist housing transformation patterns, we evaluated the bottom-up and top-down circumstances for adopting retrofit, energy transition investments, and prosumer mechanisms, considering tensions between financial, socio-political, managerial and technical challenges.

The article uses an institutional approach to assess the attitudes and perceptions of collective energy solutions among multi-family buildings, based on sixty interviews with key energy policy stakeholders and intermediaries: housing cooperative representatives. As a term, "housing cooperative" is highly context-dependent (Czischke et al., 2020), we clarify that we do not refer to co-housing or co-living initiatives often associated with housing cooperatives (Babos et al., 2020). Rather, we refer to housing cooperatives that manage multi-family residential estates in Central Europe, most of which were constructed during the socialist era to provide affordable housing for their members (Coudroy de Lille, 2015). These cooperatives have democratic management, lack common spaces or shared facilities (Vestbro, 2010) and operate to secure housing provision while generating profits for that specific purpose.

Our contribution is threefold. First, we uncovered the dominant institutional patterns and pressures under which the energy transition in multi-family buildings can occur. We found efficiency a primary drive for the housing cooperative boards, prioritising economic imperatives and maintenance-free solutions that avoid possible community conflicts. Second, we disclosed mismatches between managerial, top-down perspectives regarding energy transition uptake and bottom-up realities. The uptake of prosumer solutions was transposed from the EU legal framework, positive experiences from single-family houses and implemented at a small scale by early adopters. Still, it failed in a broader cooperative environment with different legal frameworks, decision-making processes, and cultural settings. Third, we linked the literature on residential energy transition with institutional approach, and the cooperative research strand. This combination has rarely been explored in existing energy and social science scholarship.

The paper is structured as follows. Section 2 introduces post-socialist housing cooperatives as key intermediaries in residential energy transition. Section 3 outlines the conceptual framework, drawing on institutional theory to analyse collective action in multi-family buildings. Section 4 details the research methods. Section 5 presents the results, with country-specific findings from Poland and Czechia as well as comparative findings, highlighting divergent perceptions among policymakers and stakeholders in both countries. The discussion in Section 6 interprets the findings through the lens of institutional change, and Section 7 concludes the paper.

2. Post-socialist cooperatives as housing intermediaries

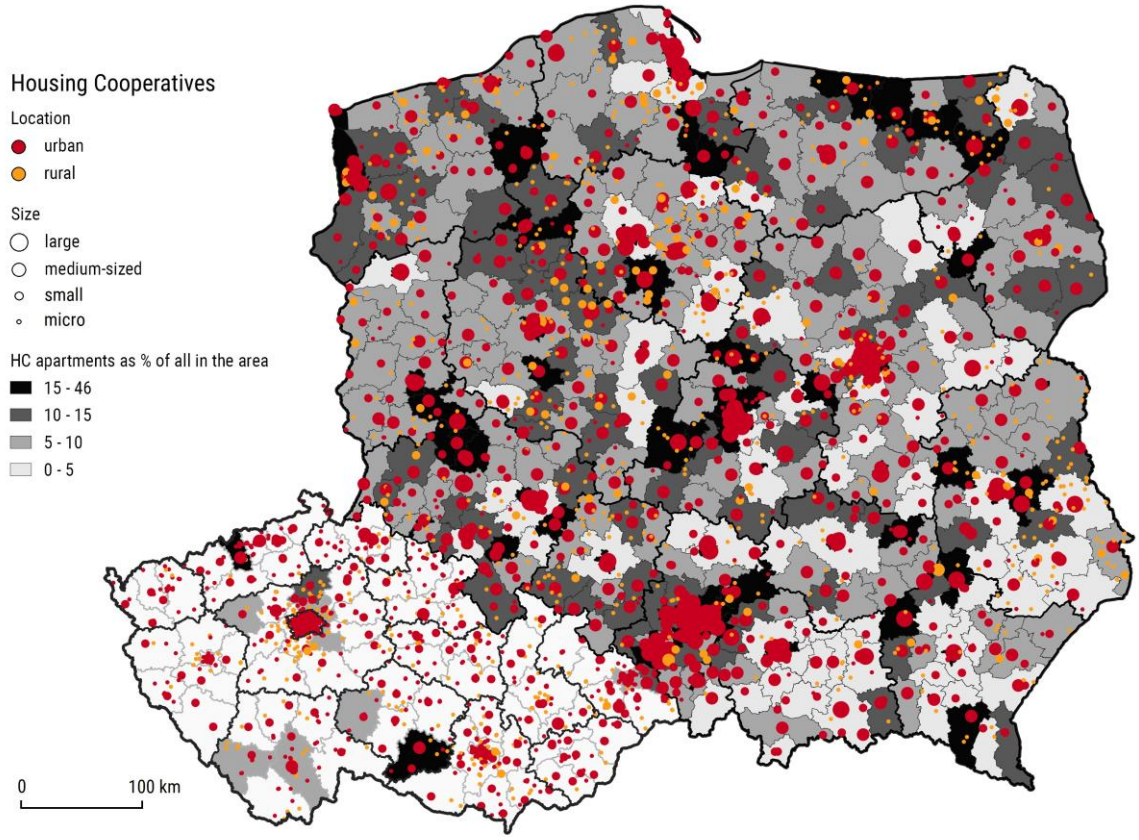
Housing stakeholders – homeowners' associations, managers, and cooperatives – are key actors with significant capacity to shape and accelerate the adoption of innovations in the residential sector. They play a crucial role in advancing interventions by leveraging networks and aligning technical upgrades with social goals. The diverse functions of housing stakeholders in the energy transition include collecting and disseminating knowledge, networking, brokering, fostering innovation, articulating expectations, requirements, and performing various institutional roles (Sovacool et al., 2020). The diversity of these functions positions them as intermediaries, which can act as political agents, mediating conflicts of interest, representing residents in relations with external actors (Moss, 2009), and supporting and facilitating energy transition (Kivimaa et al., 2020).

Housing cooperatives remain an important housing intermediary in Central Europe. With strong historical roots in socialist legacy, they remain structurally relevant, despite the weakening of the cooperative movement and a continuous decline in state engagement since the 1990s (Coudroy de Lille, 2015). In the two national contexts examined in this paper – Poland and Czechia – housing cooperatives account for a notable share of the housing stock, owning approximately 15% and 3% of all dwellings, respectively, and providing management or maintenance services for many more entities, especially homeowner associations (Milewska-Wilk, 2023). In both countries, housing cooperatives remain overwhelmingly urban, with 81% of cooperatives in Poland and 96% in Czechia. In Poland, cooperatives display greater organisational diversity (Map 1): micro cooperatives represent just over half (51%) of the sector, followed by small (31%), medium (14%), and large entities (4%). In Czechia, the sector is highly fragmented, with 96% micro-cooperatives, resulting from a more advanced housing ownership transformation process (Tsenkova and Polanska, 2014; Lux and Sunega, 2014). In this way, while Polish cooperative resources are larger and more diverse in scale, the country has almost 3,500 entities – nearly half as many as Czechia (Frankowski et al., 2023).

In Central Europe, housing intermediaries faced similar challenges. A common issue is the reluctance of homeowners to engage in the statutory bodies of housing cooperatives or associations, as these roles are often time-consuming, administratively complex, and demand professional expertise while typically offering little or no financial compensation. Another widespread challenge concerns the public perception of housing cooperatives, influenced by lingering collective housing with socialist-era aspects, forced collectivism, and bureaucracy (Tsenkova, 2014). Moreover, their residents often lack understanding of diverse ownership structures within cooperatives, which leads to limited awareness among cooperative members of their rights and responsibilities concerning active participation in cooperative governance (Milewska-Wilk, 2023). Finally, housing cooperatives experience an ageing population and lifestyle changes, which also determine the investment approach (Pach and Porada, 2021).

These dynamics suggest that, despite their professionalisation, administrative structures and operational experience, residents often perceive housing cooperatives mainly through the narrow lens of property management. At the same time, their potential as sites of collective action and community engagement remains underappreciated. This tendency also blurs distinctions between cooperatives and homeowners' associations in the public consciousness, despite substantial differences in legal forms and underlying decision-making foundations.

Map 1. Spatial distribution of housing cooperatives in Poland and Czechia



Source: own elaboration based on Statistics Poland and the Czech Statistical Office.

3. Conceptual framework: Institutional theory and multi-family buildings

Our study adopts an institutional theory to understand the dynamics of energy transitions in the residential housing sector, specifically drawing from sociological and historical institutional strands (Andrews-Speed, 2016). The institutional theory examines how structures, rules, norms, and routines shape the behaviour of individuals and organisations within a given system. At its core, institutions – laws and governance frameworks and informal norms like shared beliefs—set the "rules of the game" that individuals and organisations follow (North, 1990). The institutions form a dialectical relationship with actors, shaping and being shaped through practices, which also refers to mutual interaction between people and technological systems (Rip and Kemp, 1998). We found this perspective helpful in studying the intersection of energy and housing, where socio-technical changes occur in similar countries, and where historical choices, self-reinforcing mechanisms, and institutional constraints create path dependencies (Pierson, 2000) that can influence innovations regarding energy transitions, even at the local scale.

One of the key concepts in institutional theory is institutional logic – coherent arrangements of material practices, beliefs, values, norms, and rules which coordinate and guide actors' perceptions and actions within a particular regime, leading to its reproduction (Fuenfschilling and Truffer, 2016). Institutional logic sets the rules of the game, influences power allocation among the actors, and shapes focus on problems, specific solutions and technologies. Although usually regimes are dominated by a certain hegemonic logic, other institutional logics might be represented by certain groups of actors within the regime, e.g. residents, cooperatives, policymakers. These logics intersect at the regime level through governance structures. Over

time, the dominant institutional logic might be challenged, leading to its deinstitutionalisation and replacement by another logic with different rationalities and technological solutions. Using foundational Scott's tripartite division into regulative, normative, and cognitive pillars (Scott, 2001), we will analyse how different institutional logics illustrated by explicit rules, practices, and narratives (Jehling et al., 2019), structure the possibilities for retrofit investments, energy transition installations and developing collective solutions in housing cooperatives. Institutional theory offers convenient lens to examine barriers to change, such as path dependencies or power asymmetries (Pierson, 2000), but also to understand how and why change occurs, either incrementally—via such phenomena as layering, drift, or conversion—or more disruptively, through external shocks (Mahoney and Thelen, 2009).

In the paper, we understand rules, such as standards, regulations, and policies, as formally codified and officially sanctioned principles of conduct. These rules are not static or abstract; they are translated into concrete, everyday practices through implementation processes. This transformation from rule to practice is a socially embedded process shaped by institutional capacities, organisational cultures, local context and interpretations. What begins as a top-down directive often becomes reconfigured as it is enacted by actors on the ground – housing cooperatives or residents – who reinterpret, negotiate, or even resist formal guidelines depending on their context, resources, and collective experience (Jehling et al., 2019). Thus, the meaning and effect of rules are never purely technical; they are produced and reproduced through situated social action. Their significance lies in that, during this adaptive process, individuals or groups gain a certain degree of agency and reveal underlying tensions associated with the introduction of change. This is particularly relevant in transitional processes, where new rules are not necessarily disruptive – they can be incorporated into existing routines, allowing traditional practices to persist.

Stakeholder attitudes towards the transition process are also articulated through narratives. These nuanced forms of explanation and persuasion are conceptualised as *"explanatory schemes integrating different observations, facts, experiences, and understandings of a socio-technical regime"* (Roberts, 2017). Narratives serve not only as a means of communication but also as tools for establishing legitimacy and meaning around specific practices. When stakeholders converge around shared storylines, they may shape both the trajectory and pace of the transition, as such narratives possess agency and the capacity to mobilise change. Through narrative, rationality is expressed and situated, embedding practices within a broader interpretive framework that renders them coherent within the overall trajectory of change.

Institutional thinking is underlying the socio-technological transitions (STT) framework, including the multi-level perspective (Geels, 2002)—one of the key theoretical tools to investigate the transition towards the widespread adoption of new technologies, behaviours, or strategies. The multi-level perspective approach conceptualises regime change as unfolding via two primary pathways. A transformation may emerge through the incremental diffusion of novel practices, which gradually supplement or replace existing arrangements while enhancing system performance, such as substituting fossil fuels with renewable energy sources (Loos et al., 2020). In this scenario, transformation-oriented policies employ a range of policy instruments and mechanisms to induce or accelerate systemic shifts (Mercure et al., 2014). Cumulative changes in the system landscape may progressively intensify pressures on the incumbent regime, resulting in breakthroughs and the broader dissemination of innovations (Geels and Schot, 2007). However, transformation may also be triggered by exogenous shocks that radically disrupt the system's operating environment, making it closer to mainstream institutional frameworks. These shocks can take negative (e.g., rapid price surges, supply chain breakdowns) and positive forms (e.g., breakthrough innovations). In such cases, immediate policy responses and institutional and behavioural adjustments become necessary, even though their pace and scope may not fully correspond to the sudden nature of the triggering event.

In our study, we link the institutional approach with the theoretical and empirical contributions of socio-technical regimes and transitions literature – a combination that offers a comprehensive understanding of energy transition viewed as a process of institutional change (Andrews-Speed, 2016). However, we go beyond the tendency of existing analyses to focus primarily on the macrosystems and provide insights into the role of formal and informal rules, norms, and narratives in transformation processes. To this end, we analyse four dimensions connected with energy transitions: governance levels (national/local), key groups of actors (national policymakers/cooperative members), institutional logics (divided into rules, practices, and narratives), and barriers or enablers (technical, financial, managerial, and socio-political). This approach enables us to reveal the dominant institutional logics in the field and their governance context, as well as to explore how institutional settings constrain and potentially enable energy transition in housing cooperatives.

4. Methods

The selection of Poland and Czechia as case studies for multi-family housing was motivated by examining two Central European countries situated at different transformation stages in both the housing sector and the energy transition. Our study draws on sixty in-depth interviews with key policy stakeholders, followed by interviews with representatives of housing cooperatives engaged in the energy transition within multi-family buildings, conducted between 2023 and 2025. Stakeholders were purposively sampled from organisations directly involved in residential energy transition, including relevant ministry departments, grassroots associations of housing cooperatives, banks and funding agencies, housing research institutions, energy community associations, and media (Appendix 1). We focused on 'second-tier' expert institutions—those crucial for preparing and implementing regulations at the backstage of political debates and, therefore, more resilient to political tensions than government representatives. We also interviewed a diverse set of cooperatives, including both pioneering and early-phase cooperatives with very limited retrofit experiences. Our primary respondents were cooperative managers responsible for technical issues with a dual perspective: managers of socio-political processes, engineers, technicians, or others acutely aware of technical possibilities and limitations. From this standpoint, cooperative managers offer unique insights into underrepresented socio-technical aspects of energy transitions.

Interviews were conducted in the official language of the respondent, both in person and virtually, most frequently at institutional headquarters. Interview sessions(45–60 minutes) were recorded and transcribed. The interview process was a collaborative effort between Polish and Czech research teams. We began by preparing the interview structure and protocol, selecting categories of interviewees, debriefing results, and translating key themes. During an on-site workshop, the team established main coding categories and analysed national transcripts through institutional theory. The coding focused on three themes and two institutional categories: enablers and barriers. These categories were further situated within four overarching dimensions: financial (with subcodes such as funding access, burdens/gains), managerial (experiences, decision-making), socio-political (information access, engagement, regulatory environment), and technical (access, consumption, infrastructure). We analysed stakeholder and policymaker interviews separately to reflect design and implementation perspectives. The study adhered to ethical guidelines set forth by the Polish Sociological Association. All participants provided informed consent, ensuring voluntary participation and confidentiality. Identifying information was anonymised to protect participant privacy.

5. Results

While the decarbonisation of buildings is a shared public policy goal across the Polish and Czech residential housing, how this ambition plays out in practice reveals deep frictions between technical planning, institutional capacity, and lived social realities. In the first part of the results section, drawing on qualitative interviews with housing cooperative representatives and policymakers as well as secondary evidence, we trace chronologically how actors on both sides negotiate, adapt or resist (1) retrofits, (2) energy transition, and (3) collective energy solutions. The differentiation of these three stages reflects the historical evolution of institutional frameworks and the internal logic of the energy transition. Implementing advanced technological solutions follows prior efforts to reduce a building's overall energy demand and establish the requisite technical infrastructure. This sequential progression underscores the cumulative and path-dependent nature of transition processes in housing entities, where each phase builds on the material, institutional, and organisational conditions established in earlier stages. A table summarises the description of each case study with key groups of actors and their institutional logics. In the final subsection of the results, we compare the perceptions of Polish and Czech policymakers and cooperativists regarding barriers and enablers to decarbonising multi-family buildings in their countries.

5.1. Energy investments in housing cooperatives in Poland

5.1.1. Energy retrofits

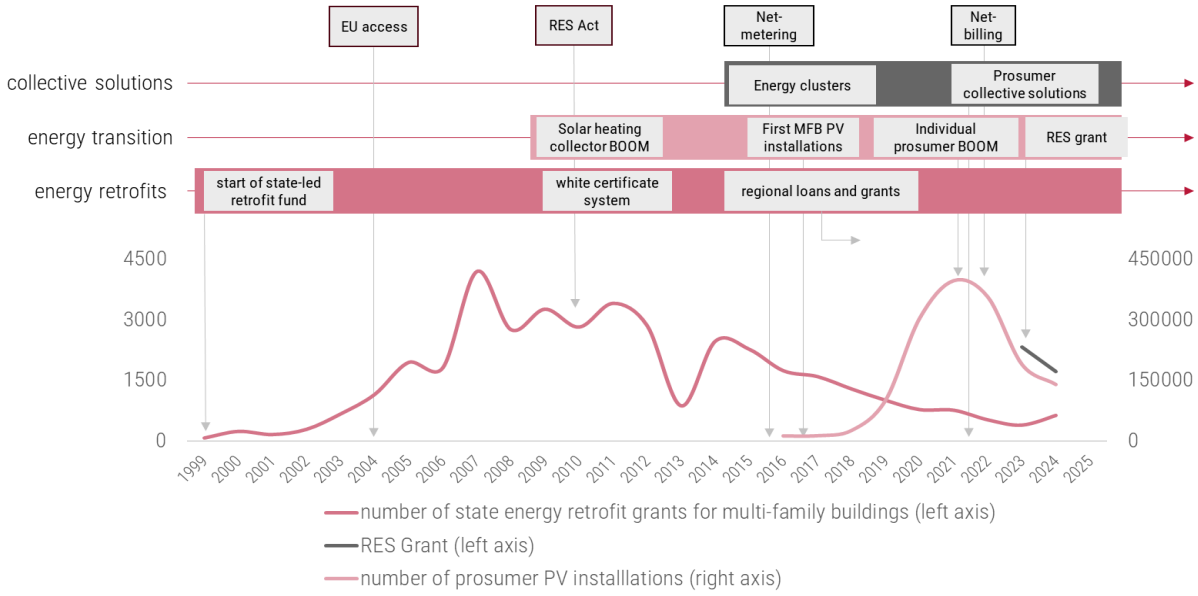
In the Polish housing cooperatives, retrofits are familiar terrain – but familiarity does not equal ease. Since the 1990s, interventions have been implemented to achieve thermal energy savings, initially focusing on replacing old windows, installations, pipes, and the insulation of apartment building facades, which retained them in relatively good conditions (Pluciński et al., 2022). Since 2011, housing cooperatives in Poland have been eligible to participate in the energy efficiency support scheme by selling so-called white certificates regulated by the amended Energy Efficiency Act (Figure 1).

The Polish housing cooperative landscape is highly diverse in terms of income. The entities in inner-city locations possess substantial renovation funds from independent sources such as renting out spaces or rooftops, building new apartments, or placing advertisements; however, some cooperatives rely solely on residents' fees to make ends meet. Housing cooperatives themselves underline managerial barriers: past investment failures, understaffed boards, and a reluctance to act without broad citizen support. Socially, decision-making remains complicated due to generational divides, communication deficits, and procedural inertia. This process in cooperatives is perceived as collective yet often resistant to change due to the faulty democracy mechanism: the declared trust in the housing management board is three times higher than the sense of individual agency in cooperative decisions. The board's agency is stronger than in homeowners' associations; however, the low direct resident involvement and reliance on a few engaged members mean that even viable retrofits can be delayed unless there is a substantial level of perceived financial benefit. The only exceptions to individual-level cooperative engagement included scattered protests observed against heat cost allocators, seen as unfair, and brief mobilisations by small cooperatives opposing energy price hikes during the crisis.

Policymakers promoted energy retrofits in multi-family housing as a low-risk intervention, yet implementation proves uneven. They acknowledge that housing cooperatives cannot pursue complex investment projects without generous external support, as they deal with structural problems: fragmented property rights and the absence of local energy agencies or contact points. The prevailing top-down approach assumes that providing access to funds will suffice; yet, it overlooks the sociopolitical complexity of decision-making in various housing

cooperatives, where financial capacity for own contribution, organisational resources, and leadership are often essential but lacking.

Figure 1. Reconstruction of the main junctures for retrofits, energy transition, and collective solutions in Polish multi-family buildings



Source: own elaboration based on BGK and the Polish Power Transmission and Distribution Association (PTPiREE) data, as well as interview results

5.1.2. Renewable energy installations

For housing cooperatives, the transition to renewable energy is treated aspirational rather than essential. Due to a high level of district heating usage (almost 80%), most energy transition aspects concerned installing heat pumps for heating water and, most notably, photovoltaic panels. The process is constrained by outdated post-socialist infrastructure that cannot handle new load demands. Many roofs are unfit or in poor technical condition, and the shared ownership structure within the building complicates investment decisions. Even more than in the case of retrofits, residents question the profitability of green technologies, especially in a financially troubled period when the return on investment seems distant or hard to assess. Therefore, access to external financing emerges as a critical enabling factor for initiating any modernisation efforts.

The primary motivation for new energy solutions, including renewable sources, is not environmental concern but economic savings. In this context, grant subsidies play a crucial role, as they are strongly preferred over loans, even partially forgivable ones. This preference reflects a deep-seated aversion to financial risk and a limited capacity among smaller cooperatives to take on debt, rooted both in the ageing of their residents, previous obligations and cultural patterns of managing collective resources. External funding thus becomes not only an economic tool but also a mechanism of social legitimation of investments. Its availability allows both cooperative boards and residents to perceive energy investments as "safe" and "justified", leading to greater support and implementation of such projects.

"We conduct a detailed, thorough, and consistent analysis of energy price forecasts provided by all available institutes and government agencies, and we search for solutions that could, in some way, help reduce the financial burden on residents. We are very committed to minimising these burdens for the majority, considering their incomes" (Interview #13, housing cooperative manager)

While environmental motivations among cooperatives remain weak, practical demonstrations and community-led pilot projects can slowly shift attitudes. Since 2016, there have been pioneer examples of cooperative renewable investments in large cities (Ryszawska et al., 2021) and rural areas, co-financed by national and regional environmental agencies. These efforts were modest compared to the prosumer energy boom in single-family housing, driven by individual-family government subsidies (Dzikuć et al., 2025). However, the PV adaptation among housing cooperatives has accelerated since 2023, based on the state-led RES grant with a 50% subsidy. Still, residents declare limited awareness and trust regarding renewable energy technologies' functionality and long-term benefits, which resonates with recent general insights on building decarbonisation (Heinz et al., 2025). At the beginning of 2025, only one in five cooperatives had experience implementing renewable energy technologies (Ministry of Economic Development and Technology, 2025).

In this context, internal dialogue between housing cooperative boards and residents is crucial in facilitating the energy transition, serving as a key precondition for its social acceptance. In cases where renewable energy solutions have been successfully implemented, open and proactive communication with residents was pursued, particularly during the preparatory stages preceding the investment. By contrast, the absence of dialogue results in project failure: for example, worse living comfort in the apartment despite higher housing costs after heat pump installations. Instances in which residents demanded the removal of installed renewable energy systems illustrate the significant misalignment that can arise between technical implementation and social readiness. Therefore, the energy transition in housing cooperatives cannot be analysed only through infrastructural or financial lenses; instead, it requires a comprehensive understanding of the knowledge, social dynamics, power relations, and communicative practices embedded within residential communities.

"*We focused on the social process accompanying the transition. (…) The cooperative's president strongly emphasises and takes pride in this approach. The new project they recently launched was developed entirely as a community initiative, together with the estate council. There were meetings, discussions, and listening to people, all aimed at co-creating with the residents. The president is particularly proud of this, seeing the social component – communication, consultation, and resident involvement – as the added value that enhanced the project's stability and raised awareness among residents."* (Interview #04, cooperative researcher)

Policymakers are caught in a double bind: they feel obliged to promote renewable energy while operating within a fragmented regulatory framework divided among a few ministries. Technical codes lag behind technological possibilities, and energy law revisions come without sufficient information for frontline actors and interested parties. Moreover, price volatility in net-billing schemes and weak regulatory follow-up reduce the perceived reliability of the support system (Dzikuć et al., 2025). Without stable incentives, renewable energy remains a hard sell for cooperatives, especially when the political commitment to decentralised solutions is perceived as shallow and limited to self-consumption (Żuk et al., 2025). Due to still immature storage implementation and unfavourable electricity sell settings, housing cooperatives are seeking intermediate solutions, e.g. heat pumps have become a way to utilise the surplus from photovoltaics. On the other hand, financial policy stakeholders believe that, similar to retrofitting, all that is needed at this stage is time to spread knowledge and generate a critical mass of investments. A cooperative environment is well-prepared for that:

"From the point of view of energy transition in housing, cooperatives are, one might say, a better entity for this than homeowners' associations. Housing cooperatives have been operating in the housing market for a long time and have structures, technical capacity, and ways of introducing change in the area they manage. In the coming years, we have no concerns about cooperatives." (Interview #02, state-led bank representative)

5.1.3. Collective solutions

The promise of new collective energy solutions, such as energy communities, virtual prosumers, or energy clusters, generated attention but was met with skepticism within housing cooperatives. Technically, the diversity in building ownership structures, limited metering integration, and lack of internal grid management pose significant challenges. The current settlement methods and technical barriers mean that the energy can only be allocated to common areas or the renovation fund for collective needs; as a result, residents do not see direct individual benefits, but they perceive individual costs. Socio-politically, there is widespread confusion due to the proliferation of legal models since 2016 and insufficient education about how such systems function. Few residents understand the implications of joining a particular collective energy scheme (collective prosumer, tenant prosumer, virtual prosumer), and those who do are often unable to mobilise broader support, as, according to one of the intermediaries, "*this is not beneficial enough to convince people from the middle class to invest and allocate their financial savings*" (Interview #007).

The inability to directly replicate the successful prosumer model uptake from single-family homes in multi-family housing, hampered the acceptance of collective solutions and their gradual implementation. Whereas single-family home owners possess full autonomy over investment decisions and directly benefit from self-generated energy, multi-family building residents operate within a collective ownership structure. This arrangement complicates both governance processes and the allocation of benefits. A key challenge is that the energy produced often serves shared needs—such as lighting, elevators, or security—diminishing perceived individual benefits and weakening already limited incentives under current regulations (Ryszawska et al., 2021).

Consequently, tension arises between economic rationality and the social organisation of residential communities, which can foster resistance or passive disengagement from adopting prosumer-based energy solutions in multi-unit contexts. Trust deficits, weak local leadership, and unclear cost-benefit communication have resulted in a socio-political limbo, where pilot projects remain isolated and unscalable.

> *"Housing cooperatives invest in photovoltaics that produce electricity for common areas, like elevators or stairwells, but are not interested in collective solutions. They don't want to get involved in the 'Polish nightmare' of mobilising people for such initiatives. (...) We are a country of individualists, from the grassroots to the ruling elites. Everyone is thinking about how to benefit the individual"* (Interview #07, nationwide cooperative energy advisor)

Policymakers see community energy as a potential lever for democratising the energy system, yet they struggle to connect this vision with the lived conditions of cooperative housing. Numerous energy models (e.g., collective prosumers, energy clusters) have been introduced to the legal framework. Still, few are fully understood by housing cooperatives or adapted to the specificities of shared housing. The relevant ministry conceptually promotes local energy markets, storage options, and decentralised models, but bureaucratic inertia and lobbying from energy suppliers often mute systemic change. Collective solutions are encouraged rhetorically but poorly grounded in the institutional and technical realities of the housing cooperatives. Moreover, the sociopolitical infrastructure—such as trusted mediators, stable regulations, and sustained engagement—is either absent or underdeveloped. Consequently, the transformative potential of residential, collective energy initiatives remains unrealised.

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Summarising the institutional logics within the field of housing cooperatives' energy transition in Poland, one can identify two main groups of actors (policymakers and cooperativists) involved at different governance levels (national and local) and representing institutional logics as illustrated by the various configurations of rules, dominant practices and narratives (Table 1).

Table 1. Institutional logics of energy transition in housing cooperatives in Poland

Governance level/ Key Groups of Actors	Rules	Practices	Narratives
National/ Policymakers	• Energy law (net-billing, prosumer models) • Funding rules and procedures • EU compliance • Polish Energy Policy/ National Energy and Climate Plan	• Designing investment 'environment' (legal solutions) and financial tools • Delegating implementation to local levels • Setting regional policies and nationwide energy advisory services • Focus on technical or financial design	• Decarbonisation as a long-term goal • Procedural complexity rather than legal or financial challenges as a key barrier
Local/ Cooperativist	• Cooperative law (General Assembly, reporting, etc.) • Specific Law (Act on Housing Cooperatives)	• Limited local engagement (top-down decisions) • Selective funding participation (subsidies preferred over loans) and risk aversion; • ROI-driven investments; limited to shared spaces; • Limited ambitions towards community solutions	• Transition perceived as aspirational rather than essential • Economic savings prioritised over environmental concerns • External funding legitimises investment decisions • Success depends on dialogue, trust, and individual engagement of the leader

Source: Own elaboration based on empirical material and qualitative analysis.

5.2. Energy investments in housing cooperatives in Czechia

5.2.1. Energy retrofits

The initial wave of renovations among Czech multi-family buildings during the 1990s was focused on improving the technical condition of the buildings, enhancing comfort, and upgrading aesthetic qualities. More systematic energy-related renovations, such as insulation or window replacement, began in earnest only in the late 1990s. These interventions typically involved retrofitting facades, windows, balconies, and, in some cases, roofs and basements. The state government supported these efforts through the 'Program PANEL' financial scheme (Dokoupilová and Horák, 2022).

In the 1990s the main question for those people was: we would like those houses to be as nice as in Germany. We eliminated building defects, poor quality manufacturing, some statics and things like that, and we took measures to extend the life of those houses. (Interview #24, cooperativists association representative)

The launch of a new scheme called 'Zelená úsporám' (Green Light for Savings[1]) in 2009 – a subsidy initiative designed to promote energy savings in buildings – marked a growing shift toward explicit retrofit objectives in residential buildings, despite energy efficiency being only one of six programme priorities. The scheme's clearly

[1] In some documents reffered to as 'Green Savings'.

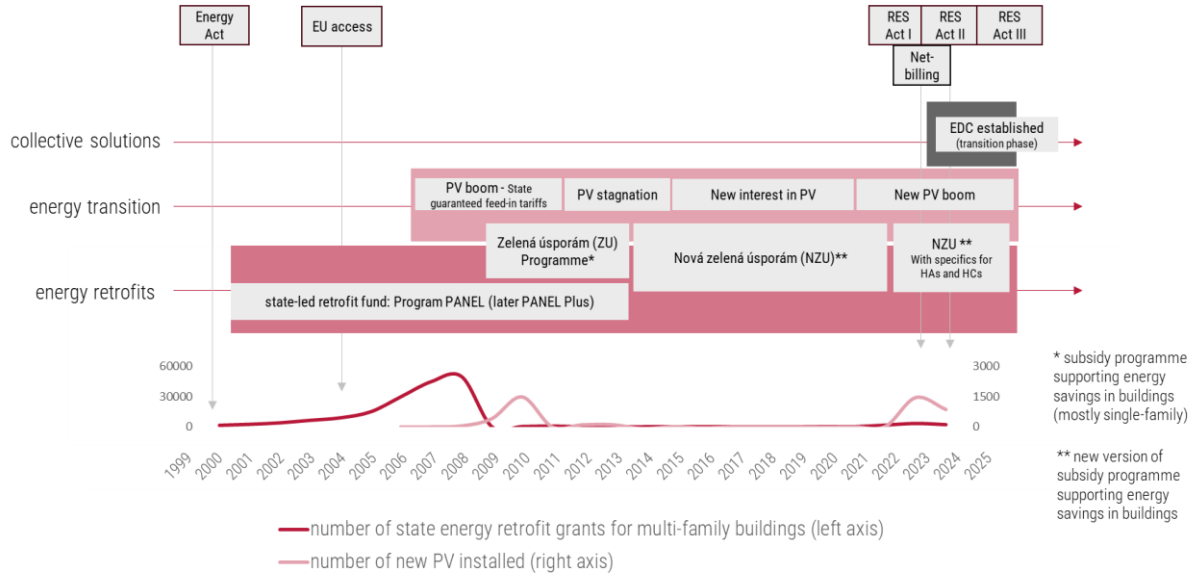
defined criteria, which differentiated between single-family and multi-family housing, required cooperative management bodies to acquire more advanced knowledge of financial and legal frameworks and technical building expertise (Ministry of Environment, 2015). These interventions aimed to reduce heat losses, as apartment heating and hot water generation were the largest contributors to total household energy consumption (European Commission, 2024). However, such investments, typically financed through long-term loans, often placed significant financial burdens on housing cooperatives and homeowners' associations.

The programme ended in 2011 but was reintroduced in a modified form in 2014 under the name 'Nová zelená úsporám' (New Green for Savings[2]), specifically targeting the multi-family buildings in 2015 (Ministry of Environment, 2015). Subsequent financing campaign rounds under this programme have each had varying parameters. 'New Green for Savings' shifted its primary focus from improving the energy standards of single-family homes through refurbishment to enhancing the energy standards of multi-family buildings, primarily through retrofits combined with new renewable energy installations. These priorities were explicitly reflected in the programme's sub-components, which were designed separately for each housing type.

In residential buildings, insulation processes are underway thanks to the New Green for Savings. Thanks to the now-transformed State Investment Support Fund, these processes have been running for quite a long time (...). A significant part of the housing stock is already insulated. (Interview #24, ministry department responsible for energy efficiency + state-led bank representative)

In recent years, the retrofit interventions – such as the installation of new airtight windows, glazing of balconies, and the reinforcement of roof and perimeter wall insulation – have continued to focus on reducing energy consumption; however, same as in Poland, financial savings rather than environmental concerns increasingly serve as the primary motivation for their implementation. These renovations are typically initiated by the leadership of housing cooperatives and are carried out sequentially, prioritising buildings with the poorest technical conditions and lowest energy performance.

Figure 2. Reconstruction of the main junctures for retrofits, energy transition, and collective solutions in Czech multi-family buildings



Source: Own elaboration based on qualitative analysis and dispersed materials on retrofitting programme implementation

[2] In some documents reffered as to "New Green Savings"

We found no evidence that internal power dynamics, income disparities, or lobbying by particular groups of cooperative members influenced the order of renovations. The pace of renovation activities is adjusted to the technological life cycle of buildings and installations, and embedded in long-term financial planning. Thus, emerging external factors, such as the energy crisis or new energy-sharing legislation, do not have a visible impact on renovation schedules. Generally, the funding sources for these interventions are the cooperative's funds, i.e., the renovation fund, which state incentives may supplement and, occasionally, by debt financing repaid through increased member contributions. Within the narratives of Czech housing cooperatives, these activities constitute a central component of their engagement with the energy transition.

5.2.2. Renewable energy installations

In Czechia, the energy transition in the residential sector has progressed slowly despite favourable conditions. Legislative changes at the beginning of 2020s – including the gradual adoption of Energy Act (LEX RES I in 2023, followed by LEX RES II in 2024 and LEX RES III in 2025) reduced administrative barriers for installing rooftop photovoltaic systems on apartment buildings, intending to promote greater adoption of solar energy in multi-family housing. Still, these legal amendments need to be perceived as delayed since the primary impulse to introduce them was the need for implementation of EU directives: on the promotion of the use of energy from renewable sources and standard rules for the internal electricity market, dating back to 2018 and 2019, respectively. The absence of these amendments resulted in no new subsidy programmes except for the abovementioned 'New Green for Savings'.

Larger and medium-sized housing cooperatives especially take advantage of managers who care for the cooperative's development and prosperity. As mentioned, once the possible long-term loans covering the retrofitting investments are already or about to be paid off, another phase of investments may emerge among some housing cooperatives. However, for implementing more advanced investments, the management still lacks comprehensive and transparent information from the government, experience in investments and installations, and certainty of legislative stability and financial returns.

"*The problem of the actual knowledge of the technology, to choose the right offer, when I want photovoltaics, I know what size I need, but now I'm going to choose either blue, yellow or green, and that is problematic to recognise the advantages of different models (...). And no one will give you much advice at the moment. There are no independent advisories here, or so far, I haven't heard of them.*" (Interview #30, Community Energy Association representative)

As indicated in the interviews, members of the housing cooperatives do not perceive improving the current situation as a sufficient motivation to pressure the management to undertake more complex energy transition investments. On the contrary, as long as residents do not experience deprivation, they tend to express satisfaction with the status quo.

Nonetheless, the question of heat sources and used fuel types – mainly district heating supplied by lignite-fueled heating plants or combined heat and power (CHP) units – does not occupy a central position in the cooperative narrative. While financial savings on energy bills might be expected to serve as a primary driver for change, this was not consistently reflected in the interviews. Specifically, central heating prices were generally considered satisfactory, even amongst residents. Although neither the residents nor the board members interviewed opposed implementing sustainable measures, there was a lack of momentum for taking action. From the cooperative members' perspective, responsibility for addressing such issues was primarily delegated to the board or elected representatives. In this context, behavioural changes — such as switching off lights — were cited by interviewees as one of the few measures households actively undertook to reduce energy expenses.

"There was a demand for it [RES solutions] when there was this big boom, as it were, so, of course, there was a bit of a demand, but I think on the part of those chairmen, even though they've only found out what the hassle of just dealing with this and that, they're still waiting on the projects to see if it moves somewhere that it would be easier, because those chairmen mostly don't want to deal with it, they don't have the time to do it, maybe if they had the funds they would hire a company to just do it all for them and they just come in and sign and they don't have to worry about anything, but it just doesn't quite work that way and they don't have the time to do it, so I think they're still kind of reserved like they're not totally into it." (Interview #06, HC director)

Both housing cooperative leaders and members with no leading positions notice the presence of individuals who put forward the motion of decentralising renewable energy sources. However, this agenda is not being perceived as relevant for cooperatives. When asked more broadly about the energy transformation inside the cooperative, the question was generally perceived as either installing rooftop PV for lighting common areas and a power source for the elevators or installing heat pumps. Even interviewees presenting a clear positive stance towards decentralised RES do not express enthusiasm for their deployment in multi-owned multi-family buildings. There are concerns about significant initial investments, too long payback periods, technical unsuitability for the building and, to a lesser extent, risks related to equipment malfunction or fire hazards.

"That initial big investment, it seems to me that there's no saving on it anyway because you have to invest an awful lot of money at the beginning, and it's hardly likely to cover any of that before it stops working. Then you would need another installation and re-investment in there that strikes me as more costly than they are telling us" (Interview #11, HC member)

The transformation process is also hindered by residents' limited overall engagement and by the involvement of multiple entities within a single building—such as housing cooperatives, homeowners' associations, or municipally owned dwellings—which must, to some extent, reach consensus on the course of action.

"*But mostly, I feel like there's this trend today to live and not be too bothered by anything, that's my feeling. I'm paying my way here, and I just want to live here and don't want to have any more worries. Make it work; that's how I would see it."* (Interview #01, director of housing cooperative)

5.2.3. Collective solutions

The prolonged absence of the newest renewable energy sources and energy-sharing supporting legal framework has made housing cooperatives' representatives somewhat cautious when deciding about major investments relying on these regulations. Some still work in the ad-interim mode, and most have not been sufficiently communicated to the relevant stakeholders, e.g. energy allocation schemes in the energy-sharing groups. The housing cooperative leaders often declare that they are waiting for the rules to settle and for examples of good practice to emerge. The issue of energy sharing and community energy does not yet seem to have made much inroads into the public debate within the housing sector.

"But I can imagine a situation about this, where a few houses that have the most advantageous position towards the sun, well, these would be the most effective, so that the photovoltaics would be installed there, and that would cover the costs associated with the consumption of the houses themselves somewhere else. But I can imagine the administrative burden—problems regarding who will pay for the photovoltaics on that house, because each house manages its own funds. Then, explain to somebody that they will have to contribute to that house there because they're paying them a portion of the energy. Well, it's got all these drawbacks, which can be figured." (Interview #03, HC member and delegate)

***

The summary of the institutional logics within the field of housing cooperatives' energy transition in Czechia, with two main groups of actors (policymakers and cooperativists) representing different institutional logics is presented in Table 2.

Table 2. Institutional logics of energy transition in housing cooperatives in Czechia

Governance level/ Key Groups	Rules	Practices	Narratives
Policymakers	• The National Energy and Climate Plan • Energy Act and amendments: LEX RES I, II, III • Funding: NZÚ, Modernisation fund • National Recovery Plan • ERO (Energy Regulatory Office) – regulations, licenses • The Building Act and its implementing regulations • Legislative work on electricity sharing (legal clarity expected by 2026)	• Establishing the Electroenergetic Data Centre to enable the efficient transformation of the domestic energy sector (data collection, standardisation and sharing within the energy sector) • Relatively simple permitting schemes for PV; more complex for wind, biogas, and water plants.	• There is no difference between homeowners' associations and housing cooperatives • 'Revolutionary change' from 2023 – the possibility to generate electricity in MFB • The energy transition is progressing well on the consumption side, less well on the production side • Energy decentralisation is chaotic in terms of responsibility and communication
Stakeholders (Cooperativists)	• Act No. 90/2012 Coll., on Commercial Companies and Cooperatives (Act on Commercial Corporations)	• Grant programme 'Nová zelená úsporám' well known and driving retrofits • HC management is responsible for initiating investments • The role of SČMBD (Union of Czech and Moravian Housing Cooperatives) as an information intermediary	• Limited resident engagement • Low adoption level of roof PV • Bureaucratic and administrative overload of the management apparatus with limited consultancy support • Technical and financial concerns (initial costs, long ROI, technical limitations) • Cooperative financial condition and technical suitability of the solution are key prerequisites for investments.

Source: Own elaboration based on empirical material and qualitative analysis.

5.3. Perceptions among policymakers and cooperativists: comparative insights from both countries

The comparative analysis of interviews from Poland and Czechia highlights significant differences in how cooperativists and policymakers conceptualise barriers and enablers within energy retrofits, renewable energy installations, and collective solutions (Appendix 3). In Poland, cooperativists adopted a more balanced perspective, identifying barriers and enablers, particularly emphasising financial opportunities and socio-political obstacles. Policymakers, however, place greater weight on barriers across all areas. In contrast, Czech cooperativists express a predominantly pessimistic view, noticing barriers three times more often than enablers, particularly within renewables and collective models. This divergence suggests a dual-layered gap: (1) between policymakers and cooperativists; (2) across national contexts with differing institutional histories and organisational capacities within housing cooperatives.

Financial constraints—commonly assumed to be a dominant challenge in the energy transition—are not the most salient barrier in either country. In Poland, cooperativists recognise particular funding streams, grounded and brand-new, as enabling conditions, suggesting relatively high financial literacy and access, especially among large, well-resourced housing cooperatives. Managerial competencies are also perceived positively in Poland, except for collective solutions, where cooperativists and policymakers acknowledge capacity barriers. By contrast, in Czechia, policymakers articulate strong concerns over the managerial readiness of cooperatives, especially for retrofits and renewable energy installations. The structural difference between Czech and Polish cooperatives seems to underlie these concerns. Both countries acknowledge collective solutions as an area where financial, managerial, and socio-political readiness appear misaligned.

Across both countries, socio-political barriers emerge as the most persistent and cross-cutting challenge. Respondents frequently cited lack of engagement, information, weak institutional trust, and regulatory barriers as primary obstacles to energy retrofits, renewable energy installations, and collective solutions. In Poland, these challenges are particularly acute in discussions of collective solutions. Czech cooperativists, meanwhile, view socio-political barriers as more pronounced for energy transition and collective solutions than for retrofits. Interestingly, Czech policymakers express a comparatively optimistic view of the socio-political feasibility of energy transition, which suggests a possible disconnect between national-level perceptions and on-the-ground verification. In both countries, this misalignment underscores a broader institutional blind spot: the overestimation of state capacity to integrate collective solutions without concurrent investment in local engagement and participatory practices.

The findings point to an implementation gap shaped by resource or technical limitations and deeper institutional asymmetries. In Poland, the technocratic orientation of policymakers—prioritising legal frameworks and theoretical solution design, often developed with external consultants or professional self-government—results in under-tested solutions that see limited uptake, especially in the light of very specific rules (cooperative law and dedicated legal act on housing cooperatives). This model prefers design over delivery and innovation over adaptation. In Czechia, comparatively weaker managerial capacity within housing cooperatives constrains their ability to respond to policy incentives, reinforcing a top-down governance model mismatched to decentralised energy systems.

6. Discussion: institutional change in housing cooperatives accommodating energy transition

Over the past quarter-century, the shift in Polish and Czech housing cooperatives toward renewable energy installations and collective energy solutions has been primarily incremental. As long-standing institutions, operating within a relative stable legal and socio-economic context, cooperatives follow existing institutional paths and implement changes gradually and conservatively, shaped by collective responsibility and a strong aversion to risk. Referring to the work of Mahoney and Thelen (2009), institutional change occurs mainly through conversion—that is, the reinterpretation and expansion of familiar retrofit investments to include renewable energy components, primarily framed as a means of reducing operational costs. Other forms of institutional change, such as layering—creating new organisational structures alongside existing ones—were not observed; cooperative structures remain relatively stable, with management boards retaining dominant authority. Drift also appears limited: cooperatives can adapt to clear regulations and accessible financial instruments for low-barrier investments. However, they struggle when change requires moving beyond established patterns, particularly when greater resident engagement is needed. Legal and policy frameworks transposed from other institutional contexts (such as individual prosumers) do not easily translate to entities operating under different institutional logics, such as cooperative housing law and its entrenched organisational routines. This shows that the energy transformation of cooperatives is hindered not only by vertical differences in institutional logic (represented by national and local level actors) but also by horizontal ones.

In analysed country cases, it is evident that rules and practices exert far greater influence than narratives. While dominant public narratives and counter-narratives around decarbonisation are visible and play an important role in public discourse, they do not significantly shape cooperative decision-making. Instead, cooperatives function as depoliticised, bureaucratic, and technocratic institutions, where rule-following (e.g., cooperative law), established procedures (such as procurement practices and reporting), limited communication channels, and low resident engagement prevent the emergence of more profound discontent. Decision-making is framed in terms of technocratic "efficiency"—often defined through return on investment—which is legitimised through the cooperative's "democratic" mandate (as established by cooperative law). However, since this legal mandate grants significant discretion to cooperative boards, motivated individuals, particularly those with technical or managerial roles, can initiate renewable energy investments if they possess sufficient drive and organisational capacity. In practice, this means that in many cooperatives, individual actors—the president of the board or the technical manager—are primarily responsible for initiating and overseeing renewable energy investments. These actions typically take the form of author-driven experiments rather than institution-wide transformations. Their motivation is not solely economic but also reputational and forward-looking, provided the initiative does not entail excessive risk.

Housing cooperatives remain hybrid organisations (Battilana and Lee, 2014), occupying a unique institutional space where competing institutional logics—economic efficiency and social-environmental values—intersect. In our study, we observed a dominance of the techno-economic approach over socio-environmental concerns. This phenomenon is usually scale-dependent: the larger the cooperative, the less significant the community becomes; while the importance of scalability and efficiency grows, cooperative members (residents) no longer possess a shared voice, expertise, experience, or the ability to influence decisions (Puusa, 2024). In this way, the dual nature of cooperatives may fade. When economic goals dominate, long-term membership and societal value tend to be neglected, and the relational aspects of cooperation are jeopardised (Novkovic et al., 2022). Thus, in all forms, we argue for preserving and strengthening the dual role of housing cooperatives, where profit is subordinated to meeting housing needs, and democratic solutions and co-management are decentralised to neighbourhoods and individual buildings; this will help to maintain the relevant energy intermediary character

and also help to create the energy commons, necessary to enable collective solutions to energy transformation. The internal tensions between economic and socio-environmental logics add to the complexity of the horizontal and vertical dynamics in which housing decarbonization takes place, suggesting that effective decarbonization solutions must be crafted with careful attention to these multi-layered and sometimes conflicting conditions.

From a policy perspective, accelerating energy transition in existing housing cooperative settings will require the application of multiple forms of institutional work (Lawrence and Suddaby, 2006): first, coercive pressure through legal mandates (e.g., the EU energy efficiency directives) and strong financial incentives (e.g., feed-in tariffs); second, mimetic pressure: by reducing uncertainty and disseminating successful use cases; and finally, normative pressure: as a final step, through moral and cultural arguments (e.g., climate narratives or appeals to community values). Experience with retrofitting shows that cooperatives can successfully adapt to new interventions when institutional and financial conditions are favourable. Renewable energy investments appear to follow a similar trajectory. However, collective energy solutions remain at the experimental stage, mainly due to the lack of tangible incentives for individual residents and the absence of strong institutional drivers that would promote their broader adoption.

Our study's approach offers a subjective narrative about housing cooperatives' uneasy accommodation of energy transition, drawing on a set of several dozen interviews with rarely accessed respondents. However, it does not incorporate representative data on the attitudes of cooperative residents, a limitation driven by the scope of the paper and our focus on institutional factors. Additionally, surveying cooperatives proved challenging due to low response rates, as audits frequently overburden these organisations in Poland. At the same time, in Czechia, many lack comprehensive contact databases because of their small size. These constraints underline the complexity of researching housing cooperatives and highlight the need for caution when generalising the findings.

Based on this study, we identify three directions of further research. First, future research would benefit from panel studies combining administrative and survey data at the building level to capture how energy transitions influence resident attitudes over time, especially by comparing buildings that have undergone energy interventions (photovoltaics, opt-out from district heating) with those that have not. Second, investigations into energy communities could clarify the thresholds at which residents opt to organise collectively, the optimal group size, the conditions that give rise to freeriding, and how internal diversity of attitudes shapes cooperative dynamics and whether there is any point in adapting energy communities in this form of multi-family housing. Third, small but emerging conflicts within multi-family buildings extend beyond traditional disputes over heating price increases or board elections, including contestation over energy efficiency measures and anxieties about implementing the EU energy efficiency directives. These evolving tensions are increasingly politicised and exploited through misinformation, marking a new possible dimension of residential conflict that warrants close sociological attention, as it can also possibly transform traditionally technocratic organisations.

7. Conclusions

In this article, we recognised the attitudes and perceptions towards energy retrofits, renewable energy installations and collective solutions between the state and building levels in Poland and Czechia, with the various historical trajectories of the housing cooperative transformations after the collapse of socialist systems. Based on 60 interviews with policy stakeholders and the cooperative representatives in both countries, we found the dominance of the techno-economic, top-down solutionism, deeply embedded in the existing structures, practices, and past experiences, with a limited capacity to adopt collective energy solutions at the stage of research. We also found substantial differences between Poland and Czechia, where slower structural and ownership transformations in Poland paradoxically maintained greater financial, infrastructural and human

potential for implementing innovative solutions based on energy transition, with limited flexibility in exchanging heat sources and less favourable conditions from the overall conditions and structure of the energy sector. The overall institutional environment hinders the implementation of energy democracy mechanisms, further exacerbated by an unstable financial and regulatory landscape, hastily enacted legislation borrowed from another institutional logic, and the disintegration of existing local communities driven by ongoing socio-demographic changes and the dominance of economic over social logics in the cooperatives. Therefore, energy transition adopts the form of a top-down process driven by economic rationality, with little direct resident involvement, or of an local experiment led by cooperative board enthusiasts—an approach whose initial experiences cast significant doubt on the viability of massive energy community movement within cooperative residential settings.

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Appendices

Appendix 1 – List of interviewees

A1.1 Poland

#	Institution	Date	Interviewee
01	Cooperative association	24.01.2023	Policymaker
02	State-led bank	24.04.2023	
03	State research institute	17.10.2023	
04	Cooperative researcher	07.11.2023	
05	Association of cooperatives	11.12.2023	
06	Main cooperative media portal	15.12.2023	
07	Nationwide Cooperative Energy Advisor	19.02.2024	
08	Ministry Department responsible for housing cooperatives	29.02.2024	
09	Cooperative association	04.03.2024	
10	State-led bank	18.03.2024	
11	Ministry Department responsible for prosumer solutions	16.05.2024	
12	Regional Environmental Fund	24.05.2024	
13	Medium-sized housing cooperative	12.06.2024	Stakeholder (cooperativist)
14	Large-scale housing cooperative	12.06.2024	
15	Micro housing cooperative	27.08.2024	
16	Micro housing cooperative	27.08.2024	
17	Micro housing cooperative	27.08.2024	
18	Micro housing cooperative	27.08.2024	
19	Micro housing cooperative	28.08.2024	
20	Micro housing cooperative	28.08.2024	
21	Micro housing cooperative	28.08.2024	
22	Micro housing cooperative	30.08.2024	
23	Medium-sized housing cooperative	16.10.2024	
24	Large-scale housing cooperative	22.10.2024	
25	Medium-sized housing cooperative	23.10.2024	
26	Small housing cooperative	24.10.2024	
27	Large-scale housing cooperative	25.10.2024	
28	Medium-sized housing cooperative	31.10.2024	
29	Small housing cooperative	26.02.2025	
30	Micro housing cooperative	05.03.2025	

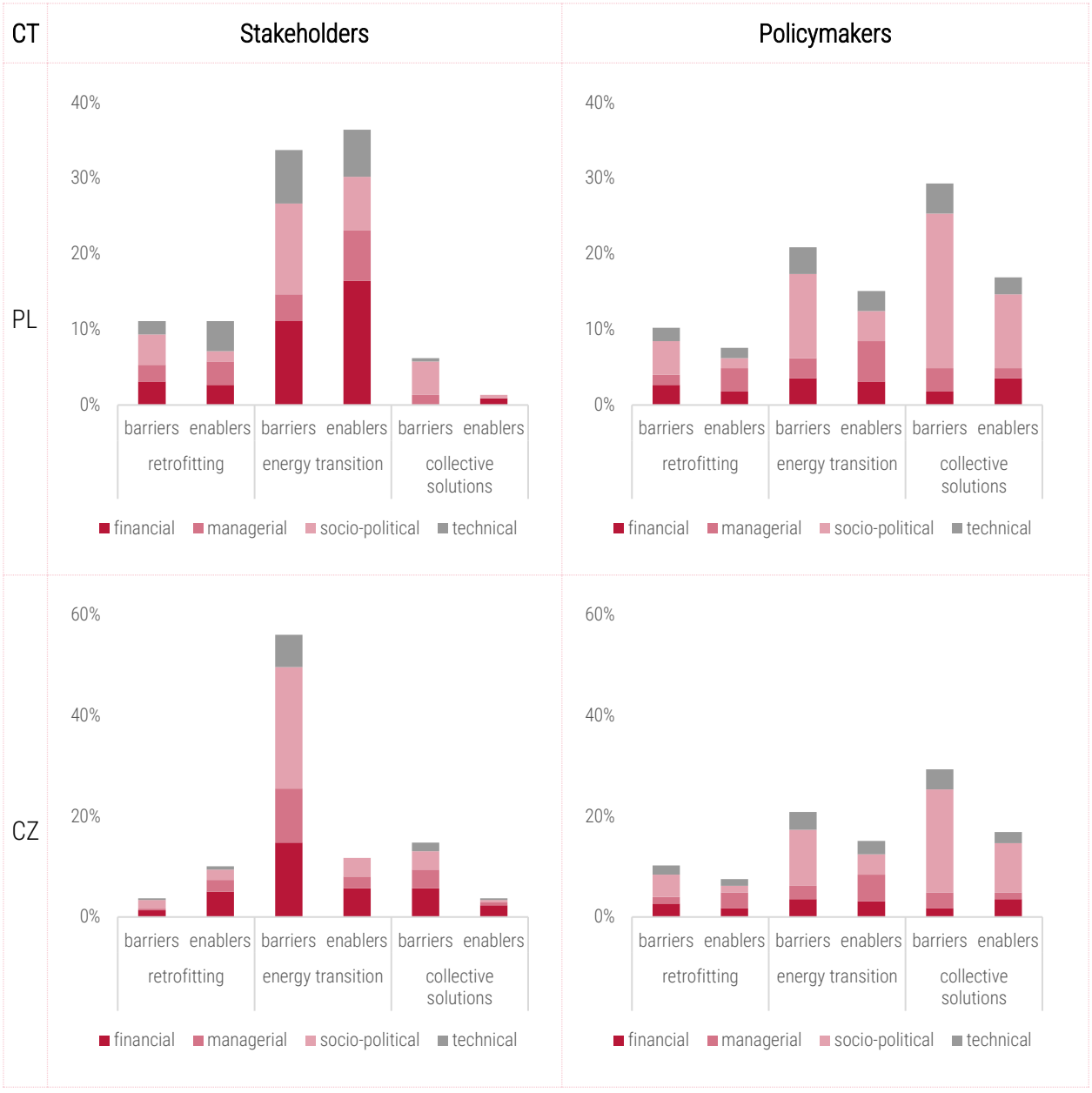
A1.2. Czechia

#	Institution	Date	Interviewee
01	Medium-sized housing cooperative	01.11.2024	stakeholder in a representative role
02	Medium-sized housing cooperative	01.11.2024	stakeholder in a representative role
03	Medium-sized housing cooperative	04.12.2024	delegate
04	Medium-sized housing cooperative	06.12.2024	delegate
05	Small-sized housing cooperative	20.11.2024	stakeholder in a representative role
06	Small-sized housing cooperative	11.11.2024	stakeholder in a representative role
07	Small-sized housing cooperative	11.11.2024	stakeholder in a representative role
08	Small-sized housing cooperative	05.11.2024	stakeholder in a representative role
09	Small-sized housing cooperative	05.11.2024	stakeholder in a representative role
10	Small-sized housing cooperative	15.01.2025	HC member
11	Small-sized housing cooperative	17.01.2025	HC member
12	Small-sized housing cooperative	21.01.2025	HC member
13	Small-sized housing cooperative	13.01.2025	HC member
14	Small-sized housing cooperative	16.01.2025	HC member
15	Micro-sized housing cooperative	21.01.2025	stakeholder in a representative role
16	Micro-sized housing cooperative	20.01.2025	stakeholder in a representative role
17	Micro-sized housing cooperative	20.01.2025	HC member
18	Micro-sized housing cooperative	17.01.2025	HC member
19	Micro-sized housing cooperative	24.01.2025	stakeholder in a representative role
20	Micro-sized housing cooperative	28.01.2025	stakeholder in a representative role
21	Micro-sized housing cooperative	28.01.2025	stakeholder in a representative role
22	Professional chamber	21.6.2023	Policymaker/ national–level expert
23	Regulatory authority	2.5.2024	
24	Association of cooperativists	3.6.2024	
25	Ministry department responsible for affordable housing	9.5.2023	
26	Ministry department responsible for energy efficiency + state-led bank	24.7.2023	
27	State investment fund	29.6.2023	
28	State environmental fund	17.8.2023	

29	The main media portal focused on the technical equipment of buildings	16.4.2024	
30	Community energy association	20.5.2024	
31	Consultant in Construction engineering	20.5.2024	

Appendix 2 – Distribution of main code categories in qualitative analysis

A2.1 Distribution of barriers and enablers across three study areas



Source: own elaboration based on qualitative analysis.

A2.2 Majorities of barriers or enablers divided across main code categories

Source: own elaboration based on qualitative analysis.

Appendix 3 – The dominance of enablers (+) or barriers (-) identified in qualitative analysis

A3.1 Poland

Enablers (+) / Barriers (–)	Energy retrofits		Renewable energy installations		Collective solutions	
	Cooperativists	Policymakers	Cooperativists	Policymakers	Cooperativists	Policymakers
Financial	0	0	(+)	(0)	(+)	(+)
Managerial	(+)	(+)	(+)	(+)	(–)	(–)
Technical	0	0	(–)	(–)	(–)	(0)
Socio-political	(–)	(–)	(–)	(–)	(–)	(–)

Source: own elaboration based on qualitative analysis.

A3.2 Czechia

Enablers (+) / Barriers (–)	Energy retrofits		Renewable energy installations		Collective solutions	
	Cooperativists	Policymakers	Cooperativists	Policymakers	Cooperativists	Policymakers
Financial	(+)	(+)	(–)	(0)	(–)	(0)
Managerial	(+)	(–)	(0)	(–)	(–)	(–)
Technical	(0)	(0)	(–)	(–)	(–)	(0)
Socio-political	(0)	(–)	(–)	(0)	(–)	(0)

Source: own elaboration based on qualitative analysis.

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