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ENERGY CITIZENSHIP AND ITS APPLICATION IN THE ENERGY TRANSITION IN POLAND

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/// Introduction

Poland, as a member state of the European Union (EU), is obligated to implement its energy strategy in alignment with the European Green Deal, which mandates that all member states achieve climate neutrality. In February 2024, the Polish government updated the National Energy and Climate Plan (Krajowy Plan na rzecz Energii i Klimatu – KPEiK) with new ambition scenarios in fulfilment of the obligation set out in EU regulations (Ministerstwo Klimatu i Środowiska 2024; Igliński et al. 2022). However, recent decades have seen failures and a lack of action towards successful decarbonisation in the energy sector in Poland (Sokołowski & Bouzarovski 2022). The country's heavy reliance on coal, which has long been protected for political and social reasons, coupled with delays in developing renewable energy, particularly wind power, has hindered progress (Mrozowska et al. 2021; Pietrzak et al. 2022). Furthermore, regulatory obstacles, such as restrictive policies on wind farm locations and underinvestment in grid infrastructure, have also slowed the shift to renewables. This has led to higher energy costs and continued dependence on coal and gas. Even though the government has introduced various plans and energy strategies in the last years, including the Nuclear Power Plant Programme (in 2009), the Energy Policy of Poland until 2040 (in 2021), and the Polish Hydrogen Strategy (in 2022), these initiatives have consistently failed, leaving decision-makers, politicians, academics, and experts still debating what actions are needed.

Consequently, during conferences and academic seminars focused on the energy transition, discussions often culminate in a central question: what hinders the energy transition process in Poland? Among the multidisciplinary panels of academics and practitioners addressing this issue, a consensus has rarely been reached, although numerous barriers have been identified, including infrastructure limitations, concerns over national sovereignty, market affordability, and inadequate or non-existent regulations. Social scientists have stressed that issues such as energy poverty (Karpińska & Śmiech 2020; Sokołowski & Bouzarovski 2022), energy democracy, justice (Iwińska et al. 2023; Tarasova 2024; Van der Wel et al. 2024), and cultural aspects of public acceptance, responsibility, and energy awareness, are matters of importance in connection with a geopolitical and technological transition to a net-zero economy (LaBelle 2020; Nyga-Łukaszewska et al. 2023; Černoch et al. 2024). From this perspective, the energy choices of individuals and communities also need to be analysed. For example, Sokołowski and Bouzarovski (2022) argued that, prior to the 2020s, the significance of households in the coal phase-out was largely misrecognised and poorly diagnosed. However, multidisciplinary energy congresses dominated by engineers, decision-makers, and representatives of business rarely take the bottom-up approach and citizen-level context into account. Although there is complete agreement that social acceptance is needed for an immediate, successful, and effective energy transition, such acceptance is seen as just a minor aspect of the vast "energy transition challenge." For social scientists, the answer to the main question of what is holding up the energy transition in Poland is more complex, though it still includes the lack of democratic, inclusive governance in energy systems and the lack of an energy-citizenship culture.

While energy democracy highlights the political and technical dimensions of energy transitions through a focus on who controls energy production and consumption, the key agents should still be citizens, and the citizenship role has three dimensions: legal status and rights, activity, and membership (Montalvo et al. 2021; Szulecki & Overland 2020). The idea of energy citizenship (EC), which has developed alongside the idea of energy democracy, aligns with two dominant conceptions of citizenship. The civic-republican view emphasises active participation, where citizens are engaged in political and community processes. In this context, energy citizenship involves individuals actively contributing to the energy transition through informed decision-making and participation in energy governance. On the other hand, liberal-individualists frame citizenship as a formal legal status

with associated rights, such as access to energy or information, while placing less emphasis on active political engagement (Montalvo et al. 2021). Here, EC is about holding rights and responsibilities related to energy without requiring active participation.

Although not yet fully conceptualised, EC plays a crucial role in the framework of energy democracy by fostering the active participation of all community members in the energy transition. It focuses on citizens as central actors, not just consumers, in shaping energy policies and governance (Wahlund & Palm 2022). By integrating citizens into the energy transition, energy citizenship serves as a bridge between technical governance and the active role individuals play in achieving a just and sustainable future. Thus, this paper summarises recent research on EC and presents a preliminary analysis based on a survey conducted in Poland (2024). The aim is to emphasise the importance of individual-level actors in shaping, through EC, a just transition in the Polish energy system.

/// The Genesis of Energy Citizenship and Current Trends in Research on the Subject

The EC framework encapsulates the rights and responsibilities of individuals and communities in shaping the energy system. At its core, EC involves active citizen participation in energy decisions, with an emphasis on proactive engagement, advocacy, and ownership. This concept "humanises" the energy transition by encouraging public involvement beyond passive acceptance. While energy democracy and EC both promote citizen engagement, they differ in approach. Energy democracy movements often push for more radical models, such as local cooperative ownership. In contrast, policymakers and energy companies tend to support more consumer-oriented forms of participation in the energy market. Together, these concepts highlight the evolving role of citizens in creating more democratic and inclusive energy systems, with varying visions of what participatory governance should look like (Lennon et al. 2020).

Patrick Devine-Wright (2007), who first created the concept of EC, approached the topic by taking into consideration both the socio-cultural level, where issues are socially constructed, and the psychological level, where behaviours are shaped. He concluded that although members of the public are viewed as passive observers in the development of the energy system, they should be seen as active participants. The role of citizens should be shaped by the idea of a fair distribution of rights and responsibilities in

addressing the impacts of energy consumption (Devine-Wright 2007: 71). According to Devine-Wright, understanding how individuals and communities perceive, interact with, and ultimately support or resist energy transitions is essential for fostering EC. He focused on wind power and renewable energy sources (RES) and claimed that public acceptance is not a static or uniform phenomenon but a complex and dynamic process shaped by various social, cultural, economic, and political factors (Devine-Wright 2007). Devine-Wright's critical review highlights the need to move beyond simplistic models of public acceptance that view resistance as merely a barrier to be overcome. Instead, he calls for a more nuanced understanding of public engagement as a participatory and collaborative process involving the values and experiences of citizens in their local and cultural contexts and political arenas.

In this vein, Lennon et al. (2020) argued that energy citizenship remains an under-theorized concept within energy governance scholarship. Researchers have pointed to the need for further research to clarify its definition and practical implications, particularly given that political discourse on energy transitions has been predominantly shaped by technical and economic considerations. Still, the focus on economic factors has often overshadowed broader discussions about the social and participatory dimensions of energy citizenship (Palm 2021; Mullally et al. 2018).

Wahlund and Palm (2022) notice, however, that the advent of energy democracy, justice, and EC signals a paradigm shift because it foregrounds citizen participation as central to the transition towards sustainable energy systems. They present a spectrum – from radical models advocating local cooperative ownership championed by energy democracy movements (representative forms of participation) to consumer forms of participation promoted by policymakers and energy companies – and highlight individual behaviours and grassroots participation in energy initiatives. Another example is the research of Laakso et al. (2023) in Finland, where they focus on housing cooperatives and employ a practice-theoretical approach to show the interconnectedness of decision-making and various forms of participation in the energy system. They discuss three forms of EC: enthusiastic engagement in housing cooperatives, resistant and counteractive membership in the community, and individual energy behaviours as a form of daily practice. This understanding of EC predominantly highlights individual and collective actions such as prosumerism and sustainable consumption practices.

Despite the transformative potential for EC, the lack of a clear definition of the concept poses challenges, as neoliberal interpretations of "good citizenship" increasingly influence policy debates, particularly within the EU. The interpretations often conflate the roles of "energy citizens" and "energy consumers," blurring the distinctions between direct, representative, and consumer-driven participation and activities that could dilute the democratic ideals underpinning EC. According to the above-mentioned researchers, the uniqueness of EC is its individual-level approach, specifically in regard to (1) the rights and responsibilities of citizens to participate in the transition to sustainable energy systems actively, (2) the evolution of attitudes away from passive energy consumption towards meaningful engagement with energy use in daily life, and (3) energy consciousness and the fostering of energy literacy (Lennon et al. 2020; Wahlund & Palm 2022; Laakso et al. 2023; Srinivasa Rao et al. 2024). Nevertheless, empirical interpretations of EC often vary, depending on the priorities of those who use the term.

Recently, more definitions of EC have been proposed in applied research, usually within EU-funded Horizon Projects, which focus on citizen engagement and the role of households and communities in the energy transition. For example, in the Energy PROSPECTS project, EC is defined as "a constellation of actors (in a context) and how it (1) enables/supports citizens to become active private and/or public energy citizens; (2) acts as a collective energy citizen by contributing to change in the energy system or as individual energy citizens and how they realise their potential in a private, public or organisational setting" (Vadovics et al. 2022; Debourdeau et al. 2024; Thalberg & Hajdinjak 2024).

Parallelly, a group of other researchers defined EC as people's belief that they have rights and responsibilities in regard to a just and sustainable energy transition, together with the drive to take action based on those rights and responsibilities (Hamann et al. 2023; Held et al. 2024). This definition proposes the conceptualisation of beliefs on two levels of analysis (individual and collective), as the authors claim that some perceptions of rights and responsibilities might be those of a community or group rather than an individual.

As a consequence of the new definitions and interpretations of EC, the criticism was made that the concept encompassed too many diverse aspects of people and energy transitions (Silvast & Valkenburg 2023). First, EC signifies the active participation of people in energy systems and reflects

diverse engagement levels among citizens. Regarding participation, energy attitudes correlate with environmental awareness and values as well as with energy (procedural) justice (Sovacool et al. 2016; McCauley et al. 2013). According to Held et al. (2024), attitudes towards energy use and environmental issues are closely aligned with the cognitive and behavioural components of EC. Similarly, pro-environmental behaviours are more strongly associated with (biospheric) values than with knowledge. Notably, individuals who prioritise these values also tend to advocate for social justice and equality for all people.

Second, EC has become an interdisciplinary approach that integrates psychological, legal, and economic dimensions, and usually refers to collective responsibility for a just energy transition. The citizen-centred approach applies mainly to rights and duties akin to EU citizenship. However, researchers also indicate that beliefs and norms at the individual and collective levels are grounded and react to the legal perspectives (Hamann et al. 2023). Building on this fact, EC is also inherently linked to the concept of energy democracy, which focuses on the active engagement of citizens in both energy production and decision-making processes. Many researchers further claim that this democratic involvement is essential for achieving equitable energy systems and facilitating the broader use of RES (Ringholm 2022; Devine-Wright 2007; Walker & Devine-Wright 2008; Wahlund & Palm 2022).

Third, Schlindwein and Montalvo (2023) call for heterogeneity of engagement. This means that EC includes various types of citizens, such as consumers, prosumers, and policymakers, and highlights individuals' diverse behaviours and roles in the energy transition. This inclusive and differentiated form has also been broadly discussed from the eco-feminist perspective, which provides data and analysis on the need to engender the energy system (Clancy & Feenstra 2019; Feenstra 2022).

/// European Energy Citizenship Research Examples

To date, EC has predominantly been conceptualised and applied within European contexts, often supported by EU-funded initiatives. The idea has gained significant traction in Europe as a framework for engaging citizens in sustainable energy systems. While there are some emerging studies in the United States and Australia, EC remains largely a European innovation (Kuch & Titus 2014). Socio-political and cultural factors unique to the European landscape play a critical role in shaping how EC is under-

stood and implemented across different countries. An interesting study on EC, which was conducted using the "Walking with Energy" methodology, explored how engaging citizens in energy landscapes can foster a deeper understanding of their energy sources and promote EC (Palm & Ambrose 2023). The study applied this method in the United Kingdom and Sweden by organising events such as physical walks to energy facilities, a virtual tour, and a language café aimed at immigrants. These activities encouraged participants to reflect on their everyday energy experiences and engage in discussions about the heating transition. Another EC project conducted in Switzerland focused on citizen-financed photovoltaics (CiFi PV), examining the participants' motivations and perceived roles in the energy transition. The study surveyed 510 participants across five CiFi PV projects and compared their characteristics to those of the general Swiss public. Participants saw themselves as active contributors to the energy transition rather than mere consumers or investors (Sierro & Blumer 2024). Using a motivational attributes scale, the study analysed the factors influencing the willingness of the participants to engage in future energy projects. The results showed that environmental concerns, local value creation, and financial motivations were significant predictors of future participation, with symbolic motivations being slightly less influential. Similarly, a Finnish study explored energy citizenship within housing cooperatives, emphasising the diversity of citizen participation in energy transitions (Laakso et al. 2023). While much research focuses on active and informed engagement, this study highlights resistance and complexity in decision-making processes. It also illustrates how everyday decisions intertwine with energy-related actions, and thus broadens the concept to include support for, and opposition to, energy initiatives.

The concept has also been used in one Polish case study. EC was applied to describe the grassroots movement and anti-fracking mobilisation in Żurawlów (2011–2015) that emerged in response to proposed shale-gas extraction. Researchers claimed that the engagement of the actors and the production of lay expertise among local activists was influenced by the interaction of the residents with NGOs and public institutions, fostering long-term environmental/energy engagement (Cantoni et al. 2018).

Cross-country studies on EC have further explored its application, particularly within the context of energy communities. In the Nordic countries, especially Denmark and Sweden, EC has been deeply integrated into sustainability and energy democracy frameworks. These nations have emphasised participatory planning, co-ownership of renewable energy

projects, and social innovation as key elements of EC. Denmark, for instance, has a long-standing tradition of community ownership in wind energy projects, where citizen involvement has been crucial to the success and acceptance of renewable energy initiatives (Wahlund & Palm 2022).

These examples show how broad and multifaceted EC remains, with its boundaries often overlapping with related frameworks such as energy justice, democracy, public participation, and so forth. This conceptual ambiguity has prompted calls for clearer operationalisation to ensure more consistent methodology and the development of research and policy applications (Silvast & Valkenburg 2023).

/// Methods: How Should Energy Citizenship Be Measured?

Since EC has been widely discussed, the need for tools to quantify it has grown. To address the methodological expectations, a study led by Johanna Held (2024) aimed to provide an empirically validated scale to measure EC based on psychological aspects of public engagement in energy transitions (Hamann et al. 2023). This scale was focused on key dimensions such as (1) beliefs about energy-related rights (e.g., the right to affordable and renewable energy), (2) beliefs about energy-related responsibilities (e.g., the responsibility to participate in sustainable energy efforts), and (3) motivation to action, which measures the willingness of individuals to act on these rights and responsibilities.

The research involved two stages: "item generation," using deductive and inductive methods, followed by pretesting in a sample (N = 51) to refine the scale. The deductive approach began with a clear definition of the EC concept, which is grounded in existing literature. This involved identifying the key components (energy justice and energy transition) and sub-categories that constitute EC, and then the inductive approach was implemented by engaging an interdisciplinary team of experts to discuss and evaluate the generated items (Held et al. 2024: 3–5). The final version of the scale was tested on large datasets in Austria and the Netherlands (N = 2,705), where the researchers conducted factor analyses and reliability tests to confirm the scale's validity and reliability. Held et al. (2024) proved that the EC scale is a measurable construct, as the results showed that the scale is a reliable and valid tool for measuring EC. The factor analyses revealed clear differentiation between the three dimensions (rights, responsibilities, and motivation). The "action motivation" factor emerged as a key predictor of behaviours related to the energy transition, while "beliefs about rights"

were more aligned with political participation in energy governance. Overall, the EC scale was validated, and the results confirmed the factorial structure of the two subscales (individual and collective), which can be used separately or as a combined EC scale.

The authors argue that "EC is not limited to a single psychological dimension but represents a broader perspective" (Held et al. 2024: 13). It focuses on measuring EC beliefs and motivations rather than behaviours, allowing for an exploration of EC as a predictor of energy-related actions and enabling comparisons with factors like knowledge or efficacy beliefs. This approach avoids conflating EC with socio-economic status, as current EC behaviours, such as investing in sustainable energy projects, are often costly and aligned with upper-class habits. By excluding behaviour, the scale treats EC as a potential outcome shaped by beliefs, motivations, and external factors.

/// Methods: Preliminary Study of Energy Citizenship in Poland

In the research project organised by Łukasiewicz-ITECH, "Polish Attitudes towards the Energy Transition 2024," a Computer-Assisted Personal Interviewing (CAPI) survey was conducted among adult Poles aged 18+. After the pilot research, a random route method was used to maintain representativeness. Interviewers followed a set path to gather responses, using the "last birthday" method to select respondents within households in order to provide a balanced and representative sample for the survey. The sample (N = 2,012) was weighted to account for key demographic variables, such as gender, age, education level, and region (based on place of residence), to ensure that the results reflect the structure of the general population. The survey was implemented by the company INDICATOR from July to September 2024, and analysis of the results has started.[1]

The research questions were focused on attitudes and the public perception of the European Green Deal, energy transition, and pro-environmental and energy behaviours. Moreover, the new EC scale was added to the questionnaire with nine main statements, divided into three key categories ("rights," "responsibilities," and "action motivation") within two distinct subtopics (Table 1).

[1] The survey was financed by the Łukasiewicz Research Network – ITECH, within the Energy Transition Research Programme. I would like to thank my research team (Joanna Grudowska, Ewa Kawiak-Jawor, Sebastian Michalik, and Dominik Zieliński) for their help in preparing the questionnaire and for discussion on the topic. Jacek Bieliński deserves special acknowledgement for his prompt additional help with the preliminary analysis.

Table 1. Energy citizenship (EC) variables divided into subcategories (based on Held et al. 2024; Hamann et al. 2023)

EC	Rights	Responsibility	Action motivation
Energy justice	Affordable sustainable (renewable) energy as a right	Responsibility to help others in the energy transition	Willingness to prevent others from being disadvantaged in the energy transition
Energy transition	Right to information on energy efficiency, Active participation in the energy market	Sense of responsibility for contributing to the energy transition Obligation to participate in the energy market	Pride in investing in renewable energy Willingness to influence energy policy

/// Results

The initial findings reveal strong support for the perception of "affordable energy" and the "right to information on energy efficiency" as fundamental rights, with nearly 70% of respondents agreeing. However, issues of "responsibility" and "active participation" in the energy market show more variability. Many respondents remain neutral or disagree regarding personal obligations, including the responsibility to help others or contribute actively to the energy transition (see supplementary materials). Notably, age plays an important role in shaping these perceptions, with middle-aged and older individuals (46–75 years) having distinct views compared to younger generations, particularly in connection with energy rights.

Regarding "willingness to influence energy policy," the responses are similarly divided, with a substantial portion of the population either neutral or opposed to taking a more active role. These results suggest a consensus on fundamental energy rights but highlight uncertainty and division over personal responsibility and involvement in the broader process of the energy transition.

Regarding gender, the analysis of variance (ANOVA) did not identify statistically significant differences in men's and women's perception of their rights ($F(1, 2012) = 3.794$, $p = 0.052$). Although the p-value approaches the conventional threshold for significance (it remains slightly above 0.05), the indication is that, while there may be some differences in how different genders perceive rights, they do not meet the strict criteria

for statistical significance at this level. However, the marginal p-value suggests further investigation into potential gender-based differences may be warranted.

In contrast, the analysis of age revealed statistically significant differences in the perception of rights across different age groups ($F(4, 2009) = 3.935$, $p = 0.003$). Post hoc comparisons show that individuals in the 46–60 age group perceive rights significantly differently from those in the 18–30 age group ($p = 0.043$). Similarly, the 61–75 age group also exhibits a significant difference in comparison to the 18–30 years group ($p = 0.008$). These findings suggest that older individuals, particularly those aged 46–75, have a distinctly different perception of rights than younger individuals.

Table 2. Variance – "rights" and age

	age.diff	**age.lwr**	**age.upr**	**age.p.adj**
31–45 yrs – 18–30 yrs	0.047	−0.098	0.192	0.902
46–60 yrs – 18–30 yrs	0.157	0.003	0.311	0.043
61–75 yrs – 18–30 yrs	0.211	0.038	0.385	0.008
76+ yrs – 18–30 yrs	0.042	−0.164	0.249	0.981
46–60 yrs – 31–45 yrs	0.110	−0.040	0.260	0.262
61–75 yrs – 31–45 yrs	0.164	−0.006	0.334	0.064
76+ yrs – 31–45 yrs	−0.005	−0.208	0.199	1.000
61–75 yrs – 46–60 yrs	0.054	−0.124	0.231	0.923
76+ yrs – 46–60 yrs	−0.115	−0.325	0.095	0.565
76+ yrs – 61–75 yrs	−0.169	−0.393	0.056	0.242

The ANOVA results for "responsibility" and "rights" based on educational attainment indicate statistically significant differences in both cases, suggesting that education plays an important role in shaping perceptions of responsibility and rights.

For "responsibility," the ANOVA shows significant differences across education levels ($F(4, 2009) = 3.583$, $p = 0.006$) (Table 3). Post hoc comparisons reveal that individuals with secondary education differ significantly from those with primary education ($p = 0.011$), and those with higher education also significantly differ from the primary education group ($p = 0.003$). These findings suggest that people with higher levels of education perceive responsibility differently from those with lower educational attainment,

with individuals with secondary and higher education showing the most pronounced differences. Other comparisons, such as between vocational and secondary education or vocational and higher education, do not show statistically significant differences, indicating that the perception of responsibility does not vary substantially between those intermediate levels.

Table 3. "Responsibility" versus education

	edu.diff	**edu.lwr**	**edu.upr**	**edu.p.adj**
Vocational – primary	0.148	−0.017	0.313	0.104
Secondary – primary	0.181	0.028	0.334	0.011
Post-secondary – primary	0.118	−0.193	0.429	0.838
Higher – primary	0.213	0.053	0.373	0.003
Secondary – vocational	0.033	−0.102	0.168	0.963
Post-secondary – vocational	−0.029	−0.332	0.273	0.999
Higher – vocational	0.065	−0.077	0.208	0.722
Post-secondary – secondary	−0.063	−0.359	0.234	0.979
Higher – secondary	0.032	−0.097	0.161	0.960
Higher – post-secondary	0.095	−0.205	0.395	0.910

Table 4. "Rights" versus education

	edu.diff	**edu.lwr**	**edu.upr**	**edu.p.adj**
Vocational – primary	0.073	−0.104	0.250	0.796
Secondary – primary	0.159	−0.006	0.323	0.064
Post-secondary – primary	0.436	0.102	0.770	0.003
Higher – primary	0.219	0.047	0.390	0.005
Secondary – vocational	0.086	−0.059	0.231	0.485
Post-secondary – vocational	0.363	0.038	0.688	0.020
Higher – vocational	0.146	−0.007	0.299	0.070
Post-secondary – secondary	0.277	−0.041	0.595	0.122
Higher – secondary	0.060	−0.078	0.198	0.759
Higher – post-secondary	−0.217	−0.539	0.105	0.351

In the case of "rights," the ANOVA also indicates statistically significant differences across educational levels ($F(4, 2009) = 5.476$, $p < 0.001$) (Table 4). Post hoc analysis reveals that individuals with post-secondary education perceive rights significantly differently compared to those with primary education ($p = 0.003$). Those with higher education also differ considerably from the primary education group ($p = 0.005$). Additionally, there is a significant difference between those with post-secondary education and those with vocational education ($p = 0.020$). These findings indicate that individuals with higher education levels, particularly those with post-secondary and higher education, tend to perceive rights differently from those with lower educational levels. The comparison between secondary education and primary education approaches significance ($p = 0.064$) and suggests potential differences, but this result does not meet the conventional threshold for statistical significance.

In summary, perceptions of rights and responsibilities vary significantly across different educational levels, with individuals possessing secondary, post-secondary, and higher education having perceptions that are distinctly different from those with primary education. This indicates the important role of education in shaping individuals' views on responsibility and rights in the context of social and civic engagement.

/// A Polish Case Study of Energy Rights, Responsibility, and Willingness to Act

The results demonstrate strong support among Polish respondents for fundamental energy rights and procedural and distributive justice, particularly the right to affordable energy and access to information on energy efficiency, with nearly 70% of respondents in agreement. However, in regard to a sense of responsibility and active participation in the energy transition, the findings reveal a more divided stance. This aligns with studies showing limited engagement due to knowledge deficits and institutional barriers, particularly among younger and less educated groups (Ryghaug et al. 2018). Many respondents either expressed neutrality or outright disagreement with the idea of personal obligations, indicating a lack of civic motivation to contribute actively to the transition. This suggests that while the public values the protection of energy rights, there is limited willingness to engage personally in the collective responsibility needed for a successful energy transition. Collective engagement and individual willingness to act should be compared, as scholars claim that individuals identify both

through personal identities ("I") and as members of social groups ("we"), which may influence EC (Held et al. 2024; Hamann et al. 2023). Collective engagement could be tied to membership in energy communities, national or EU groups, or political parties, which were not analysed in this survey. Collective identities play a crucial role in shaping citizens' engagement in energy transitions, highlighting the social dimension of EC beyond individual actions. Although Polish social capital is generally increasing, the formation of active, involved, and responsible citizenship skills is not improving (Hejwosz-Gromkowska 2020). The results on the EC scale reflect significant societal differences influenced by age and education. Age-related disparities show that individuals aged 46–75 are more aware of energy rights than those aged 18–30, reflecting generational differences in values and experiences with energy systems. Such findings align with studies examining the role of age in fostering personal norms and responsibility, which are crucial for active EC (Röderer et al. 2024).

The generational difference in the perception of rights and responsibilities could stem from varying levels of civic education or shifts in values and attitudes towards energy and environmental issues.

Although the above results are preliminary, there is a visible need to activate all age groups, particularly younger generations, who may be pivotal in organising energy communities and driving the transition towards sustainable energy systems. Empowering these younger cohorts through targeted policies and education could be key to fostering their active involvement.

Moreover, education emerges as a critical factor in shaping pro-environmental behaviours and attitudes towards the energy transition. Respondents with higher levels of education (secondary, post-secondary, and higher education) have significantly different perspectives on rights and responsibility compared to those with primary education. This finding reinforces the arguments in existing literature that suggest that higher education fosters critical engagement, greater acceptance of energy transition policies, and the ability to adapt RES (Srinivasa Rao et al. 2024). Therefore, tailored communication and educational strategies are crucial to promoting EC across diverse demographic groups (Hejwosz-Gromkowska 2020; Laakso et al. 2023; Lennon et al. 2020).

Despite the recognition of energy rights, the results indicate a broader issue: limited civic engagement and a general lack of motivation to participate actively in the energy transition. Many respondents expressed the

need for knowledge and better information about energy issues. There is a gap in energy justice, and the public feels insufficiently informed to act. This suggests that, beyond fostering responsibility, efforts must also focus on fulfilling the right to access comprehensive and transparent information about the energy transition and other incentives and support (Devine-Wright 2007; Seyfang et al. 2014). Ryghaug et al.'s study (2018) indicates that the utilisation of technologies such as smart meters and photovoltaic panels can facilitate enhanced engagement, particularly when policies are designed with inclusivity and accessibility as core principles. Addressing these barriers through targeted educational and participatory initiatives, especially for younger cohorts of the population, is crucial to bridging gaps in EC and fostering a just energy transition.

/// Limitations of the Study and Next Research Steps

The findings of this study, while insightful, are not without limitations. The paper provides preliminary CAPI results but does not fully explore the underlying factors influencing the varying degrees of responsibility and willingness to act among different demographic groups. One limitation is that the data is based on self-reports only, which means we collected declarations, and actual behaviour was not measured in our study. Further research is needed to understand what would encourage individuals, especially those who are young and less educated, to take more proactive roles in the energy transition (Devine-Wright 2007, 2008). There is also a need to investigate the barriers preventing greater engagement at both the individual and institutional levels. Moreover, it would be interesting to compare the EC individual level with various group/collective levels in different Polish regions. Additionally, to capture evolving perceptions or the broader context of political, economic, or technological developments influencing energy transition failure, it would be worthwhile to explore further topics with qualitative methodologies. Finally, since EC is changing, complex, and not fully developed, it will probably have further methodological developments, and new scales will soon be tested. As Ringholm (2022) puts it, EC "expresses itself in a multitude of forms, and new forms and expressions are probably invented as we write." Thus, working on a new EC concept and methodological improvements would still be beneficial.

/// Does Low Energy Citizenship Hinder the Energy Transition? Some Conclusions

While energy democracy and citizenship are often discussed in tandem, their distinct focuses on governance and individual agency demonstrate the multifaceted nature of participatory energy transitions. Understanding these nuances can inform more effective strategies for engaging citizens in sustainable energy practices. Unlike energy democracy, which emphasises institutionalised approaches, such as community ownership and structural reforms, EC tends to focus on individual and collective actions such as prosumerism and sustainable consumption practices. These practices frame participation as a form of self-governance rather than as participation anchored in legal obligations or entitlements. The energy transition for the general public does not mean solely a change in electricity bills or taxes. The shift towards RES and decentralisation of the energy system is a complex process that requires infrastructural changes and the active involvement of citizens, which is possible only with a proper understanding of changes and trends in the energy system, acquaintance with the "sustainability vision," and belief in the importance of actions on various levels. To address these challenges, the bottom-up approach must be supported by long-term incentives, which should also be added to the legal system (Walker & Devine-Wright 2008).

In the Polish context, this individualistic framing without proper systemic support seems to be more challenging than in Western countries (where the EC concept and scale were developed) due to cultural and historical factors. EC emphasises behavioural change and situates itself as an active yet decentralised mode of contributing to energy transitions. The energy system in Poland, however, is still rooted in a centralised, coal-dominated model that reflects the historical legacy of heavy industrialisation and state-controlled energy policies. This legacy has resulted in an institutional framework that tends to favour large-scale, centralised energy projects over grassroots or community-led initiatives, creating barriers to the development of EC. Additionally, EC reflects people's mindsets. Thus, in the structural context of the energy system, the conflation with the cultural system is visible. The EC scale, which encompasses both individual and collective perspectives, pictures the ways in which people think, perceive their responsibility, and act within the energy transition framework they have inherited – a framework that often limits their capacity for active participation to a minimum.

Furthermore, the government's "just transition" energy policy, which involves a slow implementation of decarbonisation and energy price freezes, may inadvertently suppress motivation or agency by reducing the perceived urgency or necessity of individual or community-led actions. While such measures aim to protect citizens from the volatility of energy markets, they may simultaneously create dependency and reduce the drive for decentralised, grassroots solutions. This dynamic reveals the tension between protective state interventions and the cultivation of active, participatory EC, and raises critical questions about the pathways to fostering meaningful engagement in Poland's energy transition.

The concept of EC presented in this paper offers a new framework for bridging broader discussions on energy democracy with the active participation of individuals and communities. Although the deficit of EC is not the sole factor impeding the progress of the energy transition, it will undoubtedly play a significant role in shaping the pace and forms of the planned changes.

The validated EC scale used in the CAPI survey offers a quantitative assessment tool that was used to evaluate the Polish "EC mindset." These results can be treated as a preliminary diagnosis and definitely need further in-depth research. The results presented in this paper show strong public support for fundamental energy rights, including affordable energy and access to information, with the majority of respondents emphasising the importance of procedural and distributive justice (McCauley et al. 2013). However, attitudes towards personal responsibility and active participation remain divided, reflecting barriers such as knowledge deficits and institutional limitations, particularly among younger and less educated groups (Ryghaug et al. 2018). These results are challenging in the context of the Polish government's KPEiK project, which envisions the creation of approximately 300 energy communities and around 2 million prosumers by 2030 (Ministerstwo Klimatu i Środowiska 2024). Achieving these ambitious targets depends also on the preparedness of citizens to take on active roles in the energy system. The Ministry of Climate and Environment is working on making settlements with prosumers more favourable and just, as noted by Minister Miłosz Motyka in regard to ongoing efforts to adjust settlement factors (Energetyka24, 2024). While such measures are crucial, they come amid a narrowing window for achieving net-zero targets by 2030. The reality is that neither the state nor local actors, such as individuals, local governments, and energy communities, are fully prepared for this transition.

To enhance public engagement in the energy sector, tailored strategies for different energy actors are essential. Schlindwein and Montalvo (2023) suggest that prosumers need tax credits, access to knowledge, and support for electricity production and storage. Policymakers must strengthen institutional frameworks and integrate research insights to create evidence-based, effective policies. Businesses can drive sustainability by adopting efficient practices and investing in RES. Lastly, energy communities, which function on a local and collective level, require policies that emphasise the benefits of shared goals and collective action. Many researchers claim that EC should be supported through targeted initiatives, policies, and cultural shifts that empower citizens to actively contribute to the transition (Wahlund & Palm 2022; Lennon et al. 2020; Szulecki & Overland 2020). This needs a broader, general understanding of the society in question as well as a narrow, local focus on the individual and community levels.

In summary, EC might be recognised as a critical enabler of just and sustainable energy transitions. Without the active involvement of citizens, achieving long-term climate goals will remain elusive. Energy transition requires the engagement of society and coordinated efforts at multiple levels of governance. The scale and framework of EC are thus important areas for future research.

/// Appendix

Table 1. Energy citizenship scale of nine items (descriptive statistics), *N* = 2,012

	Strongly disagree	**Rather disagree**	**Neither agree nor disagree**	**Rather agree**	**Strongly agree**
I believe that affordable sustainable (renewable) energy is an important right for all of us	5%	5%	20%	32%	37%
I have a right to information on the energy efficiency of various products	2%	6%	19%	32%	42%

	Strongly disagree	Rather disagree	Neither agree nor disagree	Rather agree	Strongly agree
I consider it an important right to be able to actively participate in the energy market (e.g., to be able to produce/sell/exchange/store energy)	3%	9%	31%	31%	26%
I believe it is my duty to help others participate in the energy transition (e.g., by sharing my knowledge)	7%	14 %	25%	36%	18%
I feel a responsibility to contribute to the energy transition	9%	16%	34%	25%	16%
I believe it is my duty to actively participate in the energy market (e.g., energy production/sale/exchange/storage)	11%	18%	36%	22%	14%
I am ready to act to ensure that no one is disadvantaged in the energy transition	10%	17%	38%	22%	13%
Investing time, effort and money to be able to use more renewable energy is something I am proud of	10%	18%	37%	21%	14%
I am ready to influence energy policy and legislation	11%	20%	36%	21%	12%

Gender

Table 2. Average factors by socio-demographic characteristics (gender)

Gender	Responsibility	Rights	Action motivation
Women	0.021	0.036	0.008
Men	−0.023	−0.041	−0.013

Table 3. Variance – responsibility versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	0.991	0.991	1.505	0.22
Residuals	2012	1325.290	0.659	NA	NA

Note: There are no statistically significant differences.

Table 4. Variance – rights versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	2.892	2.892	3.794	0.052
Residuals	2012	1533.750	0.762	NA	NA

Note: There are no statistically significant differences, but $p = 0.0516$.

Table 5. Variance – action motivation versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	0.224	0.224	0.314	0.575
Residuals	2012	1433.350	0.712	NA	NA

Note: There are no statistically significant differences.

Age

Table 6. Average factors by socio-demographic characteristics (age)

Age in yrs	Responsibility	Rights	Action motivation
18–30	−0.034	−0.084	−0.030
31–45	0.023	−0.038	0.040
46–60	0.016	0.073	0.022
61–75	0.042	0.126	−0.004
76+	−0.096	−0.049	−0.113

Table 7. Variance – responsibility versus age

Term	df	sumsq	meansq	statistic	p.value
Age	4	3.121	0.780	1.185	0.316
Residuals	2009	1323.161	0.659	NA	NA

Note: There are no statistically significant differences.

Table 8. Variance – rights versus age

Term	df	sumsq	meansq	statistic	p.value
Age	4	11.947	2.987	3.935	0.003
Residuals	2009	1524.695	0.759	NA	NA

Note: There are statistically significant differences.

Education

Table 9. Average factors by socio-demographic characteristics (education)

Education	Responsibility	Rights	Action motivation
Primary	−0.153	−0.139	−0.106
Vocational	−0.002	−0.068	0.022
Secondary	0.025	0.015	0.046
Post-secondary	−0.035	0.297	−0.019
Higher	0.059	0.078	−0.022

Table 10. Variance – responsibility versus education

Term	df	sumsq	meansq	statistic	p.value
Education	4	9.395	2.349	3.583	0.006
Residuals	2009	1316.887	0.655	NA	NA

Note: There are statistically significant differences.

Table 11. Variance – rights versus education

Term	df	sumsq	meansq	statistic	p.value
Education	4	16.574	4.144	5.476	0
Residuals	2009	1520.068	0.757	NA	NA

Note: There are statistically significant differences.

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/// Abstract

Energy citizenship, a concept that frames individuals and communities as active participants in energy transitions, has gained significant attention as a critical element in achieving sustainable and just energy systems. This

paper builds on Devine-Wright's (2007) foundational work by exploring the concept of energy citizenship as a multidimensional and evolving phenomenon. It analyses current trends in energy citizenship, including community energy initiatives, energy transition, and justice at the intersection of climate action, environmental awareness, and European research. While existing research has developed theoretical foundations, the operationalisation of energy citizenship across diverse socio-political contexts remains underexplored. Using a recently validated scale to measure perceptions of energy rights and responsibilities, this paper presents a preliminary analysis of Polish energy citizenship. The findings reveal strong public support for fundamental energy rights. However, attitudes concerning personal responsibility or willingness to act are significantly less positive. This paper provides a summary of theoretical and practical pathways towards a more equitable and inclusive sustainable energy system, while emphasising the need for targeted initiatives to address these challenges.

Keywords:
energy citizenship, energy transition, justice, participation, energy democracy

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