Collective energy actions to pursue a just transition. A Southern European observation.

Martina Massari, University of Bologna, Architecture Department
Saveria Olga Murielle Boulanger, University of Bologna, Architecture Department
Danila Longo, University of Bologna, Architecture Department

Abstract

The EU recent energy policies aim to rapidly transition to a sustainable and citizen-centered energy system. However, many regulations do not fully acknowledge the social dimension of the energy transition. The interplay between individual and collective energy action (energy citizenship) and the just transition framework requires further examination. This paper aims to explore the relationship between just transition and energy citizenship particularly within the context of collective energy initiatives in Southern Europe, showcasing their association and varied impacts based on agency dynamics, contextual factors, and governance models. Additionally, the paper proposes new tools and analytical lenses to assess and govern/guide place-based collective energy actions, thereby complementing existing policy-making efforts.

Introduction

The European Union's (EU) most recent energy policy initiatives have been geared toward a rapid transition to a more sustainable and citizen-centric EU energy system. These policies underscore the adoption of renewable energy technologies and more efficient energy use (Trevisan et al., 2023). At the same time, there has been a surge in mobilizations led by more or less organized citizens and activists (Boulanger and Massari 2022), putting forward grassroots initiatives that intervene in the socio-political debate on climate and energy transition. In this framework the potential effects of collective energy actions could be very meaningful, proposing changes at the global level on the one hand and the adoption of practical measures within communities and their own homes on the other. Citizen involvement in transforming households into a proactive energy system (Jansma et al. 2023), by producing their renewable energy, contributes to adjusting their consumption to more sustainable patterns. Accelerating the transition to sustainable energy requires not just a shift to low-carbon solutions but also an essential reconfiguration of energy needs and consumption habits: it appears indeed crucial to adopt new approaches to energy conservation and sobriety (Laurent 2020) nurturing a culture of energy as a vital but finite resource.

Moreover, the inclusion of citizens in energy-related decision-making processes, especially when it reveals existing inequalities and steps to overcome them (Jenkins et al.

Corresponding author: Martina Massari, University of Bologna, Architecture Department, m.massari@unibo.it
https://orcid.org/0000-0002-5483-5869

2016, 2018) influences community response and adoption of decarbonization solutions. Involving users in key decisions and actions for energy savings (Ryghaug et al. 2018) is widely recognized as essential to intervene in the habits of a society accustomed to consuming massive amounts of energy. Collective energy production, management, and consumption must become central to the public debate and widely recognized as leverage for just transition (Szulecki and Overland 2020). This approach is supported by recent EU legislation that gives communities and individuals the right to generate, store, consume, and sell their energy (European Commission 2016; 2019a; 2019b; 2021; 2022). These regulations are worth a first step away from the conventional view of citizens as passive price takers or presumed recipients of technologies (Boeri et al. 2020; Boulanger et al. 2021). However, what appears overlooked by these regulations is the socio-behavioral facets of the energy transition, as solely technologically driven and market-centered policies are inadequate to evoke citizen action or endorse policy decarbonization solutions (Lonergan et al. 2022).

The current literature and policy landscape highlight a significant knowledge gap, particularly in the absence of operational guidance that effectively empowers both individual (Trevisan et al. 2023) and collective actions within the combined socio-technical domain of the energy sector (Olivadese et al. 2020; Jansma et al. 2023). Meanwhile, many engagement methodologies outlined in existing literature inadequately link to the dynamic framework of just transition, thereby diminishing their relevance to policymaking (Lonegarn et al. 2023). This lack of alignment reduces the support for both policymakers and citizens, impeding the successful implementation of energy transition policies.

Additionally, while there is a global interest in the growth of energy transition, the interpretation of a just energy transition varies depending on the context. Countries like Spain, Portugal, and Italy are experiencing significant growth in collective energy transition initiatives. Despite their heavy reliance on fossil fuels, there has been a growing interest in renewable energy sources (Soeiro and Dias 2020), making them valuable case studies for countries aiming to enhance citizens' participation in the energy transition. Therefore, it is essential to examine both the energy citizenship initiatives and the enabling (or hampering/inhibiting) context for their emergence, operationalization and management. The impacts of these collective phenomena which use energy to shape shared actions in the cities and territories are still not enough investigated in southern European regions, where the richness of natural resources does not match a fast policy action regarding their utilization (ibid. 2020).

To address this, the link between collective energy action, described here as energy citizenship (Walker and Devine-Wright, 2008; Schlindwein and Montalvo, 2023) and the three-tenet framework of just transition applied to energy (Lee and Byrne 2019) requires further elucidation and study. By harmonizing these perspectives, it is possible to offer a more robust and holistic analysis of energy transitions, effectively addressing respective challenges

and providing new methods for overcoming many of the barriers that citizens face in energy participation: in particular, exclusion and lack of ability to interact with important stakeholders - whether other citizens or institutional actors - lack of access to appropriate information to support decision making, and difficulties in understanding and interpreting data and other energy-related information. Bridging this gap would contribute significantly to understanding how societal engagement in energy initiatives aligns with the principles of justice, equity, and fairness, providing valuable contextual insights for both academia and policymakers.

In this scenario, this study aims to establish the empirical link between energy citizenship and just transition within the framework of collective energy initiatives in Southern Europe. The research will examine the varying impact of these initiatives by considering the interplay of agency dynamics, contextual factors (Šćepanović et al. 2017), and governing models employed (Avelino et al., 2021). Insights into how the enabling or hindering context influences outcomes can be gained through this exploration.

The second objective is to explore new avenues for nurturing energy citizenship within specific contexts. This involves developing novel tools and analytical frameworks for evaluating and governing place-based collective energy initiatives, complementing policy-making efforts (Manzo and Devine-Wright, 2020). This approach aims to promote a comprehensive understanding of the complexities involved in fostering a just transition through community-driven energy projects.

To achieve this, the paper comprises an in-depth analysis structured into four key sections, each serving a distinctive purpose. Section one initiates the exploration by clarifying essential concepts and objectives. It defines the notions of energy citizenship and just transition and delves into their synergic frameworks, acknowledging their limitations and proposing an integrative approach. Building upon the theoretical foundations, section 2 delves into the policy landscapes of three distinct Southern European countries, intricately connected to the H2020 GRETA[1] project's case studies. Through detailed case studies, section 3 examines the deployment of novel supporting tools within three collective energy initiatives. In the final section, the paper culminates in a comprehensive discussion that synthesizes the empirical findings with the theoretical framework established earlier.

Objectives and methods

This paper aims to explore the potential convergence of aspects of the literature on energy citizenship and just transition to arrive at a comprehensive analysis to be verified in empirical cases of collective energy actions located in Southern Europe. The goal is to facilitate a

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nuanced examination of the multifaceted dimensions of collective energy actions, particularly those closely tied to localized contexts.

This paper used different qualitative methodologies (Hunter & Brewer 2015) (Figure 1) such as qualitative literature review carried out using a snowballing approach, with keywords search on both Google Scholar and Scopus, to identify pertinent literature on energy citizenship and just transition; qualitative data gathering through participant observation of three selected context in Southern Europe while undergoing empirical iterative testing of collaborative trajectories (Energy Citizenship Contracts and Community Transition Pathways) aimed at guiding energy citizens from various levels of just and fair interplay within the energy system.
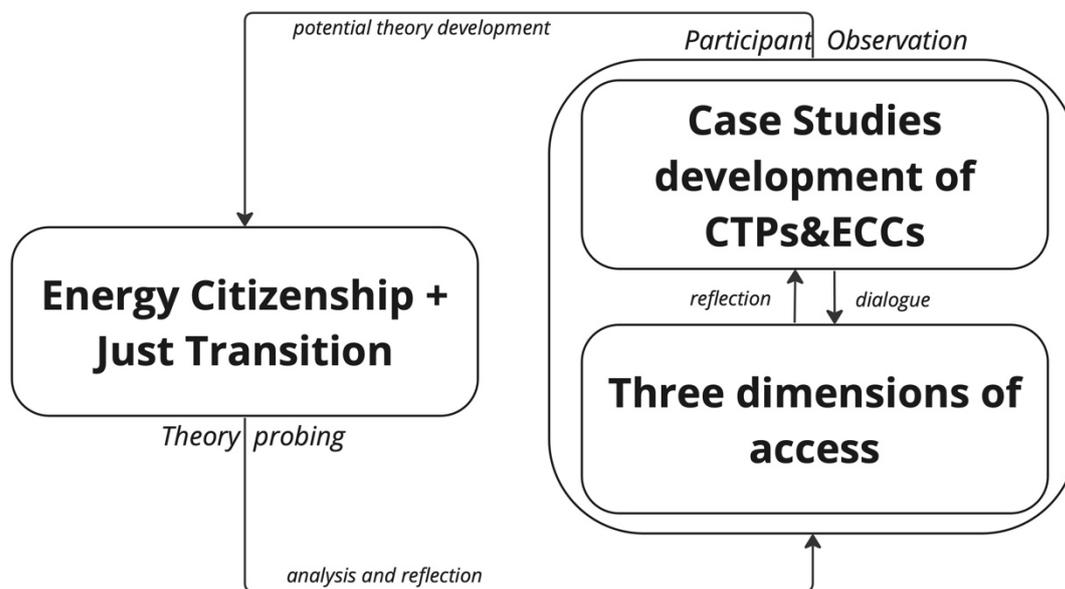

Figure 1 – Abductive research methodology adapted from Kovács & Spens (2005, p. 139)

Employing an abductive scheme (Timmermans & Tavory 2012) this research delves into selected experiences in Southern Europe, which constitute a subset of the cases examined under the GRETA project a research and innovation project focusing on investigating the factors that enable or hinder the development of energy citizenship. Abductive reasoning is applied to design a flexible research approach, adaptable to explore and incorporate diverse theoretical and empirical perspectives, facilitating a comprehensive understanding of the topic without stifling potential conflicts or dissenting views.

The selected representative case studies served as both an observation and test field to verify and adapt initial hypotheses (Groat & Wang 2013): the UrBeroa energy community in Bilbao (Spain), the Coopernico energy cooperative in Lisbon (Portugal), and the emerging Pilastro-Roveri energy community in Bologna (Italy).

 Data gathering was facilitated through participant observation, made possible by the involvement of researchers in the GRETA project. This qualitative research approach establishes direct contact with the experiences under scrutiny (Kawulich 2005, Clark et al.

2009). Participant observation served as a cornerstone of the methodology, enabling the researchers to immerse themselves in the context of the case studies. Through active engagement with the communities and stakeholders involved in collective energy actions, researchers gained firsthand insights into the dynamics, challenges, and opportunities associated with these initiatives. This approach encompassed both data collection and descriptive information obtained from documents (websites, reports, articles) related to the case studies, thus highlighting critical aspects. By adopting this methodology, a profound understanding of the lived experiences and perspectives of the actors within the energy transition systems was achieved. Participant observation incorporated iterative testing of tailored initiatives, where energy citizenship can actively contribute to just transitions, ensuring that the benefits of sustainable energy are equitably distributed. This iterative process involved the refinement and adaptation of two interconnected collaborative tools co-developed based on the evolving needs and responses of the case study communities: Community Transition Pathways and Energy Citizenship Contract.

This abductive research process recognizes the dynamic nature of the experiences described, impacting various dimensions of the relationship between energy citizenship and justice. Thus, continuous navigation between empirical observations and theoretical concepts enhances comprehension of both theoretical frameworks and case studies as well as develops a context-sensitive approach to ensure that the research remains relevant, meaningful, and sensitive to the unique circumstances of each case study.

Energy Citizenship in a Just Transition Framework

Energy Citizenship and its Growing Significance

Citizens' participation and activation (Jansma et al. 2023) have been at the forefront of recent energy transition policies. As the recognition of the pivotal role of citizens in the energy transition grows and establishes itself in academia and policy, the concept of "energy citizenship" emerges as a valuable framework for examining the local conditions that either enable or hinder citizen action toward energy transition. It represents an "umbrella term" to describe the various ways in which citizens are actively involved in the energy transition, whether as consumers, users or through political engagement in protest movements to influence the institutional direction of change (Schlindwein & Montalvo 2023). Preliminary scholarly definitions suggested that within energy citizenship the public is conceived as active rather than passive in energy system evolution and framed by notions of equitable rights and responsibilities across society for dealing with the consequences of energy consumption, notably climate change (Devine-Wright, 2004). This and similar definitions point to the human and social dimensions of the energy system, focusing rather on a shared collaboration on a fair, equal and right-based set of actions to address decarbonization through mainly

collective behaviors and initiatives. The concept seems to move beyond individualistic approaches - centered on energy technologies and personal consumer investment - to include collective spaces of participation (Ryghaug et al. 2018), psychological (Devine-Wright 2012) and behavioral commitment (Schlindwein & Montalvo 2023).

Energy citizenship highlights a precise connection between the rights and duties of individuals or a group of individuals (Lennon et al. 2020) and the different domains of energy (Devine-Wright 2012; Wahlund & Palm 2022). It defines that energy should be accessible to all who enjoy a citizenry status and how these are responsible for better management, consumption, and production of it (Longo et al. 2023).

Nevertheless, a necessary clarification entails an understanding of the concept of citizenship. Throughout history, the dynamics of citizenship have undergone significant transformations (Hildebrandt et al., 2019). Citizenship is seen here as a performative concept (Ryghaug et al. 2018), shaped by ongoing political and social struggles to define who can or cannot be considered a subject. This perspective extends beyond traditional citizens to encompass non-citizens as well, recognizing them as relational actors within diverse social groups asserting their rights. That means to approach citizenship not merely through juridical rights, but as embodied, practiced and performed acts, a process of becoming (Hildebrandt et al. 2019). According to this perspective, individual and collective energy actions can be identified as performative expressions of citizenship and explored as one of the many possible ways to navigate energy transitions by making both citizens and non-citizens claim energy rights.

This claim can also take more problematic and contradictory forms, as in cases of opposition and contestation of renewable energy installations and projects. Critical or oppositional stances toward prevailing energy policies, practices, or systems are still involved in the discourse, albeit in an agonistic way (Silvast and Valkenburg 2023), raising concerns, proposing alternatives, and advocating for change within the energy sector. These cases often conceal broader concerns that affect the history and development of an area and its people, and which cannot be reduced to the use of the NIMBY (Not in My Backyard) label. Furthermore, not all energy initiatives are fair and inclusive, as they tend to engage specific categories of users and members of the community who have the knowledge, power, connection, and possibility to participate without compromising their daily life necessities or without depriving themselves of time to devote to work, family, study.

Finally, not all energy citizenship initiatives take place in fertile contexts (politically, geographically, etc.). The contexts in which transition is territorialized are often characterized by power differences, given the hybridity of actors and their networked interactions (Sareen and Haarstad 2018). This involves considering the often-neglected individuals, communities, and territories in energy policies, emphasizing the heterogeneous nature of the citizenry, prompting a critical examination of how involvement influences the ways citizens engage and

are categorized acknowledging both intended and unintended forms of citizenship as meaningful and legitimate.

Just Transition Perspective

Just transition has garnered substantial attention within the realm of energy studies, drawing interest from various academic disciplines over the past decade (Jenkins et al., 2016). While there has been a growing focus on the justice aspects of the energy system (Walker and Day, 2012), a gap remains in understanding the intricate relationship between justice and the emergence of energy citizenship (Lee and Byrne 2019; Olivadese et al. 2020). Furthermore, exploring how the concept of just transition translates into practice is essential, as it not only serves as an analytical framework, but it also influences policy development and provides an ethical basis for decision-making in the energy sector (McCauley et al. 2013).

The just transition perspective accentuates the importance of integrating principles of justice into energy transitions. Over the decades, just transition literature has extensively explored the influence of social power relations on shaping energy systems (Sovacool 2021). From this viewpoint, it is important to recognize that collective energy actions may not necessarily benefit all social groups equally, highlighting disparities in access and participation. Not every citizen may have access to community decision-making processes or the opportunity to shape the advantages, roles, and benefits associated with individual or collective energy actions.

Scholarly discourse has extensively reflected to integrate energy-related considerations with principles of justice, aimed at addressing the emergent and crucial concerns - social, economic, political, environmental, and more - that the process of decarbonization has brought to the fore (Sareen and Haarstad 2018). These principles are centered around achieving equitable distribution of costs, fostering inclusivity in decision-making processes, and acknowledging diverse vulnerabilities (Heffron and McCauley 2017; Lee and Byrne 2019).

This perspective naturally leads to the recognition of disparities and imbalances in various dimensions. These inequities manifest in the unequal apportionment of costs and benefits resulting from energy development (distribution justice), in the access to energy decision-making (procedural justice), and in the political recognition of different types of vulnerabilities with specific needs related to energy services (recognition justice). These issues are particularly evident in underserved and vulnerable communities, where power imbalances often hinder effective challenges to the marginalization of social values in energy decisions (Bridge et al., 2018, Lee and Byrne 2019).

Expanding upon this line of thought, the insights of Jenkins et al. (2016) emphasize the procedural justice dimensions, particularly in relation to inclusion mechanisms. They argue that achieving a just transition requires three key elements: mobilization of local knowledge, dissemination of information, and institutional representation. Incorporating local knowledge into decision-making processes can have a significant impact on policies, but only if technical

resistance is taken down and eliminated. Additionally, active participation requires transparent disclosure of information and accessible mechanisms of involvement, allowing for real-time feedback loops to address distributive injustices. Moreover, ensuring better representation in public and private institutions offers a proactive approach to achieving representative justice, ensuring responsiveness to communities affected by injustice.

Overcoming Limitations Through Integration

Although the perspectives on energy citizenship and just transition enrich our understanding of the impacts of the transition on society, they are nevertheless limited. One of the primary challenges of energy citizenship is ensuring the inclusivity of citizen participation. Certain segments of society, such as marginalized or less empowered communities, might struggle to engage effectively due to resource constraints or lack of awareness. Moreover, energy citizenship frameworks sometimes struggle to bridge the gap between individual and collective actions. While emphasizing collective engagement, they need to accommodate individual behaviors and preferences that play a significant role in energy consumption patterns. On the other hand, the perspective on just transition often neglects the intricate complexities involved in the practical implementation of energy transitions. The focus on justice and equity may overshadow pragmatic challenges, including economic viability and technological feasibility. Indeed, this perspective alone risks to not consider the feasibility and the complex and contradictory work involved in implementing energy transitions - implementation, economic investment, technological development, and user behavior.

Therefore, it is imperative to explore how dimensions of justice intersect with those of energy citizenship, as well as the multiple connections between energy transition, active participation, and the potential reproduction of unjust and unequal socio-ecological relations. Rather than favoring one branch of literature over the other, the attempt is to leverage the strengths of both while identifying common ground for discussion. While energy citizenship is a newly developed concept compared to just transition, their relationship is intriguing as they both stem from local dynamics (Valkenburg and Cotella, 2016).

On the one hand, energy citizens bring situated knowledge that can inform practical energy transition deployment. This citizen-driven innovation can improve the feasibility of technological solutions by incorporating on-the-ground insights and providing a useful framework for economic viability.

On the other hand, just transition allows acknowledging the heterogeneous circumstances across countries, sectors, and economies, mandating a context-sensitive approach, heavily reliant on localized insights and solutions (Muttarak et al., 2021) but also aware of the necessary structural societal changes (Catney et al 2013).

This imperative underscore the necessity of evaluating and monitoring the conditions underpinning the emergence of collective energy actions in specific contexts (Avelino et al.,

2021) requiring exploration where geographical analysis assumes paramount importance. The geographical context intricately shapes the implementation and success of energy citizenship initiatives, thereby influencing the journey towards territorialized and just energy transitions.

The two integrated frameworks highlight the need to address exclusion and barriers faced in energy transition research and the importance of considering justice principles. On this basis, we argue that an inclusive approach is useful to consider the removal of barriers to relational, institutional, knowledge access.

Relational access refers to the ability of communities to interact with multi-level stakeholders and be represented in public and private institutions (Sovacool 2021). To foster relational access, appears crucial to formalize infrastructures that facilitate representation and relationship-building. In the realm of energy initiatives, forging strategic alliances appears essential, ensuring transparent citizens' roles and concerns complement institutional perspectives (Valkenburg and Cotella 2016). These alliances should embrace diversity, incorporating the participation of various actors, both established and emerging. A more expansive representation within the community enhances the ability to influence decision-making, ensuring a comprehensive consideration of diverse interests.

Despite concerted efforts to cultivate relationships among communities, institutions, and stakeholders, persistent power imbalances may endure, particularly in marginalized communities. These communities often lack the resources and influence needed for effective engagement, resulting in diminished visibility. Such disparities not only impede relational access but also escalate potential conflicts, misunderstandings, and biases.

Institutional access refers to communities' proximity to appropriate information and resources that support decision-making and enable action within institutions. It has been recognized that the inclusion of just energy dimensions in other policy sectors such as employment and social policy might lead to the breaking of established political divisions, policy siloed thinking, which is crucial for effective fair energy use and management (Heffron and McCauley 2017; Olivadese et al. 2020). Measures to support it entail capacity-building in navigation and accompaniment in policy, legislation, subsidy reading, and interpretation. Technical assistance and skills development should be incorporated as drivers for institutional access to avoid ambiguity or lack of transparency. Despite the openness of these measures, limitations may arise if institutional responsiveness is limited. Even with formal channels for community engagement, institutions may not always be receptive to community input or may only pay lip service to community concerns. Furthermore, when access is granted, it is important to imagine a medium-long-term commitment plan, encouraging the institutional level not to abandon demands and the commitment to make them come true, for example when a government changes, as it is often occurring in the South of Europe. In this regard, the success of collective energy action is expected to be measured by their ability to endure, grow and evolve.

Knowledge access refers to the understanding and interpretation of data and other evidence related to energy. Enhancing technical expertise within communities (encompassing residents, vulnerable people, workers, city users and policymakers) is essential for fostering access to necessary skills, critical concerning equality (Martins et al. 2020). A robust strategy for promoting energy literacy involves collaboration with educational institutions, workshops, and community-specific resources. For example, collaborating with educational institutions and hosting workshops can equip community members with foundational knowledge about energy systems, renewable technologies, and energy policies (Lane et al., 2014). This approach helps build a knowledge base that contributes to informed decision-making (Martins et al. 2020). Moreover, facilitating inner knowledge-sharing among participants fosters a collective learning process that strengthens their capacity to address energy-related challenges—a powerful mechanism of peer-to-peer sharing and circular knowledge creation. This approach nurtures a circular process of collective learning, enhancing communities' capacity to navigate complexities and fostering a sense of ownership and empowerment.

This inclusive perspective serves as a guiding framework for addressing barriers and inequalities within three case studies located in Southern Europe. By integrating this perspective into the analysis, the project aims to achieve a multifaceted exploration of energy citizenship dynamics while considering how the distribution of the transformation costs impacts inequalities and pre-existing vulnerabilities. It emphasizes the role of citizens and the necessity to remove barriers related to relational access, institutional access, and knowledge access in the energy transition.

A Southern European context on Collective Energy Transition

Diving deeper into the three selected case studies of Portugal, Italy and Spain, this section shows the presence of energy citizenship-related policies, with the aim of critically understanding which is the current starting point and the potential future developments. It offers a comprehensive overview of the policy context in these countries, elucidating the broader regulatory frameworks within which the collective energy actions unfold. It sheds light on the contextual nuances that shape the local energy transition pathways, thereby setting the stage for the subsequent case study data gathering via participatory observation and empirical testing of transition trajectories.

As reported by Sareen et al. (2018), Portugal, especially its southern part, has a huge potential in using solar-generated energy. At the same time, the authors report the presence of high energy poverty rates and the necessity for the country to import energy from abroad. In this context, the country shows a strong political inclination to implement local solar energy generation. This can be traced back to the first years of the century, with the starting of different policy initiatives and pilot projects. Among them, the most important ones to be recalled are synthesized as follows. The first one to be mentioned is the National Energy and

Climate Plan - Plano Nacional Energia e Clima (PNEC) for 2021-2030 which sets ambitious targets to reduce by 55% emissions (compared to 2005), increase energy efficiency by 35%, reinforcing the weight of renewable energies by 47% and increase the electricity interconnections by 15%. These targets align with Portugal's commitment to the European Union's Energy Union strategy. To facilitate citizen participation, Portugal has established a legal framework for energy communities through Decree-Law No. 162/2019. This framework enables citizens to form community-led initiatives for renewable energy production, consumption, and trading. It empowers citizens to collectively own and manage renewable energy projects, fostering local ownership and engagement. The framework provides a clear structure for the establishment, operation, and governance of energy communities, ensuring transparency and accountability in decision-making processes. As reported by Klein et al., in 2022, the Portuguese energy policy context experienced a significant development with the inclusion of Citizen Energy Communities (CECs). Decree-Law 15/2022, enacted on January 14, 2022, transposed EU Directives 2019/944 and 2018/2001, marking the first incorporation of CECs into Portugal's energy framework. CECs are defined as legal entities formed through voluntary participation and aim to provide environmental, economic, or social benefits rather than pursuing financial profits. They can engage in activities such as renewable energy production, distribution, sale, consumption, aggregation, energy storage, and energy services. CECs have similar regulations as Renewable Energy Communities (RECs) but with added capabilities such as owning closed distribution networks and engaging in energy activities irrespective of the energy source being renewable or non-renewable. This development demonstrates Portugal's commitment to citizen participation and empowering communities in the energy transition. Several projects and pilot experiences are also underway in the country to assist citizens on their journey toward an energy transition empowered by the community. The Portuguese Renewable Energy Association (APREN), for example, supports the creation of solar energy communities and the increase in renewable electricity generation through the creation of a supportive network of renewable energy producers.

In Italy, many policies in the energy sector are present to support the growth of collective energy actions. The country has implemented a range of policies and initiatives to advance its energy transition and promote energy citizenship in line with the European Commission requests. It is committed to reducing greenhouse gas emissions and increasing the share of renewable energy sources in its energy mix. The National Energy Strategy (SEN, 2017) provides a general orientation and planning strategy for national energy policy, setting the objectives of enhancing the competitiveness of the country to reduce the gap between the energy price and costs, of achieving the decarbonization goals identified by the European Commission. The SEN has been the political and planning platform for the following adoption of the National Integrated Plan for Energy and Climate (PNIEC) in 2020. This plan establishes the national goals by 2030 on energy efficiency, renewable energy and CO_2 emissions

reduction as well as the goals on energy security, interconnections, single energy market and competitiveness, development and sustainable mobility and the necessary measures to take in order to ensure the achievement. First Decree Law 162/2019 and then Decree 8/2020 set the conditions for the activation of collective self-consumption from renewable sources and the creation of a renewable energy community, starting the experimentation of a framework of rules aimed at allowing final consumers and/or energy producers to join for "sharing" the electricity produced locally by small-sized plants powered by renewable sources. Even if the law and the following Directives and Decrees support the creation of energy communities, some limitations are still present. On the one hand, the electricity must be locally produced by new small plants (maximum power 200 kW) located near the users of the group of self-consumers (in the case of self-consumers who act collectively, the systems must be located within the confines of the condominium, while in the case of an energy community, the plants must be connected to the network served by the secondary transformer substation - from medium to low voltage - under which the users who are part of the energy community must also be located). Some of the constraints present in these decrees were solved with the implementation of the RED II European Directive through the Legislative Decree 199/202. However, as also recalled by Trevisan and colleagues (2023) the implementing decree which would have made more precisely operative the 2021 Legislative Decree 199 is not yet ready. This is one of the possible causes of the slow pace of the creation of new energy communities in Italy (Musolino et al. 2023).

In Spain, many policies directly manage and operationalize actions around energy at the community level, in line with the European request. The first one is the Long-Term strategy for a Modern, Competitive and Climate Neutral Spanish Economy in 2050, set in 2020. This strategy responds to the commitments of Spain as a Member State of the European Union and with the Paris Agreement and sets the path to achieve climate neutrality. It is a roadmap to move forward towards climate neutrality within the horizon 2050, with intermediate milestones in 2030 and 2040. Due to its time frame, the strategy is built on the basis of technology neutrality, and the different technologies have the same development opportunities to offer the best cost-efficient solutions for the decarbonization of different sectors of the economy, taking into account externalities and degree of maturity. Inside this strategy, self-consumption is present, even shortly, in the context of promoting social participation in achieving renewable energy targets and setting citizens in the centre of the transition. The second important policy is the Integrated National Energy and Climate Plan (2021-2030, NECP), set in 2021, which is the new national energy and climate plan developed by the Spanish Government to meet the objectives and goals of the European Union in the framework of energy and climate policy. Inside this plan, there is a specific measure about individual and collective energy actions, that include assessment of the existing barriers for development of energy communities to ensure that they can produce, consume, store and sell

renewable energy, in particular through renewable electricity purchase contracts, as well as have access to all appropriate energy markets, both directly and through aggregation. The energy communities should be allowed to own, establish, acquire, or lease distribution networks and manage them autonomously, as well as to access all organized markets. The country also has specific Decrees on energy communities. The Royal Decree 244/2019, issued on April 5th, establishes the administrative, technical and economic framework for the self-consumption of electrical energy in Spain. This decree represents a pivotal step in energy policy, as it eliminates the taxation previously imposed on self-consumed energy and outlines the essential regulations governing energy self-consumption. The royal decree introduces a new definition for energy self-consumption, defines rules for access and permits, introduced two modalities of self-consumption including: "self-consumption without surpluses", which does not permit discharges of energy to the grid and "self-consumption with surpluses", in which discharges can be made to the distribution and transmission networks.

Given the described policies, it is evident that there is a significant presence of regulations and laws related to energy, including energy communities, in all three cases. Many of these laws align with European Commission resolutions rather than being standalone initiatives, although empirical experiences in the three countries have been identified, as demonstrated by Trevisan and colleagues (2023). The access, transformation, and distribution of renewable resources in Southern Europe face significant challenges, primarily due to the dominance of large private energy companies in the market, which limits access to energy grids by cooperatives or communities. Capellán-Pérez et al. (2018) observe that Southern European countries like Spain, Portugal, and Italy possess strong potential for renewable resources but still lack space for local and democratic energy projects. This constraint can be attributed to various factors. For instance, Portugal boasts a high percentage of wind energy and geothermal resources, but has only recently begun to focus on electrification and hydrogen (Fernandez & Ferreira 2014). In Spain, the decentralized government system requires effective coordination between regional and central authorities to enact successful energy strategies, leading to bureaucratic bottlenecks (Heras-Saizarbitoria et al. 2018). Additionally, Italy has raised its climate ambitions by aiming for carbon neutrality and has made efforts to reduce reliance on Russian natural gas imports through diversification (Esposito & Romagnoli 2023). However, despite these efforts, a flexible legislative framework and supportive policy environment are still hindering the emergence of collective energy actions in the country, where such enabling conditions are currently lacking.

It is also worth mentioning that the policies mentioned do not show a distinct emphasis on energy citizenship and strategies to support its development. This could be attributed to the novelty of the concept. However, it is interesting to note the absence of a direct link between the potentialities of the Mediterranean climate and the challenge of energy poverty, as highlighted by Bardazzi et al. (2023).

The GRETA Project and Preliminary Results

Following the policy framework of the three countries and to demonstrate the analytical value of the synthetic approach between just transition and energy citizenship, three case studies have been selected as examples, showcasing the empirical application of this combined perspective. As already mentioned in the methodology section, the cases have been intentionally chosen from experiences in Southern Europe, which are among those analyzed under the H2020 GRETA project. GRETA, a research and innovation project initiated in 2021 and concluded at the end of 2023, focuses on investigating the factors that enable or hinder the development of energy citizenship across local, regional, national, and transnational dimensions. This research establishes five distinct objectives:

- describing the identity and characteristics of energy citizens by delineating who these energy citizens are, their demographics, motivations, and affiliations within the energy system;
- detecting how energy citizens engage and interact within the energy domain, through the exploration of their behaviors, collaborations, and participation in energy-related initiatives and decision-making processes;
- devising effective strategies, approaches, and models that facilitate and promote energy citizenship;
- scaling the project's outcomes from local to regional, national, and even supranational levels;
- enhancing the policymaking process by creating roadmaps for decarbonization that prioritize and integrate energy citizenship, the project aims to provide policymakers with actionable insights to encourage robust citizen participation in the energy transition.

The project involves a comparative analysis of diverse case studies, wherein it contributes to modifying certain soft conditions, primarily through participatory pathways, to transition from a state of minimal awareness to heightened activation towards energy-related matters.

For this paper, two main outputs are considered interesting to add insights into the research questions: the Community Transition Pathways (CTPs) and the Energy Citizenship Contracts (ECCs). CTPs are operative and intervention-led transition routes designed with and for communities at different geographical levels (ranging from local to supra-national) to expedite their energy transition, encompassing both mitigation and adaptation actions. Implementation of CTPs aims to enhance energy citizenship across these geographical levels, empowering and engaging communities in addressing decarbonization and promoting a clean and equitable energy transition.

CTPs served multiple purposes: 1) facilitating multi-level communities in establishing a clear trajectory towards deeper engagement within the energy system; 2) assisting policy and

decision-makers in supporting the transition of cities and territories by integrating well-defined pathways into the existing European policy framework; and 3) enabling local associations and committees to forge stronger partnerships with citizens, fostering an inclusive transition. In the three case studies, Community Transition Pathways were developed through participatory processes aimed at first describing the level of preparedness of the community towards decarbonization (declaring knowledge, commitment, potential for resource allocation of both policymakers, businesses and community members); second at defining a series of collaborative actions that the communities could take to build transitions towards the consolidation of energy citizenship (dividing them into short and medium term achievable goals, potential resources to unlock and alliances to establish). CTPs incorporated diverse ideas and practices of transitions, by outlining specific actions and steps that the community is willing to take to move towards the established decarbonization goals. This may include investing in renewable energy sources, improving energy efficiency in apartments and blocks, promoting active mobility, and fostering community education on sustainable practices. This approach emphasized the need to diversify knowledge and engage a range of actors in decision-making processes, acknowledging that models are more valuable as "learning machines" rather than as definitive sources of truth (Turnheim and Nykvist, 2019; Berkhout et al., 2002). By considering different perspectives and narratives regarding the direction and nature of change, diverse pathways of transformation can emerge that deviate from conventional approaches, aligning more closely with emerging alternatives. Following this, CTPs accounted for changing technological, geopolitical, policy circumstances, being designed to be adaptable and flexible to accommodate evolving needs and opportunities.

Energy Citizenship Contracts (ECCs) represent a subset within the upcoming Climate City Contracts (CCCs) framework, which forms the basis for the ambitious "100 climate-neutral cities by 2030" initiative put forth by the Mission Board for Climate Neutral and Smart Cities to the European Commission (EC). The ECCs provide a framework for fostering collaboration between stakeholders, facilitating energy interventions such as the establishment of self-producing energy groups, associations of self-consumers, energy communities, and other services and activities related to energy and resource conservation. The contracts are tailored to the unique circumstances of each case study through a multi-level and co-creative process. They will encompass three key elements: 1) establishing goals and targets for the community to accelerate its energy transition, 2) defining the transition strategy and action plan, and 3) identifying stakeholders and their corresponding responsibilities. Each case study's community is responsible for outlining its own ECC, which will strengthen and regulate the relationships among the parties involved in the energy system, within each specific context. As operational facilitators, the ECCs have clear objectives and engage various stakeholders on a voluntary basis. The primary aim is to establish a mutually beneficial context that enables activities related to energy sustainability and community well-being, proposed and

implemented by citizens, associations, businesses, and other interested parties within the specific context.

The construction of both the CTPs and the ECCs and the identification of their constituent elements have been open to participation from all interested individuals and groups from the case studies. Explaining the territorial context in which the three selected case studies are situated not only clarifies the spatial drivers and barriers influencing the emergence of energy citizenship, but also enables informed case selection and enhances result comparability.

Pilastro-Roveri Renewable Energy District

The Pilastro-Roveri Renewable Energy District, situated in the northeastern part of Bologna (Italy), is a mixed-use area built in the 1960s. The district comprises two zones: Pilastro with residents predominantly living in public housing or in cooperative-managed buildings, including owners and renters, and Roveri, predominantly industrial. Originally designed as a self-sufficient "village" with local services and artisanal activities, Pilastro unfortunately lacks these amenities, resulting in a single-purpose residential neighborhood that has become a source of social and economic challenges. This area also accommodates numerous associations, reflecting a longstanding tradition of collaboration on different policy matters. The municipality acknowledges that the area is affected by energy poverty crises. However, energy considerations were not previously prioritized by these associations, potentially excluding segments of the already engaged population from community activities. In Pilastro area, a group of property owners recently established the Promoting Committee for a REC to facilitate the creation of the first REC in Bologna.

Roveri area is characterized by a high concentration of small and medium-sized enterprises, particularly in precision mechanics. The area's warehouses make it attractive for companies interested in joining and establishing a REC due to available space and roofs.

Figure 2 - View from the district heating plant in Pilastro and a part of the social housing dwelling

From a policy perspective, the Municipality of Bologna is actively promoting the establishment of energy communities within the city, using Pilastro-Roveri as a pilot area. This commitment is remarked by the most recent development of planning tools and regulations, such as the new urban plan extensively dedicated to resilience, the city participation in the Mission for 100 climate-neutral cities, and the climate adaptation strategy (Boeri et al. 2018). While these initiatives might serve as crucial steps towards fostering energy citizenship in the city, their regulatory and normative nature, strongly subject to the energy market, does not easily accommodate the specific requirements of the community in terms of energy engagement.

The participant observation activities in the area provided partial insights into the social and power dynamics of energy-related actions. The area has been involved in a series of participatory activities aimed at first defining the CTPs vision, actions and main resources. To support the vision, a co-developed ECC was created to serve as the primary tool for raising awareness and sensitizing both institutions and marginalized segments of the population. The ECC established clear roles, commitments, and benefits for the energy citizens of the Pilastro and Roveri areas. The precondition of ECC was for all stakeholders to share a common energy justice vision for all future interventions they plan and implement. While participation in the ECC is voluntary, it was designed to monitor the progress of energy transition collective action officially and transparently.

The activities allowed to observe how these tools could mediate the emergence of energy citizenship by tackling in particular the non-existent interactions among the actors, and asymmetries across the knowledge access of the community members. Residents of Pilastro and workers in Roveri demonstrated different levels of commitment towards energy. The inhabitants of Pilastro generally lacked awareness regarding opportunities to enhance energy efficiency in their homes, workplaces, and recreational spaces. Nevertheless, they expressed willingness and commitment to participate and seek information. In contrast, Roveri's workforce exhibited awareness and interest. Businesses are regarded as "prosumagers" (producer-consumers), however, it is challenging to classify them as a geographical community, let alone fully leverage the potential of the entire Pilastro-Roveri district.

In terms of relational access, the power imbalance elicits the struggle to represent the diversity of voices within a community (in terms of age, gender, culture, etc.), especially in Pilastro, where the average age of residents is high. This limitation has always resulted in the exclusion of important perspectives and in compromising the effectiveness of relational access. The establishment of formal channels for community engagement and representation through the ECCs was effectively oriented towards advocating for their interests and ensuring that the concerns of diverse groups are considered during the energy transition.

Pilastro-Roveri members experienced a blockage in institutional access. Moving from ideation to materialization of collective energy actions is critical due to a lack of experience on the topic both in communities and in institutions. For example, although the promotion committee for a REC is highly active, citizens still require a top-down change facilitated by a leadership role from local institutions. Simultaneously, given the absence of prior experiences with REC projects in institutions, it remains unclear who should take the initiative first, resulting in a general impasse. This lack of functional collaboration can undermine the institutional access provided by any transition-supporting tool. Overall, the co-design of operative enabling tools has allowed for the generation of interactions, through which biases and knowledge gaps among participants were deconstructed, creating comparability between their realities. Through bridging events, promoters of a technology/initiative related to energy (often coming from Roveri) and the actors who could benefit from it (residents of Pilastro) were able to explore each other's worlds and articulate socio-technological and future cooperation scenarios.

The participant observation of the development of both CTPs and ECCs in the community of Pilastro-Roveri allowed to register how participants have been increasingly motivated to act, both individually and collectively, to improve energy-related behaviors. However, they recognize the need for a group of gatekeepers who are generated by local and contextual associations, who can lead and organize stable processes linked to energy and appropriate to the community living context. Partnering formally with local grassroots organizations that are already embedded in marginalized or vulnerable communities could guarantee the genuine

integration. In this domain, ECCs were co-created as platforms for community representation, conversational objects and direct communication channels to share concerns and collectively influence decision-making processes in a structured process.

These gatekeepers would be also responsible for knowledge access, providing technical expertise on energy matters, ensuring the commitment of all stakeholders involved, and guiding the overall energy actions.

Coopérnico renewable energy company

Coopérnico, a renewable energy cooperative, is a non-profit institution that crowdfunds photovoltaic power plants and collaborates with a supplier to provide virtual solar electricity to its members at competitive rates. Founded in 2013 by 16 citizens who aimed to support sustainable development, Coopérnico allows its members to simultaneously be customers and owners of the energy cooperative. Since its inception, the cooperative has attracted many new participants, reaching a current count of 2,295 members.

Figure 3 - Coopérnico crowdfund model realized on their headquarters in Lisbon. Source: Coopernico

The renewable energy cooperative focuses on economic and environmental benefits for society, by adopting home energy management systems that enable better monitoring and understanding of energy usage. It envisions a complete transformation of the energy sector, gradually increasing the number of citizens committed to a decarbonized and socially equitable society. It relies on spillover and network effects stemming from its expanding customer base, as well as national lobbying and community engagement activities.

Environmental consciousness is deeply ingrained among Coopérnico members, and they are unwilling to invest in production that carries significant environmental consequences, such as large-scale solar projects.

Currently, Coopérnico is actively pursuing investments in decentralized collective self-consumption and Renewable Energy Community initiatives, aiming to distribute the benefits among local consumers of this renewable electricity. Currently, its trajectory relies on voluntary engagement, coordination of local groups, and other voluntary contributions. In doing so, the cooperative supports governments, citizens, municipalities, and councils in their efforts to establish Renewable Energy Communities in Portugal.

For the GRETA project, Coopérnico conducted internal deliberations regarding methods to enhance the active participation of its members in cooperative activities. The consensus has been reached that further expansion is essential, necessitating the allocation of a dedicated budget to engage a professional capable of fostering cooperation among the volunteer members. This endeavor calls for increased investments in both human resources and skills advancements, considering the availability of platforms that facilitate the voluntary involvement of community members.

The CTPs developed in Coopérnico allowed to establish a hierarchy of objectives and actions leading to highlight three main objectives to accomplish: the need to broaden its array of renewable energy generation sources; Coopérnico endeavors to strike a balance between renewable production and the technical challenges it presents; the aim to facilitate processes that guide already energy-active citizens towards more extensive community action, akin to activism, in driving a clean energy transition.

This final objective aligns with the potential of the ECC here co-created as a container platform, which is expected to take the form of a digital environment, thereby fostering greater citizen participation and engagement within the cooperative. Successfully attaining this objective would result in half of the councils in Portugal having energy cooperatives for renewable self-production by 2030, with Coopérnico itself transitioning into an energy retailer. This accomplishment would ensure that the cooperative possesses adequate policy influence to shape legal framework developments that are better suited to the cooperative's reality, ultimately placing them on an equal footing in the energy market.

As Coopérnico experience shows, by building collective knowledge, ECCs can facilitate institutional access serving as knowledge hubs, providing communities with information about energy systems, technologies, and policies. Actors involved in the delivery or concretization of individual or collective energy actions in Portugal often find limitations and barriers to access to clear and long-term institutional support. Bureaucratic-administrative barriers were frequently mentioned as bottlenecks by the Coopérnico members who feel only supported by its members (i.e., citizens and companies) as opposed to all other stakeholders with decision-making power (e.g., the government, the regulatory entity, other companies in

the sector, the energy network operators) – who are seen with mistrust given the long-lasting, pending power imbalance between energy cooperatives and traditional market players. While the legislator states that it tries to accommodate a citizen-centered view on the development and implementation of enabling legal frameworks (while still considering the needs of other stakeholders), energy citizens see that as resistant to the democratization of the energy sector. This is due to the slow pace of policy development, perceived governmental inertia, feeling that the government backs up the energy monopoly (against citizens and cooperatives), and lack of incentive mechanisms to support them in the clean energy transition.

To solve this, the experience of ECC development in Coopérnico included reflections about how to empower community members to make informed decisions, understand advantages and benefits, and not only actively participate in energy-related discussions but also advocate for it. Knowledge and information on technical, financial, legal, and market operation matters are considered fundamental to engaging in the clean energy transition – along with continued learning of good practices stemming from academia and the market, as well as knowledge on the code of conduct of cooperatives in the case of Coopérnico's members.

For this purpose, the creation of a dedicated desk aims to offer technical expertise and resources to support community-led projects, enhancing communities' capacity to improve their engagement with institutions.

Ur Beroa energy cooperative

Ur Beroa, an energy cooperative established by residents of a high-income neighborhood in San Sebastian, Spain, has provided domestic hot water and community heating services to its members since 1985 when community members assumed control of the private company responsible for these services. Currently, the cooperative has 570 members and supplies its services through district heating based on cogeneration systems.

The cooperative is located in a neighborhood with a low social mix and low unemployment rates. These factors suggest a community that likely possesses a high level of education and technological engagement. This favorable environment and the abundance of renewable technologies in the neighborhood have so far facilitated the acceptance and embrace of climate-related issues as shared challenges. This aspect benefits from active collaboration due to the prevalence of longstanding associations and participation in social and energy-related fields, including consumer groups and neighborhood associations.

Figure 4 - Aerial view of the Bera-Bera Neighbourhood where UrBeroa is based

The active presence of a neighborhood association (Ragrupamiento de Comunidades del Polígono de Bera Bera) aimed to secure favorable economic conditions, ensuring that partner remuneration aligns with the cost of services, supplies, and general cooperative expenses. However, while the cooperative current membership represents a generational continuity, the absence of generational and socio-cultural renewal within the cooperative may pose challenges in addressing the evolving needs and perspectives of the community. As time progresses, there is a risk of losing diverse viewpoints and innovative ideas that a younger generation could bring to the table. Moreover, without a formal representation mechanism, important voices and concerns may go unheard, potentially hindering the cooperative's ability to adapt to changing circumstances and emerging challenges.

In this scenario, the work conducted with the Ur Beroa community has set forth several primary objectives for their CTPs, including a significant expansion of the member base, augmentation of energy services, and implementation of collective renewable energy-based self-consumption. The initial steps towards achieving this envisioned future are anticipated to be completed within a five-year timeframe. These steps entail the exploration of collective self-consumption and the establishment of additional energy services and socio-technical infrastructure, tailored for the community. Realizing these ambitious goals necessitates an improved understanding among Ur Beroa members and the management office of energy technology development trajectories, particularly in their adaptation to the community scale. For these purposes, they also need to navigate public policies, legislative frameworks, and potential subsidies available for investments related to expanding activities. Moreover, the

cooperative must address the challenge of generational renewal. It falls upon the new generations and residents to sustain the cooperative and enhance energy awareness and engagement among members. Lastly, the implementation of planned actions requires substantial financial resources and collaboration among various stakeholders, including cooperative members, residents in surrounding neighborhoods, public administrations, project promoters, technology providers.

Ur Beroa's aim to expand its members base, resonated with a stronger support to relational access. In particular, the diversification of the community members would have granted a larger part of the younger generation to commit to a longer-term effort in the area's energy transition. In response to that CTP offered a less technical tool and a community-led process, to set the basis to empower communities from different age groups to actively participate in shaping energy policies and projects. ECC further supported that, by proposing the establishment of advisory boards comprising representatives from various demographic segments to offer input on project decisions and informal communication channels and pathways to make sure different voices and perspectives are heard.

The co-creation of the ECC for Ur Beroa allowed to formalize these efforts and facilitated the organization and coordination of multiple actors at different levels, uniting them around a comprehensive set of actions aimed at the overarching objective of expanding and diversifying the cooperative's membership, particularly in terms of age demographics. The ECC and its co-design were considered as a forum for strategic discussion – something that is not taking place during the ordinary meetings of the cooperative – allowing less-active members of the cooperative, external actors and potential stakeholders, to participate and start building a common and shared vision and priorities for the future of the cooperative and beyond.

Regarding knowledge access in the case of Ur Beroa, ECCs and CTPs may face limitations in providing comprehensive training and support, particularly in complex areas such as energy systems analysis or policy interpretation. This can hinder (current or future) community members' ability to fully understand and utilize energy-related knowledge. For these reasons, the ECC is proposed as "Declaration" to play a pivot role in improving accessibility and clarity of information by promoting energy literacy within communities through interaction with existing educational programs and infrastructures, workshops, and awareness campaigns. This integration can also constitute a recruiting tactic to get closer to different additional potential members of the communities, also at an earlier age.

Discussion on Lesson Learned and Bottlenecks

In the context of this paper's inquiry, the implementation of new tools and analytical framework to accompany, foster and guide the energy transition at the local level allows to dialogue and build further reflections on emerging literature.

The empirical observation of the CTPs and ECCs deployment in the case studies has yielded valuable insights and lessons that contribute to the advancement of relational, institutional, and knowledge access as an integrated framework for just transition and energy citizenship. While the findings remain limited to specific case studies and contexts, they offer essential reflections on the interplay between these concepts.

The critical role that energy citizens play in guiding just transition efforts emerges as a framework encompassing both a lens for analyzing transition policies and projects and a contingent process subject to dynamic interactions among actors, technologies, and institutions.

Following the lesson learned from the three case studies, we can discuss the potential for ECCs and CTPs in addressing the three lenses of intersection between energy citizenship and just transition: relational access, institutional access, and knowledge access.

	Barriers	**Case studies**	**Enablers**	**Case studies**
Relational access	Power imbalance	Pilastro-Roveri community members are not homogeneous in their interests for participation in collective energy actions	New and different actors' representation -- Integration of vulnerable communities -- Formalization of infrastructures for representation and relationship-building	Pilastro-Roveri ECC became a formal channel for communication and engagement. -- Pilastro Roveri ECC included partnership with grassroots organisations. -- Ur Beroa CTP paved the way for an informal process to engage younger generations. -- Ur Beroa included an advisory board with various demographics in the ECC
Institutional access	Unclarity, impasse --	Pilastro-Roveri members face impasse in implementing	Knowledge hub on policies, regulations,	Coopérnico ECCs offers technical expertise and resources to

	Institutional unreceptiveness and resistance -- Mistrust and skepticism	ECCs' actions for lack of experience on the topic both in communities and in the institutions	subsidies navigation -- Long term institutional commitment	support community-led in their engagement with institutions.
Knowledge access	Lack of comprehensive support for a complex subject	Pilastro-Roveri members exhibit resistance to addressing energy issues, which stems from their experience of social fragilities, which, in their perception, appear more pressing and immediate than the concerns related to the energy transition.	Enhancement of technical expertise (training) -- Interaction with existing education programme -- Peer-sharing	Ur Beroa and Pilastro-Roveri included in their ECC the possibility to interact with existing educational programmes incorporating energy engagement as subject. -- CTPs and ECCs development in the three cases incorporated internal peer-exchange sessions with members of the communities -- Coopérnico ECC will function as an accelerator platform for technical skills for collective energy actions

Table 1 - Energy Citizenship and Just Transition dimensions

Examining the case studies of Pilastro-Roveri, Ur Beroa, and Coopérnico sheds light on how these dimensions are either granted or hindered in these specific contexts.

Examining the collective energy actions efforts in Pilastro-Roveri, Ur Beroa, and Coopérnico reveals notable lessons for the three dimensions of access hypothesized. Pilastro-Roveri highlights the need to address power imbalances by formalizing communication

channels and partnering with grassroots organizations to foster inclusivity. In facing institutional access barriers, the case underscores the importance of establishing knowledge hubs and ensuring long-term commitment for effective navigation of complex regulatory landscapes. Ur Beroa introduces a nuanced approach by combining formal and informal strategies, engaging younger generations and diverse demographics in advisory boards. The interplay of knowledge and relational access is evident in Ur Beroa, where participation in educational programs and internal peer exchange sessions breaks down knowledge barriers and cultivates collaborative learning. Coopérnico strategically positions itself as a knowledge enabler, offering technical expertise and resources to empower communities for active participation in collective energy actions. Collectively, these insights emphasize the significance of inclusive representation, proactive engagement with institutions, and a balanced blend of formal and informal strategies for fostering strategic collaboration and knowledge empowerment as pivotal factors in overcoming barriers and guiding future endeavors in community-led energy initiatives.

It is important to recognize and address both risks and limitations and opportunities to ensure that ECCs and CTPs can effectively promote relational, institutional, and knowledge access while minimizing potential drawbacks. By actively working to mitigate the challenges, strategies can be adopted to bolster the longevity and impact of collective energy initiatives. Strategies for diverse representation, institutional engagement, energy literacy, and peer-to-peer learning should be thoughtfully employed to mitigate challenges and amplify positive outcomes. These findings offer a just transition roadmap for fostering equitable participation, informed decision-making, and the sustainable advancement of energy citizenship within communities. However, rigorous and additional empirical testing remains essential to ascertain their actual impact and determine their role as drivers of the energy transition, ensuring that policy decisions are grounded in tangible evidence and community needs.

A final observation involves the engagement of academia as participant observer in these processes. The selected research methodology holds the potential to address the challenge of recognizing the researcher's experience in a manner that not only avoids undermining but rather enhances the research. An abductive approach aims to foster a spirit of inquiry, especially when the researcher is in close proximity to the phenomenon under study and the source of the data.

Given their independent and informed position, researchers can advocate for the equitable representation of marginalized voices, by implementing a reflexive approach aimed at de-structure participants' biases. This ensures the commensurability of research results, that every voice is heard and considered and that decision-making processes encompass a multiplicity of perspectives (Matschoss and Heiskanen 2017), extending beyond token inclusivity that might hinder meaningful involvement.

Conclusions

This paper highlights the necessity of integrating perspectives on both energy citizenship and the justice dimensions of energy transition. Within the context of collective energy initiatives in Southern Europe, three lenses—relational, institutional, and knowledge access—have been proposed as key points of convergence and integration between these frameworks, pending verification in specific contexts. The integrated framework has been illustrated in the empirical material derived from the H2020 project GRETA, maintaining an analytical focus on these aspects while developing supporting tools for collective energy action experiences.

In the context of environmental and energy policies at both EU and national levels, planning and decision-making processes increasingly incorporate citizenship involvement. However, it is vital to consider how empowerment activities truly impact citizens' opportunities for engagement and influence over process outcomes. Similarly, the extent to which citizens can influence decision-making processes concerning urban, economic, social, and environmental choices must be examined. User empowerment is considered crucial for the energy transition, facilitating the rebalance in the relationship between actors in energy systems and directing their trajectories of development and transformation. Yet, the usual debate on the duties of citizens in the energy transition often ends up proposing an idea of citizen(s) as a universal subject with an abstract interest, erasing differences and productive conflict. According to this approach, the field of action that the citizen-consumer can traverse is limited to purchasing choices in the private sphere, eluding any political discussion of how collective organizing and the sharing of mutual interests and responsibilities can help address both the environmental crisis and the technical, social and cultural changes required by the energy transition. Consequently, engagement on energy topics cannot be separated from citizens' rights to information, awareness, guidance, and training to exercise their rights collectively.

CTPs in their long-term dimension and the enabling tool of ECCs hold the potential to raise awareness, establish roles and commitments, and monitor progress in energy transition goals. The assumption posits that ECCs and CTPs are perceived as promising mechanisms by communities and policymakers for driving active community engagement within the energy transition. GRETA's communities have requested their adoption and policy makers have acknowledged their importance in policy implementation. This demand signifies a grassroots desire for greater involvement in shaping energy policies, indicating that these tools are perceived as empowering mechanisms to facilitate community engagement. Despite this recognition, the call for further empirical testing highlights the need for concrete evidence supporting the assumption of ECCs and CTPs as fundamental elements of the energy transition.

In the case of the Pilastro-Roveri district, UR BEROA and Coopérnico, ECCs and CTPs serve as leverages to enhance citizen participation, engagement, and collective action.

However, challenges in overcoming financial, technological, and generational barriers underscore the need for increased investments and community engagement oriented toward policy adjustments.

The examination of the case studies reveals interconnected insights that might operationalize the intersection of energy citizenship and justice. Central to these conclusions is the shared commitment among stakeholders towards advancing socio-environmental objectives; entities such as cooperative members, individuals grappling with energy poverty, and business actors exhibit intrinsic motivation towards participating in the transition towards clean energy, often leveraging their own social, cultural, technical and financial resources to facilitate this transition. However, significant operational and political challenges impede their progress.

Operationally, they often encounter complexities inherent in the clean energy transition, necessitating expertise across technical, financial, market, social, and legal domains. Conversely, political constraints arise from the perceived unresponsiveness or disinterest of decision-making entities, including governmental bodies and energy distribution networks, in fostering a genuinely citizen-driven transition.

However, they benefit from support provided by academia and local associations, as well as decentralized public administration bodies such as neighborhood councils and energy agencies. These entities furnish essential technical, financial, and legal expertise, thereby fostering socially just decarbonization efforts. Nonetheless, this support engenders a non-structured co-dependency between these entities and energy citizens. In this regard, the establishment of centralized institutional support mechanisms, such as dedicated information agencies for facilitating the implementation of RECs, monitoring energy poverty emergence, or expedited transposition of EU Directives, emerges as a salient recommendation. Such measures would lend structure and equilibrium to the clean energy transition, mitigating prevailing energy justice disparities and power imbalances.

In this context, academia emerges as a crucial facilitator, ensuring institutional access and providing a focused approach to addressing pertinent issues. Scholars serve as interpreters and translators, bridging scholarly insights with practical applications to empower community members for informed decision-making and contribute to the long-term sustainability of such endeavors.

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Conflict of interest

No conflict of interest is detected.

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