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MASTERPIECE - Multidisciplinary Approaches and Software Technologies for Engagement, Recruitment and Participation in Innovative ECs in Europe

Deliverable 3.1

MODELLING CONSUMERS AND COMMUNITIES

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1. EXECUTIVE SUMMARY

This report, produced by R2M within the T3.1 - Modelling of multi-level incentive mechanisms to enhance proactive participation in Energy Communities (ECs), aims to identify and examine barriers related to EC participation. This includes barriers related to the participation of citizens in EC initiatives, including the barriers related to the EC initiatives participation in energy markets.

Additionally, this report explores various measures, including financial instruments, technical assistance, and various other incentives and support mechanisms, covering both economic and non-economic aspects. These measures aim to mitigate EC participation barriers and boost the involvement of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

Building on the theoretical EC domain research regarding the barriers to EC participation, and the subsequent investigation about various measures to overcome them, it was crucial to find some way to map these barriers and measures together and utilize these insights into a coherent framework. This process led to the development of the Barriers vs. Measures Matrix. The matrix employs a traditional row-and-column structure. Horizontal Rows as Barriers. Vertical Columns as Measures. The strength of the Barriers vs. Measures Matrix lies in its ability to map and associate measures to barriers in a way that acknowledges the complexity and interconnectedness of the issues. It facilitates a strategic alignment of solutions to problems.

Finally, we transformed the general EC Barriers vs. Measures Matrix into pilot specific Barriers vs. Measures Matrix. This transformation of the Matrix at the pilot level assisted us in identifying most relevant barriers related to the participation of citizens in EC initiatives, including the barriers related to the EC initiatives participation in energy markets faced by the MASTERPIECE pilot communities. This valuable feedback opened avenues for us to offer pilot communities customised measures. These measures encompass in the range of various funding and financing instruments, technical assistance programs, and various other incentive and support mechanisms, designed to overcome these ECs related participation barriers.

2. INTRODUCTION AND DELIVERABLE GOALS

This report represents Deliverable 3.1 and lays the groundwork for the next stages of the project, help us understand and investigate the barriers individuals and ECs face enabling MASTERPIECE project to provide targeted measures, including funding and financing instruments, technical assistance programs, and various other incentive and support mechanisms, covering both economic and non-economic aspects, designed to reduce the EC participation barriers and enhance proactive participation of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.
The report starts with the executive summary in **Section 1**.
Section 2 introduces the deliverable and the objectives of the project.
Section 3 outlines high level economic and non-economic action drivers that can lead to increased involvement and support of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.
Section 4 discusses different categories of EC participation barriers such as financial, technical, and social and behavioural from literature (including inputs from T2.1 and T2.2).
Section 5 identifies and analyse different targeted measures, including financing and funding instruments, technical assistance programs, and various other incentive and support mechanisms, covering both economic and non-economic aspects, designed to reduce the EC participation barriers and enhance proactive participation of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

Section 6 Building on the theoretical EC domain research regarding the barriers to EC participation, and the subsequent investigation about various measures to overcome these EC participation barriers, we've created a general Barriers vs. Measures Matrix. This Matrix allows for a multi-level association of measures to barriers. This section will discuss in detail the general Barriers vs. Measures Matrix and its adaptations for pilot-specific contexts and ECs.

And finally, **section 7** presents a conclusion for the work done in D3.1 (M15) and discuss next steps and activities planned to update this deliverable in M30.
Plan for M30 Update: For the forthcoming D3.2, scheduled for M30, we plan to broaden our analysis of measures to include financing and funding options, technical assistance, and various other incentives and support schemes. This will involve keeping updated of relevant calls for proposals that could benefit the MASTERPIECE pilot communities. Additionally, we aim to address all identified barriers within these communities, providing them with bespoke measures to eliminate specific obstacles. As part of D3.2, we also intend to conduct a workshop for the MASTERPIECE pilot communities to inform them about the various available support mechanisms and assist them with applications to access these resources. Lastly, we acknowledge that the vast majority of measures identified—including financing and funding options, technical assistance, and other support mechanisms—have exceeded the capacity of our current matrix to effectively manage. Consequently, for D3.2, we have decided to develop a web-based tool called Compass featuring an improved user interface. This tool will offer targeted measures and strategies, both economic and non-economic, to streamline participation for citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

3. ECONOMIC & NON-ECONOMIC DRIVERS FOR EC PARTICIPATION

This section outlines diverse action drivers (both economic and non-economic) that can shape participation in EC projects, ranging from the initial motivations to the broader incentives that attract individuals and organisations to engage and contribute to EC initiatives. Additionally, this task has collected inputs from the work done in Deliverable 2.5 Assessment of ECs' maturity and aspirations in the pilot cases about observed drivers that have an impact on the individuals to become members of ECs in various locations.

Overall, the factors that attract individuals to become members of ECs vary across different locations, ranging from cost reduction and financial gains to convenience, environmental consciousness, and community support. These drivers are discussed below:

3.1. Economic drivers

The possibility of reducing energy expenses, along with the opportunity to create new revenue streams through the sharing of surplus energy and the provision of flexibility services in the ECs, represents compelling economic incentives that can drive individual and community engagement. Additionally, the availability of public funding and subsidy mechanisms further enhances the appeal of participating in EC initiatives. By emphasising these economic drivers, ECs can attract participation from those seeking to lower their energy costs or invest in sustainable energy sources. These financial benefits not only support individual and community goals but also contribute to the broader transition towards a more sustainable and resilient energy system [1].

3.1.1. Economic savings

The results of the surveys and in-field assessments of MASTERPIECE pilot communities conducted during Deliverable 2.5 Assessment of ECs' maturity and aspirations in the pilot cases inform us that the primary driver for consumer participation in the Italian, French, and Turkish pilot communities is the reduction of energy costs. Consumers are attracted to the EC due to the potential savings they can achieve.

In Berchidda: *"The primary driver for consumer participation in the EC is the reduction of energy costs. Consumers are attracted to the EC due to the potential savings they can achieve."*

In France: "*The main motivation for joining the EC in France is the desire to reduce energy bills and achieve financial gains. Participants are motivated by the potential financial benefits offered by the EC."*

In Turkey: *"The motivation for joining the EC in Turkey revolves around informing consumers about a more logical and economic approach to cost reduction."*

Bridge Report on Economies of ECs states that some EU Member States [2] have adopted or are considering the introduction of local network/electricity tariffs or specific tariffs for self-consumption including Austria, Belgium, Portugal and France. Such tariffs can guarantee additional energy cost reductions for individuals and communities and support the establishment of ECs around Europe by improving their business models. Furthermore, D3.3 has explained different tariff mechanisms existing in the EU.

Additionally, a latest techno-economic analysis study of self-consumption schemes and ECs in Italy and Portugal [1] concluded that, for both countries, involving four different type of household and family profiles (such as couple working, couple retired, family with one child, and family with three childs), being part of an ECs is more economically viable than being in a regime of individual self-consumption. This is because individual households continue to prioritise self-consumption and personal savings, while selling their excess energy at a more favourable price than they would receive from the grid.

According to Cleanwatts[1], ECs developer company from Portugal, ECs can significantly lower energy costs for their members. By generating energy locally from renewable sources, these communities can reduce their reliance on external energy suppliers and the volatility of energy prices and provide around 20-30% energy cost reductions to the EC members.

3.1.2. Public funding and Subsidy Schemes

EU Public financing and funding (Cohesion Fund, the Recovery and Resilience Facility and the Modernisation Fund) – in the form of grants, loans, or a combination of the two – provides an exceptional opportunity and much needed support solution to risk-averse ECs in the EU, particularly those ECs in need for early-stage support [3]. Also, historically, there has never been stronger legal or political basis and momentum to provide such financing opportunities, nor more EU budget available to push for an energy transition that is sustainable and locally relevant [3]. The availability of public funding and subsidy mechanisms further enhances the appeal of participating in EC initiatives.

Furthermore, Table 4 provides an overview of the public financing and funding mechanisms and their considerations and support towards ECs.

3.2. Non-economic drivers

3.2.1. Environmental Consciousness

The reduction of greenhouse gases emissions and the replacement of fossil fuels are environmental drivers strictly correlated with the level of environmental concern among the population, independently from the matter of ECs, which is steadily increasing in recent years. Aimed at analysing the importance of this topic, the figure below displays the average percentage of people who believe that environmental protection and combating climate change should be top priorities for national policy [4].

[1] Homepage - Cleanwatts

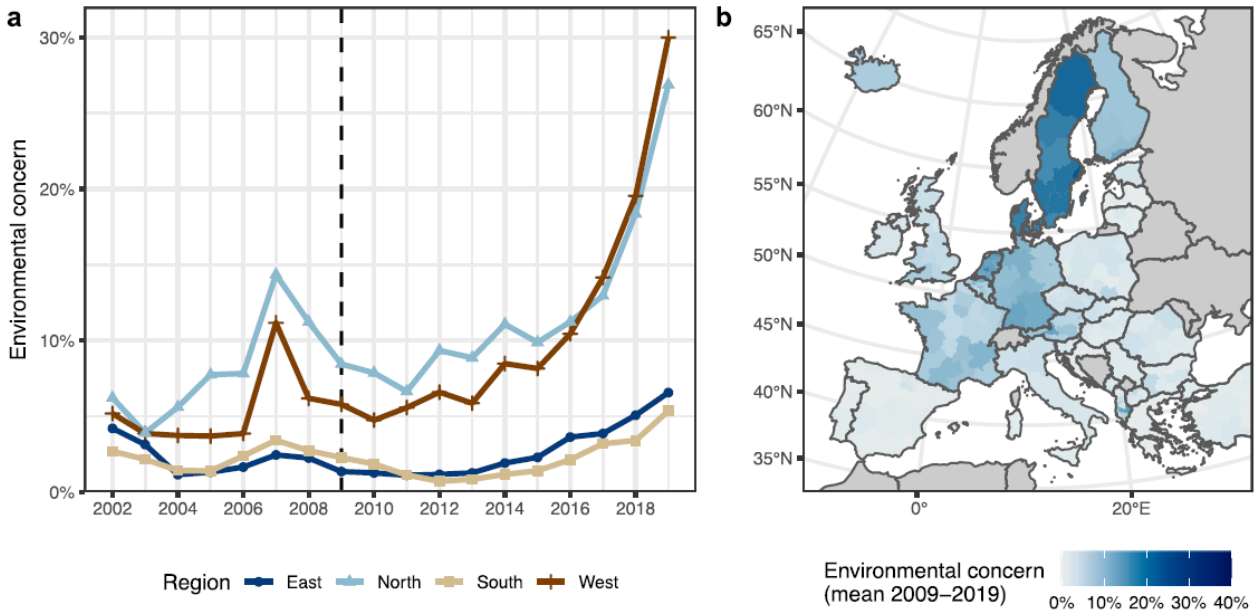


Figure 1 Percentage of population aware of environmental challenges

The author in [4] clearly reports two significant pieces of information. The first is the discrepancy between northwestern European countries and the southeastern ones: while the first ones are featured by a fraction of environmentally concerned people of nearly 30% in 2019, the second ones are lagging behind with a mere 5%. However, the chart also shows an encouraging evolution across the whole continent: on average, the four European regions identified in the study (east, north, south and west) have at least doubled the percentage of population that are aware of environmental challenges with respect to 2009 level.

This result clearly justifies the potential of the diffusion of ECs. The main reason is that such configurations imply the installation of renewable energy plants and/or a variety of energy efficiency measures, which are essential tools for the decarbonisation pathway of Europe. Besides, a further crucial role in ECs is played by the sense of community that takes place among the members. In this regard, the author in [5] explains a circular mechanism of influences: that the concept of personal environmental awareness and habitat quality affects the networks of relationships of community members which, in turn, prompts people to continue acting in a pro-environmental manner and further increases personal environmental awareness. This research, in fact, supported the numerous influences of environmental awareness as a personal psychological component, habitat quality as a contextual element outside the individual, and social capital as a social environmental factor on pro-environmental behaviour. In other words, the interest towards environmental care is an essential driver for any community and, at the same time, the sense of community itself can boost the participation of each member towards a common environmental goal, whether in terms of greenhouse gases emissions abatement or fossil fuels replacement.

3.2.1.1. Make your own neighbourhood more sustainable / a better place to live in.

The author in [5] analyses the role of habitat quality within a community. Based on their findings when infrastructure, environmental management, and ecological wellness are improved in an area with strong economic growth, community inhabitants are more likely to recognize the excellent quality of their living environment. People build groups and come to agreements intentionally or unconsciously in order to preserve their current situation, creating an environment that can defend it. Therefore, here we find again a sort of chain effect: the sense of community has an impact on the growth of social capital when they perceive a high-quality living environment, which translates into a need for its preservation (environmental driver). Finally, the latter leads to concrete pro-environmental behaviours which, thanks to the recent European directives, can be carried out also through the creation of an Energy Community.

However, the above mentioned phenomenon does not occur only in places where living standards are already at a higher level and have to be preserved, because the mechanism certainly works on the other way round as well. In fact, instead of being already present in a wellbeing context and acting as a starter for environmental preservation, the sense of community can arise also from a degraded living condition with the objective of living standards improvement: in such a situation, the identification of a common goal aimed at improving the local environment can act as a catalyst of common pro-environmental actions, thus potentially pushing towards the creation of ECs. An example of this is the Energy Community of eastern Naples (Italy), named “Comunità Energetica e Solidale di Napoli Est” [6], created and managed by two philanthropic organisations with the technical support of a company specialised on photovoltaic systems. The project was not only a response to the goal of producing "shared energy" from renewable sources but, also, of spreading an eco-sustainability culture. In fact, the plan took shape through a binomial of workshops on the definition and goals of an Energy Community together with educational initiatives on environmental topics. The latter had a focus on urban degradation: training programs were held on ecological issues for households facing socioeconomic challenges, in a working-class neighbourhood torn apart by the presence of organised crime. The district was decaying towards a low living standard, thus the creation of an Energy Community played a role in creating a sense of community around (also) an environmental challenge that members had to face all together: taking care of their habitat to make it a better place to live.

3.2.2. Education and knowledge

A further booster of the ECs diffusion is surely represented by the average level of environmental and energy literacy of a potential member. The latter can be distinguished in two main branches: the level of education (or average level of academic attainments), which can be correlated to stronger environmental sensibility, and the extent of information obtained beyond the scholar education (knowledge received from informative campaigns, mass media, social media, exchanges with peers, etcetera).

As for the first branch, according to Andrew Meyer’s findings [7], the academic background makes people perceive environmental concerns as having a greater direct impact on their lives: education makes people more conscious of social welfare topics, which causes an increase in pro-

environmental behaviours. In addition, the same study from Meyer disproves the theory according to which the engagement of educated people in more pro-environmental behaviours would consist in a mere consequence of their awareness regarding potential cost savings. In fact, survey participants of the research proved to be not just better "economic optimizers": the findings clearly show that their interest towards pro-environmental behaviours such as sorting trash for recycling, purchasing locally produced goods, and purchasing products with an environmental label (which are not financially advantageous in a direct manner), when it comes to educated people, is possibly even higher with respect to other actions that produce immediate economic gains (e.g. reducing energy consumption). [8] proved that, in view of a higher level of education, university graduates give greater importance to social welfare and the reduction of carbon emissions and they contribute significantly to the development of values that are good for both people and the environment, especially females with college degrees. [9] also stated that "people with higher education levels or with younger age tend to have more concern on the environment", thus confirming the above-mentioned correlation between education and environmentalism and extending it to adolescents and young adults. Overall, these studies suggest that, in order to guarantee the success of ECs, the drivers of education and knowledge should rely, when possible, on the inclusion of young and educated people (high school and university graduates) together with people of any age with an academic background, in view of their natural propension towards sustainability and of their capability to spread positive values for environment care. [10] proved that, through cooperation with businesses and public officials, sustainable education in high schools may promote ecosystem innovation and support the development of local economies. As a matter of fact, in their study, students proved to be interested in sustainability and "considered ECs central for the green transition".

The second branch deals with the necessity to stress on informative campaigns, workshops and in-presence meetings dedicated to the remaining part of the population that is not already familiar with sustainability challenges, not only to explain the potential economic gains of ECs but also to deepen all the environmental benefits that they could generate. Indeed, knowledge and training are crucial resources for empowerment and autonomy and, besides, they represent social benefits by themselves for all communities that are not just economically based. Making the population aware of the opportunities related to habitat quality improvement (not only on a global scale but also on a local scale), in fact, could create a further driver for their aggregation: the potential members, for example, can be further convinced of creating an Energy Community by getting to know the corresponding opportunity of improving the local air quality (reduction of polluting emissions in the community area) or of recovering old dismissed industrial/agricultural areas for the generation of renewable energy (in order to maximise a economic benefit for the whole community). Similarly, they might not be aware of the opportunity offered by such configurations to mitigate energy poverty, or to abate the dispersion of renewable energy associated with its transmission towards the national grid, etcetera. Therefore, the diffusion of knowledge about all the challenges and opportunities related to ECs might transmit to the people the awareness about their power to change the world in which they live, both on a global and a local scale, thus aggregating a community around a common goal and favouring their engagement in such collective environmental and social initiative.

3.2.3. Energy consumption awareness

Despite being expected to provide a limited contribution regarding the total renewable power targets to be installed in the next decade, ECs retain an important role in making citizens more aware of what is happening around them from an energy and environment point of view and in making them understand how each can have a relevant impact in the decarbonization path that is to be taken. This is strictly correlated to the paradigm shift that these configurations are expected to bring: ECs are new players in the energy market because they provide for the direct participation of all those users who were previously considered passive users, thus end consumers who came at the end of the value generation chain. With ECs, instead, the users can find themselves playing an active and central role.

From a technical perspective, a renewed central role of end-users is found both during the design phase of the configuration and during its operation and management.

As for the design phase, in recent years all incentives were focused on the mechanism of feeding energy into the grid, so anyone building a renewable energy plant had the sole objective of maximising power, that is, making the largest plants possible. Nowadays, instead, ECs are incentivised to locally consume as much self-produced energy as possible. Therefore, with this new concept it is necessary to build plants sized for the specific needs of the community in order to make the members capable of consuming the energy that is produced, making it imperative to deeply understand the community's needs for all the actors involved.

As for the operation phase, the objective of ECs is to continuously balance production and consumption in order to maximise the self-consumption of self-produced energy. In this perspective, an essential part of the balancing activity is represented by the implementation of Demand Side Management strategies (DSM) which, inevitably, implies an awareness increase of end-users regarding their energy consumption.

Overall, as economic incentives are generally based on local self-consumption, the criteria that guided the design and establishment of business plans for these initiatives inevitably changed. However, despite a complexity increase in the above-mentioned phases, the necessity of these new business plans lead all the technical evaluations (e.g. pre-feasibility and feasibility studies) to guarantee a deepened and continuous exchange of information with the territory: this holds both during the design phase, due to the need to deeply understand the behaviours of potential community members in order to implement the facilities with an appropriate scale, and during the operation phase, aimed at continuously prompting citizens towards energy efficient behaviours.

Both these types of information exchange with the community could imply a stronger engagement of potential members which, becoming more aware of their own energy consumption behaviours and of the opportunities provided by ECs to optimise them, could certainly increase their interest towards this kind of projects. In other words, citizens' engagement could be boosted not only by the possibility of obtaining a better economic result compared to other initiatives, but also by a simpler reason: the opportunity of better understanding their own energy consumption behaviours as a way to improve the quality of the project which, as said, is inevitably a fundamental part of an Energy Community set-up process.

3.2.4. Social motivations

Given the social nature of ECs, it becomes clear that similar projects strongly rely on a crucial element: the network of relationships within the community. The only way to make people share a set of values is to create an inclusive environment, thus pushing towards the convergence of ideas and aspirations, in order to strengthen the personal connections among each other. In order words, the presence of strong relationships represents the clearest social motivation (social driver) for the creation of a sense of community and, therefore, for a successful engagement inside of an Energy Community project.

In this perspective, [11] presented a survey to a sample of Italians to examine how social capital can contribute to the development of ECs by asking them to provide a vote from 0 to 10 to a list of items. According to their findings, shared energy consumption is influenced by the social environment: family and social networks, indeed, have a significant impact on people's propensity to engage in an energy community. With this regard, the figure below compares the statistical distribution of some main social variables of interest in violin plots. The first two violin plots show that individual factors, such as "WEC" (individual Willingness to join ECs) and "EC" (individual Environmental Concerns) still have a greater impact on potential member choices, obtaining respectively an average vote of 6.359 and 8.104 on a 0–10-point scale. However, regarding the network of relationships rather than individual factors, participants revealed that:

1) "*The average value of friend interactions (FI) was higher than that of both relatives (RI) and neighbours (NI)*", as shown in the figure below.
2) *"Social trust (ST) was higher than trust in institutions (IT)"*, as shown in the figure below.

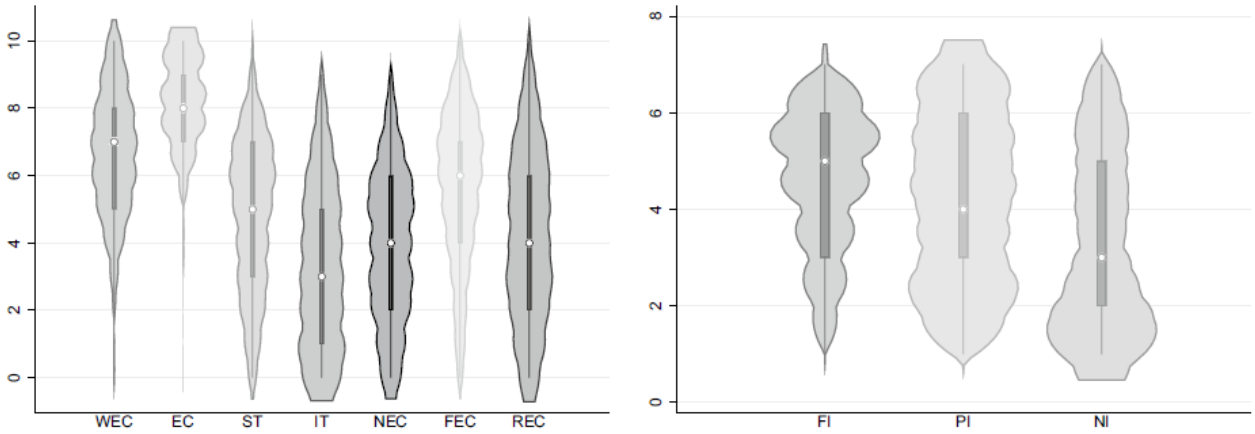


Figure 2 statistical distribution of some main social variables

This implies that the effectiveness of social connections among friends, neighbours and relatives influences the social coordination that is necessary for the development of ECs. Therefore, the development of an adequate social capital could foster a stable, long-term collaboration within such collective initiatives.

Once a good network of relationships is established, some goals and values can be commonly shared and, consequently, further social drivers can spontaneously arise around the concept of an Energy Community. Benefits can occasionally be as simple as cost reductions or the provision of renewable energy but, in the most successful circumstances, created opportunity for reinvestment in other areas of the community. The uniqueness of ECs, in fact, is the aim to merge the social mechanisms that take place inside a community with projects on energy generation installations. This characteristic translates into the opportunity of becoming part of a group of people that share a set of values, such as: the importance of promoting community based projects, the need of preserving a vital local economy, the urgency of supporting fellow citizens in energy poverty conditions, etcetera. With this regard, [12] analysed 16 projects in operation from 9 European countries to understand how a set of shared values can lead to the reinvestment of benefits into the community itself. Among the possible actions, they found:

- Educational programs (e.g. activities dedicated to students, including visits to EC facilities)
- Environmental actions (e.g. planting of vegetation)
- Training and dissemination concerning energy-related topics
- Renovation of public spaces/ construction of new facilities
- Social contribution (e.g. support to housing infrastructures, promoting social housing, etc)
- Local job creation (e.g. business incubators, internships, etc)

In conclusion social motivations are crucial to create solid links among potential community members. Somehow, this aspect might be the primary origin of all the future values and targets of the Energy Community and, therefore, dedicating an adequate focus to the confrontation, the inclusion and the cohesion within the group (or the trust between the group and, eventually, the external facilitator) to create a strong sense of community might have a major impact on the success of such collective initiatives.

4. BARRIERS FOR EC PARTICIPATION

This section discusses different categories of EC participation barriers such as financial, technical, social and behavioural, including barriers involving socially vulnerable groups in the ECs. We have divided barriers into those 4 categories in all MASTERPIECE efforts (such as T2.1 and T2.2) in analyzing barriers. However, two categories social and behavioural have been combined for this report. These barriers often lead to the limited participation of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

Table 1 Overview of ECs Participation Barriers

ECs Participation Barriers			
Financial Barriers	**Technical Barriers**	**Social and Behavioural Barriers**	**Socially Vulnerable Group Barriers**
High initial costs for establishing ECs.	Lack of technical capacity and expertise & Administrative Complexities.	Lack of Awareness & Lack of Access to Trusted Information and Knowledge.	Lack of accessibility for energy poor and vulnerable households.
Inadequate Public funding and Support schemes for ECs.	Old or inefficient energy infrastructures.	Lack of staff resources and expertise (skills & training).	Financial entry barrier.
Challenges in Securing Investments from private investors like banks.	Slow diffusion of new technologies.	People fear electronic poisoning or data leakage.	Lack of know-how of energy community sector in engaging with energy poor and vulnerable households.
Limited Understanding of Non-Traditional Financing.	Low availability and sharing of energy data.	Lack of Trust from Citizens & Energy-Poor Households.	Lack of alignment between policies to promote ECs and social policy.
Uncertainty in Revenue Consistency and Predictability.	Data security and protection issues.	Too busy/ limited time to invest in the participation.	
Difficulties in Obtaining Consistent Funding and Credit.	Technological and digital divide issues.	Difficult coordination in bottom-up initiatives.	
Savings reductions due to ESCo Involvement	Limited accessibility to flexibility markets.	Autonomy Compromise in ESCo-Managed EC.	
	Impact on Low Voltage (LV) Grid.	Cultural and social background.	
	Regulations and restrictions.	Renewables and innovative technologies acceptability.	
		Instability perceived by investors.	

These barriers have already been discussed in D2.1 and D2.5 in great detail. So, in this report we will discuss them briefly. Instead, this report will primarily focus on collecting information about measures, including financing and funding instruments, technical assistance programs, and various other incentive and support mechanisms, covering both economic and non-economic aspects,

designed to reduce the EC participation barriers and enhance proactive participation of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects (measures are discussed in next section).

4.1. Financial Barriers

The lack of economic resources for ECs can be split into two main branches: financial barriers, meaning the difficulties to deal with the initial investments, and revenue barriers, related to the complexity of guaranteeing the necessary economic inflows over time. The impact of these two types of hardships, however, strongly depends on the structure and the business model adopted by each community. Therefore, the above-mentioned issues are analysed according to the categorisation carried out by [6] on the EC models: the public lead model, the pluralist model and the builder model. A brief description of each category is provided in the figure below.

	CLUSTER 1 Public Lead Model	CLUSTER 2 Pluralist Model	CLUSTER 3 Community Energy Builder Model
Type of communities and stakeholders	Local public–private proposers; strong role of the public actor	Application of horizontal community models	Virtual intermediation between local projects and individual consumers
Generatedbenefits	Public–private partnership to create collective and local benefits	Citizen members and prosumers; coalitions of local actors	Alternative energy consumption models and action on consumer savings
Recruitment and participation processes	Predominantly top-down process and modus operandi	Predominantly bottom-up process and modus operandi	Heterogeneity of approaches between top-down and bottom-up

Figure 3 Categorization of EC models

4.1.1. High initial costs for establishing ECs (ECs)

As shown in the figure above, the "Pluralist Model" presents a majority of bottom-up initiatives which, inevitably, have to face some financial barriers. In order to create an Energy Community through a bottom-up process, the part of private citizens that are willing to become prosumers (or investors) would be required to self-finance the installation of expensive technologies which, depending on the size, might not be affordable for everyone. For instance, one could consider an investment on photovoltaic plants in an Energy Community mostly composed of households: rooftop panels have a higher chance of being financed by the owners of the houses themselves because of their limited size, meaning that there is a higher probability to overcome financial barriers. However, the situation dramatically changes in case such EC locates in a densely populated area: it could be necessary to install medium-sized PV plants in open fields outside the residential area to feed the whole community. In this case, citizens would probably be less capable of implementing the so-called crowd-investment, thus making it harder for the initiative to achieve its goals autonomously. A potential way to solve this issue while keeping the same level of empowerment of citizens might be to adopt other types of bottom-up financing mechanisms such as crowdfunding and crowdlending. However, as stated in Masterpiece deliverable D2.1, such tools are usually "not very well developed and known and often require a lot of administrative effort to manage the number of investors". Therefore, despite being useful elements, they are not expected to cover alone all the initial investment. This is confirmed by the Electricity Market Report 2021[2] of the Energy & Strategy Group (Politecnico di Milano) which supposes the infeasibility to cope with

[2] Electricity Market Report - Energy & Strategy Group (Politecnico di Milano)

the whole investment through bottom-up financing mechanisms only and, in fact, it suggests the possibility to replace them partly with bank loans. Even though there are many other private and public financing instruments available but the type of financing instruments that EC selects strongly affects the level of "autonomy" and "control". An EC can decide to reduce its autonomy and direct control over energy assets to overcome financial barriers and increase its capacity to attract citizens and provide fewer risks to them. However, this affects the EC governance, thus its BM.

Similar problems arise for the "Public Lead Model", described both in [6] and in the Electricity Market Report 2021. The main role of the public administration, in this model, is to act as a member, promoter, aggregator and, if possible, investor. Being in direct contact with the territory, municipalities can have a significant role especially in membership recruitment, selection of user groups best suited for physical energy self-consumption and sharing, and selection of users and buildings that adhere to the restrictions imposed by law. However, coherently with the previous point, municipalities often struggle at finding adequate economic resources to install the desired technologies. This holds especially in the case of small or rural towns which, among all the possible public actors, are probably the most convinced ones in the capability of ECs to revamp their territory. As a consequence, municipalities often need to rely on external economic resources to cope with the initial investment on these energy assets. There are three main actions currently available to face this issue:

- Engaging private investors or banks.
- Engaging Energy Saving Companies (ESCo)
- Obtaining access to public finance (e.g. from regions).

However, one can identify a set of issues for each of these potential solutions. Below, the main drawbacks are presented for each item.

4.1.2. Challenges in Securing Investments from private investors like banks

As stated in deliverable D2.1, ECs face challenges in obtaining funding from banks due to their small-scale, high-risk projects and not-for-profit nature. Banks often view ECs as not profitable and struggle to provide tailored loans. Smaller communities face greater funding access issues, possibly due to a market structure favouring large-scale power and centralised generation. Alternative finance and ethical banking reduce barriers to financing, but are mainly targeted at small-scale projects. Low use is due to lack of knowledge and awareness, regulatory barriers, and low spread. Legal and governance structures also impact access to specific types of finance, affecting risk-taking and profit taxation.

4.1.3. Inadequate Public funding and Support schemes for ECs

As stated in deliverable D2.1, access to public resources, whether in the form of grants, innovation funds, or targeted funding through regions and municipalities, is also hindered. The first reason is the incapability of municipalities to cope with the complexity of this matter: given that the applications for these funds are frequently highly complicated and need considerable administrative capacity, paired with a lack of human capital, the final result is that the less developed towns frequently find it difficult to access them. Besides, as reported by [13], institutions are not able to

facilitate the work for them: public fundings are frequently limited by the incomplete transposition of the REDII and IEMD European directives at a national level, making the national legislation around definitions and the enabling framework being viewed as excessively difficult to understand and, therefore, discouraging municipalities from trying to obtain such public contribution. Furthermore, national public financing mechanisms are still lacking in many European countries: as reported by [14] the Recovery and Resilience Plans of Italy, Poland, Portugal, and Spain, which aim to combat the economic effects of the COVID-19 epidemic, include financial support for ECs with specific guidelines and funding streams, but their implementation is still lagging behind. For instance, the Italian plan [3] already foresees a state contribution of up to 40% over the initial investment in EC projects for small municipalities (less than 5.000 inhabitants). However, despite allocating 2,2 billions euros for such a subsidy, these resources have still not been made available through a public tender due to bureaucratic lengths in the setup of dedicated laws. In general, as the study of Krug et al. highlights, "*measures ensuring that ECs are considered in spatial and urban planning lack in all countries*".

4.1.4. Savings reductions due to ESCo Involvement

ECs have the opportunity to reduce the complexity of starting the initiative by relying on an Energy Saving Company (ESCo) to take charge of all technological, financial, engagement, and participation aspects. However, this simplification comes at a not insignificant cost (or lost revenue), which then may disincentivize potential members from taking part in the project. The Italian research entity RSE (Ricerca Sistema Elettrico), for example, provided [3] some numerical simulations to understand the benefits of three different EC business models in Italy. According to the Italian subsidies the results showed that, when the EC is supported by an ESCo, the members could benefit from a savings of roughly 31% on the energy portion of the bill alone and a 15% reduction in the variable components of the bill. Knowing that those numbers would be higher with a self-financing mechanism, the members could be dissatisfied about the participation of an ESCo despite its capability to reduce the complexity of the project.

4.1.5. Uncertainty in Revenue Consistency and Predictability

As stated in deliverable D2.1, lack of policies addressing subsidies and incentives for Electricity Companies (ECs) negatively impacts their economic feasibility and revenue, leading to increased costs and risk-taking in investment projects, as well as negative side effects like rising electricity prices. An example of this lies in the possibility of community members to freely adhere to the project and to disjoin without penalties, as stated in the European directive IEMD[4]: "*Household customers should be allowed to participate voluntarily in community energy initiatives as well as to leave them, without losing access to the network operated by the community energy initiative or losing their rights as consumers*". The fact that potential members could leave at any moment represents an uncertainty for investors concerning long-term financial viability (the lower the number of participants, the lower the overall income). A further barrier relates to the managerial stability of the configuration. The latter plays a major role in terms of the trust that can be put by

[3] 19/2023 CER and Collective Self-Consumption: some numerical simulations in the light of the new regulation – DossieRSE

[4] Clean energy for all Europeans package (europa.eu)

the investor figure, whether social communities, private individuals, or third parties. Investors require maximum management stability: the very nature of an investment in renewable facilities sees its fruits over the long term and assumes that cash inflows are guaranteed throughout. But the latter, in the case of ECs, are proportional to the amount of energy self-produced and self-consumed (in addition to the gains from the sale of excess energy on the electricity market) and, consequently, are closely linked to the number of consumers, the number of prosumers and their balancing. In conclusion, it can be said that maintaining an adequate number of participants over time (i.e., ensuring stability of Energy Community management) is crucial to ensure economic revenues on an ongoing basis and, consequently, to persuade investors to contribute financially to the installation of power production plants in order to maximise the positive impact for the territory. Such a delicate balance to be preserved over time is an obstacle for an easy and rapid diffusion of ECs in Europe.

4.2. Technical Barriers

4.2.1. Lack of technical capacity and expertise & Administrative Complexities

In many cases, public administrations take the lead in facilitating the process of EC creation, but even they can face difficulties. In fact, public administrations often do not want to play the role of managers because they are often understaffed and under-skilled for technical design and management activities, which are described in the Electricity Market Report 2021 [5]. Design activities refer to the sizing of production facilities, decision of extra assets to be included (storage, measuring devices, electric charging stations, etc.), engagement of technology suppliers, installation of technology assets. Technical management, instead, takes care of the maintenance of technological assets as well as any potential new design phases to modify the aggregate in response to alterations (such as a rise or fall in the number of members).

4.2.2. Limited accessibility to flexibility markets

The process to provide access to the flexibility market, which could contribute to the economic gains of an Energy Community, could be expensive. The main reason is that, in order to participate, the community should fulfil some technical requirements in terms of flexible generation, consumption and storage sizes. Electrochemical storage, in particular, is the most diffused technology for energy storage and represents the highest obstacle in terms of capital expenditures. Therefore, the participation in flexibility markets such as balancing and ancillary services "*are currently still complex to access for small players, who may face high relative costs*"[6].

4.2.3. Regulations and restrictions

National laws intentionally limit the number of participants of ECs based on two main criteria: technical and proximity constraints. The first category refers to the fact that not all typologies of

[5] Electricity Market Report - Energy & Strategy Group (Politecnico di Milano)

[6] CEER Publishes Report on Self-Consumption and Energy Communities

power plants can be included in the initiative: for example, traditional power plants such as gas or coal fired plants are naturally excluded from Renewable ECs (ECs) for environmental reasons, but also utility-scale renewable energy plants are excluded since they would not be tailored on local communities needs. However, restrictions might also act as excessively limiting factors for ECs engagement. In Italy, for instance, old legacy renewable energy plants are already subsidised and, therefore, cannot take part in a REC: despite guaranteeing a fair distribution of economic incentives, this measure could exclude too many potential motivated members from the project. The same reasoning applies for the second selection criterion: the proximity constraint. Energy Community participants must be limited to a specific geographic area, but it might not be easy to understand which members fulfil this requirement. Furthermore, a stringent proximity limit might lead to an excessive fragmentation of these initiatives, thus lowering the engagement and causing management inefficiencies.

4.2.4. Impact on Low Voltage (LV) Grid

The creation of an Energy Community is based on the installation of power generation systems on the medium or low-voltage grid (MV or LV grid), to which are connected most households and small-medium enterprises (SMEs) that compose the configuration. Most commonly, such power generation technologies consist of photovoltaic panels and, in fact, ECs are expected to spread the use of PV systems as distributed generation systems. However, their uncontrolled diffusion might generate serious problems for the grid. The figure below, provided by the study of [15], reveals that the growing amount of photovoltaic (PV) electricity output has the potential to modify demand profiles, which could result in reversed power flows, voltage violations and thermal limits violations in LV networks. [16] specifically analysed the potential impact of ECs on the grid: among the scenarios they have modelled, even the ones that include storage units might create the same problems. As they highlighted, in fact, the continuous maximisation of the self-consumption strategy might not always be in line with the need of the DSO to avoid congestion on the grid. Furthermore, as reported in deliverable D2.1, the local LV grid might be featured by old and inefficient infrastructures, thus further narrowing the hosting capacity of renewable energy facilities and, therefore, the possibility of the community to push on engagement activities.

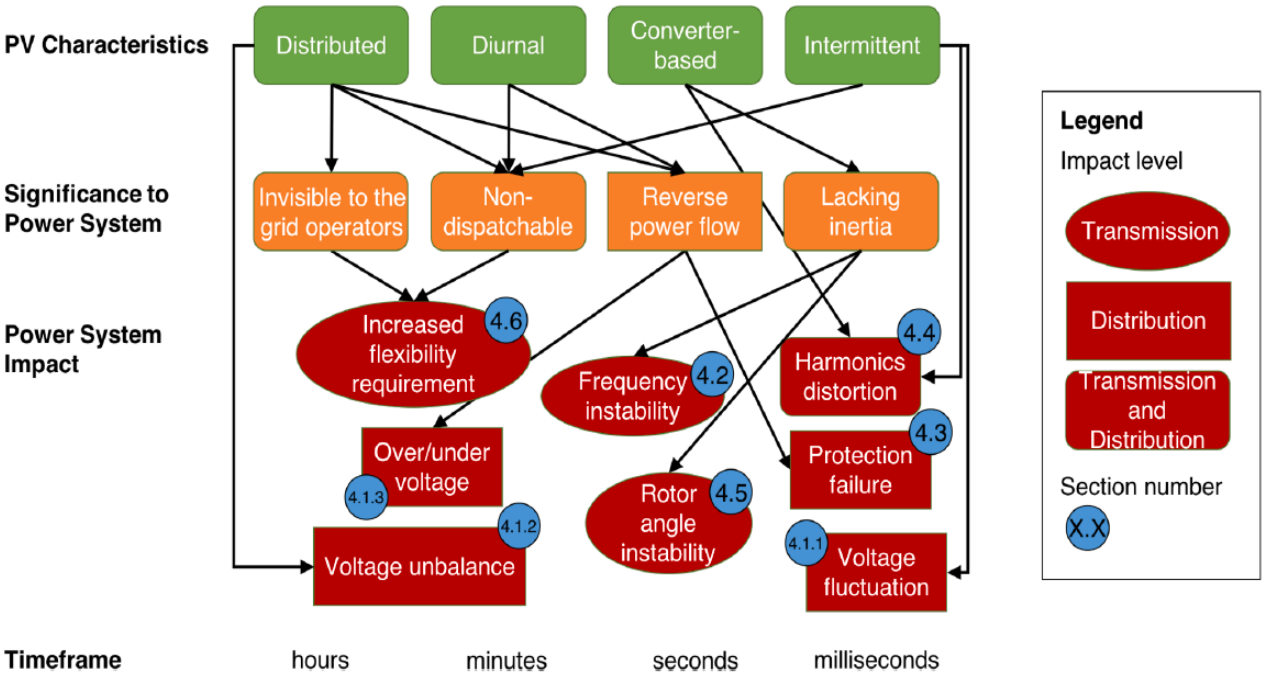


Figure 4 Overview of Power System issues caused by PV Integration

4.2.5. Slow diffusion of new technologies

The roll-out of smart meters is clearly heterogeneous across Europe, as reported in the figure below. The slowness of their diffusion is due to two main factors, as reported by [17]. The first is the lack of interoperability and a unified standard for these technologies, thus preventing smart meters producers from leveraging economies of scale and innovation in client services: with the current situation international companies cannot offer, for example, energy management services to multiple European consumers regardless of their location. According to [18], in fact, smart meters should become able to monitor and connect to smart home equipment, enabling data, energy provision contracts, and price alternatives over any border in the European Union. The second is the application of local manufacturing norms[7] that may necessitate considerable product adjustments: this circumstance makes it more difficult for multinational smart meters suppliers to penetrate specific foreign markets.

[7] Global Market for Smart Electricity Meters: Government Policies Driving Strong Growth". Working Paper. 2014

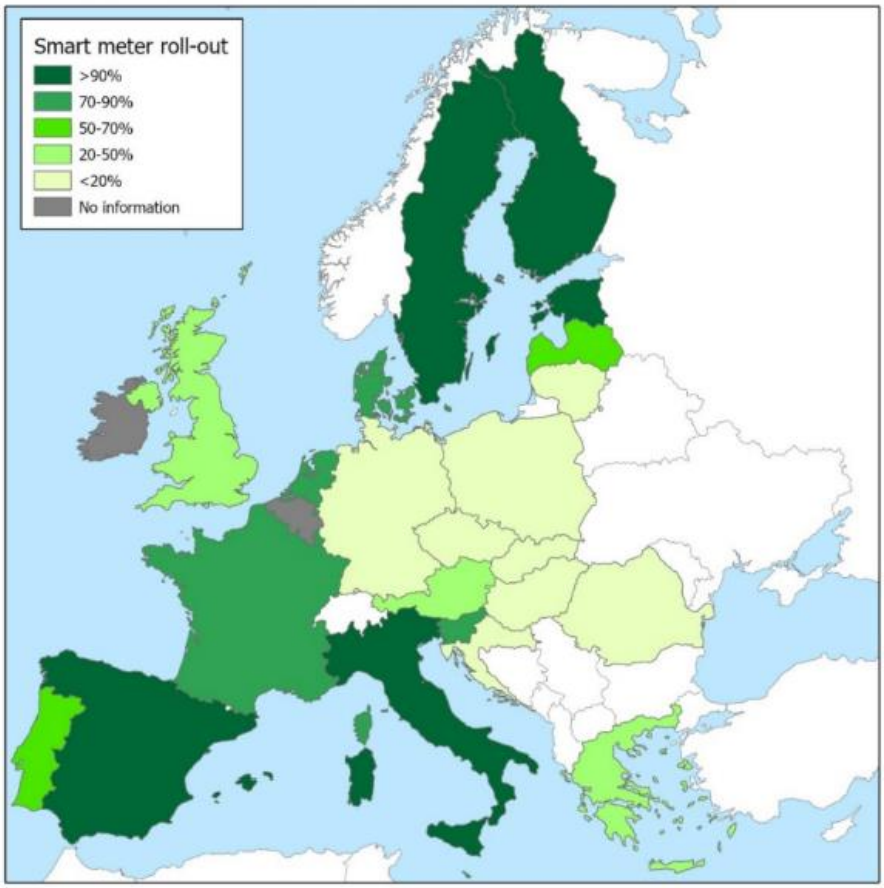


Figure 5 Progress of national smart meter rollouts

4.3. Social and behavioural

4.3.1. Lack of Trust from Citizens & Energy-Poor Households.

Lack of trust can be a significant barrier to the implementation of renewable energy projects. It can lead to delays in project approval, public opposition, and legal challenges. The main reason for the lack of trust is the perception that renewable energy projects may have negative impacts on the environment, health, and property values, together with the lack of transparency and participation in decision-making processes especially in presence of external facilitators such as energy companies. Lack of trust may be shown toward a variety of parties, including members, stakeholders, investors, or the project's structure. The engagement of local authorities can also increase the trust of citizens but, in some cases, it could also act as a barrier in case of strong political divergence.

As said, ECs might help to reduce the burden of energy bills for all those families and individuals that are facing energy poverty conditions. The possibility to have a positive social impact on a local scale, in fact, can be a significant shared value for the community and, therefore, a pivotal driver for the

engagement of the project. However, creating solid relationships between public administration, citizens and energy-poor households might not be a straightforward task.

EU Energy Poverty Observatory (EPOV) acknowledges energy poverty as a multidimensional phenomenon and developed a set of four primary indicators to assess it: arrears on utility bills, low absolute energy expenditure, high share of energy expenditure in income, inability to keep home adequately warm (EDEPI, 2022).

The figure below, provided by the study [19], summarises some of the main problems in this topic. Energy-poor households have a tendency to mistrust various aspects of society, including its institutions like the political system, the welfare state, and private businesses, and their mistrust when dealing with strong institutions is increased by their lived experience of (energy) poverty.

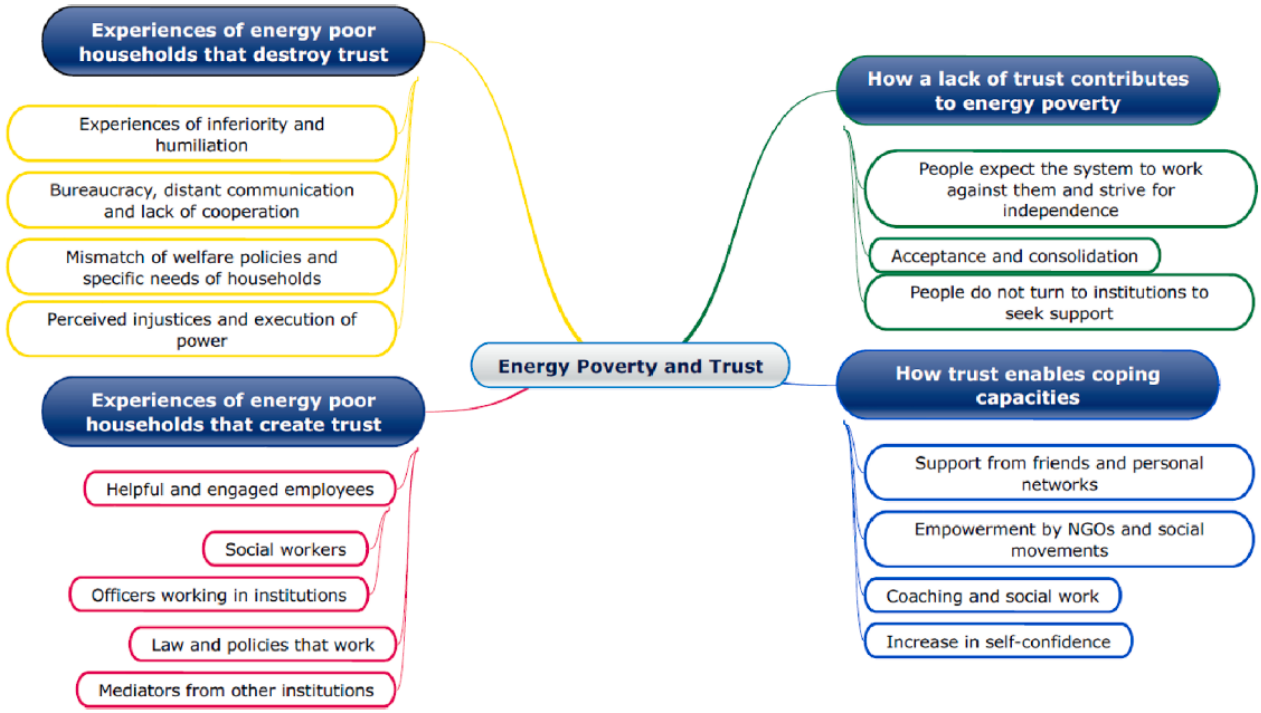


Figure 6 Energy Poverty and Trust Issues

4.3.2. Difficult coordination in bottom-up initiatives

That of the self-funded Energy Community turns out to be the most advantageous business model for participants, especially from the point of view of participation, engagement, knowledge and value creation for the territory. However, at the same time, it represents a difficult challenge to overcome in several respects. In addition to the difficulty of finding people with expertise in various technical and legal matters, there is also an organisational problem: it is not easy to get hundreds or thousands of people to agree on setting up a new legal entity that guarantees everyone's rights, just as it is not easy to get them to agree on how to make a shared investment that meets everyone's economic needs and expectations.

4.3.3. Autonomy Compromise in ESCo-Managed EC

Energy Community members have the opportunity to reduce the complexity of starting the initiative by relying on an Energy Saving Company (ESCo) to take charge of all technological, financial, engagement, and participation aspects. However, in this business model there is a risk that participants in the initiative could excessively delegate their responsibilities, leading to a loss of autonomy and control over EC assets. Consequently, the members could leave their maturity on energy issues in a backward state and thus making the goal of increasing end-user awareness in the decarbonization pathway (as mentioned in the European directives) unattainable. In other words, an external facilitator might reduce the complexity of the EC setup but, on the other hand, it might hinder participation and engagement of the participants and, therefore, their sensitivity towards energy and environment-related topics. In general, an excessive delegation might imply a

4.3.4. Instability perceived by investors

As said in the previous chapter, potential EC members have the right to join and disjoin the initiatives without penalties. Therefore, an external facilitator could play a pivotal role in the management of a similar dynamic configuration in order to guarantee adequate levels of self-production and self-consumption. Such a barrier related to management instability, however, also affects the community members themselves: citizens or public administrations may be dubious about the third parties in charge of creating and managing the community by perceiving them as insufficiently established, and may therefore be frightened or discouraged by the risk of these parties leaving during the course of the project and, consequently, by the risk of losing access to the incentive against the expenditures made. Such mistrust can be a barrier to onboarding and engaging an adequate number of investors.

4.3.5. Renewables and innovative technologies acceptability

There are several reasons why citizens might be reluctant to install renewable energy plants for an Energy Community. One of the main reasons is the lack of awareness about the benefits of renewable energy and the negative impact of fossil fuels on the environment. Another reason is the perceived high cost of renewable energy installations, which can be a barrier for many people. Moreover, some people might be concerned about the reliability and stability of renewable energy sources, as they are dependent on weather conditions and can be intermittent. Additionally, some people might be worried about the visual impact of renewable energy installations, such as wind turbines or solar panels, on the landscape. Finally, there might be political and social barriers to renewable energy installations. For example, some people might not trust the government or private companies to manage renewable energy projects effectively. Others might be concerned about the impact of renewable energy installations on local communities and wildlife. Furthermore, they might be scared of data privacy and transparency in case advanced measuring systems are installed.

5. MEASURES TO BOOST EC PARTICIPATION

This section describes different categories of measures, including financing and funding instruments, technical assistance programs, and various other incentive and support mechanisms, covering both economic and non-economic aspects, designed to reduce the EC participation barriers and enhance proactive participation of citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

Table 2 Overview of Measures for overcoming ECs Participation Barriers

Measures for overcoming ECs Participation Barriers			
Financial Measures	**Technical Measures**	**Social and behavioural Measures**	**Socially Vulnerable Group Measures**
Dedicated public financing and funding mechanisms to support EC projects.	EU funded Technical Assistance.	Raising awareness around ECs	Reinvestments for Impact: Fostering Inclusion, and Alleviating Poverty
Leverage private financing through traditional sources (i.e. banks and other financial institutions).	Training and Capacity Building.	Tools to promote trust	Micro-Donations model by Énergie Solidaire Fund
Ethical or cooperative banks.	Integration of new technologies and data availability.	Leverage Social Motivations	Zero interest loans to vulnerable households to finance their participation
Alternative Financing Schemes such as Crowdfunding and Energy Performance Contracting (EPC).	Involvement of ESCo for EC operation management.	Meaningful Citizen Participation and Control in EC	Pre-financing of shares by the Municipality
Involvement of ESCo to bring third party capital.	Data security and protection mechanisms.	Involvement of local authorities (as a trusted local leader)	Special share prices for vulnerable groups
Self-funding (when possible).	Involvement of network operators.		Energy Poverty Advisory Hub (EPAH) ATLAS
Collective investments in assets.			LIFE & Horizon 2020 projects on energy poverty
Blended Finance schemes.			
Policy based incentives to support solar PV and ECs such as Feed-in-tariffs and Feed-in Premiums.			
Revolving funds.			
Potential New Revenue Streams.			

5.1. Financing and funding opportunities for ECs

When it comes to financing ECs initiatives and activities across the EU, a predominant portion of ECs still finance their initiatives [13] from the individual investments of their members [20]. Although

there are many privately financed RES projects, ECs are still struggling to access finance to start or scale up their projects.

MASTERPIECE Deliverable 2.1 performed preliminary analysis about different financing mechanisms that could be leveraged to raise capital and finance EC initiatives. This section extends the work done in Deliverable 2.1 to examine potential financing and funding mechanisms for ECs in more detail including the barriers and opportunities inherent in these available financing mechanisms.

5.1.1. Private financing mechanisms

Commonly, there are two main options that ECs can leverage to raise the capital needed to finance their projects [13]. The first option is to target individuals or traditional financial institutions for direct investment in return for a proportional number of shares in the EC business. The other option is to acquire debt by borrowing capital. The first option – related to equity finance - can affect the autonomy of ECs, while acquiring debt finance can put their assets at risk, shall they fail to repay the debt [20].

Table 3 only lists the private financing mechanisms, such as equity or debt financing or crowdfunding. More details about these private financing mechanisms are provided in the ***Appendix 1 – Overview of Private Financing Instruments*** including the barriers and opportunities inherent in the available private financing. Additionally, as much as possible, the overview of private finance presented in Appendix 1 provide considerations for ECs that are relevant under certain conditions.

Table 3 list of private finance instruments for ECs

Private finance instrument
Share offer and Self-financing (Equity capital)
Closed-end private equity mutual funds with silent partners
Bank loans from commercial banks
Ethical loans
Green loans
Sustainability linked loans
Social loans
Soft loans
Green bonds
Peer-to-peer investment platforms
Crowdfunding
Energy Performance Contracting

Contrary to funding raised in traditional capital markets, the source of financing for ECs is typically not determined by the volume of the financial capital they need, but rather by their ownership structure and governance model, whether finance will be used to finance a project or an entire organisation, and the policy and public finance support available in the country where the EC is based.

5.1.1.1. Barriers of private financing mechanisms

Even though there are numerous private finance instruments available in the market, ECs still seem to find it difficult to secure financing from private financiers, particularly those ECs in need for early-stage support. This raises the question of what obstacles hinder the implementation of privately

funded REC projects. Identifying why private finance has not been sufficiently mobilised to accommodate the financing needs of ECs is crucial to inform the design and implementation of policies that support the proliferation of ECs [13].

Looking at the diversity of private finance available to ECs, it becomes clear that not all of them might be suitable or desirable for its members (*Table 3*). Of course, the risks and potentials of private finance for ECs vary according to different aspects, including the type of instrument, ownership structure of ECs, and the legislative context in which they operate. However, incomplete information about their risks and potentials is one of the key reasons for risk aversion of financing ECs. Nevertheless, all equity instruments potentially have a strong impact on governance. This impact can certainly be negative when profit-driven interests like private equity funds are brought in. Letting the private equity fund be a silent partner would mitigate this (as shown in the case of OekoGeno in Germany[8]) but compromise the availability of this type of financing as by far the most private equity funds would not step in then.

All types of bank loans (also the ethical and soft loans) have potential governance issues, as banks include covenants in loan contracts that can force the EC to make financial decisions which are against the interests of its members.

Debt finance, in its different forms, still proves difficult to access for new ECs because the costs of bank transactions are often high compared to the service provided.

Furthermore, the scale of most RES projects by ECs can also be challenging to tap into banks' capital. These projects are often too small to be considered profitable. Likewise, commercial banks generally lack knowledge and understanding of the concept of ECs and are therefore less ready to offer tailor-made financial solutions.

Ethical banks, by contrast, have played an instrumental role in bundling small projects (such as ECs) in a single security (i.e., a green bond) which would otherwise not be financeable. This has reduced transaction costs, effectively underwriting investment risk and increasing investors' confidence (including lessening the perceived risk). However, the positive aspects of ethical banks are limited by insufficient policy initiatives to make a bigger impact.

Finally, while alternative finance instruments have been considered vital in providing explicit financial backing for projects such as ECs, their impact remains limited. The published sources consulted for this research agree that one of the major constraints of crowdfunding is that the model is not scalable and that there are issues around licensing and regulation. In this context, most crowdfunding schemes still lag in the implementation of due diligence and generally lack management and information disclosures to protect investors. According to some experts, crowdfunding also lacks the safeguards to avoid investment in projects that can exacerbate problems such as land speculation (like, for example, crowdfunded land purchases for PV or wind farms). Likewise, equity-based crowdfunding (i.e., when crowdfunders become shareholders of the project and have the right to share the projects) requires a substantial administrative effort to manage the numerous shareholders, which can be a burden for small projects or where the capacities of the EC are limited.

[8] Cooperative for a social and ecological future - OEKOGENO

5.1.2. Public funding and financing opportunities for ECs

EU funds provide an exceptional opportunity for European Member States to support the development of the community energy projects by implementing innovative financing programmes leveraging funds from the Cohesion Fund, the Recovery and Resilience Facility and the Modernisation Fund. It is important for Europe because investments supported by the public financing and funding programs in renewable energy and community energy projects contribute to the overarching goals of the European Green Deal and RePowerEU [3].

The strength of EU Public financing and funding programs lies in the fact that they have been strategically designed to support the complete project lifecycle that is crucial for the development of ECs initiatives. From initial research and development (Horizon Europe, Innovation Fund) through to demonstration and deployment (CEF, LIFE Programme), and scaling up with significant investments (EIB Loans, EFSI), the EU provides support across the entire lifecycle of energy projects.

Finally, technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively.

Similarly, table 4 only lists the public funding and financing instruments. More details about these public funding and financing are provided in *the **Appendix 2 – Overview of Public Funding and Financing Instruments*** including the barriers and opportunities inherent in the available public funding and financing. Additionally, as much as possible, the overview of public finance presented in Appendix 2 provide considerations for ECs that are relevant under certain conditions.

Table 4 List of public funding and financing instruments for ECs

Public funding and financing instrument
Recovery and Resilience Facility[9]
RePowerEU[10]
Modernisation Fund[11]
Structural Funds (mainly ERDF and ESF) funded by Cohesion policy funds[12]
Horizon Europe[13]
LIFE Programme[14]
Connecting Europe Facility (CEF)[15]
Innovation Fund[16]

[9] Recovery and Resilience Facility
[10] REPowerEU
[11] Modernisation Fund - European Commission
[12] Cohesion Policy Funds 2021-2027
[13] Horizon Europe
[14] LIFE - European Commission
[15] Connecting Europe Facility
[16] Innovation Fund

Public funding and financing instrument
ELENA (European Local Energy Assistance)[17]
Innovation Fund - Project Development Assistance[18]
European Energy Efficiency Fund – Technical Assistance Facility (eeef - TAF)[19]
European Investment Bank (EIB)[20]
European Investment Bank (EIB) Loans[21]
European Fund for Strategic Investments (EFSI)[22]

With tables below we aim to dig deeper into different available Public funding and financing instruments at the EU level, and include some examples of how these funds have made their way into supporting ECs in national, regional and local contexts thus far.

For instance, below for every identified public funding and financing instrument, we have meticulously gathered the following information: Initiative title, type of Support, description, initiator, targeted sectors, relevance to the ECs, applicable to EC Project phase and size, type of funding, available budget, support for, expected outcome, targeted Countries, who can apply, calls for proposal, application process, deadline, and website.

[17] ELENA – European Local ENergy Assistance
[18] Innovation Fund - Project Development Assistance
[19] European Energy Efficiency Fund – Technical Assistance Facility (eeef - TAF)
[20] European Investment Bank
[21] EIB Loans
[22] The European Fund for Strategic Investments

5.1.2.1. Recovery and Resilience Funds

Below mentioned funds finances programmes in shared responsibility between the European Commission and national and regional authorities in Member States.

Initiative	Recovery and Resilience Facility[23]
Type of Support	Financial.
Description	The Recovery and Resilience Facility (RRF) is a temporary instrument that is the centrepiece of NextGenerationEU - fund to support the economic recovery from the coronavirus pandemic and build a greener, more digital and more resilient future. Funds under the RRF are being provided to Member States in line with their national Recovery and Resilience plans (NRRP) – the roadmaps to reforms and investments aimed to make EU economies greener, digital and more resilient. **This instrument will be the main source of EU public funding for energy efficiency and renewable energy in the coming years.**
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	The Commission's Guidance on the NRRP explicitly calls for 37% of funds to be allocated to climate action (including renewable energy). This creates ample opportunities for public financing to support ECs.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants and loans.
Available Budget	Recovery and Resilience Facility - an instrument that offers grants and loans to support reforms and investments in the EU Member States for a total of **€723.8 billion in current prices.** ● Part of the funds – up to **€338 billion – are being provided to Member States in the form of grants.** ● Another part – up to **€385.8 billion – funds loans** to individual Member States. The loans will be repaid by the borrowing Member States. The grants will be repaid by the EU budget.
Support for	Eligible expenses range from technical and technical-scientific assistance to the purchase of all components essential to the realisation of the energy production, distribution and sharing facilities; included in the list are the purchase costs of storage systems and that for legal and administrative assistance for the definition of agreements.
Expected outcome	Co-financing of investments in energy efficiency and renewable energy and leverage private and public investments through tailored financial instruments and project development assistance.
Targeted Countries	Information on whether and how EU RRF are being used by MASTERPIECE targeted Countries to support ECs. **Italy:** The Italy Recovery and Resilience Fund earmarks 2,2 billion euros in support for ECs, setting a target of 2,500 Gwh of clean, community-led energy produced in Municipalities with less than 5000 inhabitants. **France:** There are no mentions of ECs in France's RRP. **Sweden:** There is no mention of ECs in the Plan.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	There will be regular calls for project proposals throughout the duration of the RRF Programme (between 2021 and 2027).
Application Process	All Member States can use the funds provided by the Recovery and Resilience Facility as described in their NRRP to implement ambitious reforms and investment to make their

[23] Recovery and Resilience Facility - European Commission (europa.eu)

	economies and societies more sustainable, resilient and prepared for the green and digital transitions.
Deadline	No request for proposals at the moment.
Website	The Recovery and Resilience Facility

To utilize the funds from Recovery and Resilience Facility, all Member States have already prepared and submitted their National Recovery and Resilience Plan consisting of reforms and investments (to be implemented by end of 2026) to make their economies and societies more sustainable, resilient and prepared for the green and digital transitions.

Italy is a great example of utilizing the Recovery and Resilience Facility to support renewable ECs and self-consumers in Italy. Find more information about that in the table below.

Initiative	**Italy's recovery and resilience plan (NRRP)**[24][25]
Type of Support	Financial.
Description	Funds under the RRF are being provided to Member States in line with their national Recovery and Resilience plans (NRRP) – the roadmaps to reforms and investments aimed to make EU economies greener, digital and more resilient.
Initiator	Italian Government.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	The nature of the RRF ambitions, and the additional support of the REPowerEU targets for the green transition, all provide promising direction which some countries like Italy have been making use of to take the development of ECs into strategic consideration.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants and loans.
Available Budget	Commission has approved €5.7 billion Italian State aid scheme made available in part through the Recovery and Resilience Facility ('RRF') to support the production and self-consumption of renewable electricity. **The scheme is composed of two aid measures:** • A premium tariff on the quantity of electricity consumed by self-consumers (final customers who generate renewable electricity for their own consumption) and renewable ECs (legal entities empowering citizens, small businesses and local authorities to produce, manage and consume their own electricity), paid over a 20-year period. This measure, with a total budget of €3.5 billion, will be financed through a levy on the electricity bill of all consumers. • An investment grant of up to 40% of eligible costs, for a total budget of €2.2 billion financed through the RRF. Eligible projects must become operational before 30 June 2026 to benefit from funding through the RRF and should be located in municipalities with less than 5.000 inhabitants.
Support for	Support expenses ranging from technical assistance to material purchases for development and construction.
Expected outcome	The scheme supports the construction of renewable power generation installations, as well as the expansion of existing ones.
Targeted Countries	Italy.

[24] Commission approves €5.7 billion Italian State aid scheme (europa.eu)

[25] Italy's recovery and resilience plan - European Commission (europa.eu)

Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	The call for proposals is currently being prepared by the Ministry of Ecological Transition (MASE).
Application Process	One significant obstacle that still hinders the implementation of this investment under the recovery and resilience plan is the pending ministerial decree. This decree is set to establish the premium tariff for 'shared energy' and define the legal framework for combining this incentive with potential non-refundable financing schemes, including those from the recovery and resilience plan and other regional programmes. GSE is preparing the rules for distributing the incentives. After the approval of the rules, the GSE will activate the corresponding portals, through which the interested parties will be able to effectively submit their applications. Beneficiaries are small projects, with capacity of up to 1 MW. Beneficiaries can access the scheme on a first come, first served basis.
Deadline	No request for proposals at the moment.
Website	Italian decree to stimulate ECs enters into force

Initiative	**REPowerEU funds**[26]
Type of Support	Financial.
Description	In the context of the Russian invasion of Ukraine, the European Union implemented the REPowerEu plan to cut off the importation of Russian fossil fuels. With this aim, the Commission asked Member States to insert RepowerEU chapters into their National Recovery and Resilience Plan (NRRP).
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	The European Commission guidance on REPowerEU chapters does not explicitly mention ECs, and for the most part focuses on large-scale measures to decrease consumption and increase generation and capacity of energy within the EU, through infrastructure investments for example. However, the examples provided for policy reforms show some consideration of the role of ECs in the REPowerEU objectives. This includes reforms to facilitate permit-granting procedures and removing administrative barriers, both key to the roll-out of ECs. There is also an explicit mention of risk insurance and mitigation schemes for investments in RES, as well as tax incentives for companies and consumers to shift towards low-carbon options, and deploy local renewable capacity.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants and loans.
Available Budget	The REPowerEU plan aimed to mobilise close to EUR 300 billion for Member States to update their recovery and resilience plans, providing additional support for energy efficiency and renewable energy measures. The deadline of 31 August 2023 for Member States to request loans from the European Commission under the RRF has passed, with most Member States having submitted their revised plans, which include additional reforms and investments.
Support for	The REPowerEU are supposed to fund projects enabling the diversification of gas supplies and to increase the pace of reducing dependence on fossil fuels, including more renewable energy in the energy mix. Member States are also expected to implement measures to fight energy poverty for vulnerable households.

[26] REPowerEU (europa.eu)

Expected outcome	Implement projects to cut off the importation of Russian fossil fuels.
Targeted Countries	**Italy:** The revision to Italy's recovery and resilience plan, which includes the addition of the new REPowerEU chapter, focuses more on positive initiatives aimed at addressing climate change and supporting the decarbonisation process. For example, more than half of the newly allocated funds (EUR 19.6 billion of the Repower EU) are allocated to measures which will contribute to reducing carbon dioxide emissions. **France:** France's REPowerEU recovery plan is weak in what concerns facilitating the action of ECs. **Sweden:** There are no investments or reforms to support ECs foreseen in the REPowerEU chapter of Sweden's modified Recovery and Resilience Plan. One reform, that could indirectly support community energy actors, regards speeding up the authorisation process for electricity grid construction, including through simplification of permitting procedures.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	NA
Application Process	Each Member State is expected to submit its modified NRRP including the REPowerEU chapter by the 30th of April. However, the Commission did not formulate this in binding terms. It is only the Member States « who wish to revise their RRP to receive additional funding » who should include a REPowerEU chapter in their request.
Deadline	The deadline of 31 August 2023 for Member States to request loans from the European Commission under the RRF has passed, with most Member States having submitted their revised plans, which include additional reforms and investments.
Website	REPowerEU

5.1.2.2. Regional Development and Cohesion Funds

Initiative	Cohesion policy funds[27]
Type of Support	Financial.
Description	Cohesion policy is the EU's strategy to promote and support the 'overall harmonious development' of its Member States by reducing disparities in the level of development between regions. **The cohesion policy 2021-2027 is delivered through specific funds:** ● The European Regional Development Fund (ERDF), to invest in the social and economic development of all EU regions and cities. ● The Cohesion Fund (CF), to invest in environment and transport in the less prosperous EU countries, targeting Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. ● The European Social Fund Plus (ESF+), to support jobs and create a fair and socially inclusive society in EU countries. ● The Just Transition Fund (JTF) to support the regions most affected by the transition towards climate neutrality.
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	The Regulation[28] on the Regional Development and Cohesion Funds explicitly recognises Renewable ECs as an output indicator under Policy Priority Objective 2 (RCO97). DG REGIO has repeatedly emphasized that Policy Priority Objective 5 (Europe closer to citizens) is also a clear baseline for justification, relating to support for ECs. The Commission's Guidance on the utilization of these funds explicitly calls for 37% of funds to be allocated to climate action (including renewable energy). This creates ample opportunities for public financing to support ECs.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants and Loans.
Available Budget	In 2021-2027 EU funds allocated to Cohesion Policy amount to EUR 392 billion. With the national co-financing, about half a trillion euro will be available to finance the programmes in the EU regions and countries.
Support for	Projects supporting new EU cohesion policy (2021-2027) 5 policy objectives ● a more competitive and smarter Europe; ● a greener, low carbon transitioning towards a net zero carbon economy; ● a more connected Europe by enhancing mobility; ● a more social and inclusive Europe; ● Europe closer to citizens by fostering the sustainable and integrated development of all types of territories:
Expected outcome	Implementing projects aligned with above 5 new policy objectives.
Targeted Countries	Information on whether and how EU Regional Development and Cohesion Funds are being used by MASTERPIECE Targeted Countries to support ECs. **Italy:** The various different Regional Operational Programs explicitly mention ECs and allocate specific budgets to promote and support the setup of new ECs. **France:** There are no mentions of ECs in France's Structural Investment funds.

	Sweden: There is no mention of ECs in any of the plans, nor are there any supportive measures foreseen.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	The Member States' administrations choose which projects to finance and take responsibility of publishing calls for proposals and for day-to-day management.
Application Process	Submit your application for regional funding to the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate your project and decide whether to grant funding.
Deadline	Depends on relevant regional programme.
Website	New Cohesion Policy

Initiative	**Structural Funds (mainly ERDF and ESF)[29] - Italy**
Type of Support	Financial.
Description	Structural Funds (mainly ERDF and ESF) finance programmes in shared responsibility between the European Commission and national and regional authorities in Member States. ● European Regional Development Fund (ERDF) to invest in the social and economic development of all EU regions and cities. ● European Social Fund Plus (ESF+) to support jobs and create a fair and socially inclusive society in EU countries. Funds from the ERDF and ESF+ are allocated in three categories of regions (less developed, more developed, in transition) in the Europe.
Initiator	Italian Regional Administrations.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	In Italy, they are used through the definition and implementation of Regional Operational Plans (POR) within 7 years planning cycles. **Within the 2014-2020 planning cycle**, the majority of Regional Operational Plans (POR) included the increase of RE share and the implementation of energy efficiency measures, but Renewable ECs were not explicitly envisaged or mentioned due to the lack of a specific national legislative framework at the time of the plans definition. **Within the 2021-2027 planning cycle**, many Regional Operational Plans (POR) explicitly envisage the setup of Renewable ECs as a specific objective and allocate funds to promote them.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant, Financial instrument (equity, bonds, loans and/ or guarantees).
Available Budget	In 2021-2027 EU funds allocated to Cohesion Policy amount to EUR 392 billion. With the national co-financing, about half a trillion euro will be available to finance the programmes in the EU regions and countries. The ERDF finances programmes in shared responsibility between the European Commission and national and regional authorities in Member States.

[27] New Cohesion Policy

[28] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R1058&from=EN

[29] European Regional Development Fund

Support for	Although the strategy differs from Region to Region, holistic support is provided to ECs across different stages of project development. Specifically, funds are provided for capacity building, legal, technical and administrative support, as well as project development. **For instance some of the support schemes by Italian regions are discussed below:** **Lombardia[30]:** in July 2022 the region launched a call for interest to collect preliminary ECs projects which will be ranked and at a later time financed through a dedicated financing scheme which is not yet currently defined. **Emilia Romagna[31]:** in December 2022 the region launched a call for interest and allocated 2M€ to finance feasibility studies and ECs legal establishment expenses. Among the criteria to define the ranking lists are: quality and clarity of the specific objective and of the implementation strategy, REC management model (production, sharing, storage, economic management) number and typology of members, contribution to climate neutrality, cost-benefit ratio. **Lazio[32]:** in December 2022 the region launched a call for interest and allocated 1M€ to finance techno-economic feasibility studies for the setup of new ECs. Among the criteria to define the ranking list there are: ECs dimension (n. of members) and organisational model (members typologies: citizens, SMEs, local administrations), energy benefits (RE capacity and % of consumptions coverage), social benefits (n. of vulnerable and young consumers). **Campania[33]:** in December 2022 the region launched a call for interest reserved for small municipalities (<5.000 inhabitants) and allocated1 M€ to finance feasibility studies and ECs legal establishment expenses (max 8.000€ for each municipality). Access to funds is based on the chronological order of demands submission. **Sicilia[34]:** In June 2022 the region launched a call for interest and allocated 5M€ to finance feasibility studies and ECs' legal establishment expenses. Each regional municipality could access an amount proportionate to the local population. A specific requirement is that at least 10% of the ECs' members should be vulnerable consumers. **Sardegna[35]:** in April 2023 the region approved the allocation of funds (2M€ for 2023 and 2M€ for 2024) to finance techno-economic feasibility studies for ECs. Funds are earmarked for municipalities, which can receive up to 15.000€, giving priority to municipalities which are not connected to the methane gas grid and secondly to smaller ones.
Expected outcome	Implement projects to strengthen economic, social and territorial cohesion in the European Union.
Targeted Countries	Italy.

30 Support for the development of RECs — Lombardia
31 Support for the development of RECs — Emilia-romagna
32 Support for the development of RECs — Lazio
33 Support for the development of RECs — Campagnia
34 Support for the development of RECs — Sicily
35 Support for the development of RECs — Sardegna

Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	The Member States' administrations choose which projects to finance and take responsibility for publishing calls for proposals and for day-to-day management. There will be regular calls for project proposals by the authority managing the relevant regional programme throughout the duration of the Structural Funds (mainly ERDF and ESF) (between 2021 and 2027).
Application Process	Submit your application for regional funding to the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate your project and decide whether to grant funding. Even though they differ from Region to Region, the selection criteria to qualify for funding are overall satisfactory, prioritising various social components. For example, in some cases funds are allocated only to initiatives promoted by Local administrations (e.g. Lombardia Region), in other cases funds are allocated only to municipalities with less than 5.000 inhabitants (e.g. Campania Region). In other cases, only to initiatives that involve a minimum number of vulnerable consumers (e.g. Sicilia Region). Where a ranking list is envisaged, social and/or environmental criteria are applied to score the proposals.
Deadline	Depends on relevant regional programme.
Website	European Regional Development Fund

5.1.2.3. Modernization and Infrastructure Development Funds

Initiative	Modernisation fund[36]
Type of Support	Financial.
Description	The Modernisation Fund (MF) is a dedicated funding programme to support 10 lower-income EU Member States in their transition to climate neutrality by helping to modernise their energy systems and improve energy efficiency.
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other.
Relevance to EC	ECs can cover all the activities listed under the priority areas of the fund (e.g., renewable energy generation, energy efficiency, promotion of a just transition). Therefore, they could be supported through this fund. Actually, there are already a few countries in which MF funds have been awarded for programmes on ECs. In 2021, Hungary was awarded €20 million for programmes for the development of ECs, seemingly focused on RES.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants and Loans.
Available Budget	The MF is mainly funded from revenues from the auctioning of 2% of the total allowances for 2021- 30 under the EU Emissions Trading System (EU ETS), with a proposal to increase this to 2.5%. At the current carbon price this amounts to almost 67 billion euros, with shares being divided between the 10 countries unevenly according to the EU ETS directive.
Support for	Funding Projects activities that can accelerate investments in the modernisation of their energy systems and energy efficiency improvements.
Expected outcome	Supporting investments consistent with the climate-neutrality objectives of the European Union, as well as the Paris Agreement
Targeted Countries	The beneficiary Member States are Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia, with a proposal to add Greece and Portugal in the revised directive. Thus, not relevant for communities in MASTERPIECE Targeted Countries.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	There will be regular calls for project proposals throughout the duration of the MF (between 2021 and 2027).
Application Process	The fact that MF funds are disbursed in short cycles of 1 year. This means that each year there is a call to submit a proposal for the development of EC programs under the MF.
Deadline	Yearly
Website	Modernisation Fund

5.1.2.4. European Research and Innovation Funding Programmes

Initiative	Horizon Europe – the Framework Programme for Research and Innovation (2021/2027)[37]
Type of Support	Research, innovation, technology development and capacity building.

Description	Horizon Europe, the EU's research and innovation funding programme, succeeds Horizon 2020, which was active between 2014 – 2020.
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other
Relevance to EC	One of the key objectives of Horizon Europe "Cluster 5" focusing on climate, energy and mobility is the development and integration of renewable energy technologies, enhancing energy efficiency, and ensuring a secure and sustainable energy supply which is pretty aligned with community energy projects. As part of the **2023-2024 work programme**, Horizon Europe's Cluster 5 'Climate, Energy and Mobility' includes 6 REPowerEU flagships topics. The topics resulted in 13 projects that received €172 million in EU funding, and which will contribute to achieving the objectives of the REPowerEU plan.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant.
Available Budget	Horizon Europe work programme is the EU's key funding programme for research and innovation with a budget of €95.5 billion (between 2021 and 2027) including €5.4 billion from NGEU –Next Generation Europe –programmeof EU for Recovery from COVID-19 crisis).
Support for	With calls for proposals the Commission selects, on a competitive basis, organisations or natural persons to implement projects co- financed by EU because these projects contribute to EU policy aims.
Expected outcome	Stimulates more investment in research and innovation, notably by the private sector; leverages and complements national/regional initiatives.
Targeted Countries	France, Italy, Sweden, Turkey.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	There will be regular calls for project proposals throughout the duration of the Horizon Europe (between 2021 and 2027).
Application Process	Legal entities from the EU and associated countries can participate. Apply for Horizon Europe funding
Deadline	Following the adoption of the Horizon Europe 2023-2024 work programme, the European Commission has launched a new call for project proposals supporting efficient, sustainable and inclusive energy use call reference: HORIZON-CL5-2024-D4-01 (3 topics). The total indicative budget available is EUR 36 million. The deadline for submissions is 18 April 2024.
Website	Horizon Europe - European Commission

[36] Modernisation Fund

[37] Horizon Europe - European Commission

Initiative	LIFE Programme (LIFE CET)[38]
Type of Support	Financial.
Description	The LIFE Programme is the EU's funding instrument for the environment and climate action. Building on the success of the Intelligent Energy Europe (2003-2013) and Horizon 2020 Energy Efficiency (2014-2020) programmes, the LIFE Clean Energy Transition sub-programme continues to support the delivery of EU policies in the field of sustainable energy, in particular, the European Green Deal, the Energy Union (2030 energy and climate targets) and the European Union's 2050 long-term decarbonisation strategy.
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other
Relevance to EC	There is an increasing recognition of the need to develop specific tools to support ECs in their development. For example, the LIFE Programme had multiple calls for proposals open on developing support mechanisms for ECs. This includes the development of financial tools to facilitate the emergence of community energy projects and their access to citizen finance and bank loans.
EC Project phase and size	< 1.5 million €, 1.5-5 million €, 5-10 million €
Type of funding	Grant.
Available Budget	The LIFE Clean Energy Transition sub-programme has a budget of nearly EUR 1 billion over the period of 2021-2027 and aims at facilitating the transition towards an energy-efficient, renewable energy-based, climate-neutral and -resilient economy by funding coordination and support actions (Other Action Grants) across Europe.
Support for	SECAP implementation (soft measures, e.g. awareness raising, stakeholders' involvement), SECAP development, SECAP implementation (hard measures), Hiring of experts / preparation of bankable projects
Expected outcome	Funded projects implementing Environment and climate action.
Targeted Countries	EU-27.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	There will be regular calls for project proposals throughout the duration of the LIFE Programme (between 2021 and 2027).
Application Process	• Guidance on the application process, evaluation and grant signature, and working as an expert will be available on the Funding & tenders Portal. • Support for applicants (How to Apply for LIFE)
Deadline	The LIFE Calls for proposals 2024 (2024 LIFE Calls for proposals) are expected to be published on the Funding & tenders Portal on 18 April 2024.
Website	LIFE - European Commission.

[38] LIFE - European Commission

Initiative	Connecting Europe Facility (CEF)[39]
Type of Support	Financial.
Description	The objective of the Connecting Europe Facility (CEF) programme is to accelerate investments in Europe's transport, energy and digital infrastructure networks to support the European Green Deal and the EU's Digital transformation.
Initiator	European Union.
Targeted Sectors	Buildings, Transport, Energy, Other, Digital.
Relevance to EC	CEF 2021-2027 emphasises synergies between the transport, energy and digital sectors, with a significant budget allocated for energy projects, including those related to ECs.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant, Financial instrument (equity, bonds, loans and/ or guarantees).
Available Budget	In 2018, the CEF was renewed for 2021-2027 with a budget of €42.3 billion to support investments in EU infrastructure networks for **energy (€8.7 billion)**, transport (€30.6 billion) and digital (€3 billion). This represents a 47% increase compared to 2014-2020.
Support for	SECAP implementation (hard measures), Hiring of experts / preparation of bankable projects.
Expected outcome	Accelerate investments in Europe's transport, energy and digital infrastructure networks.
Targeted Countries	EU-27.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	There will be regular calls for project proposals throughout the duration of the CEF Programme (between 2021 and 2027).
Application Process	Every 2 years the European Commission draws up a list of EU projects of common interest (PCIs) which may apply for CEF funding. PCIs are eligible for funding from the Connecting Europe Facility for Energy, the main source of funding for energy interconnectors.
Deadline	No request for proposals at the moment.
Website	Connecting Europe Facility (CEF)

[39] Connecting Europe Facility (CEF)

Initiative	Innovation Fund[40]
Type of Support	Financial
Description	The Innovation Fund, financed by EU Emissions Trading System revenues, is one of the world's largest funding programmes for the demonstration of innovative low-carbon technologies. The Fund focuses on highly innovative clean technologies and big flagship projects with European added value that can bring significant emission and greenhouse gas reductions.
Initiator	European Union.
Targeted Sectors	Energy intensive industries, renewable energy, energy storage, carbon, capture, use and storage, and net-zero mobility and buildings.
Relevance to EC	Projects covering targeted sectors with ECs concept can target Innovation Fund calls for proposals.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grants.
Available Budget	With an estimated revenue of €40 billion from the EU Emissions Trading System between 2020 and 2030, the Innovation Fund aims to create financial incentives for companies and public authorities to invest in cutting-edge low-carbon technologies and support Europe's transition to climate neutrality. The Innovation Fund has already awarded about €6.5 billion to more than 100 innovative projects through its previous calls for proposals. The Innovation Fund applies grant financing through calls for proposals, ● large-scale (capital expenditure > €100 million); ● medium-scale (capital expenditure between €20 million and €100 million); ● small-scale projects (capital expenditure between €2.5 million and < €20 million).
Support for	The Innovation Fund can cover up to 60% of a project's relevant costs. Find more specific details about project activities funded under Innovation Fund by reading the already funded project descriptions .
Expected outcome	Promote the development of wide range of innovative technologies in areas such as energy- intensive industries, renewables, energy storage, net-zero mobility and buildings, hydrogen, and carbon capture, use and storage
Targeted Countries	Projects located in the EEA are eligible to apply (EU, Liechtenstein, Iceland, and Norway).
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	The Innovation Fund awards grants through calls for proposals and competitive bidding procedures (auctions).
Application Process	Projects will be assessed based on their potential to reduce greenhouse gas emissions, their degree of innovation, maturity, replicability and cost efficiency. Following the recent revision of the EU ETS Directive the Innovation Fund calls are now also open to the maritime, road transport and buildings sectors, in addition to technologies in energy-intensive industries (including aviation), renewable energy or energy storage. Promising projects that are not sufficiently mature for a grant or not selected for funding due to budget limitations may benefit from the European Investment Bank's Project Development Assistance (PDA).
Deadline	€4 billion call for proposals is open for funding projects developing net-zero technologies under the Innovation Fund.

[40] Innovation Fund

	New Innovation Fund Calls for proposals. Deadline: 9 April 2024.
Website	Innovation Fund

5.1.2.5. Barriers in the public financing of ECs

It is true that there has never been more legal or political basis to provide financing opportunities for ECs, nor more EU budget available to push for an energy transition that is sustainable and locally relevant. However, ECs need targeted financing tools which support their development whilst simultaneously preserving their democratic governance and ownership. Moreover, while the above EU funding comprises mostly grants and some loan-based mechanisms (e.g., JTM InvestEU loans), these often have high investment thresholds and can present considerable technical and administrative challenges to smaller-scale projects that characterise most ECs.

More specifically, in the case of regional development funds, accessing grants depends on the plans and strategies determined at national, regional and/or local level of public authority, which are not always transparent, well-known or adequately influenced by the relevant civil society. These are moreover hindered by incomplete adoptions of the provisions for CECs and ECs in the REDII and the IEMD, respectively, with current regulations around definitions and the enabling framework considered too complex and ambiguous.

Finally, funding schemes are, for the most part, not built for the needs of ECs. Many regional funding programmes require a budget or investment threshold which are too high for most ECs to qualify, and the complex processes for awarding grants holds back many of the groups with less technical and organisational capacity to participate. However, schemes that are tailored to the needs of ECs are now emerging, as is seen in the case of Ireland and the Netherlands, and are met with enthusiasm from the EC movement, but it is still too early to determine their impact.

5.2. EU funded technical assistance programs

Even though EU governments have increasingly set up dedicated public funding mechanisms to help ECs overcome hurdles they experience in financing the first stages of the project. Accessing these grants and support schemes still present considerable technical and administrative challenges to smaller-scale projects that characterise most ECs. Before ECs could apply for this type of grants they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) for developing an investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project. Usually, ECs don't have that kind of resources and technical skills, therefore, they need some technical assistance. This is further confirmed from research from the COMPILE Horizon 2020 project[41], which says that EU and national procurement rules are highly complex, and municipalities and ECs that are not well-resourced can experience difficulties navigating these rules.

[41] Compile Project

To solve this problem, EU has established technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively.

Table below highlights potential technical support areas that could be useful for EC project promoters to plan and implement their community energy projects.

Capacity building and technical support areas	
Support Areas	Example of Activities
Legal	Set up of legal structure and related administration
Governance	Governance and related administration
	Developing a vision
	Stakeholder mapping and engagement plan
Promotion and community development	Communications plan
	Organising public events, info sessions
	Recruiting members
Financial	Developing an investment campaign
	Initial financing concept and business plan
	Mapping and accessing funding and financial support
	Assessing financial and performance risk
Technical	Finding inspiring examples of local /national best practice
	Project prospection
	Energy audits
	Outlining feasibility studies for renewable energy and community projects
	Licensing and grid connection
	Design and energy yield assessment for planned renewables
	Market analyses
	Stakeholder analyses

Below some of the technical assistance programmes are discussed

Initiative	ELENA – European Local ENergy Assistance[42]
Type of Support	EU-funded technical assistance tool.
Description	The ELENA helps public authorities and private entities by providing technical assistance to implement energy efficiency, renewable energy and sustainable transport projects, thus reducing greenhouse gas emissions.
Initiator	European Investment Bank and the European Fund for Strategic Investments
Targeted Sectors	Energy efficiency, renewable energy and sustainable transport projects.
Relevance to EC	Projects focused on ECs can target ELENA facility.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant, Financial instrument (equity, bonds, loans and/ or guarantees).
Available Budget	Established in 2009, the ELENA facility has awarded more than €296 million of EU support, mobilising an estimated investment of around €9.5 billion (as of end 2023).
Support for	ELENA can provide up to 2 million euros in technical assistance funding, which is designed to catalyze substantial investments in renewable energy sources (RES). ELENA staff, with their extensive knowledge and experience, help public and private entities move forward with their projects. The ELENA facility provides expert assistance that helps people implement ambitious energy efficiency and renewable energy projects that can be replicated across the EU. ELENA technical assistance for preparing and implementing investments can involve the following activities: ● technical studies, energy audits; ● business plans and financial advisory; ● legal advice; ● tendering procedure preparation; ● project bundling; ● project management In addition, ELENA can support the efficient use of investment grants from the European Structural and Investment Funds or other national or regional grants.
Expected outcome	The expected output is the developed investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project. ELENA aims to trigger investments of at least 30 million euros, achieving a leverage ratio of 1 to 15 euros.
Targeted Countries	France, Italy, Sweden, Turkey.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	ELENA grants are allocated on a first-come, first-served basis. Unlike other EU programmes, ELENA has no deadline for the submission of proposals.
Application Process	Further eligibility requirements for ELENA applications can be found on the ELENA web site: How to apply for ELENA?
Deadline	ELENA grants are allocated on a first-come, first-served basis. Unlike other EU programmes, ELENA has no deadline for the submission of proposals.
Website	ELENA – European Local ENergy Assistance

[42] ELENA – European Local ENergy Assistance.

Initiative	Innovation Fund - Project Development Assistance[43]
Type of Support	EU-funded Project Development Assistance.
Description	The EIB offers support to the Innovation Fund through Project Development Assistance (PDA). The PDA will offer tailor-made support to selected projects, with the goal to increase project maturity for subsequent Innovation Fund calls.
Initiator	The Project Development Assistance is implemented through the EIB.
Targeted Sectors	Energy intensive industries, renewable energy, energy storage, carbon, capture, use and storage, and net-zero mobility and buildings.
Relevance to EC	Projects focused on ECs targeting Innovation Fund calls can indeed be eligible for Project Development Assistance (PDA).
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant.
Available Budget	The Innovation Fund includes a dedicated Project Development Assistance (PDA) provided by the EIB. This PDA support is offered to projects which are not awarded grant support from the fund following their evaluation and is available to large, medium and small-scale projects.
Support for	The EIB technical and financial experts are responsible for offering technical support to approved projects, with the support of external consultants.
Expected outcome	Improved application to the Innovation Fund at the next relevant Innovation Fund call.
Targeted Countries	France, Italy, Sweden, Turkey.
Who can apply	Public and private sector promoters, Companies, SMEs and association, NGOs.
Calls for proposal	Yearly calls for projects.
Application Process	Projects submitted under the Innovation Fund calls for proposals that are not selected for grant funding will be proposed by CINEA evaluators to receive PDA, if they meet the criteria, as defined in the call, and if they show the potential for improving their maturity through specific PDA.
Deadline	Similar to calls for proposals for Innovation Fund.
Website	Innovation Fund - Project Development Assistance

[43] Innovation Fund - Project Development Assistance (eib.org)

Initiative	European City Facility (EUCF)[44]
Type of Support	EU-funded technical assistance tool.
Description	The European City Facility (EUCF) aims to support municipalities and local authorities across Europe to develop investment concepts to accelerate investments in sustainable energy projects.
Initiator	Funded by the European Union's LIFE Programme
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other
Relevance to EC	In cases where public administrations (municipalities and local authorities) want to become promoters and come together to build an energy community. They could leverage EUCF in supporting the creation and development of investment concepts for community energy projects.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant.
Available Budget	The EUCF has opened a new funding opportunity for up to 75 municipalities or local authorities, their groupings and local public entities aggregating municipalities / local authorities. This funding is designed to support clean energy and energy efficiency projects, offering simple lump-sum grants of €60,000 each.
Support for	With a 60,000 € grant, the EUCF finances services and activities to support the development of investment concepts, such as (technical) feasibility studies, analyses of the market analyses, of the stakeholders, of the risks, legal, economic and financial analyses, etc. The grant is not meant to directly finance investments.
Expected outcome	The expected output is the developed investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project.
Targeted Countries	Italy, France, Sweden.
Who can apply	**Mandatory:** Energy communities would need to have a municipality as a member to be eligible for support.
Calls for proposal	The 6th call, closing on March 15, 2024, at 17.00 CET, will fund 75 beneficiaries.
Application Process	The EUCF application process consists of 2 steps: The eligibility check (Eligibility check) and the full application.
Deadline	**March 15, 2024, at 17.00 CET**
Website	EUCF - Ongoing call (eucityfacility.eu)

[44] EUCF - Ongoing call (eucityfacility.eu)

Initiative	Capacity-building programme centred on innovative financing[45]
Type of Support	Capacity-building and technical assistance.
Description	PROSPECT+ stands as a capacity-building Horizon 2020 initiative tailored for cities and regions, designed to empower regional and local authorities to finance and execute sustainable energy plans with maximum effectiveness and efficiency.
Initiator	Horizon 2020 research and innovation programme.
Targeted Sectors	Buildings, Transport, Energy, Water, Waste, Land use planning, Environment & Biodiversity, Civil protection & emergency, Other
Relevance to EC	ECs could learn more about implementing innovative financing schemes for their projects such as Citizens Finance, Energy Performance Contracting, Green Bonds and so on.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant.
Available Budget	Funded under Horizon 2020 research and innovation programme. The PROSPECT+ programme is entirely free of charge, ensuring accessibility and inclusivity for all.
Support for	Capacity-Building Programme (CBP) introduces following innovative financial approaches for energy and climate actions: ● Energy Performance Contracting for public buildings or public lighting Preparing an ELENA application ● Local incentives for the development of e-mobility ● Soft loans for the energy retrofitting of private buildings ● Funding community renovation projects ● Setting up and growing an energy agency ● Development and scale up of One-Stop-Shops for home renovation ● Citizen financing for renewable ECs ● Third-Party Financing ● Revolving and Intracting funds ● Cooperatives for ECs
Expected outcome	Crucial skills and knowledge in the ever-evolving realm of energy and climate action financing.
Targeted Countries	Italy, France, Sweden, Turkey
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	Fourth call for applications.
Application Process	Applications will be selected according to eligibility and evaluation criteria described in Section 3 of this Guidelines. The links to the online application forms are published on How to join the PROSPECT+ capacity-building programme.
Deadline	15 March 2024
Website	PROSPECT+ capacity-building programme

[45] PROSPECT+ Capacity-building programme centred on innovative financing

Initiative	Communities for Climate: Local action to respond to climate change[46]
Type of Support	EU-funded technical assistance tool.
Description	New call for local actions responding to climate change.
Initiator	European Commission.
Targeted Sectors	Climate actions in the areas of regenerating biodiversity, water management, local circular economies or renewable energy in urban or rural settings.
Relevance to EC	The Communities for Climate (C4C) will support 50 community-led projects in eleven countries of the EU, accompanying them in the realisation of new and innovative ideas for citizens engagement to address climate and sustainability issues. These lighthouse projects will serve as a replicable model for other local communities willing to engage in climate projects across the EU.
EC Project phase and size	Different, as varies from the call.
Type of funding	Grant.
Available Budget	Launched and financed by European Commission.
Support for	Selected communities will receive tailored support to help them develop a climate-related project. The experts will support your project via on-site visits and regular virtual exchanges with your project team. C4C offers the support of two types of experts: the country experts and the thematic experts.
Expected outcome	The selected local communities will benefit from specialised expertise, peer-learning, customised study visits, mentoring and coaching, and guidance on making their projects impactful and visible at European, national and local levels.
Targeted Countries	MASTERPIECE targeted Countries that are eligible for technical support under the Communities for Climate Call include: France, Italy, Sweden.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	Communities for Climate (C4C) pilot action.
Application Process	The call is seeking to select 50 local projects in 11 EU countries, committed to climate actions in the areas of regenerating biodiversity, water management, local circular economies or renewable energy in urban or rural settings. Applicants must be legal entities located in one of the eleven countries mentioned in the call text (call text), that present a specific project idea in one of the thematic areas listed here below, that will be a local community-led initiative towards achieving the call's objectives and that will demonstrate a citizen driven nature. The call invites organised local communities to apply, but also highly encourages the participation of emerging cross-border communities, operating and experimenting joint approaches. For submitting your application fill below forms: An Eligibility Check is available to help you in assessing your eligibility for this call. If you wish to join the Communities for Climate, please fill in the Application Form.
Deadline	April 3, 2024, 23:59 CET
Website	The Communities for Climate (C4C)

[46] Communities For Climate (C4C)

Initiative	Energy Community Repository[47]
Type of Support	EU-funded technical assistance tool.
Description	The ECs Repository is an initiative on behalf of the European Commission to assist local actors (including citizens, local authorities, and businesses) with setting up and advancing clean energy projects driven by **ECs in urban areas across Europe.**
Initiator	European Commission.
Targeted Sectors	
Relevance to EC	The ECs Repository aims to contribute to the dissemination of best practices and provide technical assistance for the development of energy community initiatives across the EU urban areas.
EC Project phase and size	Tailored capacity-building and technical assistance for ECs at all different stages in their development journey.
Type of funding	Grant.
Available Budget	Launched and financed by the European Commission.
Support for	The Repository provides a comprehensive range of services, including technical assistance, data collection and analysis, and the sharing of best practices and tools. The ECs Repository provides technical assistance via experts. These experts can help ECs - for example - carry out a feasibility study, develop a business model, develop a financing plan, etc.
Expected outcome	The initiative provided support to at least 150 ECs in setting up their groups, advancing their projects, and developing financing concepts, and trained national experts to support the development of national one-stop shops and encourage replication.
Targeted Countries	Italy and France.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	NA
Application Process	Local actors (including citizens, local authorities, and businesses) interested in setting up and advancing clean energy projects from all the 27 EU Member States are invited to submit a proposal to receive technical assistance for the development of energy community initiatives across the EU urban areas. A number of urban ECs that will be selected via a call for applications.
Deadline	The deadline for applications has now passed.
Website	ECs Repository

[47] Energy Communities Repository

Initiative	Rural Energy Community Advisory Hub[48]
Type of Support	EU-funded technical assistance tool.
Description	The Rural Energy Community Advisory Hub empowers the development of sustainable **energy community projects in European rural areas** by supporting citizens and authorities to set up and maintain ECs.
Initiator	European Commission.
Targeted Sectors	
Relevance to EC	The ECs Repository aims to contribute to the dissemination of best practices and provide technical assistance for the development of energy community initiatives across European rural areas.
EC Project phase and size	Tailored capacity-building and technical assistance for ECs at all different stages in their development journey.
Type of funding	Grant.
Available Budget	Launched and financed by the European Commission.
Support for	The list below provides an overview of potential areas in which a community can receive assistance: ● Investment & financial advice ● Technology- and system related advice ● Legal / regulatory support ● Communication support Capacity development and knowledge transfer support
Expected outcome	Improve the development and implementation of projects in a variety of areas, depending on the needs of each individual rural energy community.
Targeted Countries	Local authorities, businesses, farmers and citizens interested in setting up their own rural ECs from all the 27 EU Member States.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	NA
Application Process	If an energy community and/or the activities/project(s) of an energy community are located in an LAU classified as a 'rural area' per the DEGURBA classification[49]The energy community is considered a rural energy community. Consequently, the energy community would fall within the limits of the Rural Energy Community Advisory Hub and be eligible for technical support. ECs that have activities related to the energy technology biogas (e.g. pumping) would be automatically classified as rural ECs as well. A number of rural ECs that will be selected via a call for applications. These are available in all EU Languages. To apply for technical assistance, applicants must fill in and submit the application form electronically via EUSurvey (Access to Technical Assistance Program). The application form can be completed in any of the 24 official EU languages. Guidance notes on how to complete an application for technical assistance, explaining all the application pages and questions can be found here Guidance for the application form.
Deadline	The application process is open.
Website	Rural Energy Community Advisory hub

[48] Rural Energy Community Advisory hub

[49] Degree of Urbanisation (DEGURBA) Classification

Initiative	Citizen-Led Renovation[50]
Type of Support	EU funded support service.
Description	The Citizen-led renovation project aims to assist ECs to deliver citizen-led energy renovations and renewable energy installations.
Initiator	European Commission.
Targeted Sectors	
Relevance to EC	Citizen-led renovation aims to harness the combined strength and resources of local communities, with a main emphasis on empowering citizen groups, facilitating the creation of community-led energy projects, and offering technical support to realise these aspirations.
EC Project phase and size	Tailored capacity-building and technical assistance for ECs at all different stages in their development journey.
Type of funding	Grant.
Available Budget	Launched and financed by European Commission.
Support for	Depending on your needs, expectations and commitment, the project will give you the opportunity to access tailored support in terms of administrative, technical, and communicative assistance and co-implement citizen-led renovation projects in your community.
Expected outcome	The service will strengthen your community building and assists in replicating programmes for energy renovations of the buildings of your members and others, including insulation, new technical systems and installing renewables. The support service will help your community to overcome financial, legal, technical, and informational barriers to deliver future-proof residential buildings.
Targeted Countries	Local authorities, businesses, and citizens interested in developing citizen-led initiatives to deliver additional energy renovations and renewable installations in buildings from all the 27 EU Member States.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	NA
Application Process	Open for established or planned ECs that seek support in developing citizen-led initiatives to deliver additional energy renovations and renewable installations in buildings. Interested in receiving updates on the initiative and especially on the upcoming call for pilot selection Join the Network.
Deadline	The project is now starting its second phase and a call to select pilots, learners, and followers to receive tailored capacity-building and technical assistance, together with several other benefits, will open shortly.
Website	Citizen-Led Renovation

[50] Citizen-Led Renovation

Initiative	Energy Poverty Advisory Hub (EPAH)[51]
Type of Support	EU-funded technical assistance tool.
Description	The leading EU initiative on local action against energy poverty. Energy Poverty Advisory Hub aims to eradicate energy poverty and accelerate the just energy transition of European local governments.
Initiator	European Commission.
Targeted Sectors	
Relevance to EC	The Energy Poverty Advisory Hub can support ECs in the process of tackling energy poverty.
EC Project phase and size	Tailored capacity-building and technical assistance for ECs at all different stages in their development journey.
Type of funding	Grant.
Available Budget	Launched and financed by the European Commission.
Support for	As of May 2023, 30 outstanding proposals have been awarded, representing a remarkable 51 municipalities from 12 countries across Europe. These deserving municipalities or supraminicipal authorities are now receiving direct support to tackle energy poverty at the local level.
Expected outcome	Implement local actions to tackle energy poverty.
Targeted Countries	Local governments and/or organisations working in strict collaboration with local governments from all the 27 EU Member States.
Who can apply	Local authorities, Local agencies (city's stakeholders), NGOs
Calls for proposal	NA
Application Process	Local governments and/or organisations working in strict collaboration with local governments from all the 27 EU Member States are invited to submit a proposal to receive support in the process of tackling energy poverty.
Deadline	The deadline for applications has now passed.
Website	Energy Poverty Advisory Hub (EPAH)

5.3. Additional measures to boost participation in ECs

Here below are listed some of the additional effective measures to cope with ECs participation barriers that are faced during the planning and operation of an EC.

5.3.1. Financial Measures

5.3.1.1. Self-funded Energy Community

RSE, studying some theoretical business cases[52], showed how there could be the possibility to have a full engagement and an optimised overall result for the local community: the self-financing scheme. Some technical analyses show how the self-funded Renewable Energy Community model turns out to be the most advantageous for participants: sourcing human resources (technical and legal expertise) and economic resources from within the community itself, in fact, would ensure that such configurations would maximise value generation for the local community. Indeed, in this case, the payback period would be minimised, the return of investment would be optimised, and the levels of engagement and awareness of participants would be maximised. The adoption of this

[51] Energy Poverty Advisory Hub (EPAH) - European Commission (europa.eu)

[52] CER e Autoconsumo Collettivo

model can mitigate financial barriers, despite technical and legal support from external facilitators might be necessary.

5.3.1.2. Collective purchase of energy assets

Being a community and sharing resources entails employing economies of scale and is more effective than solitary self-consumer schemes or similar initiatives. It increases the utility value for consumers, lowers grid congestion and losses, and lowers the cost of solar PV [21]. Since purchasing PV panels in bulk lowers the cost per unit and eliminates the need for additional meters and inverters, it enables residents to install larger plants and fully utilise roof space. Those with less capital can contribute in lesser percentages and yet gain from solar PV because the cost can be shared among numerous participants based on their involvement.

5.3.1.3. Blended Finance schemes (mixing of both private and public financing instruments

Because financial planning is essential, it's critical to identify all funding options, including grants from the government, private donations, and public funds together with private financing mechanisms (when available). As stated above, each funding mechanism features advantages and drawbacks. Therefore, instead of relying on a single one, the key might be to rely on a mix of them, such as crowdfunding together with an Energy Saving Company (ESCo) contribution.

5.3.1.4. Partnerships and Continuous growth

A successful energy community typically includes a wide range of stakeholders. The organisation needs to constantly search for alliances with local businesses, institutions, associations, solidarity foundations and other groups with similar goals. These collaborations, indeed, may result in shared funding and more resources for the project.

5.3.1.5. Involvement of local authorities

Public administrations can provide economic support by:

- Investing in the creation of public renewable facilities at a larger scale through internal resources, debt and national financing mechanisms;
- Making public land available for private investment;
- Funding design costs for the Energy Community as a whole.

5.3.1.6. Involvement of ESCo for Financial Support

By trusting an Energy Saving Company (ESCo) to handle all technological, financial, engagement, and participation aspects, members of the Energy Community have the chance to simplify the complexity of launching the initiative. With public administrations acting as guarantors of an adequate interaction with such entities, thus making sure that engagement and awareness of citizens are essential elements for them as well, the project can receive valid support (especially from the financial and technical point of view) and pool further economic support by additional investors, convinced of its solidity because of the presence of trust-worthy ESCo.

5.3.1.7. Participation in flexibility markets

ECs can participate in flexibility services (e.g. demand response mechanisms) to create additional revenues for the community. The latter, in turn, might attract further investors in the project in view of a more reliable economic gain.

5.3.2. Technological barriers Measures

5.3.2.1. External technical facilitators

Entities well-established in the energy sector such ESCOs and utilities can play a key role in every phase of the project in case of lack of technical skills, providing a variety of services such as:

- Project Consulting: analysis, engagement and pre-feasibility.
- Legal Support: establishment of the Energy Community.
- Technical Support: realisation of RES installations.
- Technological Support: operational and administrative management.

5.3.2.2. External technical training and support

In case of the lack of technical skills (and absence of external facilitators), citizens should be aware that many technical assistance possibilities are arising across Europe. More and more universities are providing technical support, dedicated associations and foundations have been established for the same purpose, playing a key role to bridge the technical literacy gap.

5.3.2.3. Involvement of TSO and DSO

The responsible entities for the management of the grid, such as DSOs (Distribution System Operators) and TSOs (Transmission System Operators), must be involved to implement the required retrofits of the grid, to monitor the impact of the distributed generation on the LV grid, to guarantee an easy access to the flexibility market and to carry out a complete roll-out of smart meters at a national level.

5.3.3. Social and behavioural Measures

5.3.3.1. Engagement of local communities

In order to boost the engagement of EC it is fundamental to install renewable energy technologies where some local communities are already existing. Some examples found through desk research are:

- religious communities;
- family homes and social housing;
- training institutions;
- schools and kindergartens managed by third sector entities;
- reception centres for migrants;
- therapeutic communities;
- drug rehabilitation communities;
- sports centres;
- socio-educational centres (ex. mafia).

5.3.3.2. Co-ownership of plants

The presence of external facilitators capable of investing in the local self-production is necessary. However, such investors often want to keep the ownership of their facilities, thus hindering the engagement of citizens. Therefore, keeping a good level of citizens ownership of generation facilities

is a key to lower social and behavioural barriers in terms of engagement and participation. Furthermore, the fact that communities are less hesitant to allow the installation of larger devices is one of the key advantages of community ownership schemes [53]. Communities participating in and actively supporting the project significantly lessen opposition and the "not in my backyard" impact. This fosters a sense of ownership that, in turn, can immensely empower a community: as a result of their active participation, residents are more likely to work together on other projects (not only linked to energy) and feel a stronger sense of attachment to the area. This bond, along with employment creation, can be especially important in rural communities. The energy and environmental knowledge that is fostered within a community, which can go beyond energy usage, is another significant social advantage of community ownership.

5.3.3.3. Reinvestments for Impact: Fostering Inclusion, and Alleviating Poverty

ECs can implement social projects that contribute to the well-being of local communities by reinventing their revenues for socially valuable purposes: this mechanism can, undoubtedly, further convince citizens to take part in the initiative and increase their trust. These projects can be related to energy poverty alleviation, social inclusion, and community empowerment. For instance, ECs can provide energy services to low-income households and vulnerable groups, such as the elderly and disabled. They can also organise educational programs on energy efficiency and renewable energy for schools and local communities.

5.3.3.4. Meaningful Citizen Participation and Control in EC

As shown by [22], the findings of their study specifically demonstrate that when individuals believe the decision-making process to be fair, project acceptability is higher. Importantly, involving people in decision-making, and in particular giving them the opportunity to influence decisions about significant areas of the project, is one method to improve perceived procedural fairness.

5.3.3.5. Creation of a new sense of community

The Energy Community builder, whether it is a municipality or an association of citizens, can foster the aggregation of citizens by concentrating its efforts on the creation of a sense of community through continuous meetings, confrontations and feedback loops with its members. As stated by [23], positive relationships exist between community identity, trust, social norms (including peers' expectations regarding energy concerns), and more environmental awareness and willingness to participate or to invest time or money in community energy projects: indeed, social norms and trust, followed by environmental concern and more income, have the largest relationships with the willingness to participate.

5.3.3.6. Clear and effective informative campaigns

An incisive informative campaign aimed at boosting engagement mechanisms, also according to the first survey presented to pilot managers of MASTERPIECE project, should rely on:

- Clear information on overall project benefits connected to the project;
- Clear information related to time investment requirements;
- Diversification of information to make them understandable for different groups and diverse people within the EC;
- Clear rules and procedures;

[53] Business Models: Innovation Landscape Briefs (irena.org)

- Meetings with clear communication;
- Precise and concrete objectives;
- Continuous communication throughout the EC creation: social media, custom platforms, municipality website, etcetera.

Indeed, local authorities should recognize that citizens are already participating in energy systems and contributing to the energy transition. They can support the community by implementing a collaborative approach, raising project visibility and recognition by raising awareness among staff and departments [54], and using their established relationships with local and national media.

Additionally, below find more useful resources about specific topics related to ECs that could be used to remove the EC participation and promote the development of renewable energy and community energy projects.

Specific topics	Useful Resources about ECs
Starting an energy community	https://energycommunityplatform.eu/
	SCCALE Methodology Guide
	Guide to Community Energy
Financing strategy for an energy community	Financing Guide for ECs
	Best Practice Report on Access to Capital to Community Energy
	Financing Guide
	Report on Novel Financing Instruments for ECs
	Resource Selection
	ECs in the EU: opportunities and barriers to financing
	Handbook on Investment Schemes for Community Projects
	Report on how to finance community energy - REScoop
	Investment needs for the local energy transition
Partnering with municipalities	Resources from LIFE LOOP
	LIFE LOOP Accreditation scheme page
	Matchmaking Tool | Energy Community Platform
Mobilising your community and engaging members	Community energy communications at the local level
Community energy communications	Communications guide for ECs
Public and private financing opportunities for ECs	REScoop.eu's Public Financing Tracker
	Best Practice Report on Community Energy Financing Schemes
	Selection criteria for ECs: a practical checklist
Heating and cooling	Community heating and cooling: The road to energy democracy
	It's Better When We're Together: Briefing for municipalities and social housing
	Guidelines on Community Heating and Cooling
Inclusivity	Inclusivity Guidebook - SCCALE203050
Energy poverty alleviation	ECs and energy poverty alleviation
Flexibility services for energy cooperatives	Flexibility services for energy cooperatives – An overview of possible flexibility-based

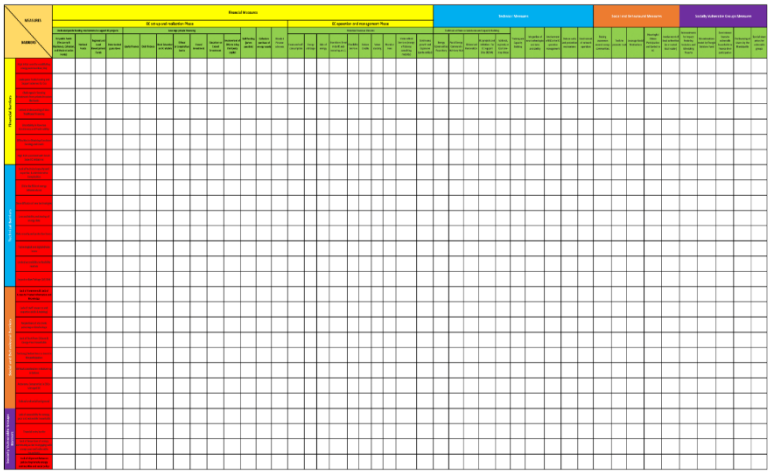
[54] How Local Authorities can encourage citizen participation in energy transitions - Energy Cities (energy-cities.eu)

6. BARRIERS VS. MEASURES MATRIX

6.1. Matrix structure explanation (general): Association of barriers to the measures to bridge the gap

Building on the theoretical EC domain research conducted in Section 4 regarding the barriers to EC participation, and the subsequent investigation in Section 5 of various financing and funding instruments, technical assistance programs, and other type of incentive and support mechanisms designed to overcome these EC participation barriers, it was crucial to find some way to map these barriers and measures together and utilise these insights into a coherent framework. This process resulted in the development of the Barriers vs. Measures Matrix shown below. For better look at the structure of the matrix (check ***Appendix 3 – Barriers vs. Measures Matrix***).

The matrix employs a traditional row-and-column structure. **Horizontal Rows as Barriers** (highlighted in red colour). **Vertical Columns as Measures** (highlighted in green colour)**.**



Different colours seen in the Matrix represent different categories of barriers and measures. For instance, the yellow colour represents financial category, blue colour reflects technical category, social and behavioural category is represented by the orange colour and finally socially vulnerable groups are assigned purple colour.

The horizontal rows of the Matrix contain key barriers (listed in Table 1), grouped under categories such as financial, technical, social and behavioural, and issues specifically affecting socially vulnerable groups. These barriers represent challenges that citizens, prosumers, socially vulnerable people, and ECs often face while implementing renewable energy and community energy projects.

On the other hand, the vertical columns of the Matrix capture key measures (listed in Table 2) across the same categories as the barriers. These measures include financing and funding instruments, technical assistance programs, and other types of incentive and support mechanisms developed to overcome the identified barriers.

The strength of the Barriers vs. Measures Matrix lies in its ability to map and associate these measures to the barriers in a way that acknowledges the complexity and interconnectedness of the issues. It facilitates a strategic alignment of solutions to problems.

6.1.1. Example of Multi-level Association of barriers to the measures to bridge the gap

Below find an example of how Multi-Level Associations happen within the Matrix that could be used to address different categories of EC participation barriers:

Example: Overcoming Financial Constraints for Renewable Energy Installations

Barrier: High initial costs for establishing ECs (ECs) – **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around ECs: Raising awareness around ECs can play a significant role in mitigating the financial barrier of high upfront. Awareness campaigns can be targeted to educate people about the concept of collective purchasing, or, awareness campaigns that aim to provide information about available financial support mechanisms, such as grants, subsidies, or favourable loan conditions specifically designed for community energy projects.

B. Self-funding and collective purchase of EC assets: Some technical analyses on the topic of financing ECs has shown that how the self-funded Renewable Energy Community model turns out to be the most advantageous for participants: sourcing human resources (technical and legal expertise) and economic resources from within the community itself, in fact, would ensure that such configurations would maximise value generation for the local community. Indeed, in this case, the payback period would be minimised, the return of investment would be optimised, and the levels of engagement and awareness of participants would be maximised. The adoption of this model can mitigate financial barriers, despite technical and legal support from external facilitators might be necessary. Furthermore, purchasing PV panels in bulk lowers the cost per unit and eliminates the need for additional meters and inverters, it enables residents to install larger plants and fully utilise roof space. Those with less capital can contribute in lesser percentages and yet gain from solar PV because the cost can be shared among numerous participants based on their involvement.

C. Access to Dedicated public funding mechanisms to support EC projects: EU has set up many public financing and funding schemes in the form of grants or loans to help ECs overcome hurdles they experience in financing the first stages of the project. However, accessing these grants and support schemes still present considerable technical and administrative challenges to smaller-scale projects that characterise most ECs.

D. Blended Finance schemes (mixing of both private and public financing instruments): Because financial planning is essential, it's critical to identify all funding options, including self-funding and collective purchase options, possibility of raising private capital from banks, crowdfunding approaches, grants and loas from the government, private donations and charities (when available). As stated above, each funding mechanism features advantages and drawbacks. Therefore, instead of relying on a single one, the key might be to rely on a mix of them, such as crowdfunding together with an Energy Saving Company (ESCo) contribution.

E. Access to EU Funded Technical Assistance: Before ECs could apply for different types of public financing and funding schemes in the form of grants or loans, they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) which usually they are not equipped to do. To solve this problem, EU has established different technical assistance

programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively. More information about all of these technical assistance programmes is provided in section 5.

F. Continuous growth and partnerships: Building partnerships with different range of stakeholders including local businesses, local authorities, solidarity foundations and other groups with similar goals. These collaborations could result in shared funding and more resources for the project.

This example demonstrated that a particularly difficult barrier may require the deployment of several different measures in concert to be effectively overcome. For example, the high upfront initial costs for establishing ECs is one such very difficult barrier that might be addressed through a combination of awareness campaigns about different financing instruments, self funding and collective purchase options, leveraging private and public financing instruments, participation in technical assistance programs, accessing financial incentives and support schemes, low-interest loans, and building partnerships with local stakeholders (Multiple Measures), each contributing a piece of the solution.

6.2. Adapting Matrix to pilot contexts and ECs

After putting together the general Barriers vs. Measures Matrix, the next step was to transform our general Barriers vs. Measures Matrix into pilot specific Barriers vs. Measures Matrix.

We simply provided the pilot community managers with the Matrix in excel file filled with general barriers and measures identified in previous sections 4 and 5 and asked them to highlight in red colour the barriers (in horizontal rows) they face and highlight in green colour measures (in vertical columns) that appear promising to them for removing the identified barriers.

This adaptation assisted us in identifying the most relevant barriers faced by the pilot community including information about measures that pilot community find promising but don't have a lot of information about them. This valuable feedback opened avenues for us to offer pilot communities customized measures. These measures encompass a range of various financing and funding instruments, technical assistance programs, and other types of incentive and support schemes, designed to overcome the participation barriers faced by the pilot community.

For D3.1 due in M15, we have strategically decided to stay focused by selecting only a few barriers from each pilot community. This approach ensures providing targeted measures for overcoming these specific barriers. Additionally, we diversified our selection across different pilot communities, covering all categories of barriers and offering comprehensive measures for their removal. In pilot specific Barriers vs. Measures Matrix below, barriers are marked in red on the horizontal rows, while the corresponding measures to address these barriers are highlighted in green within the columns. This colour coding simplifies the visual connection between barriers and their potential solutions.

6.2.1. Measures for Berchidda Pilot Site - Italy

Below in the figure you can see a specific Barriers vs. Measures Matrix for Berchidda pilot community. Berchidda is located in northern Sardinia, with less than 3000 inhabitants.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from Berchidda for providing them with specific measures that could help overcome these barriers. These barriers include:

- Inadequate Public funding and Support schemes for ECs.
- Limited Understanding of Non-Traditional Financing.

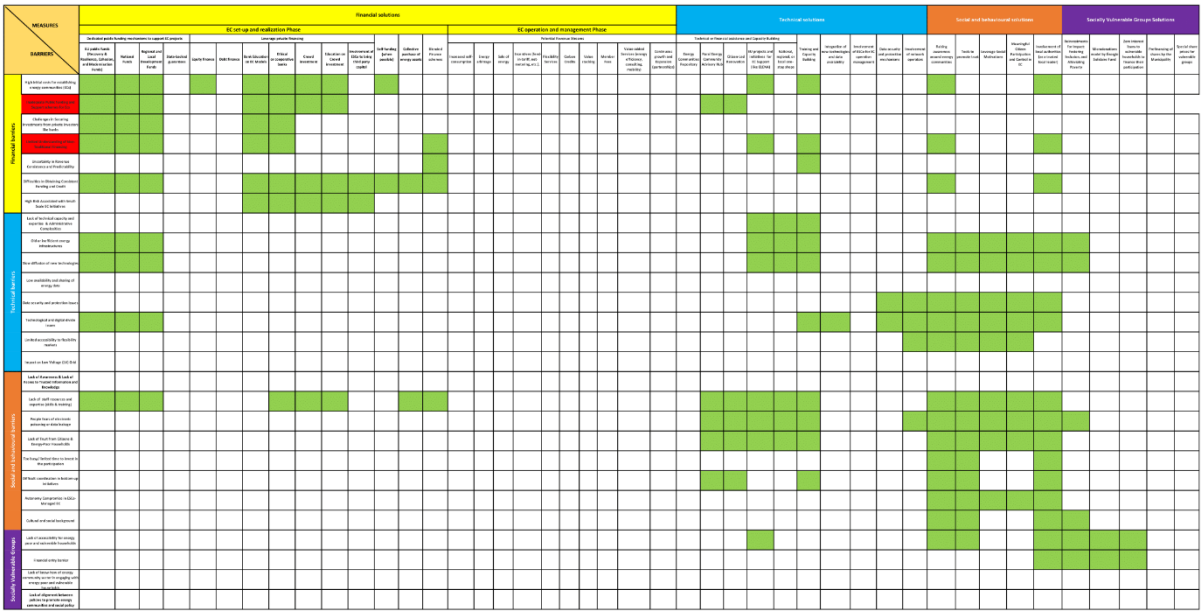


Figure 7 Berchidda pilot community - Italy

1st Barrier of Berchidda: Inadequate Public funding and Support schemes for ECs– **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around potential financing and funding opportunities for ECs: Raising awareness around ECs and different potential funding and financing instruments available for them can play a significant role in mitigating this financial barrier faced by Berchidda.

B. Self-funding and collective purchase of EC assets: This measure discussed in above example could also play an effective role in mitigating this financial barrier faced by Berchidda.

C. Access and use of Dedicated public funding mechanisms to support EC projects: Italy has dedicated public financing and funding instruments to support EC projects: Italy is a great example of a European country that is utilizing EU public funds (such as Recovery and Resilience, Cohesion policy funds, and Structural Funds (mainly ERDF and ESF) for promoting the development of renewable energy and community energy projects in the country.

For instance, **Commission has approved €5.7 billion Italian State aid scheme made available in part through the Recovery and Resilience Facility ('RRF')**[55] to support the production and self-consumption of renewable electricity.

The scheme is composed of two aid measures:

- A premium tariff on the quantity of electricity consumed by self-consumers (final customers who generate renewable electricity for their own consumption) and renewable ECs (legal entities empowering citizens, small businesses and local authorities to produce, manage and consume their own electricity), paid over a 20-year period. This measure, with a total budget of €3.5 billion, will be financed through a levy on the electricity bill of all consumers.
- An investment grant of up to 40% of eligible costs, for a total budget of €2.2 billion financed through the RRF. Eligible projects must become operational before 30 June 2026 to benefit from funding through the RRF and should be located in municipalities with less than 5.000 inhabitants.

Support expenses ranging from technical assistance to material purchases for development and construction.

The call for proposals is currently being prepared by the Ministry of Ecological Transition (MASE). So, keep an eye on the calls for proposals from the Ministry of Ecological Transition (MASE).

D. Access and use of Local and regional Italian funds

Apart from Italy's National Recovery and Resilience Plan discussed above, Italy´s Regional Operational Programs funded by Structural Funds (mainly ERDF and ESF) explicitly mention ECs and allocate specific budgets to promote and support the setup of new ECs. Since Berchidda is from Sardegna region, therefore, it is important to mention that in April 2023 the **Sardegna**[56] the region approved the allocation of funds (2M€ for 2023 and 2M€ for 2024) to finance techno-economic feasibility studies for ECs. Funds are earmarked for municipalities, which can receive up to 15.000€, giving priority to municipalities which are not connected to the methane gas grid and secondly to smaller ones.

For more information about the regional funds and the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate the project proposal and decide whether to grant funding.

E. Access and use of EU Funded Technical Assistance: Before ECs could apply for different types of public financing and funding schemes in the form of grants or loans, they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) which usually they are not equipped to do. To solve this problem, EU has established different technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively. Leveraging these technical assistance programs, Berchidda can

[55] Commission has approved €5.7 billion Italian State aid scheme made available in part through the Recovery and Resilience Facility ('RRF')

[56] Support for the development of RECs — Sardegna

develop a comprehensive investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project. More information about all of these technical assistance programmes is provided in section 5.

F. Target European City Facility (EUCF) - Call of proposals - Ongoing

The EUCF has opened a new funding opportunity for up to 75 municipalities or local authorities (ideal for the Berchidda case), who want to become promoters and come together to build an energy community. They could leverage EUCF in supporting the creation and development of investment concepts for community energy projects. With a 60,000 € grant, the EUCF finances services and activities to support the development of investment concepts, such as (technical) feasibility studies, analyses of the market analyses, of the stakeholders, of the risks, legal, economic and financial analyses, etc. The grant is not meant to directly finance investments.

The 6th call, **closing on March 15**, 2024, at 17.00 CET, will fund 75 beneficiaries.

EUCF Ongoing call Text and Application Process

G. Target Communities for Climate: Local action to respond to climate change - Call of proposals – Ongoing

The Communities for Climate (C4C) will support 50 community-led projects in eleven countries of the EU including Italy, accompanying them in the realisation of new and innovative ideas for citizens engagement to address climate and sustainability issues. These lighthouse projects will serve as a replicable model for other local communities willing to engage in climate projects across the EU. The selected local communities will benefit from specialised expertise, peer-learning, customised study visits, mentoring and coaching, and guidance on making their projects impactful and visible at European, national and local levels.

The call, **closing on Apr 3,** 2024, will fund 50 beneficiaries.

For submitting your application fill below forms:

An Eligibility Check is available to help you in assessing your eligibility for this call.

If you wish to join the Communities for Climate, please fill in the Application Form.

All above discussed measures could be useful for Berchidda to overcome the financial barrier for EC participation.

2nd Barrier of Berchidda: Limited Understanding of Non-Traditional Financing – **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Target Capacity-building programme centred on innovative financing[57]

PROSPECT+ capacity-building program concentrated on introducing innovative financial approaches for energy and climate actions is accepting applications at the moment.

[57] PROSPECT+ Capacity-building programme centred on innovative financing

Capacity-Building Programme (CBP) introduces following innovative financial approaches for energy and climate actions:

- Energy Performance Contracting for public buildings or public lighting
- Cooperatives for ECs
- Preparing an ELENA application
- Local incentives for the development of e-mobility
- Soft loans for the energy retrofitting of private buildings
- Funding community renovation projects
- Setting up and growing an energy agency
- Development and scale up of One-Stop-Shops for home renovation
- Citizen financing for renewable ECs
- Third-Party Financing
- Revolving and Intracting funds

Applying and participating in the PROSPECT+ capacity-building program on innovative financing could help Berchidda gain crucial skills and knowledge in the ever-evolving realm of energy and climate action financing including knowledge about alternative financing approaches like crowdfunding and energy performance contracting.

Applications will be selected according to eligibility and evaluation criteria described in Section 3 of this Guidelines.

The links to the online application forms are published on How to join the PROSPECT+ capacity-building programme. Deadline (15 March, 2024).

6.2.2. Measures for Solévent Pilot Site - France

Below in the figure you can see a specific Barriers vs. Measures Matrix for Solévent pilot community.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from Solévent for providing them with specific measures that could help overcome these barriers. These barriers include:

- Lack of accessibility for energy poor and vulnerable households.

- Financial entry barrier for energy poor households.

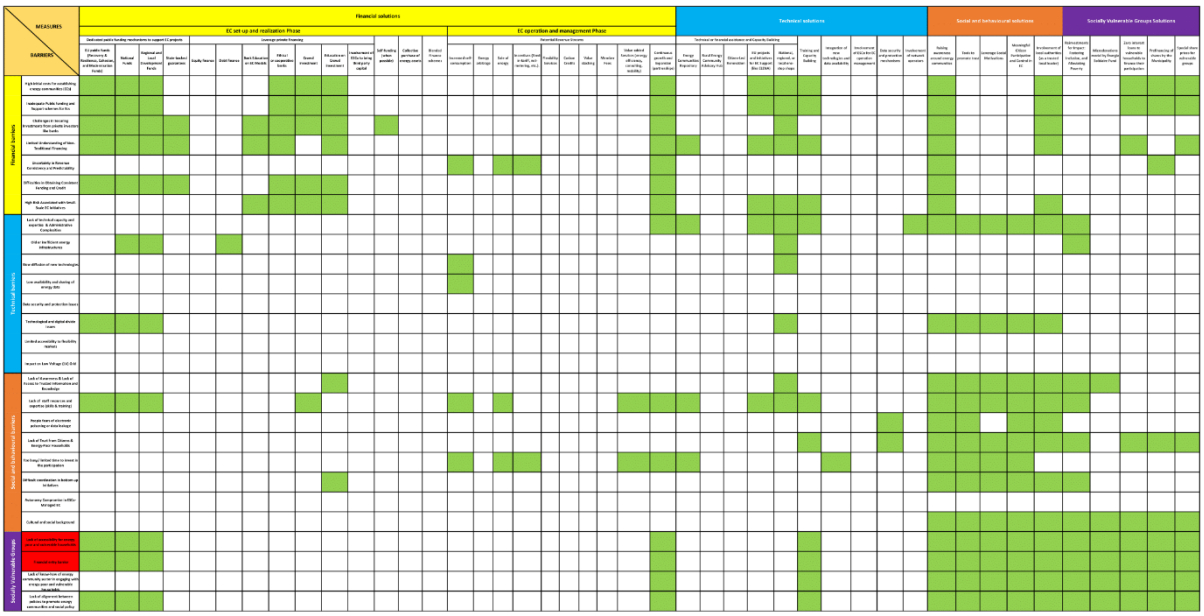


Figure 8 Solévent pilot community - France

1st Barrier of Solévent: Lack of accessibility for energy poor and vulnerable households – **(Socially Vulnerable Groups Barrier)**

List of Potential Measures to overcome this barrier affecting socially vulnerable groups:

A. Énergie Solidaire in France[58]: In France, Enercoop[59]In 2017, an energy cooperative has set up a fund called Énergie Solidaire to collect microdonations, both from its members (through a small surplus on their energy bill), and from producers (through donating produced energy). The fund is jointly governed between Enercoop and Les Amis d'Enercoop, an association focusing on energy poverty issues. The fund also has an Engagement Committee made up of experts and partner organisations fighting against energy poverty. The Engagement Committee helps identify local organisations working around France that can receive funding for projects. This provides a solidarity mechanism whereby Énergie Solidaire provides support to organisations that are already experts in addressing energy poverty. As of 2021, €220,000 had been distributed to 10 different organisations around France.

Solévent could take inspiration from Énergie Solidaire for developing strategies for improving the accessibility for energy poor and vulnerable households in their communities.

B. Access and use of EU funded technical Assistance for tackling energy poverty: The Energy Poverty Advisory Hub can support ECs that want to tackle energy poverty. The Energy Poverty Advisory Hub provides tailored capacity-building and technical assistance for ECs at all different stages in their development journey. More details about the Energy Poverty Advisory Hub is

58 Énergie Solidaire

59 EnerCoop

available in section 5. To help alleviate energy poverty, the Energy Poverty Advisory Hub has collected more than 250 inspirational cases related to tackling energy poverty and made that research available in the EPAH ATLAS[60]. The EPAH ATLAS is an online interactive database that allows visitors to discover local and international projects as well as measures addressing energy poverty across the world. Solévent could utilise the technical assistance offered by Energy Poverty Advisory Hub and its EPAH ATLAS (online interactive database) for getting to know more about the local and international projects as well as measures addressing energy poverty across the world.

C. Reinvestments for Impact: Fostering Inclusion, and Alleviating Poverty

ECs can implement social projects that contribute to the well-being of local communities by reinvesting their revenues for socially valuable purposes: this mechanism can, undoubtedly, further convince citizens to take part in the initiative and increase their trust. These projects can be related to energy poverty alleviation, social inclusion, and community empowerment. For instance, ECs can provide energy services to low-income households and vulnerable groups, such as the elderly and disabled. They can also organise educational programs on energy efficiency and renewable energy for schools and local communities, including provision of energy efficiency packages to energy poor households.

D. Access and use of Local and regional funds

Some Member States such as Italy and Lithuania have started to concretely integrate accessibility issues into supportive policies for ECs at the national and regional levels. In this case, Italy and Lithuania stand out to be good examples. For instance, the Lithuanian government has decided to use the Recovery and Resilience Fund to provide grants for ECs that address energy poverty. On the other hand, the Italian Region of Sicily uses its regional funds to provide financing for feasibility studies and the establishment of ECs. The eligibility criteria for accessing these funds include a requirement that at least 10 percent of the REC's members should be vulnerable consumers[61].

However, France the country relevant for Solévent, has no mentions of ECs in its national RRP and Structural and cohesion funds that finance regional and local programs in France[62].

For more information about the regional funds and the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate the project proposal and decide whether to grant funding.

E. Utilize Energy Solidarity Toolkit developed by Community Energy for Energy Solidarity (CEES) project[63]

CEES project, funded under Horizon 2020 research and innovation programme, has developed the Energy Solidarity Toolkit (EST), including the measures and mechanisms helping all ECs and community energy organisations tackle energy poverty at the local level.

F. Target European City Facility (EUCF) - Call of proposals - Ongoing

[60] EPAH ATLAS

[61] Support for the development of RECs — Sicily

[62] France - Public Funding and Financing for ECs - REScoop

[63] Energy solidarity toolkit - CEES

The EUCF has opened a new funding opportunity for up to 75 municipalities or local authorities, who want to become promoters and come together to build an energy community. They could leverage EUCF in supporting the creation and development of investment concepts for community energy projects. With a 60,000 € grant, the EUCF finances services and activities to support the development of investment concepts, such as (technical) feasibility studies, analyses of the market analyses, of the stakeholders, of the risks, legal, economic and financial analyses, etc. The grant is not meant to directly finance investments.

The 6th call, **closing on March 15**, 2024, at 17.00 CET, will fund 75 beneficiaries.

EUCF Ongoing call Text and Application Process

G. Target Communities for Climate: Local action to respond to climate change - Call of proposals – Ongoing

The Communities for Climate (C4C) will support 50 community-led projects in eleven countries of the EU including France, accompanying them in the realisation of new and innovative ideas for citizens engagement to address climate and sustainability issues. These lighthouse projects will serve as a replicable model for other local communities willing to engage in climate projects across the EU. The selected local communities will benefit from specialised expertise, peer-learning, customised study visits, mentoring and coaching, and guidance on making their projects impactful and visible at European, national and local levels.

The call, **closing on Apr 3,** 2024, will fund 50 beneficiaries.

For submitting your application fill below forms:

An Eligibility Check is available to help you in assessing your eligibility for this call.

If you wish to join the Communities for Climate, please fill in the Application Form.

All above discussed measures could be useful for Solévent to alleviate energy poverty, among their members or in the broader community.

2nd Barrier of Solévent: Financial entry barrier for energy poor households. – **(Socially Vulnerable Groups Barrier)**

Potential measures for eliminating Financial entry barrier and facilitating access for vulnerable households include[24]:

- Some ECs offer special share prices for vulnerable groups (e.g. below €40);
- The city can buy shares in the energy community and hand them over to vulnerable households to enable their participation (e.g. the City of Eeklo in Belgium)
- In cooperation with a local bank, the energy community can offer zero interest loans to vulnerable households to finance their participation.

6.2.3. Measures for PART'Ener and Les Mureaux Pilot Site -France

Below in the figure you can see the specific Barriers vs. Measures Matrix for PART'Ener and Les Mureaux pilot communities.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from PART'Ener and Les Mureaux for providing them with specific measures that could help overcome these barriers. These barriers include:

- High Risk Associated with Small-Scale EC Initiatives.

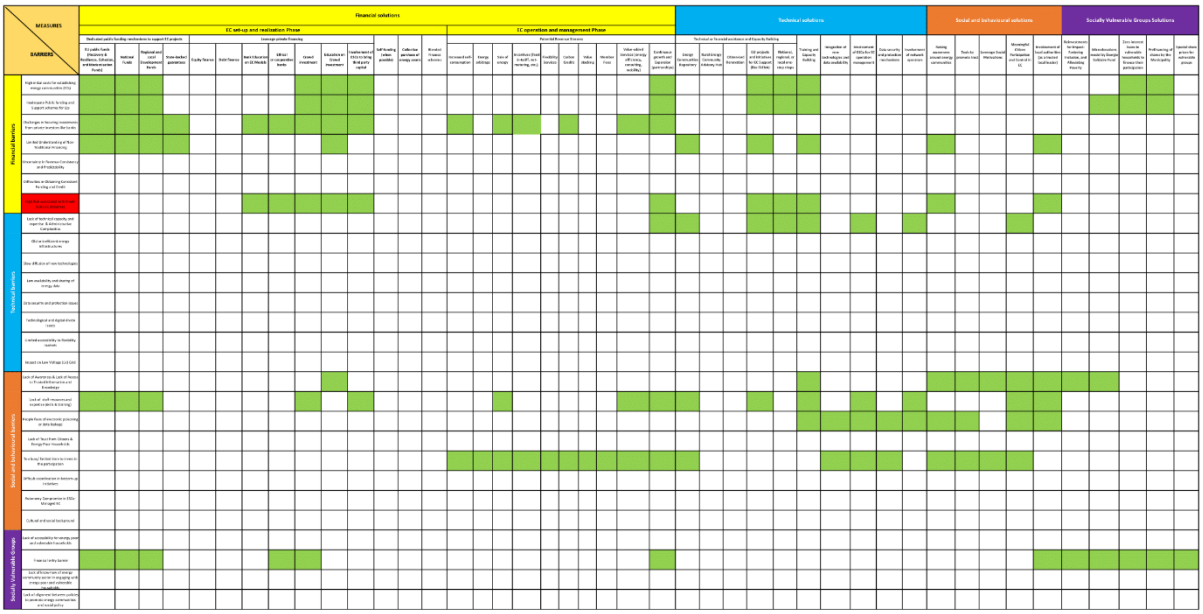


Figure 9 PART'Ener and Les Mureaux pilot communities - France

1st Barrier of PART'Ener and Les Mureaux: High Risk Associated with Small-Scale EC Initiatives – **(Financial)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around EC risks and mitigation strategies: Raising awareness around potential ECs risks and mitigation strategies could be useful to be prepared to deal with Small-Scale EC Initiatives risks.

B. Sharing the cost risks using collective ownership. In the context of REC (and other community) projects, shares can spread the cost and risk of acquisition across many shareholders.

C. Access and use of EU Funded Technical Assistance: Before ECs could apply for different types of public financing and funding schemes in the form of grants or loans, they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) which usually they are not equipped to do. To solve this problem, EU has established different technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively. Leveraging these technical assistance programs, PART'Ener and Les Mureaux pilot communities can develop a comprehensive investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment

project. More information about all of these technical assistance programmes is provided in section 5.

D. Involvement of ESCo for Financial Support: By trusting an Energy Saving Company (ESCo) to handle all technological, financial, engagement, and participation aspects, members of the Energy Community have the chance to simplify the complexity and risks of launching the initiative. With public administrations acting as guarantors of an adequate interaction with such entities, thus making sure that engagement and awareness of citizens are essential elements for them as well, the project can receive valid support (especially from the financial and technical point of view) and pool further economic support by additional investors, convinced of its solidity because of the presence of trust-worthy ESCo.

All above discussed measures could be useful for PART'Ener and Les Mureaux pilot communities to mitigate high risk Associated with Small-Scale EC Initiatives.

6.2.4. Measures for Aşağıçavuş Pilot Site - Turkey

Below in the figure you can see the specific Barriers vs. Measures Matrix for Aşağıçavuş pilot communities from Turkey.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from Aşağıçavuş (Turkey) for providing them with specific measures that could help overcome these barriers. These barriers include:

- Lack of Awareness & Lack of Access to Trusted Information and Knowledge.
- Lack of Trust from Citizens & Energy-Poor Households.

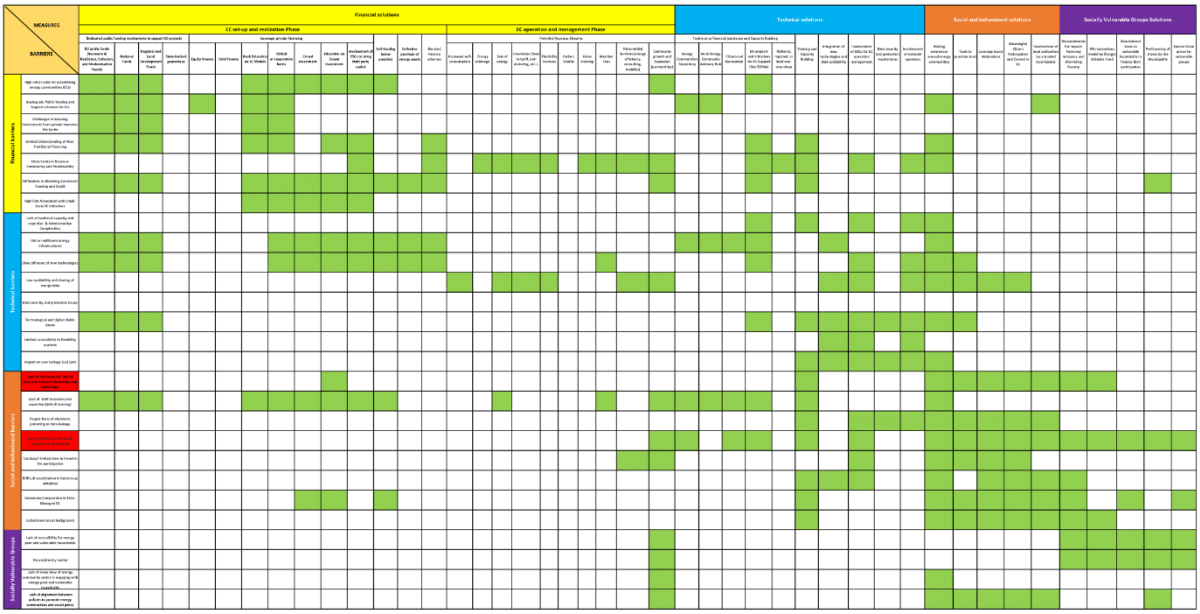


Figure 10 Aşağıçavuş pilot communities – Turkey

1st Barrier of Aşağıçavuş pilot communities: Lack of Awareness & Lack of Access to Trusted Information and Knowledge – **(Social and behavioural barrier)**

List of Potential Measures to overcome this Social and behavioural barrier:

A. Clear and effective awareness campaigns: Implement campaigns to clearly communicate important information to different stakeholders can help address several barriers that ECs face in terms of awareness and lack of capacity.

B. Utilize national, regional, or local one-stop shops for ECs around Europe: Several Member States are creating different ways of supporting and raising awareness and providing technical advice on how to get started with EC projects. This has led to the emergence of many one-stop shops for ECs around Europe that can be found here (ECs - One-stop-shops). These one-stop shops for ECs usually provide information and expertise covering different activities related to the renewable energy and community energy projects.

C. Involvement of local authorities: Local and regional government authorities have a role in bringing community initiatives together, and to provide them with support. So, check with your Local and regional government authorities in case they have already some initiative going on related to raising awareness around ECs and facilitating access to expertise.

2nd Barrier of Aşağıçavuş pilot communities: Lack of Trust from Citizens & Energy-Poor Households – **(Social and behavioural barrier)**

List of Potential Measures to overcome this Social and behavioural barrier:

A. Clear and honest communication to existing and new members: Clear communication by ECs to existing and potential new members helps to build the legitimacy of internal decision-making process, and the sharing of benefits and costs and potential liabilities.

B. Involvement by local authorities (as a trusted local leader) has been shown to have an important effect of creating trust and confidence in local projects.

C. Development of Internal standards to ensure transparency and fair treatment of members: There is a need to develop internal rules and procedures within the EC to handle matters such as facilitating smooth exit of members, handle dispute resolution procedures, ensure fair internal decision making and voting rights of the members, and to protect data.

D. Meaningful Citizen Participation and Control in EC

As shown by [22], the findings of their study specifically demonstrate that when individuals believe the decision-making process to be fair, project acceptability is higher. Importantly, involving people in decision-making, and in particular giving them the opportunity to influence decisions about significant areas of the project, is one method to improve perceived procedural fairness. Therefore, it is important to ensure that internal decision-making is independent from private interests by placing limitations on the number of shares individual members may have, imposing a one person - one vote principle, or by simply requiring the community to provide for autonomy in their founding statutes.

E. Reinvestments for Impact: Fostering Inclusion, and Alleviating Poverty

ECs can implement social projects that contribute to the well-being of local communities by reinvesting their revenues for socially valuable purposes: this mechanism can, undoubtedly, further convince citizens to take part in the initiative and increase their trust. These projects can be related to energy poverty alleviation, social inclusion, and community empowerment. For instance, ECs can provide energy services to low-income households and vulnerable groups, such as the elderly and disabled. They can also organise educational programs on energy efficiency and renewable energy for schools and local communities, including provision of energy efficiency packages to energy poor households.

F. Creation of a new sense of community

The Energy Community builder, whether it is a municipality or an association of citizens, can foster the aggregation of citizens by concentrating its efforts on the creation of a sense of community through continuous meetings, confrontations and feedback loops with its members. As stated by [23], positive relationships exist between community identity, trust, social norms (including peers' expectations regarding energy concerns), and more environmental awareness and willingness to participate or to invest time or money in community energy projects: indeed, social norms and trust, followed by environmental concern and more income, have the largest relationships with the willingness to participate.

6.2.5. Measures for Dansmästaren Pilot Site - Sweden

Below in the figure you can see the specific Barriers vs. Measures Matrix for Dansmästaren (Sweden) pilot communities.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from Dansmästaren (Sweden) for providing them with specific measures that could help overcome these barriers. These barriers include:

- High initial costs for establishing ECs (ECs)
- Inadequate Public funding and Support schemes for Ecs

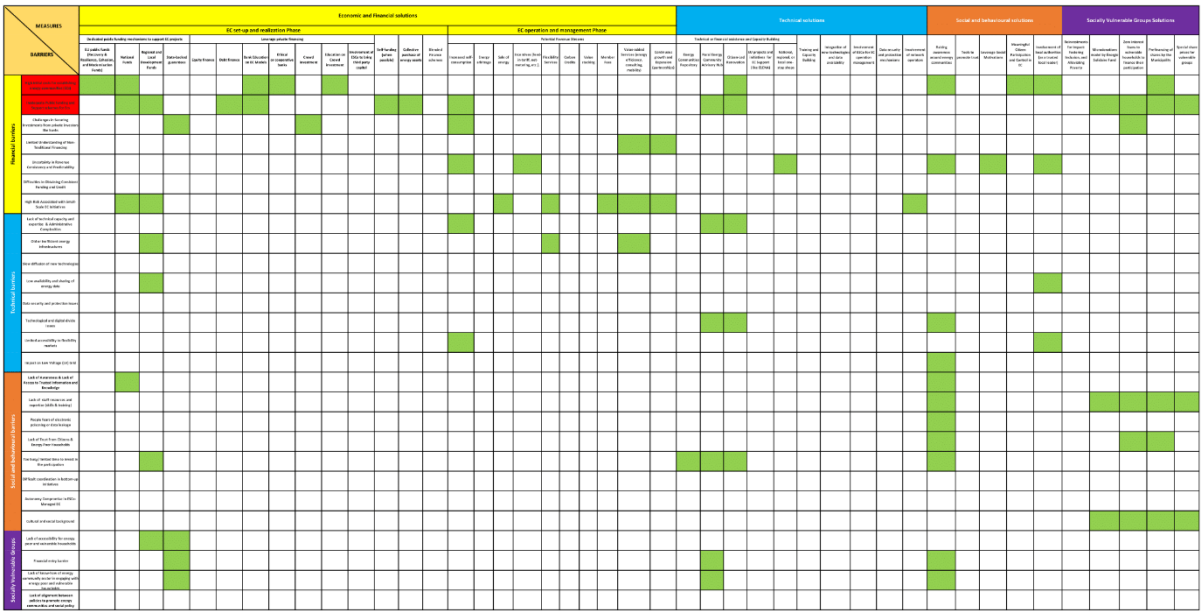


Figure 11 Dansmästaren pilot communities – Sweden

1st Barrier of Dansmästaren: High initial costs for establishing ECs – **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around ECs: Raising awareness around ECs can play a significant role in mitigating the financial barrier of high upfront. Awareness campaigns can be targeted to educate people about the concept of collective purchasing, or, awareness campaigns that aim to provide information about available financial support mechanisms, such as grants, subsidies, or favourable loan conditions specifically designed for community energy projects.

B. Self-funding and collective purchase of EC assets: Some technical analyses on the topic of financing ECs has shown that how the self-funded Renewable Energy Community model turns out to be the most advantageous for participants: sourcing human resources (technical and legal expertise) and economic resources from within the community itself, in fact, would ensure that such configurations would maximise value generation for the local community. Indeed, in this case, the payback period would be minimised, the return of investment would be optimised, and the levels of engagement and awareness of participants would be maximised. The adoption of this model can mitigate financial barriers, despite technical and legal support from external facilitators might be necessary. Furthermore, purchasing PV panels in bulk lowers the cost per unit and eliminates the need for additional meters and inverters, it enables residents to install larger plants and fully utilise roof space. Those with less capital can contribute in lesser percentages and yet gain from solar PV because the cost can be shared among numerous participants based on their involvement.

C. Access to Dedicated public funding mechanisms to support EC projects: EU has set up many public financing and funding schemes in the form of grants or loans to help ECs overcome hurdles they experience in financing the first stages of the project.

However, Sweden, the country relevant for Dansmästaren, has no mentions of ECs in its national RRP and Structural and cohesion funds that finance regional and local programs in Sweden.

For more information about the regional funds and the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate project proposal and decide whether to grant funding.

D. Blended Finance schemes (mixing of both private and public financing instruments): Because financial planning is essential, it's critical to identify all funding options, including self-funding and collective purchase options, possibility of raising private capital from banks, crowdfunding approaches, grants and loans from the government, private donations and charities (when available). As stated above, each funding mechanism features advantages and drawbacks. Therefore, instead of relying on a single one, the key might be to rely on a mix of them, such as crowdfunding together with an Energy Saving Company (ESCo) contribution.

E. Access to EU Funded Technical Assistance: Before ECs could apply for different types of public financing and funding schemes in the form of grants or loans, they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) which usually they are not equipped to do. To solve this problem, EU has established different technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively. More information about all of these technical assistance programmes is provided in section 5.

F. Continuous growth and partnerships: Building partnerships with different range of stakeholders including local businesses, local authorities, solidarity foundations and other groups with similar goals. These collaborations could result in shared funding and more resources for the project.

This example demonstrated that a particularly difficult barrier may require the deployment of several different measures in concert to be effectively overcome. For example, the high upfront initial costs for establishing ECs is one such very difficult barrier that might be addressed through a combination of awareness campaigns about different financing instruments, self funding and collective purchase options, leveraging private and public financing instruments, participation in technical assistance programs, accessing financial incentives and support schemes, low-interest loans, and building partnerships with local stakeholders (Multiple Measures), each contributing a piece of the solution.

2nd Barrier of Dansmästaren: Inadequate Public funding and Support schemes for ECs– **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around potential financing and funding opportunities for ECs: Raising awareness around ECs and different potential funding and financing instruments available for them can play a significant role in mitigating this financial barrier faced by Dansmästaren.

B. Self-funding and collective purchase of EC assets: This measure discussed in above example could also play an effective role in mitigating this financial barrier faced by Dansmästaren.

C. Access and use of Dedicated public funding mechanisms to support EC projects:

Sweden, the country relevant for Dansmästaren, has no mentions of ECs in its national RRP and Structural and cohesion funds that finance regional and local programs in Sweden.

For more information about the regional funds and the authority managing the relevant regional programme (Find your Managing Authority). That body will evaluate project proposal and decide whether to grant funding.

D. Access and use of EU Funded Technical Assistance: Before ECs could apply for different types of public financing and funding schemes in the form of grants or loans, they need to perform many technical tasks (feasibility studies, business model development, sizing of assets) which usually they are not equipped to do. To solve this problem, EU has established different technical assistance programmes (such as energy community repository, rural energy community advisory hub, citizen led renovation, energy poverty advisory hub (epah), EIB Innovation Fund – PDA, ELENA) ensuring that EC project promoters have the necessary knowledge and tools to access these funds and support schemes effectively. Leveraging these technical assistance programs, Dansmästaren can develop a comprehensive investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project. More information about all of these technical assistance programmes is provided in section 5.

E. Target European City Facility (EUCF) - Call of proposals - Ongoing

The EUCF has opened a new funding opportunity for up to 75 municipalities or local authorities, who want to become promoters and come together to build an energy community. They could leverage EUCF in supporting the creation and development of investment concepts for community energy projects. With a 60,000 € grant, the EUCF finances services and activities to support the development of investment concepts, such as (technical) feasibility studies, analyses of the market analyses, of the stakeholders, of the risks, legal, economic and financial analyses, etc. The grant is not meant to directly finance investments.

The 6th call, **closing on March 15**, 2024, at 17.00 CET, will fund 75 beneficiaries.

EUCF Ongoing call Text and Application Process

F. Target Communities for Climate: Local action to respond to climate change - Call of proposals – Ongoing

The Communities for Climate (C4C) will support 50 community-led projects in eleven countries of the EU including Italy, accompanying them in the realisation of new and innovative ideas for citizens engagement to address climate and sustainability issues. These lighthouse projects will serve as a replicable model for other local communities willing to engage in climate projects across the EU. The selected local communities will benefit from specialised expertise, peer-learning, customised study visits, mentoring and coaching, and guidance on making their projects impactful and visible at European, national and local levels.

The call, **closing on Apr 3,** 2024, will fund 50 beneficiaries.

For submitting your application fill below forms:

An Eligibility Check is available to help you in assessing your eligibility for this call.

If you wish to join the Communities for Climate, please fill in the Application Form.

All above discussed measures could be useful for Dansmästaren to overcome the financial barrier for EC participation.

6.2.6. Measures for NGENIC Pilot Site – Sweden

Below in the figure you can see specific Barriers vs. Measures Matrix for NGENIC pilot communities.

Barriers indicated in red colour in the matrix's horizontal rows have been selected by NGENIC pilot communities for providing them with specific measures that could help overcome these barriers. These barriers include:

- Challenges in Securing Investments from private investors like banks

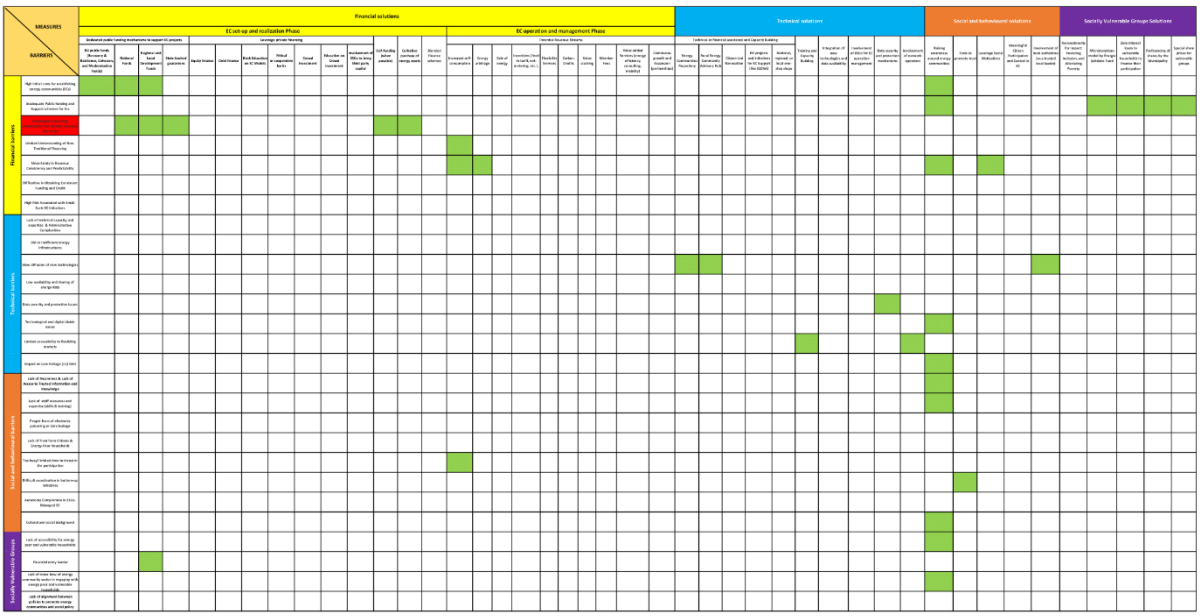


Figure 12 NGENIC pilot communities – Sweden

1st Barrier of NGENIC pilot communities: Challenges in Securing Investments from private investors like banks – **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Raising awareness around risks and potentials of different private finance instruments for ECs: Incomplete information about risks and potentials of different private financing instruments is one of the key reasons for risk aversion of financing ECs. Therefore, it is important to investigate and raise awareness among the banks and traditional financial institutions about risks and potentials of

different private financing mechanisms depending on various aspects, including the type of instrument, ownership structure of ECs, and the legislative context in which they operate.

B. Access and use of EU Funded Technical Assistance for developing investment concept: Leveraging the technical assistance programs discussed in section 5, NGENIC pilot communities can develop an comprehensive investment concept, i.e. a document providing investors and financial institutions with necessary information to assess an investment project.

C. Self-funding and collective purchase of EC assets: This measure discussed above could also play an effective role in mitigating this financial barrier faced by NGENIC pilot communities.

D. Utilize alternative financing schemes and ethical banking options. Alternative finance (such as crowdfunding and energy performance contracting) and ethical banking reduce barriers to financing, but are mainly targeted at small-scale projects. Low use is due to lack of knowledge and awareness, regulatory barriers, and low spread. Legal and governance structures also impact access to specific types of finance, affecting risk-taking and profit taxation.

E. Target Capacity-building programme centred on innovative financing[64]

PROSPECT+ capacity-building program concentrated on introducing innovative financial approaches for energy and climate actions is accepting applications at the moment.

Capacity-Building Programme (CBP) introduces following innovative financial approaches for energy and climate actions:

- Energy Performance Contracting for public buildings or public lighting
- Cooperatives for ECs
- Preparing an ELENA application
- Local incentives for the development of e-mobility
- Soft loans for the energy retrofitting of private buildings
- Funding community renovation projects
- Setting up and growing an energy agency
- Development and scale up of One-Stop-Shops for home renovation
- Citizen financing for renewable ECs
- Third-Party Financing
- Revolving and Intracting funds

Applying and participating in the PROSPECT+ capacity-building program on innovative financing could help NGENIC pilots gain crucial skills and knowledge in the ever-evolving realm of energy and climate action financing including knowledge about alternative financing approaches like crowdfunding and energy performance contracting.

Applications will be selected according to eligibility and evaluation criteria described in Section 3 of this Guidelines.

The links to the online application forms are published on How to join the PROSPECT+ capacity-building programme. Deadline (15 March, 2024).

[64] PROSPECT+ Capacity-building programme centred on innovative financing

6.2.7. Measures for UMU PoC - Spain

Below in the figure you can see specific Barriers vs. Measures Matrix for UMU (Spain) PoC pilot communities.

Barriers indicated in red colour in the matrix's horizontal rows have been selected from UMU (Spain) PoC for providing them with specific measures that could help overcome these barriers. These barriers include:

- Uncertainty in Revenue Consistency and Predictability.
- Lack of Awareness & Lack of Access to Trusted Information and Knowledge.

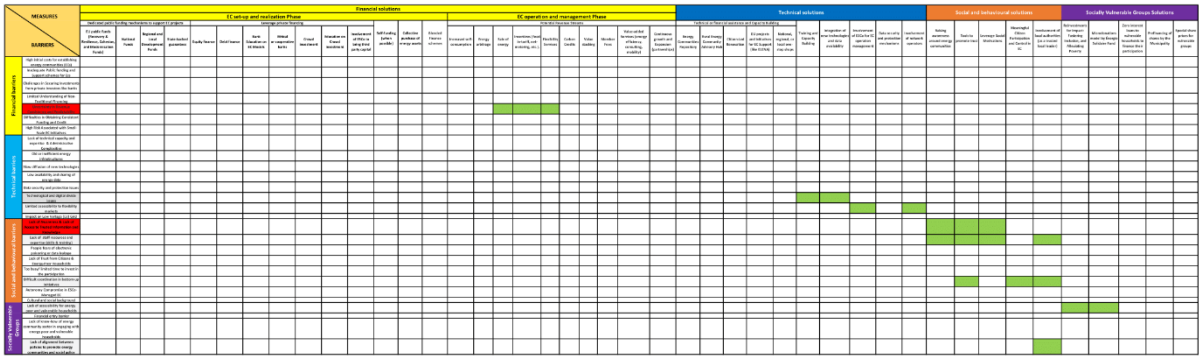


Figure 13 UMU PoC pilot community - Spain

1st Barrier of UMU (Spain) PoC pilot community: Uncertainty in Revenue Consistency and Predictability – **(Financial Barrier)**

List of Potential Measures to overcome this financial barrier:

A. Involvement of ESCo for Optimal Resource Utilization: By trusting an Energy Saving Company (ESCo) with more sophisticated digital tools that nurture ECs with smart resource utilization.
B. Participation in Flexibility Markets: ECs can participate in flexibility services (e.g. demand response mechanisms) to create additional revenues for the community. The latter, in turn, might attract further investors in the project in view of a more reliable economic gain.

C. Value Stacking: Optimizing energy usage for enabling value stacking that is defined as bundling of grid applications, creating multiple value streams, which can improve the economics for EC distributed energy resources.

2nd Barrier of UMU (Spain) PoC pilot community: Lack of Awareness & Lack of Access to Trusted Information and Knowledge – **(Social and Behavioural Barrier)**

List of Potential Measures to overcome this Social and behavioural barrier:

A. Clear and effective awareness campaigns: Implement campaigns to clearly communicate important information to different stakeholders can help address several barriers that ECs face in terms of awareness and lack of capacity.

B. Utilise national, regional, or local one-stop shops for ECs around Europe: Several Member States are creating different ways of supporting and raising awareness and providing technical advice on how to get started with EC projects. This has led to the emergence of many one-stop shops for ECs around Europe that can be found here (ECs - One-stop-shops). These one-stop shops for ECs usually provide information and expertise covering different activities related to the renewable energy and community energy projects.

C. Involvement of local authorities: Local and regional government authorities have a role in bringing community initiatives together, and to provide them with support. So, check with your Local and regional government authorities in case they have already some initiative going on related to raising awareness around ECs and facilitating access to expertise.

7. CONCLUSION

The work being done in T3.1 Modelling of multi-level incentive mechanisms to enhance proactive participation in ECs is planned to be delivered in two reports. D3.1 Modelling consumers and communities (due date M15) and Modelling consumers and communities – update (due date M30).

The first report D3.1 establishes a foundational understanding for subsequent phases of the project, exploring various categories of participation barriers in ECs—ranging from financial and technical to social and behavioural obstacles. This report has facilitated the identification and examination of targeted measures, including financial instruments, technical assistance programs, and other incentive and support mechanisms. These measures, which address both economic and non-economic factors, aim to mitigate EC participation barriers and foster active engagement among citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy initiatives. By employing the Barriers vs. Measures Matrix framework, we have gained insights into the complexity and interconnectivity of these challenges, allowing us to effectively map and associate specific measures with the identified barriers. Moreover, we adapted the general EC Barriers vs. Measures Matrix to our pilot-specific contexts, enabling us to pinpoint the most relevant obstacles encountered by the MASTERPIECE pilot communities. This tailored approach has provided these communities with customised measures to overcome their unique challenges.

For D3.1 due in M15, we have strategically decided to stay focused by selecting only a few barriers from each pilot community. This approach allowed us to provide targeted measures for overcoming these specific barriers. Additionally, we diversified our selection across different pilot communities, covering all categories of barriers and offering comprehensive measures for their removal.

For the forthcoming D3.2, scheduled for Month 30, we plan to broaden our analysis of measures to include financing and funding options, technical assistance, and various other incentives and support schemes. This will involve keeping updated of relevant calls for proposals that could benefit the MASTERPIECE pilot communities. Additionally, we aim to address all identified barriers within these communities, providing them with bespoke measures to eliminate specific obstacles. As part of D3.2, we also intend to conduct a workshop for the MASTERPIECE pilot communities to inform them about the various available support mechanisms and assist them with applications to access these resources.

Lastly, we acknowledge that the vast majority of measures identified—including financing and funding options, technical assistance, and other support mechanisms—have exceeded the capacity of our current matrix to effectively manage. Consequently, for D3.2, we have decided to develop a web-based tool called Compass featuring an improved user interface. This tool will offer targeted measures and strategies, both economic and non-economic, to streamline participation for citizens, prosumers, socially vulnerable groups, and communities in distributed generation and community energy projects.

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APPENDIX

Appendix 1 – Overview of Private Financing Instruments

Private finance instrument	Description	Considerations for ECs
Equity finance (Equity financing involves the sale of a stake (ownership interest) to raise capital for business purposes.)[65]		
Share offer and Self-financing (Equity capital)	In the context of ECs, a share offer is simply granting a share of the EC's capital to its members. To become a member of the EC, then, it is necessary to own a portion of shares of the EC. Therefore, the ownership of a share of the EC provides governance rights to its members. Self-financing occurs when funds are raised by EC members rather than private investors. The return on this type of investment is share interest, typically paid out at the end of the financial year and varies depending on the members' decision on how profits are distributed.	In the context of REC (and other community) projects, shares can spread the cost and risk of acquisition across many shareholders. Where commercial businesses fail through a lack of demand; ECs can address this by aggregating demand and ensuring that the business serves the community. A business might be unable to control costs resulting in unaffordable prices; a community can reduce costs by volunteering, or by providing cheaper capital. In an EC, members who invest equity in the RES project are given a single vote, regardless of the size of their investment. This has a positive impact on the governance of the EC, for it allows for transparent governance.
Closed-end private equity mutual funds with silent partners	Just Like mutual funds, private equity funds are pooled investment vehicles where an adviser utilises the funds pooled to make investments on behalf of the fund. A closed-end fund is a fund that has a fixed number of shares that are offered during an initial subscription period. Once the subscription period ends, the shares are traded between investors. Private equity funds typically take a controlling interest in an operating business and engage actively in the management of the business, with the idea in mind to increase its value.	ECs could maintain their autonomy when using this financing instrument by enlisting investors as silent partners (i.e., an investor that becomes a member of the EC by contributing capital but plays an inactive role in decision-making). Closedend private equity mutual fund with silent partners has been used by German coop OekoGeno under its OekoGeno GmbH project, which issues funds dedicated to the financing of RES projects. While this instrument has proven a best practice, it might be challenging in contexts where investor protection discourages private equity mutual funds as a financial model for public participation.

[65] Equity Financing: What It Is, How It Works, Pros and Cons (investopedia.com)

Private finance instrument	Description	Considerations for ECs
Debt finance (Debt financing involves raising capital by selling debt instruments to investors.[66]		
Bank loans from commercial banks	This term refers to traditional loans provided by commercial banks. There are various types of loans that a commercial bank offers, however, in general, all of them have a fixed payback period and an interest rate.	Bank loans are relatively expensive and involve high demands in relation to own equity, etc
Ethical loans	Ethical loans are loans issued by banks whose mission is to support cultural, social, and ecological projects rather than maximising profit. An ethical bank does not invest in financial markets, and issues loans exclusively to economically viable projects of the social economy: organic agriculture, social or cultural projects, energy saving, renewable energy production, etc.	Ethical loans, like other types of sustainability loans (i.e., green loans, sustainability-linked loans, and social loans) may not necessarily be arranged by ethical banks, but also by regular commercial banks. The rate for this kind of loan might be lower than regular bank loans.
Green loans	Green loans are any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and/or existing eligible Green Projects (including in RES). Green loans and green bonds are similar in that both raise capital for green eligible projects. However, a green loan is based on a loan that is typically smaller than a bond and done in a private operation. A green bond usually has a bigger volume, may have higher transaction costs, and could be listed on an exchange or privately placed.	Green loans might be of particular interest for ECs, as capital may be cheaper under these instruments (i.e., lower rates) provided Environmental, Social, and Governance (ESG) Key Performance Indicators (KPIs) are achieved. The rate for this kind of loan is usually fixed.
Sustainability linked loans	Sustainability linked loans are any type of loan instruments and/or contingent facilities (such as bonding lines, guarantee lines or letters of credit) which incentivise the borrower's achievement of ambitious, predetermined sustainability performance objectives. The borrower's sustainability performance is measured using sustainability performance targets (SPTs), which include KPIs, external ratings and/or equivalent metrics and which measure improvements in the borrower's sustainability profile	Sustainability-linked loans might be of particular interest for ECs, as capital may be cheaper under these instruments (i.e., margin adjustment mechanisms) provided ESG KPIs are achieved. For this kind of loan, there may be a margin adjustment mechanism in place. Depending how the borrower meets sustainability KPIs, the rate may fluctuate – decreasing if all KPIs are met or increasing if one or more KPIs are not fulfilled

[66] How Debt Financing Works, Examples, Costs, Pros & Cons (investopedia.com)

Private finance instrument	Description	Considerations for ECs
Social loans	Social loans are any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and/or existing eligible Social Projects (e.g., projects that target people living below the poverty line, excluded and/or marginalised populations and/or communities, people with disabilities, migrants and/or displaced persons, undereducated, underserved, owing to a lack of quality access to essential goods and services, unemployed, women and/or sexual and gender minorities, ageing populations and/or vulnerable youths, and other vulnerable groups, including as a result of natural disasters)	This type of loans can be channelled to finance REC projects that target energy poverty. For this kind of loan, there may be a margin adjustment mechanism in place. Depending on how the borrower meets sustainability KPIs, the rate may fluctuate – decreasing if all KPIs are met or increasing if one or more KPIs are not fulfilled.
Soft loans	Soft loans are loans provided at a no-interest or below market interest rate, or with favourable financing conditions for the borrower often including coaching and technical support.	
Green bonds	Green bonds are fixed-income instruments used to finance projects that deliver environmental benefits. They are an instrument of debt from the bond issuer to the bond holder, where the former is usually obliged to pay interest and pay back the principal at the bond maturity date. The bond issuer can use the funds to finance longer term investments.	Bonds are hardly accessible for individual ECs (as they are too small in scale and represent a high risk for investors). Rather, banks may issue their own bonds based on a portfolio of many small loans granted to individual ECs. Nonetheless, for ECs seeking to seize the financing opportunities of green bonds, the Energy Community Secretariat launched a webinar series in 2022 to raise awareness of green bonds and mobilise this type of finance in the Western Balkans. The focus was on the tools needed to attract potential investors and the presentations used in the webinars are available on the ECS webpage
Alternative Financing Schemes (Bottom-up financing involves raising funds through citizen and bottom-up financial initiatives).		
Peer-to-peer investment platforms	Peer-to-peer investment (P2PI) or peer-to-peer lending (P2PL) is the practice of funding loans for businesses or individuals without traditional financial intermediaries and who are known to the investor. P2PI is widely accessible through peer-to-peer investment platforms, which offer prospective investors a wide range of investment opportunities. Borrowers accept a loan at the lowest interest rate	In this case, peers are individuals who lend to other individuals grouped in an EC.

Private finance instrument	Description	Considerations for ECs
Crowdfunding	Crowdfunding is a way to raise money to finance projects and businesses. It enables fundraisers to collect money from a large number of people via online platforms. Mostly start-up companies use crowdfunding. There are different types of crowdfunding, including equity crowdfunding, rewards-based crowdfunding, donation-based crowdfunding, profit sharing, and hybrid models. While often grouped together, crowdfunding differs from P2PI in which crowdfunding is higher risk (and higher return) and therefore tends to attract savvy investors (i.e., those with high level of financial knowledge).	The same crowdfunding legislation does not apply to every country in the EU. Before engaging in detailed preparatory work, ECs should acquaint themselves with the rules that apply in their country. Crowdfunding legislation sets the amount that can be raised, type of investor participation, prospectus requirements, etc. Crowdfunding is more suitable for financing solar PV and wind power projects because of their technology maturity, modularity, high reliability, simplicity of the power generation process and availability of technical services for these RES.
Energy Performance Contracting	Energy Performance Contracting (EPC) is a form of creative financing for capital improvement which allows funding energy upgrades from cost reductions. Under an EPC arrangement, an external organisation (Energy Service Company - ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings or the renewable energy produced to repay the costs of the project (including the costs of the investment). Essentially, the ESCO will not receive its payment unless the project delivers energy savings as expected.	

Appendix 2 – Overview of Public Funding and Financing Instruments

Public finance instrument	Description	Considerations for ECs
Shared management funds (EU and National co-financing)		
Recovery and Resilience Facility[67]	The Recovery and Resilience Facility is a temporary recovery instrument that allows the Commission to raise funds to help repair the immediate economic and social damage brought about by the coronavirus pandemic. It offers grants and loans to support reforms and investments in the EU Member States for a total of **€723.8 billion in current prices.** To utilise the funds from Recovery and Resilience Facility, all Member States have already prepared and submitted their National Recovery and Resilience Plan consisting of reforms and investments (to be implemented by end of 2026) to make their economies and societies more sustainable, resilient and prepared for the green and digital transitions.	The Commission's Guidance on the NRRP **explicitly calls for 37% of funds to be allocated to climate action (including renewable energy).** This creates ample opportunities for public financing to support ECs. Italy is a great example of utilising the Recovery and Resilience Facility to support renewable ECs and self-consumers in Italy. The **National Recovery and Resilience Plan of Italy** earmarks 2,2 billion euro in support for ECs (ECs) and self-consumptions schemes (SCSs), aiming at a target of 2,500 Gwh of clean, community-led energy produced in Municipalities with less than 5.000 inhabitants[68].
RePowerEU[69]	In the context of the Russian invasion of Ukraine, the European Union implemented the REPowerEu plan to cut off the importation of Russian fossil fuels. With this aim, the Commission asked Member States to insert RepowerEU chapters into their National Recovery and Resilience Plan (NRRP). The REPowerEU plan aimed to **mobilise close to EUR 300 billion for Member States to update their recovery and resilience plans**, providing additional support for energy efficiency and renewable energy measures.	The Commission's Guidance on the drafting of the REPowerEU chapters, explicitly encourages the **funding of ECs** as a means of tackling energy poverty. Once publicly available, we need to analyze Member States' modified Recovery and Resilience Plan with RepowerEU chapters to find out if they have some investments or reforms planned to support ECs in their countries. For instance, there are no investments or reforms to support ECs foreseen in the REPowerEU chapter of Sweden's modified Recovery and Resilience Plan.

[67] Recovery and Resilience Facility

[68] Italy - Recovery and Resilience Fund - REScoop

[69] REPowerEU

Public finance instrument	Description	Considerations for ECs
Modernisation Fund[70]	The Modernisation Fund (MF) is a dedicated funding programme to support 10 lower-income EU Member States in their transition to climate neutrality by helping to modernise their energy systems and improve energy efficiency.	ECs can cover all the activities listed under the priority areas of the fund (e.g., renewable energy generation, energy efficiency, promotion of a just transition). Therefore, they could be supported through this fund. Actually, there are already a few countries in which MF funds have been awarded for programmes on ECs. In 2021, Hungary was awarded €20 million for programmes for the development of ECs, seemingly focused on RES.
Structural Funds (mainly ERDF and ESF) funded by Cohesion policy funds[71]	Structural Funds (mainly ERDF and ESF) are part of Cohesion policy funds. In 2021-2027 EU funds allocated to Cohesion Policy amount to **EUR 392 billion**. With the national co-financing, about half a trillion euro will be available to finance the programmes in the EU regions and countries. ● European Regional Development Fund (ERDF) to invest in the social and economic development of all EU regions and cities. ● European Social Fund Plus (ESF+) to support jobs and create a fair and socially inclusive society in EU countries. Funds from the ERDF and ESF+ are allocated in three categories of regions (less developed, more developed, in transition) in the Europe.	Structural Funds (mainly ERDF and ESF) finance programmes in shared responsibility between the European Commission and national and regional authorities in Member States. Information on whether and how Structural Funds (mainly ERDF and ESF) funded by Cohesion policy funds are being used by MASTERPIECE Targeted Countries to support ECs. **Italy:** The various different Regional Operational Programs explicitly mention ECs and allocate specific budgets to promote and support the setup of new ECs. **France:** There are no mentions of ECs in France's Structural Investment funds. **Sweden:** There is no mention of ECs in any of the plans, nor are there any supportive measures foreseen.
EU Research and Innovation Funding Programmes		
Horizon Europe[72]	Horizon Europe, the EU's research and innovation funding programme, succeeds Horizon 2020, which was active between 2014 – 2020.	One of the key objectives of Horizon Europe "Cluster 5" focusing on climate, energy and mobility is the development and integration of renewable energy technologies, enhancing energy efficiency, and ensuring a secure and sustainable energy supply which is pretty aligned with community energy projects.

[70] Modernisation Fund - European Commission
[71] Cohesion Policy Funds 2021-2027
[72] Horizon Europe

Public finance instrument	Description	Considerations for ECs
LIFE Programme[73]	The LIFE Programme is the EU's funding instrument for the environment and climate action. Building on the success of the Intelligent Energy Europe (2003-2013) and Horizon 2020 Energy Efficiency (2014-2020) programmes, the LIFE Clean Energy Transition sub-programme continues to support the delivery of EU policies in the field of sustainable energy, in particular, the European Green Deal, the Energy Union (2030 energy and climate targets) and the European Union's 2050 long-term decarbonisation strategy.	There is an increasing recognition of the need to develop specific tools to support ECs in their development. For example, the LIFE Programme had multiple calls for proposals open on developing support mechanisms for ECs. This includes the development of financial tools to facilitate the emergence of community energy projects and their access to citizen finance and bank loans.
Connecting Europe Facility (CEF)[74]	The objective of the Connecting Europe Facility (CEF) programme is to accelerate investments in Europe's transport, energy and digital infrastructure networks to support the European Green Deal and the EU's Digital transformation.	CEF 2021-2027 emphasises synergies between the transport, energy and digital sectors, with a significant budget allocated for energy projects, including those related to ECs.
Innovation Fund[75]	The Innovation Fund, financed by EU Emissions Trading System revenues, is one of the world's largest funding programmes for the demonstration of innovative low-carbon technologies. The Fund focuses on highly innovative clean technologies and big flagship projects with European added value that can bring significant emission and greenhouse gas reductions.	Innovation Fund projects cover a wide range of innovative technologies in areas such as energy-intensive industries, renewables, energy storage, net-zero mobility and buildings, hydrogen, and carbon capture, use and storage. Projects covering targeted sectors with ECs concept can target Innovation Fund calls for proposals.
Technical assistance and advisory support		
ELENA (European Local Energy Assistance)[76]	The ELENA provides grants and technical advice to the public and private sectors to help energy efficiency projects., renewable energy and sustainable transport projects, thus reducing greenhouse gas emissions.	ELENA supports the preparation of projects that improve energy efficiency and renewable energy use in buildings, including energy efficiency in residential and non-residential buildings, building-integrated renewables (such as solar panels), public lighting, district heating (including combined heat and power plants and biomass boilers), and smart grids.

[73] LIFE - European Commission
[74] Connecting Europe Facility
[75] Innovation Fund
[76] ELENA – European Local ENergy Assistance

Public finance instrument	Description	Considerations for ECs
		Projects implementing energy efficiency, renewable energy and sustainable transport projects with ECs concept can target ELENA facility.
Innovation Fund - Project Development Assistance[77]	The EIB offers support to the Innovation Fund through Project Development Assistance (PDA). The PDA will offer tailor-made support to selected projects, with the goal to increase project maturity for subsequent Innovation Fund calls.	Projects focused on ECs targeting Innovation Fund calls can indeed be eligible for Innovation Fund - Project Development Assistance.
European Energy Efficiency Fund – Technical Assistance Facility (eeef - TAF)[78]	European Energy Efficiency Fund – Technical Assistance Facility (eeef - TA) supports projects in the sector of energy efficiency and partly small-scale renewable energy. eeef-TA aims to bridge the gap between sustainable energy plans and real investments by supporting the beneficiary by way of allocating consultant services to the planned investment programmes (for example for feasibility studies, energy audits and evaluating the economic viability of investments, legal support). It also covers direct staff costs of the TA beneficiaries if required. Should the investment programme not be financed by eeef, the reimbursement of services previously paid by eeef is mandatory.	Projects focused on ECs targeting energy efficiency and small-scale renewable energy can indeed be eligible for European Energy Efficiency Fund – Technical Assistance Facility (eeef - TAF).
Financial Institutions Instruments		
European Investment Bank (EIB)[79]	EIB has aligned all financing activities with the principles and goals of the Paris Agreement, a commitment that builds a pathway towards low greenhouse gas emissions and climate-resilient development.	With its ambitious Energy lending policy (ELP), the EIB has achieved a milestone in the fight against climate change. EIB has decided to phase out the financing of unabated fossil fuel energy projects[80].

[77] Innovation Fund - Project Development Assistance

[78] European Energy Efficiency Fund – Technical Assistance Facility (eeef - TAF)

[79] European Investment Bank

[80] EIB energy lending policy

Public finance instrument	Description	Considerations for ECs
	A wide variety of loans, equity and guarantee products combined with advisory services are offered to both large companies and SMEs supporting this ambition.	
European Investment Bank (EIB) Loans[81]	Investment loans for single large investment projects. Cities and regions have a variety of financing needs. When a single large investment project needs long-term funding, the European Investment Bank (EIB) can provide dedicated project-specific loans, which are known as Investment loans. EIB lends to individual projects for which total investment cost exceeds EUR 25m. EIB support is often the key to attracting other investors. EIB lends to the public and private sectors.	Large scale community energy investment projects could target these loans.
European Fund for Strategic Investments (EFSI)[82]	The EFSI aims to overcome the current investment gap in the European Union (EU) by mobilising private financing for strategic investments which the market cannot finance alone. It will support strategic investments in infrastructure as well as risk finance for small businesses.	The fund will focus its financing on investments in infrastructure and innovation, as well as finance for Small- and Medium- sized Enterprises (SMEs). ECs could also target this fund.

[81] EIB Loans

[82] The European Fund for Strategic Investments

Appendix 3 – Barriers vs. Measures Matrix

MEASURES		Financial Measures																								Technical Measures										Social and Behavioural Measures					Socially Vulnerable Groups Measures				
		EC set-up and realization Phase														EC operation and management Phase																													
		Dedicated public funding mechanisms to support EC projects				Leverage private financing										Potential Revenue Streams										Technical or financial assistance and Capacity Building																			
BARRIERS		EU public funds (Recovery & Resilience, Cohesion, and Modernisation Funds)	National Funds	Regional and Local Development Funds	State-backed guarantees	Equity finance	Debt finance	Bank Education on EC Models	Ethical or cooperative banks	Crowd investment	Education on Crowd investment	Involvement of ESCo to bring third party capital	Self-funding (when possible)	Collective purchase of energy assets	Blended Finance schemes	Increased self-consumption	Energy arbitrage	Sale of energy	Incentives (feed-in-tariff, net-metering, etc.)	Flexibility Services	Carbon Credits	Value stacking	Member Fees	Value-added Services (energy efficiency, consulting, mobility)	Continuous growth and Expansion (partnerships)	Energy Communitie Repository	Rural Energ Community Advisory Hub	Citizen-Led Renovation	EU projects ar initiatives fo EC Support (like ELENA)	National, regional, o local one-stop shops	Training an Capacity Building	Integration o new technologi and data availability	Involvemen of ESCo for E operation managemen	Data securit and protectio mechanism	Involvemen of networ operators	Raising awareness around energ communitie	Tools to promote tru	Leverage Soc Motivation	Meaningfu Citizen Participatio and Control EC	Involvement local authorit (as a truste local leader	Reinvestmen for Impact Fostering Inclusion, an Alleviating Poverty	Microdonatio model by Éner Solidaire Fun	Zero intere loans to vulnerable households finance the participatio	Prefinancing shares by th Municipalit	Special sha prices fo vulnerabl groups
Financial Barriers	High initial costs for establishing energy communities (ECs)																																												
	Inadequate Public funding and Support schemes for Ecs																																												
	Challenges in Securing Investments from private investors like banks																																												
	Limited Understanding of Non-Traditional Financing																																												
	Uncertainty in Revenue Consistency and Predictability																																												
	Difficulties in Obtaining Consistent Funding and Credit																																												
	High Risk Associated with Small-Scale EC Initiatives																																												
Technical Barriers	Lack of technical capacity and expertise & Administrative Complexities																																												
	Old or inefficient energy infrastructures																																												
	Slow diffusion of new technologies																																												
	Low availability and sharing of energy data																																												
	Data security and protection issues																																												
	Technological and digital divide issues																																												
	Limited accessibility to flexibility markets																																												
	Impact on Low Voltage (LV) Grid																																												
Social and Behavioural Barriers	Lack of Awareness & Lack of Access to Trusted Information and Knowledge																																												
	Lack of staff resources and expertise (skills & training)																																												
	People fears of electronic poisoning or data leakage																																												
	Lack of Trust from Citizens & Energy-Poor Households																																												
	Too busy/ limited time to invest in the participation																																												
	Difficult coordination in bottom-up initiatives																																												
	Autonomy Compromise in ESCo-Managed EC																																												
	Cultural and social background																																												
Socially Vul	Lack of accessibility for energy poor and vulnerable households																																												
	Financial entry barrier																																												

	Lack of know-how of energy community sector in engaging with energy poor and vulnerable households																																												
	Lack of alignment between policies to promote energy communities and social policy																																												