

Article

Drivers, Motivations, and Barriers in the Creation of Energy Communities: Insights from the City of Segrate, Italy

Anita De Franco ¹, Elisabetta Venco ^{2,*}, Roberto De Lotto ² and Caterina Pietra ²

¹ Department of Architecture and Urban Studies, Milan Polytechnic University, 20133 Milano, Italy; anita.defranco@polimi.it

² Department of Civil Engineering and Architecture, University of Pavia, 27100 Pavia, Italy; roberto.delotto@unipv.it (R.D.L.); caterina.pietra@unipv.it (C.P.)

* Correspondence: elisabettamaria.venco@unipv.it; Tel.: +39-038-298-5409

Abstract: Energy communities (ECs) are considered significant instruments in the energy transition toward a low-carbon world. Important elements for the creation of ECs are the individual *drivers*, *motivations*, and *barriers* that could stimulate their creation. In this article, we focus on developing an understanding of which aspects favor or slow down the establishment of ECs in the community of Segrate (Italy). From a methodological point of view, the authors present a study based on (i) a preliminary desk analysis, consisting of an extensive and multidisciplinary literature review; (ii) an empirical investigation into the case study of Segrate (a municipality in the Lombardy region, Italy), including energy-related data and geospatial information (i.e., from the census and geographic information system); and (iii) data analysis and the collection of original materials incorporating quantitative and qualitative information (based on online surveys and on-the-spot participatory events) relating to the context. As emerges from the survey, in Segrate (considered a typical European middle-sized city), it is difficult to identify the best physical dimension for ECs: the scale of Segrate's neighborhoods do not correspond to the EC dimension usually referred to in the literature. In Segrate, the neighborhoods encompass between 4000 and 8000 inhabitants, while existing ECs (with heating systems) cover between 20 and 1200 apartments. Multi-vector ECs are forecastable with 10–20 apartments.

Keywords: energy communities; community empowerment; urban policies



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1. Introduction

Energy communities (ECs) are considered significant instruments in the energy transition toward a low-carbon world, in which citizens voluntarily participate in renewable energy and/or energy efficiency projects [1,2]. These types of organizations can develop ubiquitously and improve local energy systems as a consequence of the exchange and sharing of resources [3]. Various studies have investigated the effectiveness of ECs in (i) improving weak or non-existent grid connections [4], (ii) reducing the waste of energy caused by infrastructural rigidities [5,6], and (iii) converting energy infrastructures for distributed energy production based on renewable sources [7]. In addition to the technical benefits related to ECs (e.g., optimizing and building more sustainable and efficient energy vectors), social aims have been added to the discussion, emphasizing the benefits of improving social cohesion among participants, or aspiring members, of the community [8,9]. These aspects have been integrated and promoted at the European legislative level through (i) the “Clean Energy for All Europeans” package, which introduced and defined the concept of “energy communities” [10,11]; (ii) the directive on common rules for the internal electricity market (EU 2019/944), which aimed at improving the diffusion of ECs and facilitating the efficient integration of citizens (as active participants) in the electricity production system [12,13]; and (iii) the revised Renewable Energy Directive (2018/2001/EU, RED II), which strengthened the role of renewable energy consumers and ECs. In Italy, the legislative framework

is defined by the *Decreto Milleproroghe* (“Thousand extensions” Decree-Law, 2020), which introduced the definitions of “renewable energy communities” and “energy consumers acting autonomously and collectively”. This decree absorbed the RED II directive, marking a crucial step toward decarbonization. Furthermore, the 2021 Italian National Recovery and Resilience Plan (*Piano Nazionale di Ripresa e Resilienza*) addressed the matter of renewables by specifying and allocating the financial resources reserved for the energy transition [14].

Notwithstanding this favorable legislative framework, there are various social and psychological factors [15] that can make the diffusion of ECs particularly difficult [16,17]. Energy behaviors, at multiple scales, are influenced by local habits and values [18,19]. The establishment of ECs in particular entails an active ambition to shape the environment [1], the ability to join or create networks and enterprising attitudes [20], and the desire to participate in the configuration of local innovation processes [21].

In this article, we focus on understanding which aspects favor or slow down the establishment of ECs at a municipal level. The assumption is that many citizens would like to know more about, join, and establish ECs in their life contexts, but the variety of drivers, motivations, and obstacles at stake should be better recognized to more effectively support the diffusion of such initiatives [22,23].

To systematically discuss these aspects, this article will consider the municipality of Segrate, an Italian middle-sized city in the metropolitan region of Milan (directly neighboring the latter). This context is particularly interesting due to the city’s somewhat “pioneering” propensity to adopt principles of sustainability (especially in relation to energy saving and the quality of local greenery [24]). This is part of Segrate’s identity and of a larger ambition to establish itself as a model of a “sustainable city” since the 1960s; more recently, Segrate has also been included as a pilot site involved in a community-based project (EU Horizon 2020) called “RENERgetic”, that aims to integrate and demonstrate different solutions that favor substantial increases in energy efficiency, energy autonomy (increasing the economic attractiveness of energy systems based on local renewable sources), and local involvement in the energy transition through the creation of local ECs in different European urban contexts (e.g., Belgium, Poland, Italy). The authors themselves are members of the research project; in this article, they discuss some of the findings related to social engagement activities (conducted between September and December 2022) intended to comprehend and verify the different impressions, concerns, and ambitions related to establishing ECs in the context of Segrate. In terms of structure, this article is organized as follows. Section 2 outlines the research design (i.e., the theoretical background, context of study, research methods, and materials). Section 3 presents the results of the local investigation. Section 4 critically discusses the main findings and policy implications. Section 5 discusses the main limitations and conclusions of the research.

2. Research Design

2.1. Theoretical Background

The concept of an EC is open to different definitions [1,8] and interpretations [2,11]. In this article, we are, firstly, interested in understanding the modalities in which people decide to be part of ECs [25] by examining the possible “drivers”, conceptualized as follows:

- (i) *Organizational drivers*. It is assumed that agents may be interested in ECs as “purposeful communities” [26] and the kind of empowerment they entail in terms of governance [9], decision making, knowledge transfers [27], and managerial tasks [1].
- (ii) *Personal drivers*. It is assumed that agents view ECs as opportunities to express their individual preferences and propensities [28], achieve personal ambitions, and nurture enterprising attitudes [20] as well as to experiment with new lifestyles and consumption habits [15,23].
- (iii) *Social drivers*. ECs can be interesting for the social interactions they enable, through strategic networking [19], establishing partnerships [13], and team working [29].

- (iv) *Technological drivers*. ECs typically include a specific technical/technological driver that can impact social practices [10] and change local needs and demands [3], as well as affecting levels of comfort and the overall assessment of local quality of life [28,30,31].

Regarding the individual *motivations*, we consider four main categories [32] that can cumulate and influence each other in various ways.

- (i) *Ideal-based motivations* are linked to the desire to be a responsible energy consumer; they entail issues such as social capital and activism [4,20], community bonds, and trust [5,33];
- (ii) *Economic motivations* are linked to the desire to save energy costs. They mainly concern financial aspects, economic decentralization models for energy prosumers, strategic decisions regarding one's own income, and market uncertainties [10,34,35];
- (iii) *Hedonistic motivations* are linked to the desire to stay updated in relation to energy transition issues and solutions. They concern personal considerations including the "technical identity" of the agent [1] and perceived personal benefits such as, for example, intrinsic, experimental, and proactive attitudes toward the adoption of new technologies [28,36,37];
- (iv) *Autarkic motivations* are linked to a desire to be independent from an energy point of view. They include various forms of collaborative attitudes, aspirations toward autonomy and independence [7,38], and confidence in the capacity to be self-organized and self-sufficient in energy decisions [17,39] and to acquire ownership of the equipment [40,41].

Finally, with regard to the *barriers* to ECs, as far as Italy is concerned, the Italian renewable energy market has been booming for some time [5], but the implementation of community projects (and other energy systems based on renewable sources) seems to be limited in terms of scope and geographical diffusion [6,42]. For this reason, we consider a particular context (i.e., the city of Segrate) to better frame the debate of ECs in Italy.

2.2. The City of Segrate, Lombardy, Italy

The city of Segrate has approximately 35,000 inhabitants, it extends for 17.5 km² (with a population density of 2000 inhabitants/km²), and it can be considered a medium-sized city in the Italian context. Segrate is among the municipalities with the highest per capita gross domestic product (GDP) in Italy, which is also due to its proximity to the regional capital: that is, the city of Milan, which it borders directly. Although "suburban", Segrate is a distinct area, partially due to its particular architectural and environmental quality, which makes it highly competitive and attractive and not easily assimilable with other municipalities of the same scale and location [24].

Segrate is the home of relevant tertiary services (such as the Mondadori publishing house, designed by the famous architect Oscar Niemeyer, the television company Fininvest, IBM, etc.), air transport facilities (for example, Linate airport), hospitals, and services of general interest (San Raffaele Hospital and the related university campus). In regard to residential facilities, Segrate offers a low-density settlement type, with relatively lower prices and a greater proportion of green spaces than Milan. In terms of the urban layout, the city was progressively conceived as a system of separate districts. Today, it is possible to recognize seven distinct neighborhoods, each with its own individualities in terms of mobility and energy supply systems.

The distribution of people and building types reflects a certain diversity of social classes (mainly of medium-high profiles) and related preferences and attitudes with respect to environmental sensitivity and education on energy issues. Personal income and comfort levels also depend on the period of construction and the existing services. Novegro and Redecesio are lower-income neighborhoods. The districts with the highest per capita GDP are those of Milano 2 and San Felice, which were built toward the end of the 1960s and conceived from the outset as "unitary" districts, with a high level of architectural quality, comfort, services, and exclusive private structures (for example, several sports clubs, private security services, different areas, and exclusive access for residents). The Villaggio

Ambrosiano district consists mainly of single-family houses and villas. The quality of life there is generally higher than in other districts (especially in the Segrate Centro, Rovagnasco, Lavanderie, and Redeciesio districts). New settlements are being developed with high-quality buildings and relatively high selling prices compared to similar municipalities. Although most of the neighborhoods are characterized by a high proportion of private spaces (for the exclusive use of the community of residents), it is useful to note that the number of public services is five times higher (i.e., 96 m²/inhabitant) [43] than the minimum requirement (i.e., 18 m²/inhabitant) as defined by Regional Law 12/2005 (art. 9). The isotropic distribution of these services at the city level and the uneven characteristics of the different neighborhoods have provided valid reasons to test and replicate ways of optimizing the energy supply and demand through community and local projects of different types (including RENergetic). The municipal administration has been particularly attentive to the ecological and energy transition process in Segrate through initiatives aiming at the reduction in polluting emissions and the efficiency of energy consumption. In this last field, many initiatives have been promoted in recent years for the direct benefit of citizens (for example, projects for the production of biomethane from wet processing and new tenders to improve energy efficiency in the commercial sector, as well as the installation of charging stations for electric cars, the modernization of the municipal public lighting system, and the establishment of a social bonus for the economically disadvantaged linked to the consumption of electricity and gas for heating).

In regard to the ECs, it has only recently been possible to start them on a formal level as defined by Regional Law 2/2022 of Lombardy. The Lombardy region is highly energy-demanding (in 2021, the electricity consumption was 68.79 TWh), and the regional authority has set a series of sustainable strategies related to energy production and consumption, as well as to the reduction in climate-changing gas emissions. Within this framework, the regional government has introduced the possibility of creating local ECs (i.e., *Comunità Energetiche Rinnovabili Locali*: CERLs) with the expectations of 3000–6000 new CERLs in five years and an increase in photovoltaic power of 600–1300 MW [44].

However, within the city of Segrate, it is possible to find some pioneering cases of ECs *ante litteram*: communities that have been moving for some time in the direction of energy autonomy and sustainability. Among these, there are the aforementioned Milano 2 and San Felice neighborhoods, which were designed with a unitary thermal system serving more than 6000 users (inhabitants) and organized at several levels (i.e., the global community, the building community and the participant, and at the individual or household level). The different organizational scales have been defined as the basic rules for the functioning of the whole community so that each new participant accepts the rules of the energy community together with the typical rules of the individual building.

Against this backdrop, empirical investigations have been conducted to better comprehend what can be performed for the diffusion of ECs at the municipal level. The context of Segrate is particularly interesting because it is a middle-sized, low-density city with a strong interest in implementing sustainable models for suburban living.

2.3. Methodology and Research Materials

From a methodological point of view, the empirical investigations were based on (i) quantitative information, combining first-hand local data (produced via an online public survey) and second-hand geospatial information (i.e., census data and geographic information system-based regional databases) and (ii) qualitative information, collected through on-the-spot participatory events with Segrate citizens.

The investigations were organized in two phases. The *first phase* concerned the creation of an anonymous online survey that was administered to the population of Segrate (in September and October 2022). People could access the survey directly through their smartphones by scanning a QR code or through direct links circulating both online and offline (e.g., on official newsletters, websites, social networks, physical flyers, and posters distributed during local festivals). The survey composed of 28 questions divided into three

main sections. Two sections concerned general questions on sustainable energy transitions and were open to all users (601 total respondents: 379 women, 181 men, 3 non-conforming, 38 no response; 66 in the age group 18–29, 102 in the age group 30–39, 141 in the age group 40–49, 161 in the age group 50–59, 76 in the age group 60–69, 17 in the age group 70+, 38 no response). The other section was focused on specific questions concerning Segrate and was accessible only to those who declared that they lived in the city (a total of 163 respondents). To control the sample, the various users were asked to select: (i) the neighborhood in which they lived (see Figure 1); (ii) their form of habitation (e.g., ownership, rent, and loan for use); and (iii) their type of relationship with the local community (i.e., self-assessing on a qualitative scale their sense of belonging and degree of participation in local initiatives).

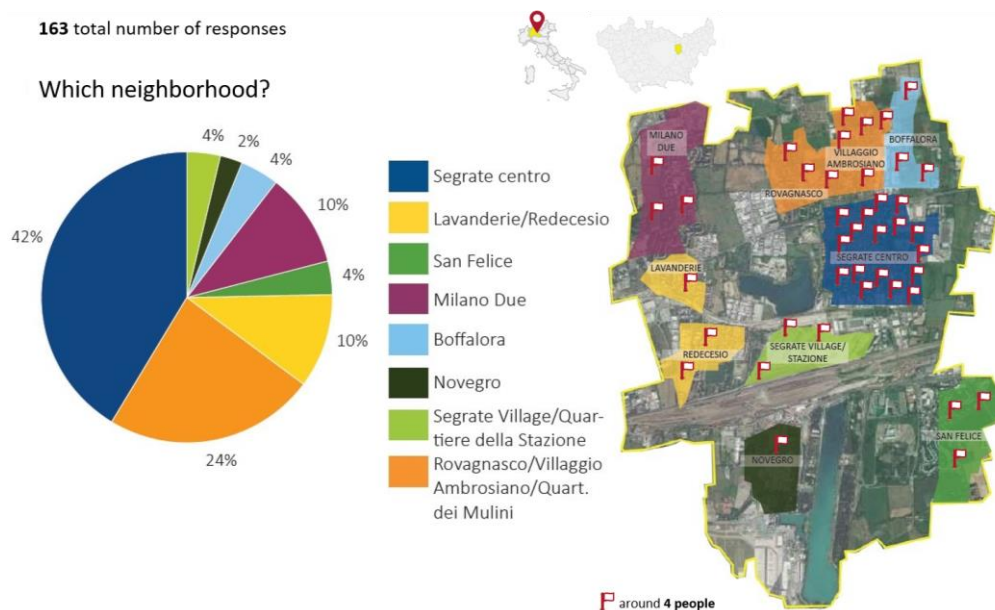


Figure 1. Distribution of the interviewees (163 citizens from a total of 601 respondents) in neighborhoods in Segrate.

The *second phase* concerned the development and refinement of local information through face-to-face meetings and participatory activities with the population (in November and December 2022). These types of initiatives consisted of

- (i) A one-way communication public meeting, presenting the RENergetic project to the local population and showing the preliminary results of the survey (phase 1) and “social engagement” initiatives to be carried out in the following events.
- (ii) Two-way communication thematic meetings, discussing with local citizens and interest groups (e.g., homeowners associations, local administrators, and representatives of elementary and middle schools) their level of awareness and interest in energy saving and possible problems and solutions connected to hypothetically establishing local ECs in their city (inspired by communicative planning approaches [27]).
- (iii) A final workshop, stimulating further practical discussion on *where* and *how* to establish local ECs using posters, maps, and collaborative boards where citizens could directly interact (inspired by collaborative [45] and co-design approaches [20,46]).

The overall goal was to understand the various opinions and levels of acquittance with the “energy transition” and EC challenges in a mid-sized city in Northern Italy [24]; see also [2,47].

3. Fieldwork Findings

In this section, the focus is on what leads or impedes the creation of ECs in the context of Segrate. As previously mentioned, the analyses will be on (i) “drivers” (i.e., organi-

zational, personal, social, and technological); (ii) “motivations” (i.e., idealistic, economic, hedonistic, and autarkic); and (iii) “barriers” (as perceived by local citizens).

3.1. Drivers for the Creation of ECs

In regard to the *organizational drivers*, the vast majority of respondents to the survey were property owners (92.7%), suggesting a strong potential for the creation of ECs (e.g., the autonomy of individual decisions), but also a higher degree of difficulty when it comes to the management of ECs (e.g., the complexity of collective decisions). Very few respondents were tenants in the private market (4.9%) or in cooperatives (2.4%).

To assess the *personal drivers*, the survey invited users to select which among popular “sustainable development assets” (i.e., electric cars, electric bikes or scooters, solar panels, and micro-wind turbines) they already owned or used. Among the respondents (42% of the sample), many already possessed electric bikes and scooters (37 persons), electric cars (24 persons), and solar panels (18 persons). It also emerged from the participatory activities that the citizens of Segrate seem to have made substantial efforts to keep up with new technologies, including in relation to cutting energy costs.

In terms of the *social drivers*, most of the respondents from Segrate felt somewhat in contact with but not necessarily close to their community (42.7%), followed by those who were neutral (37.8%) and those who instead felt very close to the community (19.5%). In contrast, most of the respondents expressed a strong sense of belonging to the city (54.3%), revealing the strong sense of identity in Segrate. Many respondents did not necessarily view themselves as “active members” in the community (42.6%) and negatively answered when asked whether everyone was “able to participate” in local initiatives (41.2%) and about the “possibility to participate” in local decisions (47.2%). These results do not necessarily indicate a real difficulty in establishing community initiatives (34.2% of respondents saw themselves as “active members” in the community); rather, there was a low level of coordination and communication relating to such initiatives (this aspect emerged in the social engagement events).

In relation to *technological drivers*, most of the respondents had no frequent disagreements with the person living with them in regard to the thermal comfort inside their dwelling (48.17%), followed by those who instead claimed to have some issues (33.54%). Further questions specifically concerned condominiums (which 130 out of 163 Segrate respondents declared they lived in). In this case, most citizens did not experience disagreements (e.g., in condominium meetings: 39.24%), followed by those who instead claimed to have frequent disagreements (35.38%). Finally, there were two questions aimed at understanding the degree of satisfaction of citizens with the temperature in their house over the last week and in general. The vast majority of citizens were highly satisfied with the thermal comfort of their homes overall (75.61%) and in the previous week (82.32%). These latter results may have been due to the high quality of Segrate residential stock (largely devoted to energy saving and the quality of thermal energy in residential homes), but may also have been influenced by the particularly favorable climatic conditions of the survey period (September–October).

3.2. Motivations for the Creation of ECs

In order to understand the possible motivations for the creation of ECs in Segrate, we focus here on the questions in the survey connected to the previously identified motivations (see Section 2.1), as detailed in Table 1.

Table 1. Main results of the survey focusing on motivations.

N°	Questions	Answers (%)						
		Definitely Not	No	More No Than Yes	Neutral	More Yes Than No	Yes	Definitely Yes
1	It is important to be conscious about individual energy behavior	0	0	0	3.66	4.88	18.9	72.56
2	I want to motivate others to be more conscious about their energy behavior	0	0.61	1.22	6.71	13.41	16.46	61.59
3	I would like to be more involved in the energy transition decisions of my local community	0	0	4.26	10.98	20.73	29.27	34.76
4	I am interested in contributing actively to the energy transition in my local community	0.61	1.22	1.83	12.80	25.61	21.34	36.59
5	I, as a person, can make a big difference in the energy transition	0.61	1.83	6.10	20.73	21.34	25	24.39
6	We, as a community, can make a big difference in the energy transition	0.61	3.05	3.66	20.12	21.95	23.78	26.83
7	I find it important to save energy	0	0	0	1.83	7.32	15.85	75
8	I want to save energy together with other people in my community	0	0	0.61	6.71	9.15	17.07	66.46
9	I would like to have access to the energy information in my neighborhood/area	1.83	0.61	1.22	6.71	15.85	27.44	46.34
10	I am satisfied with the energy information in my neighborhood/area	13.42	15.24	19.51	31.1	12.8	4.88	3.05
11	I am confident in my ability in handling new technologies	1.22	1.21	2.44	7.32	29.27	27.44	31.10
12	I am confident in my ability to adapt to new technologies	0	0.61	1.83	6.71	21.33	35.98	33.54
13	I think that public administrations should encourage the creation of ECs	0	1.22	0.61	5.49	9.76	19.51	63.41
14	I think that citizens are capable of organizing themselves into ECs without the intervention of public administrations	14.03	17.07	17.07	21.34	14.63	6.71	9.15

In regard to *idealistic motivations* (questions 1–6), almost all the respondents agreed that it is important to be aware of personal energy consumption (96.34%). Similar results emerged when participants were asked whether they would like to persuade other people to be more aware of energy consumption (91.46%). Many respondents liked being involved in community initiatives aimed at saving energy (84.76%) and would be willing to actively contribute to energy transitions in the community (83.54%). The vast majority of citizens believed that they could make a difference in the energy transition at the personal level (70.73%), as well as at a collective level (72.56%).

In terms of *economic motivations* (questions 7 and 8), almost all the respondents agreed that it is important to save energy (98.15%). When asked whether they were interested in reducing energy consumption together with others, the results slightly decreased, but most citizens still agreed (92.68%).

In relation to *hedonistic motivations* (questions 9–12), a large majority of the respondents were interested in having more information on the production and use of energy in their apartments (89.63%). In regard to the information on the production and use of energy in their neighborhood/area, most were unsatisfied (48.17%). Most of the respondents were confident in their capacity to use new technologies (87.80%). Similar results were obtained concerning their confidence in adapting to new technologies (90.85%).

Finally, concerning *autarkic motivations* (questions 13–14), the vast majority of the respondents believed that local administrations should favor the creation of communities aimed at reducing energy consumption (92.68%); however, many of the respondents did not believe that they could organize themselves to create ECs (48.17%). Others instead

believed individuals could self-organize themselves (without any aid from the public administrations: 30.49%).

3.3. Barriers to the Creation of ECs

In order to understand the possible *barriers* to the creation of ECs in Segrate, we consider here the outcomes from the participatory initiatives conducted with the local population. Considering the types of citizens participating in the meetings, it was clear that “cultural” and “income” barriers did not arise to a great extent in the discussion. There was a broad consensus on the need for more conscious use of energy; however, in relation to the perception of being able to make a “big difference” in the energy transition, opinions were more divergent. On the one hand, citizens agreed with the idea that individuals can contribute to the overall success of energy transition initiatives; many of the participants had already invested in energy-saving technologies in their homes (mainly photovoltaic and thermal isolation systems) and seemed to be particularly well informed and skilled in the use of new technologies to improve their energy consumption. On the other, they seemed to be more skeptical about the effectiveness of initiatives taken independently, arguing that more guidance is needed to demonstrate/specify the kinds of benefits gained by changing behaviors (or technologies) to save energy. In this regard, some citizens suggested that new types of information would be useful if they could indicate consumption levels before, and not after, receiving energy bills. Some pointed out that having the “raw” data tells the average user “little to nothing”. A smart household consumption information system could, for example, indicate information in a comparative manner (e.g., how much CO₂ is saved depending on the technology in use); in the citizens’ opinion, this type of communication is particularly effective in triggering a more conscious attitude toward their own energy behaviors and habits. The citizens also imagined a more proactive approach of administrators in these regards (e.g., creating a permanent counter within city hall where citizens interested in energy investments can go and receive advice).

4. Discussion

In discussing the challenges relating to the creation of ECs in our context of study, let us focus on some background aspects. First of all, at the community level, we are witnessing a particularly favorable moment for the creation of ECs, as the European directives RED I and RED II have contributed to the definition, promotion of, and support for the establishment of ECs in different member states. At the local level, there are citizens that are already part of well-established ECs (i.e., inhabitants of the Milano 2 and San Felice neighborhoods) and potential ECs that can be established in the rest of the city. In Segrate, the various drivers, motivations, and barriers appear rather heterogeneous and context-specific (Section 4.1), which suggests that different solutions should be adopted at various levels (Section 4.2).

4.1. Drivers, Motivations, and Barriers in Segrate

The *drivers* identified here are not necessarily assumed to be “enabling” factors for ECs, at least not in the same way that policy and legal frameworks factually allow the creation of ECs [9,13]. Rather, the *organizational, personal, social, and technological drivers* point to a multi-level structure for contextual changes [19] and can be conceptually overlapped with “triggers” for the launch of EC initiatives. In regard to Segrate, most of the inhabitants are property owners, with strong personal interests in energy savings, who are not necessarily “active” in or “close” to the local community, but appreciate the quality of local living and their domestic comfort. The overall appreciation and sense of belonging to the city (i.e., place attachment [48,49]) is an additional factor that may lead to the establishment of place-based ECs in the area [25,32]. As we have seen in the case of Segrate, the physical environmental quality (including building and technological infrastructures [3,12]) has enhanced residents’ place attachment and acceptance of the socio-technical challenges related to energy transitions.

In terms of the *motivations*, these can be seen as “reasons” to join local initiatives of various kinds. Here, the focus has been on ECs [32], but it is not excluded that *idealistic, economic, hedonistic, and autarkic* motivations also matter in other kinds of topics [20]. In our case, it is clear that the interest in ECs exists before, and beyond, the legal and financial opportunities offered by recent policy frameworks [5,14]. The establishment of ECs is ultimately a bottom-up process, but even when discussing its emergence as a community-driven project [13], agents are not necessarily inspired by—or do not act because of—idealistic or altruistic tendencies. We noted that citizens adopting photovoltaic technologies had stronger autarkic motivations (linked to a positive idea of self-sufficiency in the production, consumption, and management of technology) and are closer to *prosumers* [31,50,51]. These types of citizens were mostly living in single- or double-family detached houses, were already part of a local homeowner association, and showed prominent hedonistic attitudes, but did not (yet) constitute a formal EC. Part of the explanation for this is that citizens had taken advantage of public incentives made available in recent years [16,42,52] that, however, continue to favor quite traditional and centralized energy models (bound to monopolistic actors and hierarchical models in energy exchanges where renewable energy users mainly remain customers of service providers [5]).

Finally, the *barriers* that emerged in the hypothesis of establishing ECs in Segrate were mainly of an organizational and informational nature. In regard to the organizational aspects, in the opinion of many citizens, the local administrators should always support the energy transition efforts of the local population. This is also a widespread opinion in the national and general debate on ECs [29,53,54]. In relation to the informational aspects, the citizens were concretely interested in knowing more about their possible energy endeavors, including to self-assess *how* and *to what extent* their investments are or could actually be fruitful [55]. Therefore, while the issue of being “aware” of energy consumptions was largely accepted, the remaining problem was the lack of reliable and comprehensible information [51]. Considering the relatively high education levels of the citizens participating in the investigation, this is not necessarily a problem of “literacy” [12], but simply of the low quality of informational fluxes on energy consumptions. Citizens’ place-based interests also enhance expectations in a multi-scalar perspective [10]: from the single household or condominium for purely personal interests (i.e., saving expenses for the single household or family), to the neighborhood and the municipal level, as well as in terms of collective interests (i.e., make public spending more efficient).

It should, moreover, be noted that in Segrate, it is difficult to identify the best physical dimension for the creation of an EC: the scale of the districts of Segrate does not correspond to the size usually considered in the literature (ECs with heating systems are usually between 20 and 1200 apartments, while in our case, the neighborhoods have between 4000 and 8000 inhabitants) [56,57]. At the moment, only two neighborhoods in Segrate (i.e., Milano 2 and San Felice) may be regarded as proper ECs with heating systems. These neighborhoods were built to be, and to be viewed as, energy islands from the outset; they are examples of complete ECs working in an existing contractual community. In both situations, a heating network was designed and built at the same time as the buildings, with one or more heating systems (initially fueled by diesel and, subsequently, by methane). The heating system infrastructure already exists and is privately owned (i.e., owned by all the residents), and the inhabitants perceive it to be part of a larger system that is already present. In regard to the other districts, however, the situation is different. By entrusting the investment initiatives to individuals, the results can only be heterogeneous (for example, photovoltaic systems for the residents of the Villaggio Ambrosiano and thermal insulation for the inhabitants of the condominiums in other neighborhoods), and the systemic vision is even more lacking.

4.2. Policy Implications

In summary, we can state that all three elements (i.e., driving factors, motivations, and barriers) are influenced by social, psychological, and demographic considerations (for

example, the influence of income on motivations), but also and above all by considerations relating to the physical context (for example, the existence of infrastructures of a certain type, and not only energy infrastructure, but buildings and the environment in a more general sense as well). This study contributes to the wider debate on the concept of ECs, introducing the case of Segrate as a type of context in which citizens feel closer to the “city” (geographical identity) than to the local “community” (social identity). This does not prevent them from investing resources or adopting more aware and efficient behaviors to save energy [18]. In terms of policies, it is possible to divide the territory into two distinct parts: neighborhoods that already have a certain infrastructure (Milan 2 and San Felice) and ones that need new infrastructure. In the case of new infrastructural needs, the participation of the local administration is essential. Even if the issue could be considered almost exclusively private, the intervention of the local public government as an investor and as a possible partner of the community appears crucial. The role of a public institution is all the more important if we consider the guarantees of specific community agreements (in terms of duties, energy exchanges, and related money transfers between members). A possible public policy could be based on the following steps:

- (i) Include the public subject as a partner of the community (considering, for example, public buildings in the specific neighborhood) [9];
- (ii) Create an adequate rule framework for the community [58];
- (iii) Invest public money into creating infrastructure [12] (the public interest in this case is the increase in green energy production and the implementation of European directives RED I and RED II);
- (iv) Recover investments within the equipment of energy (measured by the need of the public buildings involved in the community) from the other members.

In the case of existing infrastructure, the issues seem to be simpler because the ownership of the infrastructure is already defined by a specific contract in which the municipality is a member (as the owner of the public buildings inside the neighborhood). Therefore, in terms of its institutional role, the municipal government is comparable to all the other owners.

5. Conclusions

In this article, we have attempted to demonstrate that the drivers, motivations, and barriers involved in participating in an EC are varied. This research was based on an online survey that helped to build a preliminary understanding of the issues at stake, while participatory meetings assisted in testing and expanding our hypotheses. The main limitations of our research are that, in quantitative terms, our sample consisted of only 163 online survey respondents (living in Segrate), with an average of 10 people in each participatory meeting. Overall, our results only concern a medium-sized city, with a strong identity and vocation for sustainability issues, located in a rich and dynamic context from economic and social points of view. Despite the particular characteristics of Segrate, this paper could be useful for understanding the multitude of elements at play at an urban scale, evaluating the potential for the creation of ECs with different types of neighborhoods, people, and services. The drivers, motivations, and barriers identified here could be compared and further expanded by other case studies in Lombardy as well as elsewhere.

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