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Renewable energy communities: paths to energy democracy for innovation in local welfare

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ABSTRACT

Climate change and ecological transition constitute an inseparable conceptual and political pair, whose relevance has grown exponentially in response to the urgent need to reorganize energy production and consumption systems in a sustainable and resilient way. Within this framework, the energy transition cannot be interpreted only as a technical or infrastructural process, but rather as a deeply social phenomenon, capable of reshaping territorial arrangements, power relations, and forms of collective participation.

From this perspective, this research examines the role of energy communities as territorial devices of the ecological transition, with the aim of identifying strategies capable of reducing the risk of energy poverty and strengthening the adaptive capacity of social and local systems in the face of climate change. In particular, the Thesis focuses on two case studies located in the Tavoliere delle Puglie area - the solidarity energy community of San Severo and the energy community of Biccari - selected for their different socio-spatial configurations and for the distinct development trajectories they have followed.

From a methodological standpoint, the research adopts a qualitative and process-oriented approach, inspired by the tradition of the Chicago School of urban ecology and by approaches on social innovation. The research design integrates field observation, in-depth interviews, document analysis, and visual methods, enabling a situated and relational reading of energy practices. In this way, the Thesis contributes to the construction of a sociological theory of the ecological transition that is attentive to the spatial, territorial, and community dimensions of change.

At the end of the analysis, the research highlights how energy communities are configured not only as instruments for the production and sharing of energy, but also as spaces of social experimentation in which welfare, everyday life practices, future imaginaries, and forms of territorial reappropriation intersect. Building on this empirical evidence and on the analysis of the reference socio-technical system, the Thesis advances an ambitious theoretical interpretation of the transition through the category of frontier space, understood as a sociological device capable of capturing the frictions, discontinuities, and transformative possibilities generated by decarbonization processes in local territorial contexts.

Keywords: ecological transition; energy communities; energy democracy; Biccari; San Severo; local welfare; territory; frontier-space.

Summary

INTRODUCTION.....	5
THE RESEARCH PROJECT	8
Context.....	8
Research question and theoretical framework.....	9
Objectives and results	10
Methodology	13
PART ONE: A THEORETICAL FRAMEWORK AND LITERATURE REVIEW	17
1. HOW CLIMATE CHANGE INFLUENCES THE ENVIRONMENTAL TRANSITION	17
1.1 Climate change and Economic theory.....	17
1.2 The role of economics in defining climate policy	21
1.3 Sociology of risk and uncertainty.....	24
1.4 The “apocalyptic” approach and its potential.....	28
1.5 The paradigm for the ecological transition.....	31
1.6 Beyond the technocratic paradigm: the contribution of Social Sciences to the complexity of transition	35
2. THE SOCIO-ECOLOGICAL DIMENSION OF THE ENERGY TRANSITION.....	39
2.1 The right to energy within the domain of the ecological transition	39
2.2 The socio-ecological dimension of energy conversion	42
2.3 Energy, territories and new forms of poverty	45
2.4 Beyond the theory: energy poverty in Italy	48
3. ENERGY COMMUNITIES: A MODEL FOR THE ENERGY TRANSITION AT THE LOCAL LEVEL	56
3.1 From energy poverty to the debate on energy communities	56
3.1.1 Mainstream communication: idealists, and the “hyper-simplification” effect	57
3.1.2 Energy communities and energy poverty: possibility, limits and requirements ...	61

3.1.3	The role of municipalities between expectations and responsibilities	61
3.1.4	Energy Cooperatives and Inclusion: Between Energy Justice and the Reproduction of Inequalities.....	62
3.2	RECs as Instruments of Territorial Transition: A Perspective Oriented Towards Sustainable Development	63
3.3	The regulatory framework of energy communities	67
3.3.1	The European legal framework	68
3.3.2	The Italian legal framework	76
3.4	How an REC is Realised: From Idea to Community	81
3.5	The current state of the art in the Italian landscape.....	85
3.6	Between possibility and uncertainty: a critical position.....	90
<i>SECOND PART: FIELD RESEARCH</i>.....		94
4.	THE RESEARCH DESIGN.....	94
4.1	Methodological approach: between the Innovation Studies and the ecological approach of the Chicago School	95
4.1.1	Expertise, knowledge and power in the energy transition.....	99
4.2	The research approach for the case study of Biccari.....	101
4.3	The research approach for the case study of San Severo	105
4.4	Methodology as an exploration between rigour and creativity	109
5.	BICCARI: THE ENERGY COMMUNITY BETWEEN PUBLIC NARRATIVES AND PROCESSUAL COMPLEXITY	115
5.1	Biccari within the Context of Italy's Inner Areas.....	115
5.2	The REC in Biccari	120
5.3	Conceptualising the REC: identity, governance and community.....	124
5.4	The results: the REC as a device for territorial enhancement	128
5.4.1	The territorial dimension: the REC as a symbolic lever in inner areas	128
5.4.2	The governance dimension.....	130
5.4.3	The socio-technical dimension	130
5.4.4	The participatory dimension.....	132

5.4.5	The social representation	133
5.4.6	Barriers	134
6.	SAN SEVERO: THE ENERGY COMMUNITY BETWEEN WELFARE AND INNOVATION.....	135
6.1	The city of San Severo and the territorial context.....	135
6.1.1	Local governance and energy policies.....	138
6.1.2	Caritas of the Diocese: role, functions, and importance in the community.....	140
6.2	The Solidarity Energy Community “Energia di Speranza”	142
6.2.1	Project design and identity construction.....	143
6.2.2	Actors, activities, and practices	148
6.3	The social representations of families involved	151
6.4	The results: the REC as a generative welfare device	156
<i>PART THREE: THEORETICAL CONCEPTUALIZATION OF THE RESULTS</i>		
<i>..... 160</i>		
7.1	Frontier and energy transition: between accessibility and spectacularization.....	160
7.2	Energy Democracy: the Political Side of the Frontier.....	163
7.3	Conceptualizing the space as a frontier in the dynamics of the transition	167
<i>APPENDIX A.....</i>		<i>171</i>
<i>APPENDIX B.....</i>		<i>173</i>
<i>APPENDIX C.....</i>		<i>175</i>
<i>Bibliography.....</i>		<i>177</i>

INTRODUCTION

Today the climate crisis represents one of the main forces reshaping the relationships between society, environment, and territory. It is not merely an environmental phenomenon in the strict sense, but a systemic process that affects economic structures, political institutions, social practices, and forms of spatial organization. Within this framework, the ecological transition emerges as a field of tension in which mitigation and adaptation needs intersect with demands for social justice, technological innovation, and deep territorial asymmetries. Environmental and territorial sociology provides essential analytical tools to interpret these transformations, highlighting the situated, conflictual, and non-linear nature of processes of change.

This doctoral Thesis is situated within this field of study and adopts the energy transition as a privileged lens through which to observe how the climate crisis translates into concrete practices, measures, and policies at the territorial level. In particular, the research focuses on renewable energy communities, understood not as simple technical solutions or virtuous and easily replicable models, but as complex social phenomena capable of revealing the frictions between public discourse, regulatory frameworks, material conditions, and local lived experiences. Through the analysis of two case studies located in the Tavoliere delle Puglie - the energy community of Biccari and the solidarity-based energy community “Energia di Speranza” in San Severo - the research explores how the energy transition takes shape in territorial contexts marked by socio-economic vulnerability, inequality, and specific local resources.

The aim of the Thesis is not merely descriptive. Alongside empirical analysis, the work seeks to contribute to a broader theoretical reflection by developing a conceptual device capable of encompassing the complexity of the observed cases and the dynamics that traverse them. In this sense, the notion of frontier-space is introduced from the outset as the central analytical thread of the dissertation. Rather than being confined to the concluding chapter, frontier-space operates throughout the Thesis as a heuristic lens that allows for the interpretation of the energy transition as a process that is spatially uneven, socially selective, and politically contested.

In this perspective, frontier-space is not conceived as a fixed boundary or a residual margin, nor as a binary distinction between inclusion and exclusion. Instead, it is understood as a relational and processual spatial configuration in which the energy transition materializes through thresholds, frictions, and reconfigurations of access. It designates those spaces where the promises of ecological transformation encounter pre-existing territorial conditions, producing differentiated outcomes in terms of participation, redistribution, and recognition. The frontier is therefore not external to the transition but constitutive of it: it is the space where the transition

becomes visible in its ambivalences, where opportunities for transformation coexist with the risk of reproducing or even intensifying inequalities.

Conceptualizing space as frontier also means recognizing that access to the benefits of the transition is not given, but constructed through socio-political processes. The frontier operates as a selective device that regulates who can effectively participate in the transition, under what conditions, and with what outcomes. In this sense, the notion of frontier-space allows the research to move beyond normative or idealized interpretations of renewable energy communities, focusing instead on the concrete conditions under which they emerge, operate, and produce effects within specific territorial contexts.

From a theoretical perspective, the dissertation is positioned at the intersection of environmental sociology and socio-ecological transition studies. Climate change is analyzed as a factor that challenges the traditional categories of economic theory and public governance, generating new forms of vulnerability and redefining the relationship between risk, responsibility, and collective decision-making. In this context, the ecological transition emerges as an ambiguous paradigm: on the one hand, a promise of sustainable reconversion of production systems; on the other, a discursive device that risks concealing conflicts, asymmetries, and social costs. Energy communities are embedded within this ambivalence, oscillating between imaginaries of energy democratization and the concrete difficulties of implementation.

Within this framework, frontier-space also functions as a critical category that enables a re-reading of the relationship between transition and territory. Rather than treating territory as a passive background, the Thesis approaches it as an active dimension that shapes, constrains, and redefines the trajectories of the transition. Territorial contexts are not neutral containers, but configurations of resources, power relations, institutional capacities, and social practices that mediate the translation of global processes into local realities. The frontier thus emerges precisely at this point of translation, where global narratives of transition encounter local conditions, generating uneven and often contradictory outcomes.

The structure of the dissertation reflects this dual level of analysis, both theoretical and empirical, and is organized into three main parts, preceded by an introductory section dedicated to presenting the research project. Overall, the dissertation consists of seven chapters, each of which contributes progressively to the construction of the analytical framework.

The first part of the dissertation includes Chapters 1, 2, and 3 and is devoted to the development of the theoretical framework. Chapter 1 analyzes how climate change influences the ecological transition, bringing economic theory, the sociology of uncertainty, and the debate on vulnerability into dialogue. The chapter explores the role of economics in shaping climate policies and introduces a critical reading of the transition paradigm, focusing on the analytical potential of the “apocalyptic” approach as a tool for interpreting contemporary crises.

Chapter 2 examines the socio-ecological dimension of the energy transition, with particular attention to the right to energy, new forms of energy poverty, and the relationship between energy and territory. Through a specific focus on the Italian context, the chapter shows how energy poverty is not a residual phenomenon, but a key indicator of the inequalities produced and amplified by the transition.

Chapter 3 is devoted to energy communities as a possible model of transition in territorial contexts. After reconstructing the public and scientific debate on the topic, the chapter analyzes the European and Italian regulatory framework, the stages involved in establishing an energy community, and the state of the art at the national level. The discussion concludes with a critical position that highlights the uncertain and conditional nature of these measures.

The second part of the dissertation includes Chapters 4, 5, and 6 and is dedicated to empirical analysis. Chapter 4 presents the research design, outlining the methodological approach adopted, which draws inspiration from Innovation Studies and the ecological tradition of the Chicago School. The chapter describes the research tools employed and the specific features of the two case studies.

Chapter 5 analyzes the case of Biccari, interpreting the energy community as a territorial valorization device heavily laden with symbolic meanings. The chapter highlights the gap between public narratives and the complexity of the process, focusing on dimensions of governance, participation, social representation, and the main barriers encountered. Chapter 6 is dedicated to the case of San Severo and the solidarity-based energy community “Energia di Speranza.” Here, the energy transition is interpreted through the lens of welfare and social innovation, showing how the energy community can function as a generative welfare device within an urban context marked by socio-economic fragility.

Chapter 7, which concludes the dissertation, brings together the theoretical and empirical dimensions through a systematic elaboration of the concept of frontier-space. The chapter does not introduce a new concept *ex post*, but makes explicit and fully develops the analytical thread that runs throughout the entire Thesis. It examines the energy transition as a frontier process, explores its political dimension through the lens of energy democracy, and ultimately conceptualizes space as frontier as a critical device for interpreting socio-ecological transformations in marginal territories.

Overall, this doctoral Thesis aims to demonstrate that the energy transition, far from being a neutral or purely technical process, constitutes a field of conflict and negotiation in which rights, practices, and imaginaries are continuously redefined. Frontier-space emerges as the conceptual core of this work: not simply a descriptive category, but an analytical tool capable of capturing the uneven, selective, and contested nature of transition processes, and of opening new theoretical perspectives for environmental and territorial sociology.

THE RESEARCH PROJECT

Context

The Russian aggression against Ukraine has highlighted how dependence on fossil fuel sources - particularly gas imported from Russian territories - exposes Italy and, more broadly, the European Union to vulnerability. Under this light, the environmental transition becomes not an urgent objective in the fight against climate change, but a broader societal goal strictly linked to a more resilient economy, the promotion of public health, the reduction of pollution. Last but not least, decreasing reliance on fossil fuels is crucial to counter the emergence of new forms of poverty.

Within the current geopolitical context, exposure to irreversible risks induced by climate change (Franzen, 2020), as well as the progressive increase in land consumption for energy production, are reshaping the landscape of energy poverty. Despite the diversification of energy sources proposed by the European Union, the implementation of the European Union energy policy objectives (European Commission, 2022) still presents critical issues, largely due to the slowness and discontinuity of transition processes. These shortcomings undermine the impact of the measures introduced to reduce polluting emissions, signalling the vulnerability of energy systems and, ultimately, generating social concern, particularly among low-income households, businesses, and workers.

It is noteworthy to mention that the correlation between energy poverty and vulnerable consumers was formally introduced in Italy already in 2017 within the National Energy Strategy (SEN, 2017)¹. Energy poverty was defined as the difficulty faced by consumers in accessing a minimum basket of energy goods and services. This perspective consolidated the idea of a multidimensional framework for energy poverty, which, beyond domestic heating needs, allows for a more complex understanding of the phenomenon. It highlights the necessity of strategies

¹ Cfr. Enea (2018), *Rapporto Annuale Efficienza Energetica*.
Accessibile al sito: http://www.enea.it/it/segui/publicazioni/pdf-volumi/2018/raee_2018.pdf.

that integrate environmental, economic, and social sustainability, alongside governance models for welfare systems supporting the environmental and energy transition.

Research question and theoretical framework

Within a multidisciplinary theoretical and empirical framework, renewable energy production must consider the close relationship between energy production models and the democratisation of communication processes. Jeremy Rifkin argues that recognising energy poverty as a clear manifestation of the unsustainability of centralised fossil fuel production models necessitates addressing the relationship between community energy self-production and the deliberative practices triggered through action policies (Rifkin, 2011). At both European and national levels, questions concerning the correlation between energy poverty, self-consumption communities, and deliberative practices are crucial for strengthening ecological responsibility and civic culture (Monticelli, Ruggeri, 2022).

An additional relevant theoretical element is the concept of the prosumer, a pivotal figure within contemporary energy communities. The prosumer - both a producer and a consumer - is often portrayed as the symbol of a *just transition*, emancipating citizens from the traditional logic of passive consumption. However, the strong normative charge attributed to this figure is not always accompanied by a critical analysis of the actual processes through which citizens become co-protagonists of the energy transition. While the prosumer embodies a potentially active, responsible, and conscious agent, their involvement does not automatically derive from participation in an energy community. It requires educational pathways, support mechanisms, energy and environmental literacy, and the development of social and deliberative competences. Without these processes, there is a risk of a “half transition”, where the rhetoric of individual emancipation does not translate into genuine education for energy sustainability or authentic collective empowerment.

These dimensions form the central focus of this doctoral Thesis. Today, innovation in renewable energy production must consider lifestyles (Fanizza, 2015) - the organisation of living and consumption patterns within communities - at both macro

(national and international) and micro (local territories, with their specific contexts and characteristics) levels.

The guiding research question of this work is therefore articulated as follows: Can energy communities be identified as instruments of participatory democracy? In short, drawing on sociological literature, this Thesis situates the issue of energy poverty and community energy self-production within a critical discussion that combines analysis of climate change, circular economy (Becchetti, Bruni, Zamagni, 2019), and locally generative welfare models (Fanizza, 2019). It promotes a reversal of trends by identifying new strategies for involving local actors in environmental transition processes. By emphasising the need to re-signify the environmental transition, this research considers energy communities as a form of social infrastructure (Klinenberg, 2018), potentially capable of concretely facilitating citizens' access to green energy sources.

To this end, the creation of new models for the provision of democratic energy in its sense of heritage, understood as a new matrix for sustainable territorial regeneration, represents an objective aimed at enabling citizens to exercise their right to actively contribute to the resolution of concrete problems and the satisfaction of collective needs. In this context, the figure of the prosumer—critically rethought as an outcome rather than a prerequisite of the transition—also becomes a key to understanding how energy can produce new forms of citizenship, participation, and social responsibility.

Objectives and results

Aligned with the sustainability goals of the United Nations' Agenda 2030² and the European Green Deal³, the overarching objective of this research is to investigate the relationship between energy communities, generative welfare models, and the management of energy, social, and environmental sustainability processes. The Project therefore analyses the interplay between fundamental dimensions characterising energy self-consumption communities (circularity, bottom-up

² <https://unric.org/it/wp-content/uploads/sites/3/2019/11/SDG-presentazione.pdf>

³ https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0006.02/DOC_1&format=PDF

approaches, enabling activities) and the levels of democratisation of practices that support the transition to renewable energy. Environmental awareness, the constitutional right to environmental protection (Art. 9, Italian Constitution)⁴, and civic competences can play an active role in shaping the use of natural resources.

Specifically, the research pursues four objectives:

1. Critically observe the socio-technical system of reference, understood as the set of social and environmental components that facilitate the transition towards a conscious and virtuous model of green energy production and consumption. In the case of energy communities, the social component is reflected in norms, institutions, social actors, stakeholders, associations, orientations, and relationships.
2. Understand the role of the environmental transition, conceived as the shift towards a renewable-based energy system. Consistent with the ESG⁵ sustainability model (Naomi, Akbar, 2021), this system highlights the need for a co-evolutionary approach with others (Beretta, 2022). Empirically, the focus is on demonstrating that energy communities have a tangible impact on sustainability levels, particularly in environmental, social, and governance dimensions within the Apulian territory.
3. Study innovation processes, defined as the creation of new systems of energy sustainability through the implementation of elements that enhance scalability and generate new forms of collective action. The impact is assessed across three dimensions: empowerment, inclusivity, and long-term effects of energy communities.

⁴ “The Republic promotes the development of culture and scientific research. It protects the landscape and the historical and artistic heritage of the Nation. It protects the environment, biodiversity, and ecosystems, also in the interest of future generations. State law regulates the ways and means of protecting animals.” <https://www.senato.it/istituzione/la-costituzione/principi-fondamentali/articolo-9>

⁵ The acronym ESG (Environmental, Social, and Governance) refers to the three key factors for a sustainable economy, whose ultimate goal is to ensure the “future viability” of the resources used. See Naomi P., Akbar I., (2021), Beyond sustainability: Empirical evidence from OECD countries on the connection among natural resources, ESG performances, and economic development, in *Economics and Sociology*, 14(4), 89-106.

4. Define generative welfare systems of local ecosystems (Bifulco, 2015) through the use of the “ecological matrix”. This involves exploring the concept of generativity as a bridge between environmental and energy policies and the levels of wellbeing of the communities analyzed.

The general hypothesis to be tested is that energy communities enable the experimentation and development of ecological paradigms and generative welfare systems capable of producing social capital, environmental sustainability, and widespread wellbeing. In short, community welfare. Inspired by Amartya Sen’s Capability Approach, this framework supports the creation of “enabling” urban contexts, fostering social systems that positively influence civic engagement (Baglieri, 2019).

To this end, the research focuses on two case studies, both located in the province of Foggia: the energy community of Biccari and the solidarity energy community of San Severo. These contexts, while sharing structural similarities, embody profoundly different approaches to conceiving, initiating, and developing an energy community. They thus provide fertile ground for observing how belonging, cooperation, and community-building processes evolve over time.

In Biccari, the energy community emerged relatively recently, based on the installation of photovoltaic panels on municipal buildings. The energy produced benefits the entire village and its citizens, who voluntarily choose to join the community. Here, the energy transition intertwines with the dynamics typical of small inland municipalities: relational dimensions, local social capital, proximity networks, and strong territorial identity contribute to building a community pathway where energy acts as a driver of civic participation and care for the common good.

By contrast, in San Severo the energy community is explicitly solidarity-based. Promoted by actors including the Diocesan Caritas, its primary aim is to support families experiencing vulnerability and energy poverty. Solidarity thus becomes the most significant generative element: energy production and redistribution are not only environmentally sustainable but also instruments for strengthening community welfare, reducing inequalities, and promoting energy justice practices rooted within the local social context.

The analysis of these two cases will highlight not only differences in organisational models and community practices but also the ways in which space - conceived as environment, territory, and social landscape - acts as a genuine actor in the construction of energy communities. In both contexts, territory is not a neutral backdrop but a living element that shapes inclusion, exclusion, and emancipation dynamics. It influences cooperation, creates opportunities or constraints, moulds citizen relationships, and orients the very idea of energy community. In Biccari, the small village and its proximity to other areas reinforce practices of involvement rooted in the local dimension; in San Severo, a more complex urban environment makes energy a tool for social justice, capable of regenerating spaces and relationships in neighborhoods marked by vulnerability. Through this perspective, the research aims to show how energy communities are both an expression and a transformation of the territories that host them, and how the environment and communities co-evolve along intertwined paths of sustainability, solidarity, and social innovation.

Methodology

With regards to the instruments, what heuristically characterises this research is the adoption of a mixed methodology, in which qualitative and visual data converge. In continuity with the theoretical framework guiding the work, this choice responds to the need to construct a perspective capable of grasping the participatory, relational, and territorial dimension of energy communities, observing in detail the practices that citizens and local actors implement in their everyday lives. The aim is to arrive at a critical reflection which, starting from emerging models of democratisation of energy supply, is centred on territorial configurations, valorising both the narratives and the images that document processes, interactions, places, and transformations. Accordingly, as a mixed method, the approach adopted combines two types of data: qualitative textual data, collected through interviews, life stories, and direct

observation; and visual data, obtained through photo elicitation and photovoice, with a view to progressively integrating the different sources⁶.

It is important to emphasise that the modelling of the processes observed must necessarily take into account both the participatory practices actually implemented and the practices declared by the actors involved, so as to describe, in progress, the relationships between citizens, local institutions, and the promoters of energy communities. Only through an in-depth analysis of these dynamics will it be possible to outline a generative welfare system at the territorial scale.

Consistently with the research question, data collection is based on a qualitative framework articulated in several stages. A first phase will be devoted to defining the broad theoretical and socio-environmental framework of reference, in order to situate the case studies within the existing literature. Subsequently, attention will shift to the real contexts in which energy communities operate: the aim is to move beyond the reductive scheme of feasibility studies, instead observing the uses of energy, the spaces involved, the local actors, and the social processes that accompany the production and sharing of energy.

Data collection was carried out through a set of qualitative and visual tools that enabled an in-depth exploration of the contexts of energy communities. A central role was played by direct observation (Quarta, 2020), understood as continuous presence in the places where the energy community operates on a daily basis. Through this immersion in the field, it was possible to capture formal and informal interactions, routines, gestures, latent conflicts, modes of spatial use, and concrete forms of participation, reading the territory as a living and transforming actor, rather than as a mere backdrop to social action.

Alongside observation, in-depth interviews were conducted, offering the opportunity to gather narratives, expectations, motivations, and interpretations from

⁶ The concrete application of data collection techniques and methodological procedures in the two case studies is illustrated in the chapters dedicated to the empirical analysis of energy communities. In these chapters, for each context, the selection of participants, the methods of observation and interviews, the materials used for photo elicitation/photo voice, and the process of integrating visual and textual data are made explicit. See Cescato, 2017; Mattioli, 2015; Faccioli, Losacco, 2010; Ciampi, 2007.

the various actors involved in community processes. The interviews made it possible to bring out not only what the energy community represents at a technical or administrative level, but above all how it is lived, perceived, and reinterpreted on a daily basis.

The visual component of the research assumed an equally significant role. In the study of the San Severo Energy Community, visual sociology was the methodology that enabled citizen engagement. Through photo elicitation (Richard & Lahman, 2015), images became a stimulus capable of facilitating dialogue and opening spaces for reflection on issues that often prove difficult to verbalise. The photographs, used during interviews, contributed to deepening the reading of places, community practices, and the emotions animating the relationship between citizens, energy, and territory.

Alongside this technique, photovoice (Cseznek, 2021) directly involved participants in the production of visual material. Asking citizens to photograph what they considered significant in relation to the energy community - spaces, people, moments, material or symbolic elements - made it possible to understand how they perceive territory, sustainability, inclusion, or exclusion, offering a situated and plural representation of the community experience. The images collected through photovoice rendered visible aspects of everyday life that would hardly have emerged through verbal language alone.

Together, these techniques have made it possible to construct a rich, dense, and multisensory corpus, capable of conveying the complexity of the social, territorial, and relational processes that traverse energy communities. Integrated with interviews and direct observation, photo elicitation and photovoice thus constitute the privileged tools for interpreting the social and territorial transformations produced by energy communities: the images function as a heuristic medium, able to reveal elements often not immediately accessible through textual data alone.

The various techniques were combined through qualitative triangulation (Mauceri, 2017), which made it possible to systematically and iteratively compare the information gathered from textual and visual sources, with the aim of identifying recurring nodes, divergences, emerging elements, and “zones of emphasis” for analysis. This process will not follow a linear sequence, but will unfold through

continuous returns to the field, interpretative revisions, and methodological refinements.

In short, the qualitative–visual methodology adopted will allow the construction of a theoretical framework situated in the participatory modes of energy production at the local level, offering public decision-makers interpretative tools useful for understanding how new forms of energy welfare are configured within territories. In other words, the aim is to return to local contexts not only data, but interpretations and images capable of making visible the processes through which energy communities take shape, consolidate, and generate practices of environmental and social sustainability.

PART ONE: A THEORETICAL FRAMEWORK AND LITERATURE REVIEW

1. HOW CLIMATE CHANGE INFLUENCES THE ENVIRONMENTAL TRANSITION

1.1 Climate change and Economic theory

The tangible effects of climate change have placed the issue of energy transition at the centre of global political agendas, redefining development priorities, industrial policies, and governance mechanisms. Within this framework, transition is often interpreted as a predominantly techno-economic process of decarbonisation: the shift from an energy system based on fossil fuels (coal, oil, natural gas) to one founded on renewable sources (solar, wind, hydroelectric, geothermal, biomass) considered the primary mitigation strategy because they directly address greenhouse gas emissions (IPCC, 2014)⁷.

According to the assessments of the Intergovernmental Panel on Climate Change (IPCC)⁸, fossil fuel use was responsible for approximately 75% of global greenhouse gas emissions in 2010 (IPCC, 2014). Despite the proliferation of international commitments and declarations of climate neutrality, this proportion remained virtually unchanged in the following decade⁹. This persistence signals not only the deep structural inertia of energy and production systems, which are difficult to reconvert in the short term, but also the limitations of an approach to transition that remains firmly embedded within the framework of the dominant growth model.

⁷ Cfr. <https://www.ipcc.ch/report/ar5/syr/>.

https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf

⁸ <https://www.ipcc.ch>

⁹ L'ultimo report consultabile è quello dell'anno 2023, disponibile al seguente link: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_FullVolume.pdf

From a strictly physical perspective, “climate change” in climatology refers to significant and long-lasting variations in the Earth’s climate. Whereas for long periods in planetary history such variations were slow, cyclical, and produced by the co-evolution of geological, atmospheric, biological, and biophysical factors, in the past two centuries anthropogenic activity has become the principal driver of the current rise in average global temperatures (Smil, 2017). The ongoing warming is therefore attributable to the accumulation of greenhouse gases in the atmosphere, produced mainly by industrial sectors, transport, and intensive agriculture. These gases trap part of the infrared radiation re-emitted by the Earth, thereby altering the planet’s energy balance (Anderson et al., 2016).

The increase in average global temperature triggers a chain of effects that impacts the entire socio-ecological system: melting glaciers, rising sea levels, prolonged droughts, destabilisation of hydrological cycles, and the proliferation of extreme weather events (hurricanes, floods, heatwaves). Although measurable and describable in biogeophysical terms, these effects immediately acquire also socio-economic significance, as they influence agricultural production, access to resources, housing and food security, migratory flows, and conflicts (Dalby, 2020). Historically, the current climate crisis is closely intertwined with the long sequence of energy transitions that accompanied the industrial modern era. With the Industrial Revolution, coal progressively replaced wood and other traditional energy sources, fuelling new production processes, transport infrastructures, and steam engines, profoundly reshaping the geography of production, labour, and urbanisation (Wrigley, 2010). This technological leap was simultaneously sustained by the intensive exploitation of labour and the unlimited extraction of natural resources, in line with an economic rationality based on expansive growth and continuous accumulation (Marx, 2017).

In the second half of the nineteenth century the race for energy resources intensified with the expansion of oil and natural gas, which entered the competition with coal as primary resources. The invention of the internal combustion engine inaugurated the era of modern transport, the expansion of electricity networks transformed the urban landscape, household appliances entered everyday domestic life, while territories and markets became increasingly interconnected (Fouquet, 2010).

Subsequently, in the twentieth century, the emergence of nuclear energy and the large-scale development of hydroelectric power added further components to an increasingly complex energy system, conceived primarily as an infrastructure for economic growth. It was only with the oil crises of 1973 and 1979 that the vulnerability of a global economy dependent on fossil fuels was widely perceived: from that moment some countries began to diversify their energy mix and, in several cases, to promote experimentation with renewable sources (Bridge et al., 2013).

At the same time, forms of environmental awareness matured that questioned the dominant model of development and its impacts on the planet and on human health. Works such as *Silent Spring* by Rachel Carson (first edition 1962) or *The Limits to Growth* by Meadows et al. (1972) acquired a significant popularising function. Indeed, even beyond the scientific community, the idea began to spread that there are biophysical limits to growth and that the industrial and consumerist paradigm entails unsustainable environmental costs. The first United Nations Conference on the Human Environment (Stockholm Declaration, 1972) ¹⁰ marked an important symbolic turning point: for the first time, the international community recognised that the development of science and technology had enabled humanity to transform the environment on an unprecedented scale, raising the issue of the risks associated with such power.

In the following years, the “involutive” dynamic of climate change was constructed through a dense sequence of conferences, treaties, and supranational organisations, which sought to translate the growing scientific consensus on the anthropogenic nature of global warming into policy. Indeed, in 1979 the first World Climate Conference in Geneva emphasised how the resilience of human societies to climatic disturbances had been reduced by demographic pressures and agricultural practices, to the point that even the maintenance of the current climatic regime could produce severe social impacts. From this initiative emerged the World Climate Programme¹¹, sponsored by the World Meteorological Organization (WMO) ¹², the

¹⁰ <https://www.mase.gov.it/portale/documents/d/guest/stoccolma-pdf>.

¹¹ <https://www.wcrp-climate.org>.

¹² <https://wmo.int>.

International Council for Science (ICSU)¹³, and the United Nations Environment Programme (UNEP)¹⁴, with the aim of improving understanding of the climate system, creating global observation systems, and assessing the socio-economic impacts of climatic variations.

In 1988, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC), tasked with producing updated scientific assessments on climate change, its causes, and strategies for mitigation and adaptation. The IPCC, which today includes 195 member countries, is not a scientific community in the traditional sense but rather an interface device between science and politics; it is configured as a “scientific glue” (Leonardi, 2019) that translates thousands of studies into synthesis reports designed to be “usable” – though not prescriptive – for national governments (Freudenburg and Muselli, 2010).

In 1992, at the Earth Summit in Rio de Janeiro, the United Nations Framework Convention on Climate Change (UNFCCC)¹⁵ was signed, recognising climate change as a threat to human security and setting the objective of stabilising greenhouse gas concentrations at levels that would prevent “dangerous anthropogenic interference with the climate system” (UNFCCC, 1992)¹⁶. The Convention commits States to adopt mitigation and adaptation programmes and establishes the mechanism of the Conferences of the Parties (COP), which since 1995 have represented the principal negotiating arena for monitoring the implementation of agreements and proposing new future targets¹⁷.

¹³ <https://council.science>.

¹⁴ <https://www.unep.org>.

¹⁵ <https://unfccc.int>.

¹⁶ Full document: <https://unfccc.int/resource/docs/convkp/conveng.pdf>.

¹⁷ Two moments are particularly significant:

- the Kyoto Protocol (COP-3, 1997), the first attempt to set binding quantitative targets for emission reductions for industrialised countries, introducing the principle of common but differentiated responsibilities and establishing the emissions trading market;
- the Paris Agreement (COP-21, 2015), which, building on the Fifth IPCC Report (IPCC, 2014), sets the objective of keeping the increase in global average temperature “well below” 2°C above pre-industrial levels, while striving to limit it to 1.5°C (Christoff, 2016; Lynn & Zabula, 2016).

1.2 The role of economics in defining climate policy

Designed to ensure flexibility and economic efficiency in reducing emissions, the emissions trading market¹⁸ has been the subject of numerous criticisms. On the one hand, its ineffectiveness has been highlighted, due to the difficulty of adequately pricing emissions and the presence of calculation errors in the quotas allocated (Adam, 2008); on the other hand, Marxist approaches have pointed out how it produces a new “environmental commodity” and opens up further spaces of accumulation by dispossession, thereby widening inequalities between the Global North and South and within individual countries (Bond, 2012; Böhm et al., 2012). From this perspective, carbon trading risks being configured as an attempt to resolve a crisis produced by capitalism through instruments that reproduce its very logic.

To confront this contradiction, the more recent COPs have reiterated the urgency of intensifying efforts for decarbonisation, climate finance, and adaptation; COP-28 in Dubai (2023)¹⁹, for example, sanctioned the commitment - at least at the declaratory level - to gradually phase out fossil fuels by 2050. At the same time, however, growing discontent has spread regarding the slowness and indeterminacy with which these commitments are translated into operational measures, as shown by the criticisms that emerged during COP-29 in Baku. The crisis in the relationship between science and politics had already become evident in Katowice (COP-24, 2018)²⁰, when some States refused to adopt the IPCC report as a negotiating basis, thereby calling into question precisely that “scientific glue” device which had sustained global climate governance for decades (Victor, 2015; Leonardi, 2019).

¹⁸ “The main measure adopted by the European Union to comply with the commitments undertaken by ratifying the Kyoto Protocol is Directive 2003/87/EC on the Emission Trading Scheme (ETS), which establishes at Community level a system for the trading of CO₂ emission allowances, known as EUAs (EU Allowances). The first period of application of the Directive refers to the three-year phase 2005–2007, while the second — coinciding with the implementation period of the Kyoto Protocol — covers the five-year phase 2008–2012.” <https://www.mase.gov.it/portale/-/il-mercato-delle-quote-di-co2>.

¹⁹ https://extranet.wmo.int/edistrib_exped/grp_prs/_en/Archives%202024/00783-2024-SUNFCCC-COP28-2nd_en.pdf.

²⁰ https://unfccc.int/sites/default/files/resource/WHO%20COP24%20Special%20Report_final.pdf.

This institutional framework intertwines with a deeper dynamic concerning the role of economics in defining the climate problem and its solutions. As Urry (2015) observes, within the social sciences it has been above all economists who have had the capacity to impose their own language and categories, ultimately monopolising the “framing of the human” within the climate change debate: the issue is thus predominantly interpreted in terms of negative externalities, market failures, and the search for efficient corrective instruments (carbon tax, emissions trading, incentives for “clean” innovation)²¹.

In parallel, the natural sciences—geosciences, oceanography, meteorology—have contributed to consolidating an interpretation of climate change as a scientific-environmental problem “detached” from its social context (Bjurström & Polk, 2011), focusing on the physical aspects of the phenomenon at the expense of the socio-economic processes that produce it and the political and cultural dimensions of the conflicts that traverse it. This has resulted in a double imbalance: on the one hand, a technocratic governance founded on the metrics of climate science; on the other, a strong influence of economics in defining both the objectives and the instruments of intervention.

At the micro level, this has favoured the spread of policies that individualise climate responsibility, addressing a subject conceived as rational, informed, and capable of modifying their behaviour in response to incentives and/or awareness campaigns. Climate change policies are thus configured as an invitation to “do one’s part,” to “break the habit” of excessive resource consumption (Shove, 2010b), while devices such as the individual carbon footprint or the ecological footprint (Barrett et al., 2005; Rees and Wackernagel, 1996) quantitatively measure the environmental impact of lifestyles, implicitly judging the success or failure of each individual in taking responsibility (Middlemiss, 2010).

Numerous studies, including sociological ones, have focused on how people develop awareness of global warming, the scarcity of water and energy resources, and on how they might connect their everyday behaviours to these global problems (Spaargaren, 2011). This behaviourist approach is based on the idea that behaviours

²¹ Cfr. Bardazzi et al., 2007.

are the result of conscious choices guided by attitudes and values (Shove, 2010a). The influence of microeconomics and psychology is evident: context is treated at most as an external barrier or constraint, while collective action, material infrastructures, and institutions remain in the background.

Shove (2010a) emphasises that this way of interpreting climate change has an eminently political significance: shifting attention onto individuals means obscuring the extent of the support that governments continue to provide to economic institutions and unsustainable lifestyles, as well as their role in concretely shaping possibilities and options for action. The climate crisis is thus reduced to a matter of individual choices, while productive structures, energy infrastructures, mobility regimes, and socio-territorial inequalities are treated as mere backdrops.

In parallel, technocratic and neoliberal solutions have taken hold, focusing almost exclusively on technological innovation, the market, and the intervention of economic and technical *élites*: from carbon markets to geoengineering technologies such as carbon capture and storage, through to the massive promotion of electric vehicles which, while reducing certain emissions, maintain high socio-environmental impacts and inequalities, neglecting more inclusive alternatives such as the strengthening of public transport (Pellizzoni, 2023a; Arrobbio, 2023). Here too, the dominant economic rationality tends to preserve the core of the development model, replacing technologies without questioning the structure of consumption, the distribution of costs and benefits, or the role of marginal territories.

In Italy, climate policy is inscribed within the framework of the European Green Deal and the multilateral agreements negotiated under the UNFCCC, with the National Recovery and Resilience Plan (NRRP)²² representing one of the main levers for accelerating decarbonisation and reducing dependence on foreign energy. The national agenda emphasises the expansion of renewables, energy efficiency, the electrification of industry and transport, and the promotion of renewable energy communities. Despite these advances, however, significant challenges remain: territorial conflicts over installations, delays in authorisation procedures,

²² <https://www.governo.it/sites/governo.it/files/PNRR.pdf>.

difficulties of access for the most vulnerable actors, and the risk that the transition may result in a new form of exclusion for those lacking sufficient economic resources, skills, and social capital to participate in innovation.

In this scenario, the debate on a “just transition” takes shape, explicitly invoking dimensions of social justice, community participation, and inclusion in the processes of energy production and governance (Bouzarovski, 2022). The climate crisis can no longer be addressed as a mere technical problem or as an issue to be resolved exclusively through economic rationality: it is configured as a systemic and global crisis that brings into play the relationships between economy, society, and nature, and that requires profound transformations of institutions, everyday practices, and the relations between centre and periphery, between urban areas and frontier spaces.

It is at this juncture - from climate change as an environmental externality to ecological transition as a socio-territorial process - that space opens up for a rethinking of the role of territories, local communities, and collective forms of energy management. The following sections will examine the contribution of the main sociological theories in reconstructing this shift and in framing the transition not only as a technological restructuring, but as a field of conflict, innovation, and justice.

1.3 Sociology of risk and uncertainty

When climate policy is constructed as a polarised battlefield - on the one hand the relentless appeal to individual responsibility, on the other governments struggling to guarantee protection and social rights - “collective responsibility” becomes an explosive container. Within this container frustrations, unmet expectations, and perceptions of injustice accumulate: it is here that vulnerability takes shape, stratifies, and manifests itself. Cracks emerge that were already present in the social structure, but which the neutral language of the “green transition” often tends to conceal.

Within this framework, sociological reflection on climate change arises precisely from the need to make visible what risks remaining in the background: the social processes that produce, amplify, or reduce vulnerabilities (Dunlap & Brulle, 2015;

Tacchi, 2011; Zaccaria, 2022). A decisive step is represented by the work of the American Sociological Association's task force, which culminated in *Climate Change and Society* (Dunlap & Brulle, 2015). This volume systematises the sociological contribution around several key lines: the social causes of climate change (including the responsibilities of for-profit organisations), the role of consumption, the unequal distribution of impacts (climate justice), response strategies (mitigation and adaptation), and the recognition of the problem by civil society (movements, public opinion, denialism). In other words, Sociology demonstrates that climate change is not merely a matter of molecules being emitted into the atmosphere, but a phenomenon rooted in institutions, values, cultures, and everyday practices.

With the advent of the new millennium, while economists largely continued to focus on the individual point of view - calculating costs and benefits, predicting responses to incentives, modelling "rational" behaviours (Urry, 2011) - Sociology shifted its gaze to routines and social structures as drivers of anthropogenic climate change (Reusswig & Lass, 2010). The focus was no longer merely on "how much the individual consumes," but on how institutions organise ways of dwelling, moving, and producing; how energy, housing, and transport infrastructures incorporate and reproduce inequalities; and how public policies distribute risks and protections (Dunlap & Brulle, 2015; Hulme, 2009).

In this field, the concept of vulnerability becomes central. It does not merely indicate physical exposure to a risk (such as living in an area subject to floods or heatwaves), but rather the interplay of three dimensions: exposure, sensitivity, and adaptive capacity. Thus, two people living in the same neighbourhood affected by an environmental disaster are not equally vulnerable: what makes the difference are income, housing quality, social networks, and access to services and information. Climate change therefore acts as a risk multiplier: it amplifies existing fractures, deepens inequalities, and makes visible the fault lines that traverse societies (Barnett et al., 2016).

At this point, Ulrich Beck's reflection on the "Risk Society" (1986; 1999; 2000; 2015) comes into play. Beck argues that modern societies are characterised by the production of "manufactured" risks (generated by specific technological and

economic models) which have no geographical boundaries and concern multiple generations. Climate risk fully belongs to this category: it is global, widespread, uncertain in its outcomes, and at the same time produced by well-defined economic structures. Yet for Beck, risk is not only a threat: it is also a potential catalyst for change. It can stimulate new forms of public awareness, transnational cooperation, and institutional rethinking. Hence his provocative question: “how can climate change save the world?” (Beck, 2015).

Along the same lines, Anthony Giddens develops the well-known “Giddens paradox” (Giddens, 2015): although aware of climate risks, individuals and governments tend not to act decisively because the effects of climate change are perceived as distant, abstract, and not immediately tangible. Like a crack running beneath the plaster, the problem is known but postponed: intervention occurs only when it becomes too evident, often too late. To procrastinate action until the consequences are manifest—an exceptional flood, a devastating drought—means exposing oneself to potentially irreversible effects, increasing vulnerability and narrowing the margin of choice.

This tension between known risk and deferred action fuels what we may define as a Sociology of uncertainty. Uncertainty does not concern only *whether* an event will occur, but also *how*, *where*, and *who will be affected*. From this perspective, Sociology does not merely measure probabilities: it investigates who defines the thresholds of acceptable risk, which voices are heard or excluded, and how narratives of uncertainty are used to justify political decisions or to delay them (Zinn, 2016a; 2016b).

In the internal debate within the discipline, Lever-Tracy (2008) had already denounced, albeit with a touch of irony, the tendency of mainstream Sociology to ignore “the elephant in the room”: an increasingly evident climate crisis yet scarcely addressed in the leading journals. The reasons for this delay are at least twofold: on the one hand, a diffidence towards any discourse that directly invokes the future (in an era of fractured expectations regarding the grand narratives of development); on the other, the difficulty of integrating ecological variables into analysis without falling into environmental determinism.

It is in this context that Rebecca Elliott's (2018) proposal marks a further step forward: instead of asking only "what can Sociology do for climate change," we must ask "what does climate change do to Sociology." The key that Elliott proposes is that of *loss*. Climate change does not merely produce damages measurable in economic terms, but brings about the disappearance of resources, landscapes, lifestyles, and forms of sociality. Like a slow erosion, climate reshapes places and, with them, memories, bonds, and belongings (Barnett et al., 2016; Klinenberg et al., 2020).

"Loss" has many dimensions (political, cognitive, practical, material), but for a Sociology attentive to territories, it is above all the *materiality of loss* that proves crucial: the "loss of places." Consider coastlines threatened by rising sea levels, agricultural areas rendered unproductive by drought, or neighbourhoods subject to policies of "renaturalisation" or energy retrofit that end up expelling the most vulnerable segments of the population. In such cases, strategies of adaptation or "urban greening" may translate into forms of ecological or climatic gentrification, where the improvement of environmental quality coincides with processes of social displacement (Beretta & Cucca, 2019; Bouzarovski et al., 2018; Grossmann & Huning, 2015). The question then inevitably becomes: who loses what, when, and how? Who is protected, and in what ways? Which territories become crucial, and through which mechanisms? Investigating vulnerability thus means reconstructing these unequal geographies of loss, and understanding how they are narrated, negotiated, or erased.

Finally, attention to loss and uncertainty has at least two fundamental implications. First, it highlights the need to complement mitigation policies with a stronger focus on adaptation and the strengthening of community resilience, understood not as a mere capacity to "absorb shocks," but as the possibility of collectively reimagining the future. Second, it calls for a reconsideration of the often-reassuring rhetoric of "sustainable development," shifting the gaze from what we wish to sustain to what is already disappearing or will inevitably be transformed (Elliott, 2018).

As Hulme (2011) reminds us, the task of Sociology is to avoid two opposing extremes: climatic determinism, which attributes to climate a total causal power over social processes, and indeterminism, which minimises its effects. The

Sociology of uncertainty is situated in this intermediate space: it shows how climate does not automatically determine society, but profoundly conditions it, and how political, institutional, and community responses can in turn redraw the maps of risk and protection.

In a context where ecological transition risks being narrated solely in technical or economic terms, this perspective becomes essential for understanding how climate uncertainty is experienced within territories, especially those which, like “frontier spaces,” are already marked by social, economic, and institutional fragilities. It is here that vulnerability ceases to be an abstract category and becomes a concrete experience, inscribed in places and biographies.

1.4 The “apocalyptic” approach and its potential

Sociological attention to loss and uncertainty opens, as we have seen, at least two fronts: on the one hand, the need to complement mitigation policies with a more decisive focus on adaptation and community resilience, understood not as a mere capacity to “absorb shocks,” but as the possibility of collectively reimagining the future; on the other, the questioning of the reassuring rhetoric of “sustainable development,” shifting the gaze from what we wish to maintain to what is already disappearing or will inevitably be transformed (Elliott, 2018). In this intermediate space, where Sociology is called upon to avoid both climatic determinism and indeterminism that minimises its effects (Hulme, 2011), lies the potential, but also the ambiguity, of what we may define as an “apocalyptic” approach to climate change.

“Apocalyptic” should not here be understood as synonymous with paralysing catastrophism, but rather as a disposition to face the possibility that part of the damage is already irreversible, relinquishing the implicit promise that “everything will be fine” if only we can find the right combination of technologies, incentives, and virtuous behaviours. In this sense, Jonathan Franzen’s contribution is particularly useful. In the essay *What If We Stopped Pretending?* (Franzen, 2020), the American writer begins from a brutal observation: after decades of warnings, treaties, and attempts, it is difficult to continue believing that collective action will be able to “prevent” the climate apocalypse within his lifetime. If in the 1990s it

still made sense to imagine climate change as a problem to be avoided, today, Franzen argues, society is forced to think of it as something with which we must learn to live. Through bold arguments, such as critically reflecting on the potential of social movements (Fridays for Future, Extinction Rebellion, for example), denouncing the democratic and climate establishment in the United States, and even defining the IPCC as culpable for catastrophic climate change, Franzen renounces the possibility of imagining a future optimistically improvable (*ibid.*).

This acknowledgement does not arise from cynicism, but from a demand for intellectual sincerity. Franzen denounces a double risk: on the one hand, that climate change monopolises public discourse in an abstract and ritualised manner, becoming a kind of omnipresent rhetorical backdrop devoid of real transformative capacity; on the other, that hope is reduced to a mobilising slogan, detached from an honest assessment of the actual probabilities of success of global mitigation strategies. For him, a hope worth cultivating must rest on two pillars: intellectual sincerity and personal ethics, understood as care for places, relationships, and communities (Franzen, 2020).

In this perspective, the apocalyptic approach has a critical potential: it forces us to recognise that not everything can be saved, that some losses are already underway, and that part of “sustainable development” risks becoming a reassuring oxymoron. Yet precisely for this reason, it brings back to the centre the question of what we still wish to defend and how we want to live within a world that will not return to what it was. If the horizon of a “total solution” closes, that of a politics of limits, distributive conflicts, and concrete choices concerning territories and populations opens up.

This disenchanted gaze finds an interesting resonance on a critical, historical, and structural level in Jason W. Moore’s reflections on the Capitalocene. In *Anthropocene or Capitalocene?* (Moore, 2016), the author questions the category of “Anthropocene,” understood as a new geological epoch in which “Humanity” as a whole has become a natural force capable of altering the Earth system. According to Moore, this narrative tends to universalise responsibility, erasing the profound asymmetries that run through the history of modernity: it is not “humanity” in the

abstract that has produced the climate crisis, but a specific historical regime of organising nature and labour—capitalism and its forms.

Moore therefore proposes the term *Capitalocene* to designate a “world-ecology” in which nature is systematically treated as a low-cost, or even cost-free, resource: “cheap nature.” In this reading, capitalism does not merely use nature; it incorporates it as a structural condition of its functioning, converting forests, mines, oceans, but also bodies and territories, into energetic and material inputs from which to extract value (Moore, 2016). In this framework, the climate apocalypse is not an unpredictable accident or the result of a generic “excess of humanity,” but the historical product of a system that has built its expansion on the assumption that the environment could absorb waste, emissions, and extractions “at zero cost.”

Franzen’s apocalyptic approach - which urges us to stop pretending that we can avoid catastrophe while continuing to think within the same categories - and Moore’s systemic critique converge, albeit from different perspectives, on one point: the climate crisis is inextricably intertwined with the capitalist model of development. To pretend that the system can be “fixed” with a little green energy and some technological innovation ultimately means perpetuating the illusion that catastrophe can be avoided without addressing power hierarchies, inequalities, and relations of exploitation between centre and periphery.

In this sense, apocalyptic lucidity is not an invitation to surrender, but a device of unmasking and of accepting the fact that certain scenarios of collapse are now probable or already underway. This compels us to ask who has benefited from nature’s “zero cost,” which territories have been transformed into sacrifice zones, and which populations pay the highest price of accumulation (*ibid.*).

The sociological potential of the “apocalyptic approach” lies in at least three elements:

1. It makes explicit the conflictual dimension of the transition. If one assumes that there is no painless way out of the climate crisis, it becomes inevitable to discuss losses, renunciations, and redistribution. Who will have to reduce consumption the most? Which industrial sectors will need to be reconverted or dismantled? Which territories will be subject to priority adaptation interventions, and which risk being abandoned?

2. It brings the climate issue back down to earth, into concrete places. The apocalypse is not an abstract event that happens to “the planet” in general, but a multiplicity of transformations affecting coasts, countryside, cities, and inland areas in differentiated ways. Here the dialogue with the category of “loss” (Elliott, 2018) is evident: adopting an apocalyptic gaze means accepting that certain landscapes, ways of life, agricultural and community practices will be lost or profoundly transformed, and that sociology must concern itself with how these losses are experienced, managed, and politicised.
3. It reopens the question of “what is to be done?” starting from the notion of limit, not from the idea of integral salvation. If, as Franzen suggests, authentic hope requires sincerity and ethics, then political action cannot be confined to reiterating often abstract long-term objectives, but must concretely support those practices that build forms of resilience and justice within an already wounded world.

Thus, between an apocalyptic gaze “from below” and a historical reading “from above,” Franzen and Moore, in different ways, propose breaking with a consolatory vision of transition. Far from leading to paralysis, this double gesture—recognising the depth of the crisis and identifying its systemic roots—can constitute the premise for a Sociology capable of interrogating the sites of vulnerability and the possible spaces of justice within the public sphere.

1.5 The paradigm for the ecological transition

In contemporary public discourse, “ecological transition” has become an omnipresent keyword: a container capable of evoking both the promise of profound change and the urgency of responding to the climate crisis. Precisely because of this evocative force, if not nourished by adequate political, administrative, and institutional substance, it risks turning into an empty shell: a discursive horizon rather than a transformative process, an image of the future rather than a set of concrete and territorialised actions.

The definition proposed by *Treccani*²³ captures this ambivalence well. In a broad sense, ecological transition is described as the process through which human societies redefine their relationship with the physical environment, aiming at more balanced and harmonious relations within different ecosystems. In a narrower sense, it refers instead to technological reconversion aimed at producing fewer polluting substances; in a third, even more circumscribed meaning, the term becomes the institutional designation of a ministry entrusted with implementing environmental policy. In just a few steps, the concept thus slips from a transformative perspective on socio-ecological relations to a technical-administrative label.

To recover the analytical scope of the paradigm, it is useful to return to the notion of ecological transition elaborated by Bennett (2017). In this perspective, ecological transition does not coincide with a mere “correction” of the productive system, but with the ways in which human groups, cultures, and institutions adapt, creatively or conflictually, to changes in the biophysical environment. It is a historical process of co-adaptation between society and nature, which places practices, knowledge, and forms of collective organisation back at the centre. Transition is therefore not a punctual episode, but an uneven trajectory, traversed by power asymmetries, inclusions, and exclusions.

Recent sociological reflection in European context captures this shift well. Magnani (2018; 2023), though starting from cases linked to energy systems, insists that the transition towards more sustainable forms of development involves political, social, and cultural dimensions: it redefines what we consider the common good, the modalities of access to resources, and the forms of citizenship and participation. In this perspective, the “ecological” element does not concern only the reduction of environmental impacts, but the overall rethinking of the ways of inhabiting the planet and of distributing the costs and benefits of transformation.

In this direction, the political-institutional use of the term appears doubly problematic. On the one hand, as Martone (2023) shows in his examination of the PNRR, ecological transition is frequently framed as an economic opportunity: a

²³ [https://www.treccani.it/vocabolario/transizione-ecologica_\(Neologismi\)/](https://www.treccani.it/vocabolario/transizione-ecologica_(Neologismi)/)

lever to increase competitiveness, attract investment, and generate high value-added employment. This discourse can be situated within the broader strand of environmental frames oriented towards problem solving (Dryzek, 2013), which do not truly question the dominant political-economic model, but rather seek to adapt it, relying on the combination of technological innovation and public regulation.

On the other hand, the category of “sustainability” assumes a strongly rhetorical role: it is invoked as a normative and value-based foundation, without clarifying the material, social, and institutional conditions necessary to make it effective. Since it aggregates diverse actors and languages, its polysemy can be productive, but it is also risky: it ends up legitimising narratives of green economy and eco-efficiency that leave in the background the questions of who pays the price of transition, which territories are sacrificed, and which social groups remain at the margins (Martone, 2023)

Within this framework, the question posed by Giudici (2023) - “sustainable for whom?” - becomes central to the construction of the paradigm. The author shows how ecological transition is never neutral: it redistributes risks, burdens, and opportunities, and can generate new forms of social vulnerability. Thus, interventions designed to improve environmental quality or reduce emissions may, for certain categories, result in increased living costs, loss of access to essential services, forced displacement, or precarisation. Transition, in short, does not merely reduce environmental impacts: it reconfigures the perimeter of who is considered “included” or “excluded” from the sustainable future.

Here the connection returns to the Sociology of uncertainty and vulnerability discussed in the preceding paragraphs. If ecological transition is conceived and governed as a sequence of technical measures dictated by urgency, without adequate involvement of the most exposed subjects, it risks becoming an additional factor of insecurity for those already living in conditions of socio-economic fragility. Local communities, especially in peripheral or “impoverished” contexts, find themselves confronted with projects and interventions often decided elsewhere, with languages and instruments that do not always acknowledge their needs and competences.

Hence the importance of interrogating the concrete capacity of territorial institutions to handle the paradigm of ecological transition. Municipalities, unions of municipalities, and regions are entrusted with new responsibilities: they must integrate climate and environmental objectives into planning, coordinate interventions on land, water, mobility, and hydrogeological risk adaptation, and participate in European and national programmes. Yet they often suffer from structural limitations: shortages of staff and technical expertise, financial fragilities, complex procedures, and a stratification of regulations. The outcome is a paradox: ecological transition is demanded with urgency precisely from institutions that, over recent decades, have been progressively weakened.

In this context, the paradigm of ecological transition may evolve in two divergent directions. On the one hand, it may consolidate as a technocratic label that justifies decisionism, centralisation, and top-down interventions in the name of an incontestable necessity. On the other hand, it may become a space of experimentation for new forms of ecological democracy, in which top-down instruments (guidelines, indicators, open data, dedicated funds) intertwine with bottom-up processes of civic monitoring, co-design, conflict, and negotiation. The challenge, as Martone (2023) and Giudici (2023) suggest, is to avoid presenting ecological transition as a neutral, inevitable, technically given process. Rather, it should be recognised as a field of tensions between:

- institutional rhetorics that promise green growth and innovation;
- territorial demands that call for equity, recognition, and participation;
- technical devices that require administrative capacity and coordination;
- social processes that demand legitimacy, transparency, and redistribution.

The question is not whether ecological transition is necessary, but which ecological transition is to be promoted, with which instruments, in which places, and to whose benefit. Only by taking this question as a starting point does it become possible to transform the paradigm from a rhetorical container into a critical device for interpreting and orienting processes of change in territories,

particularly in frontier spaces where social vulnerability and ecological fragility intersect most profoundly.

1.6 Beyond the technocratic paradigm: the contribution of Social Sciences to the complexity of transition

In critically revisiting approaches that tend to reduce ecological transition to a predominantly technical or economic process, it is important to acknowledge that such reductionism has already been widely problematized in recent years by the social sciences and humanities (SSH), which have significantly contributed to restoring complexity to these processes. Rather than insisting on a sharp dichotomy between technocratic approaches and socio-political perspectives, it is now more productive to situate the analysis within a research field that has become deeply hybridized, where technological, economic, cultural, and social dimensions are increasingly intertwined. What emerges is not the replacement of one paradigm with another, but the gradual construction of a more reflexive and integrative framework for understanding transition.

A clear indication of this evolution is the growing institutional recognition of the role of SSH within European research frameworks. The European Commission report “Integration of Social Sciences and Humanities in Horizon Europe” highlights that SSH are involved in 88% of projects funded under Pillar II of Horizon Europe, with particularly strong representation in clusters dedicated to climate, energy, mobility, and environmental sustainability. This figure is not merely indicative of quantitative diffusion; rather, it reflects a qualitative transformation in how transition is conceptualized. Transition is no longer treated as a technical problem to be solved through isolated innovations, but as a complex societal process requiring the integration of diverse forms of knowledge, practices, and disciplinary perspectives. The report explicitly emphasizes that addressing climate change and environmental challenges necessitates understanding social acceptance, behavioral change, governance structures, and cultural contexts, thereby reinforcing the indispensability of SSH contributions.

Within this evolving framework, SSH contribute in multiple and interrelated ways. First, they enable a deeper understanding of social behaviors and everyday practices that shape resource use and the adoption of innovations, moving beyond the notion of an abstract, rational individual as the primary target of policy design (Shove, 2010). This shift is particularly relevant in light of critiques of behaviorist and economistic models, which tend to individualize responsibility while neglecting the structural and institutional conditions that shape action. Second, SSH make visible the distributive implications of transition, showing how costs and benefits are unevenly distributed across social groups and territories, and highlighting issues of justice, inequality, and vulnerability (Sovacool, 2016). Third, they provide analytical tools to rethink governance in a participatory and multi-level perspective, emphasizing the role of local institutions, civil society, and collective action in shaping transition pathways (Geels, 2019). Finally, they contribute to the construction of shared narratives and visions, recognizing the importance of discourses, values, and representations in influencing both policy design and public engagement (Stirling, 2014).

However, this integration process is not without its ambiguities and limitations. As the European Commission report itself indicates, the involvement of SSH in research projects often remains partial or uneven, with contributions that are sometimes added at later stages rather than embedded from the outset. In many cases, SSH are called upon to complement projects already framed in technical terms, rather than to co-design research questions, methodologies, and objectives. This suggests the persistence of an epistemic hierarchy that privileges techno-scientific knowledge while positioning social knowledge as secondary or supportive (Jasanoff, 2010). Such a hierarchy risks limiting the transformative potential of SSH contributions, reducing them to instruments for improving policy acceptance rather than recognizing their capacity to fundamentally reshape problem framings.

In light of these considerations, the reflections developed in the previous sections can be reinterpreted not as an isolated critique of technicist approaches, but as part of a broader and already established debate that has progressively

contributed to redefining the very object of ecological transition. The emphasis placed on the limits of techno-optimistic narratives, on the risks of decisionism, and on the inadequacy of standardized “one-size-fits-all” solutions aligns with a substantial body of literature that has highlighted the need to account for the specificity of territorial contexts, socio-cultural dynamics, and institutional arrangements (Leach et al., 2018; Scoones et al., 2015). At the same time, it is necessary to recognize that these critiques have not remained external to policy processes, but have increasingly informed the design and implementation of research agendas and governance frameworks.

From this perspective, the analytical challenge is no longer to oppose “technology” to “society,” but to construct effective spaces of interdisciplinary dialogue, where different forms of knowledge can interact on an equal footing. This implies moving beyond additive models of interdisciplinarity, where social sciences are simply appended to technical projects, towards genuinely integrative approaches in which problem definitions, methodologies, and evaluation criteria are co-produced. Ecological transition thus emerges as a field of negotiation among knowledge systems, interests, and visions, in which the social dimension is not an external corrective, but a constitutive element of transformation.

At the same time, the increasing institutional recognition of SSH at the European level does not automatically translate into effective implementation at the territorial level. The capacity to integrate these perspectives depends largely on the institutional, administrative, and cultural conditions of specific contexts, as well as on the availability of adequate resources and expertise. Local authorities, in particular, play a crucial role in translating abstract policy frameworks into concrete interventions, yet they often operate under conditions of limited capacity, fragmented competences, and complex regulatory environments. In the absence of adequate support, there is a risk that even the most advanced and theoretically informed policies remain only partially implemented, or are adapted in ways that dilute their transformative potential. This gap between conceptual advancement and practical implementation highlights a central tension in contemporary transition processes. On the one

hand, there is a growing awareness - both in academic research and in policy discourse - of the need to integrate social, cultural, and political dimensions. On the other hand, there remain significant challenges in operationalizing this integration in practice, particularly in contexts characterized by institutional fragility or socio-economic vulnerability. As a result, transition processes may continue to reproduce existing inequalities and asymmetries, even as they seek to address environmental challenges.

In this sense, the dialogue between the critical perspectives developed in this work and the empirical evidence provided by the European Commission report allows for a more nuanced understanding of the current state of ecological transition. Rather than portraying transition as either fully technocratic or fully democratized, it becomes possible to conceptualize it as a dynamic and contested process, marked by both progress and persistent tensions. This perspective avoids simplistic dichotomies and instead foregrounds the complexity of interactions between different actors, scales, and forms of knowledge.

Ultimately, recognizing the growing contribution of SSH does not mean assuming that the challenges of integration have been resolved. Rather, it calls for continued critical engagement with the ways in which knowledge is produced, mobilized, and translated into policy and practice. The ecological transition can thus be understood not as a linear and predetermined pathway, but as an evolving process in which the construction of a genuine integration between technical and social dimensions remains one of the central challenges. This challenge is particularly salient in territorial contexts, where the success or failure of transition processes is determined not only by technological innovation, but by the capacity to engage communities, address inequalities, and build inclusive and context-sensitive governance frameworks.

In this light, the contribution of social sciences and humanities appears not merely complementary, but essential for navigating the uncertainties, conflicts, and opportunities that characterize ecological transition. Their role is not only to critique or to interpret, but to actively participate in shaping more reflexive, equitable, and territorially grounded pathways of transformation.

2. THE SOCIO-ECOLOGICAL DIMENSION OF THE ENERGY TRANSITION

2.1 The right to energy within the domain of the ecological transition

Within the framework of ecological transition, energy occupies a paradoxically “obvious” yet still underexplored position on the socio-legal level. If ecological transition is increasingly understood as a process of structural transformation of economic and social systems, aimed at realigning the organisation of societies with the planet’s ecosystemic limits, it materialises first and foremost as an energy transition: the reconversion of systems of energy production, distribution, and consumption; the reduction of dependence on fossil fuels; and the reorganisation of the most energy-intensive industrial sectors (Moliterni, 2022). In this sense, to speak of ecological transition already largely means to speak of energy and of modes of energy production and supply.

From a legal-institutional perspective, the emergence of this field is fundamentally linked to European Union policies and to the progressive consolidation of an autonomous “energy law.” As Bradbrook (1996) and, more recently, Talus (2013) remind us, academic reflection on energy law developed later than environmental law and climate change law, but experienced strong acceleration with the processes of market liberalisation, the oil crisis of the 1970s, and the subsequent centrality of climate policies. In parallel, at national levels, ministries and regulatory authorities specifically dedicated to energy have proliferated, marking its emergence as an object of strategic public regulation.

Precisely because the field originates as linked to Community policy and the construction of the internal market, any sociological analysis of the energy transition cannot disregard reference to the sources of energy law. Treaties, regulations, and European directives, together with their implementation within national legal systems, constitute a valuable source for sociological reflection. It is within this corpus of norms that the objectives of decarbonisation, the trajectories of climate neutrality, the modalities of citizen participation, the guarantees of access, and the measures to combat energy poverty are defined (Vetrò, 2022). In

other words, the socio-ecological background of the energy transition can only be inscribed within a legal infrastructure that shapes its aims, instruments, and subjects.

Within this framework, the idea of energy as a “substantive transversal right” (Pepe, 2021) assumes particular significance. Energy cannot be reduced to a single branch of law: it is a microcosm in which administrative, civil, commercial, fiscal, international, and European norms converge and hybridise (Federici, 2015). This is why part of the legal doctrine proposes to consider energy law as a “fourth-generation right,” born from the convergence of different disciplines and called upon to reconcile conflicts between multiple public interests: security of supply and environmental protection, economic efficiency and consumer protection, technological innovation and democracy (Pepe, 2021). Hence the idea of energy law as a “law of compromises,” which institutionalises a perpetually provisional balance between the subjects, goods, and constitutional values at stake.

If we adopt a socio-ecological perspective, however, the decisive point is not only the transversal nature of energy law, but its enabling function in relation to the exercise of other fundamental rights. In the form of access to more or less essential services such as heating, cooling, mobility, and digital connection, energy increasingly takes shape as a meta-right: its fulfilment is not in itself the exercise of a specific right, but rather the condition of possibility for civil, political, and above all social rights to be concretely exercised and protected. Without accessible, reliable, and sustainable energy, the right to housing remains abstract, as do the rights to health, education, and participation in public life. In this sense, the fight against energy poverty becomes an integral part of welfare policies and not merely a chapter of environmental policy.

The most recent European trajectories confirm this reading. The Union increasingly insists on a “just” transition, later reformulated as “fair,” that is, one capable of holding together climate objectives and the reduction of social and territorial inequalities (Ammannati, 2022). European climate legislation explicitly recalls the link between the transition towards a decarbonised energy system, price security and accessibility, the reduction of energy poverty, and the promotion of public participation in decision-making processes (Vetrò, 2022). Energy is no longer

merely the object of technical-economic regulation, but becomes a matter of distributive justice, recognition, and participation, which affects the forms of citizenship and the geographies of inequality

From this perspective, the debate on ecological transition, as Moliterni and other authors show, marks an important shift compared to the traditional *ex post* approach to environmental protection. It is no longer merely a matter of limiting or compensating for the negative impacts of productive activities, but of rethinking the very modes of functioning of the economic system, in the perspective of a “realignment” between the socio-economic system and the natural system. This implies a reconsideration of the role of public authorities, called not only to set limits and constraints, but to selectively guide energy and industrial reconversion, directing investments, innovation, and infrastructures towards long-term objectives. Ecological transition thus becomes a process of qualitatively different growth, which takes the environment not as an external limit but as an internal and presupposed variable of development trajectories (Moliterni, 2022).

In this perspective, energy law is not a mere technical backdrop but a central device of the socio-ecological transition. It structures the incentives and disincentives that orient the choices of enterprises, administrations, and citizens; it defines who can produce, distribute, and consume energy, with which rights and responsibilities; it establishes how the costs of reconversion are distributed among territories, social classes, and generations. The growing attention to energy communities, to forms of “bottom-up” production and management, and to citizen participation, analysed by Iaione and De Nictolis (2022), makes it even more evident that the energy arena is simultaneously a field of legal regulation and a field of social conflict

In summary, placing energy at the heart of ecological transition means recognising it both as a socio-ecological node and as a meta-right: a transversal right, constructed through the interplay of European and national sources, which functions as an enabling condition for the effectiveness of many other rights. It is on the basis of this dual nature—socio-ecological and juridical—that, in the following paragraphs, it will be possible to interrogate the energy transition in terms of justice, democracy, and concrete forms of territorialisation, leading up to the role of energy communities and local practices of self-organisation.

2.2 The socio-ecological dimension of energy conversion

In the debate on ecological transition, the combination of economics, legal sciences, and natural sciences often seems sufficient to define the problem and to orient solutions: discussions revolve around “optimal” energy mixes, regulatory instruments, decarbonisation scenarios, and margins of compatibility with planetary limits. However, what risks being overlooked in this approach is not so much the “efficient cause” of transition—namely norms and modes of production—but its terminal part: the societies that undergo, interpret, and re-elaborate the effects of energy conversion. In other words, conversion does not concern only what fuels plants or structures markets, but redefines social relations, institutions, forms of everyday life, and distributions of power and vulnerability (Miller et al., 2013; Abramsky, 2010).

It is precisely from this awareness that the strand of studies focusing on the “social dimensions” of energy transitions emerges, criticising reductionist readings that confine the issue to a problem of technologies, prices, and tonnes of CO₂ (Miller et al., 2013). Strategic reports such as those of the National Academy of Engineering and the Department of Energy in the United States²⁴ have delimited the field to a comparison of technological options and costs, marginalising implications for communities, inequalities, conflicts, and capacities for participation (*ibid.*). It is here that the socio-ecological perspective becomes decisive: not to replace other disciplines, but to interrogate who and what is being transformed, with what outcomes, and who has a voice in defining the trajectories of change.

The starting point is the idea of energy systems as socio-technological systems, elaborated within a long tradition of studies (Hughes, 1983; Nye, 1990, 1998, 2010; Hecht, 2012; Geels, 2005; Miller et al., 2013). Energy is not only a set of machines, pipelines, mines, power plants, cables, and devices, but is also constituted by the people who design and manage them. Not only machines and people, but also organisational routines, value chains, regulatory institutions, and social norms that render the everyday use of energy “obvious.” Around these systems are organised financial networks, labour markets, educational systems, urban planning rules,

²⁴ <https://www.energy.gov>

forms of dwelling and mobility, down to the elementary gestures we learn as children (Miller et al., 2013). Energy conversion, in this perspective, is always a socio-ecological conversion: it simultaneously modifies material infrastructures, social relations, and relations with ecosystems (Edwards et al., 2009; Kaijser & van der Vleuten, 2006).

One of the main contributions of this approach concerns the issue of infrastructures. Energy infrastructures - oil pipelines, electricity grids, gas pipelines, generation plants, storage systems - are at once scarcely visible and profoundly structuring: they last for decades, orient productive locations, consumption habits, and territorial hierarchies (Edwards et al., 2009; Nye, 2010). Design choices are not neutral: they determine who lives near refineries, mines, or wind farms, which territories benefit from economic spillovers, and which bear environmental impacts (Newell & Mulvaney, 2013). It follows that new infrastructures for renewables may reproduce extractive logics and imbalances similar to those of fossil fuels, unless questions are raised about modes of raw material supply, global value chains, and forms of compensation (Newell & Mulvaney, 2013; Raman, 2013).

A second axis concerns what Miller and colleagues define as “energy epistemics”: who knows what about energy systems, how this knowledge is produced, and which forms of knowledge count in decision-making (Miller et al., 2013). The functioning of energy networks depends on highly specialised expertise—geology, engineering, grid management—but also on devices of quantification and evaluation that incorporate normative visions of risk, efficiency, and possibility (Porter, 1996; Jasanoff, 2004). The very category of “energy transition,” when used too narrowly, risks obscuring these socio-political entanglements (Laird, 2013; Hess, 2014). The analysis of national “socio-technical imaginaries” shows how different states project distinct expectations and fears onto technologies such as nuclear power, thereby influencing the distribution of risks and benefits (Jasanoff & Kim, 2009). Alongside expert knowledge, situated forms of knowledge also emerge which contest official interpretations and propose alternative criteria of justice and acceptability (Phadke, 2013).

The third axis is that of energy justice. Energy systems always produce asymmetric configurations of advantages and disadvantages: who has access to reliable energy

at affordable prices, who lives in proximity to the most polluting plants, who participates in decision-making, and who is systematically excluded (O'Rourke & Connolly, 2003; Miller, 2012). Transitions are never neutral processes: they redraw boundaries between the “haves” and “have-nots” of energy, redefining which social groups and territories are protected, compensated, or reconverted, and which, instead, are left without safeguards (Miller et al., 2013). The contrast between sudden moratoria, as in the case of the drilling ban in the Gulf of Mexico, and “just transition” pathways based on worker reconversion programmes, as occurred in Germany with coal, shows that there are very different trajectories in the distribution of the social costs of conversion (Graham, 1996; Miller et al., 2013). Looking at the concrete choices involved in configuring energy systems, it becomes evident that conversion is not played out merely between different fuels, but between alternative models of socio-ecological organisation. In the case of solar photovoltaics, for example, the issue is not simply moving from fossil fuels to a renewable source but deciding whether to prioritise large utility-scale plants, community-based installations, or widespread diffusion across rooftops and small buildings. Each solution entails different dominant actors (large utilities, local cooperatives, households), distinct relationships with electricity grids, varying degrees of community control, territorial impacts, and potentials for inclusion or exclusion (Cowell et al., 2011). Similarly, in the case of electric mobility, the way in which the charging network is designed—predominantly domestic overnight charging or widespread provision in workplaces and public spaces—conditions compatibility with scenarios of high renewable penetration, the distribution of infrastructural costs, and the shape of the future city.

In summary, a socio-ecological reading of energy conversion highlights at least three implications for the discourse on ecological transition. First, transitions are systemic transformations that affect infrastructures, institutions, and forms of life, not mere technological substitutions. Second, the knowledges that orient them are partial, situated, and often contested, and the question of “who knows” and “who decides” is an integral part of the problem. Third, every choice of energy configuration produces specific geographies of justice and injustice, of protection and exposure, which cannot be considered collateral effects.

For Sociology, this means shifting the focus from energy as a technical or regulatory variable to energy as a socio-ecological device that structures the life possibilities of people and territories. It means interrogating energy conversion as a process that redraws boundaries between centre and periphery, between protected spaces and spaces of sacrifice, between those who can imagine and negotiate their own energy future and those who bear its consequences (Rockström et al., 2010). From this perspective, in the following paragraphs it will be possible to read the energy transition not only as a technical or juridical agenda, but as a terrain of conflict and social experimentation in the areas where the effects of the climate and energy crisis manifest themselves with greatest intensity.

Figure 1

Socio-Ecological Implications of Energy Conversion



Source: Author's own elaboration

2.3 Energy, territories and new forms of poverty

The socio-ecological perspective discussed in the previous paragraph has shown that energy transitions do not merely consist in replacing one set of technologies with another, but entail profound transformations in social and environmental systems: they redefine infrastructures, power relations, access to resources, and

possibilities for adaptation. Within this framework, the issue of energy inevitably intertwines with that of inequalities and social vulnerability. It is therefore not only a matter of understanding *how* energy systems are changing and will change, but of asking *who* will be most exposed to impacts, who will be able to benefit from new opportunities, and who, instead, risks being left behind.

One of the key points emerging from studies on climate vulnerability concerns the existence of two distinct conceptual approaches: vulnerability as an end point (*outcome vulnerability*), understood as the result of climatic impacts mitigated by adaptive capacity, and vulnerability as a start point (*contextual vulnerability*), which emphasises its processual nature, rooted in social, economic, and territorial contexts (O'Brien et al., 2004; Füssel, 2010). Adopted by the IPCC, in the first case the relationship between society and environment remains separate, and vulnerability is a function of the impact, more or less aggravated by the insufficiency of resources, knowledge, or technologies. In the second case, by contrast, environment and society are conceived as parts of the same socio-environmental system: vulnerability derives not only from the climatic event, but from the structural conditions which, even before the impact, determine different degrees of exposure, sensitivity, and margins of action (O'Brien et al., 2008).

This distinction also has significant implications for the way in which we frame energy poverty and, more generally, the relationship between energy and territories. Conceived as an “end point,” energy poverty appears primarily as an effect of price increases, building inefficiency, or extreme weather conditions. From a “start point” perspective, however, it becomes a component of the structural vulnerability of many territories: the result of historical dynamics, institutional arrangements, socio-economic stratifications, and precarious housing conditions that precede and shape energy and climate impacts. It is precisely this second reading that makes visible the interweaving of energy, territories, and new forms of poverty.

In recent years, attempts have been made to integrate disaster studies (Mela et al., 2017) with research on climate vulnerability, with the aim of constructing analytical tools capable of dialogue across disciplines and scales (*ibid.*). In this direction lies the model proposed by Birkmann (2013a; 2013b), conceived as a thinking tool to orient multidimensional analyses of vulnerability, highlighting factors, processes,

and territorial conditions that affect response and adaptive capacity. What these approaches share is the idea that vulnerability is situated, relational, and evolving, and that energy transformations, like any socio-environmental phenomenon, are rooted in specific territorial configurations.

It is precisely from this perspective that the debate on infrastructures and energy policies in Italy becomes linked to the conditions of inland and marginalised areas. Characterised by demographic ageing, depopulation, the scarcity of essential services, and economic fragility, these zones often present an obsolete building stock, limited investment capacity, and greater exposure to the combined impacts of climate change and rising energy costs. Recent studies highlight how the risk of energy poverty in Italy is profoundly territorial: southern regions and certain areas in the North characterised by socio-economic vulnerability show higher levels of risk, both for climatic reasons and for the presence of families in fragile conditions and buildings constructed before the introduction of energy-saving regulations (Berti et al., 2023).

The geographical distribution of energy poverty is therefore not uniform. According to the analysis by Berti et al. (2023), different configurations emerge: on the one hand, regions such as Lombardy, where the combination of an ageing building stock and the presence of vulnerable families produces significant risk, despite higher average income levels; on the other hand, the regions of the Mezzogiorno, where persistently low spending capacity and the increase in cooling days linked to climate change further accentuate the exposure of less affluent households. These elements show that energy poverty cannot be interpreted exclusively as a technical or economic problem, but requires an approach that brings together climate, socio-demographic conditions, housing forms, and geographies of vulnerability.

In this framework, inland areas become emblematic sites of a dual process: on the one hand, that of infrastructural and energy marginalisation, manifested in the difficulty of accessing essential services and the limited capacity to benefit from the opportunities offered by transition; on the other, that of possible experimentation with alternative models, based on distributed production, energy communities, and territorial adaptation practices that seek to rebuild connections between energy, territory, and social cohesion. Yet without adequate infrastructuring, without

policies to counter structural vulnerability, and without effective redistributive mechanisms, transition risks further widening the gap between already strong and already fragile territories.

Energy and territories, therefore, meet in a field where poverty assumes new, hybrid forms, closely intertwined with climatic transformations, housing conditions, and socio-economic inequalities. What is being reconfigured is not only access to energy, but the very capacity of territories to imagine and sustain possible futures, in a context where vulnerability is increasingly less a point of arrival and more a point of departure from which to rethink policies, infrastructures, and devices of territorial care.

2.4 Beyond the theory: energy poverty in Italy

In Italy, the issue of energy poverty is assuming increasing centrality in reflections on the ecological transition, not only as an economic phenomenon but also as a social and territorial matter that cuts across housing conditions, family configurations, the quality of the building stock, and structural inequalities. The very notion of energy poverty has matured slowly within the Italian regulatory system. In Italy, the definition first appeared in the National Energy Strategy of 2017, where it was identified as the “difficulty in purchasing a minimum basket of energy goods and services, or alternatively, in a notion of energy vulnerability, when access to energy services entails a diversion of resources (in terms of expenditure or income) above a normal value”²⁵ (SEN, 2017).

Only in recent years, thanks to the impetus of the National Integrated Energy and Climate Plan (PNIEC)²⁶ and the work of the Italian Observatory on Energy Poverty (OIPE)²⁷, has it obtained clearer institutional recognition, being defined as the difficulty of accessing a minimum basket of energy goods and services at an

²⁵<https://www.mimit.gov.it/images/stories/documenti/Testo-integrale-SEN-2017.pdf><https://www.mimit.gov.it/images/stories/documenti/Testo-integrale-SEN-2017.pdf>

²⁶ <https://www.pniecmonitoraggio.it/Pagine/piattaforma%20pniec.aspx>

²⁷ <https://oipecosservatorio.it/>

economically sustainable cost (Ministry of Economic Development, 2019)²⁸. This definition emphasises the relationship between household income, energy prices, and housing characteristics, confirming the observations of Faiella and Lavecchia, according to whom energy poverty is a multidimensional phenomenon situated “*at the intersection of economic conditions, energy costs, and the efficiency of the building stock*” (Faiella and Lavecchia, 2021).

The measurement of the phenomenon, however, still represents one of the most critical issues today. According to OIPE, Italy has adopted as its official indicator the LIHC-PNIEC, an adaptation of the Low Income High Cost model, which considers vulnerable those households simultaneously below a certain income threshold and above the median of energy expenditure. According to this measure, as early as 2016, Italian households in energy poverty numbered over 2.2 million, equal to 8.6% of the total (Faiella and Lavecchia, 2021). The same study, however, proposes a second indicator, based not on actual household expenditure but on that necessary to guarantee a minimum level of thermal comfort: applying this criterion, “fuel poor” households in the period 2014–2016 amounted to about 3 million, equal to 11.7% of the total (Faiella and Lavecchia, 2021). The discrepancy between the two measures makes it clear that energy poverty is not a phenomenon that can be confined to a single formula: it depends on how the problem is observed, on the boundaries drawn, and on the groups chosen for inclusion or exclusion.

In this sense, this critique aligns with the observations of De Vidovich, who emphasises that the official Italian measurement tends to capture only part of the phenomenon, neglecting not only subtler forms of vulnerability, such as “hidden energy poverty”, but also the complex set of factors that emerge in conditions where energy services and the needs derived from them are inaccessible or unmet (De Vidovich, 2024).

This behaviour, widespread especially among elderly households, low-income families, and families with children, distorts the statistical picture, as it artificially reduces energy expenditure while leaving the condition of thermal discomfort

²⁸https://www.mimit.gov.it/images/stories/trasparenza/2019/Piano_della_performance_2019-2021.pdf

unchanged. The OIPE Report 2023²⁹ confirms this criticality, noting that many Italian families with dependent children live in dwellings so inefficient that they cannot afford to reach minimum comfort levels, regardless of their consumption behaviour (OIPE, 2023, p. 13)³⁰.

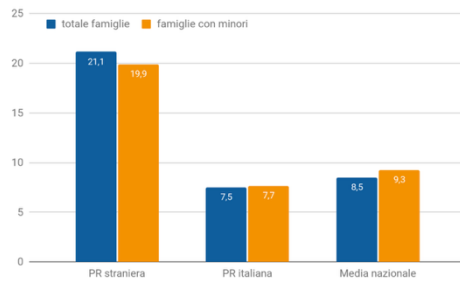
The problem assumes an even more urgent connotation when considering the health effects of prolonged exposure to inadequately heated or cooled housing conditions. International literature has long shown the correlations between extreme temperatures and increased morbidity and mortality, especially among the elderly and children (Healy, 2004; Liddell, 2012). In Italy, where much of the building stock dates back to periods prior to the first energy-saving regulations, the inability to maintain comfortable housing conditions is one of the main determinants of risk. According to OIPE, more than two million families report difficulties in maintaining adequate indoor temperatures during winter or summer, indicating that energy poverty is as much a health issue as it is an income issue (OIPE, 2023).

The social dimension of the phenomenon is also complex and stratified. The most exposed categories include elderly people living alone, single-parent families, large households, and families with at least one foreign member. Among these, households with minors and those with foreign citizenship represent two of the most vulnerable groups, as is clearly shown by one of the most significant figures in the 2023 OIPE Report, which illustrates the incidence of energy poverty by the citizenship of the reference person of the household under consideration.

²⁹ https://oipecosservatorio.it/wp-content/uploads/2024/03/rapporto_2023_IT.pdf

³⁰ In-depth analysis: children and energy poverty – Following a recommendation from Save the Children Italy ETS, an in-depth study was conducted on energy poverty and minors in Italy. At the end of 2021, just over a quarter of households in energy poverty had at least one child. This amounts to around 583,000 households and 950,000 minors (10 per cent of the total) living in unhealthy environments, poorly heated and/or cooled, or inadequately lit. This exposes children, especially the youngest, to greater risks, such as an increase in respiratory problems, reduces the quality of time spent at home, and, ultimately, may influence prospects for social mobility. See OIPE Report 2023, pp. 13–14

Figure 2. Households in Energy Poverty by Citizenship of the Reference Person (RP) (percentage share of households)



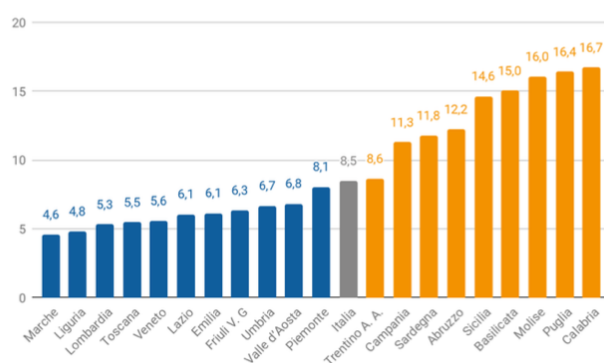
Source: OIPE Report 2023 – Authors’ elaborations based on the Household Expenditure Survey (2021), Istat.

This figure highlights how households with migration histories are more frequently affected than the Italian national average, pointing to a structural link between family backgrounds and exposure to energy risk (OIPE, 2023). Energy poverty thus emerges as a deeply relational phenomenon, affecting not only those with low incomes, but also those living in family and non-family conditions that amplify energy demand and reduce its economic manageability, thereby widening gaps and asymmetries.

Overlaying this social stratification is the geographical dimension, perhaps the most distinctive feature of the Italian case. The territorial distribution of energy poverty does not perfectly mirror the traditional North–South divide, but instead reveals a much more articulated pattern. The 2023 OIPE Report shows that in 2021 incidence ranged from a low of 4.6% in the Marche region to a high of 16.7% in Calabria, with elevated levels also in Sicily, Apulia, and Campania - regions where more extreme climatic conditions, dispersed settlement patterns, less energy-efficient building stock, and more limited access to incentives combine to amplify vulnerability (Castellini et al., 2023, p. 11). The chart on regional incidence of energy poverty (Fig. 1.4) confirms this heterogeneity, showing a gradient that increases moving toward Southern Italy: a complex mosaic in which risk depends not only on income, but on the interaction between climate, the quality of the housing stock, and local administrative capacity.

The territorial component becomes even more evident when considering households with minors, among those most exposed to energy risk. The 2023 OIPE Report indicates that in 2021, 9.3% of households with minors were experiencing energy poverty, a figure that rises sharply in the case of foreign households: one fifth of them are in a condition of energy hardship, with an incidence in Southern Italy more than four times higher than in the rest of the country.

Figure 3. Energy Poverty in the Italian Regions



Source: OIPE Report 2023 – Data elaboration for 2021

Even without entering into detailed regional analysis, the charts show that southern regions, and Apulia in particular, display more pronounced levels of vulnerability, reflecting a combination of factors that include lower average incomes, an older building stock, and greater difficulty in accessing energy-efficiency policies. What emerges is a territorially uneven landscape in which energy poverty is not merely an economic phenomenon, but the outcome of differentiated socio-environmental configurations that define specific risk trajectories across regional contexts.

The condition of inner areas requires particular attention, as energy poverty here takes especially acute forms. These territories are characterized by depopulation, infrastructural isolation, limited access to services, and a building stock that is on average older and less energy-efficient. This combination leads to a significant increase in energy needs while simultaneously reducing households' capacity to benefit fully from energy use: many families are unable to access energy-efficiency incentives due both to the complexity of administrative procedures and to the lack of qualified operators at the local level. As shown in the OIPE Report, the

prevalence of poorly insulated dwellings, obsolete systems, and limited information about support measures means that a share of households living in these contexts experiences levels of energy hardship that are even more severe than those observed in urban areas (Castellini et al., 2023).

This is compounded by a historical legacy tied to the identity of places, namely the typology and spatial distribution of housing. The specificity of inner areas is also reflected in settlement morphology: the predominance of detached houses increases thermal dispersion and reduces the typical benefits of multi-unit residential buildings, where shared surfaces allow for a natural containment of energy consumption (*ibid.*). Territorial isolation further translates into informational isolation: many households are unaware of energy bonuses or are unable to use them due to a lack of technical and administrative support. Consequently, the limitation is not linked solely to energy poverty *per se*, but rather to the factors that constrain knowledge and awareness of energy-related behaviors (Della Valle, 2019; Della Valle & Czako, 2022). The result is an accumulation of disadvantages that transforms energy poverty into an indicator of the broader fragility of local systems, where social conditions, environmental characteristics, and infrastructural shortcomings intersect and reinforce one another.

Within this framework, inner areas represent both a locus of criticality and a potential laboratory for the energy transition. Available environmental resources could sustain local renewable energy supply chains capable of reducing dependence on external markets and generating new economic opportunities. Energy communities, microgeneration technologies, and interventions aimed at improving the energy efficiency of dispersed building stock outline scenarios in which energy becomes part of an integrated strategy for territorial development. For this to occur, however, it is necessary to recognize that energy poverty in inner areas is not simply an economic difficulty, but the expression of a distressed territorial system, that the ecological transition can help to rethink in a more equitable and sustainable direction.

It is within this complex framework that the role of renewable energy as a potential lever for reducing energy poverty must be situated. A growing body of literature argues that the expansion of renewables, especially when combined with models of

self-production and collective self-consumption, can contribute to lowering energy vulnerability. This is due to households' reduced exposure to fossil fuel price volatility, the possibility of decreasing energy expenditure through local production, and the greater resilience of decentralized systems to global market shocks. The 2023 OIPE Report emphasizes that, when properly designed, self-production systems can generate significant savings for vulnerable households, translating renewable energy generation into a stable form of economic protection (OIPE, 2023). Other studies likewise recognize that renewables can function as a form of “social infrastructure” for the transition, provided they are accompanied by inclusive and redistributive governance models (Leone et al., 2023; Coleandro, 2024; Ginelli & Daglio, 2016).

At present, the most promising perspective is that of Renewable Energy Communities (RECs), which enable collective self-consumption and the sharing of economic benefits. In several European contexts, RECs have demonstrated their capacity to reduce the energy expenditure of disadvantaged households; in Italy as well, as reported by OIPE, pilot projects implemented primarily in Southern regions indicate significant savings and an improved ability of households to cope with energy costs (OIPE, 2023). The participation of vulnerable households in RECs not only reduces their exposure to energy costs, but also creates new forms of social inclusion, strengthening the community dimension of the ecological transition.

However, the diffusion of renewable energy does not automatically lead to a reduction in vulnerability. Territories must possess adequate technical, administrative, and financial capacities to promote equitable models of participation. The experience of the Superbonus scheme—which primarily benefited wealthier territories—shows how the gains of the transition risk being captured by contexts that already have greater resources, thereby widening rather than narrowing existing disparities. For this reason, a paradigmatic shift is required: from a compensatory logic (bonuses, subsidies) to an organization of energy welfare rooted in territories, capable of integrating housing policies, energy strategies, and social interventions.

The Italian context suggests that energy poverty is not merely a problem to be corrected, but an indicator of how the country's social and energy infrastructure

responds to ongoing transformations. The ecological transition offers an opportunity to rethink this system by restoring centrality to territories and communities, rebuilding the material conditions of dwelling, and redefining the relationship between citizens and energy. From this perspective, addressing energy poverty means not only reducing energy bills, but also laying the foundations for a just transition—one capable of including the most vulnerable groups and of valorizing local resources as levers of both energy and social emancipation.

3. ENERGY COMMUNITIES: A MODEL FOR THE ENERGY TRANSITION AT THE LOCAL LEVEL

3.1 From energy poverty to the debate on energy communities

The shift from reflection on energy poverty to the discussion of energy communities constitutes a crucial juncture in the contemporary debate on socio-ecological transition. As shown in the previous chapter, transition cannot be reduced to a technological process or a mere substitution of energy sources: it involves the social dimension of vulnerability, the ways in which families inhabit spaces, the capacity of institutions to support adaptation pathways, and the structural inequalities that characterise territories. It is precisely in this intermediate space, between transformation of the energy system and the material conditions of life, that Renewable Energy Communities (RECs) have emerged as one of the most debated and expectation-laden devices, particularly in Italian public discourse.

The OIPE Report 2023 highlights that the growing attention devoted to RECs is the result of a dual movement. On the one hand, climate urgency and the need to reorient the energy system towards more decentralised and cooperative models have driven institutions, enterprises, and citizens to seek alternatives to traditional mechanisms of energy production and consumption (OIPE, 2023). On the other hand, the unexpected rise in energy costs, amplified by recent geopolitical crises, has brought energy poverty to the centre of the political agenda, making evident the fragility of households and local communities in relation to the oscillations of the energy market (Brugnetti et al., 2023).

In this scenario, RECs have assumed an almost salvific narrative role: they have been placed within an imaginary of possibility, as an instrument capable of simultaneously responding to the demand for accessible energy, the need for autonomy, and the call for greater citizen participation in territorial transition. However, such a narrative contains many simplifications and requires closer attention to concrete processes, constraints, and social conditions that determine their actual capacity to contribute to energy justice.

3.1.1 Mainstream communication: idealists, and the “hyper-simplification” effect

According to OIPE (2023), the rapid diffusion of RECs in public discourse has been fuelled by what the authors define as the “dominant narrative,” a media rhetoric that has merged diverse expectations into a unitary, often simplified imaginary. The actors involved in this communicative construction can be distinguished into at least two relevant categories.

The first is that of the “idealists,” composed of activists, sustainability movements, opinion leaders, and actors who have set the value agenda of the debate. For these actors, the energy community represents a symbol of the just and desired transition: a return to the local dimension, to sharing, to forms of mutual support, often placed within a framework of ecological and social imagination. They push towards collaborative models capable of redistributing benefits to the community, but at times overlook technical, economic, and regulatory complexities.

The second category is that of the “convinced.” These are actors who recognise in RECs an opportunity for investment, innovation, or strategic positioning in the energy sector: consultants, companies, installers, renewable operators, grid managers. In this case, the driving force is not so much ideological as linked to the economic and operational potential of the new model.

Alongside these two groups stand the media, which have transformed RECs into a readily communicable slogan laden with expectations of a “definitive solution.” The combined effect has been to present energy communities as the privileged (if not the sole) pathway to addressing energy poverty, obscuring the complexity of the phenomenon and the intrinsic limits of RECs, particularly in their initial configuration.

As OIPE (2023) emphasises, this narrative ends up generating a form of “over-simplification”: the idea that merely speaking about and including vulnerable households in RECs is sufficient to produce a significant impact on their condition. Yet energy poverty does not derive solely from the price of energy: it is connected to income, housing quality, type of tenancy contract, technological provision, thermal inefficiency, and other structural variables (Boardman, 1991). It is therefore

evident that no REC, on its own, can resolve a problem that has deep economic, social, and infrastructural roots.

Within this framework, however, an additional layer of simplification cuts across both “idealists” and “convinced” actors, further reinforcing the effect of analytical reduction: the implicit and often unproblematic use of the concept of “community.” In mainstream communication on RECs, the community is frequently evoked as a given, cohesive, and internally harmonious entity, characterised by a shared sense of belonging, common values, a spontaneous willingness to cooperate, and an almost automatic capacity for collective mobilisation. Such a representation, while functional to the construction of a positive and mobilising narrative, reproduces one of the most persistent simplifications in the history of sociology.

As is well known, the concept of community has accompanied the discipline since its origins, beginning with the classical distinction between *Gemeinschaft* and *Gesellschaft* (Tönnies, 1887), and has undergone multiple theoretical re-elaborations that have progressively highlighted its problematic, ambivalent, and historically situated nature. Rather than referring to a stable and univocal social form, community should be understood as an analytical construct marked by tensions, conflicts, power asymmetries, and processes of inclusion and exclusion. In this sense, more recent literature has shown that the uncritical use of this notion risks producing normative and prescriptive effects, projecting onto empirical reality an ideal of cohesion that is rarely found in concrete contexts.

A particularly relevant contribution in this direction is offered by Osti and Pellizzoni (2018), who, in *Energy and Innovation between Global Flows and Local Circuits*, provide a critical reading of contemporary energy transformations, focusing also on the forms of collective organisation emerging at the local level. The authors emphasise that community-based energy configurations cannot be interpreted as homogeneous and self-sufficient entities, but must be understood within a constant tension between global flows and local circuits, between systemic constraints and the agency of territories (Osti & Pellizzoni, 2018). From this perspective, “community” is never a pre-existing condition, but rather the outcome of contingent

social processes shaped by negotiation, adaptation, and often misalignments between expectations and practices.

Applying this perspective to RECs, it becomes clear that the dominant narrative tends to overlay an idealised image of community onto contexts that, in reality, display highly differentiated levels of social cohesion, relational capital, and organisational capacity. The empirical research conducted in this thesis clearly confirms this gap. While public discourse presupposes the existence of already-formed communities capable of recognising themselves around shared values and activating collective action, the data collected reveal instead situations marked by relational fragility, uneven participation, and forms of engagement often mediated by institutional actors or intermediaries.

In particular, interviews and fieldwork activities show that a sense of belonging cannot be taken for granted, but must be built over time through concrete practices, mediation devices, and processes of social learning. In many cases, participation in RECs does not stem from a conscious and shared adherence to a collective project, but rather from contingent opportunities, economic incentives, or pre-existing relationships of trust with specific actors (local authorities, associations, third-sector organisations). This aspect is particularly evident in the case of the solidarity-based energy community in San Severo, where the involvement of beneficiary households is strongly mediated by the diocesan Caritas and embedded within pre-existing support pathways.

In light of this evidence, community appears less as a starting point and more as an uncertain outcome, a process in the making that may consolidate or remain fragile and incomplete. In other words, RECs do not automatically generate community dynamics, but rather constitute contexts within which such dynamics may eventually emerge, provided that appropriate social, cultural, and organisational conditions are activated. Once again, the analysis by Osti and Pellizzoni (2018) proves particularly valuable, as it draws attention to the situated and relational character of energy innovation processes, warning against overly linear or deterministic interpretations.

A further element worth highlighting concerns the positioning of academic production itself within this discursive field. The growing body of literature on

RECs, while significantly enriching the debate, is not immune to reproducing, at least in part, the same dichotomy between “idealists” and “convinced.” On the one hand, a portion of the literature emphasises the transformative potential of energy communities in terms of energy democracy, citizen empowerment, and energy justice, thus aligning more closely with the “idealist” perspective. On the other hand, a substantial share of scientific output focuses on technical-economic aspects, business models, and feasibility conditions, positioning itself nearer to the standpoint of the “convinced”.

This polarisation, while useful in highlighting different dimensions of the phenomenon, risks overlooking the intermediate zones, namely those contexts in which RECs develop through compromises, adjustments, and hybrid practices that escape clear-cut classification. In this sense, the research presented here explicitly situates itself in an intermediate position, approaching RECs not as normative models or predefined solutions, but as complex social processes shaped by tensions between technical and social dimensions, between participatory rhetoric and structural constraints.

Finally, it is important to underline how the methodological choice to ask interviewees about the meaning of “community” has made it possible to bring to light a plurality of representations that significantly diverge from the dominant imaginary. The responses collected show that the term is associated less with an abstract idea of cohesion and more with concrete, often limited and situated experiences: proximity networks, neighbourhood relations, circumscribed forms of mutual aid, but also, in some cases, the absence of meaningful ties or perceptions of isolation. This finding further confirms the need for an analytical approach that does not take the existence of community for granted, but instead investigates empirically its conditions of possibility.

In conclusion, integrating the theme of community within this paragraph strengthens the critique of the “hyper-simplification” effect that characterises mainstream communication on RECs. The issue is not only to scale down expectations regarding the capacity of energy communities to address energy poverty, but also to problematise one of the key concepts through which this capacity is narrated and legitimised. In line with Osti and Pellizzoni (2018),

recognising the processual, conflictual, and situated nature of communities means restoring complexity to a phenomenon that, precisely because of its relevance, requires adequate interpretative tools and constant attention to the empirical dynamics that shape it.

3.1.2 Energy communities and energy poverty: possibility, limits and requirements

Recent literature (Brugnetti et al., 2023; Magnani & Scotti, 2024; Carrosio & Magnani, 2024; Scotti, 2025) converges on a clear position: RECs represent a promising opportunity, but their capacity to impact energy poverty is by no means automatic.

Among the elements of potential that emerge are:

- the possibility of reducing energy costs thanks to incentives and forms of collective self-consumption;
- the community dimension, which can strengthen forms of solidarity and support vulnerable groups;
- the role of local authorities as actors capable of reinvesting energy savings into collective services.

However, such benefits can only be realised if accompanied by precise political and regulatory choices. RECs, in fact, do not act upon the totality of energy consumption: they intervene exclusively in electricity use, while many of the energy needs of vulnerable households concern domestic heating, often fuelled by gas (Brugnetti et al., 2023). Moreover, in order to achieve significant reductions in expenditure, members must be able to modulate consumption in line with the renewable production of the community - a behaviour that is far from guaranteed. Finally, the economic income of RECs may prove insufficient to substantially affect the budgets of households with extremely low incomes. Therefore, without complementary policies on energy efficiency, targeted bonuses, and specific funds, the redistributive effect risks remaining marginal

3.1.3 The role of municipalities between expectations and responsibilities

Within the dominant narrative, municipalities have often been positioned as the driving force behind the establishment of RECs, invested with an almost “natural” role of guidance and guarantee. However, as noted by OIPE (2023), this role does not always correspond to a clear strategy: at times it is a reactive response to media pressure rather than the outcome of local energy planning.

When, instead, the involvement of local administrations does not arise from external pressures or emulative dynamics, but from a conscious and strategic choice, RECs can become an effective instrument of territorial governance. In such cases, municipalities can use the energy community to activate a virtuous circuit of resources and interventions: the savings generated by collective self-consumption can be reinvested in the improvement of public services, helping to ease local budgets that are often under strain; at the same time, the administration can direct economic benefits towards targeted support measures for vulnerable households, integrating the REC into a broader framework of social policies. Moreover, the presence of a shared energy infrastructure can provide the opportunity to plan energy efficiency interventions on public building stock or social housing, addressing not only household energy expenditure but also the quality of living spaces, which represents a crucial element of the problem of energy poverty.

In this perspective, the REC is not simply a technical-administrative mechanism, but a device that enables local authorities to integrate environmental, social, and urban policies within a single framework of action. Yet this potential requires clear tools for identifying vulnerable households, which are still absent in many municipalities (Castellini et al., 2023). Without shared metrics and regulatory guidance, the responsibility for protecting fragile subjects falls upon individual RECs, which must construct mechanisms of fair redistribution, often based on the willingness of members to relinquish part of their own benefits

3.1.4 Energy Cooperatives and Inclusion: Between Energy Justice and the Reproduction of Inequalities

An additional element of complexity emerges when analysing organisational forms such as energy cooperatives, which represent a long-standing and widespread

model in Europe (Bauwens et al., 2016; 2022). The most recent studies (Dudka and Magnani, 2024a; 2024b) show that these organisations, although oriented towards principles of equity and participation, risk involving predominantly individuals already endowed with economic and cultural resources.

The same risk applies to Renewable Energy Communities (RECs): without specific safeguards, they may primarily attract groups with technical competences, social capital, and investment capacity, thereby reproducing existing inequalities.

To prevent such an outcome, the involvement of vulnerable groups cannot be left to spontaneous dynamics but requires deliberate choices and precise mechanisms. First, it is necessary to adopt governance models that pay close attention to inclusivity, establishing clear rules for participation and the redistribution of benefits. Second, appropriate financial instruments must be introduced, tailored to the actual economic capacities of the most fragile households, so as to avoid access to the energy community being restricted by the requirement of an initial investment or by excessively high recurring costs.

Finally, it is essential to promote pathways of energy literacy that enable even less informed citizens to understand how the community functions, to manage their own consumption, and to benefit concretely from the advantages generated. Only through this combination of attentions and mechanisms is it possible to counteract the selective effect and ensure that energy communities are genuinely instruments of equity, rather than devices that, even unintentionally, reinforce social divides.

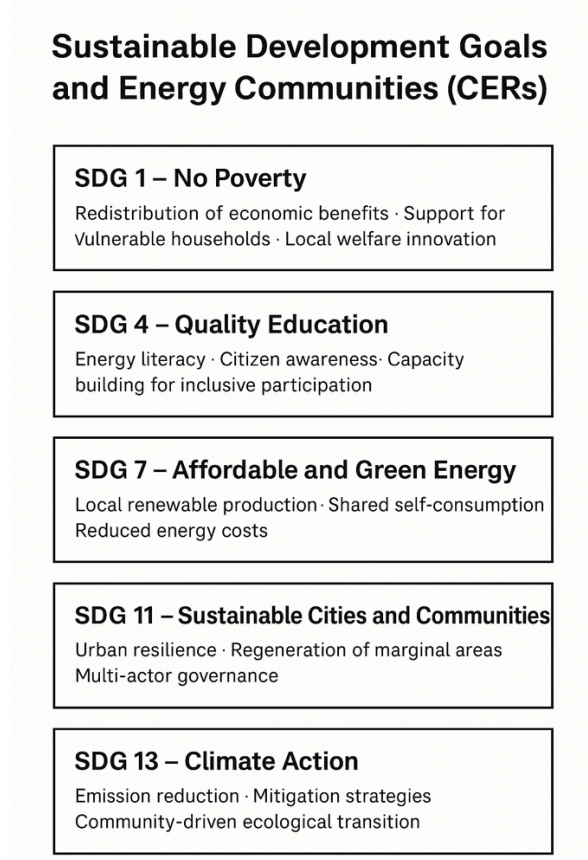
3.2 RECs as Instruments of Territorial Transition: A Perspective Oriented Towards Sustainable Development

Within the framework outlined by the updated PNIEC and the European objectives of Agenda 2030, Renewable Energy Communities (RECs) emerge as an essential component of the territorial energy transformation, assuming a role that transcends the technical dimension to encompass the social, institutional, and environmental spheres. As Cotana (2025) emphasises, European and national policies do not assign RECs a marginal task but a strategic one: they represent one of the principal means of advancing decarbonisation, collective self-consumption, and the local redistribution of the benefits derived from renewable energy production. In this

sense, RECs are not merely a new policy instrument but a complex territorial device that interconnects cities, society, and the environment, activating a virtuous cycle grounded in the nexus between social rights, energy justice, and sustainable development.

Precisely because they are structurally oriented towards the local production of energy and the shared management of a critical resource, Renewable Energy Communities (RECs) contribute in a transversal manner to numerous Sustainable Development Goals (Cotana et al., 2024; Giani et al., 2022).

Figure 5: RECs' contribution to SDGs



Source: Author's own elaboration

Under this perspective, the energy community becomes an enabling device: a socio-technical space that allows citizens, enterprises, local institutions, and civic actors to experiment with new configurations of cooperation, redistribute power, and

strengthen the collective competences required to confront the challenges of the ecological transition.

However, the territorial dimension assumes a decisive role, since Renewable Energy Communities (RECs) do not operate in the abstract: they are rooted in specific socio-economic, demographic, and cultural contexts, marked by inequalities, opportunities, and material constraints. The Italian framework reflects this complexity. Although the diffusion of RECs is still limited, existing experiences reveal the richness of possible pathways and, at the same time, the need for a strongly transdisciplinary analytical approach.

This is because the operations required to establish an energy community simultaneously involve technical, legal, administrative, economic, and cultural aspects.

Hence the importance of adopting a transdisciplinary approach (Moallemi et al., 2020), capable of integrating experiential knowledge, technical expertise, and contributions from the social sciences. This work fully aligns with such a direction, privileging the sociological perspective and, in particular, one that views Renewable Energy Communities (RECs) as territorialised phenomena, expressions of relationships among actors and of the socio-political construction of space.

In the literature, one of the most complex issues concerns precisely the definition of “energy community”. While regulations provide clear frameworks, in practice the concept tends to remain fluid. The studies of Bauwens and his research group (2022) have highlighted how the plurality of interpretations of energy communities derives from the ambivalent nature of the terms involved. “Community”, “energy”, “benefits”, and “participation” are configured as umbrella concepts that evoke a multiplicity of themes and arguments not always consistent with the collective production of energy from renewable sources. As Creed (2006) reminds us, the very concept of community is often employed in a romantic and evocative manner, becoming a seductive notion without necessarily conveying its authentic meaning. RECs, in this sense, are no exception: they may be spaces of social innovation (Ciampolini, 2019) and cooperation, but also environments where hierarchies and asymmetries are reproduced.

It is at this point that the “territorialist” approach becomes indispensable. The analysis of socio-demographic contexts, urban morphologies, administrative capacities, and social networks makes it possible to understand how and why an energy community may emerge, evolve, or fail. The research conducted by De Vidovich (2021), for example, shows that the earliest Italian experiences are organised into three models (public lead, pluralistic, and community energy builder), which differ in their modes of participation and benefit distribution. These models are not merely technical variants but reflect distinct political cultures, levels of social capital, the presence of intermediaries, the institutional strength of municipalities, and the capacity for collective mobilisation.

In parallel, Giani et al. (2022) provide a legal-institutional perspective that further enriches the analysis: Renewable Energy Communities (RECs) contribute to redefining the relationship between citizens and territory, positioning themselves within emerging forms of urban governance based on collaboration among a multiplicity of actors. By integrating public, private, social, civic, and cognitive actors, the paradigm proposed by Giani (2022) of the “quintuple helix” (Foster and Iaone, 2019) becomes a useful model for understanding how RECs can function as social infrastructures, capable of facilitating shared decision-making processes and forms of institutional innovation.

Within this framework, RECs are not exclusively technical instruments but political spaces that contribute to the construction of energy citizenship, promoting new forms of participation and collective responsibility. The reference to the right to the city (Lefebvre, 2014) in a Lefebvrian sense is entirely pertinent here: the energy community, insofar as it redistributes power and resources, becomes a device for the reappropriation of urban space and for social regeneration. To explain it in Henri Lefebvre’s terms, energy communities become “central” to claiming the right to the city, enabling its “simultaneous” activation within the city itself (Lefebvre, 2014; 2018).

The implications are particularly evident in peripheral contexts, inland areas, or territories marked by economic and demographic vulnerabilities. Renewable Energy Communities (RECs) can in fact contribute to the revitalisation of villages, the valorisation of marginal areas, and the regeneration of working-class and

peripheral neighbourhoods, supporting local investment and new medium-term projects. When adequately integrated into broader territorial strategies, they can trigger processes that do not merely restore the status quo but instead foster forms of self-regulation and proactive adaptation of local systems (Giani et al., 2022).

In this vision, Renewable Energy Communities (RECs) become part of a long-term territorial strategy that unites environment, city, and society within a framework of shared rights and responsibilities. The energy transition thus ceases to be an exclusively technological process and takes the form of a collective project that engages social justice, territorial cohesion, multi-level governance, and active citizenship. To critically understand the dynamics of RECs therefore means questioning how territories are able to activate latent resources, transform needs into capabilities, connect different actors, and construct common visions.

From this perspective, the territorialist approach (Magnani, 2018) proves indispensable for interpreting the complexity of transition processes. It provides analytical tools to recognise the plurality of contexts, to valorise local specificities, and to understand how technical innovations can become social innovations. It is precisely on this terrain that Renewable Energy Communities (RECs) reveal their deepest nature: not merely technical configurations, but social infrastructures which, through their everyday functioning, connect environment, city, and society, contributing to the construction of a new territorial pact oriented towards sustainable development.

3.3 The regulatory framework of energy communities

As stated in the research project, this doctoral thesis also intends to analyse the technical system of reference within which Renewable Energy Communities (RECs) are situated. In this context, however, “technical system” does not refer to the engineering or technological specificities of the plants, but to the normative, institutional, and social conditions through which RECs can move from idea to reality. In other words, the aim is to understand the limits, possibilities, and configurations that the regulatory framework attributes both to the notion of community and to the energy matrix, concretely determining what an energy community can, or cannot, become within territories.

This perspective allows us to grasp an essential point: law is not reducible to a mere exercise in normative production. On the contrary, it can be understood as a science of context, a device that disciplines, orients, and makes possible the forms through which a society defines itself within a given socio-technical environment. Legal regulation does not operate in a vacuum, but takes shape in relation to social, economic, symbolic, and natural factors that precede and, at the same time, influence it. The norms that define energy communities are therefore not simply technical instruments, but the outcome of a complex process of institutional translation of the major transformations of the energy transition.

Within this framework, Sociology assumes a complementary position to law. It enables us to observe how the dynamics disciplined by regulation become practice, how legal categories are interpreted in local contexts, and how institutional models encounter existing social structures. Analysing RECs thus means reading regulation not only as a set of rules, but as an integral part of the social construction of energy—a device that renders certain trajectories possible while limiting others. Within this framework lie the two fundamental dimensions of European law and national law, which will be examined in the following paragraphs.

3.3.1 The European legal framework

The European Union represents the first political-institutional context in which energy communities are recognised as instruments capable of integrating environmental, social, and economic objectives within the broader strategy of energy transition. In the first instance, the regulatory impetus derives from the Clean Energy for All Europeans Package (2018–2019)³¹, a legislative package that redefined the architecture of the European electricity market by introducing new forms of active participation, including individual and collective self-consumers and energy communities. As noted in numerous studies on REC regulation (Coiante, 2022; Aquili, 2022; Ruggieri, 2022; Argirò, 2023; Aquili, 2025), the EU

³¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016DC0860>

has progressively adopted a language that recognises citizens not as marginal but as structural actors in the production, management, and sharing of renewable energy, positioning energy communities among the key instruments for achieving the climate and environmental objectives of the European Green Deal.

The European regulatory framework rests on two fundamental directives: Directive (EU) 2018/2001, known as RED II³², and Directive (EU) 2019/944 on the internal electricity market (IEMD)³³. It is here that, for the first time, a legal definition of energy communities emerges and a regulatory framework is outlined that recognises the right of citizens to organise collectively to produce, consume, share, and store renewable energy without being considered traditional market operators. Defined as the framework regulation, RED II represents the core of the European recognition of Renewable Energy Communities (RECs). Article 2(16) provides a detailed definition clarifying their nature, purposes, and operational principles. The definitions contained in Article 2 of RED II precisely summarise the three pillars of the concept: open and voluntary participation; control exercised by members located in proximity to the plants; and a primary purpose that is not economic but oriented towards environmental, social, and economic benefits for the local community (Argirò, 2023).

This passage is crucial for at least two reasons. On the one hand, the directive does not define the community as a mere technical-productive entity, but as a legal entity with social purposes, endowed with territorial and collective relevance. On the other hand, it establishes a principle of proximity that distinguishes RECs from other models of distributed generation: the community is not an abstract aggregate, but a settlement embedded in the socio-territorial dynamics that characterise the space in which it operates.

In this sense, RED II does not merely introduce a new form of energy governance, but opens the way to a rethinking of the relationship between citizens, territory, and infrastructures, anticipating themes already discussed previously, such as local development, territorial empowerment, and the possible convergence between energy policies and urban policies.

³² <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32018L2001>

³³ <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32019L0944>

One of the most innovative elements of RED II is the explicit introduction of the right to individual and collective self-consumption³⁴. Analysis of the regulation shows that the directive has made citizen participation as producer-consumers legally possible, anchoring this right to fair and non-discriminatory market conditions (Aquili, 2025). Thus, the central figure of energy production for self-consumption connects perfectly with the modalities of energy communities: the *prosumer*, namely the individual who produces and uses the energy generated within the energy community (Giobbi, 2017; 2022).

This framework is complemented by the IEMD (Directive 2019/944), which instead defines the figure of the *Citizen Energy Community* (CEC). While RECs are linked to renewable sources and geographical proximity, CECs neither require the exclusive use of renewables nor localisation within a restricted territorial perimeter (Cusa, 2020). The distinction is not merely technical: it concerns the very nature of the objectives. RECs, as noted above, must pursue environmental and social benefits; CECs, by contrast, may encompass broader activities related to energy services, while still maintaining democratic governance.

The coexistence of these two community forms is clear evidence of the new European approach to energy participation: a pluralist model that recognises energy not only as an economic good but also as a relational good, capable of generating new forms of cooperation within local societies.

Accordingly, the role of energy communities is inextricably linked to the EU's vision and its intent to pursue the strategic objectives set out in conferences, plans, and community declarations. The European legislative framework acknowledges the need to achieve by 2030 a significant share of energy produced from renewables and to reduce greenhouse gas emissions. The European Commission therefore considers energy communities not as residual instruments, but as essential levers to bring citizens closer to the transition, reduce dependence on fossil fuels, and distribute more equitably the benefits deriving from decarbonisation (Carra et al., 2024).

³⁴ See the introductory section of Directive (EU) 2018/2001 of the European Parliament and of the Council of December 11, 2018, on the promotion of the use of energy from renewable sources – RED II.

The normative premises of RED II (paragraphs 26, 67 and 70) emphasise three central dimensions:

1. Social inclusion: energy communities must contribute to reducing energy vulnerability and promote access to clean energy;
2. Democratic participation: the community model must strengthen citizen involvement in local energy choices;
3. Territorial development: plants must generate economic benefits that remain within the territory, avoiding value extraction and promoting local spillovers.

These aspects mark a discontinuity with the centralised energy models of the past, and thus energy becomes a field of collective action, in which the normative dimension dialogues with the social one.

In 2023, the adoption of Directive (EU) 2023/2413, known as RED III³⁵, further strengthened the role of RECs. The new directive introduces more ambitious objectives (42.5% renewables by 2030) and further clarifies the rights of energy communities, particularly in relation to grid access, simplified authorisation procedures, and the integration of storage systems.

The EU has also published specific recommendations addressed to Member States to support energy communities in tackling energy poverty, emphasising the role of vulnerable groups and marginal areas. This evolution highlights a key element: European regulation recognises that the energy transition is not merely a technological process, but a social transformation concerning the distribution of power, access to resources, and the reduction of inequalities (Iaone, De Nictolis, 2024).

The introduction of energy communities into European law has not simply defined new legal entities, but has inaugurated a deeper transformation, affecting the functioning of electricity markets, the roles of citizens and local administrations, and, more generally, the ways in which energy is produced, managed, and redistributed. As emerges from the reading of the regulation, European legislation insists on a fundamental principle: in order for RECs to perform a social and

³⁵ https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=OJ:L_202302413

environmental function, they must be structured as open, inclusive organisations oriented towards generating collective benefits, avoiding speculative drifts or appropriation by economically dominant actors (Cusa, 2020).

A distinctive feature of the regulation is the recognition, for members of energy communities, of a set of specific rights that overturns the traditional paradigm of the passive user. Participants must be able to produce and consume (prosumerism)³⁶, store and share renewable energy; they must access energy markets under non-discriminatory conditions; they must be fully informed and able to manage their own consumption data. Above all, they must have the possibility to influence the community's decisions, according to democratic modalities not proportionate to the capital invested (Gotti, Greco, 2025).

This set of rights constitutes the core of the concept of “energy as a common good” (Colombo and Scandroglio, 2019). An arena no longer reserved for specialised operators, but distributed among citizens, public bodies, and small enterprises, which thereby regain a direct capacity to intervene in the energy system.

The issue of governance is one of the most delicate aspects of the entire regulatory framework. The RED II insists on the concept of “effective control” exercised by actors located in geographical proximity to the plants and who do not carry out energy activities as their primary function. This condition is not marginal, as it serves to prevent RECs from being captured by industrial operators, investment funds, or actors seeking to exploit them solely for economic profitability. Local rootedness thus becomes a legal criterion, even before a social one. From this perspective, the territory is not merely the backdrop to energy activities, but an essential component of the community's identity: it delimits the field of action, defines who can participate, and directs the overall aims of the project.

The internal governance of RECs must also reflect this orientation. European regulations require transparent decision-making procedures, participatory processes, and mechanisms that prevent the concentration of power (Dugato et al.,

³⁶ Cfr. Ritzer, G. (2015). Prosumer capitalism. *The Sociological Quarterly*, 56(3), 413-445. Zafar, R., Mahmood, A., Razzaq, S., Ali, W., Naeem, U., & Shehzad, K. (2018). Prosumer based energy management and sharing in smart grid. *Renewable and Sustainable Energy Reviews*, 82, 1675-1684.

2024). The idea is that, in order to be considered as such, an energy community must ensure a balance between technical expertise, diffused responsibilities, and collective decision-making capacity. They are therefore not merely collectives of users, but hybrid organisations in which economic, social, and territorial dimensions are continuously negotiated.

At the infrastructural level, the aforementioned directives grant RECs specific rights of access to the grid, recognising that the transition towards a decentralised energy system requires less burdensome procedures, non-discriminatory conditions, and network tariffs consistent with the social nature of communities. RED II and RED III emphasise that Europe does not conceive of RECs as subjects to be passively protected, but as potentially active actors in the management of local flexibility and in supporting the stability of the electricity system, in line with transformations linked to the integration of renewables and the digitalisation of networks (Aquili, 20204; 20205).

Member States, in turn, are called upon to establish favourable conditions for the development of energy communities, intervening at the administrative, regulatory, and informational levels. European regulation requires a clear and stable framework, simplified procedures, transparent support schemes, and specific instruments to encourage the participation of vulnerable actors. Literature and regulation converge on one point: normative provision alone does not guarantee inclusion (Ruggieri, 2024; Barbaro and Napoli, 2023). Without adequate support and training tools, communities risk replicating existing social imbalances and excluding precisely those groups that could benefit most from participation.

Particularly relevant is the positioning of RECs within the European Green Deal and the “Fit for 55”³⁷ package. Here, the role of energy communities is explicitly situated in relation to decarbonisation objectives, the reduction of energy dependence, and the construction of forms of democratic participation in the transition. RECs thus become a strategic device through which the Commission

37

[https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733513/EPRS_BRI\(2022\)733513_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733513/EPRS_BRI(2022)733513_EN.pdf)

seeks to combine energy security, social justice, and territorial sustainability. The RED III, in reformulating renewable targets, further reinforces this vision, requiring Member States not only to transpose the regulatory framework but also to integrate it into territorial policies and long-term energy plans.

Overall, European regulation reveals a conception of energy that transcends the technical-engineering domain and assumes a social and political significance. From this perspective, energy communities represent the arena in which new forms of energy citizenship, value redistribution, and participatory resource management are experimented with. This is also why the directive requires particular attention to governance, conditions of access, and the protection of vulnerable subjects: the REC is not merely an economic model, but a device that shapes society and the power relations that traverse it (Martinello and Capparelli, 2025).

Taken as a whole, the European regulatory framework constitutes a fundamental element for understanding both the nature and the potential of energy communities. The RED II, IEMD and, more recently, RED III directives do not merely provide a legal definition and a set of rights and duties but also outline a genuine socio-institutional architecture in which the production and management of energy intertwine with processes of economic democratisation, climate objectives, and forms of territorial cohesion. RECs emerge as instruments capable of connecting dimensions that, in the past, were treated separately: the electricity market, environmental policies, local development, and civic participation. It is in this integration that their originality lies.

European regulation, in fact, goes beyond the idea that the energy transition is an exclusively technical or technological process; on the contrary, it recognises that the way in which energy is produced, used, and shared is always inscribed within a specific social and territorial context. This awareness is evident in the principles that structure the regulatory framework.

The European framework, however, does not automatically resolve the complexities that characterise the passage from normative enunciation to practice. As we have seen, RECs require clear administrative conditions, adequate infrastructures, non-discriminatory access to the grid, forms of technical support, and instruments that genuinely facilitate the participation of actors with different

resources, knowledge, and needs. The success of these organisational forms therefore depends on the capacity of Member States to translate European principles into a coherent set of national rules and operational procedures, without undermining their social and territorial function.

In this respect, Italy represents a particularly significant case. On the one hand, the transposition of European directives has generated a complex regulatory pathway, which over time has introduced definitions, experiments, incentives, and increasingly detailed technical rules. On the other hand, the construction of a clear and stable operational framework has been slowed down by continuous legislative updates, a prolonged experimental phase, and coordination that has not always been immediate among the various institutional levels involved (GSE, ARERA, MASE³⁸, Regions). It is precisely in this interplay between European constraints and national adaptations that the specificity of the Italian case is situated.

The evolution of European regulation thus constitutes the indispensable premise for understanding the Italian framework, which cannot be read as a simple transposition of EU directives, but rather as a complex and stratified process of institutional translation. European principles serve as a constant reference, but their implementation is shaped by the characteristics of the national electricity system, the administrative competences of different bodies, territorial conditions, and the political priorities of the country

For this reason, the following paragraph analyses in detail the Italian regulatory framework, reconstructing the trajectory from the experimental phase launched in 2019 to the full operability achieved between 2023 and 2024. As will be seen, the transposition of European directives has not been linear, as it has involved successive steps, interpretative clarifications, operational rules elaborated by the

³⁸ The *Ministry of Environment and Energy Security* (MASE) is the governmental authority responsible for defining national energy and environmental policies. The MASE is tasked with transposing European directives, issuing implementing decrees relating to energy communities, and establishing economic incentives for the production and sharing of energy from renewable sources. The Ministry also coordinates decarbonisation strategies, plans the objectives of the *National Integrated Energy and Climate Plan* (PNIEC), and supervises the overall functioning of the electricity system with a view to security, sustainability, and ecological transition. Within the framework of RECs, the MASE is the body that defines the regulatory and financial conditions enabling energy communities to be established, to operate, and to participate in the national energy transition. Cfr. <https://www.mase.gov.it/portale/home>

GSE, and numerous interventions by ARERA to ensure regulatory coherence. At the same time, the national translation reflects a constant tension between European principles and local needs, confirming that regulation is not merely a set of prescriptions, but a dynamic field in which different actors negotiate functions, meanings, and roles.

It is in this intermediate space that the challenge of RECs in Italy as instruments of transition is realised.

3.3.2 The Italian legal framework

Italy has transposed the provisions of RED II and the IEMD through a succession of regulatory and legislative measures of increasing definition, initially adopting a cautious approach and subsequently moving towards a more structured orientation in the following years. The result is a complex framework that reflects both the evolution of national energy policies and the need to create an institutional environment conducive to the development of Renewable Energy Communities (RECs).

The process began in 2019 with Article 42-bis of the *Decreto Milleproroghe*, which for the first time introduced into Italian law the possibility of establishing collective self-consumption configurations and renewable energy communities on an experimental basis³⁹. Discussed also within the jurisprudential sphere (Molinari, 2022; Aquili, 2025), this preliminary phase responded to a specific need: to test, in a real context, the applicability of European provisions while simultaneously limiting administrative burdens and the impact on the national electricity system. The legislator therefore established particularly restrictive conditions, requiring, for example, that all participants be located under the same secondary substation and that the capacity of the plants not exceed 200 kW. The *Decreto Milleproroghe* thus had an essentially exploratory function: it was intended to observe user behaviour, the operation of measures for the valorisation of shared energy, and the capacity of communities to structure themselves as genuine collective entities.

³⁹https://def.finanze.it/DocTribFrontend/decodeurn?urn=urn:doctrib::DL:2019-12-30;162_art42bis

The experimental phase was further specified by the decree of the Ministry of Economic Development of 16 September 2020, which defined the incentive system and the operational procedures for accessing financial support through the GSE⁴⁰. This measure introduced, for the first time, a stable feed-in tariff mechanism for shared energy—an essential element for making participation in collective configurations economically sustainable. It should be noted that this provision played a crucial role in outlining a reference framework for the first real experiences of energy communities in Italy, allowing the testing of instruments later incorporated into the definitive framework (Pidalà, 2024).

The qualitative leap in the system occurred in 2021 with the approval of Legislative Decree 199/2021⁴¹, which fully transposed RED II. With this measure, Italy moved beyond the experimental phase and introduced an organic framework for renewable energy communities (Persico, 2021). The decree significantly broadened the scope of the institution, overcoming the limitations of the secondary substation and instead adopting the primary substation as the territorial reference. This was a substantial change: the geographical extension considerably increased the number of potential participants and made possible projects of a much larger scale.

Moreover, the decree clearly defined the non-profit purposes of RECs, reaffirmed the necessity of democratic governance, and assigned a precise role to the various actors who may take part, ranging from public administrations to small enterprises and individual citizens.

Also in 2021, Legislative Decree 210 supplemented the provisions of Legislative Decree 199, harmonising the regulation of energy communities with European rules on energy markets. In essence, this integration was necessary to avoid

⁴⁰ The *Gestore dei Servizi Energetici* (GSE) is the public company wholly owned by the Ministry of Economy and Finance, operating under the guidance of the Ministry of Environment and Energy Security. It is the body responsible for promoting the development of renewable energy sources in Italy and for managing the incentive mechanisms linked to the production and self-consumption of energy from RES. In the context of energy communities, the GSE performs crucial functions: it registers RECs, verifies compliance with regulatory requirements, collects and certifies data on energy flows, calculates the shared energy, and provides for the disbursement of incentives, thereby ensuring transparency, uniformity, and monitoring across the national territory.. Cfr. <https://www.gse.it>

⁴¹ <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2021-11-08;199>

inconsistencies between the community dimension and the functioning of electricity markets—for example, in data management, participation in flexibility services, or the relationship between RECs and grid operators. These two decrees constitute the primary regulatory framework of the current Italian system, as they situate energy communities within a framework of public purposes, orienting them towards shared environmental, social, and economic benefits and preventing, as required by European directives, speculative drifts or forms of control by economically dominant actors (Martinello and Presciutti, 2024; Martinello et al., 2025).

However, primary legislation alone is not sufficient to define the effective functioning of energy communities. The complexity of collective configurations requires extremely detailed technical regulation, entrusted to ARERA⁴². Resolution 727/2022/R/eel and the subsequent updates of 2023 gave rise to the so-called *Integrated Text for Widespread Self-Consumption* (TIAD)⁴³, which specifies the operation of the various self-consumption configurations, including RECs. The TIAD clarifies the definition of shared energy, establishes the methods for measuring and valorising electricity flows, and regulates the relationships between users, grid operators, and the GSE.

This step is essential because it translates the normative principle into a set of operational practices without which no community could effectively function. The intervention of ARERA was crucial in overcoming regulatory fragmentation and in introducing uniform criteria across the national territory, thereby reducing the uncertainties that had characterised the initial phase of transposition.

⁴² The Regulatory Authority for Energy, Networks and Environment (ARERA) is the independent body established in 1995 with the task of regulating and overseeing the sectors of electricity, natural gas, water services, and waste. In the field of energy, ARERA defines network tariffs, sets the technical and economic conditions for access and service provision, protects consumers, and ensures competition, transparency, and balance among operators. With regard to energy communities, ARERA plays an essential role in defining operational rules: it regulates the modalities of connection and measurement of flows, establishes the criteria for calculating shared energy, outlines network charges, and contributes to the construction of the regulatory framework that makes the functioning of RECs possible within the national electricity system. Cfr. <https://www.arera.it>

⁴³ <https://www.arera.it/fileadmin/allegati/docs/22/727-22TIAD.pdf>

Completing the framework is the *Decreto CER* of 2024⁴⁴, issued by the Ministry of the Environment and Energy Security (Pidalà, 2024). This decree represents the definitive implementation of the Italian system of energy communities, as it introduces for the first time a regime of structural and permanent incentives that go beyond the experimental phase and are consistent with the objectives of the PNRR. The decree establishes a feed-in tariff for shared energy, differentiated according to the capacity of the plant, and introduces a non-repayable grant of up to 40% for installations located in municipalities with fewer than five thousand inhabitants. This latter element is particularly significant, as it shows how Italy has chosen to use energy communities also as instruments of territorial rebalancing, in line with the European vision that links the energy transition to cohesion policies and to strategies for the potential valorisation of inland areas. The redistributive and territorial purpose can therefore be understood as one of the distinctive features of the Italian case (Giannobile et al., 2024).

Another aspect that distinguishes the Italian model is the central role of the GSE. Emerging from the regulatory framework not merely as a provider of incentives but as a true guarantor of the entire system, the GSE is in fact responsible for the registration of communities, the verification of requirements, the collection of energy data, the calculation of shared energy, and the disbursement of incentives. The GSE can therefore be understood as the interface between the energy community, the regulator, and the electricity system, emphasising how this centralisation of functions is necessary to ensure transparency, monitoring, and uniformity at the national level (Brambilla, 2024).

The Italian model also presents certain legal specificities, outlined below. An energy community must be established as an autonomous entity, with a legal form that ensures democratic participation and non-profit management. Its statute must precisely define not only the objectives and decision-making procedures, but also the criteria for the distribution of benefits, the rules governing entry and withdrawal, the liability regime, and the management of common funds. The Ministry of the Environment and Energy Security (MASE) emphasises this point, clarifying that

⁴⁴ <https://www.mase.gov.it/portale/-/energia-mase-pubblicato-decreto-cer>

attention to the legal structure is not a mere formal detail but one of the elements that guarantee coherence between the social purpose of the communities and their concrete functioning.

The centrality of territory represents, finally, one of the most significant aspects of the Italian system. The introduction of the primary substation constraint, the incentive measures for small municipalities, and the possibility of using energy communities as instruments of local development and urban regeneration demonstrate that Italian legislation does not merely transpose technical principles but is rooted in a specific vision of territory as a space of cooperation, production, and redistribution. Leone (2022; 2023) emphasises precisely this territorial dimension, highlighting how the energy community is configured not only as an economic actor but also as a device capable of activating dynamics of social cohesion and local innovation.

Despite the considerable progress made, certain critical issues remain that render the framework still evolving. Administrative complexity, the need for advanced competences, connection times, difficulties in coordinating among different actors, and the informational asymmetry between communities and sector operators pose significant challenges, particularly in more fragile contexts. The risk is that energy communities may end up being accessible primarily to actors already endowed with resources and organisational capacity, thereby reducing the inclusive potential and the innovative scope that European legislation attributes to them.

Overall, the Italian system of Renewable Energy Communities (RECs) today presents itself as an advanced and relatively stable regulatory framework, capable of integrating technical, legal, and territorial dimensions. Its evolution reflects both the European ambition to democratise energy and the national need to combine energy transition, territorial cohesion, and civic participation. Energy communities thus emerge as a laboratory in which the relationships between citizens, institutions, and territory are redefined, becoming a crucial device in Italy's ecological transition.

3.4 How an REC is Realised: From Idea to Community

The definition of a clear pathway for the establishment of a Renewable Energy Community (REC) today represents a central objective of national energy policies. It is no coincidence that, alongside the publication of the *Decreto CER* of 23 January 2024, the Ministry of the Environment and Energy Security (MASE) released online a set of informational tools in the form of FAQs contained in the document *Renewable Energy Communities “in a nutshell”*⁴⁵. This instrument was designed to support citizens, local authorities, and organisations in translating the regulatory framework into operational practices. The institutional material precisely outlines the stages through which a project idea can be transformed into a functioning community, capable of sharing renewable energy and generating economic, environmental, and social benefits within the local context.

This need for guidance stems from the complexity of the system: a Renewable Energy Community (REC) is not simply a collective photovoltaic installation, but a socio-technical architecture that requires territorial choices, legal configurations, economic assessments, and organisational competences. The *Decreto CER* 2024 also introduces significant incentives, such as the premium tariff on shared energy and the PNRR grant of up to 40% for municipalities with fewer than 5,000 inhabitants. These measures make the current development context particularly favourable, but they also impose procedures and requirements that must be carefully understood and managed.

The following pathway reconstructs, in a synthetic and reasoned manner, the fundamental steps for the establishment of a Renewable Energy Community (REC), integrating:

- the official contents of MASE (FAQs),
- the functions and procedures of the GSE,
- the regulatory provisions introduced by the *Decreto CER*,
- an interpretation that conveys the collective, territorial, and institutional meaning of the process.

⁴⁵https://www.mase.gov.it/portale/documents/20119/4325498/Le+Comunità+Energetiche+Rinnovabili+-+FAQ_1.pdf/ef71cc1b-d7ac-2342-5614-e245bc271384?t=1745365090196

PRELIMINARY PHASE

Every REC begins with a simple question: does it make sense to activate a system of energy production and sharing in a given territory? The answer requires an initial exploratory phase, which the Ministry of Environment and Energy Security (MASE) describes as a moment of encounter among local actors: citizens, public bodies, small enterprises, cooperatives, parishes, third-sector organisations, and civic associations. It is here that the shared vision of the project takes shape: what should the REC be for? which energy, economic, or social needs can it address? which local resources can be mobilised?

This phase does not concern energy alone, but the territory as a social space. RECs are in fact devices of collaborative governance, as they require trust, coordination, and willingness to cooperate. From this initial elaboration emerge the guiding principles that will orient the entire process.

Upstream, however, it is necessary to understand whether the project is technically feasible. In its FAQs, MASE identifies several essential elements:

- verifying the availability of sites for installing plants (public roofs, private buildings, marginal areas);
- assessing the geographical constraint of the primary substation, which defines the perimeter of shareable energy;
- understanding the consumption profile of potential members;
- estimating the expected production of renewable energy plants.

This preliminary assessment, carried out through a feasibility study, makes it possible to establish whether the REC can generate real benefits, above all in terms of shared self-consumption—a necessary condition for accessing the twenty-year incentive tariff of the GSE.

GEOLOCATION AND VERIFICATION

One of the most delicate steps, introduced clearly by the 2024 REC Decree, concerns the constraint of the primary substation. All members of the REC, both producers and consumers, must be located within the area served by the same primary substation. The GSE provides an interactive map that allows:

- geolocation of substations,

- identification of addresses included within their perimeter,
- verification of the compatibility of potential members.

This step is not merely technical: it defines the “energy territory” in which the community can operate, and thus its social and organisational dimension. From this depend the possibilities of citizen involvement, the inclusion of public bodies, and the optimal localisation of plants.

LEGAL IDENTITY

Once the idea is clear and the territory defined, the REC must be formally established as an autonomous legal entity, an essential requirement set out by the REC Decree and the RED II Directive.

MASE indicates that an REC may take different forms: association, cooperative or benefit cooperative, third-sector entity, consortium, or non-profit organisation. The form is not neutral: it affects governance, participation, and the ways in which economic benefits can be redistributed. In all cases, the REC must be equipped with:

- a deed of incorporation, defining the will of members and objectives;
- a statute, regulating membership, withdrawal, rights, duties, criteria for benefit distribution, powers of the assembly and of the representative;
- internal regulations, useful for specifying the operational mechanisms of energy sharing.

This phase establishes the non-profit and socially oriented nature of the REC, as required by both RED II and the 2024 REC Decree. Large enterprises, as clarified in the FAQs, cannot be part of RECs, while natural persons, SMEs, public bodies, religious institutions, third-sector organisations, and vulnerable subjects are admitted.

FINANCIAL PLAN

The transition from vision to realisation requires a sustainable economic plan. The REC Decree provides three main forms of support:

1. GSE incentive tariff.

Applied to shared energy, with a value ranging between €60 and €120/MWh, granted for 20 years.

2. ARERA remuneration for shared energy.

Approximately €8/MWh, updated annually.

3. PNRR contribution up to 40%.

For plants in municipalities with fewer than 5,000 inhabitants, with defined ceilings per kW.

Additional instruments include banking tools, EPC contracts with energy operators, crowdfunding, leasing, Power Purchase Agreements, and regional contributions. Proper financial planning allows costs to be shared transparently, supports vulnerable households, and ensures the long-term sustainability of the REC.

IMPLEMENTATION PHASE

Once the decision-making phases have been completed, the REC can proceed with plant construction. This phase includes:

- obtaining urban and building permits,
- procedures for grid connection,
- installation of production systems and, where applicable, storage systems,
- technical checks and testing.

MASE emphasises that plants must have a capacity not exceeding 1 MW and must not have already benefited from incentives. Pre-existing plants may also be included, provided they entered into operation after 16 December 2021.

Once installation is complete, the REC must:

1. register on the GSE platform,
2. submit an application for access to the shared self-consumption service,
3. sign the contract with GSE,
4. communicate members' PODs⁴⁶, plant data, and energy configuration.

From this point onwards, GSE measures the energy produced and consumed, calculates shared energy (virtual self-consumption), determines the incentive tariff and ARERA remuneration, and disburses economic contributions to the REC's

⁴⁶ The Point of Withdrawal or Point of Delivery (POD) is the unique alphanumeric code that identifies each electricity user on the national grid. It does not contain sensitive customer information, but allows the user's location to be accurately identified for metering, billing, and, in the case of CERs, verification of the electrical perimeter underlying the primary substation. <https://www.gse.it/servizi-per-te/autoconsumo/le-comunita-energetiche-rinnovabili-in-pillole>

account. This step is fundamental as it marks the moment when the community “comes into operation.”

MONITORING

An REC is not a static project. After its launch, the following must be ensured:

- monitoring of production and consumption,
- transparency in economic management,
- maintenance of plants,
- updating of strategies in relation to regulatory developments,
- energy literacy pathways for members,
- possible entry of new participants.

Well-functioning RECs tend to expand: they include new public roofs, new private plants, storage systems, electric charging stations, and an enlarged membership base.

3.5 The current state of the art in the Italian landscape

To understand how renewable energy communities are taking shape in the Italian context, the *Renewable Energy Communities Report* (Eroe et al., 2025) proves particularly useful. The *State of Play in Italy*, published by Legambiente at the end of 2025, offers an updated snapshot of collective self-consumption configurations across the country, based on GSE data available as of September 2025.

From the outset, the report situates RECs within the broader framework of the climate and social crisis. In this sense, the decarbonisation of the energy system is interpreted as a necessary condition not only for reducing emissions, but also for addressing the economic vulnerability of households and the competitiveness of production systems. In this perspective, energy communities are presented as an instrument whose social value lies in their capacity to disseminate renewables widely, to engage territories in the transition, and to contribute to reducing energy costs for citizens and enterprises (ivi., p. 4).

From a quantitative perspective, the picture that emerges is that of an ecosystem in rapid evolution, though still far from the potential envisaged by the legislator. According to Legambiente’s elaboration of GSE data, Italy counts 1,127 configurations of collective self-consumption, which together amount to

approximately 115 MW of installed capacity, distributed across 1,532 plants and involving 9,673 users (ivi., p. 7). Within this universe, RECs in the strict sense represent just over half of the configurations: 597 renewable energy communities, with a total capacity of 67.7 MW, 883 plants, and 5,508 users. The other typologies (groups of collective self-consumers, individual self-consumers at a distance, and collective or remote active customers) cover the remaining share, showing how the TIAD has effectively opened up a plurality of organisational models of self-consumption.

When read in relation to the development potential defined by the national strategy and European objectives, these figures reveal an ambivalent picture. On the one hand, the presence of more than a thousand configurations within just a few years indicates an intense phase of experimentation, in which different actors (municipal administrations, cooperatives, enterprises, citizens) are engaging with new forms of energy production and sharing. On the other hand, the overall installed capacity remains modest when compared with the national renewable growth targets and with the role envisaged for RECs in planning documents. Indeed, the report itself refers to a slower-than-expected start, despite the completion of the regulatory framework with DM 414/2023 and the operational rules of the GSE (ivi., p. 14).

Figure 6. RECs in Italy



Source: Legambiente from GSE data

The territorial snapshot provided by Legambiente reveals a highly uneven distribution (ibid., p. 8). Lombardy is the region with the highest number of self-consumption configurations (181 systems) and it also holds the record for the number of RECs (98 communities, 125 plants, 675 users) and for groups of collective self-consumers (57 configurations, 67 plants, 746 users). Piedmont follows, with 143 total configurations and 78 RECs, while Sicily counts 135 self-consumption systems, of which 58 are energy communities.

In terms of overall installed capacity, Piedmont leads the ranking with approximately 19.9 MW, followed by Lombardy with 16.6 MW. Considering only REC capacity, Piedmont again tops the list with 14.6 MW, ahead of Friuli Venezia Giulia (7.1 MW) and Sicily (5.8 MW).

These data suggest at least three sociological considerations. First, energy innovation tends to concentrate in regions where there is already a consolidated tradition of local cooperation, greater administrative capacity, and a widespread technical culture: the North-West, parts of the North-East, and certain island regions that have invested politically in the issue. Second, although characterised by a high potential for renewable energy production, the regions of the South display more limited figures, indicating a delay that cannot be attributed solely to favourable or unfavourable climatic conditions, but rather to the combination of infrastructure, administrative capacity, and access to financing instruments. Third, it becomes clear that territory is not a neutral container. RECs are likely to develop where active social networks exist, where local authorities are able to promote complex processes, and where intermediaries (cooperatives, associations, ESCo) are capable of translating regulatory opportunities into concrete projects, mobilising human resources in the application of new competences.

The report also devotes attention to the evaluation of support policies, particularly the PNRR funds allocated to RECs and collective self-consumption groups in small municipalities. In its initial version, the PNRR earmarked €2.2 billion for capital grants covering up to 40% of investment costs, directed exclusively at municipalities with fewer than 5,000 inhabitants (ivi., p. 11). This choice, intended to support the most fragile and peripheral territories, nevertheless resulted in a series

of critical issues: delays in the publication of calls, unclear rules, and difficulties in project design for administrations with limited technical capacity.

According to Legambiente's reconstruction, the overall effectiveness of the measure proved lower than expected, to the extent that in 2025 the Government expanded the pool of eligible municipalities to those with up to 50,000 inhabitants. As of 14 October 2025, the applications submitted amounted to €474.7 million, for a total installed capacity of the projects under request equal to 1,091 MW (ivi., p. 5).

These data confirm that the issue of financial resources and project competences remains central. Even in the presence of substantial incentives, many communities fail to activate the necessary investments, either because of the difficulty in covering the co-financing share or due to the uncertainty that long accompanied the legislative process. Legambiente highlights how, during the same period, numerous projects were also blocked for other reasons: lengthy authorisation procedures, the complexity of accessing the GSE platform, difficulties in updating the composition of REC members during implementation, and the absence of "bill unbundling", which would make the economic benefits of self-consumption immediately visible to citizens, as is the case for those who own a domestic photovoltaic system.

From a qualitative perspective, the report emphasises that many of the RECs established in Italy constitute genuine laboratories of civic participation and shared resource management, in which energy tends to be represented as a common good rather than as a mere commodity. In numerous experiences, innovative forms of local population engagement are being tested, ranging from co-design with associations and parishes to the creation of energy solidarity funds aimed at vulnerable households. The very establishment of the *CERS Award*, promoted by Legambiente, signals the intention to valorise the most innovative practices from a social and environmental standpoint, presenting a picture composed of initiatives that go beyond the mere economic optimisation of shared energy.

At the same time, Legambiente highlights certain structural risks. The first is that of the paradox of reverse selection, whereby only those contexts strongest in terms of social capital, technical competences, and access to credit succeed in transforming the regulatory opportunity into real projects. This tends to concentrate

the benefits in territories already relatively well-equipped, leaving behind inland areas, small municipalities lacking technical staff, and the more fragile urban peripheries. The second risk is that administrative and regulatory complexity may shift the centre of gravity of RECs towards professional actors (energy service companies, large multi-utility cooperatives), thereby reducing the space for genuine citizen participation, particularly among those in conditions of economic or housing vulnerability.

In this context, the report stresses the need for procedural simplification to make energy communities genuinely accessible even to citizens without specific technical competences. Among the recurring proposals are the standardisation of authorisation procedures for small-scale plants, the reduction of grid connection times, the effective introduction of bill unbundling of economic benefits, and the strengthening of technical support services provided by the GSE and the regions.

For those observing RECs from a sociological and territorialist perspective, the Legambiente 2025 report thus represents a valuable source for at least two reasons. First, because it allows the phenomenon to be quantified with a certain degree of precision, distinguishing between the different configurations of self-consumption and showing how energy communities are situated within a broader mosaic of distributed production practices. Second, because it highlights the interplay of technical, economic, and social variables that condition the emergence and consolidation of RECs. Among these are the administrative capacity of local authorities, the presence of intermediaries able to support the processes, access to credit and incentives, and the quality of territorial social capital.

In summary, the state of the art in Italy can be described as an institutional frontier phase in which renewable energy communities have moved from an experimental to a structural dimension, yet their development remains marked by strong regional disparities and economic and bureaucratic constraints. The snapshot provided by Legambiente confirms the underlying hypothesis of this work. RECs are not merely a technical device for producing renewable energy, but a field of tension in which relations between cities, territories, and social rights are being redefined. For this reason, their analysis requires holding together numbers and maps with local stories, practices of participation, and forms of vulnerability that emerge in concrete

contexts. The following chapters, dedicated to the cases of San Severo and Biccari, are situated within this perspective, showing how local trajectories position themselves, at times in continuity and at times in contrast, with the national framework outlined here.

3.6 Between possibility and uncertainty: a critical position

As shown, the relationship between renewable energy communities and energy poverty lies within a complex space where possibility and uncertainty coexist in practice. RECs represent a potential that should not be underestimated, as they create favourable conditions for generating savings through collective self-consumption and participatory governance processes. Moreover, they produce cultural innovations through the proximity of production, consumption, and transition. However, this potential does not derive from intrinsic characteristics of RECs, but from the social, institutional, and regulatory context in which communities are formed and operate. The capacity to counter energy poverty does not stem from the mere presence of an REC, but from the ability of local social systems to mobilise resources, competences, relationships, and norms in a manner consistent with their territorial structure.

The OIPE (2023) reminds us that RECs do not automatically resolve energy poverty. They can act as useful instruments only if integrated into broad public policies that combine efficiency measures, economic support for vulnerable groups, inclusive governance mechanisms, and pathways of social accompaniment. Therefore, an REC does not become an actor of energy justice simply by declaring the principle of sharing, but only if it is embedded within an institutional ecosystem that addresses the root causes of inequality.

For this reason, the debate on energy communities should be interpreted as an opportunity to explore new forms of coordination, rather than as a search for simple solutions. Their function is defined through collective experimentation, the capacity to interweave diverse forms of knowledge, and the ability to adapt to the constraints and opportunities of territories. In short, it lies in the possibility of constructing a

public debate that is fruitful both in terms of outcomes (the activation of energy communities) and in terms of the communicative processes set in motion.

This perspective finds support in Niklas Luhmann's (2021) reflection on ecological communication. Luhmann observes that, when complex environmental issues are addressed, public discourse tends to produce a spontaneous moralisation (Luhmann, 2021). Through the various systems (science, economy, law, politics), communication invites social actors to do the right thing, exhorts them to consume less, emit less, change their lifestyle, and imagines that the mere formulation of a norm is sufficient to orient collective behaviour.

Luhmann warns against this simplification, arguing that those who frame the problem in such terms fail to consider the real nature of society. Modern society does not behave as a unitary subject capable of receiving instructions, admonitions, or ethical recommendations. There is no intrinsic rationality within ecological communication. It is composed of functional systems that operate according to their own logics and do not respond to a common normative centre (rationalisation).

By contrast, the discursive theory of the public sphere, in its Habermasian version (Rosati, 2017), is based on an idea of participation oriented towards validity, which requires conditions of shared rationality and communicative cooperation—conditions that, for Luhmann, do not correspond to the operational complexity of social systems (Belardinelli, 1996; Cevolini, 2021; Tarditi, 2023).

This distance between normative imagination and systemic reality intensifies when communication concerns ecological issues. Environmental communication presupposes an ethical framework that assigns responsibilities to actors, recalls the need for correct decisions, and invokes a unity of society around common values. Observed from a systemic perspective, this claim proves problematic because communication does not automatically produce consensus (Moro, 2009). Communication constructs differences, selects information, and generates expectations that resonate differently across the systems of politics, economy, law, science, welfare, and media (Bartoletti, Faccioli, 2013). None of these systems operates according to a shared purpose, and none can guarantee that ecological values will become common decision-making criteria.

Luhmann shows that the absence of a unitary decision-making centre prevents environmental problems from being treated as if there were a morally correct response applicable to society as a whole (Luhmann, 2021). In light of this reasoning, mainstream communication on energy communities appears marked by the same dynamic. RECs are often described as the right solution, ethically preferable, capable of automatically reducing inequalities and generating solidarity. It is assumed that the diffusion of the idea of the energy community can activate virtuous behaviours and create coordination among actors operating under very different structural conditions. This assumption ignores the differentiated nature of society and, therefore, of communication. Just as there is no univocal set of codes, registers, and contexts through which ecological discourse is articulated, there is no, and cannot be, a level of collective identity capable of binding systems to a unitary ecological rationality. At the same time, there is no privileged locus that can translate values into immediate operational decisions. Society does not function as a harmonious whole spontaneously tending towards the common good. Society is a plurality of differences that interact without forming a moral unity (*ibid.*).

Luhmann's reference to ecological difference thus offers a useful interpretative key for the debate on RECs. Systemic rationality does not manifest itself as adherence to an ethical end, but rather as the capacity to distinguish and select information relevant to the continuation of action. This implies that vulnerable households, local administrations, energy enterprises, and social organisations respond to the proposal of an REC according to different logics. Convergence among these actors cannot be taken for granted and cannot be achieved through moral appeals.

An REC that aspires to generate inclusion must be able to articulate these differences and construct possible and plural forms of coordination. Ultimately, energy justice does not therefore derive from the rhetoric of solidarity, but from the capacity to translate territorial complexity into governance practices capable of adapting to institutional constraints, technical resources, available investments, and local social conditions.

Luhmann invites to shift our gaze from the normative to the observational dimension. The question is not how society should respond to the energy crisis, but how it actually responds (Luhmann, 2021; Greco, 2021). One should not presume

that public discourse automatically produces cooperation, but rather recognise the operational conditions of the systems that process communication. Nor should one imagine a collective subject capable of acting as a moral unit, but instead consider that every possible solution to energy poverty passes through the management of differences among institutions, markets, social organisations, and citizens.

It is in this direction that reflection on RECs can acquire theoretical maturity and practical solidity. Energy communities should not be regarded as a panacea, but as spaces in which social complexity can be coordinated in a temporary and situated manner. They represent possibilities that emerge within territories, not definitive answers. Their effectiveness depends on the capacity to build mediations among diverse actors, to develop appropriate governance instruments, and to recognise that no single actor can govern alone the processes that define energy poverty.

SECOND PART: FIELD RESEARCH

4. THE RESEARCH DESIGN

This chapter presents the methodological design that guided the entire research conducted on the renewable energy communities of Biccari and San Severo. The research took place between January 2023 and December 2025 and involved a progressive immersion in the local contexts, with the aim of understanding how energy community initiatives take concrete shape in the territories of Southern Italy and how different actors construct, interpret, and sustain such processes. The definition of the methodology was accompanied by a review of the literature, which clarified the theoretical and socio-technical framework within which RECs are situated and made it possible to outline hypotheses, concepts, and interpretative dimensions.

The chapter opens with section 4.1, devoted to the general methodological approach. Here, the reasons are outlined for integrating the ecological approach of the Chicago School with the interdisciplinary framework of Innovation Studies—two perspectives that support a situated and processual reading of the energy transition. This choice made it possible to recognise the role of context, relationships, and collective learning processes in the construction of energy communities.

Sections 4.2 and 4.3 present the two selected case studies: the energy community of Biccari and the solidarity energy community of San Severo. The two cases are treated as separate studies because they are situated in different territorial and institutional contexts and require specific modes of observation. In both cases, the methodology combined observation with other tools and types of data, with the aim of capturing practices, expectations, and dynamics of participation.

The chapter concludes with section 4.4, which gathers some final methodological considerations and reflects on the limitations and potential of the adopted research design.

4.1 Methodological approach: between the Innovation Studies and the ecological approach of the Chicago School

The research design adopts a methodological approach arising from the integration of two different yet complementary traditions: the ecological approach of the Chicago School and the interdisciplinary framework of Innovation Studies. The decision to combine these perspectives responds to the need to analyse, in a situated and processual manner, two small-scale renewable energy communities located in the inland areas of Apulia, where the social production of space takes on particular forms and requires tools capable of grasping both the environmental dimension and the relational fabric that organises everyday life. The hybridisation of these two traditions makes it possible to observe energy communities as processes embedded in local ecosystems in continuous transformation and to recognise the role played by interactions among different disciplines in generating innovative dynamics, both in practices and in interpretative models.

The ecological approach of the Chicago School makes it possible to read territories as social environments that configure opportunities, constraints, forms of organisation, and shared perceptions. This does not mean assuming the neighbourhood as a rigid analytical category, but rather valuing the reflection developed by this school on the relationship between spatial configurations and forms of collective life (Castrignanò, 2021). Scholars of Chicago emphasise that every urban or rural area presents a specific ecological logic that structures the ways in which social actors inhabit spaces, build relational networks, and shape processes of cooperation, conflict, or adaptation (Small, 2011). This idea proves particularly useful for studying energy communities, since such experiences develop within circumscribed local contexts and produce effects that largely depend on the social, cultural, and material characteristics of the places in which they operate.

The research conducted in Biccari and San Severo therefore adopts the ecological approach as a framework that directs attention towards the environmental dimension in the broadest sense of the term. The environment encompasses physical spaces, infrastructures, institutions, social relations, and the everyday practices that compose collective life. In this respect, the idea of the natural area, central to the Chicago tradition, proves particularly suitable for the case of small-scale energy communities, as it encourages observation of the forms of coordination that emerge

spontaneously within territories and recognition of the weight of spatial configurations in defining the possibilities for action (Castrignanò, 2014; 2021). This perspective makes it possible to understand how energy, while being a technical resource, acquires social meaning through the ways in which local actors interpret it, share it, and use it to construct relationships, imaginaries, and regimes of cooperation.

To understand the methodological value of this approach, it is useful to consider the contribution developed by Mario Luis Small within the Chicago tradition, which Marco Castrignanò and Gabriele Manella recognise as a classic of urban and rural sociology. In his study of Villa Victoria, a neighbourhood in Boston (Castrignanò and Manella, 2011), Small shows that the validity of ethnographic observation derives from the ability to grasp the specific conditions that orient actors' behaviour. The contextual dimension—defined as conditional—does not represent a mere backdrop to social dynamics, but a constitutive element that shapes resources, constraints, and forms of social bonding. Small thus introduces the conditional approach, that is, a perspective which considers context as a matrix capable of generating differences in practices and perceptions, even in the presence of similar structural conditions (Small, 2011; Bergamaschi, Musarò, 2011). This approach invites us to recognise that actors do not act as abstract entities, but as subjects embedded in specific situations that shape their behaviours, expectations, and possibilities for cooperation.

Small's contribution proves valuable for analysing the energy communities of Biccari and San Severo, as it enables the energy transition to be read as a process that takes shape within local conditions and depends on the ways in which actors interpret and utilise spaces, norms, and available resources. Accordingly, the conditional approach highlights the need for careful and continuous ethnographic observation, capable of capturing the complexity of contexts and recognising elements that would hardly emerge through more distant or standardised techniques. Ethnographic observation thus makes it possible to follow the micro-processes that compose the life of energy communities, to grasp the gestures, interactions, and routines that sustain local governance, and to interpret the

tensions, expectations, and ambivalences that accompany the construction of new forms of cooperation.

The field of energy transition also presents a strongly multidimensional character that requires an approach capable of interweaving different levels of analysis. On the one hand, the ecological approach makes it possible to observe how spaces and social configurations shape behaviours and practices. On the other, the technological and regulatory dimension underpinning energy communities requires tools able to capture the ways in which technical innovations, regulations, and governance structures interact with social life. For this reason, the research methodology complements the Chicago tradition with the theoretical framework of Innovation Studies (Fagerberg et al., 2013).

Innovation Studies represent a multidisciplinary field focused on the relationship between technology, society, and learning processes (Fanizza, 2019). Their origins lie in reflections on economic innovation, but over time this approach has expanded towards a broader perspective, more attentive to the social, cultural, and institutional dimensions of innovation (Ramella, 2015). Innovation Studies are characterised by their capacity to integrate contributions from different disciplines and by the ambition to develop shared conceptual frameworks that facilitate the generation of new knowledge (Fagerberg and Verspagen, 2009; Fanizza, 2019). Indeed, this characteristic proves particularly useful in the study of energy communities, which are situated at the crossroads of technological, regulatory, and social issues.

Indeed, the energy transition does not concern only the introduction of new technologies, but entails a rethinking of the ways in which communities produce, share, and use energy. For this reason, Innovation Studies highlight the need to consider innovation as a collective process in which different actors develop shared knowledge through repeated interactions and through learning that arises from the encounter between different disciplines. From this perspective, innovation appears as a generative process that does not merely apply pre-defined solutions, but produces new interpretative possibilities, new practices, and new ways of conceiving the relationship between technology and society (Fagerberg, 2013).

The literature shows how Innovation Studies foster the emergence of approaches capable of valuing interdisciplinarity and dialogue among different competences. More specifically, it is possible to define how Innovation Studies support the construction of shared frameworks that generate social innovation through the cross-fertilisation of disciplines and the activation of collective learning processes (Fanizza and Spallone, 2021; 2023). Fanizza and Colloca (2018) highlight how social innovation requires the capacity to integrate different perspectives and tools in order to address complex problems in fragile areas. Ramella (2015) reconstructs the sociological genealogy of economic innovation and emphasises the role played by the interaction among social systems, institutions, and technology in generating new interpretative paradigms.

It thus becomes clear that applying Innovation Studies to the analysis of energy communities means recognising that these processes require a composite toolbox integrating at least four disciplinary dimensions. Jurisprudence provides the regulatory framework within which energy communities develop and defines the margins of action available. Political science enables an understanding of the effects of public policies and the forms of multi-level governance that characterise the sector. Sociology analyses the interactions, representations, and practices through which local actors interpret the energy transition and construct forms of cooperation. The natural sciences offer tools for understanding the environmental and climatic implications that orient processes of energy production and consumption. By integrating these perspectives, Innovation Studies foster a systemic vision that makes it possible to grasp the complexity of energy communities and to interpret them as spaces in which technical, social, and environmental dynamics meet and are transformed.

The encounter between the ecological approach of the Chicago School and Innovation Studies thus makes it possible to construct a methodological framework attentive both to the contextual dimension and to the processes of learning and innovation that characterise the energy transition. The ecological approach directs the research towards situated observation that captures the specificity of the territories of Biccari and San Severo. Innovation Studies provide an interpretative framework that values interdisciplinarity and the processual character of

innovation, enabling energy communities to be read as places where new forms of collaboration, new knowledge, and new possibilities for building a collective future are generated.

4.1.1 Expertise, knowledge and power in the energy transition

The integration of the ecological approach of the Chicago School and the framework of Innovation Studies provides a solid interpretative basis for analysing renewable energy communities as situated and processual phenomena. However, such an approach requires further refinement in order to fully grasp a crucial dimension of energy transition processes, namely the role of expert knowledge and the asymmetries of power structured around the distribution of technical competences. While Innovation Studies emphasise interdisciplinarity and collective learning processes, they also implicitly point to the existence of differentiated forms of knowledge, whose access and control are not evenly distributed among the actors involved.

It is important to clarify, however, that this research does not focus directly on the technocratic dimensions of the energy transition, nor does it aim to provide a specialised analysis of energy systems or their engineering components. The thesis is situated within the field of environmental and territorial sociology and privileges a perspective centred on social practices, relational dynamics, and processes of meaning-making. This does not imply an underestimation of the role of expert knowledge. On the contrary, the research fully acknowledges the influence and responsibility of the technical dimension in shaping renewable energy communities, treating it as a structural element of the context within which such initiatives develop.

Within the energy sector, this dimension becomes particularly significant. Contemporary energy systems can be understood as complex socio-technical configurations, characterised by high levels of technological specialisation, dense regulatory frameworks, and strong dependence on centralised infrastructures. In this context, technical knowledge does not merely represent an operational resource, but rather a form of power capable of shaping actors' possibilities for action, defining the boundaries of feasibility, and influencing the trajectories of the transition. As Jasanoff (2004) highlights, the production and circulation of technical knowledge are always intertwined with forms of social and political order, giving rise to processes of co-production in which knowledge and power reinforce one another.

Applying this perspective to the study of renewable energy communities means recognising that such experiences do not develop within a neutral space, but within a field of relations marked by epistemic and material asymmetries. Local actors—

citizens, public administrations, and third sector organisations - often find themselves interacting with actors endowed with a high level of technical expertise and infrastructural control, such as grid operators, regulatory bodies, and energy system managers (ENEL, TERNA, GSE). In this sense, the “power of competence” operates on a dual level: on the one hand, as the ability to define and interpret technical and regulatory constraints; on the other, as direct control over infrastructures and operational processes that make the implementation of projects possible, or, conversely, hinder it.

The case of Biccari makes this dimension particularly visible. The development of the renewable energy community is shaped by a set of constraints related to grid connection, authorisation timelines, and energy injection criteria, which cannot be understood solely as technical obstacles, but must be interpreted as expressions of a power structure that privileges institutionally and technically stronger actors. Delays in procedures, rigid regulatory frameworks, and difficulties in interfacing with the national energy system represent, in this perspective, disincentives that limit the capacity of local communities to activate alternative models of energy production and sharing. These dynamics highlight how the energy transition is not only a matter of technological innovation, but also a process of reconfiguring the balance between centres of expertise and local contexts.

In the case of San Severo, the presence of a technical partner such as Hivergy introduces an additional layer of complexity. Here, expert knowledge plays a mediating role between the energy system and the local community, enabling the translation of complex technical content into accessible practices for the beneficiaries of the solidarity-based energy community. However, even in this case, dependence on specialised competences remains a structural condition, pointing to the need to reflect on how technical knowledge is shared, simplified, and made usable. The capacity to communicate energy, to render it understandable, and to foster processes of collective learning thus becomes a crucial element for ensuring the inclusiveness of the transition.

In this regard, the contribution of Scotti (2020) proves particularly relevant. Analysing the wind energy sector and the professions of the green economy, the author shows how the energy transition is accompanied by the emergence of new professional figures, whose role extends beyond the technical implementation of innovations to include the construction of new imaginaries and social practices related to energy. Technical competences thus become central not only in economic terms, but also in cultural and territorial terms, contributing to redefining the relationship between labour, environment, and local development. From this perspective, energy professions represent a strategic lens through which to interpret ongoing transformations, highlighting how the ecological transition is also a transition of knowledge and competences.

In light of these considerations, integrating the dimension of expert knowledge into the methodological framework makes it possible to enrich the analysis of renewable

energy communities by bringing to light aspects that might otherwise remain in the background. The ecological approach allows for the observation of how networks of expertise intersect with local contexts, influencing participation dynamics and forms of governance. Innovation Studies, in turn, provide the tools to interpret these processes as outcomes of interactions among systems of knowledge, institutions, and technologies. Taken together, these perspectives enable a more articulated reading of the energy transition, understood not only as technological innovation or social practice, but as a field of tension among knowledge, power, and territories.

4.2 The research approach for the case study of Biccari

The case study of Biccari required the definition of a research design capable of grasping an initiative of renewable energy community development in an inland area of Southern Italy, characterised by specific socio-territorial conditions and by a transition process still underway. Observation and case study did not follow a predetermined path, but took shape through a progressive engagement with the territory, carried out between 2023 and 2025, which made it necessary to combine different tools and integrate heterogeneous sources. The methodological framework adopted reflects both the ecological approach of the Chicago School—useful for interpreting the relationship between spatial configurations and social forms—and the perspective of Innovation Studies, which recognises the role of collective learning, governance, and interdisciplinarity in socio-technical change processes. The first phase of the research concerned the study of the territorial context, conducted through five ethnographic explorations carried out between 2023 and 2024. These observations aimed to understand the environmental and social configurations within which the announced energy community is situated, capturing the elements that define the organisation of space, the morphology of the territory, and the material infrastructures used by inhabitants. The ecological approach guided this initial work, as it invites the interpretation of the territory as a set of interrelations among places, actors, and resources, in which each element acquires meaning only when observed within the network of connections that sustains it. Observation therefore makes it possible to grasp not only the materiality of places, but also the ways in which the environment becomes an active component of the practices and representations of local actors. As shown in Small's studies, revisited by Castrignanò and Manella (2011), this method allows social life to be

read through a conditional logic that recognises the context as a fundamental heuristic dimension.

Alongside the ethnographic explorations, the definition of the context was supported by a study of the National Strategy for Inner Areas (SNAI)⁴⁷. The SNAI provides an institutional framework useful for understanding the structural conditions that characterise territories such as Biccari and allows the emergence of the energy community to be situated within broader dynamics of territorial marginality, rebalancing policies, and attempts at institutional innovation in vulnerable areas. In this way, the integration of field observation and policy analysis made it possible to elaborate a methodological framework capable of interpreting the energy community not as an isolated phenomenon, but as part of a wider process of territorial construction of the ecological transition.

The second phase of the research concerned the specific study of the energy community. In order to reconstruct how the initiative was presented, perceived, and narrated by local actors, it was necessary to expand the methodological repertoire to include the analysis of media narratives. Newspaper articles, institutional press releases, social media content, and dissemination materials produced by the actors involved in the project were examined. The aim was not only to verify the accuracy of the information, but also to understand the public representations of the energy community, the expectations that such representations construct, and the narrative frames through which the initiative is legitimised or problematised. In short, the objective was to grasp the role of public debate in the construction of the energy community. Media analysis enriched ethnographic observation with an additional level of interpretation, as it provides access to the discourses circulating in the territory and influencing the collective perception of the energy community.

Another tool employed in the case study was the semi-structured interview with the Mayor of Biccari⁴⁸, conceived as a privileged moment of dialogue with an actor

⁴⁷ https://www.mim.gov.it/documents/20182/890263/strategia_nazionale_aree_interne.pdf

⁴⁸ The Mayor of Biccari was interviewed as a strategic figure in the activation and development of the energy community. First elected in 2009, he has served as mayor for three consecutive terms, totaling fifteen years of local government. Administrative continuity and long-standing political roots have fostered the development of a coherent vision of territorial policies and ensured that the municipal administration plays a central role in defining local priorities in the areas of energy, welfare, and sustainable development. As will be seen in Chapter 5, the Mayor played a decisive

occupying a central position in territorial governance and in the processes of activating the energy community. The interview guide made it possible to investigate several dimensions⁴⁹: the local vision of the energy transition, representations of the community, the role of the administration in processes of change, the relationship between public actors and the third sector, perceived challenges, and future expectations. The interview with the Mayor assumes significant methodological value because, as Small suggests, understanding local processes requires exploring the perspective of actors who hold resources, knowledge, and coordination capacities (Small, 2011). Local governance, in fact, represents a decisive node for interpreting the ways in which initiatives of this kind take root in the territory and generate new forms of cooperation.

In parallel with the study of local institutions, the research included semi-structured interviews with twenty-four inhabitants of Biccari involved in the energy community. The interviews were conducted between May and August 2023. The first two questions of the interview guide, reported below, reflect the conceptual framework adopted:

1. What is your point of view on the energy transition?
2. Describe the territory of Biccari in relation to energy communities.

The other questions developed around the two key words *community* and *criticalities*, which constitute the analytical core that effectively guided the construction of the interview outline. The aim of these interviews was not to verify the citizens' level of technical knowledge, but to explore the values, motivations, perceptions, and expectations accompanying the birth of the energy community. The qualitative method in fact makes it possible to capture the relational dimension

role in the design and promotion of the energy community, becoming its main creator and supporter. The interview therefore took on particular methodological significance, as it provided access to the perspective of a key player through whom the political choices, forms of coordination, and strategic visions that guided the entire process were articulated. The centrality of this figure is confirmed by the involvement of the entire municipal council, which shared and supported the administrative and participatory process linked to the energy community, helping to consolidate a stable local governance framework conducive to the implementation of the project.

Reproduced in full in the Appendix section at the end of the thesis.

⁴⁹ Reproduced in full in the Appendix section at the end of the Thesis.

of communities, understood as the condition through which local actors activate networks of competences and deliberative processes that sustain the governance of the initiative (Fanizza, Spallone, 2023).

The choice to combine ethnographic observation, public policy analysis, media narratives, and interviews is linked to the need to interpret the case of Biccari as a socio-technical process embedded within an evolving context. The ecological approach shows how social dynamics emerge from spatial configurations and from the relationships that actors establish with the environment. Innovation Studies, on the other hand, reveal how innovation requires the convergence of knowledge, rules, technologies, and social practices, and how these elements intertwine within local processes of ecological transition. In the case of Biccari, the research adopted a perspective that interprets the energy community as a possible model of *welfare space* (Fanizza, 2019; Fanizza and Spallone, 2023), that is, as a space in which practices, actors, and resources are articulated to produce widespread well-being. This orientation guided the selection of tools and the construction of analytical dimensions, enabling the energy community to be read as an emerging form of social innovation rooted in the territory.

Within this methodological perspective, the territory is not considered a mere container of social dynamics, but a collective and actively influential actor. In this sense, the conditional approach developed by Small makes this dimension particularly evident.

The construction of the energy community was therefore observed through a method that values the plurality of sources and the complementarity of tools, in order to ensure a description consistent with reality. This combination makes it possible to interpret the case of Biccari without reducing it either to a mere technical project or to an exclusively social process, but rather as a phenomenon that takes shape at the intersection of technological innovation, local governance, and territorial culture. The research design thus sought to capture this complexity without anticipating results, but instead laying the foundations for a critical and comparative reading of the case, which is developed in the following chapter.

4.3 The research approach for the case study of San Severo

The research design relating to the case of San Severo is situated in continuity with the methodological framework described in the previous paragraphs, but requires a specific articulation due to the peculiar nature of the renewable solidarity energy community analysed here. Unlike Biccari, where the energy community emerged as a civic initiative within a cohesive territorial context, the CERS of San Severo developed within the Caritas of the Diocese and addresses families living in conditions of poverty and socio-economic vulnerability. This structural difference calls for a methodological framework capable of observing, understanding, and interpreting more complex relational dynamics, different models of governance, and forms of participation influenced by cultural, religious, material, and linguistic factors. Accordingly, the choice of methodological tools employed in this case responds to the need to capture the specificity of the context and to ensure an observation sensitive to the ways in which actors interpret the very meaning of the energy community.

The research developed through extended direct observation, conducted from September 2024 to December 2025, with a frequency of once a week and an average duration of three hours per session. The main sites of observation were the headquarters of the Caritas of the Diocese of San Severo and the *Emporio della Solidarietà*, the operational centre through which the social dimension of the CERS is articulated. The *Emporio* in fact serves as a meeting point between the lead organisation of the energy community, the operators responsible for the social management of the project, and the beneficiary families. Observation made it possible to follow the everyday practices that sustain the initiative, to identify organisational routines, and to understand the ways in which operators and families build and maintain relationships of trust, listening, and support.

Direct observation was not limited to the moments in which the CERS was already active but also encompassed the preparatory phase of the project. Design meetings, sessions dedicated to collecting memberships, changes introduced in relation to the funded project, as well as the process of launching the initiative, were all observed. The research also followed the monitoring activities and visits carried out by *Fondazione con il Sud*, the funding body of the energy community, which

represented moments of verification, dialogue, and adaptation of project activities. These phases made it possible to observe the construction of the governance of the CERS in real time, the negotiation of tasks, and the translation of general objectives into operational practices.

Nonetheless, the presence of families with migratory backgrounds and differing levels of linguistic proficiency made it evident, from the very first observations, that it was necessary to adopt research tools capable of reducing the risk of communicative and cognitive bias. For this reason, the study integrated techniques of visual sociology, considered by the author to be consistent with the ecological approach of the Chicago School and functional to the needs of a project in which verbal communication risks, at times, being insufficient or uneven. The use of visual tools in fact facilitates the involvement of all participants, regardless of their level of linguistic literacy, and makes it possible to collect data more closely connected to everyday experiences, perceptions, and symbolic representations associated with the idea of community and with the functioning of the CERS.

In particular, the nine families currently participating in the energy community were invited to take part in an activity inspired by the Photovoice methodology (Catalani and Minkler, 2009), adapted to the needs of the context and to the specific research question. The families were asked to produce two photographs and, if they wished, a brief comment on the meaning of the term *community* and on their personal definition of *energy community*. The questions, formulated in a simple and clear manner, were:

1. “What does the word community mean to you?”
2. “In your view, what is the energy community?”

The families were entirely free to participate or not, without any obligation or prescriptive expectation. The choice to invite the production of images without imposing requirements responded to the need to respect participants’ sensitivity, to avoid undue pressure, and to acknowledge the social vulnerability that characterises some of the households involved. The photographs collected represent valuable material for understanding how families interpret belonging to the community, the meaning attributed to the CERS, and the relationship with everyday living spaces. In line with research conducted on and through visual methodologies, the optional

comments, when present, proved useful for integrating the images with narrative elements, but did not constitute a necessary requirement for the validity of the data collected (Cseznek, 2021; Scârneci-Domnişoru and Cseznek, 2022).

After the data collection phase, the images were analysed on the basis of their pertinence and relevance to the observed dimensions. The aim was not to read the photographs aesthetically, but to interpret their content in the light of the meanings proposed by the participants and the guiding questions of the research. The methodological orientation adopted values the role of participants as co-producers of meaning (Hergenrather et al., 2009), avoiding the imposition of external interpretations and allowing the images to express, in their immediacy, central elements of community life and of the relationship with energy. This methodological choice responds to a dual need: on the one hand, to capture families' representations of the community; on the other, to ensure a fair communicative ground that does not penalise those with weaker linguistic competences or less familiarity with institutional procedures.

To ensure coherence between the data collection techniques employed with families and the interviews conducted with the actors responsible for designing the CERS, the semi-structured interview technique using Photo Elicitation was also adopted (Harper, 1988; 2002). This technique involves the use of images as stimuli to facilitate narration during interviews, producing a more reflective interaction that is less constrained by the codes of formal communication (Vassenden and Jonvik, 2022; Bojanić et al., 2023). In the case of San Severo, Photo Elicitation was employed in three semi-structured interviews conducted between 2024 and 2025: one with the Director of the Caritas of the Diocese of San Severo, one with the social manager of the energy community, and one with the technical representative of Hivergy, partner of the CERS. The interview guide, included in the appendix, informed and directed the data collection, ensuring coherence with the analytical dimensions already employed in the case of Biccari.

The interviews investigated the same conceptual dimensions already explored in the previous case, namely the meaning attributed to the energy transition, the role of the community, the perceived criticalities, and the dynamics of governance. To these dimensions, an additional one was added, necessary in the context of San

Severo: the reconstruction of the specific competences that each interviewee brings to their role. In the case of the Director of Caritas, the research explored the relationship between the institutional mission of the organisation, its activities in supporting families, and the way in which the energy community is embedded within the diocese's tradition of social intervention. The interview with the social manager made it possible to deepen the analysis of mediation between the technical dimension, the management and selection of families, and the everyday construction of participation. The interview with the representative of Hivergy, on the other hand, provided an understanding of how the technical dimension of the energy community is translated into operational activities, what competences are required for the management of the plants, and how technological innovation is made accessible to families.

Within this methodological framework, the CERS of San Severo appears as a case profoundly different from Biccari. While the latter can be described as a territorial energy community rooted in a relatively homogeneous context, the CERS of San Severo is configured as an action of energy welfare aimed at reducing inequalities and supporting families living in conditions of poverty. This peculiarity directly influenced the methodological choices and consequently required tools capable of observing both the energy dimension and the social one. The ecological approach made it possible to consider the energy community as part of a broader territorial ecosystem, in which religion, welfare, neighbourhood networks, vulnerability, and innovation coexist and probably influence one another. Innovation Studies, for their part, allow the CERS to be interpreted as an emerging socio-technical system, in which technology, governance, and social practices combine to generate new forms of participation and inclusion.

The methodological design adopted for the case of San Severo therefore sought to respond to this complexity through a combined use of qualitative and visual tools, capable of valuing participants' perspectives and reflecting the cultural and social differences that traverse the community. This methodological mix made it possible to observe the everyday construction of the CERS, to understand how families interpret the notion of community, and to reconstruct governance processes in a way that is sensitive to the specificities of the territory. The choice of tools does not

merely respond to descriptive needs, but reflects an ethical methodological orientation, which recognises vulnerability as a structural element of the case and seeks to avoid any form of exclusion or communicative misunderstanding.

In summary, the case of San Severo required a research design that integrated direct observation, visual techniques, and semi-structured interviews, within an interpretative framework that combines the ecological perspective with that of Innovation Studies. This approach makes it possible to grasp the socio-technical nature of the CERS, its function as a response to energy and social poverty, and the way in which the energy community becomes a potential opportunity for empowerment, participation, and a renewed capacity to build connections between institutions, territories, and families.

4.4 Methodology as an exploration between rigour and creativity

The methodological pathway outlined in the preceding paragraphs stems from the need to combine analytical rigour with exploratory openness in a field—renewable energy communities—that challenges the more standardised forms of social research, since CERs are constituted in an adaptive manner according to the requirements of specific cases. In this scenario, the integration of the ecological approach of the Chicago School with the framework of Innovation Studies guided the choice of tools and techniques, enabling the construction of a research design sensitive to context, relational dimensions, and processes of collective learning.

Figure 7: Analytical dimensions to explore

<i>Analytical dimensions</i>	<i>Field of observation</i>
Territorial dimension	Location of the REC Role of the territory
Governance dimension	Leadership and type of initiative (top-down or bottom-up)
Governance dimension	REC model Network and roles of the actors involved in the process
Participatory dimension	Involvement of the local community Ways of combating energy poverty Social empowerment practices
Social representation	Cultural factors Social narrative
Barriers	Barriers to energy transition and relevance

Source: Author's elaboration based on the research design

The table of analytical dimensions and their corresponding “directions of gaze” (Figure 7) provides a synthetic representation of this approach, showing how the use of ethnographic observation, interviews, visual techniques, and documentary analysis does not constitute a mere aggregation of methods, but rather an attempt to compose a coherent itinerary of exploration.

Within this framework, the presence of two case studies that differ from one another constitutes a central element rather than a limitation. The energy community of Biccari and the solidarity energy community of San Severo are situated in distinct territorial, institutional, and social contexts, which makes a classical comparison neither meaningful nor scientifically valid. The case of Biccari developed in a small village of the Daunian Apennines, with civic governance deeply rooted in the territory and a local administration that interprets the energy community as a tool for development and innovation, as well as a means of creating an alternative narrative of the small village. By contrast, the case of San Severo emerged within the religious and charitable context of the diocesan Caritas, and from the outset was configured as an energy welfare intervention directed towards families experiencing material and social poverty. The differences between the two cases concern not only territorial scale or social composition, but also the ways in which energy, well-being, and participation are connected and translated into practices.

For these reasons, the intention of the thesis is not to undertake a systematic comparison between two units of analysis considered equivalent, but rather to gain an in-depth understanding of two possible articulations of energy communities as situated socio-technical devices. Consequently, the objective is not to verify which model works better or to establish a hierarchy, nor to derive universally valid principles. On the contrary, the aim is to show how energy communities can be configured as plural instruments of energy democracy within a cultural framework shaped by the ecological transition. *Plural*, because they are rooted in institutional, cultural, and symbolic landscapes that are not superimposable; *plural*, because they are embedded in different historical trajectories and systems of relations; *plural*, finally, because they interrogate in diverse ways the relationship between energy, rights, vulnerability, and forms of welfare.

The choice not to claim any universal validity is situated within this perspective. The research design therefore explicitly assumes the situated character of the processes observed, acknowledges the conditional nature of contexts, and employs the case studies not as a basis for statistical generalisation, but as an opportunity to construct interpretative itineraries, working hypotheses, and analytical categories capable of being reused and re-elaborated in other contexts. In this sense, the table of analytical dimensions and corresponding observations does not codify a prescriptive model but rather conveys the itinerary of a research endeavour that sought to hold together the specificity of empirical situations and the need to elaborate a shared conceptual vocabulary.

On the basis of these premises, methodological reflection cannot be limited to listing tools and procedures but must interrogate the role of sociological imagination in the way the research pathway has been constructed (Fanizza, 2019b). Charles Wright Mills defined sociological imagination as that quality of mind which enables one to connect biography, history, and social structure, and to read individual experiences in the light of the collective processes within which they are inscribed (Fanizza and D'Anna, 2017). In a passage that has now become classic, he describes sociological imagination as the capacity to “disentangle, in the chaos of everyday experience, the broad lines, the warp of modern society, and to trace upon it the psychological weft of a whole range of men and women,” transforming personal unease and public indifference into attention to common problems (Mills, 2000). From this perspective, the work of the researcher is not the mere application of predefined schemes, but a continuous exercise in moving between perspectives, scales, languages, and contexts.

Thus understood, sociological imagination constitutes the heuristic horizon within which this thesis is situated. The methodological design does not aim to produce further “abstract empiricism,” to use Wright Mills’ expression (*ibid.*), but rather to construct pathways of knowledge arising from the intertwining of consolidated tools and field-calibrated experimentations. The combined use of ethnographic observation, semi-structured interviews, visual techniques, and analysis of public narratives is not the outcome of a desire for accumulation, but the choice of a methodological creativity conceived as the capacity to combine, in a reflective

manner, classical methods with less conventional investigative devices. In this sense, creativity is not synonymous with arbitrariness, but a concrete form of epistemological responsibility in the face of complex research objects that elude standardised schemes.

Pier Luca Marzo's reflections (2015) on creativity as a sociological method help to shape this approach. Building on the thought of the American sociologist, Marzo introduces in his work the idea of an "aesthetic pathway" to research, capable of transforming method into an art oriented towards grasping the deeper dimension of everyday life (Marzo, 2022). Thus, creativity is not conceived as an element external to method, but as one of its conditions of possibility: on the one hand, every creative conception must follow a method in order to be translated into a cognitive result; on the other, it is thanks to a creative image that method can interrupt its own circular, sequential, and predefined processuality, opening new directions of inquiry. This vision dismantles the neopositivist dichotomy between creativity and rigour and invites us to conceive sociological research as a space in which imagination and method mutually implicate one another (Marzo, 2015; 2020).

Placing the design of this thesis within such a perspective means recognising that the use of techniques such as adapted Photovoice or Photo Elicitation does not represent an "innovative" digression from an otherwise canonical framework, but rather the outcome of a reflective engagement with the relationship between expressive forms, communicative asymmetries, and conditions of vulnerability. In the case of San Severo, the use of visual languages is not an embellishment, but a way of rendering methodologically coherent the idea that the families benefiting from the CERS are not merely recipients of interventions, but actors who can contribute to defining the meaning of community and of energy. Likewise, the choice of an ethnographic approach for the case of Biccari is not reducible to a technical preference but is rooted in a tradition—that of the Chicago School—which regards fieldwork as an essential component of the capacity to read the territory as a space of relations, narratives, opportunities, and conflicts.

This conception of method as a space of connection between creativity and rigour is implicitly situated in dialogue with Max Weber's critique of the transformation of socio-historical research into a mere production of data generated by the static

intellect, according to repetitive and impersonal procedures⁵⁰. Weber draws attention to the risk of reducing social science to a technical exercise devoid of interpretative impetus and calls for the recovery of the vocational dimension of intellectual work, understood as the capacity to interrogate the meaning of phenomena and to assume responsibility for the interpretations proposed (Weber, 1997). In this direction, sociological imagination and methodological creativity do not represent an escape from rigour, but rather the attempt to free research from the logic of serial data production and to bring it back within a critical horizon, capable of grasping the connection between forms of knowledge and forms of life.

Contemporary reflections on sociological imagination insist precisely on this point (Puga and Easthope, 2017). Faced with globalised social facts such as the pandemic or the climate crisis, several authors have emphasised the need for a sociological imagination capable of moving beyond methodological nationalism, of grasping the interdependencies between local scales and global dynamics, and of questioning sociology's capacity to identify adequate responses to new problems. In this sense, the ecological transition and energy communities can be read as a testing ground for contemporary sociological imagination: they refer to global issues—climate change, environmental justice, the reconfiguration of energy systems. Yet they take concrete form in specific local contexts, such as Biccari and San Severo, where history, geography, institutions, and political cultures shape different models of energy democracy.

Within this scenario, the methodology adopted in this thesis takes shape as an exploration between rigour and creativity. Rigour is manifested in the clarity of choices, the transparency of procedures, and the coherence between research questions, theoretical frameworks, and the tools employed. Creativity emerges in the capacity to adapt methods to contexts, to experiment with unexpected combinations of techniques, and to accept that research may also be a process of

⁵⁰ In his lecture *Wissenschaft als Beruf*, Weber criticizes the reduction of historical and social research to a “data factory” producing data according to standardized procedures, guided solely by “cold” intellect, and calls for recognition of the vocational, interpretative, and meaningful dimension that must accompany scientific work. Weber, M. (1997). *La scienza come professione*. Armando Editore.

shared learning (Fanizza, 2019b), in which the researcher progressively modifies their gaze in light of interactions with the subjects involved. From this perspective, sociological imagination is a necessity: it is what enables one to avoid the shortcuts of rigid typifications, to resist the attraction of universal models, and instead to construct situated knowledge, aware of its own limits yet attentive to what occurs in the interstices of everyday practices.

Ultimately, the methodology adopted does not aim to provide a model replicable in every context, but to show how it is possible, within a robust theoretical framework, to construct research pathways that are able to hold together possibilities and constraints, rules and inventions, consolidated tools and creative openings. It is in this dynamic balance between rigour and creativity that the thesis situates its contribution, proposing an interpretation of energy communities as places where the ecological transition takes shape in multiple forms, and where sociology is called upon to fully exercise its capacity to imagine and to understand social worlds in transformation.

5. BICCARI: THE ENERGY COMMUNITY BETWEEN PUBLIC NARRATIVES AND PROCESSUAL COMPLEXITY

5.1 Biccari within the Context of Italy's Inner Areas

The case of Biccari fits coherently within the framework of Italy's inner areas, as it makes observable within the same local space both the structural conditions that have historically fuelled marginality and demographic decline, and the more recent forms of territorial reactivation that characterise many small Apennine municipalities. From this perspective, the reference to inner areas does not function as a descriptive label, but as an analytical device that enables the village to be read as a point of intersection between service accessibility, selective development trajectories, and the local capacity to generate projects, imaginaries, and initiatives of regeneration.

The literature and policies that have brought inner areas back to the centre of public attention converge on a common element, as they recognise the “non-homogeneous” nature of these territories (Labianca & Navarro, 2025; Bonifazi et al., 2022). The National Strategy for Inner Areas, in particular, has proposed a place-based approach that takes distance from essential services as the key to interpreting territorial inequalities and the quality of citizenship, distinguishing municipalities according to the time required to reach the service hubs for education, healthcare, and mobility. This approach avoids mechanical equivalences between inner areas and mountain areas, as it places concrete conditions of accessibility and life opportunities at the centre, and allows marginal territories to be understood as historical and institutional outcomes rather than as mere natural data (SNAI, 2013).

Within this framework, Biccari appears as a municipality which, by demographic size and location, fully fits the profile of the small towns that structure Italy's dispersed settlement pattern. The system of small municipalities represents a numerically predominant component of the national administrative architecture and concentrates a non-negligible share of residents, with a specific weight that becomes even more significant in the Apennine and sub-Apennine areas, where distance from services and the fragility of local economies more directly affect

demographic trajectories and quality of life. In this context, Biccari today has a population of 1.282 (ISTAT data as of 1 January 2025), and already by its size confirms its belonging to that “minute Italy” which materially renders visible the issue of inner areas⁵¹.

The territorial framing further reinforces this positioning. Biccari rises in the Sub-Appennino Dauno, on a hill at around 450 metres above sea level, in a location that articulates two contiguous yet unequal landscapes: on the one hand the mountain and its ecological systems, on the other the Tavoliere plain with its agrarian and infrastructural logics. The municipal territory extends towards the Cornacchia massif, which reaches 1,151 metres and constitutes the highest peak in Apulia, and includes places of strong natural recognisability such as Lake Pescara, linked to hydrological dynamics and mountain micro-ecosystems⁵². This morphology makes Biccari a threshold point between plain and inner area, as it combines geographical proximity to a major productive system such as the Tavoliere with, at the same time, conditions typical of the Apennine mountain in terms of accessibility, seasonality, and settlement density⁵³.

The threshold dimension - namely, the frontier for practices and populations - also has a historical depth that helps to explain the identity stratification of the Monti Dauni. In the area of Biccari, sources (Ivona et al., 2021; Volpe, 2020) document ancient settlements and continuity of occupation, pointing to a long-standing relationship with resources, transit routes, and defensive functions. The catalogue of national cultural heritage records, for instance, both evidence of Neolithic occupation in the surrounding countryside and the proximity of the remains of Tertiveri, a vanished medieval city and one of the oldest episcopal sees of Daunia⁵⁴. In this respect, the hamlet of Tertiveri assumes a significance that goes beyond mere toponymic description, as it conveys a historical geography made up of connections between the Apennine ridge and the plain, and of ecclesiastical and politico-military institutions that organised the territory throughout the medieval period.

⁵¹ <https://www.anci.it/atlane-dei-piccoli-comuni>

⁵² <https://www.visitbiccari.com/wp-content/uploads/2020/09/itinerario-MonteCornacchia.pdf?utm>

⁵³ <https://www.bibliotecabiccari.it/la-citta/?utm>

⁵⁴ <https://catalogo.beniculturali.it/detail/ArchitecturalOrLandscapeHeritage/1600365342>

This set of elements suggests a first analytical implication for the territorial analysis: Biccari cannot be treated as an “isolated village,” because its position constructs structural relations with areas outside the municipality, which affect both its development opportunities and its forms of dependency. Therefore, the condition of an inner area does not coincide with an absence of relations, but with a specific type of asymmetric relation, in which the capacity to connect with external opportunities depends on material infrastructures, institutional resources, and governance devices. In this sense, the category of inner area does not merely serve to describe service deficiencies, but helps to reconstruct how territorial hierarchies between centres and margins are produced, and how these hierarchies translate into differentiated local trajectories.

Recent literature on the Monti Dauni offers useful tools to refine this reading, as it highlights how inner areas are not simply “lagging spaces,” but also contexts in which forms of regeneration are experimented with, through social innovation, the construction of imaginaries, and the re-articulation of local networks. Contributions on the “System of Hospitable Communities,” for example, show how the mountain can be the object of intentional territorial narratives, capable of orienting attractiveness and valorisation practices, provided that public actors and local communities are able to govern the process in a coherent and continuous way (Rinella & Rinella, 2018). Similarly, more recent comparative studies interpret the Monti Dauni as a laboratory of regeneration initiatives read through the prism of social innovation, placing at the centre not only the projects themselves, but also the conditions that make such projects more or less sustainable over time (Labianca & Navarro, 2025).

This attention to narratives does not concern tourism or the external image of territories alone. Analyses focusing on online representations and the communication strategies of municipalities in the Monti Dauni show how the digital dimension contributes to the construction of meaning repertoires, the promotion of identities, and the orientation of forms of attraction, within a logic that can support local initiatives but may also produce gaps between public discourse and actual implementation capacity (Pollice et al., 2023). In the case of Biccari, this perspective is particularly relevant, as the analysis of the Biccari Renewable Energy

Community (REC) also focuses on the relationship between public debate, project design, and operational difficulties. The inner areas framework thus makes it possible not to interpret this gap as an “anomaly” specific to the case, but rather as a potential systemic effect of contexts in which the production of visibility and the search for external resources become integral components of territorial survival strategies.

The theme of energy and ecological transition introduces an additional level. In the Monti Dauni area, the energy transition is discussed as a field that intertwines multi-level governance, administrative capacity, and public policies, and which requires coordination between local actors and supra-local devices in order to transform territorial potential into infrastructures and collective benefits (Pannacciulli & Giandolfi, 2024). From this perspective, Biccari’s location in the Sub-Appennino Dauno does not represent merely a geomorphological datum, as it also signals the presence of environmental resources, spaces, and conditions that can sustain projects linked to renewables, while at the same time exposing processes to the technical, economic, and institutional constraints typical of peripheral contexts. Consequently, the notion of inner areas helps to hold these two sides together: potential and constraints do not cancel each other out, but coexist and define the structure of possibilities within which initiatives take shape.

At this point, it becomes useful to recall one final dimension, concerning the possible protagonism of inner areas. Indeed, part of the contemporary debate recognises that marginality does not only produce decline, but can also generate new forms of territorial agency when policy opportunities are activated and when local communities are able to seize them through credible projects (Baldi, 2018; Carrosio, 2019). In recent years, public instruments and investments have sought to support this direction, reopening spaces of intervention for small towns through programmes dedicated to the cultural and social regeneration of villages and to their attractiveness⁵⁵. Within this framework, the possibility of protagonism does not

⁵⁵ The reference is to the National Recovery and Resilience Plan (NRRP), Mission 1, Component 3, Investment 2.1, “Attractiveness of Villages,” structured into Line A (regional pilot projects) and Line B (local projects for the cultural and social regeneration of small historic villages). <https://pnrr.cultura.gov.it/misura-2-rigenerazione-di-piccoli-siti-culturali-patrimonio-culturale-religioso-e-rurale/2-1-attrattivita-dei-borghi/>

depend on any presumed intrinsic virtue of inner areas, but on the combination of available resources, project-making capacity, and administrative continuity—elements which the place-based perspective invites us to observe as decisive factors for the effectiveness of policies directed towards places.

This entails a methodological consequence for the case study. Situating Biccari within the context of Italy's inner areas means assuming that the processes observable in the town cannot be reduced to a "closed" local dimension but must be read as situated outcomes of interactions across scales, in which the municipal level engages with regional, national, and European devices. The trajectory of the energy community itself, which will be reconstructed in detail in the following paragraphs, can be interpreted as a testing ground for the capacity of these territories to transform narratives and opportunities into operational institutions and durable practices. Framing within the category of inner areas does not therefore serve to introduce a generic context, but to establish an interpretative grid that makes it possible to understand why, in small Apennine municipalities, the distance between public discourse and concrete realisation often becomes a recurring feature, linked more to structural constraints and organisational fragilities than to individual contingencies.

In summary, Biccari emerges as an emblematic case for observing the condition of inner areas in a specific form: a form in which marginality does not coincide with immobility, since environmental resources, historical stratifications, and regeneration initiatives exist that nurture project-making; and a form in which project-making encounters persistent constraints, as processes require continuity, competences, and coordination that peripheral contexts often struggle to sustain. This dual register, which holds together potential and constraint, prepares the ground for the analysis of the chapter, as it renders the energy community intelligible not merely as a sectoral project, but as an episode embedded within the broader attempt, typical of inner areas, to construct new development trajectories based on local resources and external opportunities.

5.2 The REC in Biccari

The following paragraph reconstructs the experience of the Renewable Energy Community of Biccari on the basis of a dual set of data. On the one hand, the analysis is grounded in a structured review of journalistic and informational materials collected over time, including articles from national and local press, specialised journals, institutional websites, and platforms dedicated to the themes of energy transition and social innovation. This corpus makes it possible to reconstruct the public narrative of the energy community, the interpretative frames within which the project was presented, and the expectations that accompanied its launch and development. In essence, the data drawn from the press constitute not only the boundaries, themes, and contents of the public debate surrounding Biccari's REC, but also act as factors in the mediatization of the municipality's energy transition process.

On the other hand, the description draws on direct observation of the local context, understood as presence in the territory and attention to the material and symbolic transformations of the town, to the elements visible in the urban space, and to the concrete outcomes of the declared project pathway. The integration of these two sources makes it possible to keep distinct, yet analytically connected, the level of public discourse and that of the actual state of the process, thereby providing an account that does not aim to evaluate the experience in normative terms, but to describe its modes of emergence, the forms it has assumed, and its current conditions of development.

The Renewable Energy Community of Biccari has established itself in the public sphere through a broad and articulated media narrative, constructed over time by a plurality of newspapers, specialised journals, and platforms dedicated to the themes of sustainability, social innovation, and energy transition. Since 2020, the project has been portrayed as one of the first renewable energy community experiences launched in Italy in cooperative form, rapidly acquiring exemplary status in the national debate on RECs, particularly in the contexts of small municipalities and inner areas.

Portals such as *Italia Che Cambia*, *Italia Circolare*, and *Altreconomia* situate Biccari's experience within a wider account of territorial good practices,

emphasising the town's capacity to anticipate innovative processes in the field of shared energy (La Trofa, 2022; Facchini, 2021). In these contributions, the energy community is described as an instrument capable of combining environmental sustainability, civic participation, and local development, highlighting the active role of citizens and the possibility of reducing energy costs through collective self-consumption. Similarly, specialised journals and websites such as *Smart Building Italia* present Biccari's REC as an example of innovation applied to the built environment, underlining its pioneering character and its potential replicability in other Italian villages (Ventimiglia, 2023).

Platforms linked to the cooperative world and the social economy, such as *Respira Coop* and *Fa' la cosa giusta!*, also contribute to reinforcing this image, portraying the energy community as the expression of a grassroots green revolution, capable of restoring centrality to marginal territories and promoting new forms of local cooperation⁵⁶. In these narratives, Biccari is often represented as a laboratory of social innovation, in which renewable energy becomes a lever to strengthen community ties and to construct new trajectories of development.

A central role in the construction of the narrative is also played by channels linked to the actors directly involved in the project. Specifically, the website of the energy cooperative *èNostra*⁵⁷, the technical partner of the initiative, presents the collaboration with the Municipality of Biccari as a pilot project of a renewable energy community, highlighting the launch of the feasibility study and the intention to accompany the administration and citizens along a structured pathway towards collective self-consumption (*èNostra*, 16/10/2020). Similarly, portals such as *Comuni Rinnovabili* and *Next Economia* take up and disseminate information about the project, reinforcing the idea of an energy community already defined in its essential features⁵⁸.

⁵⁶<https://www.respira.coop/news/a-biccari-in-puglia-nasce-la-prima-cer-da-una-cooperativa-di-comunita/>

⁵⁷ <https://www.enostra.it>

⁵⁸ <https://esg.nexteconomia.org/utente/cer-di-biccari/>

The visibility of the project is further amplified by television coverage, such as that broadcast by *RaiNews TGR Puglia*⁵⁹, which situates Biccari's REC within formats dedicated to sustainability and renewable energy, thereby contributing to the dissemination of the town's image as a territory at the forefront of the energy transition. Within this ensemble of narratives, the energy community appears as a process already underway and oriented towards progressive technical and social implementation.

Alongside this mediatized narrative, direct observation of the local context nevertheless reveals a different, more fragmented and less linear picture. Despite the reiteration of announcements and the persistence of media visibility over time, no photovoltaic installations clearly attributable to a fully operational renewable energy community are observable in the urban fabric of the town. The expectations generated by the public narrative—particularly regarding the spread and visibility of solar panels on public and private buildings—do not find immediate confirmation in the physical space of the village.

During the observation, the only photovoltaic installations recognisable on public buildings were those located on the roof of the multifunctional centre "*Bollenti Spiriti*" and on that of the municipal library.

Although frequently recalled in institutional and media communication as part of the energy community's trajectory, these plants are not connected to the electricity grid nor integrated into a functioning collective self-consumption system. This evidence is reinforced by consultation of the official mapping of the *Gestore dei Servizi Energetici* (GSE), which does not list Biccari's REC among the active energy communities in 2025⁶⁰. Confirming this finding, in the *Geoportal Energia e Territorio* of RSE (*Ricerca sul Sistema Energetico*), Biccari's REC is classified as being in the design phase, indicating that the pathway has not yet reached a stage of full technical and managerial operability⁶¹.

⁵⁹ <https://www.rainews.it/tgr/puglia/video/2023/02/tgreen-cer-comunita-energetiche-rinnovabili-biccari-f7265747-ba3e-441b-ac94-ed689272526c.html>

⁶⁰ Last accessed: 12 December 2025 <https://www.gse.it/servizi-per-te/autoconsumo/elenco-delle-configurazioni>

⁶¹ Last accessed: 12 December 2025 <https://geoportale.rse-web.it/#/viewer/openlayers/769>

The gap between the public image of the project and its technical materialisation thus emerges as a salient feature of the experience.

From the perspective of the project pathway, journalistic and institutional sources concur in identifying the formal launch of the energy community in 2020, with the commissioning of the feasibility study to the cooperative *èNostra* (Gia & Jadeluca, 2020). This step is presented, in articles published by *Italia Che Cambia*, *Italia Circolare*, and on the cooperative's own website, as the founding act of the project and as a signal of governance oriented towards collaboration between the municipal administration, technical expertise, and citizens. The project sequence is described as progressive and orderly, moving from the study phase to legal constitution and, subsequently, to the activation of the implants.

The observable state of affairs, however, indicates that several years after the launch of the pathway, there are no public signs of a renewable energy community that is stably constituted and genuinely operational. No governance bodies are recognisable in the ordinary management of the project, nor is there documentation attesting to the regulation of energy flows or the formalisation of relations among participants. The process appears to be concentrated predominantly in its initial phase, characterised by design, communication, and the construction of expectations, rather than by consolidated management over time.

Also in terms of participation, the media narrative and direct observation return images that are not fully coincident. Outlets such as *Respira Coop* and *Smart Building Italia* emphasise the potential involvement of a significant number of families, the organisation of information meetings, and the promise of economic benefits linked to the reduction of energy bills. Consequently, participation is described as a central and qualifying element of the experience.

However, in the everyday life of the town, there are no signs of continuous and structured involvement that goes beyond the preliminary phases. No regular assemblies dedicated to the management of the energy community are held, nor are there public spaces stably recognisable as places of project coordination. The participatory dimension thus appears more present in the media discourse and in the project phase than in the daily practices of the locality.

Overall, the experience of Biccari's REC takes shape as a process characterised by strong media exposure and a coherent and persistent public narrative, supported by numerous journalistic outlets and specialised platforms, in contrast with an implementation status that still appears partial. The energy community is fully present in the symbolic and communicative space of the town, while its material and organisational infrastructuring is less evident.

This gap between narrative and practice is not interpreted here in evaluative terms, but described as a constitutive element of the experience itself. The case of Biccari shows how, in the contexts of inner areas, energy transition processes may unfold along trajectories in which the mediatic and projectual dimensions precede and at times exceed concrete realisation. Such a configuration makes the case particularly significant for interrogating, in the following paragraphs, the conditions that affect the passage from announced project-making to the possible and announced participation of the community.

5.3 Conceptualising the REC: identity, governance and community

Although exploratory in intent, and without any claim to generalisability of the data collected, the field research conducted in Biccari clearly demonstrates how cultural dynamics and identity-related aspects are two critical dimensions that prove difficult to intertwine with practices of adhesion to energy communities. In particular, the interviews conducted with citizens and the Mayor of Biccari insist on these aspects and provide some interesting insights into the numerous dynamics and dimensions that influence the energy transition within local territories. In this way, such reflections have enabled a new and unprecedented analysis of the dimension of transition, making visible the possible correlation with the halting of the process of community formation even before its actual start.

From the reading of the data collected, the main dimensions that appear to affect the representation of RECs as valid instruments for improving levels of sustainability in the energy field can be summarised in the following table (figure 8).

Figure 8: Table of emerging topics

<i>Emerging topics</i>
Previous experience
Self-management tool
Social skills
Deliberative practices
Energy sustainability
Source: Author's elaboration of data emerging from the interviews

Within these emerging themes, the role of leadership processes becomes crucial. The functions, including political ones, attributed to the Mayor and the municipal administration are highly diverse. Positioned halfway between a community manager and a community animator, this figure is called upon to perform a dual function: a vertical intermediary, when it comes to managing and coordinating relations with third-sector organisations, in relation to which they must ensure the quality of economic, technical, and sustainability processes; but also a horizontal intermediary among citizens, where they assume the role of moderator. In particular, this is achieved by leveraging the construction of community.

*"We, as a Municipality, can say that we made a choice. At the level of the administration, we have resources at our disposal which are provided to us by the companies that extract hydrocarbons in our territory, because from an energy perspective we do not only have renewable plants but also fossil ones, namely hydrocarbon extraction. Thus, the law grants us small royalties. We made this political choice, which is also quite significant, to use these hydrocarbon royalties to build renewable energy production plants; therefore, to move, also in practical terms, from the fossil condition to the renewable one. So the Municipality builds the plants. Moreover, the REC is a very powerful instrument because it allows us, as an administration, to tell citizens: 'you can step out of this dimension of subordination if you self-organise and you can become producers through some basic elements but also with a fair degree of freedom of action.' From this perspective, it is an almost revolutionary instrument. Of course, one must then understand how it can be used in practice. Here we encountered several difficulties, which we somehow managed to overcome because the Municipality has always worked on the potential of our people."**
(Interview with the Mayor, July 2023. Author's own translation)

On the themes connected to the motivations that drive local administrators to join initiatives of collective green energy production in order to improve territorial sustainability, "past experiences" represent the key factor on which it is necessary to invest in order to activate practices of experimenting with RECs within the territories. Both to reactivate previous experiences and to mobilise competences

already consolidated within society, for local governance it proves fundamental to anchor the energy community project to the narrative of earlier initiatives which, consequently, have made possible an increase in the public value of space.

"We established the community cooperative in 2017, which now has 200 members and is a very interesting laboratory. In short, we almost define it as a social infrastructure of the town, and we have already experimented in some way with the potential of being together. It was within that context that the idea of taking up the challenge of energy communities also emerged. Probably, if this place—this community cooperative—had not existed, we would not have started so early with the energy community. Instead, we are in a context where the energy was already there, the community was already there, and we simply had to bring them together in this new project." (Interview 4, Citizen member of the community cooperative, July 2023. Author's own translation)

For those living in a small village, the dimension of the *welfare space*—that is, the possibility of making public spaces socially relevant—acquires particular significance in everyday practices (Fanizza & Spallone, 2023). Indeed, through the analysis and observation of Biccari's territory, it becomes evident that one of the most striking features of this area is the dynamism of associative life. A reticular and, in some respects, fertile activity generates constant vibrancy in public spaces, primarily, though not exclusively, with the aim of revitalising tourist attractiveness and repopulating the village. Moreover, the welfare dimension is a fundamental factor for increasing levels of well-being and reducing the risk of energy poverty.

"We made this political choice, so the Municipality builds the plants. The other partner in the project is Arca Capitanata, because spaces, roofs, and above all municipal buildings were exhausted, and therefore the Mayor asked Arca Capitanata to grant, free of charge, the surface rights to all the roofs of the public housing it manages in our town. The element that then determined the more social nature of this experiment is the fact that the main beneficiaries are precisely the residents of these public housing units, and so they decided, in a gradual perspective, to offer this instrument first to those who, simply by virtue of their housing condition, are most in need of combating the effects of energy poverty." (Interview 11, Citizen member of the energy community, May 2023. Author's own translation)

From the interview, a clear awareness emerges of the social and cultural value that spaces in general—and above all public spaces involved in REC projects—can generate among the population. Although communication with Enel (the energy provider) represents a weakness for project design, lowering levels of accessibility and creating critical issues regarding the possibility of extending the project's boundaries, the dimension of accessibility—understood as the opportunity offered

to citizens to join the energy community—constitutes the *trait d'union* between community and participation. Indeed, the sections of the interview that investigate the criticalities linked to deliberative practices demonstrate, conversely, the positive perception that citizens and local administrations have of the REC.

In summary, the dimension of risk does not appear to have a significant impact on the representation of energy communities as instruments for improving collective well-being. Moreover, the dimension of risk does not seem to be correlated with the social dimension, but rather with Enel's inefficiency in establishing itself as a technical support entity in the territory.

"For example, what was our difficulty? In our first project, Enel gave us a connection solution 3 km away from the plant, therefore very distant, very costly, and requiring not only a very significant financial commitment on our part, but also the construction of another substation. With waiting times of twenty-four months. At first, Enel did not provide me with the map of the substations present in our territory. After a legal warning, we managed to obtain the map of the energy network, of the power lines present in our territory with the related substations. When we asked for the connection solution for the plant, it was given to us very far away, with long times and high costs. Therefore, we had to divide the plant, making two smaller connections, because with connections of less than 25 kW we were able to obtain closer solutions. So instead of building a single large plant of 70 kW, we had to build several smaller plants of less than 25 kW. Clearly, however, this means increasing fixed costs." (Interview with the Mayor of Biccari, July 2023. Author's own translation)

Therefore, in general terms, the dimension of space is linked to that of well-being within a perspective of territorially situated welfare, whose characterisation is strongly correlated with the concepts of energy sustainability, the modalities through which collaboration among different actors takes place, and the reduction of the risk of energy poverty. Indeed, the dynamics of participation and involvement in the processes activated have been directed towards understanding the needs of families already experiencing a situation of energy vulnerability.

"Another choice was made: it was said, 'we will use this module for social purposes, because we are addressing only those people with a certain ISEE level, who live in public housing.' Therefore, it has this social nature." (Interview 17, Citizen of the Village, August 2023. Author's own translation)

In this case, while it is evident that the "social nature" is not merely a separate component of the project, there is also a sense of regret regarding the possibility of recalibrating the concept of welfare space, annexing it to the capacity to constitute

a concrete device for those inhabitants not equipped to cope with “new risks of social exclusion.” Thus, following the trajectory outlined by the concept of *gardening nature*—that is, an approach aimed at dismantling intervention logics centred exclusively on systems of preventing social vulnerabilities—the energy community can be articulated in two ways: on the one hand, as a possible strategy for controlling risks arising from energy vulnerability; on the other, as an encounter between the natural environment and the social environment, within which the demand for well-being takes root in order to develop a welfare system that is new and, in certain respects, unprecedented.

"Let us say that the energy community is an instrument for well-being. It also serves to respond to new risks of social exclusion, given the price of energy. It is also used experimentally to understand the connections between natural resources and technologies, to identify the strengths and weaknesses of this model, to see what needs to be corrected, and meanwhile to look elsewhere as well." (Interview 5, Citizen of the Village, August 2023. Author's own translation)

5.4 The results: the REC as a device for territorial enhancement

The overall analysis of the Biccari case makes it possible to highlight a set of findings that go beyond the single experience of an energy community and more broadly question the role of Renewable Energy Communities (RECs) in inner area contexts. In the preceding sections, the energy community has emerged as an articulated process, characterized by strong public visibility, an intense discursive production, and a project trajectory that has developed in a non-linear way with respect to its actual technical implementation. From this perspective, the Biccari case shows how a REC can function, at least in an initial phase, as a territorial valorization device, capable of activating narratives, attracting media attention, and redefining the symbolic positioning of the village, even in the absence of full infrastructural operability.

5.4.1 The territorial dimension: the REC as a symbolic lever in inner areas

Embedded in the inner-area context of the Monti Dauni, the Biccari Renewable Energy Community (REC) is located in a territory marked by structural dynamics of marginality, depopulation, and a contraction of economic and employment

opportunities. As has emerged, these conditions make the village particularly exposed to the search for valorization strategies capable of countering processes of demographic and symbolic decline. Within this framework, the energy community takes on a function that goes beyond the strictly energy-related dimension and is configured as a tool through which the territory can be narrated as a site of experimentation, innovation, and project-making capacity.

This function is part of a broader strategy aimed at constructing a new territorial narrative, one that engages with emerging forms of place use associated with a type of tourism that, while distancing itself from the logics of intensive touristification (Jover & Barreo-Rescalvo, 2024), proposes alternative modes of territorial consumption. From this perspective, the energy community contributes to the construction of a new narrative of the village that resonates with emerging ways of experiencing the territory. The summer initiatives promoted by the municipality and the activities of the Biccari Adventure Park (including the School in the Woods and the summer camps organized between 2020 and 2021)⁶² represent examples of tourism that diverges from the logics of intensive touristification and instead proposes alternative ways of engaging with the territory. These experiences privilege temporary stays, environmental education, and relationships with the natural context, and have generated significant media resonance.

Widely covered by the media and characterized by strong visibility, particularly in Northern Apulia, these experiences contribute to shaping an image of the village as a space of experimentation, reinforcing a narrative oriented toward sustainability, slowness, and engagement with the environment. In this sense, the REC becomes part of an ecosystem of initiatives that, while operating on different levels, jointly contribute to redefining how the territory is represented, experienced, and temporarily inhabited, rather than merely visited.

⁶² <https://www.dauniavventura.com/2021/07/12/la-scuola-nel-bosco-2021/>

5.4.2 The governance dimension

The findings show that governance represents one of the central nodes in the process of building the Biccari Renewable Energy Community. The leadership of the municipal administration emerges as a decisive element both in the start-up phase of the project and in its public legitimation. As discussed in Section 5.3, the Mayor and the local administration assume a hybrid role situated between that of institutional intermediary and community facilitator, tasked with coordinating diverse actors and translating the technical complexity of the REC into a language accessible to citizens.

Accordingly, this type of initiative displays features that can be traced to a predominantly top-down dynamic, insofar as the project impulse and the definition of strategic choices originate exclusively from the local authority. At the same time, this dimension intersects with certain bottom-up elements, linked to the presence of pre-existing social capital and an active associative network, which contribute to rendering the project socially legitimate. Local governance thus takes shape as a mediating device rather than as a mere command structure, capable of articulating political visions, technical expertise, and social expectations.

Within this framework, the energy community also becomes a form of symbolic or potential policy through which the administration asserts a political orientation toward sustainability and the ecological transition. However, governance appears to be heavily engaged in managing project design and communication, while the absence of a fully operational REC limits the transition toward a phase of ordinary and shared management of the process.

5.4.3 The socio-technical dimension

From a socio-technical perspective, the Biccari case reveals a configuration characterized by a strong emphasis on project design and by partial implementation. The Renewable Energy Community model outlined in public narratives envisages the production of energy from renewable sources through the installation of photovoltaic systems on public and residential buildings, with the declared aim of

activating mechanisms of collective self-consumption and of redistributing economic and social benefits among participants. However, the energy community is not yet operational from a technical standpoint, and the systems currently present in the area do not appear to be integrated into an effectively functioning energy-sharing network.

Alongside this condition, a further analytically relevant element concerns the limited availability of publicly accessible technical information. No institutional sources or technical documents emerge that would allow for a detailed reconstruction of the socio-technical configuration of the REC, such as the total installed and active capacity, grid connection arrangements, consumption and production profiles, or criteria for energy allocation among members. The absence of structured and verifiable data makes it difficult to assess the degree of infrastructural advancement of the project and contributes to positioning the experience primarily within the sphere of project design and communication.

The network of actors involved in the process includes the municipal administration, external technical partners, and third sector organizations, each with distinct roles in the phases of project conception and support. However, in the absence of full activation of the energy community, these roles largely remain confined to the project and communication dimension, without translating into stable operational practices or consolidated socio-technical arrangements. Relationships among actors therefore appear to be defined more at the level of intentions and programmatic statements than at that of coordinated and continuous action.

This configuration contributes to reinforcing the symbolic character of the energy community, which continues to be represented as a process in the making and as an open project, maintaining a constantly evoked threshold of possibility that has not yet been translated into a stable and functioning infrastructure. In this context, the socio-technical dimension of the Biccari REC takes shape as a space of potential interaction, in which the promise of innovation precedes and, at least temporarily, substitutes for its actual material implementation.

5.4.4 The participatory dimension

The participatory dimension emerges as one of the most recurrent and strongly emphasized elements in the narrative surrounding the Biccari Renewable Energy Community. In public discourse, institutional communication, and interviews conducted with administrators and residents, participation is presented as a foundational principle of the project and as a distinctive feature in contrast to traditional energy models, which are perceived as distant and centralized. The declared intention is to actively involve the local community not only as a beneficiary of outcomes, but as a co-responsible actor in the processes of energy production and management.

In particular, the orientation toward addressing energy poverty represents a central axis of the participatory dimension. The decision to prioritize households living in public housing gives the REC a marked social orientation, situating it within a broader reflection on energy welfare and on the role of energy communities as instruments for mitigating vulnerability. This approach reinforces the idea of the REC as a device capable of intertwining environmental sustainability and social justice, attributing to participation a meaning that goes beyond mere formal adherence.

However, the analysis of the current state of affairs shows that participation takes on a predominantly potential form in practice. The absence of a fully operational energy community limits opportunities for concrete involvement and reduces the ability of residents to directly experience practices of energy self-management and to benefit tangibly from mechanisms of collective self-consumption. In this sense, participation is situated in an anticipatory phase, based more on adherence to a future project than on consolidated everyday experiences.

Despite this limitation, the participatory dimension retains significant symbolic relevance. The energy community contributes to the construction of a shared imaginary of autonomy, co-responsibility, and collective capacity for action, reinforcing a sense of territorial belonging and the perception of the REC as a common good. Even in the absence of stable operational practices, the appeal to participation sustains a representation of the community as an active subject of the

energy transition, capable of imagining alternative forms of resource production and management.

From an empowerment perspective, the findings indicate that the Biccari REC primarily generates symbolic and discursive empowerment. Through meetings, public communication, and shared narratives, residents are recognized as potential protagonists of change, strengthening their perception of agency with respect to energy issues and territorial well-being. However, the lack of a functioning energy infrastructure and of participatory management mechanisms limits the transformation of this symbolic empowerment into practical skills and effective decision-making capacity.

Overall, the participatory dimension of the Biccari REC takes shape as a space of tension between project intentionality and actual practices. On the one hand, participation constitutes a key element of the narrative and contributes significantly to territorial valorization and the social legitimation of the project. On the other hand, the absence of an active energy community prevents participation from translating into stable forms of operational involvement. This configuration highlights how, in inner-area contexts, participation may assume a predominantly symbolic function in the initial phases of the transition, keeping open a threshold of possibility that remains, at least temporarily, not fully realized.

5.4.5 The social representation

One of the most evident findings concerns the social representation of the energy community. The Biccari Renewable Energy Community is embedded in a narrative that portrays it as a pioneering experience, an example of innovation, and a symbol of a territory capable of anticipating the ecological transition. This representation is supported by a broad and continuous media coverage, which contributes to consolidating the image of the village as a space of experimentation.

The social narrative surrounding the REC intersects with other territorial narratives, particularly those related to experiential tourism, environmental education, and the valorization of natural heritage. In this sense, the energy community is not an isolated element, but part of a broader storytelling framework that redefines the way the territory is perceived and engaged with, rather than merely visited.

5.4.6 Barriers

Finally, the findings highlight the presence of structural barriers that significantly affect the energy transition process. Among these, particular importance is attributed to technical difficulties related to grid connection and the management of relations with the energy operator, which function as obstacles capable of slowing the implementation of the energy community and prolonging its persistence in a project phase. Added to these critical issues is a relevant temporal element: since 2020, the year in which the planning process formally began, the Biccari Renewable Energy Community has not yet been implemented or activated, despite the continuity of public narratives and declared project intentions.

This lack of implementation over the medium term represents a central factor in understanding the nature of the barriers encountered. These obstacles cannot be reduced to contingent difficulties, but rather take the form of structural impediments to the translation of the project into an operational infrastructure. Such barriers do not appear to significantly affect the social representation of the energy community, which remains predominantly oriented toward the future potential of the project. On the contrary, they produce a persistent gap between narrative and practice, between announced project ambitions and concrete realization.

This gap contributes to configuring the Biccari Renewable Energy Community as a frontier space of the transition. It is an apparently open frontier in which expectations, media visibility, and project narratives accumulate, but which tends to generate primarily symbolic effects. The energy community thus occupies a prolonged threshold, in which territorial valorization and meaning-making precede and, at least temporarily, substitute for actual infrastructural transformation, rendering the transition a process that is narrated more than it is practiced.

6. SAN SEVERO: THE ENERGY COMMUNITY BETWEEN WELFARE AND INNOVATION

6.1 The city of San Severo and the territorial context

San Severo is a municipality in the province of Foggia, located in the northern sector of the Tavoliere delle Puglie, a territory strongly shaped by the historical and contemporary socio economic dynamics of the Capitanata area. With a surface area of approximately 333 to 336 km² and a predominantly flat morphology, the city occupies a strategic geographical position between the urban centres of Foggia, Lucera, Torremaggiore, and Rignano Garganico, embodying the role of an urban node within the territorial context of the Alto Tavoliere⁶³.

In recent decades, San Severo has experienced demographic trends marked by population decline and ageing, in line with many areas of Southern Italy characterized by migration flows toward Northern regions or abroad, together with a negative natural balance resulting from declining birth rates and a relative increase in the elderly population⁶⁴. According to ISTAT data and available statistical evidence, the city has seen a gradual reduction in its number of residents compared to the early 2000s, reflecting processes of demographic contraction associated with socio economic vulnerability and limited generational turnover⁶⁵.

These demographic dynamics are accompanied by a condition of structural ageing, with a growing share of adult and elderly residents compared to younger cohorts. This phenomenon has significant implications both for public service planning and for social cohesion and forms of civic participation. The progressive outmigration of younger populations is also symptomatic of declining employment opportunities at the local level, revealing structural fragilities in urban development pathways and in trajectories of socio economic inclusion.

From a territorial perspective, San Severo stands out within the Apulian context as an intermediate urban centre. It cannot be fully assimilated to more remote inner areas, yet it is not entirely integrated into the growth dynamics of the main Apulian

⁶³ https://www.comune.san-severo.fg.it/vivere_il_comune/territorio/territorio_1.html

⁶⁴ <http://demo.istat.it/pop2011/index.html>

⁶⁵ <https://www.tuttitalia.it/puglia/44-san-severo/statistiche/popolazione-andamento-demografico/>

cities. As an urban peripheral node, it displays hybrid characteristics. On the one hand, it functions as a centre of services and economic relations for the surrounding area, particularly with reference to the agri food sector. On the other hand, it shows signs of erosion of traditional urban functions, including demographic decline, loss of investment attractiveness, and difficulty in sustaining processes of economic modernization (Contò & Lopez, 2008).

This configuration can be interpreted through the conceptual lens proposed by Fanizza with the notion of the “void at the centre,” according to which, in certain territorial contexts, the relationship between citizens and institutions is characterized by feelings of disaffection and distance from public affairs, perceived as alien or incapable of effectively responding to local needs. This dynamic feeds a sense of abandonment or instrumentalization of community demands (Fanizza, 2008). Such a condition is not merely an administrative deficit, but concerns the very way in which the collective identifies or fails to identify with the urban project, generating a fracture between social needs and the institutional capacity for governance and territorial vision. In this sense, the void at the centre is not only a moral or symbolic phenomenon, but a concrete rhythm of social and power relations that translates into challenges for cohesion and civic participation (ibid.).

The city has deep historical roots in the agricultural economy. Cropping traditions linked to viticulture, olive growing, and cereal production have long shaped its economic structure. San Severo is also known for Sansevero DOC wine, one of the first to receive this designation in Apulia, and for the diffusion of the so called “Sanseverese vase,” a distinctive olive tree pruning technique typical of the Capitanata area (Speranza et al., 2022).

However, although specific agricultural sectors remain an integral part of local identity, the role of agri food production as a driver of employment and productivity has declined over time. This has been accompanied by the relative growth of a service based tertiary economy that has nevertheless failed to generate sufficient levels of growth to reverse the broader trend of economic slowdown.

In particular, the presence of high quality agricultural production has not translated into an inclusive and sustainable development circuit. The persistent weakness of local supply chains, the marginalization of small and medium sized agricultural

entrepreneurs within global markets, together with the absence of technological innovation hubs and business support infrastructures, represent structural factors that constrain the capacity to generate qualified employment and attract young human capital.

A significant element of the territorial dimension surrounding San Severo concerns the presence of labour exploitation and illegal recruitment practices in the surrounding countryside. In particular, the so called “Gran Ghetto” located between San Severo and Rignano Garganico represents one of the most striking examples in Italy of informal settlements for seasonal agricultural workers, characterized by poor housing conditions, severe exploitation, and deprivation of rights (Fanizza and Omizzolo, 2019). Here, farm labourers, often coming from other Italian regions or from Sub Saharan Africa, live in informal settlements during harvest seasons, facing extremely low wages and conditions of material deprivation documented by numerous journalistic investigations and social studies (Omizzolo, 2019).

Despite various institutional initiatives and regional interventions aimed at addressing these conditions, the issue remains complex and deeply rooted. It reveals how the socio economic vulnerabilities of a significant segment of the population intersect with practices of labour exploitation, spatial marginality, and institutional fragility. Recent contributions highlight that informal settlements continue to function as spaces of degradation and illegality, where improvements in housing conditions have not been sufficient to overcome the structural irregularity and precariousness of residents’ lives (Fanizza and Spallone, 2024).

In this context, the city of San Severo is not merely a geographical transit point, but an urban node where dynamics of migration, seasonal labour, social fragility, and territorial governance intersect. These conditions acquire particular significance when read through theoretical tools such as the concept of the void at the centre, which underscores how social and institutional relations struggle to translate into shared development pathways and effective responses to everyday vulnerabilities. In response to the challenges of the urban and territorial context, San Severo has over the years experimented with innovative planning projects, including the “Mosaico of San Severo,” an initiative of urban regeneration and landscape protection that has recently celebrated its tenth anniversary through institutional

dialogue, civic participation, and territorial experimentation. This project has involved institutions, citizens, and local stakeholders in a dialogue on the urban future and on the valorization of relationships between urban and rural environments, placing participation and the transformation of public space at its core (Mucilli, 2021; Fraccacreta et al., 2019).

The significance of these regeneration processes lies in their attempt to construct long term visions that go beyond emergency management, seeking to generate a sense of community, belonging, and urban project making. In a city that is weakly attractive to external resources and characterized by consolidated vulnerabilities, such initiatives represent efforts to fill institutional gaps and to transform the criticalities of San Severo's public space into opportunities for the co production of shared spaces, values, and practices.

Within this complex socio territorial framework, the energy issue cannot be understood as a merely technical or infrastructural management problem. Instead, it emerges as a crucial node in trajectories of social inclusion, sustainability, and territorial justice.

6.1.1 Local governance and energy policies

In a city marked by high levels of economic vulnerability, a fragile productive fabric, and forms of civic participation undermined by a perceived institutional abandonment, energy policies take on a strong welfare dimension. Access to decent, sustainable, and affordable energy services is closely linked to quality of life, the reduction of inequalities, and the construction of new forms of relationship between citizens, institutions, and communities.

San Severo can therefore be interpreted as an urban peripheral frontier space in which energy enters the field of social action even before that of infrastructural planning, and where energy transition practices intertwine with demands for welfare, participation, and territorial regeneration that emerge from the concrete living conditions of the population.

The theme of the energy transition has also found space within local political discourse, having been repeatedly addressed during the electoral campaign for the

2024 municipal elections. In particular, the civic list Alternativa Civica, through the mayoral candidacy of Lidya Colangelo, proposed the creation of a city wide energy community as one of the qualifying pillars of the electoral program, presenting it in public debates as a lever for combining environmental sustainability, economic savings, and social inclusion.

However, more than one year after the administration took office, this proposal has not yet been translated into operational measures, despite being included in the Guidelines of the Mandate within the section dedicated to energy policies and the ecological transition. No city council sessions have placed on the agenda resolutions or acts aimed at initiating feasibility studies or formal planning pathways related to energy communities. The energy transition thus remains located primarily at the level of programmatic declaration, without concrete institutionalization within administrative practices.

An initial sign of political interest can be identified in the city Council meeting of 6 February 2025⁶⁶, during which the governing majority expressed a willingness to initiate a public debate on energy communities. On that occasion, city councillor Marianna Orlando, explicitly referring to Mayor Colangelo's electoral program, reiterated the intention to promote energy policies through the creation of Renewable Energy Communities on public buildings, highlighting their potential economic, social, and environmental benefits⁶⁷.

Nevertheless, the intervention remained largely explanatory and introductory, limited to clarifying what an energy community is and what theoretical opportunities it may offer. The absence of a subsequent translation into concrete acts has contributed to keeping the issue in a state of conceptual limbo, in which the energy transition appears as a shared discursive horizon that has yet to acquire real institutional traction. This gap between political narrative and administrative action reinforces the interpretation of San Severo as a frontier space of the transition, in which promises of energy innovation could evolve into structured and operational processes.

⁶⁶ <https://www.comune.san-severo.fg.it/il-consiglio-comunale-convocato-il-5-e-6-febbraio-2025/>

⁶⁷ <https://sansevero.consiglicloud.it/archive>

6.1.2 Caritas of the Diocese: role, functions, and importance in the community

The Diocese of San Severo is a jurisdiction of the Italian Catholic Church linked to the Archdiocese of Foggia-Bovino and included within the ecclesiastical region of Apulia. It encompasses a historical territory that includes, in addition to the city of San Severo, several neighbouring municipalities, and it is characterized by a community of believers that is deeply rooted in identity, cultural, and religious terms. The diocese is led by Bishop Giuseppe Mengoli, who took office in 2023 after many years of local episcopal leadership, and it includes a significant proportion of baptized members relative to the resident population⁶⁸.

Within an urban community marked by socio economic fragilities and a growing demand for welfare services, the Catholic Church in San Severo functions not only as a spiritual reference point, but also as an active actor in social intervention, inclusion, and support for individuals and families in difficulty. At the centre of this outward facing Church, oriented toward dialogue with local civic and associative realities, stands the Diocesan Caritas of San Severo, the ecclesial body responsible for promoting and coordinating projects and actions related to solidarity, social justice, and the fight against poverty.

Present in all Italian dioceses under the umbrella of Caritas Italiana and therefore connected to Caritas Europa and Caritas Internationalis, Caritas serves as the pastoral office responsible for animating and promoting the charitable and social service activities of the Church. Its concrete action unfolds through listening centres, soup kitchens, aid services, inclusion projects, anti poverty initiatives, and accompaniment pathways aimed at people living in conditions of vulnerability, marginality, or hardship. Caritas' mission is therefore not merely assistential, but oriented toward recognizing human dignity, promoting social justice, and fostering processes of emancipation and active inclusion.

In the specific case of San Severo, the Diocesan Caritas plays a leading role within the territorial welfare system, acting as a hub that connects the ecclesial community, civic institutions, the third sector, and informal solidarity networks. Caritas

⁶⁸ <https://www.diocesisansevero.it/>

activities span multiple domains, ranging from the management of first reception services to the promotion of training pathways, from socio economic accompaniment to the construction of collaborative networks with other local actors, with the aim of responding in an integrated manner to emerging needs.

Among the most significant initiatives promoted by Caritas in San Severo is the Solidarity Emporium “Don Felice Canelli,” inaugurated in June 2021 as a concrete response to the economic and social hardships intensified by the pandemic crisis and the persistent economic fragility affecting many local families. The Emporium represents an emblematic example of how the local Church interprets its mission of service within the community, not merely as the distribution of goods, but as a space of listening, dignity, and social inclusion. It operates as a store where goods are not purchased with money, but accessed through a membership system and the allocation of points for shopping based on the needs of families eligible for the service.

Named after Don Felice Canelli, a priest recognized as Venerable by the Holy See and remembered for his dedication to the poor and the marginalized, the Emporium was established with the support of Caritas Italiana through funds from the eight per thousand tax allocation. It is conceived as a place of systemic solidarity, where the response to primary needs is intertwined with pathways of human and social accompaniment⁶⁹.

The functioning of the Emporium is based on a points based free supermarket model. Beneficiaries, assessed through Caritas listening centres, receive a temporary card that allows them to autonomously choose essential goods such as food and personal and childcare hygiene products according to their specific needs. This mechanism not only addresses material urgency, but also seeks to safeguard personal dignity by enabling autonomous choice rather than imposing predefined assistance.

Beyond the distribution of goods, the Emporium promotes integrated services of guidance, training, and socialization, and it functions as a meeting place for different social actors, strengthening support networks for individuals and families

⁶⁹ <https://www.caritasdiocesisansevero.it/>

in difficulty. The presence of such integrated spaces reflects a vision of welfare that cannot be reduced to the mere provision of material aid, but is conceived as an opportunity for encounter, dialogue, and the promotion of human dignity.

The Emporium also plays a role in reducing food waste through cooperation with local businesses and enterprises that donate surplus goods, thereby integrating the material value of assistance with the ethical and community oriented value of sustainability.

Overall, experiences such as the Solidarity Emporium highlight how Caritas is not simply an assistential organization, but a strategic actor in territorial welfare, capable of interpreting multidimensional needs and of networking institutional, spiritual, and community resources. This bridging role between the Church, civil society, and public administration is particularly significant in contexts such as San Severo and in projects such as the energy community, where social fragilities and inequalities make central the function of actors able to integrate material interventions with actions aimed at human promotion and social inclusion.

6.2 The Solidarity Energy Community “Energia di Speranza”

The Renewable and Solidarity Energy Community “Energia di Speranza” in San Severo is situated within an urban context marked by widespread socio economic fragilities, a weak institutional capacity to identify and translate emerging needs into structured policies, and a significant presence of third sector actors engaged in proximity based welfare. Within this framework, the solidarity energy community does not take shape as a merely technical energy initiative, but rather as a complex socio territorial device in which energy transition, welfare, technological innovation, and social accompaniment are intertwined in a non linear manner.

The project originates and develops through an alliance among heterogeneous actors. The Diocesan Caritas of San Severo acts as the lead organization and as the primary social infrastructure. Hivergy, a technology start up legally based in San Severo, plays the role of technical partner. The Agape cooperative is involved in activities of promotion and territorial animation. The initiative is financially

supported by Fondazione con il Sud, which funds the project in recognition of its social and territorial relevance⁷⁰.

The analysis presented here is based on a qualitative research design that integrates interviews with project promoters, engagement with participating families, direct and prolonged observation in key project sites, particularly the Solidarity Emporium “Don Felice Canelli,” participation in informational and public meetings, as well as analysis of the technical and economic feasibility study prepared by the technical partner. This approach makes it possible to grasp not only the formal structure of the CERS, but also the practices, representations, and tensions that traverse the process of building the energy community.

6.2.1 Project design and identity construction

The genesis of the Renewable and Solidarity Energy Community “Energia di Speranza” is closely linked to the encounter between an already well-established social sensitivity and a drive toward technological innovation that finds in energy a shared field of convergence. The Diocesan Caritas of San Severo, the ecclesial body responsible for promoting charitable action and social intervention, represents the social and symbolic core of the project, starting with the very name chosen for the energy community. Oriented toward supporting people in conditions of hardship and promoting human dignity, its mission has progressively come to include environmental and energy issues as well, in line with the teaching of Pope Francis and with the encyclical *Laudato si’* (2015)⁷¹, which advances a vision of “integral ecology” capable of holding together environmental concerns, social justice, and ethics.

This thematic openness converges with the proposal put forward by Hivergy, a start-up founded in 2023 by a group of young professionals with engineering and

⁷⁰ <https://www.fondazioneconilsud.it/progetto-sostenuto/comunita-energetica-san-severo/>

⁷¹ https://www.vatican.va/content/dam/francesco/pdf/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si_it.pdf

information technology backgrounds, two of whom originate from San Severo⁷². The decision to approach Caritas as the first interlocutor was not accidental, but reflected the intention to anchor the energy community within a real social context characterized by concrete needs and by an already consolidated network of trust. As explained by Hivergy's Chief Operating Officer:

"The project was born thanks to Fondazione con il Sud, which made available part of the PNRR funds for energy communities. After reading the call, we immediately contacted Caritas of San Severo because the director is someone very aligned with energy issues. He responded almost immediately and showed full availability. In fact, he was already familiar with this type of project and had collaborated several times with Fondazione con il Sud. From there, we started working. Why did we contact Caritas and not other organizations in San Severo? Because our primary goal was to provide concrete support to those who genuinely needed it. So we went directly to Caritas, also because I and another colleague at Hivergy have often volunteered serving meals at the soup kitchen. We know the social context well, and it seemed like an ideal match to bring our engineering skills and put them at the service of the most vulnerable." (Interview, COO of Hivergy. Author's own translation)

The account provided by the Director of the Diocesan Caritas confirms this convergence of intentions and places it within a broader ecclesial and pastoral horizon:

"On the theme of energy communities and the use of renewable sources that are sustainable for the environment, even Pope Francis has spoken about this in the encyclical Laudato si'. As a representative of the Italian Church, I have been hearing about these issues for some time now, especially at conferences organized by Caritas and the Italian Church, where there is growing sensitivity at the central level toward Renewable Energy Communities. At the local level, however, there are still rather isolated experiences. I already had this sensitivity, and in fact a few years ago, when there was a boom in photovoltaic systems, I asked the Curia to install a system here, although a different decision was eventually made. My intention was already there, especially because energy savings matter when managing a structure like this, where there are consumption and costs. Then the call from Fondazione con il Sud was published. At first, I did not pay much attention to it, but Antonio sent me emails proposing an energy community. Antonio, a young man from San Severo, and his partners made themselves available. They also contacted the municipal administration, but I was the only one who responded. And that is how it all began." (Interview, Director of the Diocesan Caritas. Author's own translation)

The identity of the CERS thus emerges as hybrid. On the one hand, it is strongly rooted in the charitable mission and in proximity-based welfare. On the other hand, it is oriented toward technological innovation and the experimentation of new models of energy production and consumption. The very name "Energia di

⁷² Two of the managers of the start-up Hivergy are originally from San Severo; this factor helps to strengthen the project's roots in the local area and also allows it to be interpreted as a form of skills transfer back to the local context.

Speranza” carries an evocative and symbolic value, explicitly recalling the idea of energy not only as a technical resource, but also as a social and relational one, capable of generating opportunities and countering multiple forms of poverty.

This hybrid identity finds an initial formalization in the technical and economic feasibility study developed by the technical partner Hivergy. This document does not merely assess the sustainability of the system in terms of installed capacity, expected production, and incentives, but explicitly states from its opening sections the social purpose of the project. The energy community is conceived as a Renewable and Solidarity Energy Community, in which energy production from renewable sources is primarily aimed at supporting households in conditions of economic vulnerability, identified through the listening and accompaniment pathways managed by the Diocesan Caritas.

From the perspective of project genesis, the feasibility study clarifies that the decision to locate the main installation at the Caritas headquarters is not dictated solely by technical or logistical considerations, but responds to a precise strategy of territorial and symbolic anchoring. The Caritas headquarters is already recognized by the local community as a place of assistance, trust, and social mediation. Installing the photovoltaic system there means embedding energy production within a pre-existing welfare infrastructure, strengthening its public and collective function.

This orientation is further reinforced by the decision to allocate a significant share of the energy produced to services directly provided by Caritas, specifically the soup kitchen, the laundry, and the shower facilities. In this way, the CERS is configured not only as a tool for reducing energy costs, but also as a lever for the economic sustainability of essential services aimed at the most vulnerable segments of the population. The feasibility study emphasizes that lowering energy costs for these services makes it possible to free up financial resources to be reinvested in additional support and accompaniment activities, thereby enhancing the overall social impact of the project.

This approach is also reiterated in the interviews, which clearly show that the energy community is conceived not as an end in itself, but as an instrument embedded within a broader welfare strategy. The Director of Caritas, in particular, repeatedly

stresses the link between energy savings, the economic sustainability of facilities, and the possibility of expanding the services offered:

“My intention was already there, especially when energy savings come into play, because when you have to manage a structure like this, there are consumption levels and costs, so you always try to save where possible.” (Interview, Director of the Diocesan Caritas. Author’s own translation)

From this perspective, the CERS becomes an integral part of a broader process of efficiency enhancement in charitable activities, in which energy is not considered a neutral variable, but a structural component of the capacity to respond to social needs.

The feasibility study also highlights that the initial configuration of the community envisages a limited number of members, selected on the basis of vulnerability criteria and technical compatibility, with a plan for gradual expansion over time, up to thirty families by the end of the funded project. This gradual approach is interpreted by the promoters as a precautionary choice aimed at testing the model’s functioning and progressively building trust and awareness among participants. As emerges from the interview with Hivergy’s COO, initial attention is focused on the technical and organizational solidity of the community:

“Specifically, within the community we deal with feasibility studies to understand whether this community can actually be implemented or not.” (Interview, COO of Hivergy. Author’s own translation)

This statement indicates that the technological dimension is regarded as a necessary but not sufficient prerequisite for launching the CERS. Technical and economic feasibility constitutes a condition of possibility that must be accompanied by a social process of community building, largely entrusted to Caritas.

The study also reveals a relevant identity element. The San Severo CERS does not originate as an initiative promoted by a municipal administration or a public authority, but rather as a quasi bottom-up project supported by a third sector organization and a private start-up. This configuration reinforces the frontier character of the energy community, positioned in an intermediate space between public and private, between institutional welfare and community-based welfare, and between technological innovation and social action.

The promoters' narratives clearly reflect this intermediate positioning. Hivergy's COO emphasizes that the choice of Caritas is linked not only to its mission, but also to its ability to act as a trusted intermediary in a context characterized by diffidence and suspicion:

"Our primary goal was to provide concrete support to those who truly needed it. It seemed like the right combination to bring our engineering skills and put them at the service of the most vulnerable."
(Interview, COO of Hivergy. Author's own translation)

This mediating function is further strengthened by the presence of consolidated social competencies within Caritas, which make it possible to translate a technologically complex project into a language that is understandable and acceptable for families with low levels of cultural and digital capital. In this sense, the identity of the CERS "Energia di Speranza" is constructed through a continuous process of mediation between different worlds: engineering and data, energy poverty and everyday hardship, European project design and funding calls, and the lived practices of beneficiary families.

Finally, the feasibility study helps clarify a central aspect of the genesis of the CERS, namely the awareness that the energy transition in a context such as San Severo cannot be addressed solely as an infrastructural issue. The choice to define the project as "Energia di Speranza" reflects the intention to situate renewable energy production within a horizon of gradual social transformation, in which changes in consumption practices, the reduction of inequalities, and the strengthening of community cohesion advance together, despite limits, constraints, and contradictions.

In this sense, the genesis of the CERS cannot be read as the linear launch of a technical project, but as the emergence of a space of possibility in which different actors converge around a shared objective, reinterpreting energy as a relational good and as a lever of territorial welfare. It is precisely this processual, open, and tension-filled dimension that makes the San Severo case particularly relevant for the sociological analysis of the energy transition in urban peripheral contexts.

6.2.2 Actors, activities, and practices

The structure of the Renewable and Solidarity Energy Community “Energia di Speranza” is based on a tripolar governance model, in which each actor performs specific and complementary functions. The Diocesan Caritas of San Severo acts as the lead organization and as the main social infrastructure of the project. Hivergy assumes the role of technical partner, responsible for feasibility studies, the installation and management of energy systems, and the development of digital technologies. The Agape cooperative operates in the field of territorial promotion and community animation, facilitating the involvement of the local community.

From a technical perspective, the CERS is based on a photovoltaic system installed on the roof of the Diocesan Caritas headquarters, initially sized at 30 kWp, with an estimated annual production of over 36.000 kWh. The gradual increase in membership, involving not only households already supported by Caritas through the Solidarity Emporium “Don Felice Canelli,” but also other local families, companies, and artisanal businesses acting as benefactors, led to the decision to expand the system’s productive capacity. In 2025, work began on the installation of an additional 11 kW of photovoltaic panels and 10 kW of battery storage, with the aim of increasing the system’s capacity and maximizing the economic and social benefits generated by the energy community⁷³.

As previously noted, the energy produced is used not only for shared self-consumption among CERS members, but also to directly supply Caritas’ social services, in particular the soup kitchen, the laundry, and the shower facilities. All of these services are provided free of charge to individuals living in conditions of severe vulnerability. This element reinforces the configuration of the CERS as a concrete energy welfare tool, in which renewable energy production is immediately translated into improved living conditions for the most fragile groups.

⁷³ This intervention was made possible through the use of funds originally allocated to the creation of a co-working space within the Caritas facilities. Due to urban planning and cadastral constraints, this space was not implemented and, as a result, the funding was redirected to enable the expansion of the photovoltaic system’s capacity.

The economic logic of the community is based on the assumption that an increase in the number of participants will lead to higher levels of shared self-consumption and, consequently, to a greater amount of incentives recognized by the Italian Energy Services Operator. The distribution of economic benefits takes place on an annual basis, with the first redistribution scheduled between December 2025 and January 2026. This mechanism clearly shows how the economic sustainability of the CERS is closely linked to its capacity to involve a plurality of actors and to maintain, over time, a balance between the technical and social dimensions.

Within this context, Hivergy positions itself as an actor capable of reducing the distance between citizens and energy innovation through an integrated service that combines hardware and software specifically designed for energy communities. As explained by the Chief Operating Officer during the interview:

“Hivergy offers a comprehensive energy service beyond the energy community itself. Specifically, within the community we carry out feasibility studies to assess whether the community can actually be implemented. We know that energy systems are not limited to photovoltaic installations; there are also wind turbines, for instance. Some clients may say they would like to install a turbine. We therefore start with a feasibility study to determine the scale of the system, the number of users who will be part of the community, and their consumption profiles, and we then try to balance everything as effectively as possible. Initially, this balancing is done on paper. Afterwards, our technology comes into play, which operates on two levels. The first level is a microcontroller installed in the electrical panel that allows real-time monitoring of energy flows. The second level is a cloud-based application that enables all users to view their consumption, the incentives they have earned through virtuous behavior, and related information.” (Interview, COO of Hivergy. Author’s own translation)

The start-up has also developed an application that allows users to identify the energy community best suited to their needs and to move between different RECs without constraints:

“What distinguishes our application from what is currently available on the market is that it allows users to move from one energy community to another without constraints, and it indicates which energy community best fits their needs.” (Interview, COO of Hivergy. Author’s own translation)

Technological innovation is presented as a lever for promoting more conscious consumption behaviors. However, as the analysis shows, it does not automatically guarantee processes of empowerment or participation, especially in contexts characterized by low levels of cultural and digital capital.

The social dimension of the CERS is largely entrusted to Caritas, which provides relational expertise and a trust-based network built over time. The interview with

the social coordinator of the CERS, responsible for relations with participating families, clearly conveys the vision underlying the project:

“This project truly engaged us. Those who, like Caritas, work on the front line with people in poverty realize how many difficulties there are. Even something like the electricity bill, the economic burden that is often hidden, must be understood in relation to the lifestyle that poor families struggle to sustain. The idea of the energy community is therefore to raise awareness and materially enable families to receive support in accessing certain services. This idea involved us deeply, because many families struggle to manage daily consumption. For example, turning on the light, charging a mobile phone, using a washing machine. That is why, within Caritas, we created a laundry service.” (Interview, Social Coordinator of the CERS. Author’s own translation)

Beneficiary families are identified through the listening pathways activated at the Solidarity Emporium and are characterized by high levels of socio-economic vulnerability:

“Everything starts with Caritas and the listening process at the Emporium. Initially, we thought that the main criterion would be the number of minors in the household. The first families, Italian families, sometimes did not have regular rental contracts, and therefore the utility bills were not in their name but in the landlord’s. In some cases, we intervened because they were paying very high rents. Most of the families are migrant families living in San Severo because they work in agriculture. At present, only two families are Italian, and they are all large households with more than two or three dependent children. Some families include children with disabilities, while others have lived for long periods using petrol generators. Through listening, we are able to identify different forms of poverty. This is a type of poverty that has increased in recent years.” (Interview, Social Coordinator of the CERS. Author’s own translation)

The pathway with families is conceived as an accompaniment process aimed at restoring dignity and autonomy:

“We must restore dignity to people in poverty, and in this sense the energy community helps to restore a degree of autonomy in managing resources. Alongside this, we also help families understand what it means to belong to the energy community and how to manage what we have. What we do is organize meetings with the families involved to explain what it means to manage electricity consumption.” (Interview, Social Coordinator of the CERS. Author’s own translation)

These meetings, directly observed during the research, take place on a non-regular basis at the Solidarity Emporium and represent crucial moments of energy education and awareness raising. They are fundamental to community empowerment, even though beneficiaries do not assume the role of prosumers. Direct observation also highlighted structural limits to inclusion. Some families are unable to join the CERS due to the absence of regular rental contracts or utilities

registered in their name, a situation that poses both ethical and practical constraints on Caritas' action.

Finally, the social coordinator emphasizes the initial difficulties related to understanding the concept of an energy community, particularly among families facing language barriers and low levels of informational capital:

“The only critical issue was that, at the beginning, families did not understand what an energy community was and why it could be important. But this is natural, because not all families speak Italian fluently, and communication is not always easy in general. With patience, we managed to overcome this. In some cases, the level of information initially offered did not make sense to them. Once they understood, it became easier. Even today, however, this topic is still discussed very little.”
(Interview, Social Coordinator of the CERS. Author's own translation)

6.3 The social representations of families involved

The photovoice activity carried out with the families involved in the Renewable and Solidarity Energy Community “Energia di Speranza” made it possible to explore in depth the subjective and collective representations of both community and energy community, highlighting how these concepts are translated into images, emotions, and everyday practices. The two guiding questions (“What does the word community mean to you?” and “In your view, what is an energy community?”) oriented the photographic production toward a reflection that goes beyond the purely cognitive dimension and directly engages the lived experiences of families, their material needs, and their expectations.

The four selected images do not function as simple illustrations, but as genuine narrative devices through which families articulated a situated understanding of community and energy, deeply anchored in their concrete living conditions. Taken together, they convey a representation of the REC as a space of welfare, recognition, and possibility, rather than as a technical infrastructure or an institutional project.

Figure 9



Taken inside the Solidarity Emporium “Don Felice Canelli,” the first image was associated with the question “What does the word community mean to you?” The choice to represent a clearly recognizable physical space indicates that, for the families involved, community is not understood as an abstract entity or as an undifferentiated group of people, but as a concrete place of encounter, support, and relationships.

In the narratives accompanying the observations, the Emporium emerges as a space of mediation between need and dignity. It is not merely a place where material goods are distributed, but a context in which people are listened to, recognized, and accompanied. In this representation, community coincides with a proximity-based welfare infrastructure capable of making visible a network of relationships built over time through everyday practices of support.

From an analytical perspective, this image conveys a conception of community as an embodied relational space, in which the social dimension precedes and grounds the institutional one. Community is not defined by formal membership, but by the repeated experience of access to a safe, predictable, and welcoming place. In this sense, the Emporium functions as a threshold, an access point through which families come into contact with a form of welfare that is not perceived as mere assistance, but as an opportunity to rebuild social ties.

Figure 10



The second image (figure 10) depicts the plaque displayed outside the Caritas headquarters in San Severo and was associated with the question “What is an energy community?” Unlike the first photograph, the focus here is not on a space lived from within on a daily basis, but on a public and visible sign that certifies the existence of a project and confers legitimacy upon it.

The decision to photograph the plaque suggests that, at least at this stage, the energy community is perceived as something that needs to be recognized and named in order to exist. The energy community is grasped through an institutional symbol that renders it real in the eyes of participants. In this sense, the plaque functions as a marker of belonging and as a sign of reliability, which is particularly significant in a context characterized by mistrust toward innovation and toward initiatives perceived as complex or opaque.

The image suggests that the energy community is initially understood more as a recognized collective project than as a set of shared energy practices. It is associated with an “authoritative” place that acts as a symbolic and social guarantor. This finding is consistent with what emerged from interviews and direct observation, namely that trust in the CERS is placed not in the technology itself, but in the institution that promotes it and makes it accessible.

Figure 11



The third image (figure 11) portrays pieces of firewood and is accompanied by the sentence “When I can turn on the radiators, my family and I will feel better.” This photograph represents one of the most symbolically and emotionally dense moments of the entire photovoice activity.

Here, energy is not represented as kilowatt-hours, photovoltaic panels, or economic incentives, but as comfort and well-being. The reference to radiators directly evokes the dimension of energy poverty, understood not only as the difficulty of paying utility bills, but as the inability to guarantee decent living conditions, particularly during the winter months.

The pieces of firewood thus become a social metaphor for an inhabitable life, in which well-being is not taken for granted but results from a fragile balance between available resources and essential needs. The image highlights how, for these families, the energy community is associated with the possibility of reducing anxiety related to consumption, of accessing warmth without fear of unsustainable costs, and of improving the quality of everyday life.

From a sociological perspective, this representation shows that when the energy transition is observed from below, it is not interpreted in terms of abstract environmental sustainability, but as a response to immediate material vulnerability. Energy becomes a matter of dignity, health, and family care, fully situated within the domain of welfare.

Figure 12



The fourth image (figure 12) depicts a sunrise and was associated with the question “What does the word community mean to you?” Unlike the other photographs, which are strongly anchored to concrete spaces and needs, this image introduces a broader symbolic and temporal dimension.

The sunrise represents a beginning, a possibility of change, and an improvement in living conditions. In the narratives accompanying the image, community is described as something that has not yet been fully realized, but that can emerge over time through processes of accompaniment, learning, and mutual trust. Community is therefore not only what already exists, but what it can become.

This representation is particularly significant when read in light of the vulnerability conditions of the specific family involved. The sunrise is not associated with a salvific promise or a sudden transformation, but with a cautious hope, built on small steps and gradual improvements. In this sense, the energy community is inscribed within a horizon of possibility rather than certainty, consistent with the idea of transition as an open and non-linear process.

Taken together, the four images show how the families involved in the REC “Energia di Speranza” construct a representation of community and energy that is deeply intertwined with their experience of vulnerability. Photovoice functioned as

a tool for the emergence of meanings, allowing families to express needs, expectations, and visions that would have been difficult to articulate within a purely technical narrative of the energy community.

The activity also fostered processes of awareness and empowerment, even in the absence of an active role as prosumers. In this sense, photovoice emerges as a device consistent with the vision of the REC as an instrument of energy welfare: not only the production and redistribution of energy, but also the construction of shared meanings, trust, and the capacity to imagine a different future. It is precisely within this symbolic and relational dimension that the energy community of San Severo reveals its transformative potential.

6.4 The results: the REC as a generative welfare device

The analysis of the San Severo REC “Energia di Speranza” makes it possible to provide an articulated reading of the results that have emerged, which cannot be reduced either to a purely technical assessment of energy efficiency or to a linear measurement of economic impacts. Rather, the observed outcomes are situated in an intermediate space shaped by processes in the making, emerging social practices, and structural tensions that traverse the urban context of San Severo. In this sense, the REC takes shape as a generative welfare device, capable of activating resources, relationships, and collective learning, while remaining marked by limits, constraints, and forms of incompleteness (Fanizza, 2019).

The adoption of a qualitative approach based on field observation, in-depth interviews, and participatory tools such as photovoice has made it possible to capture dimensions that would escape any purely quantitative reading. The energy community thus emerges not only as an infrastructure for the production and redistribution of renewable energy, but as a social space of interaction in which energy becomes a vector of welfare, recognition, and possibilities for empowerment.

A first significant result concerns the ability of the San Severo REC to move beyond a traditional assistential logic. Although promoted by an actor such as Caritas, historically associated with the provision of support services for the most vulnerable

groups, the energy community does not merely deliver a direct economic benefit, but activates a process of co-responsibility and gradual participation.

The concept of generative welfare helps to interpret this dynamic. The REC does not simply “give” incentives, but creates conditions of well-being through which beneficiaries become part of a broader process that includes information, accompaniment, and learning. In this sense, the energy produced supplies essential collective services, strengthening the economic sustainability of pre-existing welfare infrastructures, while simultaneously fostering a new awareness of energy as a shared good.

Field observation shows that this transition is neither immediate nor free of ambiguity. Families initially do not perceive themselves as “members” of an energy community, but rather as users of a service. Over time, however, through informational meetings, moments of dialogue, and educational practices, a slow transformation of beneficiaries’ roles takes place. Families begin to recognize the link between everyday behaviors, energy consumption, and collective well-being. A second result concerns the dimension of social empowerment, which in the San Severo case necessarily assumes a partial and situated form. Families involved in the REC are not prosumers, they do not directly participate in energy production, and in most cases they do not possess advanced technical or digital skills. Yet, through the pathway activated by Caritas, they are progressively engaged in a process of energy awareness that affects everyday practices and representations of energy.

Photovoice proved particularly effective in capturing this aspect. The images produced by families show how energy is perceived in relation to warmth, access to energy services, and the security of being able to use essential appliances without fear of unsustainable costs. In this sense, empowerment does not coincide with the acquisition of technical skills, but with the symbolic reappropriation of energy as a central element of quality of life.

Direct observation of the meetings organized at the Solidarity Emporium highlights how energy education becomes a vehicle of empowerment precisely because it is embedded in an already consolidated relationship of trust. Families participate, ask questions, share experiences and difficulties, and construct forms of collective

learning that go beyond the individual dimension. This result confirms the importance of social competencies as a prerequisite for any energy transition process in contexts of vulnerability.

A cross-cutting element of the results concerns the crucial role of field observation as a tool for understanding ongoing processes. Continuous presence in the spaces of the REC, particularly at the Solidarity Emporium, the Caritas headquarters, and public meetings, made it possible to grasp informal dynamics, implicit resistance, and micro-changes that would be difficult to capture through structured interviews alone.

Through observation, structural limits to inclusion become visible. These include families excluded from the REC due to the absence of regular rental contracts or utilities registered in their name, linguistic barriers that slow understanding of the project, and mistrust linked to previous experiences of exclusion or exploitation. These elements do not simply represent operational difficulties, but are analytically significant results, as they show how the energy transition is embedded in pre-existing inequalities and risks reproducing them if not accompanied by adequate social dispositifs.

Overall, the REC “Energia di Speranza” can be interpreted as a fully generative welfare device only if it is read as an experience in the making, shaped by ongoing processes and latent potential. The results do not point to a definitive solution to energy poverty, but show how energy, when embedded in a network of relationships, social competencies, and educational practices, can become a tool for empowerment and for reconfiguring the link between ecological transition and social justice.

The findings from the San Severo case confirm the interpretation of the REC as a frontier space of the energy transition. On the one hand, the energy community opens up concrete possibilities for improving living conditions and strengthening territorial welfare. On the other hand, it remains suspended between planning and implementation, between political narratives and everyday practices, between technological innovation and social fragility.

This frontier dimension also emerges in the gap between public discourse on the energy transition and the lived experience of families. While at the institutional

level the solidarity REC is often presented as an innovative and replicable solution, in practice it appears as a slow process shaped by mediation, adaptation, and compromise. This gap should not be read as a failure, but as a structural feature of transitions in urban peripheral contexts, where change cannot be linear or immediate.

By relating the dimensions examined in the previous sections, a complex picture emerges in which the outcomes of the REC cannot be reduced to individual indicators. The technological dimension, while central, does not produce automatic effects. The social dimension, embodied by Caritas, proves decisive for activating the community. The symbolic dimension, revealed through photovoice, contributes to providing meaning and legitimacy to the project.

This interconnection suggests that the main value of the solidarity REC “Energia di Speranza” lies in its capacity to hold together heterogeneous elements: energy and welfare, innovation and care, technique and relationships. It is precisely in this capacity for articulation that the generative character of the device becomes evident, as it produces not only immediate benefits but also processes of learning and role redefinition.

Finally, the results invite a non-celebratory reading of the REC. Family participation remains partial, empowerment is fragile and strongly dependent on Caritas’ mediation, and economic sustainability relies on external incentives and funding. Yet, it is precisely these limits that make the San Severo case analytically relevant, as they show that generative welfare is not a guaranteed outcome, but a process that must be built over time.

PART THREE: THEORETICAL CONCEPTUALIZATION OF THE RESULTS

7. SPACE-FRONTIERS AS A DEVICE FOR ENERGY TRANSITION

7.1 Frontier and energy transition: between accessibility and spectacularization

This doctoral thesis has examined renewable energy communities as socio-territorial devices embedded within the broader process of the energy transition, adopting from the outset a critical stance toward the linear, neutralizing, and technocratic representations that often accompany public discourse on decarbonization (Ronchi, 2021). Through a qualitative approach based on field observation, interviews, and the analysis of practices, the research has shown that the energy transition does not merely produce environmental or infrastructural effects, but also generates transformations, often profound ones, in social relations, forms of local governance, and the ways in which territories are symbolically and materially repositioned within geographies of development. In this sense, the transition emerges as an intrinsically spatial process, producing new thresholds, discontinuities, and asymmetries, and giving rise to genuine frontier spaces.

The concept of frontier space, adopted as a transversal interpretative device throughout the research, makes it possible to hold together dimensions that are often analyzed separately: technological innovation, welfare practices, forms of participation, dynamics of exclusion, and public narratives of sustainability. The frontier is not understood here as a simple geographical or administrative boundary, but as the outcome of friction between dominant energy models and situated territorial practices, between promises of inclusion and the persistence of vulnerability, between participatory openings and selective closures. It is precisely within this tension that the energy transition becomes observable in its ambivalence, revealing both its transformative potential and its risks of reproducing existing inequalities.

The findings of the fieldwork clearly show that energy communities are neither neutral devices nor automatically emancipatory. Rather, they take shape as dense social spaces whose functioning depends largely on conditions of accessibility, repertoires of trust, available relational and cultural resources, and the ways in which territories are recognized, narrated, and governed. In this sense, the notion of accessibility plays a central role in this dissertation. Accessibility does not concern only the formal possibility of joining an energy community, but encompasses the entire set of material, symbolic, and cognitive conditions that make participation in the transition effectively practicable.

Access to shared renewable energy, to economic benefits, to decision-making processes, and to technical competences represents a crucial threshold of the energy frontier. In the observed contexts, this threshold manifests itself in differentiated ways, producing contrasting configurations of openness and closure. The comparison between the cases of San Severo and Biccari, without forcing a strictly comparative reading, allows two emblematic modes of crossing, or failing to cross, the frontier of the transition to be illuminated.

In the case of the San Severo CERS, the energy community takes shape as an open frontier space, in which the energy transition is deliberately anchored to a vision of territorial welfare and social justice. Here, energy is not treated as a commodity or merely as a vector of technological innovation, but as a common resource through which concrete needs and pre-existing vulnerabilities within the social fabric are addressed. The anchoring of the energy community to the Caritas Solidarity Emporium and, more broadly, to an already existing local welfare system lowers the threshold of accessibility to the transition, transforming it into an experience that is comprehensible, situated, and relational.

In this case, the frontier does not appear as a sharp line of separation, but as a dense and porous space that can be crossed, in which energy vulnerability becomes the starting point for activating pathways of social capital mobilization (Selman, 2001). The families involved are not merely passive beneficiaries of an assistential intervention, but subjects accompanied through a process of progressive familiarization with energy, its costs, its uses, and its environmental implications. Accessibility here cannot be reduced to an economic dimension alone, but acquires

a social and symbolic value: the transition is made accessible because it is embedded in relations of trust, practices of care, and accompaniment dispositifs that recognize the complexity of the living conditions of those involved.

By contrast, the case of Biccari shows how the frontier of the transition can be configured as an apparently open space that is, in fact, closed and static. Here, the energy community has been evoked as a promise of innovation and territorial revitalization, acquiring a strong symbolic value within public narratives about the village. However, the absence of actual activation of the community, the lack of energy production and sharing, and the weakness of participatory processes have transformed the energy community into a predominantly discursive device. In this case, the transition does not translate into an improvement in residents' material conditions or a reduction in energy vulnerabilities, but rather into an aesthetic and communicative reconfiguration of the territory.

It is precisely in this passage, within this aesthetic function, that the issue of the spectacularization of the transition emerges forcefully (Fanizza, 2013). The energy community becomes an element of territorial branding, a sign of modernity and sustainability deployable within media and tourism spaces, yet devoid of concrete redistributive effects. The frontier, rather than opening, becomes rigid. The promise of inclusion turns into a new, subtler, and less visible form of exclusion, in which vulnerabilities are not eliminated but merely recoded. Energy poverty does not disappear, but is obscured by the rhetoric of innovation; participation does not materialize, but is replaced by alternative forms of consumption.

In this sense, spectacularization represents a specific mode of frontier closure. It does not take the form of an explicit rejection of the transition, but rather of its neutralization through language, images, and narratives. A totalizing system in which the energy transition is rendered visible as an event, a promise, a form of storytelling, while remaining inaccessible as everyday practice and as social infrastructure. The result is a suspended frontier space, in which symbolic investment in sustainability produces neither welfare nor redistribution, but instead reinforces dynamics of consumption and the display-oriented transformation of territory (Codeluppi, 2007; 2021).

The research thus shows that accessibility and spectacularization constitute two key dimensions for understanding the functioning of energy communities as frontier spaces within the transition. On the one hand, accessibility indicates the capacity of an energy community to lower the thresholds of entry into the transition, making it practicable for vulnerable subjects and marginal territories. On the other hand, spectacularization signals the opposite risk: that of a transition consumed at a symbolic level, without affecting the structures of inequality that traverse it.

These two dimensions are not simply alternatives, but can coexist in hybrid and dynamic forms. Even in the case of San Severo, the research highlights tensions and fragilities related to the economic sustainability of the project, its dependence on external funding, and the need to maintain over time a balance between the solidarity dimension and managerial complexity. Likewise, the case of Biccari cannot be dismissed as a definitive failure, but should be read as a stalled frontier, in which conditions of accessibility have not yet been constructed and in which the transition remains confined to the space of promise.

In both cases, however, it clearly emerges that the energy transition does not traverse territories uniformly. It selects, includes, excludes, renders some subjects visible and others invisible. The concept of frontier space makes it possible to read these processes not as deviations or anomalies, but as structural outcomes of a transition that takes root in socially unequal contexts. In this sense, the frontier is an ordinary condition of the transition in marginal territories.

7.2 Energy Democracy: the Political Side of the Frontier

If the previous section showed how the energy transition produces differentiated frontier spaces, this section focuses explicitly on the political dimension of those frontiers. In particular, energy democracy and the fight against poverty emerge here as devices of passage, real passports that determine who is able to take part in the transition and who, instead, remains at its margins. The energy frontier is therefore not a neutral threshold, but a political construction that reflects power relations, social hierarchies, and logics of territorial accumulation.

The international literature on energy transitions has long challenged the idea that decarbonization is a purely technical or linear process. Authors such as Sovacool

(2022) and Newell and Carter (2024) have shown that transitions are contested processes, traversed by conflicts, negotiations, and resistance, in which economic interests and institutional arrangements are redefined. From this perspective, energy is not simply a productive input, but a political field in which issues of power, control, and access to resources are played out. Bridge et al. (2013) further strengthened this approach by proposing to read energy as a socio-technical assemblage, that is, as a heterogeneous set of infrastructures, actors, forms of knowledge, and practices that are always situated in space and time.

Even the multi-level perspective developed by Geels (2005), while providing useful tools for understanding the dynamics of change in energy systems, shows clear limitations when applied to contexts marked by deep territorial inequalities. Its emphasis on evolutionary trajectories and processes of “scaling up” tends to underestimate local frictions, power asymmetries, and the material conditions that make the transition selective. In territories such as Southern Italy, and particularly in the Tavoliere delle Puglie, the transition does not appear as an orderly sequence of stages, but as a field of tensions in which promises of innovation coexist with persistent forms of exclusion.

It is within this framework that the notion of energy democracy assumes a crucial role. Far from being a normative slogan, energy democracy can be understood as a set of practices and dispositifs aimed at redistributing decision-making power, economic benefits, and capacities for agency along the energy chain. The literature on energy justice has made a decisive contribution to politicizing the debate on energy, showing that energy inequalities are not side effects, but structural outcomes of socio-economic systems. McCauley et al. (2017) proposed the now-classic tripartite framework of energy justice, articulated into distributive, procedural, and recognition dimensions, highlighting how injustice emerges both in the distribution of costs and benefits and in decision-making processes and the recognition of the subjectivities involved.

Along the same lines, Bouzarovski and Simcock (2017) developed the concept of energy vulnerability, emphasizing how access to energy is deeply intertwined with housing conditions, labor trajectories, and territorial contexts. Energy poverty cannot be reduced to a lack of income, but takes shape as a spatially situated

condition that reflects building quality, access to infrastructure, and the capacity to influence energy choices. Shove and Walker (2014) further reinforced this perspective, showing how energy inequalities are inseparable from broader social inequalities and how energy policies can contribute either to mitigating or to reproducing them.

When read through the lens of frontier space, energy democracy thus appears as the political side of the transition, that is, as the terrain on which it is decided whether the frontier will remain a selective device or can be transformed into a traversable space. In the absence of redistributive and participatory mechanisms, the energy frontier tends to reproduce logics already observable in other domains of territorial governance, particularly in relation to processes of marginalization and exploitation analyzed by socio-marxist literature on the Foggia area.

Several field-based studies have clearly shown how the agricultural migratory frontier of the Capitanata operates through dispositifs of non-representation, rendering entire populations invisible while keeping them functional to the productive system (Boano et al., 2025; Grimaldi et al., 2025). The Borgo Mezzanone ghetto, like other informal settlements, is not the result of an absence of policies, but the outcome of specific choices that selectively suspend rights and services, producing a territorialized vulnerability. From this perspective, the frontier is not a boundary to be crossed, but a mechanism of governance that allows value to be extracted from precariousness (ibid.).

Transposing this interpretative key to the energy field, it becomes clear that the transition can also function according to similar logics. Without effective democratization, energy risks becoming yet another domain in which vulnerability is managed rather than overcome. Energy poverty, in this sense, is not merely a social problem to be mitigated, but a political indicator that signals the presence of a closed frontier. Where access to renewable energy and its benefits is limited, the transition takes shape as an elitist process, reinforcing the separation between those who can choose and those who must endure the choices of others.

The case of Biccari illustrates this risk with particular clarity. Here, the energy community has been presented as a symbol of innovation and sustainability, but it has not produced a real expansion of participation nor a reduction in energy

vulnerabilities. In terms of energy democracy, the frontier remains firmly guarded: energy becomes an object of narration and symbolic consumption, while underlying power relations remain unchanged. The transition, rather than functioning as a passport, turns into a *dispositif* of legitimation that makes the persistence of inequality acceptable through the language of sustainability.

By contrast, the experience of the San Severo solidarity REC attempts to position itself explicitly on the side of democratization. Here, tackling energy poverty is not a secondary effect, but the declared objective of the project. Anchoring the energy community to a system of territorial welfare and placing vulnerable families at the center of the redistribution of energy benefits makes it possible to interpret the community as an attempt to re-politicize the frontier. Energy becomes a lever for questioning who has the right of access, who decides, and who benefits from the transition.

It is important to stress that even in this case energy democracy is not realized in a full or definitive form. The small scale of the intervention, dependence on external funding, and managerial complexity keep the project in a condition of fragility. However, what distinguishes San Severo is not the absence of limits, but the political direction of the project: energy poverty is neither obscured nor spectacularized, but taken on as a priority criterion. In this sense, the fight against poverty functions as a genuine passport of the frontier, making the transition traversable for subjects who would otherwise be excluded.

This analysis strongly suggests that energy democracy cannot be reduced to a matter of formal governance or symbolic participation. It entails a material redistribution of power and resources, capable of affecting structures of vulnerability. Without this dimension, the transition risks reproducing, in renewed form, the same logics of exclusion that characterize other domains of the territorial frontier, from agricultural labor to housing.

In conclusion, reading the energy transition through the lens of energy democracy and poverty as a political threshold brings into focus the political side of the frontier. The frontier is not only the place where the transition encounters resistance, but the *dispositif* through which it selects its beneficiaries. In this sense, energy democracy does not represent an automatic outcome of the transition, but a political choice that

determines whether the frontier will remain a space of exclusion or can become, at least in part, a space of emancipation.

7.3 Conceptualizing the space as a frontier in the dynamics of the transition

Conceptualizing space as a frontier in the dynamics of the energy transition entails a significant theoretical shift with respect to the main paradigms through which socio-ecological change has so far been interpreted. The transition is often described as a future-oriented, linear, and cumulative process, in which technological innovation and institutional regulation represent the primary drivers of change. Within this perspective, space tends to be treated as a neutral variable or as a mere container within which the transition unfolds. By contrast, adopting the frontier as a central spatial category implies recognizing that the transition is an intrinsically territorial process, one that produces thresholds, discontinuities, and asymmetries, and that these effects are not accidental but structural.

The notion of frontier-space makes it possible to move the energy transition beyond a purely functionalist reading and to restore its historical and political dimensions. In this sense, the frontier does not coincide with a clearly defined geographical boundary, nor with a static line separating centers and peripheries. Rather, it should be understood as a dynamic device through which power relations are organized, resources are distributed, and differentiated forms of access to the benefits of change are regulated. The frontier does not simply delimit a marginal space; it actively produces marginality, rendering it functional to specific trajectories of development.

From a theoretical standpoint, frontier space emerges as a category capable of holding together three fundamental dimensions of the transition: the material, the political, and the symbolic. At the material level, the frontier is the site where infrastructures, projects, and investments are concentrated, but also where shortages, delays, and interruptions accumulate. At the political level, it represents the space in which conditions of access, priorities, and forms of governance of the transition are decided. At the symbolic level, finally, the frontier is the terrain on which narratives of progress, sustainability, and innovation are constructed, often coming into tension with the real conditions of territories.

Conceptualizing the frontier as a device means recognizing that it operates through selective mechanisms. The energy transition does not simply include or exclude territories and subjects; rather, it includes and excludes them in differentiated and often opaque ways. In this sense, the frontier functions as a regulated threshold: it renders some spaces fully traversable, others partially accessible, and still others structurally inaccessible. This selectivity is not neutral, but reflects pre-existing power arrangements that the transition tends to reorganize rather than overcome.

A central element of this conceptualization concerns the relationship between the frontier and the temporality of the transition. Energy policies are often structured around short time horizons, linked to funding cycles, regulatory deadlines, or quantitative targets. Territories, by contrast, operate according to longer temporalities, shaped by historical sedimentations, economic trajectories, and collective memories. Frontier space emerges precisely from the friction between these misaligned temporalities. The transition promises sustainable futures, but situates them within spaces that experience a fragile and uncertain present, producing a condition of permanent suspension.

From this perspective, the frontier can be read as a space of waiting, in which change is continuously announced but rarely consolidated. This condition should not be interpreted simply as a delay in policy implementation, but rather as a structural effect of the transition in contexts characterized by territorial fragility. The frontier thus becomes a place where the future is discursively anticipated but materially postponed, generating disillusionment and distrust.

Another theoretically relevant aspect concerns the relationship between frontier space and the production of vulnerability. Far from being a natural datum or a temporary condition, vulnerability can be interpreted as a spatially organized outcome. The frontier is the site where certain vulnerabilities are recognized and addressed, while others are normalized or rendered invisible. In this sense, the frontier is not merely a space of lack, but an active mechanism of differentiation that contributes to establishing which needs are deemed legitimate and which can be neglected.

Conceptualizing space as a frontier also makes it possible to problematize the relationship between transition and territorial capacity. Territories are not

homogeneous entities, but complex configurations of material resources, institutional competences, and social capital. The frontier emerges where these capacities are insufficient to sustain the burden of the transition, or where they are mobilized selectively. In this sense, the frontier does not simply signal a deficiency, but reveals a structural asymmetry between what the transition requires and what territories are actually able to provide.

This asymmetry helps explain why the energy transition tends to produce differentiated effects across space. Some territories are able to translate change into opportunities for social and economic reorganization, while others remain trapped in conditions of dependence or mere exposure to the effects of change. The frontier, in this sense, is not a temporary phase, but a persistent condition that accompanies the transition in more fragile contexts.

From a theoretical point of view, frontier space also differs from other categories commonly used to describe territorial inequalities, such as margin, periphery, or inner area. Unlike these categories, the frontier does not indicate a fixed position within a spatial hierarchy, but a dynamic relationship that can intensify or attenuate over time. A territory may find itself in a frontier condition with respect to a specific dimension of the transition, while not being marginal in other respects. This conceptual flexibility makes frontier space particularly suitable for capturing the complexity of ongoing processes.

Ultimately, conceptualizing space as a frontier means recognizing that the energy transition is an intrinsically political process, not because it necessarily produces overt conflict, but because it silently redefines power relations, priorities, and visibility. The frontier is the place where these redefinitions materialize in space, often in unintended and unacknowledged ways. Making the frontier visible therefore means bringing back to the center of analysis the power issues that traverse the transition, removing it from a purely technical or moralizing narrative. In conclusion, frontier space can be proposed as a transversal theoretical category, useful not only for analyzing specific energy policies or individual territorial experiences, but also for interrogating more broadly the processes of socio-ecological transformation in contexts of fragility. The frontier is not the residue of change, but the place where change becomes most evident in its ambivalence.

Adopting it as a critical device means accepting that the transition does not automatically eliminate inequalities, but reorganizes them in space, and that it is precisely in this reorganization that one of the main theoretical and political challenges of our time resides.

From this perspective, Sociology is called not so much to provide immediate operational solutions, but to render legible the processes through which the transition produces new geographies of the possible and the impossible. Frontier space, as an analytical category, makes it possible to name these geographies, offering a tool to understand where the transition opens up, where it stalls, and where it continues to operate beneath the surface. In this sense, the frontier does not represent the limit of the transition, but its critical point, the place where change can be interrogated, rethought, and potentially transformed.

APPENDIX A

Semi-structured interview guide with the Mayor of Biccari

The interview was conducted in a semi-structured format, with the aim of reconstructing the perspective of the local administration on the project of the Biccari Renewable Energy Community and situating it within the broader dynamics of the ecological transition at the local scale.

The guide was not used as a rigid scheme, but as an orienting prompt to guide the conversation, leaving room for the exploration of emerging themes, for the personal re-elaboration of the experience, and for the articulation of an overall vision of the project.

The questions were organised into thematic areas in order to encourage a structured narrative that brings together the territorial context, the activation process, the mobilisation of competences, and future expectations.

General framing: Renewable Energy Communities and the ecological transition

- At a general level, how do you frame Renewable Energy Communities within the broader scenario of the ecological transition?
- What role do you believe RECs can play for small municipalities and for inner areas?

2. Territorial context

- What are the main environmental, social, and cultural characteristics of Biccari that led you to promote the project of a Renewable Energy Community?
- What vision inspired the Biccari REC?
- What political, administrative, or territorial motivations supported this choice?

3. Experience and process of building the REC

- What have been the main stages in the development of the Biccari REC project?
- How did the idea of the energy community emerge, and who was the first to propose it?
- Which actors were involved in the project?
- How were they involved?
- What role did the different actors play (local administration, citizens, other stakeholders)?
- How does, or will, the REC function from an organisational perspective?
- Did any conflictual dynamics emerge among the actors involved? If so, at which stages?
- How was the initiative communicated to the local population?
- How was it received by residents and by the most directly involved beneficiaries?

- What role did the local community play in the different phases of the project?
- At what stage is the project currently?
- What difficulties or limitations have emerged during the implementation process?

4. Mobilised competences

- What competences were mobilised by the Municipality of Biccari, both at the administrative level and among citizens?
- Which competences not available locally were instead sought outside the municipality?
- How were these external competences integrated with local ones?

5. Expectations and anticipated impacts

- What expectations do you currently have regarding the impacts that the REC may have on the actors involved and on the territory?
- Have these expectations changed compared to the initial phase of the project? If so, in what ways?
- What impacts are expected in particular with regard to:
 - environmental impact;
 - citizens' levels of well-being;
 - local economies;
 - the tourism sector;
 - the activation of other projects of social and technological innovation in the territory?

APPENDIX B

Semi-structured interview guide with the citizens of Biccari

The interview was conducted in a semi-structured format with 24 residents of Biccari involved in the Renewable Energy Community, during the period between May and August 2023.

The guide was used as an orienting framework and conversational prompt, with the aim of collecting citizens' viewpoints, representations, and expectations regarding the energy transition and the local renewable energy community project.

The semi-structured approach made it possible to maintain a shared thematic framework while at the same time leaving room for the personal re-elaboration of experiences and for the emergence of elements relevant from a territorial and social perspective.

Interview guide

- What is your point of view on the energy transition?
- How would you describe the territory of Biccari in relation to renewable energy communities?
- What does the term “community” mean to you?
- What were the reasons that led you to decide to join the energy community?
- How would you describe the process of joining the Renewable Energy Community?
- In your opinion, can conflictual dynamics emerge among the different actors involved in the energy community?
- How was the energy community initiative communicated?
- What do you consider to be the main critical issues of energy communities?
- What expectations do you have for the future of the energy community?

List of interviews (May–August 2023)

1. 12/05/2023 – Retired, 74 years old
2. 12/05/2023 – Homemaker, 68 years old
3. 12/05/2023 – Municipal employee, 52 years old
4. 23/05/2023 – Worker, 59 years old
5. 23/05/2023 – University student, 27 years old
6. 23/05/2023 – Teacher, 61 years old
7. 05/06/2023 – Retired, 72 years old
8. 05/06/2023 – Self-employed professional, 45 years old
9. 23/06/2023 – Homemaker, 56 years old
10. 23/06/2023 – Artisan, 63 years old
11. 23/06/2023 – Student, 29 years old

12. 23/06/2023 – Employee, 48 years old
13. 14/07/2023 – Retired, 76 years old
14. 14/07/2023 – Shopkeeper, 54 years old
15. 18/07/2023 – Homemaker, 62 years old
16. 18/07/2023 – Worker, 41 years old
17. 18/07/2023 – Employee, 35 years old
18. 18/07/2023 – Teacher, 58 years old
19. 03/08/2023 – Retired, 70 years old
20. 03/08/2023 – Student, 31 years old
21. 03/08/2023 – Self-employed professional, 44 years old
22. 03/08/2023 – Employee, 39 years old
23. 03/08/2023 – Homemaker, 50 years old
24. 03/08/2023 – Farmer, 67 years old

APPENDIX C

Semi-structured interview guide with the promoters of the San Severo Energy Community - Photo elicitation

The interview was conducted in a semi-structured format and was carried out using the photo elicitation technique, employing images as narrative stimuli to encourage reflection, the emergence of meanings, and the re-elaboration of experience by the promoters of the San Severo Energy Community.

The guide was not used as a rigid scheme, but as an orienting framework for the conversation. The images accompanied the interview, facilitating the narration of the project, its phases of development, and the visions that supported its activation, while allowing space for the emergence of elements that are not immediately verbalised.

The questions were organised into thematic areas in order to hold together the broader framework of the energy transition, the territorial context, the process of activating the energy community, and future expectations.

Photo guide

Figure B



Source: Italia Caritas

Figure B



Source: Logo of the San Severo Energy Community

Interview guide

Figure A

- How do you frame the experience of the San Severo energy community within the broader scenario of the energy transition?
- Which elements of the territorial, social, and cultural context of San Severo influenced the emergence and the form taken by the energy community?
- What visions, values, or motivations guided the launch of the energy community project?
- How did the idea of the energy community emerge, and what were the main phases of its development?
- Which actors were involved in the project, and what role did they play in the process of building the energy community?

Figure B

- How was the energy community communicated and narrated externally, and what kind of response did it generate among beneficiaries and the local community?
- What difficulties, critical issues, or limitations emerged during the activation and implementation of the energy community?
- What expectations do you have regarding the future impacts of the energy community, both for the actors directly involved and for the wider territory?

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