

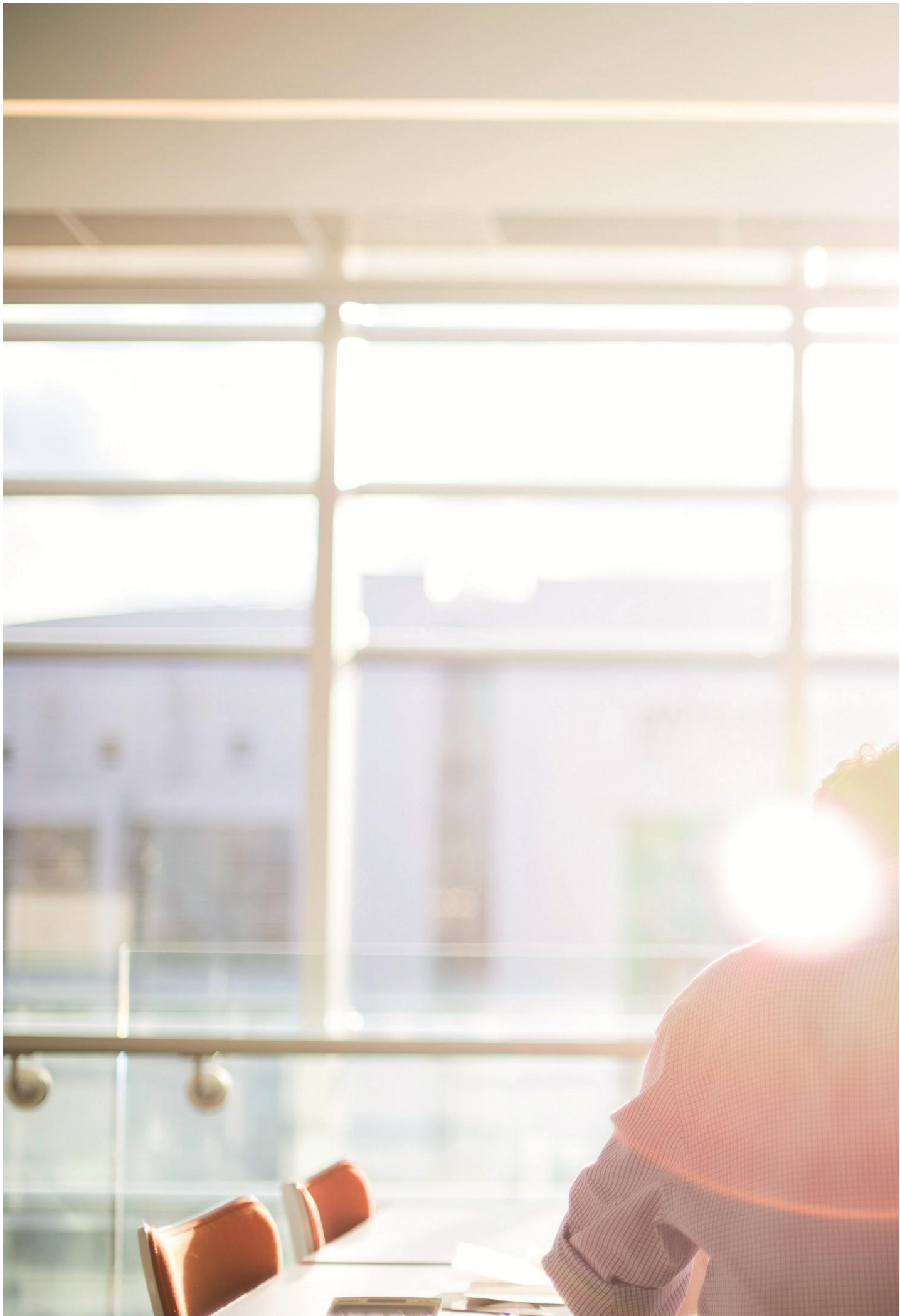


Working Paper

**"Trust Me. We Can Co-create (and Not Co-destroy)":
Energy Communities Building Sustainable Future**

Luciana OLIVEIRA MILITÃO & Josivania SILVA FARIAS

CIRIEC No. 2026/01



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Energy Communities Building Sustainable Future**

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Abstract

In a global environment shaped by a lack of citizen trust in government, it is essential to better understand the relationships between the actors of energy communities in order to promote renewable energy co-production for the energy transition. In this regard, this study investigated how citizens' trust in actors within the energy community fosters value co-creation and mitigates value co-destruction. Adopting a qualitative approach, a case study was conducted in the energy community initiated by the first photovoltaic energy cooperative in Minas Gerais, Brazil. Interviews were carried out with the renewable cooperative, 12 cooperative members, and six institutional actors from the community, in addition to document analysis involving 18 organizations. The content analysis was based on three stages of trust, namely calculus-based, knowledge-based, and identification-based, and on three practices: helping, paying, and informing. The results show that identification-based trust, primarily grounded in close interpersonal relationships, promotes the co-production of renewable energy and the co-creation of value. This high level of trust can be extended to the energy cooperative. Knowledge-based trust also plays a significant role, particularly in interactions between cooperative members and public or private organizations. However, even the high stage of trust does not eliminate the risk of value co-destruction. One of the study's key contributions is the emphasis on the strategic role of trust intermediaries, such as local leaders and cooperatives, who act as catalysts in the energy transition. For future research, we suggest deepening the investigation into the role of intermediaries in trust networks related to value co-creation and co-destruction. It is also recommended to explore how social innovation contributes to the energy transition and to the inclusion of vulnerable groups.

Keywords: Trust, Value co-creation, Value co-destruction, Cooperatives, Intermediaries

JEL Codes: Q42, Q48, P13, P18

1. Introduction

Citizens' trust in government is crucial for the consolidation and expansion of state policies (Devine et al., 2021). However, there is a global trend of declining trust in government, including in Brazil (OECD, 2023, 2024). For citizen participation to advance within the energy transition agenda, it is essential to better understand the relational dynamics within energy communities, which involve energy consumers, governments, and other stakeholders.

The climate crisis, alongside ongoing technological and social transformations, is driving changes in energy systems. Within this context, the energy transition emerges as a multidimensional process that goes beyond the mere replacement of fossil fuels with renewable sources (El Zein & Gebresenbet, 2024). It entails a reconfiguration of institutional, technological, and social models.

A key factor in the energy transition has been the strengthening of collaborative ecosystems, such as energy communities, arrangements in which citizens interact with various actors (e.g., governments, companies, and nonprofit organizations) in the governance, management, and production of energy (Ahmed et al., 2024). These new social models have demonstrated the potential to expand access to clean energy by promoting social innovation and democratic governance of energy resources (Pan et al., 2023; Popescu et al., 2022).

Through distributed generation, energy communities serve as mechanisms to increase flexibility within the electricity system, challenging the traditional logic of centralized production (Alanne & Saari, 2006). Citizen participation can occur either individually or collectively, for example, through cooperatives. Ahmed (2024) highlights cooperatives' capacity to engage citizens, foster resource sharing, and generate local community benefits.

The success of the energy transition does not rely solely on initial citizen engagement. A sustained perception of value is also necessary for long-term viability. Cifolelli et al. (2025) argue that value co-creation is essential for the continuity of energy communities. Value co-creation is understood as a process involving practices and the integration of resources by multiple actors, resulting in positive experiences through the perception of added value (Echeverri & Skålén, 2021; Osborne, 2020; Vargo & Lusch, 2017). Conversely, these processes can also lead to value co-destruction when the misalignment of practices or the disintegration of resources results in the reduction or loss of value (Echeverri & Skålén, 2021; Laud et al., 2019; Plé & Cáceres, 2010).

Trust precedes value co-creation (Shulga et al., 2021), while a lack of trust contributes to value co-destruction (Järvi et al., 2018). As Arrow (1974) notes,

no transaction is possible without trust. According to the OECD (2024, p. 16), trust can be defined as "a person's belief that another person or institution will act consistently with their expectations of positive behavior." In the context of the energy transition, the participation of consumers, investors, and communities affected by renewable energy sources is closely related to the existence of trust-based relationships (Hu et al., 2022).

Several authors highlight important gaps in the literature on trust, value co-creation and co-destruction, and the energy transition. Saxena et al. (2024) emphasize the need to further explore the role of trust in shaping consumer experience. Shulga et al. (2021) call for a deeper understanding of trust networks in value co-creation. Otto et al. (2023) argue that trust network research enables assessment of trust's role in transforming energy systems and recommend that future studies investigate who trusts whom and how trust is built within the energy sector. Additionally, Ryszawska et al. (2021) point out that the concept of "co-creation" remains underutilized in energy transition projects.

In light of this context, this research aimed to investigate how citizens' trust in actors within the energy community contributes to value co-creation and mitigates value co-destruction. We conducted a qualitative study using a case study strategy, focusing on the energy community initiated by the first photovoltaic energy cooperative in Minas Gerais, Brazil.

The next sections present the theoretical background, followed by the research methods and key results. The paper concludes with a discussion and final considerations.

2. Theoretical Background

This section presents the main concepts and scholarly debates related to the research themes.

2.1 Citizens in the Energy Transition: Service Co-production

Energy communities are among the most recent strategies promoted by the European Union to mitigate the effects of climate change, whose effectiveness is strongly conditioned by citizen participation (Guetlein & Schleich, 2023). In Brazil, citizen engagement in photovoltaic energy production has grown significantly since 2020 (ABSOLAR, 2025). Wolsink (2018) analyzes the role of citizens as co-producers of renewable energy, a role that, according to Ostrom (1996), entails active collaboration with governments and other actors in the provision of public services.

Giacovelli (2022) notes that although academic publications on social capital and the energy transition have increased, the topic still receives little attention in South America. The author emphasizes that bottom-up initiatives tend to generate more enduring behavioral change. De Lotto et al. (2022) argue that the energy transition requires investment in citizen awareness and the promotion of pro-environmental behaviors.

2.2 Trust in Energy Communities

Energy communities are considered essential facilitators of end-user participation in the energy transition (Mustika et al., 2022). These arrangements consist of groups of citizens, social entrepreneurs, and public authorities who jointly invest in the production, commercialization, and management of renewable energy. Renewable energy cooperatives, which often initiate energy communities, can act as powerful levers of civic influence, essential to ensuring a just transition (Končalović et al., 2023).

The familial and social proximity that shapes these communities is marked by trust, which is fundamental to their formation (Hu et al., 2022). Rupp et al. (2025) highlight the mediating role of trust between cooperatives and consumer engagement, fostering interpersonal connections and a sense of belonging. The authors argue that renewable energy cooperatives activate social norms, stimulate symbolic ownership, foster collective interests, and bridge cognitive gaps between energy generation and consumption.

2.3 Trust in Value Co-creation and Co-destruction

By sustaining long-term relationships, trust fosters continued consumer engagement and supports the co-creation of value (Li & Tuunanen, 2022). It is important to highlight that value co-creation is fundamentally shaped by the user's perceived value, which may or may not involve active participation in service production, that is, co-production. In this sense, Desmarchelier et al. (2019, p. 1) argue that "consumers can always formulate a judgment about an offering, regardless of their level of involvement in its development process."

Although trust is widely acknowledged as an antecedent of value co-creation (Shulga et al., 2021) and lack of trust as a driver of value co-destruction (Järvi et al., 2018), this relationship remains underexplored in the literature. Moreover, most studies focus on trust between citizens and service providers, overlooking the role of trust in the interactions among other ecosystem actors.

In response, Shulga et al. (2021) propose expanding the Service-Dominant Logic framework to incorporate trust networks as a central component of value co-creation.

3. Method

The research adopts a qualitative and exploratory approach based on a case study (Yin, 2015). The empirical setting was an energy community initiated by the first photovoltaic energy cooperative in Minas Gerais, Brazil, referred to in this study as COPEF, in partnership with the state-owned energy distributor and other stakeholders. The selection of this case was justified by the leading role of Minas Gerais in photovoltaic energy generation in Brazil (ABSOLAR, 2025) and by COPEF's experience in renewable energy co-production, involving both value co-creation and co-destruction processes.

A total of 19 interviews were conducted, including COPEF representatives, 12 cooperative members, and six public, private, and nonprofit organizations involved in the energy community. Additionally, documentary research was carried out using the official websites of 18 organizational actors. The president of COPEF was intentionally selected as a key informant. The six organizations were identified using the snowball sampling technique (Vinuto, 2014) based on the key informant's recommendations. The number of cooperative members interviewed was determined by theoretical saturation (Falqueto et al., 2019).

The data were analyzed using content analysis techniques (Bardin, 2016). Cooperative members' trust in the various actors that make up the energy community was examined through the progressive stages of trust development proposed by Lewicki and Bunker (1995, 1996): calculus-based, knowledge-based, and identification-based trust. The first stage is grounded in an evaluation of the consequences of trusting or not trusting, its cost-benefit analysis. The second stage corresponds to the ability to know the other party well enough to predict their behavior. The third stage occurs when the trustor internalizes the preferences of the other with whom they identify.

4. Results

This section presents the study's findings: trust in the actors of the energy community from the perspective of cooperative members; the co-creation and co-destruction of value in the two main dyads of energy co-production; and the emergent category of value recovery, which was not initially anticipated in the analytical framework but arose during the research process.

4.1 Mapping the Progressive Stages of Trust in Energy Communities

Among the 30 actors in the energy community, in addition to members of the cooperative, three key actors involved in the provision of renewable energy services in the analyzed energy community were identified: (a) the government, referred to as GOV in this study; (b) the energy distributor, referred to as DISTR; and (c) the photovoltaic energy cooperative, referred to as COPEF. Key actors are defined here as those directly involved in service delivery, namely, service providers (GOV, DISTR and COPEF) and consumers (COPEF's members). The government holds legal responsibility for the provision of energy services in Brazil, while the energy distributor and the photovoltaic cooperative provide the service under government delegation.

Beyond these key actors, five additional actors were identified as relevant to the energy community initiated by COPEF from the perspective of cooperative members: (a) the public regulatory agency for energy services, the National Electric Energy Agency – ANEEL; (b) a regional organization representing cooperatives, referred to in this study as CREPR; (c) a credit cooperative, referred to as CCRED; (d) the technology integrator company responsible for constructing the photovoltaic power plants, referred to as EITEC; and (e) the president of the energy cooperative, referred to as PRES. The relevant actors, although not direct service providers, play an important role in the organization and functioning of renewable energy service delivery.

Subsequently, as illustrated in Figure 1, we classified cooperative members' trust in both key and relevant actors according to the stages proposed by Lewicki and Bunker (1995, 1996): calculus-based trust, knowledge-based trust, and identification-based trust. In general, knowledge-based trust prevailed in relationships between cooperative members and public entities, while identification-based trust was most prominent in relationships between cooperative members and the cooperatives, as well as with the president of COPEF.

Figure 1. Cooperative members' trust in energy community actors

Actors Trust	ANEEL	DISTR	GOV	COPEF	CCRED	CREPR	EITEC	PRES
Identification-based trust		E9		E1, E2, E3, E4, E5, E6, E8, E9, E10, E12	E1, E4, E5, E8, E10, E3	E4, E5		E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12
Knowledge-based trust	E3, E7, E9	E1, E2, E4, E5, E8, E10, E12	E1, E7	E11		E1, E12	E1, E3, E4, E6, E9, E10, E11, E12	
Calculus-based trust			E6, E8	E7				

Source: Prepared by the authors based on Lewicki and Bunker (1995, 1996).

Note: The letter "E" followed by a number denotes an interviewed COPEF member.

Initially, we confirmed that the lack of citizen trust in government, as reported by the OECD (2024), persists. Participant E4 was emphatic in stating, "The farther away from the government, the better". E9 understands that the government is reactive as it waits for provocation from the private sector to act. E2 considers the government "...very slow and obscure." The few instances of trust in government reported in this study (4 out of 12 interviewees) were based on the calculus and knowledge stages of trust, as proposed by Lewicki and Bunker (1995, 1996).

Calculus-based trust was observed when cooperative members needed to have a positive outlook to keep their projects going. Trusting the government would bring more benefits than giving up on the photovoltaic energy project. When asked whether he trusted the government, E8 replied: "I trust but with reservations." Knowledge-based trust was grounded in perceptions of regulatory stability and the separation of powers. E1 explained, "There is the legislative, the executive, and the judiciary. These forces must function to ensure security."

One member expressed confidence in the current government, indicating that this confidence would not be confirmed if it were an-other party group.

The citizens' lack of trust can be explained, in part, by the political polarity in the country and the circulation of fake news, which has been growing in recent years, according to Edelman (2023). E3, for example, based its lack of trust in the government on widely disseminated false information.

We observed that cooperative members' trust in public institutions (ANEEL and DISTR) involved in the energy community initiated by COPEF was also largely based on knowledge. E1 stated, "When ANEEL issued its latest ordinance, it gave the sector more confidence to invest." When asked about DISTR, E7 affirmed: "It's a company that's been in the market for many years... one of the best companies in Minas Gerais." Similarly, E4 said: "I trust it because of its reputation in Minas Gerais, its seriousness." These statements reinforce that public entities' reputations are central to building trust within the context of the energy community.

Paradoxically, the satisfaction of citizens with DISTR has declined in recent years, according to ANEEL's Consumer Satisfaction Index (ANEEL, 2025). It is also important to note that COPEF members had no direct contact with DISTR in the co-production of renewable energy services; these interactions were mediated by other actors and technology. For example, E7 stated: "... all my interactions with DISTR were through COPEF."

Therefore, COPEF members' trust in public bodies appears to be largely based on the company's past performance and may not reflect the current reality. Although this type of trust is classified as knowledge-based (the second stage of trust), it is structurally fragile and susceptible to change as members become more aware of DISTR's actual performance. For instance, E10 reported a loss of trust in DISTR during the energy co-production process.

Trust in EITEC was also constructed based on knowledge (Lewicki & Bunker, 1995, 1996). In this case, trust stemmed from the perception of technical competence, service quality, and the company's track record. Based on these elements, cooperative members inferred the company's likely future behavior in the energy community. As E4 stated: "... their seriousness as an engineering company, because they built the plants, and to this day, we haven't detected any problems with construction or productivity as promised." E3 highlighted that EITEC's close relationship with DISTR contributed to his trust in the technology company.

In the case of cooperatives (COPEF, CCRED, and CREPR), trust was predominantly identification-based (Lewicki & Bunker, 1995, 1996). These cooperatives were generally founded on close interpersonal, personal, and professional relationships - among friends, family, neighbors, and coworkers -

which reinforced shared values, goals, and perceived similarity, the key elements supporting the highest stage of trust.

E2 illustrated this bond by stating that he belongs to "...a group of people, of entrepreneurs and individuals who came together for the common good." E8 echoed this sense of belonging: "I fully trust it because I am part of it." E4's account demonstrates a kind of fusion between his own personality and COPEF: "I trust 100%. COPEF is me. If not, I wouldn't trust myself, my friends, or my colleagues. This is a relationship of trust and friendship. We trust people. It's something I helped build."

Trust in the founding president of COPEF was entirely identification-based, the highest level of trust in Lewicki and Bunker's (1995, 1996) typology. COPEF members expressed affinity with the president due to close personal relationships and shared goals. E3 referred to him as a friend and colleague. Several interviewees praised his knowledge and ability to propose innovative solutions, such as E1, who stated: "He is an innovative leader." E4 emphasized his willingness to take risks: "... if the project had any leverage, it's thanks to the President because he took on all the risks."

In short, Figure 1 shows that citizens' stage of trust is linked to physical and social proximity to other actors (Nilsson, 2019). Close interpersonal relationships were the most conducive to identification-based trust (cooperative members × PRES, COPEF, CCRED, and CREPR). Another characteristic of identification-based trust is its long-term development (Lewicki & Bunker, 1995).

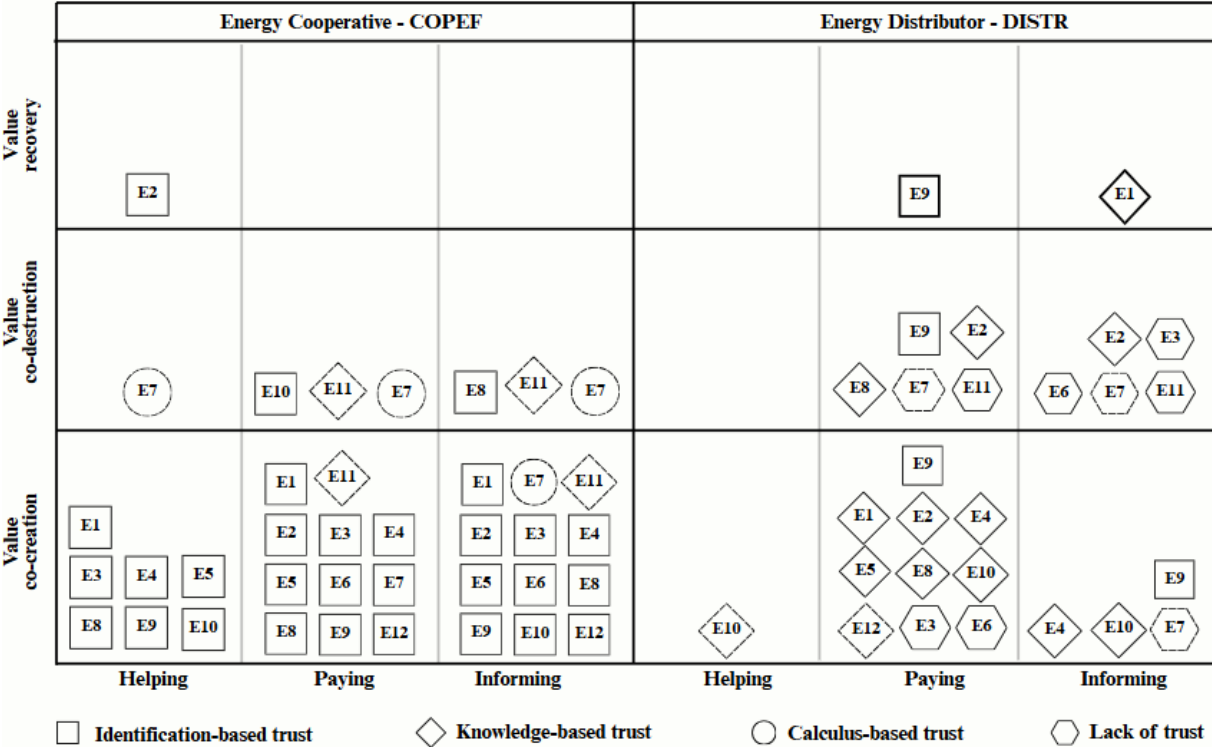
We observed that E9 developed identification-based trust in DISTR, a company with 70 years of history in Minas Gerais. The long service provision and shared traditional values generated trust by identification. Trust in the government, ANEEL, DISTR, and EITEC, actors with whom participants had no close interpersonal relationships, was primarily knowledge-based.

4.2 The Role of Trust in Value Co-creation and Co-destruction within Energy Communities

Value co-creation and co-destruction were analyzed in two dyads between service providers and energy consumers directly involved in service delivery: (a) COPEF members and the energy cooperative (COPEF) and (b) COPEF members and the energy distributor (DISTR). The dyads were examined through three identified practices: informing, paying, and helping. The dyad between COPEF members and the government was not analyzed, as there were no direct practices between them in service delivery; these were delegated to DISTR and COPEF.

As shown in Figure 2, both dyads revealed a predominance of value co-creation over value co-destruction. This outcome suggests that, despite the presence of conflicts and misalignments in specific interactions, institutional arrangements, collaborative structures, and the presence of trust among actors led to positive experiences and contributed to value generation for consumer citizens in the energy community.

Figure 2. Value Co-creation and Co-destruction and Stages of Trust



Source: Prepared by the authors based on Lewicki and Bunker (1995, 1996) and Echeverri and Skålén (2021).

Note: The letter "E" followed by a number denotes an interviewed COPEF member. The shapes in the figure's legend indicate the stages of trust and lack of trust expressed by each participant regarding COPEF and DISTR. The dotted lines indicate a loss of trust following the change in COPEF's management. Darker lines indicate that value recovery involves mediation by another actor.

In the first dyad (COPEF members × COPEF), value co-creation was significant in all three practices and was mainly supported by trust based on identification. This result is mainly due to the close relationships between members. The practices of "paying" and "informing" are necessary for the co-production of energy. Therefore, it was expected that in these cases, the interactions would be recurrent, generating co-creation and/or co-destruction of value. The practice

of "helping", although not mandatory, is related to the very nature of the cooperative, of which its members are the owners.

In contrast, value co-destruction occurred less frequently and was mainly associated with a breakdown in trust due to a change in COPEF leadership. E7 reported having had "a positive experience during the time of the founding President", but noted that, after the management transition, financial reports were no longer received. These findings suggest that trust in COPEF, which was based on identification during the founding president's administration, has shifted to knowledge-based (E11) and calculation-based (E7) trust. This reduction in trust since the management transition has resulted in communication failures and the value co-destruction.

In the second dyad (COPEF members × DISTR), value co-creation was primarily based on knowledge-based trust and was especially prevalent in the "pay" practice. This first result is possibly due to the fact that the payment practice was mediated by technology, the informing practice was mediated by COPEF, and the helping practice was practically non-existent in this dyad.

Value co-destruction in this dyad was mainly attributed to a lack of trust in DISTR, confirming Järvi et al.'s (2018) findings. For example, E11 doesn't trust DISTR and described the payment practice as a negative experience, citing difficulties in making automatic debit payments. However, all other members stated they paid easily through automatic debit, resulting in value co-creation. E11's case illustrates what Plé and Cáceres (2010) define as customer misbehavior, as the value co-destruction appears to have stemmed from the member's own difficulties in resolving the issue with their bank. This misbehavior possibly stems from a lack of trust.

However, it is important to note that value co-destruction also occurred in both dyads even when trust was present, whether calculus-based (E7), knowledge-based (E2, E8 and E11), or identification-based (E10 and E8). The latter represents the most advanced stage of trust according to the typology by Lewicki and Bunker (1995). Although such instances were isolated, they indicate that identification and a sense of belonging are not, on their own, sufficient to ensure conflict-free or fully aligned interactions.

We found that when the target of identification-based trust is an organization, this trust can be weakened by organizational changes, unmet expectations, or communication failures, conditions that open the door to value co-destruction. E10 reported that transferring payments to COPEF was a negative experience, preferring payment via bank slip. However, most COPEF members stated that this practice was approved in a general assembly and

yielded positive experiences, leading to value co-creation. E2, for example, described the payment process as "very straightforward." This case illustrates value co-destruction arising from unmet expectations (Echeverri & Skålén, 2021).

On the other hand, there were exceptional cases of value co-creation in the second dyad, even in interactions where COPEF members reported not trusting DISTR. At first glance, this finding appears to challenge the conclusions of Gardziulevičienė et al. (2022), who propose trust as a prerequisite for value co-creation. However, we interpret that the technology used in the payment practice functioned as a trust mediator, enabling value co-creation. As Bodó (2021, p. 2675) states, "Some technologies, such as platforms, marketplaces, and resource-sharing services, emerge as producers of institutional trust." Regarding payments to DISTR, E12 reported: "My bill is paid by direct debit. The information provided is sufficient and clear."

Finally, it is worth noting that value recovery occurred in both dyads. In the first dyad, E2's trust in COPEF was based on identification. This level of trust is also conducive to conflict mitigation, as it promotes a tendency to attribute positive intentions to others' behavior (Lewicki & Bunker, 1996).

In the second dyad, E1 and E9's trust in DISTR was based on identification and knowledge, respectively. In both cases, however, trust mediation was provided by the private technology company (EITEC) and COPEF. These findings suggest that identification-based trust can give COPEF members greater interpretive flexibility and the capacity to reframe initially misaligned practices. At the same time, intermediaries play a facilitative role in realigning interactions and enabling value recovery by promoting communication channels and technical support.

5. Discussion and Conclusions

This study aimed to investigate how citizens' trust in actors within the energy community contributes to value co-creation and mitigates value co-destruction. The findings support the argument by Shulga et al. (2021) that trust is a relevant antecedent of value co-creation. However, we found that it is possible for citizens to co-create value even when there is a lack of trust in the dyad. Trust proved especially significant in the context of energy communities, where individuals tend to rely on close personal ties to take on the risks associated with investing in the co-production of renewable energy, a process often marked by technical and organizational complexity.

The cooperative studied was formed predominantly by individuals with familial, professional, or friendship ties, many of whom acted as trust intermediaries. Identification-based trust, fostered by these close relationships, was transferred to the energy cooperative, thereby facilitating value co-creation with the nonprofit as well. In this context, we suggest that local governments invest in the renewable energy cooperative model to include vulnerable populations in the energy transition. In this case, shared participation can be more engaging than individual participation.

Knowledge-based trust also emerged as an important driver of value co-creation and value recovery. This finding is particularly relevant in energy communities where limited knowledge and information pose significant barriers (Fuentes-del-Burgo et al., 2021; Queiroz et al., 2020). In this regard, we suggest that private companies invest in accessible communication strategies to increase citizen engagement in renewable energy co-production (prosumers).

Value co-destruction, in turn, may occur even when identification-based trust is present. In fact, it was more pronounced when trust was absent or had been lost during the co-production process. However, when trust has been built over time and reached the level of identification, its loss, however partial, leads to intense disappointment and, consequently, value co-destruction. In such cases, the unfulfilled expectations act as a key antecedent of value co-destruction (Laud et al., 2019; Plé & Cáceres, 2010). It is up to managers to be aware of the causes that can lead to the loss of trust, which takes a long time to build but can be lost in minutes.

The study's findings on trust within dyadic relationships offer insights into how value is co-created or co-destroyed in energy communities. However, the most significant contribution lies in highlighting the crucial role of trust intermediaries in fostering value co-creation and mitigating value co-destruction. The results indicate that trust mediation underpins the broader trust network within the energy community. This trust network, in turn, is fundamental to value co-creation (Shulga, 2021).

Kivimaa et al. (2019) refer to such intermediaries as key catalysts in sustainability transitions, acting as bridges between actors in contexts where direct interaction is limited or communication is impaired. By triangulating trust, value co-creation, and value co-destruction, this study incorporates these dimensions into the analysis of intermediaries' roles in energy communities. The findings reveal that actors with close personal ties played a decisive role in encouraging citizen participation in energy co-production, with the cooperative model itself acting as a central catalyst for value co-creation.

This prominent role is consistent with the cooperative principle of pursuing the common good (Namorado, 2007), which reinforces identification-based trust among members (Lewicki & Bunker, 1995). In renewable energy cooperatives, the notion of “common good” is further strengthened by the fact that environmental sustainability generates benefits for society as a whole, making it a public value (Osborne et al., 2022). Moreover, cooperatives often emerge from pre-existing groups (Birchall, 2003), which strengthens shared values. Greater efforts are needed to identify and support such local groups to foster broader citizen engagement in renewable energy co-production.

In summary, this study demonstrates that trust is indeed essential to the sustainability of energy communities (Caferra et al., 2023). Cooperatives are encouraged to develop greater awareness of their strategic function as trust intermediaries among the various actors in energy communities. By strengthening this role, cooperatives can enhance their legitimacy, increase member engagement, and reduce the cognitive distance between citizens and institutional actors (Rupp et al., 2025).

Another relevant aspect is the strengthening of leadership within renewable energy cooperatives. Torfing et al. (2019) emphasize that leadership is critical for achieving shared goals, influencing behaviors, and fostering interaction among diverse stakeholders in value co-creation. Chen et al. (2021) report that local agents appointed by the Chinese government play a central leadership role in energy communities, disseminating information and fostering trust. In democratic contexts such as Brazil, a promising alternative lies in investing in the capacity building of civil society representatives willing to take on leadership roles in cooperatives.

Strong and legitimate leadership, combined with active member participation, creates favorable conditions for developing more advanced forms of co-operation. The cooperative engaged effectively with its members, the local government, technology companies, and credit cooperatives, demonstrating a collective intelligence that exceeded the capabilities of individual actors (Woolley et al., 2010). However, there is a need to extend this collective intelligence to a broader and more diverse cooperative structure, connecting cooperatives across Minas Gerais, Brazil, and internationally. Such a movement could also foster open innovation among cooperatives through artificial intelligence, since technology can also mediate trust (Bodó, 2021).

To delimit the scope of the study, we focused on trust, value co-creation, and value co-destruction from the perspective of citizen energy consumers acting as co-producers of photovoltaic energy. Future research could broaden

this perspective by examining how these phenomena are perceived by other stakeholders, such as citizens impacted by renewable energy, as well as local government, technology firms, and nonprofit organizations.

In addition, this study focused on the service delivery phase of renewable energy. Future research could explore earlier phases, such as planning and design, to understand how citizen participation in public policy and in the formation of energy communities can either co-create or co-destroy value.

As part of the research agenda, we also recommend deepening the analysis of trust intermediaries in value co-creation and co-destruction. Furthermore, it is important to explore new business models to foster the engagement of citizens in renewable energy co-production. It would be valuable to further explore the perspective of social innovation. Comparative studies between developing and developed countries would help identify how different energy community models can learn from each other.

Finally, further research is needed to develop more effective ways to engage vulnerable citizens in renewable energy co-production. Such engagement may increase citizen awareness of the technical, social, and environmental dimensions of the energy transition (Barbosa et al., 2022).

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