Citizens' Motives towards Becoming Members of Renewable Energy Communities (RECs): The Role of Biospheric Values, Environmental Communication, and Sense of Community

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Abstract

Renewable Energy Communities (RECs) represent complex phenomena involving technical, environmental, and social issues. Consistently, they need to be framed as socio-technical innovations, and citizens' involvement in them as rooted in several psychosocial dimensions. Therefore, the present study unravels citizens' intention to become members of a REC from a psychosocial standpoint, taking into account the role of their Sense of Community (SoC), biospheric values, and environmental communication, as well as of intrinsic and extrinsic motivations towards RECs. An online questionnaire was administered to 900 Italian citizens (51.4% female; aged between 18 and 84) not being involved in RECs currently. A multiple mediation model was tested using Structural Equation Modeling (SEM). The results show that environmental communication, biospheric values, and SoC all showed positive effects on both intrinsic and extrinsic motivation, even though only the latter showed a – positive – association with the intention to become member of a REC. Consistently, only the indirect effects through extrinsic motivations were significant. Overall, this suggests the complexities underlying RECs formation and maintenance, which require further attention. The theoretical and practical implications are discussed.

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Keywords: Renewable Energy Community (REC), renewable energy, ecological transition, environmental crisis, environmental communication

Riassunto. ***Le motivazioni dei cittadini a diventare membri delle comunità energetiche rinnovabili (CER): il ruolo di valori biosferici, comunicazione ambientale e senso di comunità.***

Le Comunità Energetiche Rinnovabili (CER) rappresentano un fenomeno complesso che include dimensioni tecniche, ambientali e sociali. Esse vanno inquadrate, dunque, come innovazioni sociotecniche e il coinvolgimento dei cittadini in esse va letto come radicato in diverse dimensioni psicosociali. Il presente studio approfondisce in ottica psicosociale l'intenzione dei cittadini di diventare membri di una CER, prendendo in considerazione il ruolo del Senso di Comunità (SoC), i valori biosferici e la comunicazione ambientale, così come le motivazioni intrinseche ed estrinseche a diventare membri di una CER. Un questionario online è stato somministrato a 900 cittadini italiani (51.4% donne; di età compresa tra i 18 e gli 84 anni), non coinvolti in esperienze di CER al momento della raccolta dati. È stato testato un modello di mediazioni multiple utilizzando i Modelli di Equazioni Strutturali (SEM). I risultati hanno mostrato che SoC, valori biosferici e comunicazione ambientale hanno effetti positivi sia sulle motivazioni intrinseche sia su quelle estrinseche, ma solo queste ultime hanno effetto – positivo – sull'intenzione di diventare membri di una CER. In linea con ciò, soltanto gli effetti indiretti mediati dalle motivazioni estrinseche sono risultati significativi. Nel complesso, quanto emerso suggerisce che la formazione e il mantenimento delle CER rappresentano processi complessi, che richiedono di essere ulteriormente approfonditi. Le implicazioni teoriche e pratiche sono ulteriormente discusse.

Parole chiave: Comunità Energetiche Rinnovabili (CER), energia rinnovabile, transizione ecologica, crisi ambientale, comunicazione ambientale

1. Introduction

The effects of climate change are visible in different domains of individual and social life (e.g., mental health, social inequalities, resource scarcity, extreme climate events; Anneser *et al.*, 2024; Bourque & Willox, 2014), proving its great relevance to the life of individuals and communities. Mitigating these negative effects by acting on their causes is urgently needed (Mori & Tasaki, 2019); in this, pro-environmental behaviors are seen as a fundamental way to reduce climate impacts and at the same time act on the triggering causes (Kollmuss & Agyeman, 2002; Larson *et al.*, 2015). Among these actions, the use of renewable energy sources makes it possible to bring about socio-technical modifications that promote environmental well-being (Van der Waal *et al.*, 2018).

In several cases, the shift towards the use of renewable energy sources is supported by the promotion of energy communities (Petrovich & Kubli, 2023), whose core dimension lies in participatory processes aimed at sus-

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taining energy transition (Bauwens, 2019). Among these, Renewable Energy Communities (RECs) are autonomous legal entities «where citizens, groups, enterprises, and local authorities produce, consume, and share energy generated from renewable sources» (Scardigno *et al.*, 2025, p.2). Therefore, they represent an innovative direction toward decarbonization, moving in the direction suggested by the most recent European Union regulations on energy (Directive (EU) 2018/2001, also known as RED II, translated in Italy with law 199/2021; Ahmed *et al.*, 2024).

Along with being technical innovations, RECs also involve social dimensions (Magnani *et al.*, 2017), as they are based on (a) energy democracy, that is, the institutionalization of participatory forms of energy provision (Szulecki, 2018), and (b) energy citizenship, which focuses on citizens' active engagement with energy (Wahlund & Palm, 2022). Consistently, the decision to take part in a REC is complex and involves different psychosocial dimensions (De Simone *et al.*, 2025), which leads to the need to consider the intersection of individual, community, and broader societal factors (Soeiro & Ferreira Dias, 2020). Therefore, an ecological perspective (Bronfenbrenner, 1979) taking into account all these aspects simultaneously is needed to address these phenomena and citizens' attitudes towards them.

Consistent with the different kinds of benefits that can stem from being involved in a REC (that is, environmental, economic, social benefits; De Franco *et al.*, 2023), the motivations leading to the intention to take part in one can be either extrinsic or intrinsic: indeed, the former refers to instrumental advantages such as economic (e.g., reductions on bills) or social (e.g., social recognition) ones, while the latter to the interest in, and gratification derived from, the participation in the REC itself (Deci & Ryan, 2000). Pro-environmental actions have often been studied through an intrinsic perspective (Sloot *et al.*, 2018), since attention to the environment requires a prolonged commitment over time, more consistent with intrinsic aspects (Horstink *et al.*, 2020; Lupi *et al.*, 2021). Nevertheless, other studies have also shown that extrinsic motivation can be effective as well as a starting point for moving from amotivation and intrinsic motivation (Ryan & Deci, 2000) – also with specific reference to the intention to become member of a REC (Gatti *et al.*, 2026).

However, to the authors' best knowledge no study so far has deepened the individual and community-related roots of both intrinsic and extrinsic motivations to become members of a REC, which may be identified in individual values, tie to the community of belonging, and social communications. Therefore, the aim of the present study is to propose a theoretical model (see Figure 1) addressing the individual and community-related fac-

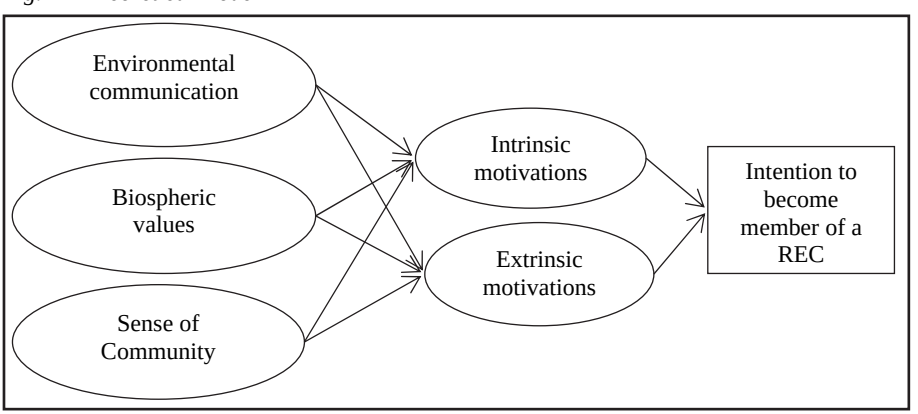
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tors shaping people's motivations – both intrinsic and extrinsic ones – towards the intention to become members of a REC.

Indeed, at the individual level, values are one of the aspects on which the established literature about pro-environmental behaviors has focused the most over time (e.g., Gifford & Nilsson, 2014; Stern, 2000). Broadly speaking, values drive the actions of individuals; when specifically linked to the environment, they foster the responsibility in the implementation of pro-environmental behaviors (Chen, 2015). Additionally, based on RECs also representing a socialized phenomenon (Gatti *et al.*, 2026), the role of interpersonal communications in modifying individual perception of such phenomena should be addressed too (Dóci, 2021). Indeed, communication plays a central role, shaping citizens' beliefs about the potential effects of RECs and potentially fostering the motivation to take part in them (Ioannidis & Koutsoyiannis, 2020).

At the community level, the tie to the group of belonging – that is, the Sense of Community (SoC; McMillan & Chavis, 1986) – plays a fundamental role in promoting citizens' participation (Procentese *et al.*, 2024). Indeed, SoC also leads to caring about and taking action for the place where the community is located, wanting to protect it (Omoto & Packard, 2016). This may become particularly relevant when it comes to getting involved in initiatives reckoned as collective – that is, involving several community members, who share common goals linked to collective well-being and improvement of the quality of life for the community as a whole (e.g., Procentese *et al.*, 2019a), as in the case of RECs.

Fig. 1 – Theoretical model



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2. The Role of Biospheric Values

Values represent a trans-situational goal of varying importance, which serve as a guiding principle in the life of a person or of a social entity (Schwartz, 1992). With specific reference to environmental issues, Gifford & Nilsson (2014) draw attention to biospheric values, referring to individuals' concern for the environment without a clear link to human activities (Bouman *et al.*, 2018). Such a concern towards nature is for its own sake, without external benefits (Van Speybroeck *et al.*, 2024): people with biospheric values have shown empathy towards the environment, based on their inner concern (Swami *et al.*, 2010). Consistently, biospheric values constitute the primary motivational basis for pro-environmental concern (Milfont & Gouveia, 2006), as they attribute intrinsic moral worth to nature and heighten sensitivity to ecological degradation, differently from self enhancement and materialistic values – including market oriented or techno optimistic worldviews – which are rather associated with diminished environmental concern (Ghijselinck, 2023).

Overall, biospheric values emerge as the foundational antecedent shaping moral judgement and engagement in pro-environmental behavior (Mattijssen *et al.*, 2020). They stimulate an ecological worldview, leading people to be more aware of the effects of climate change and to feel greater responsibility in acting to face them (Chen, 2015). Consistently, individuals who show higher biospheric values are more concerned about the environment (Milfont & Gouveia, 2006) and this also reflects in their beliefs and behaviors, with them being more likely to act in its favour (Bouman *et al.*, 2018; Gifford & Nilsson, 2014; Nordlund & Garvill, 2002).

However, the relationship between values and environmental protection is not always linear; there is the possibility that individuals experience conflicting values (Howes & Gifford, 2009), as well as that values can be impacted by political views that give priority to other aspects, such as economic ones (Feinberg & Willer, 2012).

What has been said so far can also reflect in the motivation to participate in a REC, where environment-related values play a significant role (Dóci, 2021; Dóci & Vasileiadou, 2015). Indeed, people with biospheric values will be more inclined to take part in initiatives related to community energy projects (Conradie *et al.*, 2021). Specifically, this may happen through intrinsic motivations, as individuals having biospheric values are intrinsically concerned about the environment and aware of the effects of climate change, perceiving the responsibility to reduce them (Chen, 2015; Milfont & Gouveia, 2006). However, this may also happen through extrinsic motivations, based on environmental, economic, social benefits being

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tightly intertwined and reinforcing each other in RECs (De Franco *et al.*, 2023). Therefore, these hypotheses are posed:

- H1: biospheric values positively associate with the intrinsic (*H1a*) and extrinsic (*H1c*) motivation towards becoming a member of a REC, as well as with the intention to do so (*H1b*);
- H2: the relationship between biospheric values and the intention to become member of a REC is mediated by both intrinsic (*H2a*) and extrinsic (*H2b*) motives towards it.

3. The Role of the Community

Playing out behaviors aimed at protecting individual, collective, and environment health can also be considered in its relationship to group membership (Hystad & Carpiano, 2012). As to this, SoC specifically refers to the feeling of belonging to a community and being important to it; it includes four core dimensions: sense of belonging, feeling of having influence within the community, shared emotional connection with other members of the community, and perceiving that one has things in common with the different members of the group (McMillan & Chavis, 1986). The group can be defined on a geographic basis, or in terms of personal characteristics, interests, and values.

Therefore, SoC is an important resource to stimulate environmental engagement, since people will be more prone to carry out prosocial actions toward their community of belonging (Chavis & Wandersman, 1990; Flanagan, 2003; Talò *et al.*, 2014). Consistently, SoC already proved its connection with playing out environmental volunteering actions (Omoto & Packard, 2016) as well as several individual pro-environmental behaviors (Procentese *et al.*, 2024), thus representing a driver of both individual and collective pro-environmental engagement.

Specifically, the link between SoC and intrinsic and extrinsic motivations towards pro-environmental behaviors may follow two different paths. On the one hand, SoC is expected to represent a root upon which intrinsic motives towards getting involved in a REC, as well as the specific intention to become member of one, may rely. Indeed, people experiencing a strong SoC are more likely to engage in behaviors they consider important for the community, or that can provide it with benefit (e.g., Procentese *et al.*, 2019a, 2019b), and that are aimed at improving individual and collective life conditions, as well as taking care of and protecting community life places (Kusenbach, 2006; Omoto & Packard, 2016; Zhao & Wise, 2019). Becoming member of a REC is expected to make no exception to this, as it

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can be meant as an action aimed at reducing one's and one's community's harms to life places (Gatti *et al.*, 2026), thus protecting individual and community well-being as well as their life places.

On the other hand, group membership and normative behaviors are closely linked (e.g., Turner, 1991), with recent studies showing that the sense of commonality with other members of the group one identifies with plays an important role in pushing individuals to play out behaviors that are reckoned as positive and valuable within that group (e.g., Wakefield & Khauser, 2021). Based on this, SoC may also represent a driver for extrinsic motivations towards the involvement in RECs, based on social-acknowledgment- and social-acceptance-based benefits individuals could derive with reference to their community of belonging.

Therefore, taken together, these sets of hypotheses follow:

- H3: SoC positively associates with the intrinsic (*H3a*) and extrinsic (*H3c*) motivation towards becoming a member of a REC, as well as with the intention to do so (*H3b*);
- H4: the relationship between SoC and the intention to become member of a REC is mediated by both intrinsic (*H3a*) and extrinsic (*H3b*) motives towards it.

4. The Role of Environmental Communication

In the context of pro-environmental behaviors, communication processes represent the mechanism through which representations of the environment and its critical issues are negotiated and shared, exerting a significant influence on the relationship between individuals, society, and the environmental context (He *et al.*, 2023; Kidd *et al.*, 2019; Klöckner, 2015; Pezzullo & Cox, 2018). Indeed, many environmental issues take on a global dimension, while often remaining difficult to directly observe in individuals' daily lives. For this reason, people rely on social and interpersonal communication processes to interpret and attribute meaning to environmental phenomena that cannot be directly experienced within their own contexts of life (Dunlap *et al.*, 2000).

From this perspective, environmental communication practices, such as talking, listening, and discussing, contribute to the construction of an environmental public sphere through processes of exchange and negotiation of shared meanings, fostering pro-environmental attitudes, concerns, and practices, as well as forms of social influence within relational networks (Cox, 2006; Kassing *et al.*, 2010; Tian *et al.*, 2025). Individual propensity to communicate about environmental issues may represent an expression of

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environmental engagement, as individuals who are more concerned about the environment and more oriented toward pro-environmental behaviors tend to devote more space to sharing and discussing these topics in their everyday interactions (Kassing *et al.*, 2010).

Indeed, talking with others about environmental issues can represent an important stimulus for pro-environmental change (Hoffmann *et al.*, 2025). In this way, communication actively stimulates behavioral change by addressing psychological and social barriers that may hinder the change processes (Carbonell-Alcocer *et al.*, 2025; Kotler & Zaltman, 1971; Gonella *et al.*, 2024). Therefore, effective communication plays a fundamental role in raising citizens' awareness of sustainability issues and fostering behavioral change (Piselli *et al.*, 2022) and can enhance individuals' intentions to engage in pro-environmental behaviours (Ardoin *et al.*, 2015).

Consistently, communication processes may also play a relevant role in the motivational mechanisms underlying the adoption of pro-environmental behavior. Through the sharing of information, meanings, and representations of the environment, communicative interactions may contribute to shaping how individuals interpret environmental issues, attribute value to their own and others' actions, and associate sustainable behaviors with different types of benefits (Cox, 2006; He *et al.*, 2023; Pezzullo & Cox, 2018). However, the relative effectiveness of these different motivational orientations remains unclear, as empirical findings are contradictory (Mingolla *et al.*, 2020): in some cases, personal and environmental (i.e., intrinsic) motivations were more effective than financial and extrinsic ones in fostering the adoption of pro-environmental behaviors (Dogan *et al.*, 2014), whereas in other cases communications emphasizing financial and extrinsic benefits were associated with greater intentions to engage in pro-environmental behaviors (Hafner *et al.*, 2017). However, although different communicative approaches appear potentially effective, an exclusive emphasis on external or financial benefits associated with pro-environmental behaviors may reduce individuals' actual engagement in them. Indeed, extrinsic motivation is more fragile and less stable in promoting behavior adoption compared to intrinsic motivation, highlighting that strategies relying exclusively on external incentives may be less effective in the long term (Deci, 1971; Deci & Ryan, 1985).

This perspective is particularly relevant in the context of RECs, where participation requires not only awareness of their potential benefits but also the development of motivational orientations supporting engagement. In this context, communication processes are significant in promoting citizens' intentions to participate in RECs (D'Errico *et al.*, 2025) and in supporting the development of both intrinsic and extrinsic motivations towards

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participation. They can contribute to increasing individual and collective awareness of the intertwined benefits stemming from RECs participation (either environmental, economic, and social; De Franco *et al.*, 2023) while fostering a broader understanding of their role within the sustainable energy transition (Biddlestone *et al.*, 2022; Lucas *et al.*, 2021; Scardigno *et al.*, 2025; Whitmarsh, 2011).

Based on this, the following hypotheses are added to the previous ones:

- H5: environmental communication positively associates with the intrinsic (*H5a*) and extrinsic (*H5c*) motivation towards becoming a member of a REC, as well as with the intention to do so (*H5b*);
- H6: the relationship between environmental communication and the intention to become member of a REC is mediated by both intrinsic (*H6a*) and extrinsic (*H6b*) motives towards it.

5. The Study

5.1 Participants and Procedures

Data was collected in Italy between March and April 2025 by a professional panel provider. An online questionnaire was set up, taking advantage of the Qualtrics platform; a screening question ensured that only individuals not currently being members of RECs were included in the sample. Ethical approval was acquired from the Ethical Committee of Psychological Research of the Department of Humanities of the University of Naples Federico II with protocol number 1/2025 (date of approval: January 15, 2025).

Respondents were 900 Italian citizens (51.4% female) not being involved in RECs currently, aged between 18 and 84 (M = 50.64; SD = 14.33). A sensitivity analysis was carried out using G*Power to determine the effect size the model was sensitive to detect with a sample size of 900, $\alpha = .05$, a power of .90, and three predictors. It showed that the study was sensitive to detect an effect size as small as $f^2 = .0117$, suggesting that that the available sample is sufficient to detect even small effects in the paths of the model (Cohen, 1988).

Participants had been living in their municipality for 39.86 years on average (SD = 19.58, 1-84 range scale). 65.6% of the respondents were married or in a cohabitant couple, and 61% had at least one child; 21.9% were single, 8% were separated or divorced, 1.8% were widowers, and 2.7% were involved in an unmarried and non-cohabitant couple. They were mainly employees (46.4%) or retired (20.1%), while 15.4% were unem-

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ployed, 9.6% were freelancers, 3.6% were students, 2.6% were entrepreneurs, and 2.2% had managerial roles; one participant chose not to disclose this information. Most of them (58.2%) had a high school diploma; 20.1% had a master's degree, 11.2% had a bachelor's degree, and 8.3% a postgraduate degree; only 2% had a secondary school diploma, and only 0.2% had a primary school diploma.

As to RECs, most of the participants (64.9%) had already heard about them. Additionally, even though they were all not members of one, most (62.3%, n = 561) would have also been interested in becoming a member if the municipality where they lived was to collect subscriptions to a new REC. Of these 561 respondents, 51.7% were interested in taking part as consumers – that is, only using the produced energy – while 32.6% as prosumers – that is, as producers and users of the energy at the same time – and 15.7% as prosumers also willing to do voluntary work for the REC.

5.2 Measures

The questionnaire was introduced by an explanation about confidentiality and anonymity issues, where participants had to express their informed consent to take part in the study and answer the questionnaire. It included a socio-demographic section followed by specific measures, consistently with the aims of the study.

5.2.1 Environmental Communication

An adapted version of the Environmental Communication Scale (Kassing *et al.*, 2010) was used, including twelve items (e.g., "I start discussions about environmental issues"). Respondents were asked to rate their agreement with each statement on a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

5.2.2 Biospheric Values

The Biospheric Values dimension from the Environmental-Portrait Value Questionnaire (E-PVQ; Bouman *et al.*, 2018) includes four items (e.g., "It is important to him/her to protect the environment"). Respondents were asked to rate their similarity with the description included in each item on a 7-point Likert scale (1 = *Not like me at all*; 7 = *Very much like me*).

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5.2.3 Sense of Community (SoC)

The Brief Sense of Community scale (Gatti & Procentese, 2020; Peterson *et al.*, 2008) comprises eight items (e.g., "I can get what I need in this neighborhood"). Respondents were asked to rate their agreement with each item on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

5.2.4 Intrinsic Motivations

Three items (e.g., "Because I find it rewarding to actively participate in the energy transition") were adapted from those included in the Intrinsic and Extrinsic Motivation Scale by Tabernero & Hernandez (2011) to detect the main intrinsic reasons that could motivate citizens to get involved in a REC. Respondents were asked to rate their agreement with each statement on a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

5.2.5 Extrinsic Motivations

Three items (e.g., "Because I have the opportunity to save money on my bill") were adapted from those included in the Intrinsic and Extrinsic Motivation Scale by Tabernero & Hernandez (2011) to detect the main extrinsic reasons that could motivate citizens to get involved in a REC. Respondents were asked to rate their agreement with each statement on a 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

5.2.6 Intention to Become Member of a REC

A single item was used to detect whether respondents would have liked to join a REC in their municipality (0 = *No*; 1 = *Yes*), using the following stimulus: "The municipality where you live is collecting applications for a new Renewable Energy Community (REC) project. Would you like to join this initiative?".

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5.3 Data Analyses

5.3.1 Preliminary analyses

First, the factor structure of all the measures was checked through Confirmatory Factor Analyses (CFA) with Structural Equation Modeling (SEM). The Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA) and its 90% confidence interval (CI), and the Standardized Root Mean square Residual (SRMR) were observed to evaluate the model fit (MacCallum & Austin, 2000). For CFI and TLI, if the value is equal to or greater than 0.90 and 0.95, the fit is good or excellent respectively; for RMSEA and SRMR, if the value is equal to or smaller than 0.06 and 0.08, the fit is good or reasonable respectively (Hu & Bentler, 1999). Reliability of each measure was checked through Cronbach alpha (α).

Additionally, before testing the model, several measurement models were compared to ensure that respondents discriminated among the different constructs involved in the study: a six-factor model – in which all the constructs loaded on different variables – was compared to a one-factor model (with all items loading on the same latent variable), a three-factor model (environment- and community-related predictors, motivation, and intention to become a member of a REC), a four-factor model (environment-related predictors, SoC, overall motivation, and intention to become a member of a REC), and a five-factor model (environmental communication, SoC, biospheric values, overall motivation, and intention to become a member of a REC). The Akaike information criterion (AIC) was used to determine which model best fit the data: the lower the value the better the fit. The six-factor model was expected to be the one better fitting the data.

5.3.2 Hypotheses testing

To address all the hypotheses, a multiple mediation model (see Figure 1) was run using SEM: environmental communication, biospheric values, and SoC were included as the independent variables, intrinsic and extrinsic motivations as the mediators, the intention to become member of a REC (0 = *No*; 1 = *Yes*) as the outcome variable. Despite being dichotomous, the outcome was treated as a continuous variable within the model to ensure metric comparability between the coefficients among paths, thereby avoiding the scaling complications that arise when a mediation model combines linear and non-linear estimators (MacKinnon, 2008; MacKinnon & Dwyer,

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1993). Indeed, linear regression on binary outcomes (i.e., the Linear Probability Model, LPM) produces estimates that are essentially comparable to those obtained using logistic regression as to the direction and significance of the effects (Hellevik, 2009; Angrist & Pischke, 2009).

The model was estimated using the maximum likelihood (ML) method, as it entails the typical limitations of the LPM (Long, 1997). The model fit was evaluated by relying on the same fit indices as for CFAs (MacCallum & Austin, 2000).

Before running the model, the absence of outliers was checked using the leverage value and Cook's D (Cousineau & Chartier, 2010): leverage values should be lower than 0.2 and Cook's D lower than 1. Tolerance index and Variance Inflation Factor (VIF) values were used to verify the absence of multicollinearity issues; Tolerance indices should be higher than or equal to 0.2 (Tabachnick & Fidell, 2001), while VIF values lower than 10 (Cohen *et al.*, 2003).

The significance of the effects was tested using a bootstrap estimation approach with 10,000 samples (Hayes, 2018): the bias-corrected 95% CI was computed by determining the effects at the 2.5th and 97.5th percentiles; the effects are significant when 0 is not included in the CI.

6. Results

6.1 Preliminary results

Indices of model fit and reliability for all the study measures are in Table 1, descriptive statistics and correlations for all the variables are in Table 2.

As expected, the six-factor measurement model turned out to have the best fit, AIC = 69,549.266, BIC = 70,101.542, compared to the five-factor, AIC = 69,760.264, BIC = 70,288.527, four-factor, AIC = 72,400.468, BIC = 72,890.312, three-factor, AIC = 73,403.257, BIC = 73,893.101, and one-factor, AIC = 74,044.083, BIC = 74,533.927, ones; therefore, it was used for the subsequent analyses.

Tab. 1 – Summary of reliability coefficients and fit indices for all the study variables

Variables	*α*	*CFI*	*TLI*	*RMSEA*	*RMSEA 90% CI*	*SRMR*
Environmental Communication	0.72	0.95	0.93	0.07	[0.06, 0.08]	0.07
Biospheric Values	0.92	0.98	0.97	0.08	[0.06, 0.09]	0.03
Sense of Community	0.91	0.95	0.94	0.08	[0.07, 0.08]	0.06
Intrinsic Motivations	0.87	0.99	0.99	0.001	[0.001, 0.01]	0.001
Extrinsic Motivations	0.65	0.99	0.99	0.001	[0.001, 0.01]	0.001

Note. $n = 900$.

α = Cronbach alpha; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean square Residual.

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Tab. 2 – Descriptive statistics and correlations for the study variables

Variables	*M (SD)*	*1*	*2*	*3*	*4*	*5*
1. Environmental Communication	3.23 (0.56)[a]	-				
2. Biospheric Values	5.62 (1.24)[b]	0.358***	-			
3. Sense of Community	3.08 (0.90)[a]	0.367***	0.257***	-		
4. Intrinsic Motivations	3.64 (0.98)[a]	0.531***	0.535***	0.357***	-	
5. Extrinsic Motivations	3.48 (0.86)[a]	0.475***	0.396***	0.378***	0.699***	-
6. Intention to Become Member of a REC	0.62 (0.49)[c]	0.252***	0.226***	0.185***	0.336***	0.307***

Note. $n = 900$.
[a] 1-5 range scale; [b] 1-7 range scale; [c] 0 = *No*, 1 = *Yes*.
*** $p < 0.001$ (2-tailed).
M = mean; *SD* = standard deviation. REC = Renewable Energy Community.

6.2 Hypotheses testing

The leverage value was always lower than 0.04, while Cook's *D* lowest and highest values were 0 and 0.2, indicating the absence of significant values affecting the analyses. Tolerance indices were comprised between 0.402 and 0.805 and VIFs between 1.24 and 2.49, suggesting that multicollinearity was not an issue.

The model only partially confirmed the hypotheses (see Table 3and Figure 2) and showed a good fit to data, $\chi^2(409) = 1{,}732.51$, $p < 0.001$, CFI = 0.92, TLI = 0.91, RMSEA = 0.06, 90% CI [0.057, 0.063], SRMR = 0.08. First, environmental communication, biospheric values, and SoC all showed significant and positive direct effects on both intrinsic and extrinsic motivations to become member of a REC. This supports H1a, H1c, H3a, H3c, H5a and H5c; it led to the decision to compare the effects of each predictor on the two kinds of motivations considered, to further unpack whether a difference between them existed.

Wald's test was used to test whether the effects of each independent variable on the two types of motivations significantly differed. Only the effects of environmental communication significantly differed, $\chi^2(1) = 42.68$, $p < 0.001$, indicating that the effect of environmental communication on intrinsic motivations was significantly stronger than its effect on extrinsic ones. Conversely, the effects of both biospheric values, $\chi^2(1) = 1.76$, $p = 0.18$, and SoC, $\chi^2(1) = 0.15$, $p = 0.70$, showed no significant differences.

Additionally, only environmental communication and extrinsic motivations showed significant positive effects on participants' intention to become member of a REC, which supports H5b yet not H1b and H3b.

As to the indirect effects, only those via extrinsic motivations were significant, supporting H2b, H4b, and H6b; they were all positive. That is,

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the higher the SoC, biospheric values, and environmental communications, the higher the extrinsic motivations, which in turn strengthened the intention to become member of a REC. H2a, H4a, and H6a are not supported.

7. Discussion

The present study proposed a theoretical model (see Figure 1) of the individual and community-related drivers of people's motivations – both intrinsic and extrinsic – towards the intention to become members of a REC. Specifically, biospheric values and environmental communication were taken into account at the individual level, SoC at the community-related one.

The hypotheses were only partially confirmed, with three main points emerging. First, all predictors showed positive effects on both types of motivation; the effects on these two types of motivations were comparable in all cases but environmental communication, whose effect was significantly stronger on intrinsic motivations. However, only extrinsic motivations showed a significant effect on the intention to become members of a REC. Last – and consistently – only the indirect effects mediated by extrinsic motivations were significant.

On the one hand, at the individual level, the results suggest that individuals attributing intrinsic moral worth to nature and experiencing higher sensitivity to ecological degradation are more motivated towards RECs – which can be meant as a strategy to reduce the harm on local environment indeed. Given that biospheric values represent a basis for pro-environmental concern (Ghijselinck, 2023; Milfont & Gouveia, 2006), this result stands consistent with recent results suggesting that the intention to become member of a REC may represent a coping strategy aimed at reducing the negative arousal and beliefs stemming from being aware of the current environmental crisis, as well as a practical a strategy to reduce one's harm to the environment (Gatti *et al.*, 2026). However, while the positive effect on intrinsic motivations toward involvement in RECs seems clear and easily understandable, the one on extrinsic ones requires further attention. A possible explanation for this may lie in extrinsic benefits (e.g., economic ones; De Franco *et al.*, 2023) representing an inherent component of RECs public representations. Consistently, these may represent a motivation tightly related to the implementation of RECs itself.

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Tab. 3 – Model results

Paths	*β*	*B (S.E.)*	*BC 95% CI*
Direct effects			
Environmental communication → Intrinsic motivations	0.60	0.96*** (0.13)	[0.73, 1.23]
Environmental communication → Extrinsic motivations	0.42	0.60*** (0.10)	[0.42, 0.80]
Environmental communication → Intention to become member of a REC	0.13	0.12* (0.06)	[0.003, 0.24]
Biospheric values → Intrinsic motivations	0.16	0.12** (0.04)	[0.04, 0.19]
Biospheric values → Extrinsic motivations	0.20	0.14*** (0.04)	[0.06, 0.21]
Biospheric values → Intention to become member of a REC	-0.03	-0.01 (0.02)	[-0.05, 0.03]
SoC → Intrinsic motivations	0.19	0.21*** (0.04)	[0.14, 0.28]
SoC → Extrinsic motivations	0.15	0.14*** (0.04)	[0.07, 0.21]
SoC → Intention to become member of a REC	0.07	0.04 (0.02)	[-0.004, 0.08]
Intrinsic motivations → Intention to become member of a REC	0.12	0.06 (0.06)	[-0.04, 0.18]
Extrinsic motivations → Intention to become member of a REC	0.15	0.09* (0.05)	[0.001, 0.18]
Indirect effects			
Environmental communication → Intrinsic motivations → Intention to become member of a REC	0.07	0.06 (0.05)	[-0.003, 0.03]
Biospheric values → Intrinsic motivations → Intention to become member of a REC	0.02	0.008 (0.007)	[-0.04, 0.18]
SoC → Intrinsic motivations → Intention to become member of a REC	0.02	0.01 (0.01)	[-0.007, 0.04]
Environmental communication → Extrinsic motivations → Intention to become member of a REC	0.06	0.05* (0.03)	[0.001, 0.03]
Biospheric values → Extrinsic motivations → Intention to become member of a REC	0.03	0.01* (0.007)	[0.002, 0.12]
SoC → Extrinsic motivations → Intention to become member of a REC	0.02	0.01* (0.007)	[0.001, 0.03]
Total effects			
Environmental communication → Intention to become member of a REC	0.27	0.23*** (0.05)	[0.14, 0.33]
Biospheric values → Intention to become member of a REC	0.02	0.008 (0.02)	[-0.03, 0.05]
SoC → Intention to become member of a REC	0.12	0.07*** (0.02)	[0.03, 0.11]

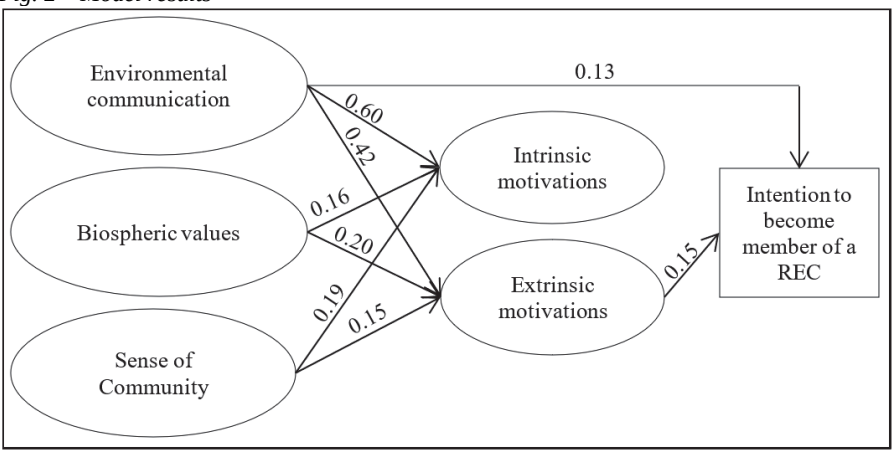
Note. $n = 900$.

*** $p < 0.001$ (2-tailed); ** $p < .01$ (2-tailed); * $p < 0.05$ (2-tailed).

SE = Standard Error; BC = Bias-Corrected; CI = Confidence Interval. SoC = Sense of Community; REC = Renewable Energy Community.

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Fig. 2 – Model results



Note. $n = 900$.
Standardized coefficients (β) are shown.
Measurement model was not displayed for clarity. Only the direct effects which emerged as significant are shown. All direct, indirect, and total effects are in Table 3.

Additionally, extrinsic benefits may be strongly highlighted when communicating about this phenomenon. Accordingly, environmental communications enhance both intrinsic and extrinsic motivations towards RECs too – even though the effect is stronger on the former. This suggests that, even though both kinds of motivations are passed through getting involved into social and interpersonal communications around this phenomenon, a stronger accent is placed on the intrinsic value of RECs in protecting the environment and supporting individual and community well-being. Consistently, getting involved into environmental communications also directly sustains the intention to become member of a REC.

Nevertheless, the present results also suggest that only extrinsic motivations towards RECs may represent a driver towards the intention to become member of one – which echoes recent results unpacking citizens' interest towards RECs (Gatti *et al.*, 2026), as already mentioned. Overall, this stands consistent with other studies showing that the exposure to framings stressing the extrinsic benefits linked to pro-environmental behaviors may support individuals' intention to engage in them (Hafner *et al.*, 2017). This may suggest that more direct and tangible – yet extrinsic – benefits (i.e., the possibility of receiving a reward or avoiding a penalty, and the possibility of gaining social acceptance) may represent more functional boosts for the intention to join a REC, while intrinsic benefits (i.e., contributing to something worthwhile for the environment, enjoying taking an active part in the energetic transition, and having the opportunity to contribute to the collec-

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tive well-being of one's community of belonging) may be perceived as too abstract to concretely gain citizens' attention. This stands consistent with recent studies identifying a gap between idealized values-driven energy citizens and their actual incentive-responsive behaviors (Jansma *et al.*, 2023).

On the other hand, at the community level, SoC shows a similar pattern to the other two predictors. On the one hand, individuals being more tied to their local community of belonging are more likely to be intrinsically motivated towards RECs, which could be meant as strategies to take care of and protect their life places, and contribute to collective well-being. This may stand consistent with SoC relying on reciprocal *influence* and *fulfillment of needs* – that is, bringing citizens towards engaging in order to make a difference for their community and endeavor to improve it so that it can meet its members' needs (McMillan & Chavis, 1986; Omoto & Packard, 2016). On the other hand, they may also be more motivated by extrinsic factors, such as the social acceptance and acknowledgement they could get within their community. This may stand consistent with the *membership* dimension of SoC (McMillan & Chavis, 1986), which may bring individuals towards acting in ways that are accepted and positively evaluated by their community of belonging. This may support the relevance individuals put on their community positively evaluating their actions and behaviors: indeed, based on the connection between group identification and normative behavior (e.g., Turner, 1991), the sense of belonging to the same community plays an important role in the adoption of behaviors that are reckoned as positive for the group itself, and that are positively evaluated by the group itself (e.g., Wakefield & Khauser, 2021). Taken together, this suggests that SoC may sustain both intrinsic and extrinsic motives towards becoming members of a REC, based on its different components making citizens interested to actively engage to improve collective life conditions but also behaving in a socially acceptable and positively valued way.

Overall, several theoretical and practical implications stem from these results. On the theoretical side, the role of both intrinsic and extrinsic motivations towards the involvement in RECs requires further attention. On the one hand, the role of intrinsic motivations should be better understood, up to unraveling whether other individual, community-related, or even broader societal factors may represent drivers allowing them to play a relevant role in fostering the intention – or the actual behavior itself. Indeed, it should also be taken into account that the outcome of the present study was the solely intention to join a REC; therefore, it may also be possible that extrinsic motivations are more relevant to the intention, while intrinsic ones may be more relevant to the concrete implementation of the behavior – consistently with intrinsic motivations being more suitable when it comes to

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commitment towards shared goals and sustaining such commitment over time (Horstink *et al.*, 2020; Lupi *et al.*, 2021; Silvi & Padilla, 2021).

On the practical side, citizens' involvement with environmental communication seems one key element to be considered in RECs formation process. The message driven should focus on both aspects of motivation, namely, intrinsic and extrinsic ones – which should not be considered as two antinomic elements. Indeed, RECs represent a complex phenomenon, based on tangible and intangible aspects, which both need to be taken into account. Therefore, communication strategies aimed at fostering RECs should be tailored for this specific phenomenon, based on these particular features, supporting citizens' engagement in interpersonal interactions aimed at sharing these contents. Considering that SoC is related to the intention to build a REC, this communication may be applied during community meetings, adopting a *vis-a-vis* interaction, to allow the growth of relational aspects.

7.1 Limitations and future directions

It is also important to acknowledge some limitations of the present study. First, the sample was not representative of Italian citizens. Nevertheless, the sampling and data collection procedures allowed to reach wide and heterogeneous groups of Italian citizens, going beyond student samples and providing more validity to the results. Similarly, the cultural specificities of the Italian context limits generalizability to other ones with established community energy traditions. However, the results allow deepening the early development stages of RECs, potentially revealing the psychosocial dynamics in which citizens' intention to become member of a REC is rooted.

As to the data analysis, it is to mention the measure detecting extrinsic motivations reported a relatively modest Cronbach's alpha, even though such value can still be considered acceptable given that it is a three-item scale (Cortina, 1993). Another issue refers to the outcome of this model being the intention to become member of a REC rather than the actual participation behavior. From a methodological point of view, the main issue with this variable lies in the use of a dichotomous item, which limits the ability to detect variability in such construct. However, such strategy was chosen based on no validated measure existing to detect this kind of behavioral intention. On the theoretical side, addressing stated intentions rather than actual behavior hinders from definitively establishing whether the identified patterns predict sustained participation or merely reflect transient expressions shaped by social desirability. This implies that these results can repre-

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sent a starting point for deepening the strategies towards the promotion of citizens' interest in RECs yet do not provide guarantees of their actual participatory behavior as to them nor of them maintaining such involvement over time. Therefore, future studies should develop proper measures for detecting the intention to become member of a REC and further deepen the shift from the intention to become member to the concrete involvement in a REC, to better understand the drivers which could shape this additional – yet critical – step and its long-term maintenance. Moreover, the role of socio-demographic characteristics could be addressed too, as these elements may contribute to shaping citizens' intention to become members of a REC yet have not been included into this model due to its exploratory nature.

Finally, the cross-sectional design of the study prevents causal inferences, and the tested relationships may also be addressed in the opposite direction. For example, citizens willing to get involved in a REC may pay more attention to intrinsic or extrinsic motivations towards them. Future studies could shed further light on these relationships through longitudinal studies and taking into account concrete behavior implementation processes.

8. Conclusion

RECs represent modern *socio-technical* constructs (Magnani *et al.*, 2017), meaning that they imply technical aspects – such as managing energy assets and sharing self-produced energy from renewable sources among their members (De Simone *et al.*, 2025; European Parliament and Council, 2018) – but also social ones – such as energy democracy and citizenship (Szulecki, 2018; Wahlund & Palm, 2022), as well as long term commitment (De Simone *et al.*, 2025). Therefore, the need to better understand the psychosocial processes upon which their settlement and maintenance rely clearly stems when it comes to promoting citizens' interest and participation in them.

In this, the results from the present study highlight the complexities specifically revolving around how to motivate citizens towards joining a REC based on the peculiar role of intrinsic and extrinsic motivations – which may be linked to the inherent characteristics of RECs themselves and of the benefits citizens can derive from becoming members (De Franco *et al.*, 2023). Overall, relying on pragmatic motivational and engagement strategies (e.g., stressing the economic or social benefits) stems as a potentially useful strategy, suggesting that policymakers may include these dimensions in their campaigns instead of only relying on intrinsic, value-based or environment-related, motives.

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However, these results also require paying further attention to the role of intrinsic motivations towards joining a REC in order to better understand whether they can play a role in this. Indeed, the present results – along with other recent ones (Gatti *et al.*, 2026) – detected no role of this kind of motivations, even though they were expected to play one based on the established literature on pro-environmental behaviors (e.g., Horstink *et al.*, 2020; Lupi *et al.*, 2021; Silvi & Padilla, 2021; Sloot *et al.*, 2018). Therefore, the need to better unpack whether intrinsic motivations only play a role in the concrete behavior implementation, or rather play no role as to RECs involvement, still stems. Indeed, in the second case, this may represent a psychosocial process specific to this kind of socio-technical innovation, which may depend on their inherent features, but also on the kind of communication revolving around and within them (e.g., D'Errico *et al.*, 2025; Scardigno *et al.*, 2025).

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