



The communicative processes in the renewable energy communities (REC): a systematic review

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Abstract

Renewable Energy Communities (RECs) represent an important resource for promoting the energy transition through participative forms of governance. Focusing on communicative processes is crucial for the success of RECs, since effective communication can promote citizens' engagement and participation in these projects. This systematic review aims to investigate communication within the RECs, exploring the main communicative strategies and channels, as well as the main actors involved in communicative processes. Following the PRISMA guidelines, we screened two databases (Scopus; Web of Science), analyzed the resulting sample ($n=886$ records), and selected 9 papers that met the eligibility criteria. The findings emphasize the importance of a clear and transparent communication style that is understandable to all community members, and the critical role of local leaders in promoting community engagement by acting as a bridge between community members, institutions, and experts. RECs' communicative processes differ depending on the target audience and the project's development stage, implying the need for a deep investigation of phases and peculiarities to design successful communication strategies. This paper provides a systematic overview of the current state of RECs' communicative processes in research, highlighting an important gap in the current literature. Further research should be conducted on this topic, focusing on how RECs should adjust communication depending on community features and project stages, what channels and contents are particularly effective, how practices of RECs are narrated within their communities, and how these narratives can strengthen citizens' participation.

Highlights

- This systematic review concerned communication in Community Renewable Energy.
- The PRISMA model was used to guarantee a systematic process.
- The investigated topic represents an important gap in the current literature.
- Opportunities, limits, and implications are outlined.

Keywords Renewable energy community · Communication · Renewable energy · Community energy initiative

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Introduction

Climate and economic crises necessitate simultaneous solutions, including the transition to sustainable and renewable energy systems.

Participatory energy transition is crucial in the global energy transition (Bauwens 2019), implying the concepts of energy democracy and energy citizenship (Wahlund and Palm 2022). ‘Energy democracy’ refers to the institutionalization of participatory forms of energy provision and represents a means to redistribute economic and decision-making power (Szulecki 2018). On the other hand, ‘Energy citizenship’ mainly focuses on individual participation as a means to foster more active and meaningful engagement with energy in daily life, highlighting citizens’ rights. Despite their specific features, energy democracy, and citizenship share several key features: (a) prosumerism, that is the community or individual ownership of energy production (Delina 2018); (b) citizen participation in energy decision-making and social movements (Ryghaug et al. 2018); and (c) a preference for decentralised energy systems (Wahlund and Palm 2022).

In this context, a strategic approach to encourage renewable energy systems and foster more sustainable and resilient societies involves the promotion of energy communities (Petrovich and Kubli 2023).

The label ‘Renewable Energy Community’ was introduced and spread by the European Directives REDII and IEM. It refers to experiences of energy cooperation where citizens, groups, enterprises, and local authorities produce, consume, and share energy generated from renewable sources. Before this more systematic definition, the role of the more inclusive ‘energy cooperatives’ had been widely acknowledged in the sustainable transition of the energy system (Klagge and Meister 2018): they serve as a tool for directly involving citizens in energy generation and distribution, thus contributing to “energy justice” (Sovacool and Dworkin 2014, p. 5). Thus, they can be defined as preliminary “experiments” focused on the ethical construction of community economies on the ground (Gibson-Graham and Roelvink 2009).

The European Union (EU) defines a Renewable Energy Community (REC) as an autonomous legal entity that can both manage energy assets and share locally generated energy among its members (European Parliament and Council, 2018). RECs are characterized by participatory governance: control is principally exercised by citizens, local authorities, and small and medium-sized enterprises (SMEs). Specifically, two legal entities are identified: the ‘citizen energy community’ and the ‘renewable energy community’.

The Internal Energy Market Directives of the European Union define “Citizen Energy Community” as a legal entity characterized by voluntary and open participation, effectively controlled by its members or shareholders, which may include natural persons, local authorities (such as municipalities), or small enterprises. The primary objective of this legal entity is to provide environmental, economic, or social benefits to its members, shareholders, or the local communities in which it operates, rather than to generate financial profit. Additionally, a Citizen Energy Community may engage in various energy-related activities for its members or shareholders, including generation (even from renewable sources), distribution, supply, consumption, aggregation, energy storage, the provision of energy efficiency services, charging services for electric vehicles, or other energy services.

With a specific focus on the adoption of the renewable energy, the Renewable Energy Directive (2018/2001/EU) entered into force in December 2018, as part of the Clean energy for all Europeans package (RED II) defined “Renewable Energy Community” as a legal entity which: “a) in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities; c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

“Both entities can own, develop renewable energy projects, and share their production among the community members—renewable energy community members do not need to be behind a single metering point or physically interconnected with the production units of the community” (Petrovich and Kubli 2023). However, the EU directives do not exclude the existence of other types of energy communities and still guarantee a certain degree of freedom in the national transpositions.

Beyond their peculiarities, community energy initiatives (CEI) emphasize the central role of ‘communities’: they both promote, develop, and control these projects (who the project is by) and are directly impacted by them (who the project is for) (Prehoda et al. 2019). Consequently, CEIs are usually enacted through grassroots initiatives and promoted by local leaders and stakeholders, who represent the community’s interests and values (Seyfang and Smith 2007). However, external variables concerning motivations, management, and control should not be neglected (Catney et al. 2014).

Given that motivations, values, practices, and relationships are “at stake” within communities, social and community psychology is becoming more interested in investigating the crucial aspects of these processes. Particularly, psychology’s contribution to the interdisciplinary debate concerning climate change and energetic transition should also encompass communicative features. Recent research has highlighted the importance of strategic communication—characterized by purposefulness, transparency, and participation—in establishing organizational legitimacy (Aggerholm and Thomsen 2024). Other works have focused on effective communicative and framing strategies to improve public engagement and address widespread skepticism, uncertainty, and conspiracy beliefs (Biddlestone et al. 2022; Whitmarsh 2011). Nevertheless, the role of communication needs further exploration, particularly within the domain of community energy initiatives and Renewable Energy Communities, where both content and relational issues are implicated.

Therefore, this work aims to investigate how communicative issues and processes are addressed in the scientific literature on Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs) or community energy initiatives (CEIs) that share key RECs’ features (prosumerism and focus on renewable energy). In particular, we will focus on the essential features, already acknowledged in the persuasive communication literature (Hovland 1948), namely, the source, the message, and modality, and the receiver’s features. Particular attention is also given to the community dimension of the persuasive communication, which is essentially participatory, as in the case of community-based communication (Schiavo 2013). This framework underlines the importance of internal communication (communication for coordinating, communication for empowering) in addition to the external one, aimed at promoting positive and prosocial behaviors (communication for promotion; see McCall 2011), especially when it involves the whole community together with local leaders (Schiavo 2020). In this recent model, community-based communication must be considered in its various developmental stages to foster effective and engaging communication strategies oriented toward sustainability (Schiavo et al. 2016).

In light of these theoretical starting points, we believe that a systematic review can promote reflection on communicative processes within RECs, thereby holding both theoretical and practical implications. In line with our psychosocial approach and considering the several labels concerning energy communities, we decided to focus on Renewable Community Energy and, to a limited extent, on the most inclusive term ‘community energy initiatives’ and “citizen energy communities”, thus encompassing experiences that share RECs’ main characteristics—such as prosumerism,

flexible management, and shared decision-making processes. Given the ‘European’ focus of the construct under investigation, we acknowledge that the primary context for this review will predominantly include European countries and initiatives. Nevertheless, we intend to broaden our scope to include communication process analyses from other geographical contexts. This allows us to examine non-European community energy initiatives that, while not formally designated as Renewable Energy Communities (RECs), share core operational principles with them.

The main features of REC as a socio-technical construct

Renewable Energy Communities (RECs) are widely defined as “socio-technical” constructs (Magnani et al. 2017), implying the interplay of technical, economic, management, and social spheres.

From a social perspective, citizens’ participation in the energy community has several benefits, including strengthened awareness regarding the energy transition (Klein and Coffey 2016), and new avenues for community involvement, thereby enabling new opportunities for a just transition (Inês et al. 2020; Yamamoto 2016). A ‘just’ transition, based on shared objectives of reducing energy poverty, can yield additional practical benefits, such as lower electricity consumption, revenues and profits for local communities, self-sufficiency, and energy independence (van Bommel and Höffken 2021). However, within the critical framework of “energy justice” (Sovacool et al. 2017), aimed at “identifying and analysing injustices in the energy system related to aspects such as class, race, ethnicity, age, gender or spatial and economic inequalities” (Hanke et al. 2021, p. 3), scholars still emphasized the challenges faced by underrepresented groups and social groups affected by such injustices. Age, low income, gender stereotypes, and other social disparities were identified as individual and community disincentives to citizens’ engagement in RECs (De Simone et al. 2025).

In addition, since the success of these initiatives is not universal and varies according to several variables, the social acceptance of these projects has emerged as a pivotal factor in motivating individuals to join a CEI (Lode et al. 2022) and ensuring their successful implementation (Bonaiuto et al. 2024). Moving beyond a binary opposition between support vs. resistance, social acceptance has been more widely defined as a dynamic and multi-layered process deriving from the interactions of individual perceptions, institutional settings (policy frameworks, incentives, and social norms), and collective narratives (Busse and Siebert 2018). As such, social acceptance has been usefully included in the psychosocial research about RECs programs, since their

slow expansion is more often attributed to unclear/uncertain issues – e.g., regulatory environments, limited financial incentives, gaps in public awareness and participation – rather than explicit oppositions (Freschi et al. 2024; Mengatto et al. 2025). Social acceptance was also related to distributional and procedural justice (Standal et al. 2023) as well as to poorly developed mechanisms for public participation and engagement (Leiren et al. 2020). In a recent review (De Simone et al. 2025), community involvement and participation were found to be critical in RECs' implementation, acting as both important drivers and successful features, but also adverse ones: inadequate involvement, especially in meetings and the communication process, can act as community barriers (Rygg et al. 2021).

From a technical perspective, innovation is a key characteristic of CEI (Van der Waal et al. 2018), manifesting “in the form of new or improved functionality or quality, reduced cost, better or more widespread availability [...] or some combination of any or all of these” (Morris 2011, p. 12). CEI practices and activities are organized based on diverse motivations (mainly environmental, social, economic, and political) and involve several types of beneficiary actors and patterns. This implies that ‘one size does not fit all’ (Martiskainen 2017, p. 79) and no ‘prototypical’ projects can be outlined. However, existing community energy initiatives can serve as inspiration for new initiatives. Therefore, the Diffusion of Innovation (DOI) theory can have an essential role in this process: its four key elements - innovation, communication channels, time, and the social system (Rogers et al. 2014)- can support the diffusion of these “niche” communities (Hill and Duffy 2022).

In the international scenario, previous research on community energy has addressed a wide range of issues. Studies stressed the multiple challenges faced by energy communities, including legal and organizational questions, planning requirements, market barriers, and institutional/policy support (Hill and Duffy 2022). A social perspective emphasizes the importance of social, organizational, and governance issues as critical factors, since their synergistic combination can represent a strength point, fostering social cohesion and trust within communities (Warbroek et al. 2019).

Within the social domain, community engagement has been widely acknowledged as a core feature of RECs. Personal pro-environmental motivations and values have been found to predict subjective adherence to pro-environmental behaviors, including involvement in CEIs (van der Werff and Steg 2016; Sloot et al. 2018). However, personal variables alone are insufficient: since these initiatives can generate benefits at the community and societal levels, community factors can contribute to explaining citizens' commitment. Among several community factors, the perception of what motivates relevant others and groups, as well as the extent

to which individuals are involved in their community, have been found to affect the initiative involvement (Goedkoop et al. 2022). Specifically, within RECs, key social motivations for investment include (Bauwens 2019): (i) relational goods, meant as the possibility of non-instrumental exchanges lying in social interactions; (ii) social identity with the group, implying the adhesion to sustainable energy initiatives following a strong sense of shared collective identity (Bamberg et al. 2015); (iii) peer effects in the adoption of innovations, emphasizing, e.g., the role of word of mouth and opinion leaders.

In the management domain, governance has been identified as a relevant issue (Brummer 2018b). In the RECs domain, a particularly fitting governance definition and model comes from Kooiman's proposal of “interactive” governance (1999). In his model, a three-pillar concept of interaction is proposed, aligning with the RECs governance which is particularly focused on decision-making processes (Brummer 2018b): (i) interferences, meant as uncoordinated, spontaneous forms of interactions; (ii) interplay, referring to semi-formalized interactions operating in collaboration and group formation; (iii) intervention, types of interactions that are usually based upon rules or juridical frameworks.

Bridging the social and governmental domains, the organizational level can be outlined through several kinds of interaction between community energy initiatives and local communities, including cooperation among local, regional, and national networks for community energy (Van der Schoor et al. 2016). Warbroek and colleagues (2019) identify six dimensions at this level: (i) bonding (or social) capital, defining the number of social ties as well as the related mobilized resources; (ii) bridging capital, connected to weak ties and social network between heterogeneous groups; (iii) alignment with local community institutions, mainly referring to the local relational systems, e.g. the connectivity of firms with local organizations and the presence of community institutions; (iv) alignment with local values and frames of reference, as well as to any cultural and cognitive pressures and taken-for-granted assumptions providing identity features, ideas, and practices; (v) community involvement, meant as the community-level social and normative features as well as the participatory governance; (vi) visibility, referring to the relation between clear norms and values and positive effects on legitimacy of these initiatives.

The intersections among these domains have been emphasized in the concept of “social capital”: while commonly understood as a system of shared norms, values, and beliefs embedded within social networks and recognised as a facilitator of entrepreneurial activity, it can play a sensitive role in community renewable energy initiatives (Grignani et al. 2021). Specifically, the importance of internal networks

and external network development has been acknowledged to overcome emerging challenges arising from limited competencies (e.g., technical skills, lack of knowledge about the technologies, or in accessing resources) and societal/local needs (Morrison and Ramsey 2019).

Renewable energy communities and communicative processes

Renewable Energy Communities are also defined in the literature as ‘grassroots innovations’ (Seyfang et al. 2014) or ‘local low carbon energy initiatives’ (LLCEIs) (Warbroek et al. 2019).

Since energy transitions imply a significant set of long-term structural changes impacting societal energy use and quality of life, it is widely acknowledged that community members should have an important role in these dynamics (Prehoda et al. 2019; Sovacool et al. 2016).

Communication plays a critical role in the success of RECs, encompassing multiple intersecting elements such as sources or actors, messages, channels and ‘receivers’ (Hovland 1948). In particular, key aspects of a community-based communication approach (Schiavo et al. 2016) include identifying who should be involved in decision-making and who holds decision-making power, promoting inclusive dialogue in internal communication processes, understanding how and what kind of knowledge should be shared to foster external engagement and participation, and monitoring or investigating the intended communication outcomes (McCall 2011; Schiavo et al. 2016; Prehoda et al. 2019).

Nevertheless, to the best of our knowledge, neither systematic reviews nor entirely communication-focused research has been conducted, investigating the key factors of effective communication in REC and similar experiences in terms of actors, content and channels (Hovland 1948).

Since community involvement in environmental initiatives can promote pro-environmental behaviors, understanding how to involve and persuade community members in RECs is crucial. An important contribution can be offered by the multiple motives underlying communicative appeals, including financial, environmental, and communal ones (Sloot et al. 2019). Specifically, financial reasons seem to play a less relevant role when compared to others. While financial benefits may not suffice to motivate behavioral change, individuals tend to be more engaged in community environmental initiatives when they are motivated to protect the environment and connect with their community. However, studies on the overall impact of appeals on initiative involvement are not univocal: it has been found that combined (environmental and communal) appeals are not more effective than single ones. Furthermore, in existing community energy initiatives, no clear relationships were found

between financial, environmental, and communal benefits of initiative involvement and the proportion of community members involved (Sloot et al. 2021).

To provide a “flexible, multisided, transactional platform that provides a structured support system to assist projects at each stage of development” (Hill and Duffy 2022, p. 6), four layers of communicative processes have been identified: (i) Intra-Community Transactions, involving the development and operation of projects and communications between community members mainly dealing with group, technical, and financial issues; (ii) Inter-Community Transactions, meant as horizontal networks between communities aimed at sharing knowledge and expertise amongst peers, thus supporting the development of other communities and building trust and confidence; (iii) Support Layer Transactions, defined as vertical and two-ways networks, where stakeholders and support groups provide knowledge, resources and tools, and energy communities provide feedbacks about those items; (iv) Policy-Level Transactions, meant as vertical relations among policy makers (EU and national policy makers) and grassroot communities aimed at disseminating policies and collecting data on the community energy, having a potential impact on new policy measures.

However, the main literature on energy community presents some limitations and shortcomings, mainly deriving from the following dimensions: (i) a limited attention to the actors’ ‘voices’ and the decision drivers (Coy et al. 2021); (ii) research mostly focus on case-studies, which, while improving deep knowledge of investigated contexts, hinder the generalization of results (Bielig et al. 2022); (iii) the values of inclusivity and transparency in communication processes, and their role in shaping engaging way to communicate within and between local communities, are underexplored; (iv) even if research in social and organizational psychology acknowledges the critical role of team processes (Mathieu et al. 2008) and dynamics (Kozlowski 2015), emphasizing the importance of evolution and temporal processes in understanding team effectiveness (Salas et al. 2013), a little attention has been devoted to those matters in CEIs.

Objectives

As a transversal process related to all these issues, communication can have a sensitive impact on RECs and similar projects planning, activation, and implementation. This work is mainly aimed at investigating the extent to which and how the scientific literature focuses on communication as a critical variable in implementation of this kind of initiatives, focusing on Renewable Energy Communities (REC), and Citizen Energy Communities (CEC) or community energy initiatives (CEI) that share key RECs’ features (prosumerism and a focus on renewable energy). Exploring

how consistent, structured, and organized international scientific research about communication in REC is, can have a sensitive function not only for defining the current state-of-the-art but also for informing future research directions, suggestions, and applications. Specifically, the overall research question moving this systematic review is: What are the main communicative features in terms of actors, content and channels (Hovland 1948), even considering the different phases and evolution in RECs (Schiavo 2020)?

Methods

Research strategy

We performed the systematic review following the PRISMA guidelines (Moher et al. 2009; Page et al. 2021). All available research articles retrieved from two databases (Scopus; Web of Science) have been considered, with no time limits. In line with the overall aims of the systematic review, two research queries have been used (see Fig. 1).

Research queries were run on 22nd February 2024. As for the first part of the queries, we decided to include both specific labels, such as ‘Community Renewable Energy’ and their similar articulations/declinations, such as ‘Community Energy’ and related, and ‘Citizen Energy Community’ and their similar articulations/declinations. Some of these labels can have more nuanced meanings, e.g., ‘Community energy’ is an umbrella term for different initiatives managed by communities, including projects that focus on renewable energy production (Haf and Parkhill 2017). However, we decided to be inclusive because all labels were used in scientific literature and more disseminating papers. In the second part of the queries, terms referred to communication, including channels (e.g., ‘social media’ and ‘television’) and analytical pathways (‘media analysis’), were included.

Eligibility criteria

Records from databases were assessed using the following inclusion criteria:

- a) Full text must be available.
- b) Articles must be written in English.
- c) Articles must be empirical
- d) Studies should look at Renewable Energy Communities or alternative community energy initiatives in which renewable energy systems are implemented, and community members can participate as prosumers.

- e) Information regarding the communication processes of community energy initiatives must be present.

Records were excluded based on the following exclusion criteria:

- a) Full text was not available
- b) Articles were written in other languages
- c) Articles were theoretical studies, reviews, and book chapters.
- d) Studies investigated community energy initiatives that did not focus on renewable energy or did not allow community members to be prosumers.
- e) The studies did not include information about the communication processes of the investigated community energy initiatives, but instead focused on other topics such as technical or regulatory issues.

We decided to include in the systematic review studies focused on Renewable Energy Communities (REC) and community energy initiatives (CEI) or Citizen Energy Communities (CEC) that share key RECs’ features (prosumerism and a focus on renewable energy). From now on, we’ll refer to the community experiences included in the review as RECs.

Research selection

Research selection started with the identification phase in February 2024. At this stage, we identified 808 records from Scopus and 78 from Web of Science, totaling 886 units. Then, 85 duplicate records were removed.

In the second phase, the research team, which included two professors and one research fellow, screened the identified records according to studies, abstracts, and titles. 733 records were excluded based on title and abstract, while 68 units were selected as relevant papers and assessed for eligibility. In the third phase, all the selected articles were collected on a Microsoft Excel spreadsheet, extracting from the full-text information like authors, year of publication, title, abstract, method, participants, principal outcomes, type of community energy initiative considered (including if renewable energy is adopted and if community members can participate as prosumers), and information about communication processes (if present). Following this spreadsheet, the research team verified whether the records adhere to eligibility criteria. At the end of the eligibility evaluation, 9 studies were included in the systematic review (Fig. 2).

Platform / Database	Community Renewable Energy	Citizen Energy Community
Scopus	TITLE-ABS-KEY ("COMMUNITY RENEWABLE ENERGY" OR "COMMUNITIES RENEWABLE ENERGY" OR "COMMUNITY ENERGY" OR "COMMUNITES ENERGY" OR "RENEWABLE ENERGY COMMUNITY" OR "RENEWABLE ENERGY COMMUNITIES") AND ("COMMUNICATION" OR "NEWSPAPER" OR "SOCIAL MEDIA" OR "SOCIAL NETWORK" OR "MASS MEDIA" OR "MASS-MEDIA" OR "MEDIA ANALYSIS" OR media OR "TELEVISION")	TITLE-ABS-KEY ("CITIZEN ENERGY COMMUNITY" OR "CITIZEN ENERGY COMMUNITIES") AND ("COMMUNICATION" OR "NEWSPAPER" OR "SOCIAL MEDIA" OR "SOCIAL NETWORK" OR "MASS MEDIA" OR "MASS-MEDIA" OR "MEDIA ANALYSIS" OR media OR "TELEVISION")
Identified records	767	41
Web of Science Databases accessed: Emerging Sources Citation Index Science Citation Index Expanded Social Sciences Citation Index Arts & Humanities Citation Index Conference Proceeding Citations Index Book Citation Index	((TS=("COMMUNITY RENEWABLE ENERGY")) OR (TS= ("COMMUNITY ENERGY")) OR (TS= ("COMMUNITIES RENEWABLE ENERGY")) OR (TS= ("COMMUNITES ENERGY")) OR (TS= ("RENEWABLE ENERGY COMMUNITIES")) OR (TS= ("RENEWABLE ENERGY COMMUNITY")) AND ((TS=("COMMUNICATION")) OR (TS=("NEWSPAPER")) OR (TS=("SOCIAL MEDIA")) OR (TS= ("SOCIAL NETWORK")) OR (TS= ("MASS MEDIA")) OR (TS= ("MASS-MEDIA")) OR (TS= ("MEDIA ANALYSIS")) OR (TS=(MEDIA))))	((TS=("CITIZEN ENERGY COMMUNITY")) OR (TS=("CITIZEN ENERGY COMMUNITIES"))) AND ((TS=("COMMUNICATION")) OR (TS=("NEWSPAPER")) OR (TS=("SOCIAL MEDIA")) OR (TS= ("SOCIAL NETWORK")) OR (TS= ("MASS MEDIA")) OR (TS= ("MASS-MEDIA")) OR (TS= ("MEDIA ANALYSIS")) OR (TS=(MEDIA))))
Identified records	77	1

Fig. 1 Research queries

Results

Descriptive results

The communicative dimensions emerging from the review are very recent since they appear in the temporal range from 2015 to 2024. Regarding the geographical distribution (Table.), the main area interested in the communicative processes are North Europe (60%, n= 6), South Europe

and Others countries like Usa e North Corea. It should be mentioned that two studies investigate RECs from different countries. The Netherlands is the most investigated area (three studies investigate communications strategies of the Netherlands' RECs), followed by the United Kingdom and Germany. In addition, the first quinquennium (2014–2019) appears to be relatively more focused on the communicative dimension compared to the 2020–2024 period, during which

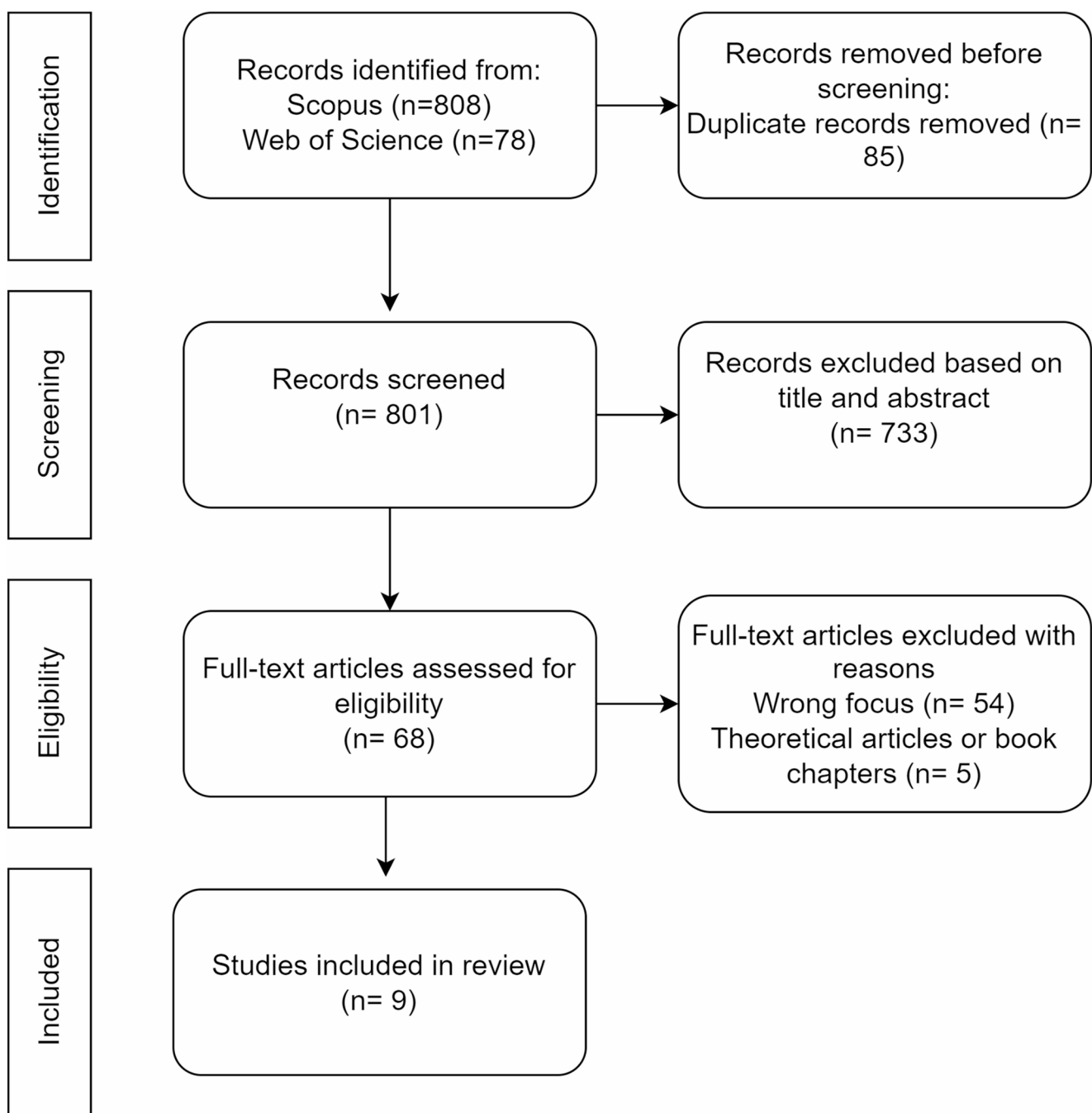


Fig. 2 PRISMA flow diagram, based on the PRISMA model (Page *et al.*, 2021)

there is a notable decrease in publications (–50%, from six articles to three), highlighting a decline in interest (Fig. 3).

All the studies included in the systematic review present an empirical section; specifically, they make use of qualitative or mixed approach: they all employ interviews, and 66,67% (n=6) combine interviews with other methods (like surveys, focus groups, workshops, documentary analysis etc., see Fig. 4). None use a quantitative approach. Four studies focus on participants who are members of RECs,

two on members of local communities, and three include both types of participants. As for the RECs' origins: two studies analyze top-down community initiatives (which are typically initiated by institutions); four focus on bottom-up community initiatives (which are initiated by local community members); and three look at community initiatives with mixed or unspecified initiation processes. Furthermore, the studies mostly investigate existing RECs (n=7), except for

Fig. 3 Geographical distribution of the articles included in the systematic review

Region	n(%) 2014-19	n(%) 2020-24	n (%)
Northern Europe	4 (66.7%)	2 (66.7%)	6 (60.0%)
Southern Europe	0 (0.0%)	1 (33.3%)	1 (10.0%)
Other Countries (Usa/South Korea)	2 (33.3%)	0 (0.0%)	2(20.0%)
Total	6 (65%)	3 (35%)	9 (100%)

a feasibility study (Prehoda *et al.*, 2019) and a study that compares a successful experience to a failed one.

Features of RECs' communication

Drawing on Hovland's (1948) seminal framework on persuasive communication, six of the nine included articles analyze the features of RECs' communication, focusing on elements identified as central to messaging. Interestingly, they stress the importance of transparency in communication: von Bock und Polach and colleagues (2015) identify transparency and equal distribution of relevant information as important social drivers of RECs. Doci (2021) highlights the importance of providing community members with all the details about the RECs, including any weaknesses or difficulties associated with the projects, to improve trust and allow members to feel involved. Focusing on renewable energy communities as an instrument to drive a just energy transition, Standal and colleagues (2023) highlight that respondents perceive the lack of trustworthy objective information as detrimental and advocate measures to facilitate information access for potential stakeholders. Beyond the focus on transparent and comprehensive communication, special attention is devoted to what is communicated to community members. Local cooperatives and community members should be acquainted with a) technical subjects such as energy technology, b) political strategies, c) and financial housekeeping, with specific attention to those not having a technical background (Schoor *et al.*, 2016). Rodrigues and colleagues (2020) describe the content provided to community members via a website: firstly, general information about the project, the location of the REC, and partners were outlined; secondly, ad hoc sections for news were found. News concerned the project's development, topics related to community energy, events, contact, research

related to the project (such as journal articles, conference papers, etc.), and the project's impact. Finally, Bauwens (2019) stressed the importance of content customization referring to the targets of RECs' communication: members of larger RECs would be more drawn by claims that emphasize a positive economic outcome, while members of smaller communities would be more attracted by messages emphasizing the environmental and social benefits of these projects (Fig. 5).

The source of the communication process: the role of local leaders

A closer examination of the included articles also reveals interesting descriptive insights regarding the source (Hovland, 1948) of REC communication, which involves different actors and stakeholders, who are both internal and external to communities: local associations, cooperatives, local political institutions, but also grid companies, research institutions, and the business sector (Standal *et al.*, 2023; von Bock und Polach *et al.*, 2015). Thus, individuals with leadership abilities have to coordinate external and internal actors involved in RECs. Regarding these matters, four papers emphasized the pivotal role of local leaders in RECs' communication processes. Kim (2017) defined local leaders as those who initiated community energy initiatives and acted as a bridge to communicate with government officials. In addition, the continuity of RECs heavily depends on the commitment of local leaders, whose absence or change can result in the suspension of the projects (Kim, 2017). Community members emphasized that having confident and skilled community leaders was crucial for convincing the broader community about the project's feasibility and importance (Van Veelen, 2018) (Fig. 6).

Authors	Title	Year	Methods	Country (Area)	
Bauwens T.	Analyzing the determinants of the size of investments by community renewable energy members: Findings and policy implications from Flanders	2019	Semi-structured interviews + literature review + survey	Netherlands (North Europe)	2014-2019
Dóci G.	Collective action with altruists: How are citizens led renewable energy communities developed?	2021	Semi-structured interviews	Netherlands, Germany (North Europe)	2020-2024
Kim H.	A community energy transition model for urban areas: The energy self-reliant village program in Seoul, South Korea	2017	Semi-structured interviews + documentary analysis	South Korea (Other)	2014-2019
Prehoda E.; Winkler R.; Schelly C.	Putting research to action: Integrating collaborative governance and community-engaged research for community solar	2019	Semi-structured interviews + world café+ survey + financial analysis	USA (Other)	2014-2019
Rodrigues L.; Gillott M.; Waldron J.; Cameron L.; Tubelo R.; Shipman R.; Ebbs N.; Bradshaw-Smith C.	User engagement in community energy schemes: A case study at the Trent Basin in Nottingham, UK	2020	Interviews + survey + workshops	UK (North Europe)	2020-2024
Standal K.; Leiren M.D.; Alonso I.; Azevedo I.; Kudrenickis I.; Maleki-Dizaji P.; Laes E.; Di Nucci M.R.; Krug M.	Can renewable energy communities enable a just energy transition? Exploring alignment between stakeholder motivations and needs and EU policy in Latvia, Norway, Portugal and Spain	2023	Semi-structured interviews + focus group	Latvia, Portugal, Spain, Norway (South Europe)	2020-2024
Van Der Schoor T.; Van Lente H.; Scholtens B.; Peine A.	Challenging obduracy: How local communities transform the energy system	2016	Interviews	Netherlands (Nord Europe)	2014-2019
Van Veelen B.	Negotiating energy democracy in practice: governance processes in community energy projects	2018	Interviews + documentary analysis	UK (North Europe)	2014-2019
Von Bock Und Polach C.; Kunze C.; Maaß O.; Grundmann P.	Bioenergy as a socio-technical system: The nexus of rules, social capital and cooperation in the development of bioenergy villages in Germany	2015	Semi-structured interviews	Germany (North Europe)	2014-2019

◀ **Fig. 4** Main features of the articles included in the systematic review

Local leaders can be identified as “local champions”, virtuous examples who can have an active role by pushing for change, engaging other citizens, and promoting collaboration in the REC. Local champions are recognized for their persuasive competencies, personal motivation, and leadership skills, which are often combined with technical expertise and knowledge (Standal *et al.*, 2023). Local leaders can also be recognized as “local experts” who act as connecting figures between experts and community members, as they translate otherwise incomprehensible or untrustworthy technical discourse into accessible language and content; vice versa, they formulate community members’ concerns and questions in more technical language, if needed. Furthermore, local leaders can act as informal delegates, taking the voice of community members who are unfamiliar with public meetings and could feel uncomfortable with public speaking in front of larger audiences (von Bock und Polach *et al.*, 2015). Local leaders are typically members of local communities; however, they can have political and/or economic roles too. For instance, they can be institutional local officers or entrepreneurs (von Bock und Polach *et al.*, 2015).

Phases and channels of the communication process

Community-based communication also takes into account its own developmental phases (Schiavo 2013, 2020), conceiving communication as a dynamic process that — similarly to social marketing (Grier and Bryant 2005) — requires stages of knowledge gathering, information dissemination, monitoring, and strategy revision. In light of this useful framework, the review highlighted the particular relevance of a single article that focuses on the importance of adjusting RECs’ communication strategies following the different phases of the projects (Doci, 2021). During the first phase, the primary goal is to provide information and update community members about the ongoing developments. In this view, newsletters, leaflets, emails, articles, and local advertisements can be useful. The main aim of the second phase, when the RECs are already underway, is to provide participants with the opportunity to give feedback or ask questions. Typically, information events or face-to-face conversations are useful for the initiators to persuade skeptics and opponents too (Doci, 2021).

Beyond a step differentiation, several studies focus on the RECs’ internal communication strategies and channels, identifying face-to-face meetings as the most favorite ones (Bauwens, 2019; Doci, 2021; Prehoda *et al.*, 2019; Rodrigues *et al.*, 2020; Van Veelen, 2018). Face-to-face meetings can be beneficial, as they promote direct social interactions between community members and can help to engage them

financially (Bauwens, 2019); however, direct social interactions should be limited to formal face-to-face settings (such as formal meetings, community consultations, and ballots), rather than extended to informal local spaces (Van Veelen, 2018). Nevertheless, Prehoda and colleagues (2019) emphasized the difficulty of ensuring broader community participation in community meetings as a possible solution, they proposed scheduling meetings at different times of the year to encourage participation from persons with conflicting agendas. Furthermore, the process involves the selection of compensated community representatives who then, in turn, recruit participants for community meetings from within their personal social networks. However, face-to-face meetings are not the only way to communicate with community members. Rodrigues and colleagues (2020) investigate different communication opportunities, including websites and social media channels, an online user engagement platform, and a hybrid model, where a physical community energy hub coexists with an interactive virtual energy space. The authors found that the residents’ perceptions of the websites and social media are generally positive since they usually use them to interact with friends about the projects. However, some participants perceived the user engagement platform as complicated to navigate, so they preferred more traditional social media platforms (like Facebook) to communicate with other residents. Finally, residents appreciated the Community Energy Hub as an opportunity for “face-to-face” discussions. More generally, the possibility to communicate both in person and online provided flexibility and convenience to different users (Rodrigues *et al.*, 2020) (Fig. 7).

Beyond the internal communication dynamics, some studies highlighted the importance of external communication processes. Doci (2021) emphasizes the essential role of advertising to gain media attention at both the regional and national levels. Websites, newspapers, and social media enabled communities to achieve wider audiences, thus enabling projects to raise funds and engage increasing numbers of individuals and stakeholders (Doci, 2021; Rodrigues *et al.*, 2020).

Discussion

The limited scholarly attention to communication in RECs is a significant finding, particularly given its crucial role in the energy transition. However, when investigated, communication emerges as a critical variable capable of promoting community members’ trust and engagement in projects, in alignment with the theoretical approaches of community-based communication (Schiavo 2013, 2020). Renewable Energy Communities have been conceptualized and normed

Author(s)	Main Focus	Key Findings / Contributions
von Bock und Polach et al. (2015)	Social drivers in RECs	Emphasize the importance of transparent communication and equal distribution of information as drivers of participation.
Doci (2021)	Trust-building and involvement	Advocates for sharing all project details , including challenges, to build trust and foster member involvement .
Standal et al. (2023)	Fair energy transition and access to information	Notes the lack of trustworthy, objective information ; calls for measures to improve access for all potential stakeholders.
Schoor et al. (2016)	Type of information shared	Recommends sharing technical, political, and financial information , especially tailored for non-experts within the community.
Rodrigues et al. (2020)	Website communication and structure	Identify structured website sections: project overview, news updates, event info, research outputs, and project impact .
Bauwens (2019)	Message customization based on audience size	Suggests tailoring messages : larger RECs are motivated by economic benefits , smaller ones by environmental/social benefits .

Fig. 5 Communication strategies in REC

by the EU as autonomous legal entities that manage energy assets and share locally generated energy among their members. This technical innovation is accompanied by social opportunities deriving from community participation in governance and decision-making. Communication has a critical responsibility in the whole process of REC, given the different intersecting technical plans, complex directions, competencies of the actors, and relevance of the outcomes. All these dimensions also fit with the emerging

needs of a community-engaged research approach (Prehoda *et al.*, 2019).

Nevertheless, limited attention has been devoted to the communicative processes in their different sources, contents, channels, and phases, considered in light of effective and persuasive communication (Hovland, 1948). When communication is considered, it does not represent the core topic: its operationalization in research and gathering data appears unconvincing and fragmented, e.g., by devoting

Author(s)	Main Focus	Key Findings / Contributions
Standal et al. (2023)	Multi-stakeholder involvement & leadership	RECs involve a range of actors (associations, political institutions, businesses, etc.). Leaders must coordinate internal/external stakeholders and act as change agents.
Standal et al. (2023)	Local champions and leadership qualities	Local champions combine persuasive abilities, motivation, technical knowledge , and the capacity to engage and mobilize citizens and collaborators.
von Bock und Polach et al. (2015)	Community dynamics and representation	Local leaders act as informal delegates, translating technical discourse and representing less vocal members in public settings. May also have institutional/economic roles.
Kim (2017)	Leadership continuity and institutional linkage	Defines local leaders as initiators and bridges to institutions . Project continuity relies on their commitment and presence ; absence can jeopardize the REC.
Van Veelen (2018)	Persuasive and mobilizing power of leadership	Confident and competent leaders are essential to gain community trust and support for project feasibility.

Fig. 6 Features of *Local leader* in the articles included in the systematic review

no more than a few items to those matters (Li *et al.*, 2021; Romero-Castro *et al.*, 2023). Most of the time, communication is considered an implicit dimension (van Summeren *et al.*, 2022; Van der Waal *et al.*, 2018; Van Veelen, 2018), thus making it hard to have a clear understanding of its strengths and weaknesses. In addition, results deriving from research can be ambiguous (Sloot *et al.*, 2021), asking for additional efforts in those directions. And crucially, no reflections about the specific role and function of communication were produced. As a consequence, this work aims to fill some of these gaps by proposing a systematic review of literature concerning communication in REC through the PRISMA guidelines.

The several steps of the PRISMA model and the individuation of the inclusion/exclusion criteria enabled us to obtain a final sample of 9 empirical articles, whose analysis supported us in answering the main question concerning

features and contents of communication processes, communicative strategies and channels, actors and roles in social networks of REC. The even limited number of final records emphasizes the importance of a clear and transparent communication style, as well as content that is understandable to all community members, including those without a technical background (Doci, 2021; von Bock und Polach *et al.*, 2015; Schoor *et al.*, 2016).

As for the research pathways, the communicative processes of RECs have been investigated with qualitative or mixed methodologies: interviews, focus groups, and documentary analysis are the favorite tools for data gathering, in line with the overall exploratory aims. Pure quantitative studies are rather missing, thus making generalization of results challenging. Again, this result fits with the general choice to promote case analysis (Bauwens, 2019; Dóci, 2021; Kim, 2017; Prehoda *et al.*, 2019; Rodrigues *et al.*,

Author(s)	Main Focus	Key Findings / Contributions
Docì (2021)	Communication phases in RECs	Identifies two phases: (1) Informative phase (newsletters, flyers, emails), and (2) Interactive phase (feedback, persuasion via info events, Q&A). Emphasizes adaptation over time .
Bauwens (2019)	Internal communication preferences	Face-to-face meetings are preferred; they promote social interaction and financial engagement .
Van Veelen (2018)	Formal vs informal interactions	Supports formalized face-to-face settings (consultations, ballots); warns against relying on informal spaces.
Prehoda et al. (2019)	Participation barriers	Highlights participation challenges ; proposes holding meetings at various times and using compensated community representatives for broader inclusion.
Rodrigues et al. (2020)	Hybrid and digital communication tools	Assesses use of websites, social media, online platforms, and physical energy hubs . Found users appreciated hybrid models; Facebook preferred over complex platforms.
Rodrigues et al. (2020); Docì (2021)	External communication for visibility	Advertising and media coverage via websites, newspapers, and social media helped attract attention, raise funds, and engage broader audiences .

Fig. 7 Communication strategies across REC phases

2020; Schoor *et al.*, 2016; Standal *et al.*, 2023; Van Veelen, 2018; von Bock und Polach *et al.*, 2015), which is preferred to obtain more contextualized insights. Looking at the geopolitical contextualization of these research articles, it seems to support the general trend in RECs research (Brummer, 2018), showing an overrepresentation of North European countries in the literature that takes into account RECs' communication.

Considering the source of communication, a focus on the various actors involved in RECs' communicative networks stressed that local leaders play a pivotal role. Local

leaders are typically members of the local community, although they may also be political or economic representatives (von Bock und Polach *et al.*, 2015). Thanks to their motivation and persuasive power, they promote community members' engagement and participation in projects, acting as a bridge between community members, institutions, and experts (Kim, 2017; Standal *et al.*, 2023; Van Veelen, 2018; von Bock und Polach *et al.*, 2015). Consistent with prior research on environmental communication (Lee *et al.* 2017; Higgins and Walker 2012), an essential point concerns the necessity of integrating both central/rational and peripheral/

heuristic pathways, also taking into account the project stage and the community type (e.g. solidarity vs. non-solidarity) (D'Errico et al., 2025).

However, the continuity of RECs heavily depends on the commitment of local leaders, whose absence or change can result in the suspension of the projects (Kim, 2017). Thus, leaders' motivation and involvement can have a sensitive and multifaceted impact on RECs, even in determining whether the whole project will succeed or fail. Even if considered a necessary profile in the coordination of the different figures and participants in the Renewable Energy Community (Kim, 2017), it would thus be useful to explore strategies to make the continuation of projects less reliant on the function of the leader and more based on community members' contributions. One way could be to promote intermediate and formally recognized figures and roles that, in case of the leader's absence or departure, can work as an acknowledged and legitimated mediator between community members, institutions, and experts. In addition, leadership oriented on a participative style could take global benefits: being decision-making and stakeholder involvement central dimensions, collective participation could be encouraged, thus enhancing trust, commitment, and diversity of perspectives while improving decision quality and organizational performance (McCann & Holt, 2010; Nedelko & Potocan, 2021). Participatory leadership can be specifically favoured in ecological transition pathways, since it is grounded in communality, responsibility, and ethical conduct, whereby leaders foster creativity, problem-solving, and sustainable practices, while also embodying social and environmental responsibility (Wang et al., 2022).

More generally, initiators of RECs need to encompass multifaceted skills, including not only financial and social capital, but also competence in business, administration, as well as cultural and symbolic capital that inspires change to engage other actors to get involved, thus representing a 'niche group' (Standal et al., 2023).

Considering the specific patterns of RECs, the systematic review shows that RECs' communicative processes vary depending on the target audience (external vs internal) and the energy community's development stage (Doci, 2021). These findings highlight how understanding the phases and changes of RECs' communicative processes is essential for designing successful communication strategies at each level of the project's development (and target). Taking into account the dynamic aspect of communication throughout a project means recognizing that the different project phases are related to specific tasks and demands, thus requiring different uses of media communication (Handke et al., 2019). Even if in this review we found a single article dealing with project stages, this issue can be additionally sensitive in RECs projects, since team effectiveness even depends on

the alignment of team processes and environmentally driven tasks (Kozłowski & Ilgen, 2006). Developing tailored communication issues and strategies can promote RECs' success by engaging community members and enabling projects to raise funds from external institutions. Thus, raising awareness among energy communities on this topic can be useful, as well as promoting the creation of ad hoc working groups to develop tailored communication strategies within the RECs. Poor communication processes and high technical complexity were generally identified as adverse features during the implementation of RECs, implying the essential role of communication for inclusive purposes. As for the addressees, to the best of our knowledge, there are no specific studies concerning inclusive communication strategies, specifically referring to gender gap or other social ones (e.g., age divide). Since traditional gender roles and other axes of marginalization are easily reproduced when citizens engage in energy production, diversity needs to be more seriously taken into account to fulfill the expectations of inclusiveness (Standal et al., 2023).

The complexity of RECs' communicative processes, phases, and actors suggests that the promotion of effective communicative strategies needs to be aware of community features, including the technical background of community members, their priorities and problems, as well as their values and needs. RECs' communicative processes should reflect community values and be effective, prioritizing inclusive and accessible communication strategies in both content and channels. Surprisingly, some relevant issues concerning energy justice were not taken into account. Whereas literature stressed the importance of integrating gender into the research concerning the dynamics of inclusion and exclusion, thus providing insights to accelerate the renewable energy transition and contrasting gender stereotypes and gender divide in the energy sector (Lazoroska et al., 2021), in our corpus, no specific mentions were found about possible gender gaps. In this direction, customization of communication can support citizens' participation and inclusive involvement, which, in turn, can enhance energy democracy and social justice goals, as, for example, has been shown through emphasizing women's leadership in renewable energy initiatives (Allen et al., 2019). As a remaining gap, the inclusion of gender dynamics and other socio-cultural factors can surely support the overall aim of tailored and inclusive communication, which, in its turn, can promote citizens' participation and sense of community (De Simone et al. 2025).

The main weakness of this review is related to the limited number of studies focusing on the communicative processes of RECs. The number of articles included in this study ($n=9$) made the authors aware of the limited generalizability of findings, together with the limited types of methods used,

and the unbalanced geographical distribution that, consequently, was found in the sample. However, we decided to keep this corpus because a) we really wanted to focus on communications in RECs as well-defined constructs, thus avoiding investigating more general assumptions about communication in energy projects; b) we believed this is an essential informative finding in itself.

Furthermore, it is possible that the databases chosen for this research were not comprehensive, potentially leading to the oversight of relevant studies on the topic. Additionally, despite our efforts to design an inclusive search query (e.g., by including generic terms such as "Community energy"), it may not have captured all terminological variations for Renewable Energy Communities (RECs) experiences, particularly those prevalent in non-European contexts. The diverse and evolving nature of REC terminology, especially across different geographical regions, suggests that some pertinent research, particularly from outside of Europe, might have been inadvertently excluded from our review.

In the future, literature should investigate RECs' communicative processes, actors, and stages more systematically, specifically implying: a) the importance of the methodological triangulation, in line with the specific aims of qualitative and quantitative methods; b) the need to focus on RECs located in other European zones, such as the Mediterranean area, in the double effort to investigate specific socio-cultural impacts affecting engagement and to foster the process of RECs' implementation.

This work has both theoretical and practical implications. As for the theoretical side, a first effort was accomplished to clearly outline the main features of communication and their role for wider participatory dynamics, thus laying the basis for making communication a key factor in predictive psychosocial models. As for the practical side, all those who are involved in the process of REC's activation should take into account the importance of the overall communication as well as its peculiarities related to the community features and the project's stages. Thus, actionable insights for policymakers and practitioners can be proposed: register, imagery, and emotional tone can be tailored to audience needs, and social identity cues can enhance engagement, while highly technical messages may be effective only for publics already familiar with such discourses (D'Errico et al., 2025).

Regarding communication channels and tools, it appears crucial to identify, according to the characteristics of each specific community, the most appropriate means to enhance both internal and external communication, thereby ensuring inclusivity across diverse target groups within the broader community. For internal communication, accessible and user-friendly digital tools (e.g., instant messaging platforms) may be particularly effective; when more complex

tools are required, dedicated educational or training sessions could facilitate their adoption and use. Globally, communicators should reflect on what kind of channels and content results could be more effective and why, to be aware of how RECs can be narrated and how these narratives can promote members' participation and engagement in these projects. Thus, again, the responsibility of research to further investigate these processes is recalled, since the aggregated data from this review suggest that, over the past five years, such publications have actually decreased.

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Data availability The authors are willing to share study materials with other researchers. The data supporting this study's findings are available from carmela.sportelli@uniba.it upon request.

Declarations

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