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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 decarbonisation of multi-family buildings is crucial for Europe's energy transition, yet the role of collective forms of housing governance in this process remains poorly understood. This paper examines how institutional dynamics shape energy investments in Poland and Czechia, two countries with distinct post-socialist housing transformation patterns. Using institutional theory and 61 semi-structured interviews with policymakers and cooperative representatives, we demonstrate that housing cooperatives are structurally positioned to adopt renewable energy technologies primarily as top-down, techno-economic projects aimed at reducing costs. These initiatives rarely develop into participatory or resident-driven models. The potential for collective energy action is further constrained by financial, managerial, and regulatory barriers, as well as the erosion of community structures under ongoing socio-demographic changes. Where energy transition occurs, it tends to follow a centralised, efficiency-driven logic that restricts deeper resident engagement. Experiences with more advanced prosumer solutions illustrate the difficulties of translating both top-down and individually oriented frameworks into cooperative settings shaped by distinct legal, organisational, and cultural conditions. By integrating institutional theory with cooperative studies, the paper shows how path-dependent governance and conflicting logics limit bottom-up energy initiatives in multi-family housing. These findings raise critical questions about the prospects of energy communities within housing cooperatives under current socio-regulatory conditions, highlighting structural barriers that must be addressed if housing cooperatives and similar forms of collective housing are to play a meaningful role in Europe's emerging energy community frameworks, as well as in the residential energy transition in general.

1. Introduction

Multi-family buildings, crucial contributors to urban infrastructure, face numerous challenges when it comes to energy upgrades. Market failures in the housing sector and persistent socio-technical barriers continue to hinder the achievement of ambitious climate goals [1]. In

this context, strong organisational capacity and effective institutions are more crucial than ever for driving the decarbonisation of the residential sector. While a substantial portion of multi-family buildings has undergone basic modernisation, many still require further improvements to enhance energy efficiency. Successfully advancing this process requires reconciling various stakeholder interests. Yet, policy and research

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studies often overlook the role of intermediaries, despite their potential to accelerate change [2] and break existing institutional lock-in [3]. In the residential sector, intermediaries in multi-family buildings act as entities that enable and coordinate collective investments in the energy transition. Their functions can be taken on by homeowners' associations, property managers, or cooperatives. Despite their importance, the intermediary role remains largely unrecognised; even though such actors may set the standard precedents for countries where formal resident associations are less common.

This article aims to understand how formal rules, normative structures, and cultural-cognitive frameworks constrain or enable energy transition in multi-family residential buildings. Based on research materials collected 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, renewable energy investments, and prosumer mechanisms while considering tensions between financial, socio-regulatory, managerial and technical challenges.

In this article, we use institutional theory to examine the attitudes and perceptions of energy investments among multi-family buildings, based on 61 interviews with key stakeholders, including policymakers operating in a multi-family building environment and various housing cooperative representatives. As examples of intermediaries operating within multi-family buildings, we chose housing cooperatives as an illustrative case of formalised intermediaries managing multi-family properties, characterised by a strong place-based connection, organisational structures, and a distinct culture. As a term, “housing cooperative” is highly context-dependent [4]; we do not refer to *co-housing* or *co-living* initiatives, frequently associated with housing cooperatives [5]. We refer to housing cooperatives that manage multi-family residential estates, most of which were constructed during the socialist era to provide affordable housing for their members [6–8]. These cooperatives have democratic management, lack shared facilities [9], and operate to secure housing provisions while generating profits for that specific purpose. Yet, they remain largely absent from cross-national comparative research on energy transition, as they constitute a relatively insular community with diverse governance structures, local specificity, and limited scale, which complicate systematic analysis.

Our contribution is threefold. First, we identified the dominant institutional patterns and pressures that facilitate the energy transition in multi-family buildings. Efficiency is shown to be a primary driver for housing cooperative boards, as it prioritises economic imperatives and maintenance-free solutions that avoid potential community conflicts. Second, we disclose mismatches between managerial, top-down perspectives regarding energy transition uptake and bottom-up realities. The uptake of prosumer solutions was derived from the European Union's legal framework, drawing on positive experiences from single-family homes and implemented on 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 link the literature on residential energy transition with institutional theory 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 study results, including findings from Poland and Czechia, as well as comparative insights that highlight divergent perceptions among policymakers and cooperative representatives in both countries. The discussion in Section 6 interprets the findings through the lens of institutional change and provides policy implications. Section 7 concludes the paper.

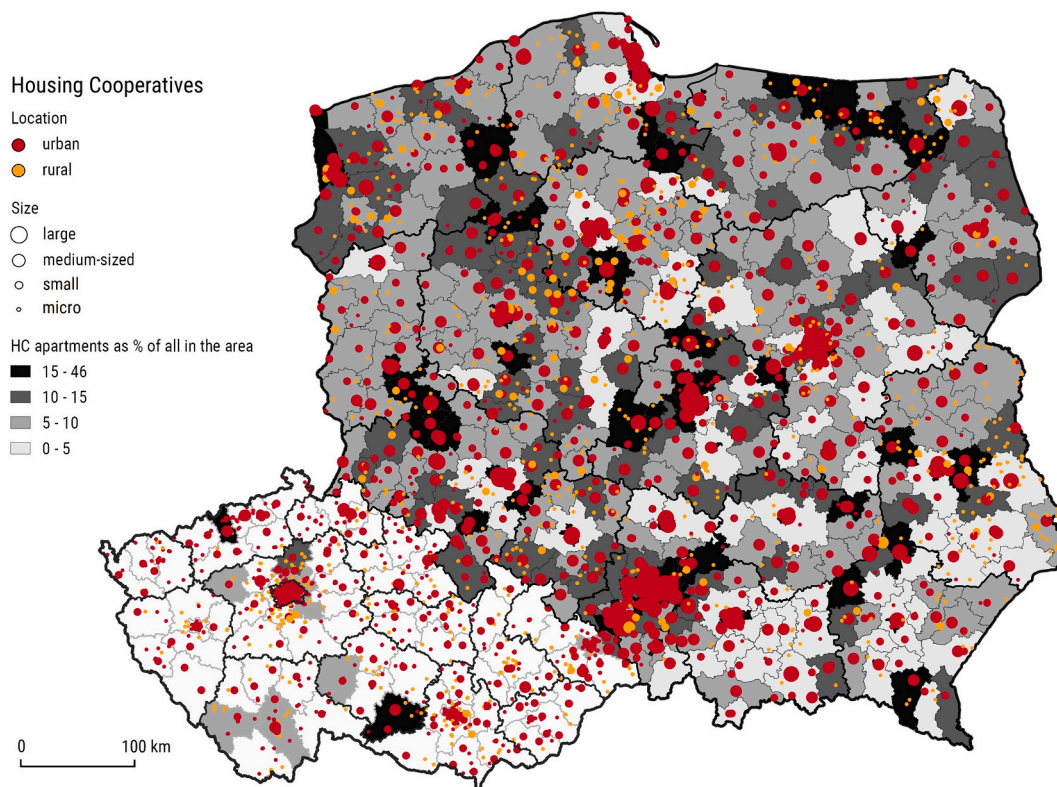
2. Housing cooperatives as energy transition intermediaries

Housing stakeholders — such as homeowners' associations, managers, and cooperatives — are key actors with significant capacity to shape and accelerate change in the residential sector. They play a crucial role in advancing interventions by leveraging networks and aligning technical upgrades with social goals, connecting the resident practices to the institutional context of collective housing [10]. The diverse functions of housing stakeholders include collecting and disseminating knowledge, networking, brokering, fostering improvement, articulating expectations and requirements while performing various institutional roles [11]. The diversity of these functions positions them as intermediaries that can act as political agents mediating conflicts of interest, representing residents in relations with external actors [11], and supporting and facilitating the energy transition [12]. Their role as intermediaries may also manifest in interpreting complex policies and goals into more easily understandable, acceptable, and implementable procedures. The role might include navigating members through bureaucratic processes and facilitating access to financial schemes. Through collective action, they can negotiate better conditions and prices with suppliers, allocate collective resources for large-scale projects, and coordinate processes. If resistance to change among members arises, the intermediary role may involve moderating discussions, balancing expectations, sharing knowledge, explaining costs and benefits, alleviating fears by providing examples from early adopters, educating members about energy efficiency, and monitoring results. In an external-facing role, intermediaries may inform policymakers with feedback regarding the implementation of a particular solution, primarily through their association umbrella bodies.

Polish and Czech housing cooperatives continue to play a crucial role as intermediaries in the housing sector. With strong historical roots in the socialist legacy, they remain structurally relevant, despite the weakening of the cooperative movement and a continuous decline in state engagement since the 1990s [6]. 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 homeowners' associations [13]. In both countries, housing cooperatives remain overwhelmingly urban, including 81 % of all cooperatives in Poland and 96 % in Czechia, and encompass a wide range of building types [14]. While commonly associated with large-scale urban estates of pre-fabricated concrete blocks constructed between the 1950s and 1980s, cooperatives are also found in smaller towns and rural areas where they often consist of low-rise, masonry apartment blocks built for employees of state farms, factories, or local institutions [15], and share similar features: collective ownership or management of common infrastructure, limited financial and technical capacity, and ageing housing stock.

In Poland, cooperatives display greater organisational diversity (Map 1): micro-cooperatives¹ 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 [16,17]. In this way, while Polish cooperative resources are larger and more diverse in scale, the country has almost 3500 entities — nearly half as many as Czechia, which reported 7775 active housing cooperatives in 2022 [14]. They remain critical decision-makers for implementing energy efficiency upgrades, insulation retrofits, and

¹ As for the size gradation of housing cooperatives, we adopted a classification based on the annual revenues in 2022 (for which we had data). We used the following ranges: up to PLN 1 million (micro), PLN 1 million – 10 million (small), PLN 10 million – 50 million (medium), over PLN 50 million (large). We adopted analogous ranges (converted into Czech crowns) for the Czech cooperatives [14].



Map 1. Spatial distribution of housing cooperatives in Poland and Czechia.
Source: authors' illustration based on Statistics Poland and the Czech Statistical Office.

renewable energy installations, thereby playing a crucial role in reducing the high energy intensity of residential heating [18]. Moreover, their organisational structures further predispose them to establish energy communities to lower energy costs for their residents. At the same time, housing affordability has emerged as a pressing issue in both countries [19], positioning housing cooperatives as an interesting and accessible alternative to the market.

In other Central European countries, housing intermediaries have faced similar challenges. A common issue is the reluctance of cooperative members or 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 to no financial compensation. Another widespread challenge concerns the public perception of housing cooperatives, as influenced by lingering collective housing with socialist-era aspects, forced collectivism, and bureaucracy [20]. Moreover, their residents often lack an understanding of the diverse ownership structures within cooperatives, which leads to limited awareness among cooperative members of their rights and duties regarding active participation in cooperative governance [13]. Finally, housing cooperatives complicate the investment approach [21]. Younger generations are increasingly drawn to co-housing initiatives, which are typically limited in scale and closer to a developer-based model, and often overlook the differences between housing cooperatives and other ownership modes.

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 the distinction between cooperatives and homeowners' associations in the public consciousness, despite substantial differences in legal forms and underlying decision-making foundations.

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

Our study adopts institutional theory to understand the dynamics of the energy transition in the residential housing sector, specifically drawing on sociological and historical strands of new institutionalism [22,23]. The institutional theory examines how structures (regular social arrangements such as family or economy), formal rules (e.g., laws) and informal institutions – including informal rules (e.g., customs controlled through social pressure), norms (acceptable behaviours informed by certain values), and routines (regular, patterned actions) shape the behaviour of individuals and organisations within a given system. At its core, institutions set the “rules of the game” that social actors follow [24]. The institutions form a dialectical relationship with actors, shaping and being shaped through practices, which also refers to the mutual interaction between people and technological systems [25]. While historical institutionalism helps us understand institutional change, i.e., how institutions develop over time, the sociological strand highlights the role of institutions in shaping preferences, cognitive scripts, and actions of social actors. 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 [26] that can influence innovations and change regarding energy transitions, even at a local scale.

One of the key concepts in the sociological strand of institutional theory is institutional logic – a coherent arrangement of material practices, beliefs, values, norms, and rules that coordinate and guide actors' perceptions and actions within a particular regime, leading to its reproduction [27]. Institutional logic sets the rules of the game, influences power allocation among the actors, and shapes how we focus on problems, specific solutions and technologies. Although regimes are usually dominated by a certain hegemonic logic, other institutional

logics may be represented by particular groups of actors within the regime, such as residents, cooperatives, or policymakers. These logics intersect at the regime level through governance structures. Over time, a dominant institutional logic might be challenged, leading to its deinstitutionalisation and replacement by another logic with different rationalities and technological solutions. Scott's [28] tripartite division of institutions into three pillars — regulative (formal, legally sanctioned, often enforced by the state); normative (based on values and moral expectations); and cognitive (based on shared understandings and beliefs) — provides a useful framework to explore comprehensively various dimensions and mechanisms in which institutions shape collective action. Therefore, we adopt it to analyse how different institutional logics, illustrated by explicit rules, practices, and narratives [29], structure the possibilities for retrofit investments, renewable energy installations and the development of collective solutions in housing cooperatives. In turn, the historical institutionalist lens helps us examine institutional change and stability — how and why institutions change, either incrementally (via such phenomena as layering, drift, or conversion) or more disruptively, through external shocks [30]. This perspective also allows us to analyse the extent to which path dependencies or power asymmetries hinder the implementation of new investments or innovative solutions.

In this paper, we understand rules, such as standards, regulations, and policies, to be 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 [29]. Thus, the meaning and effect of rules are never purely technical; they are produced and reproduced through situational social action. Their significance lies in the fact 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 and perceptions 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*” [31]. 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 the narrative, rationality is expressed and situated while embedding practices within a broader interpretive framework that renders them coherent within the overall trajectory of change.

Institutional thinking underlies the socio-technological transitions framework, including the multi-level perspective [31] — one of the key conceptual tools for investigating 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 [32]. In this scenario, transformation-oriented policies employ a range of policy instruments and mechanisms to induce or accelerate systemic shifts [33]. Cumulative changes in the system landscape may progressively intensify pressures on the incumbent regime, resulting in breakthroughs and the broader dissemination of innovations [34]. 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.

Our study links institutional theory with the theoretical and empirical contributions of socio-technical regimes and transitions literature. These theoretical perspectives and traditions can be successfully applied to study societal transitions, although they adopt different conceptualisations and terminologies. Our view, consistent with earlier studies [23,27], is that this combination provides a comprehensive understanding of the energy transition as a process of institutional change. 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 transformational 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-regulatory). 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

Our study draws on 61 semi-structured interviews with key stakeholders, including housing cooperative policymakers, followed by interviews with representatives of housing cooperatives engaged in the energy transition within multi-family buildings. We conducted the interviews between 2023 and 2025. Policymakers 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 diverse housing cooperative representatives, including pioneering and early-phase cooperatives with limited retrofit experience.

We covered facts, attitudes, and perceptions of various energy investments in housing cooperatives during the interviews. We interpret and understand their attitudes as the stakeholders' grounded positions towards retrofits, renewable energy installations, and collective solutions, encompassing cognitive, affective, and behavioural components. Perceptions, in contrast, refer to the stakeholders' subjective understandings of energy transitions, which are shaped by personal experiences and narratives rather than objective evidence. Using these categories during the interviews allowed us to distinguish between what participants believe or feel and how they interpret and make sense of the various energy investments, which helps us to uncover the institutional logics behind. Interviews were conducted in the respondent's official language, both in person and virtually, most frequently at the respondent's institutional headquarters. Interview sessions (45–60 min) 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 the 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 identified during the inductive coding of the

collected material: financial (with subcodes such as funding access, burdens/gains), managerial (experiences, decision-making), socio-regulatory (information access, engagement, regulatory environment), and technical (access, consumption, infrastructure), which also refers to divisions and analytical categories in seminal publications devoted to energy transition [35,36]. We analysed policymakers' and housing cooperative representatives' interviews separately to reflect design and implementation perspectives (Appendix 2) and calculated dominant views (Appendix 3), which treat particular dimensions as enablers or barriers. We recognise the limitation that using only frequency analysis can be misleading, especially since one issue can be dominant over others during the semi-structured interview or recur repeatedly. We sought to mitigate the risk at the level of coding and by carefully balancing frequencies in our results interpretation; however, the frequency of codes serves mainly as a supporting measure. At the same time, the qualitative analysis of the content and context of statements remains fundamentally important.

The study adhered to ethical guidelines set forth by the Polish Sociological Association, and both institutions of the paper's authors approved the project's assumptions. All participants provided informed consent, ensuring voluntary participation and confidentiality. Identifying information was anonymised to protect participant privacy in line with GDPR, although we omitted sensitive and vulnerable issues in the interview scenario.

5. Results

While the decarbonisation of buildings is a shared national policy goal across Polish and Czech residential housing, how this plays out in practice reveals deep frictions between technical planning, institutional capacity, and social realities. In the first part of the results section, we chronologically trace how actors on both sides negotiate, adapt or resist (1) retrofits, (2) renewable energy installations, and (3) collective energy solutions. The differentiation of these three stages reflects the historical evolution of institutional frameworks and the internal logic of energy transition. Implementing advanced technological solutions builds upon prior efforts to reduce a building's overall energy demand and establish the necessary 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 housing cooperative representatives 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 Polish housing cooperatives, retrofits are a familiar terrain – but familiarity does not equate to ease of implementation. Since the 1990s, interventions have been implemented to achieve thermal energy savings, initially focusing on replacing old windows, installing new pipes, and insulating apartment building facades, which were in relatively good condition [37]. 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 (Fig. 1).

Housing cooperatives themselves are often associated with managerial barriers, including 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. We perceive this process as collective, yet often resistant to change, due to a faulty democracy mechanism: the declared trust in the housing management board is three times higher than the sense of individual agency in cooperative decisions [38]. The board's agency is stronger than in homeowners' associations; however, 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, as indicated by our respondents, included scattered protests against heat cost allocators, seen as unfair, and brief mobilisations by small cooperatives opposing energy price hikes during the crisis.

Policymakers have promoted energy retrofits in multi-family housing as a low-risk intervention; however, implementation has proven to

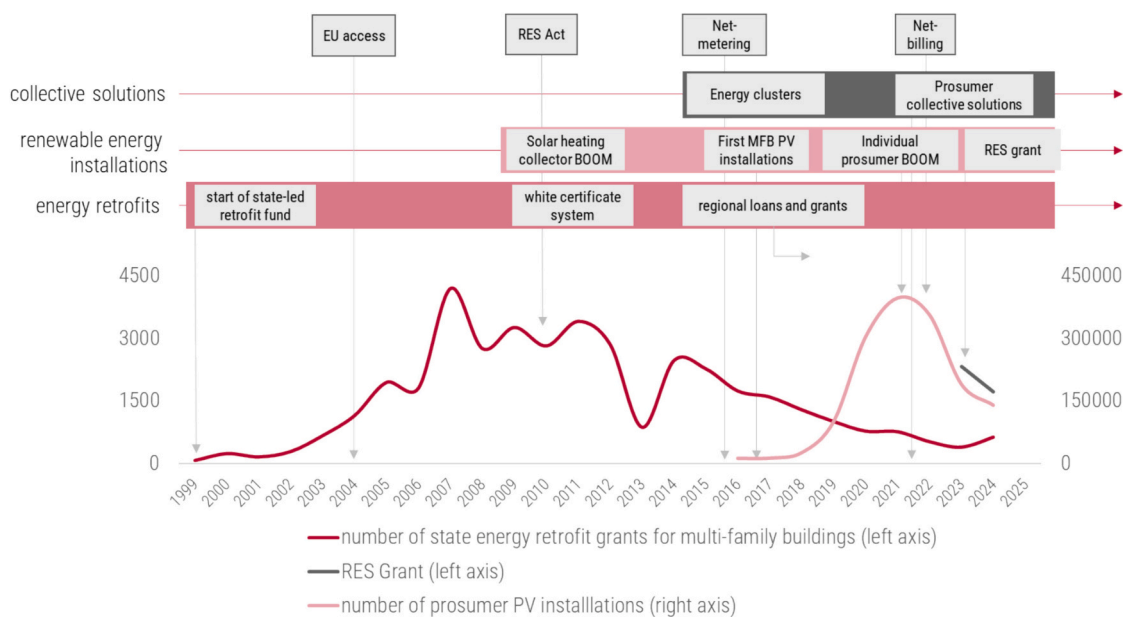


Fig. 1. Reconstruction of the main junctures for retrofits, renewable energy installations, and collective solutions in Polish multi-family buildings. Note: the lines connect the number of installations which appear in a particular year.

Source: Authors' illustration based on BGK and the Polish Power Transmission and Distribution Association (PTPiREE) data, as well as interview results.

be uneven. They acknowledge that housing cooperatives cannot undertake complex investment projects without substantial external support, as they face structural issues, including fragmented property rights and the absence of local energy agencies or designated 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 the financial capacity for their own contributions, organisational resources, and leadership are often essential but lacking.

5.1.2. Renewable energy installations

Housing cooperatives treat the transition to renewable energy as more aspirational 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 energy and building 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 so than in the case of retrofits, residents question the profitability of renewable sources, especially during financially troubled periods when the return on investment seems distant or difficult 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 an 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 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 for social legitimisation 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_PL, housing cooperative manager).

While environmental motivations among cooperatives remain weak, practical demonstrations and community-led pilot projects can slowly shift attitudes. Since 2016, pioneering examples of cooperative renewable investments in large cities [39] and rural areas have been co-financed by national and regional environmental agencies. These efforts were modest compared to the prosumer energy boom in single-family housing, driven by government subsidies for individual households [40]. However, photovoltaic installations since 2023 have been driven by the state-led RES grant, which features a 50 % subsidy. Still, residents express limited awareness and trust regarding the functionality and long-term benefits of renewable energy technologies, which aligns with recent general insights on building decarbonisation [1]. At the beginning of 2025, only one in five cooperatives had experience implementing renewable energy technologies [41].

In this context, the 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, an absence of dialogue results in project failure; for example, worse living conditions in apartments 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, communicative and cultural 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 sessions with residents, all aimed at co-creating with them. The president (of the cooperative board) 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_PL, cooperative researcher).

Policymakers are caught in a double bind: they feel obligated to promote renewable energy while operating within a fragmented regulatory framework divided among several ministries. Technical codes often lag behind technological options, and revisions to energy law frequently follow suit. Furthermore, revisions to energy law are often made 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 [40]. 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 [42]. Due to the still immature storage implementation and unfavourable electricity selling settings, housing cooperatives are seeking intermediate solutions, such as hot water heated by heat pumps to utilise the surplus from photovoltaics. On the other hand, financial policymakers believe that, as with 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 possess the necessary structures, technical capacity, and methods for introducing change within the areas they manage. In the coming years, we have no concerns about cooperatives.” (Interview #02_PL, state-led bank representative).

5.1.3. Collective solutions

The promise of emerging collective energy solutions — such as energy communities, virtual prosumers, or energy clusters — has attracted attention, yet it has been met with considerable scepticism 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). 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 #07_PL, nationwide cooperative energy advisor).

The inability to directly replicate the successful uptake of the prosumer model from single-family homes in multi-family housing hampered the acceptance of collective solutions and their gradual implementation. While single-family home owners possess full autonomy over investment decisions and directly benefit from self-generated

energy, residents of multi-family buildings 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 [39]. 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-apartment 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_PL, 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 actual living conditions of cooperative housing. They introduced numerous energy models (e.g., collective prosumers, energy clusters) 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 large state energy suppliers often mute systemic change. Collective solutions are encouraged rhetorically, but they are poorly grounded in the institutional and technical realities of housing cooperatives. Moreover, the socio-regulatory 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.

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

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 focused on improving their technical condition, enhancing comfort, and upgrading aesthetic qualities. More systematic energy-related renovations, such as insulation or window replacement, began 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 [43].

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

The launch of a new scheme called ‘Zelená úsporám’ (Green Savings Programme²) in 2009 – a subsidy initiative designed to promote energy savings in buildings – marked a growing shift towards explicit retrofit objectives in residential buildings, despite energy efficiency being only one of six programme priorities. The scheme required cooperative management bodies to acquire more advanced knowledge of financial

and legal frameworks, as well as technical building expertise [44]. These interventions aimed to reduce heat losses, as apartment heating and hot water generation were the largest contributors to total household energy consumption [45]. However, such investments, typically financed through long-term loans, often place 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 Savings Programme³), specifically targeting multi-family buildings in 2015 [44]. Subsequent financing campaign rounds under this programme have each had varying parameters. ‘New Green 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 (Fig. 2). 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 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_CZ, ministry department responsible for energy efficiency and 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, 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.

“When you visited someone's apartment building in 1990, it was extremely hot inside, and the windows and curtains were flapping in the air, so at that moment, you did the cheapest thing possible: you replaced the windows and sealed the building completely. So moisture began to rise and mould began to grow, and so on. So, in that period, insulation did not have to be motivated by energy savings. Still, it was really necessary to improve the condition of the building and the living conditions in the apartment, and so on. Today, it's really just about money. (...) I have divided it into three stages for myself. The first stage is reducing heat loss, the second is optimising existing resources, and the third is incorporating green technologies into the system. You can combine stages two and three, but what usually happens is that they insulate the building. They looked at it, built a new gas boiler room, replaced the boiler, and now they're considering taking it a step further with photovoltaics, solar water heating, or some combination of the two.” (Interview #24_CZ, housing cooperative association representative).

We found no evidence that internal power dynamics, income disparities, or lobbying by any particular group of cooperative members influenced the order in which renovations were made. 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, specifically the renovation fund, which may be supplemented by state incentives, 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 energy transition.

5.2.2. Renewable energy installations

In Czechia, the energy transition in the residential sector has

² In some documents referred to as ‘Green Savings’.

³ In some documents referred to as “New Green Savings”.

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

| Governance level/key groups of actors | Rules | Norms and practices | Narratives |
|---|--|--|--|
| National/policymakers | <ul style="list-style-type: none"> Energy law (net-billing, prosumer models) Funding rules and procedures EU compliance Polish Energy Policy/ National Energy and Climate Plan | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Decarbonisation as a long-term goal Procedural complexity rather than legal or financial challenges as a key barrier |
| Local/housing cooperative representatives | <ul style="list-style-type: none"> Cooperative law (General Assembly, reporting, etc.) Specific Law (Act on Housing Cooperatives) | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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: Authors' elaboration based on empirical material and qualitative analysis.

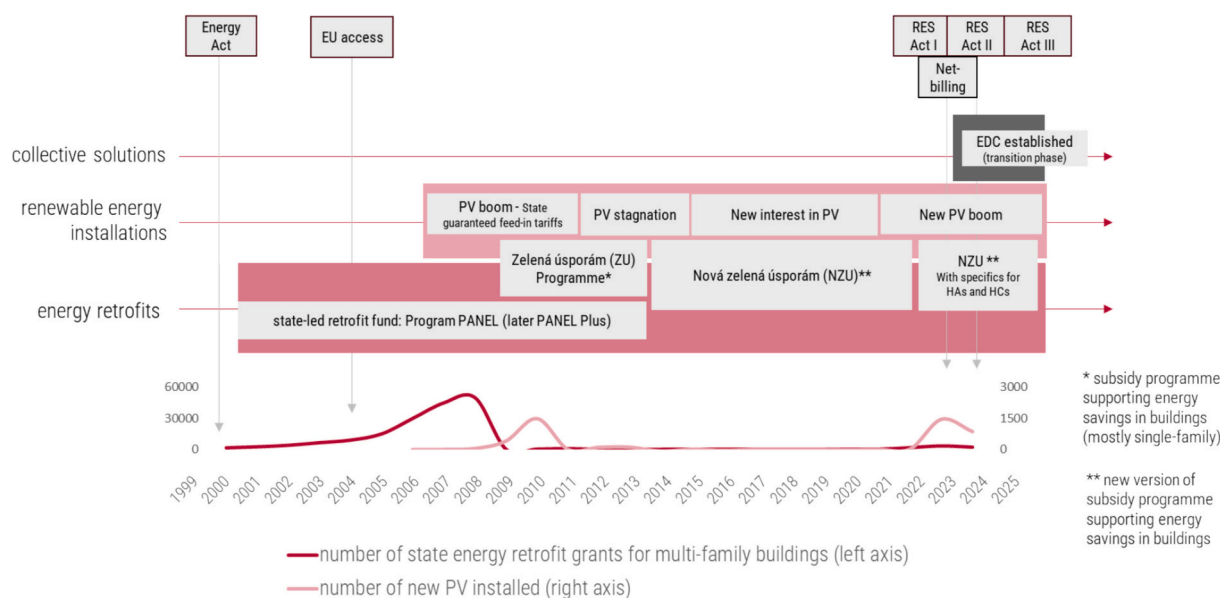


Fig. 2. Reconstruction of the main junctures for retrofits, renewable energy installations, and collective solutions in Czech multi-family buildings. Note: The lines connect the number of installations that appear in a particular year.

Source: Authors' illustration based on qualitative analysis and dispersed materials on retrofitting programme implementation.

progressed slowly, despite favourable conditions. Legislative changes at the beginning of the 2020s – including the gradual adoption of the 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 should be viewed as delayed, as the primary motivation for introducing them was the need to implement EU directives, which promote the use of energy from renewable sources and establish 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 aforementioned ‘New Green Savings’.

The biggest housing cooperatives, in particular, employ a team of managers responsible for overseeing the cooperative's development and prosperity. As mentioned, once the possible long-term loans covering the retrofitting investments are already paid off or about to be paid off, another phase of investments may emerge among some housing cooperatives. However, to implement more advanced investments, management still lacks comprehensive and transparent information from the government, experience in investments and installations, and a sense of

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 I haven't heard of them.” (Interview #30_CZ, 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 management to undertake more complex renewable energy 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 fuel types used — mainly district heating supplied by lignite-fueled heating plants or combined heat and power 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 among residents. Although neither the residents nor the board members interviewed

opposed implementing sustainable measures, there was a lack of momentum to take action. From the cooperative members' perspective, the responsibility for addressing such issues was primarily delegated to the board or elected representatives. In this context, simple behavioural changes—such as switching off lights—were cited by interviewees as one of the few measures households actively undertake to reduce their 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 you'll 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_CZ, Housing cooperative member).

The transformation process is also hindered by residents' limited overall engagement and, often, 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 a 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 want to live here without any more worries. Make it work; that's how I would see it.” (Interview #01_CZ, director of housing cooperative).

5.2.3. Collective solutions

The prolonged absence of the newest renewable energy sources and a supportive legal framework for energy sharing has made housing cooperatives' representatives somewhat cautious when deciding on major investments that rely on these regulations. Some still work in an ad-interim mode, and communication between the representatives and most stakeholders has not been sufficiently communicated, e.g., regarding energy allocation schemes in the energy-sharing groups remains poor. The housing cooperative leaders often declare that they are waiting for rules to be finalised and for examples of good practice to emerge. The issue of energy sharing and community energy does not yet seem to have made many inroads into the public debate within the housing sector. There is a significant amount of uncertainty and mistrust regarding the economic viability of potential solutions and the allocation of roles among multiple entities within a single energy community. From the policymakers' perspective, a particular role in bridging the information gap in the future is, according to some interviews, attributed to the advisory network of experts under the Ministry of Industry and Trade and non-governmental Local Action Groups (*MAS 'Místní*

akční skupiny’).

“But I can imagine a situation 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 out.” (Interview #03_CZ, HC member and delegate).

Policymakers also expressed some scepticism about the development of community energy, pointing to a certain imbalance between centralised and decentralised energy systems and the strong position of energy companies and their interests. The newly established Electro-energetic Data Centre is helping to reduce some of the imbalances in access to data for decentralised energy.

“Simply put, the big players, the manufacturers, also have businesses. Now, they are doing everything they can to lobby for investing as little money as possible in decentralised energy, which means that democratisation will be severely curtailed. They will try to get the money they invested. So, then the profit will be... well, they say that community energy shouldn't be profitable, right?” (Interview #23_CZ, Regulatory authority).

Table 2 summarises the institutional logics within the field of housing cooperatives' energy transition in Czechia, with two main groups of actors (policymakers and housing cooperative representatives) representing different institutional logics.

5.3. Attitudes and perceptions among stakeholders: comparative insights from both countries

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

Financial constraints — commonly assumed to be a dominant challenge in energy transition — are not the most salient barrier in either country. In Poland, housing cooperative representatives recognise certain funding streams, both established and 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 housing cooperative representatives and policymakers acknowledge capacity barriers. By contrast, in Czechia, policymakers express strong concerns about the managerial readiness of cooperatives, particularly 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-regulatory readiness appears misaligned.

Across both countries, socio-regulatory barriers emerge as the most persistent challenge. Respondents frequently cited lack of engagement, information, weak institutional trust, and legal barriers as primary obstacles to energy retrofits, renewable energy installations, and collective solutions. In Poland, these challenges are particularly acute in

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

| Governance level/key groups | Rules | Norms and practices | Narratives |
|---|--|---|--|
| National/ policymakers | <ul style="list-style-type: none"> • The National Energy and Climate Plan • Energy Act and amendments: LEX RES I, II, III • Funding: NZÚ, Modernisation Fund • National Recovery Plan • Energy Regulatory Office – regulations, licenses • The Building Act and its implementation regulations • Legislative work on electricity sharing (legal clarity expected by 2026) | <ul style="list-style-type: none"> • Relatively simple permitting schemes for PV; more complex for wind, biogas, and water plants. • Establishing the Electroenergetic Data Centre to enable the efficient transformation of the domestic energy sector (data collection, standardisation and sharing within the energy sector) | <ul style="list-style-type: none"> • There is no difference between homeowners' associations and housing cooperatives • 'Revolutionary change' from 2023 – the possibility to generate electricity in multi-family buildings • 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 |
| Local/housing cooperative representatives | <ul style="list-style-type: none"> • Act No. 90/2012 Coll., on Commercial Companies and Cooperatives (Act on Commercial Corporations) | <ul style="list-style-type: none"> • Grant programme 'Nová zelená úsporám' is well known and driving retrofits • Housing cooperative management is responsible for initiating investments • The role of SČMBD (Union of Czech and Moravian Housing Cooperatives) as an information intermediary | <ul style="list-style-type: none"> • 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: Authors' elaboration based on empirical material and qualitative analysis.

discussions of collective solutions. Czech housing cooperative representatives, meanwhile, view socio-regulatory barriers as more pronounced for energy transition and collective solutions than for retrofits. Interestingly, Czech policymakers express a comparatively optimistic view of the socio-regulatory 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 indicate an implementation gap shaped by resource or technology 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 light of specific, particular rules (cooperative law and dedicated legal acts on housing cooperatives). In Czechia, comparatively weaker managerial capacity within housing cooperatives constrains their ability to respond to policy initiatives, reinforcing a top-down governance model ill-suited to decentralised energy systems.

6. Discussion: institutional change and policy implications for housing cooperatives accommodating energy transition

Over the past quarter-century, the shift in Polish and Czech housing cooperatives towards renewable energy installations and collective energy solutions has been mostly incremental. As long-standing institutions, operating within a relatively 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, 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 [30]. 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 indicates that the residential energy transition in housing cooperatives is hindered not only by vertical differences in institutional logic (represented by national and local-level actors) but also by horizontal ones.

In the country cases analysed, it is evident that norms, rules and practices exert far greater influence than narratives. While dominant public narratives and counter-narratives around decarbonisation are visible and play an essential 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.

While our analysis primarily focused on institutional drivers and constraints, we also acknowledge that the narratives provided by cooperative stakeholders are not descriptive but performative in nature. Respondents, particularly board members and technical staff, often sought to present themselves and their organisations in a positive light, positioning renewable energy adoption as a marker of competence, innovation, or social responsibility. These accounts serve as reflections of experience and tools for enacting authority, securing legitimacy, and

negotiating institutional roles. For cooperatives that had successfully implemented photovoltaic installations or heat pump systems, such narratives functioned as reputational assets and symbolic evidence of modernisation. At the same time, those who refrained from action often invoked rational arguments such as return on investment, legal ambiguity, or infrastructural limitations to justify their position. This divergence underscores the inherently strategic nature of stakeholder discourse, which is shaped by internal governance dynamics and broader institutional pressures. While we did not systematically analyse the discursive construction of legitimacy, we strove to remain attentive to the positioning of actors within their accounts, especially when classifying responses as barriers or enablers. A more comprehensive investigation of these narrative dynamics would offer valuable insights into how energy transition is negotiated and enacted within bureaucratised and politically neutral institutions such as housing cooperatives.

Housing cooperatives remain hybrid organisations [46], occupying a unique institutional space where competing institutional logics — economic efficiency and social-environmental values — intersect. In our study, we observed the 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. Meanwhile, the importance of scalability and efficiency continues to grow, and cooperative members (residents) no longer possess a shared voice, expertise, or experience, and their ability to influence decisions is limited [47]. 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 [48]. 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 assist in creating the energy commons required 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 decarbonisation takes place, suggesting that effective decarbonisation 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 [49]: first, *coercive pressure* through legal mandates (e.g., the EU energy efficiency directives) and strong financial incentives which should be particularly directed at entities that have not yet participated in the energy transition; 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.

To bridge the gap between cooperative economic logics and decarbonisation policy imperatives, we recommend: (a) increasing financial incentives for housing cooperatives to invest in renewable energy without requiring prior experience — at the EU level this means better targeting of structural and recovery funds, while in Poland and the Czechia it requires simple access to loans and grants at the national level; (b) enabling collective energy sharing and billing among residents, both within single buildings and at the broader scale of housing estates or districts — in Poland this requires removing legal barriers for prosumers that prevent cooperatives from sharing energy, while in Czechia

it requires effective implementation of the newly adopted community energy legislation, (c) developing digital tools for citizen participation to increase their role in housing cooperatives, facilitate co-decision making and ensure transparency. Such measures would accelerate the adoption of renewable energy and prosumer installations in urban areas, where demand is highest, reduce energy costs, and enhance the role of citizens in the energy transition.

Historically, cooperative housing incorporated participatory elements through shared legal subjectivity and financial responsibilities. In many cases, members were expected to contribute actively to the implementation of projects, including their direct participation in construction brigades, thereby mobilising their cultural and social capital for a collective benefit [50]. The post-1989 transformation, however, led to the practical demise of most participatory forms of housing. A massive wave of privatisation encompassed the entire housing stock, including state, municipal, cooperative, and company housing. Cooperatives came to be perceived as a relic of socialism and were often either dissolved or converted into homeowners' associations, further individualising their participatory dimension. This process not only reshaped the structure of the housing stock but also reflected a broader ideological inclination towards individualised housing forms [17]. As a result, it fostered a culturally embedded preference for private homeownership, commonly referred to as *privatism* [51,52]. It remains evident in the residual cooperative sector and continues to shape attitudes and behaviours that contest collective investments — also in the energy transition. Although participation is not applied in practice to the same extent as when the cooperatives were founded, the essence of financial involvement and decision-making powers remains enshrined in the statutes, which may occasionally delay decisions on necessary investments.

Our study's approach presents a subjective narrative about the uneasy accommodation of housing cooperatives to the energy transition, drawing on a set of 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. At the same time, in Czechia, many organisations lack comprehensive contact databases due to 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 that combine 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 (such as photovoltaics or opting out of 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 free riding, and how internal diversity of attitudes shapes cooperative dynamics. Additionally, it could be explored 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 resistance to particular energy efficiency measures and technologies (i.e., heat allocators) and anxieties about implementing 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 recognise 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 housing cooperative transformations

following the collapse of the socialist systems. Based on 61 interviews with policymakers and housing cooperative representatives in both countries, we demonstrate the dominance of techno-economic, top-down procedures, which are deeply embedded in existing structures, practices, and past experiences, and have a limited capacity to adopt collective energy solutions. We also point out substantial differences between Poland and Czechia, where slower structural and ownership transformations in Poland paradoxically maintain greater financial, infrastructural and human capital for implementing innovative energy transition solutions, despite limited flexibility in switching heat sources and less favourable conditions of the energy sector. The overall institutional environment hinders the implementation of energy democracy mechanisms, which is 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 local experiments led by cooperative board enthusiasts — an approach whose initial experiences cast considerable doubt on the viability of a massive energy community movement within existing cooperative residential settings.

Declaration of Generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the authors used ChatGPT-4 in order to assist in cross-checking the occurrence of selected themes in interview excerpts and to enhance the language and readability of the manuscript, which was subsequently checked by the authors and proofread by a native speaker. Finally, the authors thoroughly reviewed and edited the content to ensure accuracy and coherence, and take full responsibility for the final version of the publication.

CRedit authorship contribution statement

Jan Frankowski: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Joanna Mazurkiewicz:** Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Soňa Stará:** Writing – original draft, Investigation, Data curation, Conceptualization. **Aleksandra Prusak:** Writing – review & editing, Writing – original draft, Investigation, Data curation, Conceptualization. **Wojciech Belch:** Writing – original draft, Supervision, Project administration, Investigation, Funding acquisition, Conceptualization. **Michał Nesládek:** Investigation, Data curation, Conceptualization. **Tomáš Vácha:** Writing – review & editing, Conceptualization. **Krzysztof Niedziałkowski:** Writing – review & editing, Methodology, Conceptualization.

Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.erss.2025.104519>.

Data availability

Data will be made available on request.

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