

MASTERPIECE

Multidisciplinary Approaches and Software Technologies for Engagement, Recruitment and Participation in Innovative Energy Communities in Europe

Deliverable 2.5

**Assessment of energy communities' maturity and
aspirations in the pilot cases**

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1 EXECUTIVE SUMMARY

This report, prepared by Experientia, presents the preliminary findings and insights obtained from research, surveys, and preliminary contextual inquiries conducted for the MASTERPIECE project. The project aims to revolutionize the energy communities (ECs) landscape in Europe by establishing an innovative platform that promotes creation, coordination and cooperation among different forms of ECs. Four real-life pilots located in France, Italy, Sweden and Turkey are being implemented to showcase the transformative potential of the platform and contribute to sustainable development.

The report starts with the executive summary in Section 1.

Section 2 provides an introduction to the deliverable and the objectives of the project.

Section 3 provides an assessment of existing frameworks in ECs, examining their social and behavioural characteristics and their role in the energy transition. It also classifies the categories and subcategories of ECs and defines their types. Additionally, it presents a preliminary mapping of relationships between current EC users, prospective users, and stakeholders.

Section 4 describes the assessment methodologies used and to be used in the project, including a conducted survey and the planned intervention program. Section 5 presents the preliminary findings extracted from the survey, revealing patterns of behaviour within the four pilots and highlighting the importance of their heterogeneous characters. Further investigation will be conducted to better understand these patterns and identify key factors contributing to the success of engaged Energy Communities.

Section 6 provides an early overview of the nudging and boosting mechanisms, which will be central to the project's work in future deliverables (D3.6 and D3.7 in WP6). The work on Section 7 have just started, hence the results will be outlined in the next release foreseen in month 24.

And finally, section 8 concludes with a summary of potential key findings and a preliminary proposed approach.

The report represents Deliverable 2.5 and lays the groundwork for the next stages of the project, where user profiling, behavioural patterns, and further investigations will be conducted. The MASTERPIECE project aims to foster active participation in collaborative energy communities, contributing to a new paradigm in the energy market.

2 INTRODUCTION

This report represents Deliverable 2.5 and is prepared by Experientia. It intends to provide an overview of the preliminary findings and insights which have been obtained through research, surveys, as well as an early look at contextual inquiries targeting active community hubs. It also provides a set of early quantitative and qualitative data that was collected during the early stages, on which Experientia will build the user profiling and behavioural patterns associated with the pilots in the next stages as well as in WP3.

2.1 Objectives

MASTERPIECE project is an ambitious initiative with a clear path focused on revolutionising the creation and operation of the energy communities (ECs) landscape in Europe. The project strives to establish an innovative platform that enables coordination and cooperation in the context of the different forms of Energy Communities. Through a staged implementation approach focusing on 4 real-life pilots in 4 different geographical locations (France, Italy, Sweden, Turkey), MASTERPIECE aims to showcase the transformative potential of its platform and contribute to the sustainable development of energy communities across Europe.

Furthermore, MASTERPIECE seeks to pave the way for a new paradigm in the energy market. To achieve this ambition, the project focuses on proactively initiating a shift in traditional energy consumers to become active participants in collaborative energy communities.

As stated in D1.4 the project's objectives are:

- to develop technical and social innovations to empower traditional energy consumers and to make them active agents of collaborative energy communities, paving the way towards a new energy market paradigm.
- to create user-centric solutions that are based on participatory approaches such as co-creation and naturally accelerate citizens' involvement.
- to propose new business strategies and incentive mechanisms that activate the reactions of market participants craving business opportunities that imply energy use and cost reduction.
- to configure a standardised and sound cyber-security infrastructure, so the active citizens are protected against cyberattacks, while privacy is defended in accordance with the revised EPBD and the GDPR law
- to demonstrate the applicability and replicability of methodological, technical and business innovations in a variety of real-life pilots in different geographical locations, with heterogeneous social and economic environments and different regulatory/administrative frameworks.

2.2 Relation to Other Tasks

In addition, this report outlines the elements of a roadmap that is required to be set as the main guideline for the submission of D26 in month 24. The main objective remains to develop a well-defined pathway for the initiation of a productive and collaborative energy community.

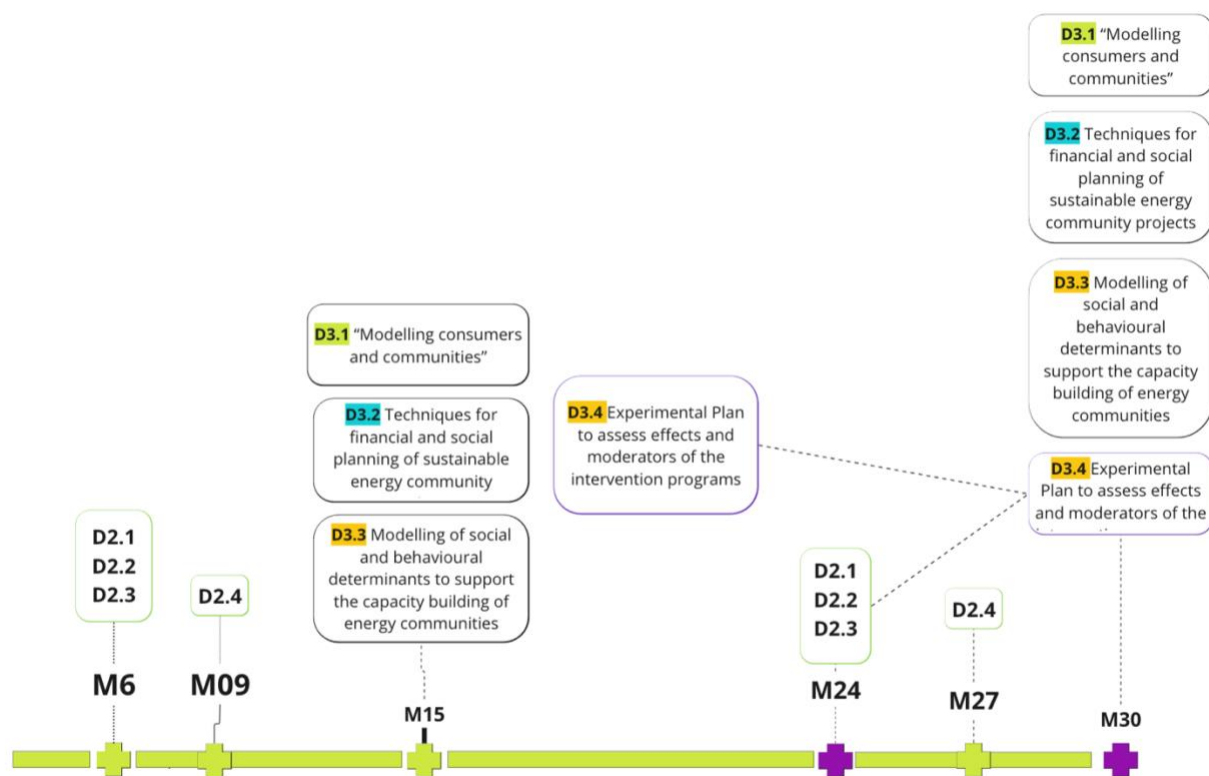


Figure 1: Experientia's tasks and deliverables relationship in WP2 and WP3

2.3 Structure of the document

Section 3 titled as "Assessment of Existing Frameworks in ECs" will lay down a preliminary general observation of the current situation of EC in EU. It will tackle a research observation on the social and behavioural characteristics and describing the role of EC in the energy transition. Also, this section will classify the categories and subcategories of EC, as well as defining their types. And finally, we close section 3 by defining the type of current EC users, prospective users, stakeholders and providing a preliminary mapping of their relationships.

Section 4, "Assessment of Pilots' current situation" describes the different assessment

methodologies that are and/or will be used in the project. A survey has been already conducted and will be more discussed. A description of the intervention program that is going to be launched in M24.

Section 5 will lay down the preliminary findings extracted from the survey. It allows a first look at the patterns of behaviour displayed in the four pilots, which can be traced to an intricate network of interactions between community members.

The initial inquiry revealed a specific path based on the Pilots and the importance of their heterogeneous characters. It comprises several stages and it holds great potential for the promotion of an active energy community. In the following months, the focus will shift towards a more comprehensive investigation of this distinctive journey. The objective is to ascertain a better understanding by examining further the data gathered and exploring other sources of the behavioural models and identifying key factors that contribute to the success of engaged Energy Communities.

Most of the content Section 6 will be the work of D2.6 in month 24, therefore it will be extended on the second version of this deliverable. However, in this report, we provide our early overview of both the nudging and boosting mechanisms. Two main mechanisms that are going to be the cornerstone of our work for D3.5 and D3.6 in WP3.

The work on Section 7 have just started, hence the results will be outlined in the next release foreseen in month 24.

And finally, Section 8 will provide a Summary of key potential findings as well as a Preliminary proposed approach.

3 ASSESSMENT OF EXISTING FRAMEWORKS IN ECS

3.1 A preliminary social and behavioural observation of the current situation EC in EU

When examining the various definitions of an energy community (EC), it is notable that most definitions focus on characterizing the key elements that shape the EC ecosystem. To provide a comprehensive understanding of these definitions, we can shape the common main characteristics of ECs as follows:

"Who": The first aspect to define is the composition of the EC, which includes the associations of actors. These actors encompass both users and stakeholders, or in simpler terms, citizens and market players. This inclusive definition recognizes the importance of diverse participants coming together to drive the transformation of the energy system.

"What": The common objective shared by the actors within the EC is to transform the energy system. This objective reflects the essence of what the EC aims to achieve. By working collectively, the EC strives to bring about positive changes in energy production and consumption, promoting sustainability and decarbonization.

"How": The collaborative and participatory processes employed within the EC shape the way in which the objective is pursued. By ensuring that, diverse perspectives are considered and integrated, the EC aims to foster inclusive decision-making and engagement. This approach emphasizes the importance of active involvement and the cooperation among the actors within the EC.

"Why": The underlying motivation driving these collaborative efforts is to achieve collective outcomes in energy prosuming (both producing and consuming energy). This motivation encompasses broader goals, such as establishing a more decarbonized and flexible energy system. Additionally, the EC engages in social innovation activities, reflecting its commitment to realizing shared benefits and advancing sustainable energy practices.

By examining the "who," "what," "how," and "why" of the EC, we gain a comprehensive understanding of its purpose and objectives. This multifaceted approach highlights the significance of inclusive participation, collective outcomes, and sustainable energy practices within the EC ecosystem.

3.2 Energy communities and their role in the energy transition

Energy communities have a pivotal role to play in the energy transition. In essence, the energy community's activities are not limited to defining its constituent parts but are also aimed at transforming the traditional energy system through inclusive and participatory approaches. In the field of renewable energy, the success of this form of collective active participation in the energy transition results in aspiring other forms of collectives such as communities, municipalities or even cities. However, this success also extends to energy productivity, which serves as a broader social innovation initiative aimed at advancing the transition towards decarbonized and flexible energy systems in the European Union (EU).

By promoting Energy Communities (ECs) as collective endeavours led by citizens, these communities facilitate the adoption of clean energy and inspire others to initiate or replicate similar success stories. The numerous benefits associated with ECs serve as compelling reasons for the creation of these communities. Notably, ECs contribute to enhanced energy efficiency, reduced electricity costs, increased opportunities for individuals, the utilization of renewable energy sources to minimize reliance on fossil fuels, and the establishment of local employment opportunities.

Furthermore, ECs bring together not only individuals but also a diverse range of stakeholders, including small and medium-sized enterprises (SMEs), private investors, and distribution system operators (DSOs). This collaborative network of citizens and stakeholders operating within the framework of an EC forms a dynamic ecosystem working towards achieving the primary objectives of renewable energy, not only within the EU but also on a global scale.

In summary, the success of ECs as a catalyst for the transition to clean energy not only has a positive impact on energy productivity but also fosters broader social innovation by encouraging the participation of citizens and various stakeholders. These communities serve as a thriving hub dedicated to realizing renewable energy goals, thereby contributing to the advancement of decarbonized and flexible energy systems regionally and globally.

3.3 Energy communities: Categories and subcategories

Renewable Energy Communities (REC)

- Clean Energy Communities (CECs) are associations of actors engaged in energy system transformation through collective, participatory, and engaging processes, seeking collective outcomes. This definition is more comprehensive than the one proposed in the EU's Clean Energy Package as it explicitly recognises the array of actors involved in recent activity, including for-profit enterprises.
- Industrial Energy Community have no citizens involved.
- Virtual Energy communities: Communities that involve commercial partners that are not initiated by citizens or People who are not physically connected together.
- Federated EC: The energy community may grow and involve a larger number of members and energy resources. It may integrate with the national grid or other Energy Communities to leverage synergies and to provide services beyond the community.

3.4 Energy Community Stages

Based on our research, Energy communities can go through different stages of development and growth. Here are some common stages of an energy community:

3.4.1 Proto Energy community

Step 1 - Assessment and knowledge of the existing regulation

Before starting a community, it is crucial to understand the legal setup and regulations surrounding energy communities. The rapid advancement of technology in community

energy systems has led to a lack of consensus among countries regarding regulations and support for communities. In the European Union (EU), the Renewable Energy Directive (EU) 2018/200 (RED II) is an important regulation that member states must adopt. This directive provides a common definition for Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs), which are essential for communities to form as legal entities. However, the translation process and adoption of RED II have been ongoing and uneven across Europe. It is important to stay informed about a country's progress in adopting the RED II directive, as it will determine the right time to establish an energy community.

Step 2 - Building a business case

Developing a convincing business plan is crucial for attracting funding to support an energy community. Lenders and investors may still have reservations about the viability and profitability of energy communities. Securing funds is usually based on the following:

- Defining the purpose of the energy community as well as goals and objectives of the community.
- Assessing production models permitted in the area and understanding the local regulations to ensure compliance and viability.
- Conducting evaluation of the financial aspects for different operating models such as Power Purchase Agreements (PPAs), collective self-consumption, and island mode.
- Selecting energy production technologies that align with the local conditions and resource availability.

Step 3 - Establishing connections and partnerships

Establishing connections and partnerships with key stakeholders is essential for the success of an energy community. Some important actors to engage include:

- Project Partners: A community cannot operate in isolation.
- Distribution System Operators (DSOs)
- Local Authorities

Step 4 - Engaging the relevant stakeholders

Identifying the relevant stakeholders involved in the project and understanding their incentives, ambitions, and potential barriers. Mapping and profiling stakeholders involved in the project will help develop inclusive solutions for all actors involved.

3.4.2 Energy community

Step 5 - Optimization Phase

During this phase, focus on optimizing energy efficiency and resource management within the energy community. Implement advanced technologies and strategies for consumption monitoring, load management, demand response, and distributed energy resource management. Examples of IoT and cloud solutions used in energy management include smart grids, smart buildings, and energy storage solutions.

Step 6 - Maturity Phase

In the maturity phase, the energy community becomes fully operational and stable. Energy management processes are well-established, and the community achieves a high level of energy self-sufficiency and resilience. Sustainable economic models for energy activities management are developed, ensuring the long-term success and viability of the energy community.

3.4.3 Federated Energy Community

During the expansion and integration phase of a federated energy community, the community aims to grow and involve a larger number of members and energy resources.

Integration with the national grid or other energy communities becomes a priority to leverage synergies and extend services beyond the community boundaries.

3.5 A preliminary observation of the existing EC users and stakeholders' profiles in EU

The energy community consists of various key participants who play important roles in its operation. These stakeholders include:

- 1. Energy producers:** They encompass renewable and conventional energy plants such as wind farms, solar power plants, hydroelectric plants, and thermal power plants. These producers generate energy within the community.
- 2. Consumers:** They are the end-users of energy within the community and can include households, businesses, buildings, and other facilities that utilize and consume the energy produced within the community.
- 3. Prosumers:** These individuals are consumers who not only use energy but also can produce energy through distributed generation systems like solar panels or wind turbines installed on their own premises.

- 4. Grid operators:** Responsible for the distribution of energy and coordination of activities within the energy community, these operators ensure the smooth functioning of the energy grid.
- 5. Energy aggregators:** Companies or organizations that gather and manage the energy produced by different producers within the community. They act as intermediaries, optimizing the distribution and utilization of energy between producers and consumers.
- 6. Regulators and regulatory authorities:** Governmental entities or organizations that establish rules and policies for the functioning of energy communities, ensuring compliance and promoting effective energy management.
- 7. Enabling technologies:** These encompass digital technologies such as monitoring and control systems, smart metering systems, smart grids, energy management systems, and energy storage solutions, which enhance the efficiency and effectiveness of energy utilization.
- 8. Local organizations:** Public bodies, non-governmental organizations (NGOs), or local communities that actively participate in the management and promotion of energy communities, contributing to their development and success.
- 9. DSO (Distribution System Operator):** The distribution company responsible for managing the energy produced or requested by the energy communities.
- 10. Flexibility market operator:** Serves as the point of contact between energy communities and energy distributors or suppliers, facilitating the exchange of flexibility resources.
- 11. Shareholders:** Investors who have shown their commitment and support by investing in the community project, sharing in its potential returns.

It is important to note that the specific composition of an energy community may vary depending on the context and objectives, but these stakeholders represent some of the main participants involved in its functioning.

3.6 A preliminary observation of the existing EC users and stakeholders' profiles in EU

As part of our research and analysis, we have identified a comprehensive list of actors and stakeholders within the context of the report. This list consists of various user categories and roles that play a significant role in energy communities and related initiatives. The purpose of this list is to provide a clear understanding of the terminology used throughout the report, ensuring consistent usage and accurate representation of the different user types. By categorizing and defining these actors and stakeholders, the report aims to facilitate a nuanced discussion and analysis of their roles, behaviors, and contributions within the energy community context.

DSO (Distributor):

Distribution company of the energy produced or requested by the energy communities.

Facility manager / Building owners:

Reference point for energy communities with regard to the buildings or houses they live in

Flexibility market operator:

Point of contact between energy communities and energy distributors or suppliers

Asset owners:

Owners of condominiums, buildings, lands, who want to rent their assets to an energy community and make their properties energy self-sufficient.

Shareholders:

Investors who have bet on an income from the community project.

Citizen

- **Consumers** are individuals who play the role of end-users, purchasing goods, products, or services primarily to fulfill personal, social, family, household, or similar needs. Their engagement is focused on satisfying their own requirements without direct involvement in business-related activities.
- **Prosumers**, on the other hand, go beyond traditional consumption by actively participating in the creation and utilization of value. They may produce goods or services for their own use or for others' consumption. Prosumers can receive incentives, such as financial rewards or non-monetary benefits, from organizations involved in the exchange process. These incentives recognize and encourage their dual role as both consumers and producers.

Energy Communities

- **Passive users:**

Passive users refer to community members who avail and benefit from the services provided without actively engaging or showing interest in the community's functioning. They may be unaware of their own consumption patterns and lack involvement in community activities.

- **Simple users:**

Simple users are community members who actively participate to some extent by expressing their opinions and being aware of how the community operates and its role. They have a basic understanding of the community's functions and are conscious of their own consumption behavior.

- **Active Savers with potential:**

Active Savers with potential are users who exhibit a tendency to save energy and adopt energy-efficient practices. They possess knowledge of good energy-saving habits and can influence other members by promoting such practices. They have the potential to create awareness and encourage energy conservation within the community.

- **Influencers:**

Influencers are significant users within the community who hold the power to impact the behavior, energy usage, and choices of other members. They possess influence and credibility within the community, allowing them to shape opinions and guide decision-making processes.

- **Community operator:**

The community operator serves as the representative of the energy community. They can be multiple users who collect requests and manage the overall operations and activities of the community. Their role involves coordinating community initiatives, addressing member concerns, and ensuring the smooth functioning of the community.

- **Opinionated Consumers:**

Opinionated consumers are users who actively take an interest in the progress of the community. They are attentive to the needs and requirements of the community and express their opinions subjectively as individuals. They play a role in providing feedback, sharing perspectives, and contributing to discussions within the community.

Consequently, we have developed, at Experientia, a comprehensive Stakeholders' map (*fig 5 and fig 6*) that is structured into three dimensions, allowing for a more holistic understanding of the various stakeholders involved in the energy landscape:

The (broad) energy ecosystem:

In this dimension, we zoom out to consider the broader energy ecosystem (Fig 2), which includes all the interconnected elements involved in the production, distribution, and consumption of energy. This dimension enables us to identify and analyze the stakeholders operating outside the immediate energy community but who have a significant impact on its functioning and outcomes. This can include energy suppliers, grid operators, technology providers, policymakers, and other key players within the energy industry.

Regulatory and finance:

The regulatory and finance dimension recognizes the importance of understanding the legal and financial aspects that shape the energy community. This dimension (*fig 3*) involves mapping regulatory bodies, policymakers, financial institutions, investors, and other entities responsible for setting rules, providing funding, and creating an enabling environment for the energy community. By considering this dimension, we gain insights into the regulatory frameworks, incentives, and financial mechanisms that influence the behavior and engagement of stakeholders within the energy community.

By structuring our Stakeholders' map across these three dimensions, we ensure a comprehensive and nuanced understanding of the various stakeholders involved in the energy landscape. This approach allows us to identify key relationships, dependencies, and

dynamics between stakeholders across different dimensions, enabling us to develop targeted strategies and interventions that foster collaboration, engagement, and sustainable energy practices.

The Energy community ecosystem:

This dimension focuses on mapping the stakeholders within the energy community itself (*fig 4*). It encompasses individuals, different types of users and prosumers, organizations, facility managers, community operators, EV operator. By mapping stakeholders that actively participate in or are affected by the energy community initiatives, we understand and define their roles, relationships, and their influence on the functioning and development of the energy community.

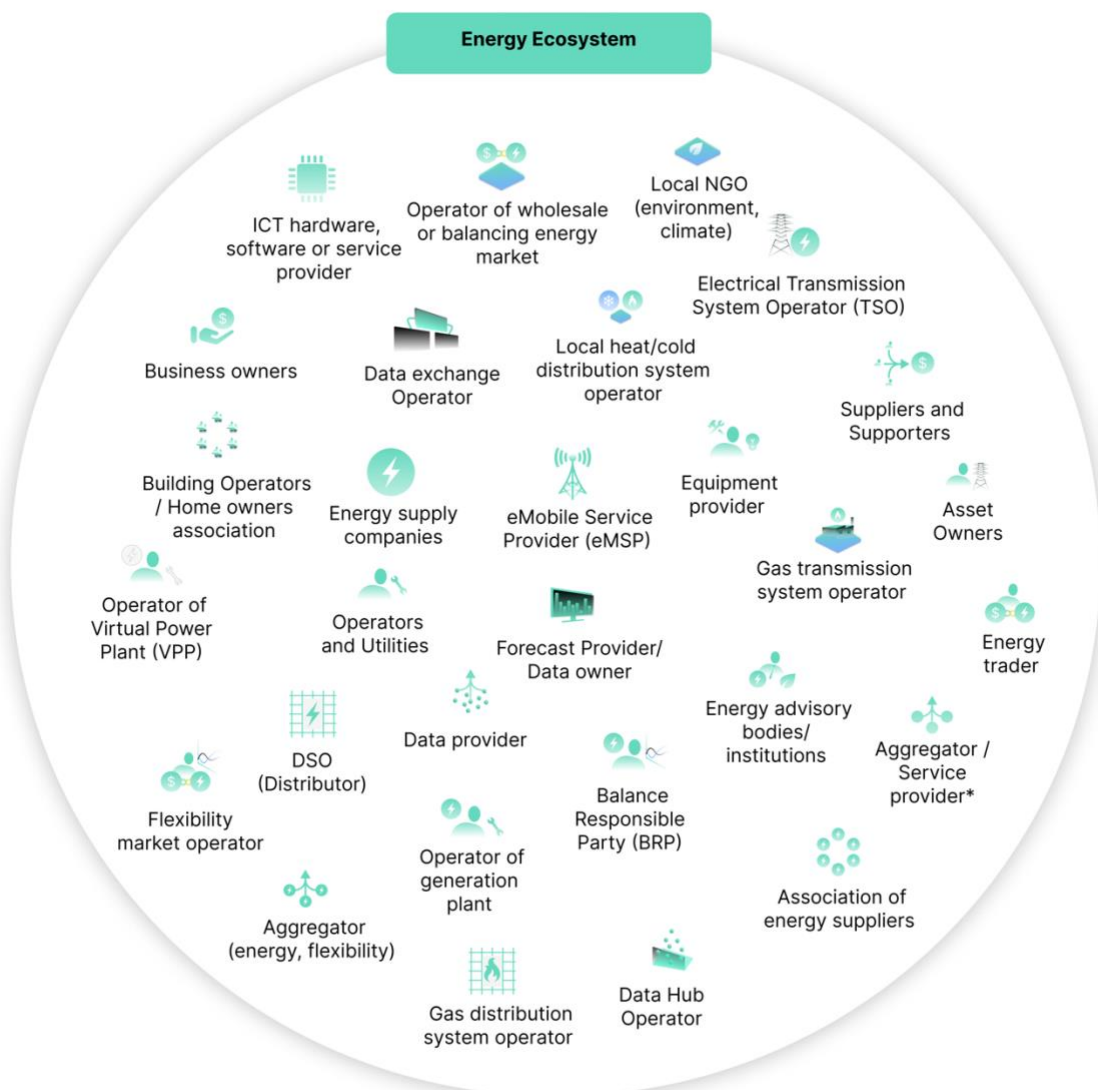


Figure 2: The energy ecosystem

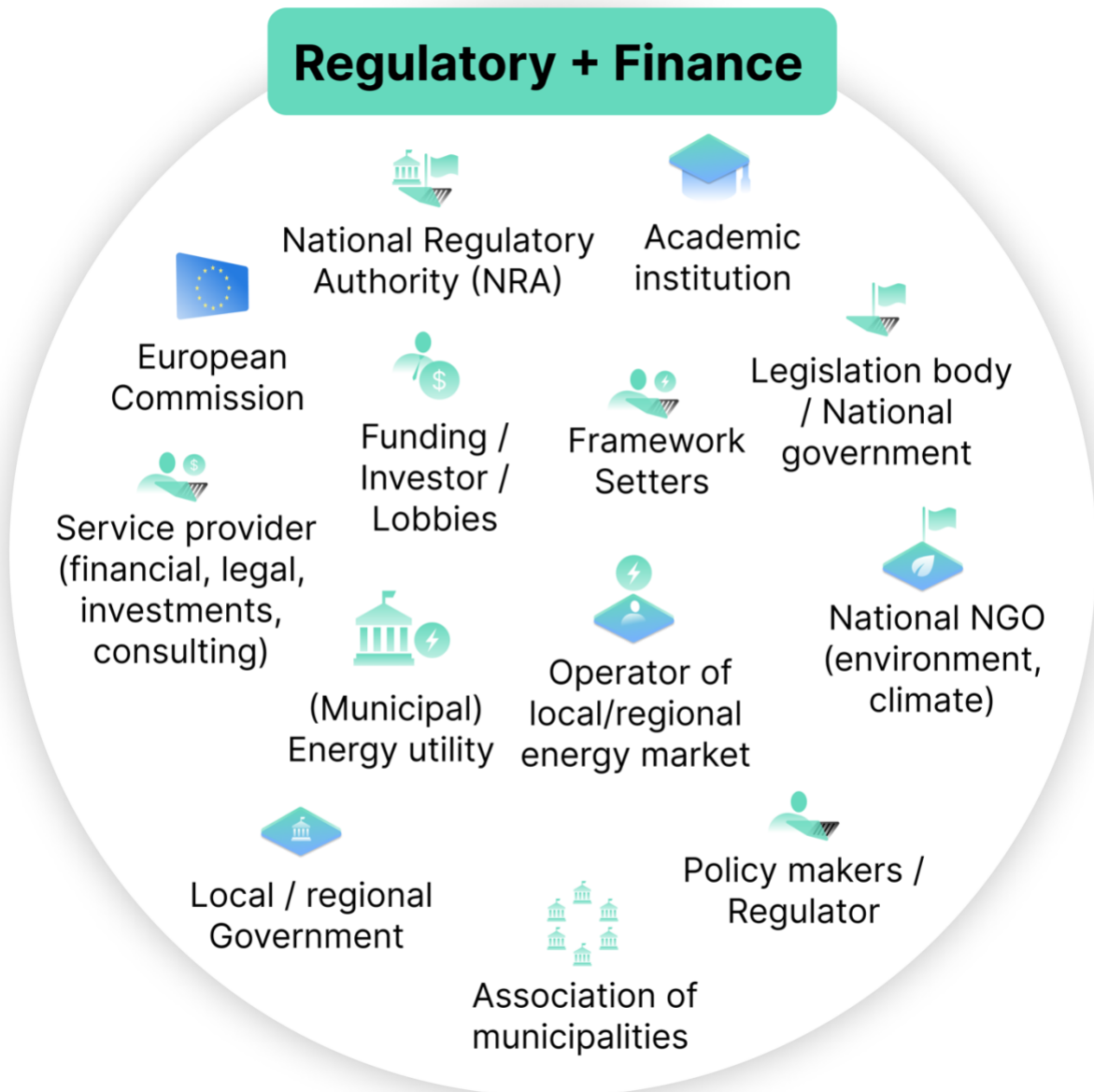


Figure 3: The regulatory and finance system

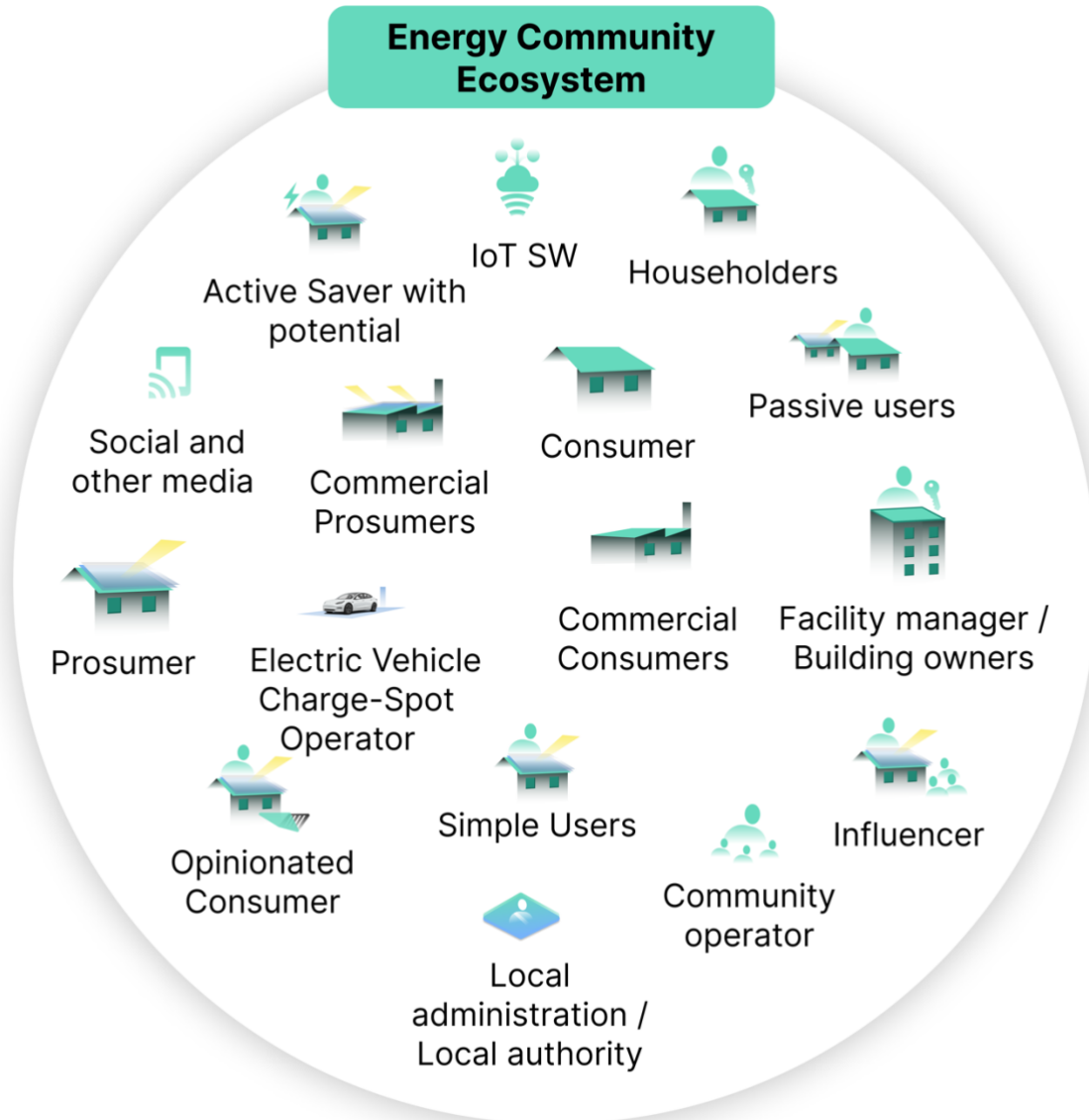


Figure 4: The energy community ecosystem

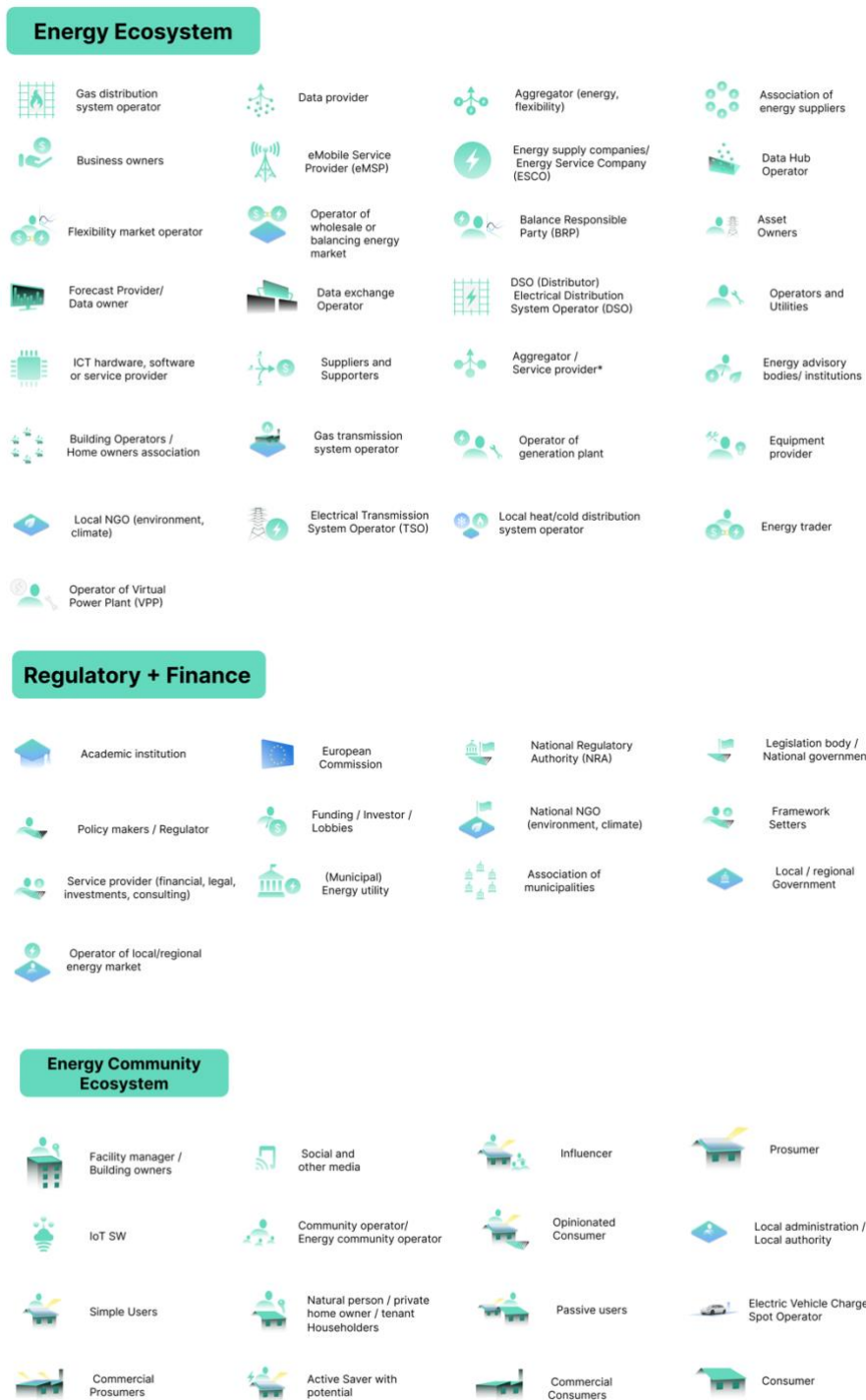


Figure 6: Legend for the Comprehensive EC Stakeholders' map ©Experientia Global SA

4 ASSESSMENT OF PILOTS' CURRENT SITUATION

4.1 Description of the methodology used to assess pilots

4.1.1 Early assessment through survey and data collection

A simple survey has been conducted, with managers of each pilot. For this, we dedicated section 5 of this document to expand on the in-depth analysis of the findings and the data collected from the early survey.

4.1.2 In-field assessment

In the next months of the project, we will organize visits to each pilot to conduct observational fieldwork and contextual inquiries. This on-site approach will provide first-hand observation opportunities to closely monitor the development of ECs, enabling a more comprehensive understanding of the process in each country.

By implementing these strategies, we aim to address the diverse needs of stakeholders and gain valuable insights into user profiles, needs, and the development of Energy Communities within the identified pilot studies.

4.1.3 Intervention program

The central focus of the MASTERPIECE approach is the Intervention Program, which aims to implement and test assumptions and strategies for facilitating the expansion of energy communities. The Intervention Program is planned to start in month 18 of the Project (i.e., June 2024) and will last till month 30 (i.e., June 2025). The program aims to enhance their participation and understanding of energy resource sharing, distribution, planning, and sales dynamics. To gauge the success of the intervention, several key factors will be monitored and measured.

The objectives of the intervention program include a 30% increase in adhesion to energy communities, a 20% increase in federated services within each community, and the development of embryonic models of mobility services in the four pilot sites. These objectives have methodological implications for the program's execution.

Firstly, the engagement and participation methodology will utilize participatory practices to design information display systems on smart meters. The maturity and aspirations of energy communities in the four pilot sites will inform the requirements for engaging various stakeholders and community members in the envisioned processes.

Secondly, automation systems will present aggregated data to users based on their usage characteristics and activity hierarchies. Monitoring, resource aggregation, simulation of energy distribution, and production planning activities will be enabled based on users' access rights and information. These activities and automation algorithms will be developed through modeling activities in Work Package 3.

Thirdly, an Experimental Plan will be designed to evaluate the effects and moderators of the Intervention Programs. The plan will establish economic, behavioural, and cultural moderators to accelerate the formation of collaborative energy communities. This plan will include monitoring, simulation, planning, and sales tasks to verify participation and behavioural stability within the communities.

The Intervention Programs, including the Experimental Plan, represent the current state-of-the-art methodology in social and behavioural sciences. They aim to study individual and community behaviours with automated support in large-scale projects like MASTERPIECE, with the objective of achieving social impact and sustainable innovation. The program is expected to yield guidelines for enhancing management competence, social well-being, and sustainability of energy communities.

Furthermore, the recommendations derived from these experimental studies can establish new methodological standards for accelerating sustainable innovation models. The results obtained can guide policymakers in scaling support programs for energy communities, contributing to their long-term success.

In summary, the MASTERPIECE approach emphasizes the Intervention Program to facilitate the growth and understanding of energy communities. The program's objectives and methodological implications, along with the Experimental Plan, highlight the significance of social and behavioural sciences in achieving sustainable innovation and societal impact. The resulting guidelines and recommendations can shape the future of energy community support programs and assist policymakers in their decision-making processes.

4.2 Description of Data Collection

4.2.1 Survey

In addition to the initial survey that was conducted, the upcoming stages of the project will involve conducting further surveys to gather valuable and in-depth data. These subsequent surveys will specifically focus on engaging with end-users and stakeholders to gain a deeper understanding of their needs and requirements. The data collected from these surveys will serve as a valuable resource, providing both quantitative and qualitative insights. This data will play a crucial role in our work within work package 3, as it will inform the recommendations and design of systems for users, as well as the development of effective nudging mechanisms. By analyzing and utilizing this data, we aim to tailor our solutions to the specific needs and preferences from the onboarding phase to boosting EC members proactivity.

4.2.2 Pilot assets

At this stage, apart from the Turkish pilots, the remaining pilots are still in the primary phase.

Consequently, there is a lack of comprehensive information regarding their assets. For instance, the Swedish pilot's assets are either non-existent or not organized in matter to be documented.

Nevertheless, it is worth mentioning that the pilot managers have taken an inclusive approach in describing their pilot assets, encompassing various resources such as human capital, social and communal traits, communal support, business acumen, energy, and technology.

Here are the main asset descriptions of each pilot:

Berchidda:

When it comes to their strategic elements, even though Berchidda REC has not been established yet, the following were considered as their assets at this early stage:

- Availability of resources from renewable sources (although many plants are still to be built)
- Involvement of the local community
- Energy efficiency

Les Mureaux:

The following sites and their respective photovoltaic power plants are the current assets:

- Library (17.8 kWp)
- Molière center (school, 54 kWp)
- The site "Léo Lagrange," which will be delivered in the summer, will also feature a photovoltaic power plant for individual self-consumption (49 kWp).

Sweden:

No assets reported at this stage.

Turkey:

The initial assets that are currently considered as supportive are as follows:

- Availability of local renewable energy resources
- Strong sense of community engagement and support for energy-related initiatives
- Improvement in energy efficiency
- Reduction of energy costs
- Increased independency from electric companies
- Creation of local businesses

4.2.3 Observational data

To be included in the next release foreseen in month 24 (i.e., December 2024)

4.2.4 Experimental data

To be included in the next release foreseen in month 24 (i.e., December 2024)

4.2.5 Analytical data (consumption, production, and management of energy)

Descriptive data

To be included in the next release foreseen in month 24 (i.e., December 2024)

Diagnostic data

To be included in the next release foreseen in month 24 (i.e., December 2024)

Predictive data

To be included in the next release foreseen in month 24 (i.e., December 2024)

Prescriptive data

To be included in the next release foreseen in month 24 (i.e., December 2024)

5 FINDINGS

5.1 Socio-demographic data in each pilot:

Table 1: Socio-demographic data in each pilot

	Berchidda	EC Les Mureaux	SUST/UPP/NGENIC	Turkish pilot /Turkey
Age average	49	44,7% less than 30 years old	-	49
Gender	Women 50,5%; Men 49,5%	50,53% Men 49,47% Women	50% Men 45% Women	%27 female, %73 male
Education level	5% of the population holds a degree; 22% holds a diploma	-	-	Higher
Annual Income per capita	17k€/year	-	Middle class	Over average 20k€/year

5.2 Preliminary Socio-behavioural identification of:

5.2.1 Stakeholders in each pilot

Current Stakeholders in Berchidda Pilot:

DSO (Distributor)	AEC (Azienda Elettrica Comunale)
TSO	TERNA
Asset owners	Berchidda Municipality; private PV owners (private household; local enterprises)
Funding / Investor / Lobbies	at the moment only public funding used by Berchidda municipality in order to set up its own REC
OEM / HW	Ziv Automation will provide smart meters to Berchidda municipality (which is under the process to buy)
Policy makers / Regulator	national government, Regione Sardegna, Sassari province, ARERA
Business owners	Potential cooperative member
Householders	Potential cooperative member

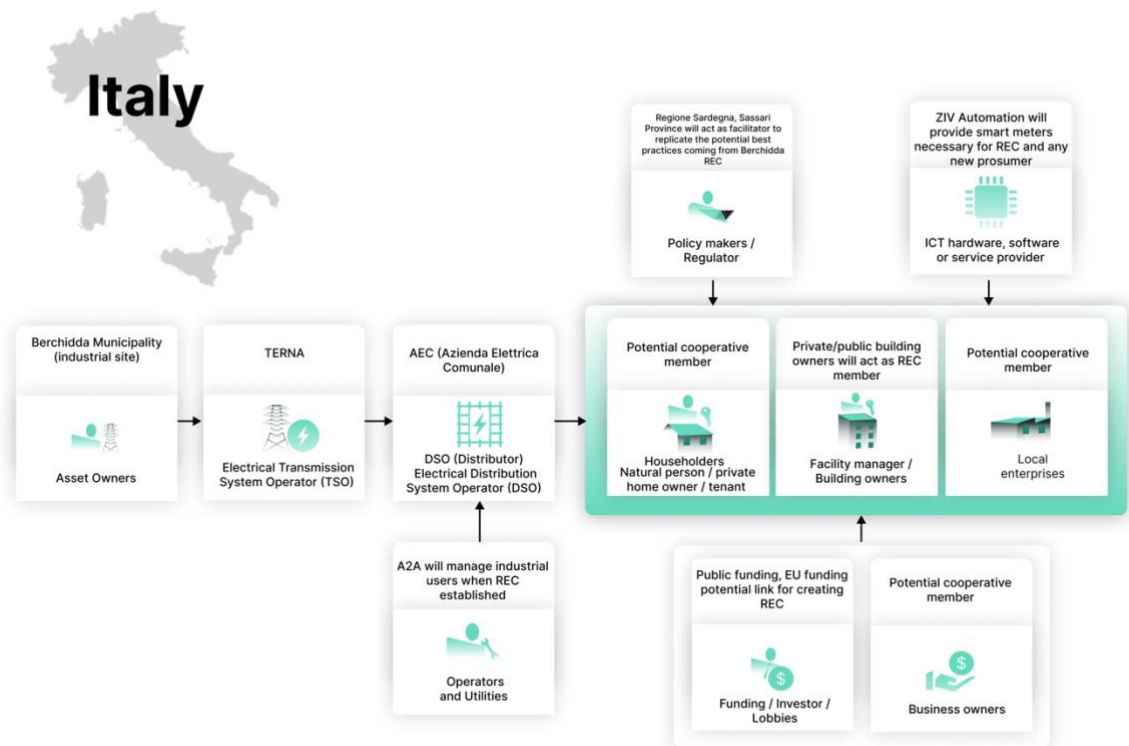


Figure 7: Berchidda stakeholder's map

Current Stakeholders in LES MUREAUX Pilot:

DSO (Distributor)	ENEDIS
Asset owners	Les Mureaux Municipalities, individual PV owners
Optimization Operator	AMU
Energy supply companies	e.g., EDF
Policy makers / Regulator	Local stakeholders
Business owners	from 2 to 5
Householders	from 5 to 15

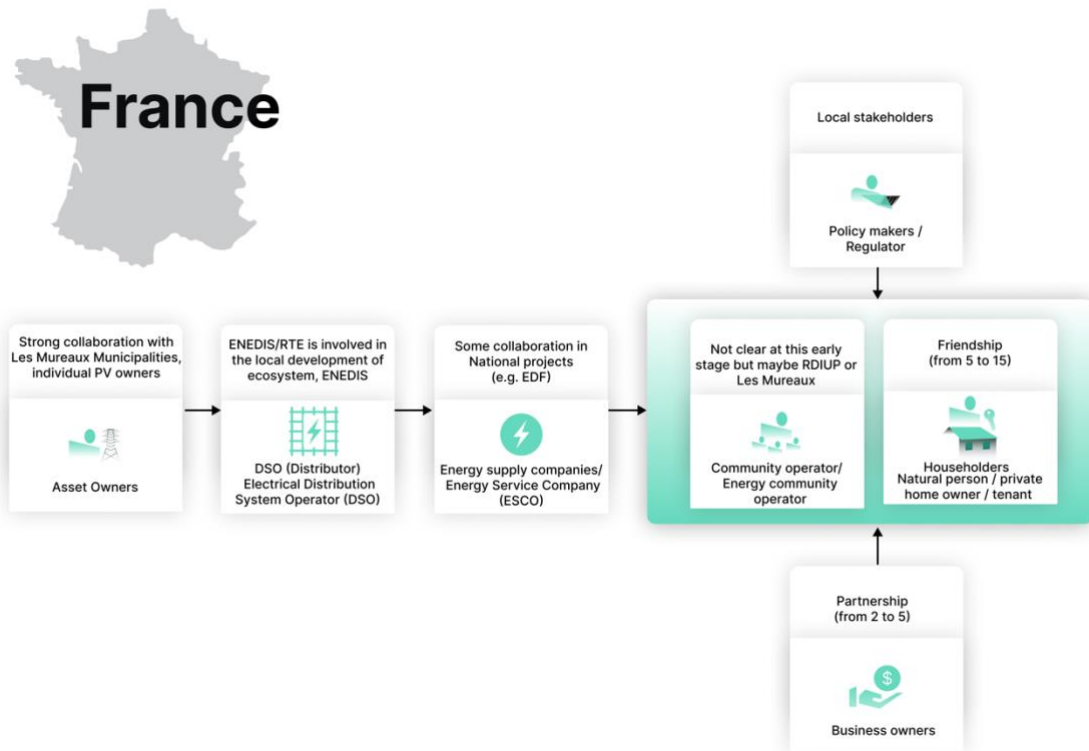


Figure 8: Les Mureaux stakeholder's map

Current Stakeholders in SUST/UPP/NGENIC Pilot:

Aggregator / Service provider

Service providers (as Ngenic) can provide demand control services, in theory future flex actors can enact on response activities as well, but the regulations are not there yet, and the technology not implemented.

Policy makers / Regulator

A facilitator or blocker of the development of energy communities

Householders

A lot of housing associations procure heating (district heating for e.g.) and currently operate, in theory, as an energy community at a basic level.

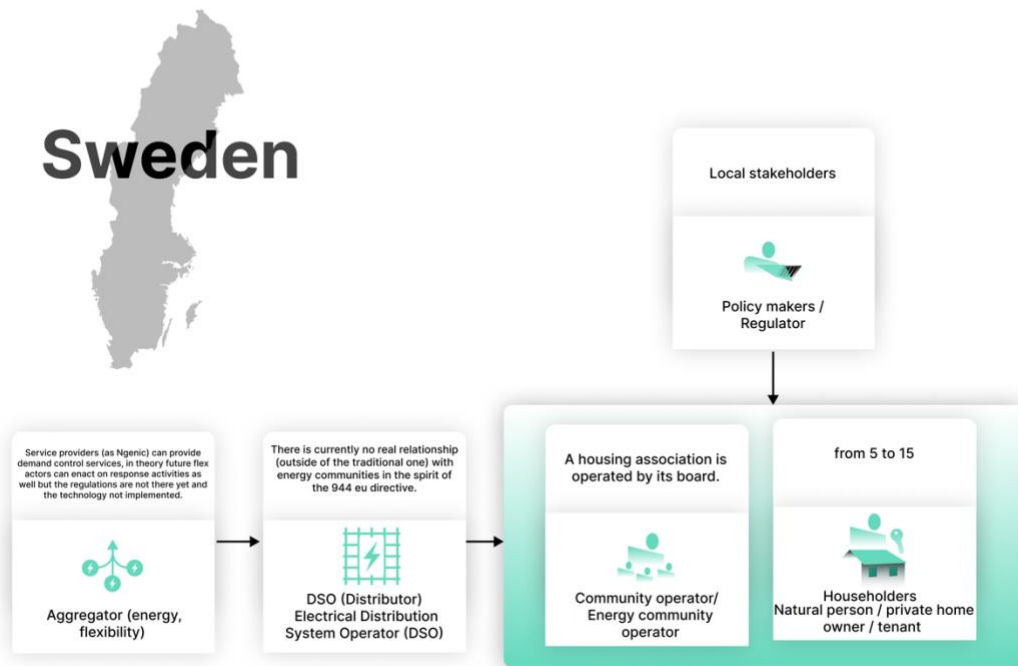


Figure 9: SUST/UPP/NGENICS stakeholder's map

Current Stakeholders in Turkey Pilot:

Flexibility market operator	FM is a new term for our RECs in Turkey and there is lack of information
Funding / Investor / Lobbies	Finding a fund and exchange rates
Policy makers / Regulator	Regulations changes suddenly
Householders	Cooperative members

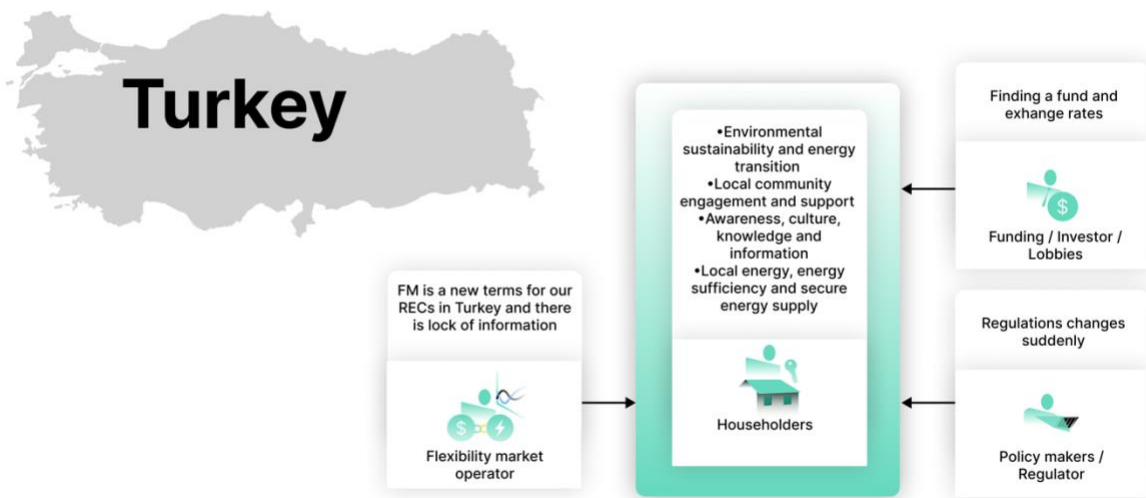


Figure 10: Turkey's pilot stakeholder's map

5.2.2 Users and end-users' profiles in each pilot

To be included in the next release foreseen in month 24 (i.e., December 2024)

5.2.3 Values in each pilot

Berchidda:

Although the EC is not yet established, the intention is to combine social innovation with great and extensive involvement of the local population and to make our region less and less dependent on fossil fuels by using renewable sources. The EC will also serve to have smarter and more efficient infrastructure networks.

Les Mureaux:

At its current stage, the EC initiative is being planned with the objective of establishing an open ecosystem that enables homeowners and other building owners to expand its reach and actively participate in the value chain. The envisioned outcome includes the provision of customized business models, enabling participants to generate revenues in a manner that suits their individual needs. Additionally, a key focus is placed on fostering fair and transparent governance mechanisms to ensure equitable interactions among shareholders.

Sweden:

N/A at this time.

Turkey:

The primary objective is to establish a model that effectively addresses the region's energy requirements through the utilization of renewable resources, while simultaneously phasing out reliance on fossil fuels. This will be accomplished by promoting the adoption of cooperatives and energy cooperatives as means to facilitate the transition of individuals towards clean energy sources. By disseminating the concept of cooperatives and encouraging their formation, the aim is to empower people and enable widespread participation in the clean energy transition.

5.2.4 Goals in each pilot

Based on our observation of the survey results, we have classified the goals into five main categories:

1. **Financial:** These goals are related to financial gains or savings, including reducing bills or even making a profit from prosuming (producing and consuming energy). This category focuses on the economic benefits that can be achieved through energy-related initiatives.
2. **Energy Economy:** The goals in this category aim to save and economize on energy consumption. They involve implementing measures and practices to optimize energy usage, reduce waste, and increase efficiency. By prioritizing the energy economy, individuals and communities can minimize their energy expenses and improve overall resource management.
3. **Environmental:** This category encompasses goals that promote a green shift and environmental sustainability. These objectives aim to reduce the environmental impact of energy consumption and promote the use of renewable and clean energy sources. By adopting eco-friendly practices and technologies, individuals and communities contribute to mitigating climate change, preserving natural resources, and protecting the environment.
4. **Social/Communal:** The goals in this category are focused on achieving communal-level objectives, fostering togetherness, and promoting social innovation initiatives. These goals emphasize the importance of community engagement and collaboration in energy-related endeavours. By working together, communities can create a sense of unity, support local energy projects, and drive positive social change.
5. **Energy Independence:** This category highlights the goals related to relying on local sources of energy and becoming independent of large fossil fuel energy suppliers. The objective is to reduce dependence on external sources of energy and promote self-sufficiency through the utilization of local renewable resources. Energy independence empowers individuals and communities, enhances resilience, and reduces vulnerability to fluctuations in energy prices and supply.

By categorizing the goals into these five main areas, it becomes easier to understand and prioritize the different aspects of energy-related initiatives, allowing for a more organized and comprehensive approach to achieving sustainable and beneficial outcomes.

Table 2: Goals in Italy pilot

Pilot	Goals described by Pilot manager	
Berchidda (Stage 1)	To be able to produce its energy as a community and distribute its economic and environmental benefits.	Making Berchidda a zero-emission municipality, as well as developing local economic initiatives.
Financial	✓	
Energy economy		
Environmental	✓	✓
Social/ communal	✓	✓
Energy independency		

Table 3: Goals in France pilot

Pilot	Goals described by Pilot manager	
EC Les Mureaux (Stage 1)	Reduce the costs of energy.	Reduce CO2 emission and provide green energy
Financial	✓	
Energy economy	✓	
Environmental		✓
Social/ communal		
Energy independency		

Table 4: Goals in Sweden pilot

Pilot	Goals described by Pilot manager

SUST/UPP/N GENIC Sweden (Stage 0)	Revenue	Lowered costs	Better grid planning (reduces investment costs)	Increased accessibility)	Increased autonomy,	increased resilience
Financial	✓		✓			
Energy economy		✓		✓		✓
Environmental						
Social/communal						
Energy independency					✓	

Table 5: Goals in Turkey pilot

Pilot	Goals described by Pilot manager				
Turkish pilot /Turkey (Stage 4: Multiple applications of EC - EC is applied in multiple use cases and applications)	To produce their own electricity	Expanding renewable energy cooperatives in Turkey,	Influencing local development	Ensuring gender equality in energy and bringing women to the fore	
Financial					
Energy economy					
Environmental		✓			
Social/communal			✓	✓	

Energy independence	✓			
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5.2.5 Drivers in each pilot

In conducting the survey on drivers, we focused on exploring four key perspectives that help us understand the factors that drive participation in pilots and energy communities:

Initiation Drivers: These are the initial motivations or triggers that prompt individuals or organizations to get involved in the pilots.

EC Members Participation Engagement in a Local Energy Community: This focuses on the involvement and engagement of members within the local Energy Community.

Drivers to Engage Participation in the Energy Community: This looks at the motivations that attract individuals or entities to participate in the broader Energy Community.

General Participation Drivers: These are the common motivations that influence participation in pilots and energy communities.

By analysing these four perspectives, we aim to gain a comprehensive understanding of the diverse drivers that shape participation in pilots and energy communities, ranging from the initial motivations to the broader incentives that attract individuals and organizations to engage and contribute to these initiatives.

Drivers to engage participation in the Energy Community:

Classification of drivers described by pilot managers:

Table 6: Drivers to engage participation in the EC - Berchidda

Berchidda (Stage 1)	Financial	Energy economy	Environmental	Energy independence	Social/communal
Energy efficiency measures at a lower cost through the intermediation of the REC	✓	✓			
The possibility through the REC to be supplied by locally produced energy, increase				✓	✓

energy sufficiency and secure energy supply					
Support the local community environmentally by reducing local pollutant emissions.			✓		✓
Support the local community by supporting local businesses and disadvantaged citizens economically	✓				✓
Potential energy savings, production of energy from renewable sources and reduction of environmental impact		✓	✓		
Financial savings; reduction of electricity bills	✓	✓			
Overall participation benefits, and costs in terms of time investment	✓				

Table 7: Drivers to engage participation in the EC - France

EC Les Mureaux (Stage 1)	Financial	Energy economy	Environmental	Energy independency	Social/communal
Extra revenues	✓				
energy saving	✓	✓	✓		
billing reduction	✓	✓			

Table 8: Drivers to engage participation in the EC - Sweden

SUST/UPP/NGENIC Sweden (Stage 0)	Financial	Energy economy	Environmen tal	Energy independen cy	Social/ communal
n/a					

Table 9: Drivers to engage participation in the EC - Turkey

Turkish pilot /Turkey (Stage 4: Multiple applications of EC - EC is applied in multiple use cases and applications)	Financial	Energy economy	Environmen tal	Energy independen cy	Social/ communal
Reducing climate change effects			✓		
advocacy against fossil fuels			✓		✓
Çanakkale has so many thermal reactors in nearby cities			✓		✓

EC members participation engagement in a local Energy Community

Classification and rating of participation engagement identified by pilot managers:

Importance rate 1 to 5 (5 = highest importance)

Table 10: EC members participation engagement in a local EC

	Berchidda	EC Les Mureaux	SUST/UPP/ NGENIC	Turkish pilot /Turkey
Financial savings on energy expenses thanks to reduced electricity bill (virtual savings in the pilots)	5	5	5	5
Reduction of greenhouse gas	4	4	2	5

emissions that lead to global climate change				
Replacing fossil fuels needed for the energy supply of the house with renewable energy sources (e.g., solar energy)	4	3	2	5
Make your own neighbourhood more sustainable / a better place to live in. Improvement of air quality and of the local environment thanks to the reduction of polluting emissions in the community area	4	4	4	3
Be part of the local community and personal engagement in local community activities, make your own energy plan with your neighbours or community	4	3	1	4
Support the economy of the local community (e.g., local workers and commercial activities engaged in energy community activities	4	3	1	4
Support community-based project (e.g., reinvestment energy community of financial gains for	4	3	3	4

the local community)				
Support citizens in energy poverty condition	4	3	1	2

EC initiation drivers:

Classification and rating of initiation drivers identified by pilot managers:

Low importance	Medium importance	High importance
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Table 11: EC initiation drivers - Berchidda

Berchidda (Stage 1)	Reducing the high energy costs of households	Reducing emissions through renewable installations	CO2 through energy	REC is also an expression of social innovation: the community coming together to create and distribute value and benefit.
Financial				
Energy economy				
Environmental				
Social/communal				
Energy independence				

Table 12: EC initiation drivers - Les Mureaux

EC Les Mureaux (Stage 1)	Reducing energy costs	Generating extra revenues	Increasing number of houses and building equipped with PVs
Financial			
Energy economy			
Environmental			
Social/communal			
Energy independency			

Table 13: EC initiation drivers - Sweden

SUST/UPP/NGENIC (Stage 0)	Revenue	Being a part of the green transition	Energy resilience.	Increased autonomy	Lowered costs
Financial					
Energy economy					
Environmental					
Social/communal					
Energy independency					

Table 14: EC initiation drivers - Turkey

Turkish pilot /Turkey	Ecological concerns (To have a solution for	Advocating against thermal reactor.	To reduce the high energy costs in households.	Acting as a community for value adding to society.

(Stage 4: Multiple applications of EC - EC is applied in multiple use cases and application)	promoting renewable energy and reducing CO2 footprint.			
Financial				
Energy economy				
Environmental				
Social/communal				
Energy independency				

5.2.6 Barriers in each pilot

Barriers

Problems identified by pilot managers, encountered in all aspects of the energy community.

Low importance	Medium importance	High importance
----------------	-------------------	-----------------

Table 15: Barriers in each pilot

	Berchidda	EC Mureaux Les	SUST/UPP/NG ENIC	Turkish pilot /Turkey
Policy and Regulatory				
Economical/Financial				
Technological				

Energy				
Cultural and Social				

Barriers in EC at operation phase

Identified by pilot managers.

Relevance rate 1 to 10 (10 = highest relevance)

N/A

Table 16: Barriers in EC at operation phase

	Berchidda	EC Mureaux	Les	SUST/UPP/NG ENIC	Turkish pilot /Turkey
Financial and economic	7				
Institutional (legal and administrative)	9				
Technological	5				
Social/behavioural	4				

Barriers in setting up EC

Described by pilot managers.

Relevance rate 1 to 10 (10 = highest relevance)

N/A

Table 17: Barriers in setting up EC

	Berchidda	EC Mureaux	Les	SUST/UPP/NG ENIC	Turkish pilot /Turkey
Financial and economic	8	9			1
Institutional (legal and administrative)	9	9			1
Technological	4	6			1
Social/behavioural	4	7			1

Barriers according to their importance in preventing EC members from engagement in the Energy Community

Described by pilot managers.

Importance rate 1 to 5 (5 = highest importance)

Table 18: Barriers according to their importance in preventing EC members from engagement in the Energy Community

	Berchidda	EC Mureaux	Les	SUST/UPP/N GENIC	Turkish pilot /Turkey
Not enough awareness of sustainability issues	2	4		5	1
Difficulty understanding how the energy community works (e.g., business model)	2	4		5	1
No clear information about the financial gains/savings	3	3			
Lack of experience in cooperative models	3	5		5	1
Too busy/ limited time to invest in the participation	1	2		5	1
Lack of computer literacy skill	2	3			

Administrative/bureaucratic burden or complexity in EC entry regulation/participation process	4	4	5	1
Ambiguity towards the potential of renewable energies	1	2	5	1
No clear identification of the benefits from joining the EC	3	3	5	1

5.3 Preliminary Stakeholders and users relationship map

In this section, we present our preliminary stakeholders and users relationship map, which provides a descriptive and comprehensive overview of the key stakeholders and actors involved in an EC. This map offers a detailed visualization of their interconnected relationships and highlights the important roles they play in shaping an EC. This descriptive and comprehensive map (*fig.11*) serves as a foundation for further analysis and engagement of the EC ecosystem.

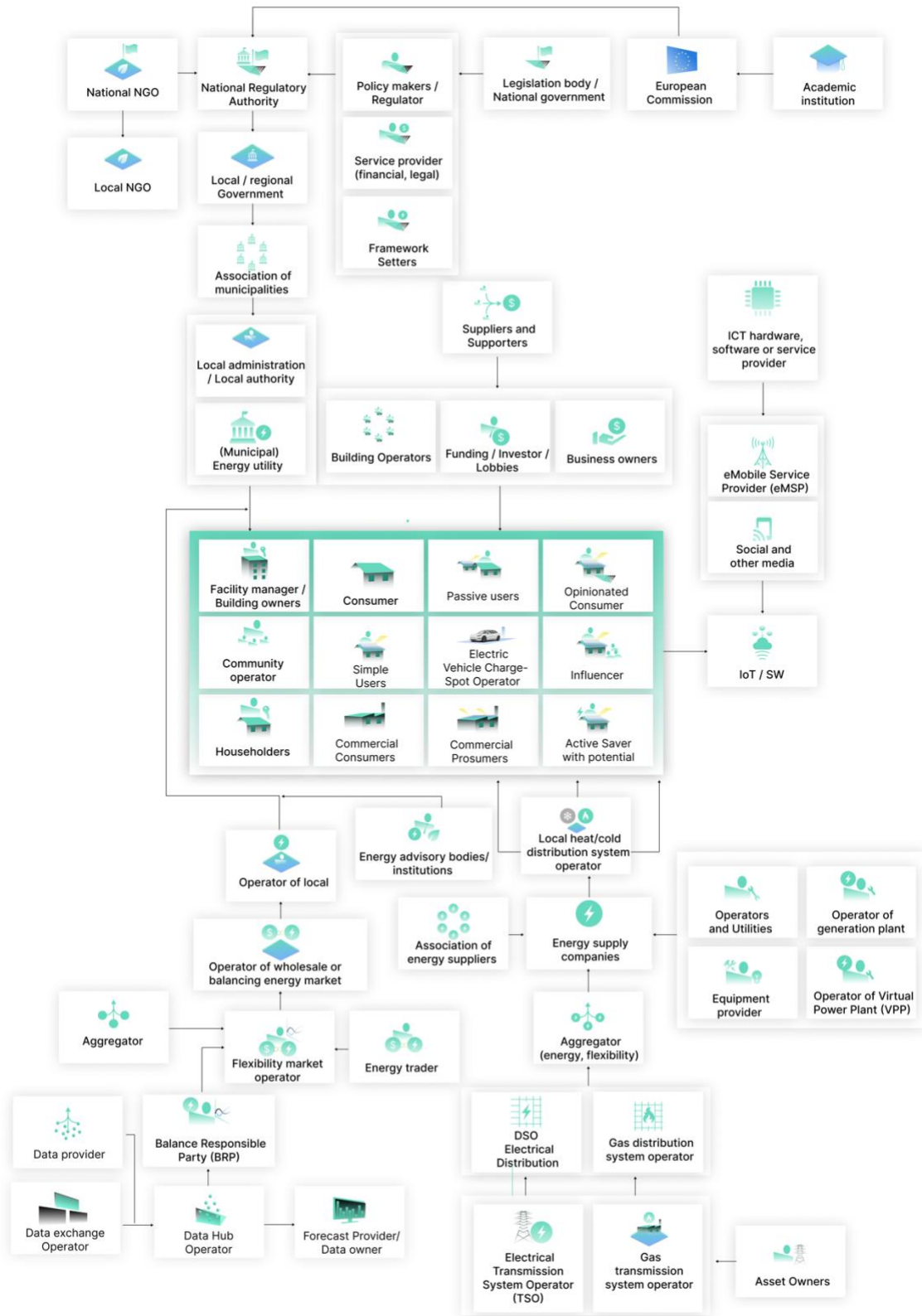


Figure 11: Stakeholder's map

6 SHAPING MODELS OF EC GROWTH

6.1 Measuring levels of:

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.1.1 Maturity in EC

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.1.2 Readiness in EC

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.1.3 Competence in EC

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.1.4 Agency in EC

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.1.5 Collaboration in EC

These measurements have just started and will be outlined in the next release foreseen in month 24 (i.e., December 2024)

6.2 Early overview of the nudging mechanisms

EXP's plan is to establish new benchmarks in community engagement, leveraging Nudging and Boosting techniques to enhance energy management and production literacy. The ultimate goal is to improve planning capabilities, market transparency, and the dynamics of storage and pricing. One specific focus involves engaging building owners, tenants, and temporary occupants in the

collaborative design of renovation projects. EXP will focus on addressing prosumers' needs and raising awareness about Energy Community (EC) performances.

To encourage participation in the services, EXP will implement Nudging mechanisms that activate processes for joining. Additionally, Boosting mechanisms will be developed to foster competence, agency, and collaboration. These strategies will be identified at this stage to be developed in WP3, specifically in Task 3.5, and reflect the cutting-edge methodologies of the social and behavioral sciences. These tasks will be the same within each pilot site, although they will be localized to reflect the local characteristics of the energy communities.

Based on our work in behavioural modelling we oversee that in order to ensure the success of nudging initiatives within energy communities, it is crucial to consider several key aspects:

Engaging the Community:

- Actively involve the diverse members of the energy community, including residents, businesses, and organizations.
- Gain a comprehensive understanding of their energy consumption patterns, preferences, and needs through meticulous surveys, interviews, and data analysis.
- Tailor nudging strategies to resonate with their core values and aspirations, fostering a sense of ownership and driving behaviour change from within the community.
- Empower community members by involving them in decision-making processes and implementing community-led energy initiatives, promoting a sustainable energy culture.

Collaborating with Stakeholders:

- Identify and engage the key stakeholders driving the energy community's progress, such as local government representatives, energy providers, environmental organizations, and community leaders.
- Cultivate their support, collaboration, and expertise to propel nudging initiatives forward, capitalizing on their knowledge and resources.
- Align their interests and goals with the desired outcomes of sustainable energy practices within the community.
- Forge strong partnerships with stakeholders to develop supportive policies, secure funding, and establish a cohesive framework for implementing and scaling nudging strategies effectively.

Ensuring Sustainable Funding and Support:

- Identify the individuals, organizations, or entities responsible for funding the energy community initiatives.
- Foster relationships with funders and stakeholders to secure ongoing financial support, emphasizing the long-term value and potential impact of nudging programs.
- Articulate the value proposition of nudging initiatives, showcasing their capacity to drive

energy conservation, cost savings, environmental benefits, and community well-being.

- Explore diverse funding sources, including grants, sponsorships, crowdfunding, and public-private partnerships, to ensure the longevity and sustainability of nudging efforts.

Collaboration with Profit Makers:

- Recognize and collaborate with actors within the energy community who stand to benefit financially from sustainable energy practices, such as renewable energy project developers, energy-efficient technology providers, or energy service companies.
- Encourage profit makers to invest in research, development, and deployment of sustainable energy technologies and solutions that align with the community's goals.
- Foster innovative business models, incentives, or revenue-sharing mechanisms that harmonize profit-making endeavours with the community's overarching energy conservation objectives.
- Cultivate an environment of cooperation and shared vision among profit makers and the energy community to foster holistic progress.

By considering these critical factors and embracing the unique dynamics of the energy community, nudging initiatives can be strategically designed and implemented to maximize their impact. The successful integration of community engagement, stakeholder collaboration, sustainable funding, and profit maker participation will pave the way for a sustainable energy future driven by collective action and shared responsibility.

Nudging:

We then identify nudging at different levels:

- Nudging on values level (changing beliefs):
 - Nudging on values level aims to transform beliefs and shape the way people perceive the world.
 - By gently steering individuals towards new perspectives and influencing their core values, nudging can inspire a shift in mindset, encouraging a collective vision and mission.
 - This process ultimately reflects in daily activities as individuals start aligning their actions with their newly formed beliefs.
- Nudging on behavioural level (changing habits):
 - Nudging on behavioural level targets habits and routines.
 - By subtly altering the context and environment, nudging prompts individuals to adopt new behaviours and discard detrimental ones.
 - Through small adjustments in the choice architecture, such as rearranging options or providing timely reminders, nudging can effectively guide individuals towards

healthier or more sustainable choices, gradually transforming their habits and lifestyles.

- Nudging on communal level (being part of a community):
 - Nudging on communal level fosters a sense of belonging and social connection.
 - By encouraging individuals to be part of a larger community, shared values and goals can be reinforced, leading to a greater sense of purpose and collective action.

6.3 Early overview of the boosting mechanism

EXP will design Boosting mechanisms with the purpose of fostering virtuous collaborative patterns within the communities. These mechanisms aim to enhance people's literacy and capacity building in energy-related matters. By boosting awareness among Energy Community (EC) members, EXP seeks to empower citizens to become active participants in shaping and influencing energy initiatives. The goal is to cultivate a sense of ownership and collaboration, ultimately leading to the formation of strong and cohesive energy communities.

To effectively implement our boosting mechanisms and maximize their impact and long-term success, we consider the various perspectives of stakeholders and align incentives accordingly. Boosting initiatives can bring about positive changes at the values, behavioral, and communal levels, shaping beliefs, habits, and fostering a sense of community. With this in mind, we focus on:

- Defining our end-users: who is using the final service:
- Identifying the individuals who directly benefit from the service and understanding their needs and preferences.
- Profiling the users and developing tailored nudging mechanisms that can resonate with their values and aspirations, increasing the likelihood of behavior change.
- Defining stakeholders: who is the decision maker:
- Identifying the key decision makers and influencers involved in implementing nudging strategies.
- Engaging stakeholders in the process and aligning their interests with the desired outcomes can enhance the effectiveness of nudging initiatives.
- Defining our payers: who is paying for the service:
- Identifying the individuals or entities providing financial support for the service.
- Ensuring sustainable funding and resource allocation is crucial for the long-term success and impact of nudging initiatives.
- Defining profit makers: who are the actors making profit:
- Identifying the actors who derive financial gains from the initiative.
- Exploring potential incentives for behavior change that align with the profit makers' interests

can create win-win scenarios.

6.4 Early overview of the relation between social values and the economic value

As we progress with our exploration to understand energy communities for the "Masterpiece" project, our work for the next stages will focus on gaining a comprehensive understanding of energy communities. A crucial aspect of our investigation entails examining the social dynamics and behavioural traits that shape these communities.

We will focus next on identifying and mapping social traits and behaviours that influence energy communities. By studying the relationships and interactions among individuals, families, and their broader social contexts, we aim to unravel the complexities underlying decision-making processes that influences energy consumption and energy prosuming within these communities.

In this sense, identifying a set of patterns at the macro-level behavioural of different profiles of households will lead us to identify the factors that drive energy consumption, production, and distribution practices within energy communities.

Understanding how households engage with energy systems and the motivations behind their choices will be one crucial part that defines our project roadmap for WP3. We will then expand the scope focusing on how to actively engage stakeholders to adapt to and incorporate diverse energy usage patterns. This will also help us to define how to facilitate tools for the onboarding process in promoting EC on one hand and defining nudging and boosting mechanisms on the other.

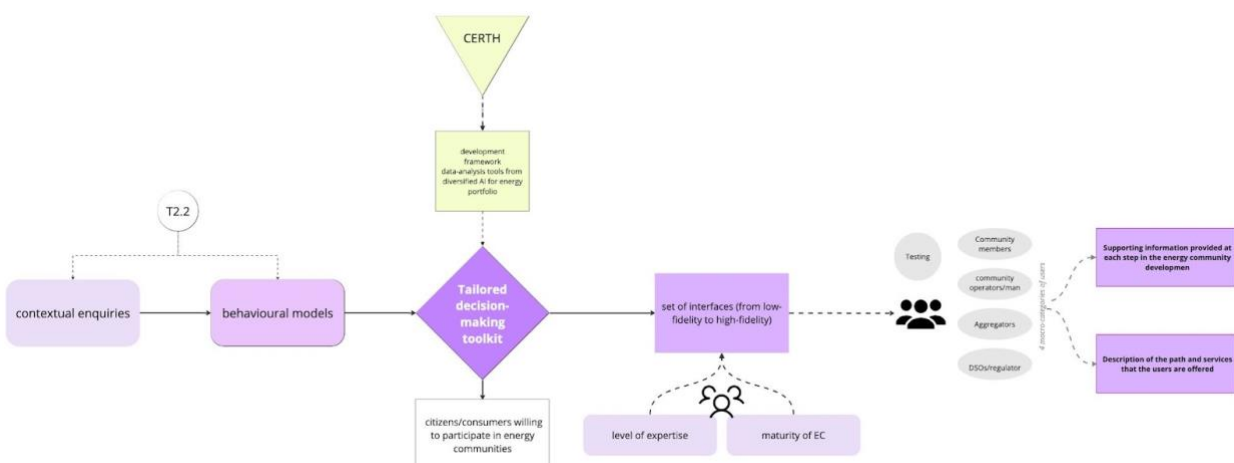


Figure 12: Map of wp2 and wp3 relationship

Based on our analysis, which included a survey conducted with pilot managers, as well as in-depth EU 's Grant Agreement 101096836.

Dissemination level: SEN

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research and assessment of the current economic conditions of EC in the EU, we concluded that there is a significant and extensive relationship between social values, economic value, and the subsequent creation and exchange of value. Social “values” can be understood as a defined set of behaviours or actions that individuals or groups adhere to. They represent beliefs that play a crucial role in shaping the behaviour and activities of individuals or communities. Social values have a profound influence on an individual's attitudes and behaviour. As those values provide a sense of purpose, they extend their influence on macro-level moments within households or individuals. For instance, a social value such as promoting a zero-emission environment entitles a certain discipline that, in turn, promotes awareness of macro-level behaviours and encourages more responsible energy consumption. This ultimately leads to reduced overall energy consumption.

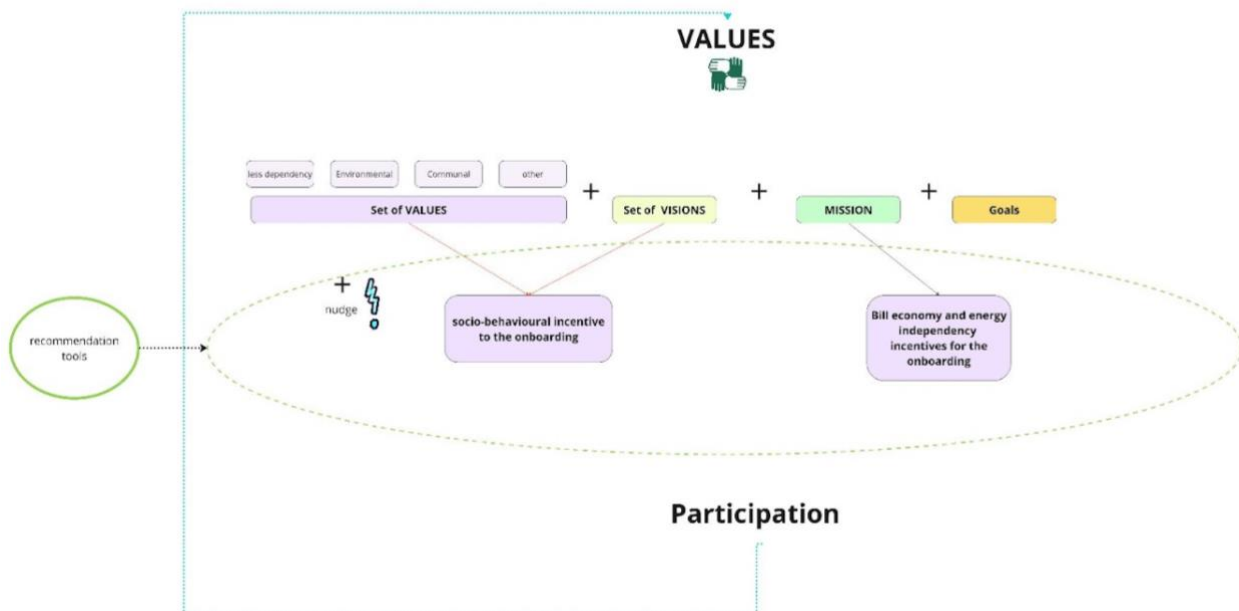


Figure 13: Values and participation

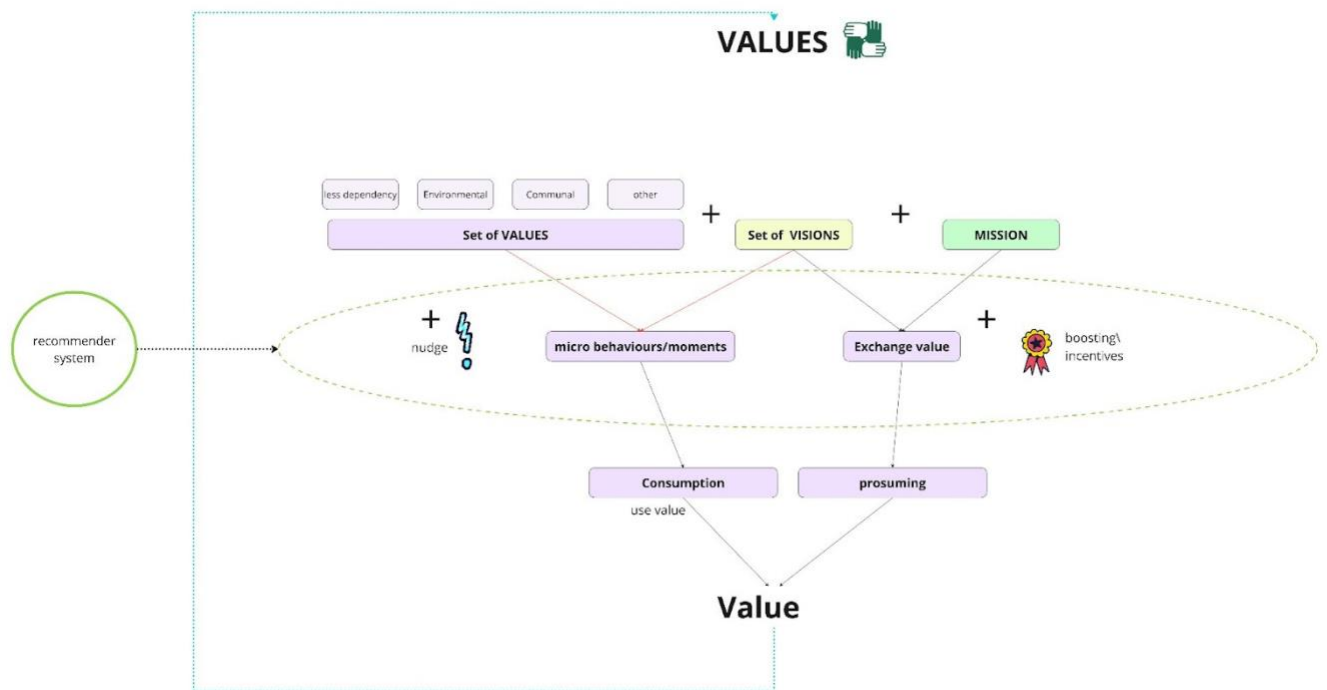


Figure 14: Social values and economical values

Values, in this sense, are typically derived from social and behavioural factors. Hence, in the context of ECs, nudging focused on a new set of consumption behaviour can positively shift the primary focus of end-users on value creation. Along with a recommender system that Experientia is working on, the nudging and boosting techniques will subsequently allow to shift micro-behaviours in energy use to prosuming.

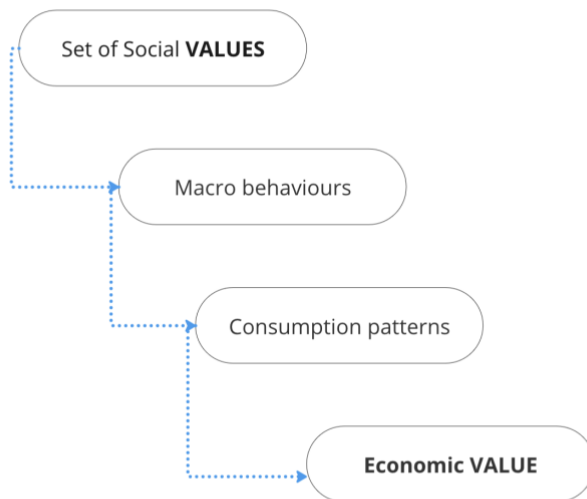


Figure 15: From social values to economic value

Hence, within the ecosystem of the energy community, the creation of economic value is then based on both individual/household consumption and the result of a synergy between different types of resources. These resources include human resources, energy resources, technology, and other relevant factors. By leveraging this synergy, the energy community can optimize the value creation and subsequently their value exchange. Consequently, when the EC energy production is greater than the consumption, the resulting surplus could be reinvested, hence a success of the EC which turns to prove the validity of the sustainable values through economic value creation.

In this regard, the involvement of human resources, such as EC members, citizens, professionals, experts, and active participants in the energy community, is crucial for generating economic value. Additionally, the availability and efficient use of energy resources, advancements in technology, and adherence to social values or community guidelines all contribute to the creation of economic value in the energy community.

1. **Human Resources:** The involvement and contribution of individuals within the energy community
2. **Energy:** The availability and efficient use of renewable energy sources, energy efficiency measures, and sustainable energy practices that align with social and environmental goals.
3. **Technology:** This includes innovative solutions, smart grid systems, energy storage technologies, and digital platforms and interfaces as well as recommender systems that enable efficient energy management and facilitate proactive energy saving.
4. **Social Values or Community Guidelines:** The shared values and guidelines within the energy community. Aligning individuals and stakeholders' actions and values inclusive to principles such as sustainability, environmental responsibility, energy equity, and community engagement.

By bringing together these different elements, the energy community can enhance value creation, leading to positive outcomes for all stakeholders involved.

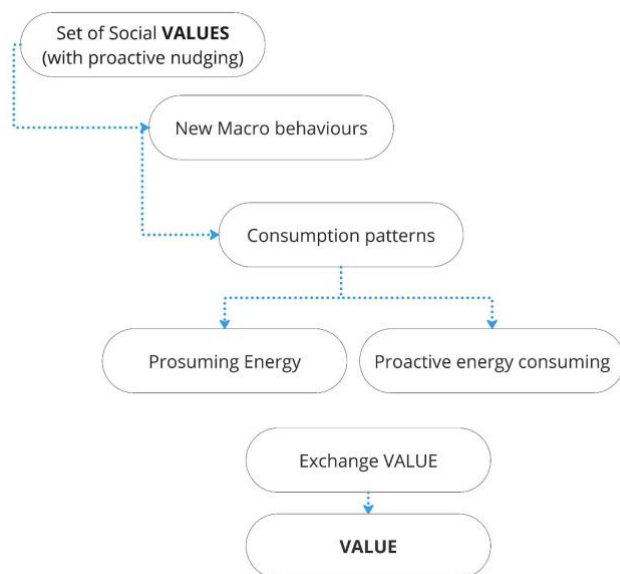


Figure 16: Nudging: From social values to new macro-behaviours to economic value

7 DEFINING EC JOURNEYS

7.1 At an individual level: From consumer to prosumer

MASTERPIECE aims to foster citizens' participation and accelerate their involvement in shaping the energy future.

This shift in energy consumption requires a synchronized multilayered work mainly engaging 3 different perspectives:

- The development of **technical** solutions: to facilitate the functional backstage of both managing the grid and user consumption. Additionally, MASTERPIECE places great emphasis on ensuring the security and privacy of active citizens in accordance with relevant laws and regulations.
- **Financial**: to facilitate a business plan new business strategies
- **Social/behavioural**: shifting people's habits requires a deeper understanding of people's behaviour and their contextual patterns. Looking at people from both micro and macro and user-centric solutions

EXP's approach

To address the diverse needs of stakeholders, including energy service companies, financial operators, and municipalities, EXP's approach encompasses the following strategies:

Stakeholder Identification:

- We conducted a simple survey to gather data from the managers of each pilot. This survey served as the primary method to collect relevant information and insights.
- Based on the survey results, we identified the key stakeholders in each pilot.

Stakeholder Interviews:

- A study guide was created to conduct in-depth interviews with the identified stakeholders during the later stages of the project.
- These interviews will be organized and executed, and the findings will undergo a meticulous analysis.
- Early insights obtained from these interviews will be included in the subsequent sections of this report, ensuring prompt dissemination of information.
-

Understanding User Needs and Behavioural Patterns:

- To gain a comprehensive understanding of user needs, behavioural patterns, values, goals, as well as the drivers and barriers in developing Energy Communities (ECs), we will undertake the following steps.
- We will identify the profiles of users and end-users involved in each pilot.
- Similar to the stakeholder identification process, a simple survey will be conducted, with the assistance of reference persons associated with each pilot, to gather valuable data specifically focused on the users and end-users.
- Furthermore, we will organize visits to each pilot to conduct agile contextual inquiries. This on-site approach will provide first-hand observation opportunities to closely monitor the development of ECs, enabling a more comprehensive understanding of the process in each country.

By implementing these strategies, we aim to address the diverse needs of stakeholders and gain valuable insights into user profiles, needs, and the development of Energy Communities within the identified pilot studies.

7.2 At a community level: From Proto-EC to federated EC

- A) Networking potential (perception of togetherness) (good for simple users)
- B) Having my Purpose Perishable (good for influencers) incentives
- C) I can communicate my social identity
- D) I Wish would become independent from energy provider (e.g., Monopolies)

8 SUMMARY

8.1 Key insights and reflections from the findings

Next, we present the outcomes and key points derived from our analysis, which were based on a survey conducted with pilot managers:

In smaller and close-knit communities, there exists a stronger sense of connection and a heightened interest in the environment. These values hold more significance and meaning compared to purely financial factors. Within these intimate contexts, the overall welfare of local communities and the preservation of the natural environment take on a paramount level of importance.

Synergies and cooperation between people in these small communities have also been noted to be very valuable. There is a clear intention to put people together and work together to produce energy sustainably and prove that the impact and implications of their actions go beyond financial incentives and rather to the benefit of their community. This means that the key role of promoting ECs at local level can be played by a driving force behind their participation in the European Community.

Also, we realize that the drivers to participate in energy communities are not based solely on financial gain. Rather, it emphasizes a deep sense of responsibility for community well-being and a desire to actively contribute to creating a greener and more sustainable future through establishing and running successfully an EC.

Furthermore, our research has revealed a strong correlation between financial factors and end-user behaviour. This connection highlights the potential for leveraging consumer engagement and transitioning them into proactive participants, thereby fostering a transformative shift towards positive change. Additionally, by employing effective nudges, we can influence macro-behaviours, encouraging individuals to embrace positive change at a fundamental level.

Based on the survey conducted, we found no conclusive evidence to suggest a significant relationship between individuals' education levels and their inclination to join or engage in an EC (engagement community). The data collected from the survey indicates that education does not appear to be a determining factor in their willingness to participate in such communities.

However, upon further analysis of different types of communities of practice, we were able to identify distinct factors driving individuals' involvement. In one type of EC, participants showed a strong drive stemming from their personal values, a shared vision, and a deep sense of community.

By examining these different types of pilots and the motivations that underlie participation, we have gained a comprehensive understanding of the survey results. Our findings highlight the diverse and multifaceted nature of community engagement, where motivations can vary based on factors such as personal values, vision, financial incentives, and adherence to community rules.

Observed drivers that have an impact on the individuals to become members of ECs in various locations:

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 Sweden: One of the key drivers for individuals to join the EC in Sweden is the promise of frictionless interaction. The EC provides a seamless and user-friendly experience, which appeals to consumers and encourages their involvement.

In Turkey: The motivation for joining the EC in Turkey revolves around informing consumers about a more logical and economic approach to cost reduction. Additionally, participants are motivated by the opportunity to support renewable energy initiatives and earn income through this cooperative model.

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.

Observed barriers that have a negative impact on target members of ECs when trying to become effective members:

Berchidda:

One of the barriers in Berchidda is the lack of trust in the regulator. Potential members may have reservations about the regulatory body overseeing the EC. Additionally, the concept of implementing a Renewable Energy Community (REC) might be perceived as complicated and potentially offering low energy cost reductions, which can deter individuals from becoming active participants.

Les Mureaux:

In Les Mureaux, a barrier to effective membership is the lack of trust between shareholders. The governance structure of the EC may not be transparent, which can lead to scepticism and reluctance among potential members. Without trust and transparency, individuals may hesitate to actively engage in the community.

Sweden:

In Sweden, the barriers revolve around business models and regulations. Potential members may encounter challenges related to the compatibility of their existing business models with the EC framework. Moreover, regulatory constraints can hinder the smooth integration of individuals into the EC, creating obstacles to their effective participation.

Turkey:

One of the barriers in Turkey is scepticism about the potential financial benefits of joining the EC. Potential members may have doubts regarding the economic advantages they can gain from participating in the cooperative. These doubts can create hesitancy and hinder their willingness to become active and engaged members.

Overall, these barriers, such as lack of trust, perceived complexity, non-transparent governance, incompatible business models, regulatory constraints, and scepticism about financial benefits, pose challenges to potential target members in their journey to becoming effective participants within the ECs. Addressing these barriers is crucial for promoting increased engagement and fostering a thriving community.

To keep the EC informed and involved in the decision-making processes, various tools are/or planned to be utilized in the pilots:

Berchidda:

In Berchidda, meetings play a vital role in keeping the EC informed and engaged. Regular face-to-face meetings are organized to discuss important matters. Additionally, social media channels such as Facebook and the municipal website are utilized to share updates and communicate with the EC members effectively.

Les Mureaux:

In Les Mureaux, the main tools used include networking, interviews, and face-to-face meetings. These personal interactions allow for direct communication and engagement. The use of Masterpiece APPs and the Municipality Information Point are also expected to aid in keeping members well-informed about relevant information.

Sweden:

In Sweden, the housing association board meetings is considered to play as a crucial tool to involve the EC in decision-making processes. These meetings provide a platform for discussions, updates, and decision-making related to the EC. By actively participating in these board meetings, members stay informed and have a say in important matters.

Turkey:

In Turkey, several tools are employed to keep the EC informed and involved. These include a social media group on WhatsApp, a dedicated website (www.yenkoop.com), a mailing list for regular communication, and general meetings held twice a year. These tools facilitate effective communication, information sharing, and active involvement of EC members.

The utilization of these tools varies across different locations, allowing the ECs to adapt to the specific needs and preferences of their members. By employing a combination of face-to-face interactions, digital platforms, regular meetings, and communication channels, ECs can ensure that members remain informed and could actively participate in the decision-making processes.

Observation on the barriers in the 4 pilots:

In our research that focuses on the behavioural and social aspects of users and stakeholders in the context of energy communities (ECs), we recognize the significance of addressing the barriers that hinder effective participation. Two key barriers that have been highlighted are the lack of trust and the need for delivering relevant information at different stages of participation.

To address the issue of lack of trust, we will concentrate on identifying the profiles of users and stakeholders within the EC. By mapping their relationships and gaining a deep understanding of their needs, we aim to uncover hidden characteristics that can help bridge the trust gap among different stakeholders. This analysis will enable us to establish a foundation of trust, fostering better collaboration and engagement among all participants involved in the EC.

In terms of delivering relevant information, we acknowledge the importance of tailoring communication to different stages of participation. We will implement strategies for providing the right information at each stage to ensure effective engagement:

Early participation stage: At this stage, we will identify appropriate recommendations for initiating conversations based on the profiles of stakeholders and citizens. By understanding their specific needs and interests, we can facilitate meaningful interactions and lay the groundwork for their involvement in the EC.

Onboarding stage: For individuals joining the EC and operating as beginners, we will focus on conveying the necessary and relevant information in a clear and concise manner. By providing guidance that is easy to understand, we can support a smooth transition into active participation within the community.

Running community level: To maintain active involvement and promote proactive behaviour in energy production and consumption, we will explore strategies for sustaining ongoing conversations. This involves continuous engagement and communication to sustain participants' interest and encourage them to take an active role in the EC. By fostering a sense of community and providing valuable information, we can enhance their commitment and drive toward positive energy-related actions.

By addressing these aspects, we aim to overcome the barriers of trust and information delivery, creating an environment where trust is established, and relevant information is effectively delivered at each stage of participation in the EC. This holistic approach will contribute to the success and engagement of stakeholders and users, ultimately leading to a more sustainable.

8.2 Summary

In conclusion, the findings from the different locations emphasize the diverse nature of Renewable Energy Communities (ECs) and the factors that influence their success and engagement.

Turkey demonstrates strong initial assets for the EC, including the availability of local renewable energy resources, a supportive community engagement, a focus on energy efficiency, and the desire to reduce energy costs. These factors create a favourable environment for the EC's development, empowering citizens and fostering local businesses.

Berchidda highlights the importance of renewable resources and the involvement of the local community as key elements for the success of the REC. Additionally, economic savings and energy efficiency are recognized as strategic factors that contribute to the REC's effectiveness once implemented.

Les Mureaux showcases the integration of renewable energy in public facilities, such as the library, Molière center, and the upcoming "Léo Lagrange" site. This reflects a commitment to sustainable energy practices and sets an example for the community.

Overall, the results underscore the significance of renewable energy resources, community engagement, energy efficiency, and economic benefits in driving the effectiveness and engagement of ECs. By leveraging these assets and addressing potential barriers, ECs can thrive and bring about positive change in their respective communities.

8.3 Next steps

Our objectives of the next phase in the MASTERPEICE project will focus on establishing a solid foundation for collaboration, trust, and meaningful engagement within energy communities (ECs) by effectively defining and aligning the vision, mission, values, and drivers of the EC. This comprehensive approach will empower stakeholders to overcome barriers and create a thriving and impactful community dedicated to a greener and more sustainable future.

In addition to addressing the barriers of trust and delivering relevant information, it is crucial to focus on the initiation level of the EC. At this stage, defining and understanding the intersection of vision, mission, and values plays a critical role in overcoming the identified barriers and fostering effective participation.

Vision serves as a powerful tool in projecting dreams and goals, especially those related to environmental sustainability. It provides a clear direction and inspires stakeholders by highlighting the potential for a better future, not only for the current generation but also for future generations. A compelling vision can create a sense of purpose and motivate individuals to actively engage in the EC.

The mission, on the other hand, provides a tangible roadmap for achieving the vision. By defining specific objectives, tasks, and strategies, it reduces scepticism and uncertainty among participants. A well-defined mission clarifies the purpose of the EC and inspires confidence in stakeholders, guiding their actions towards meaningful contributions.

Values within the EC define a common set of social and societal guidelines. These values serve as a moral compass and influence the behaviours and decisions of individuals involved. By establishing shared values, the EC fosters a sense of unity and collaboration, promoting a positive and supportive community environment.

Furthermore, drivers play a crucial role in empowering individuals to join and actively participate in the EC. These drivers act as the main motivating forces behind engagement and commitment. They can vary from financial incentives and cost reductions to a deep sense of responsibility towards the environment and the desire to contribute to a more sustainable future. Understanding and leveraging these drivers is essential in creating an empowering environment that encourages effective participation.

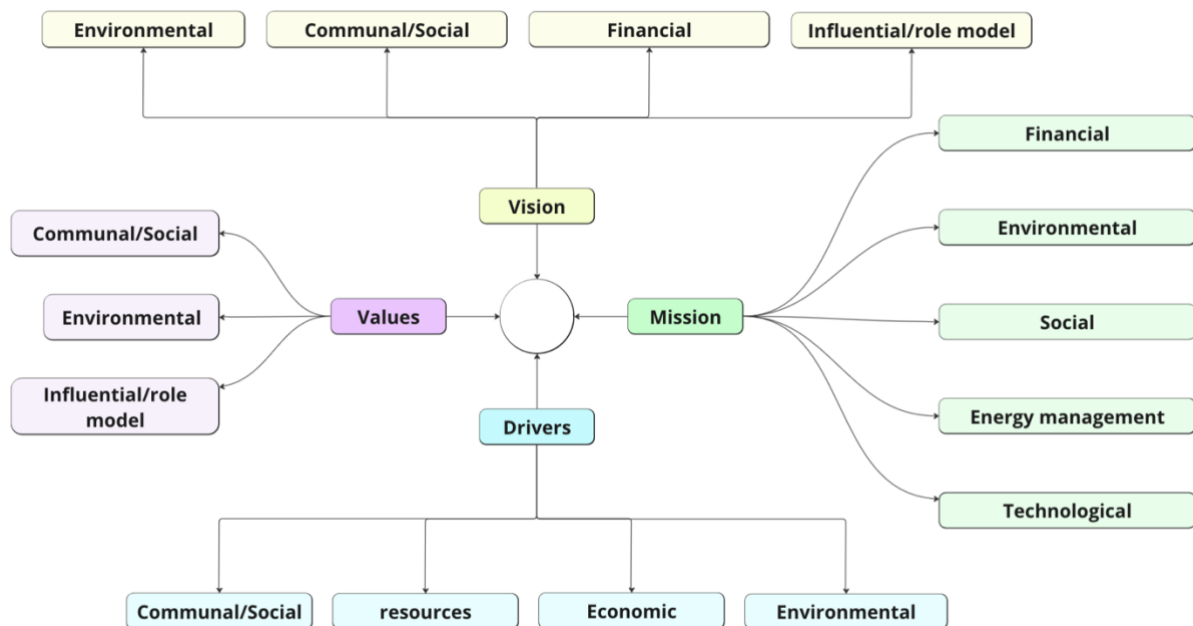


Figure 17: Intersection of vision, mission, drivers, and values

Defining the Vision, Mission, and Values

- Vision Definition:
 - Develop a powerful vision that projects dreams and goals related to environmental sustainability.
 - Emphasize the potential for a better future, inspiring stakeholders of both current and future generations.
 - Highlight the clear direction and purpose of the EC.
- Mission Clarification:
 - Define specific objectives, tasks, and strategies that reduce scepticism and uncertainty among participants.
 - Provide a tangible roadmap for achieving the vision.
 - Clarify the purpose of the EC and inspire confidence in stakeholders.
- Value Establishment:
 - Establish a common set of social and societal guidelines within the EC.
 - Use values as a moral compass to influence behaviours and decisions.
 - Foster a sense of unity and collaboration, promoting a positive and supportive community environment.

Leveraging Drivers and Empowering Participation

- Understanding Drivers:
 - Identify and understand the motivating forces behind engagement and commitment within the EC.
 - Explore a range of drivers, including financial incentives, cost reductions, environmental responsibility, and desire for a sustainable future.

- Leverage these drivers to create an empowering environment that encourages effective participation.

Roadmap for Effective Participation and Value Creation

- Comprehensive Understanding:
 - Gain a comprehensive understanding of energy communities, including social dynamics and behavioural traits.
 - Study relationships and interactions among individuals, families, and their broader social contexts.
 - Unravel the complexities underlying decision-making processes that influence energy consumption and prosuming.
- Macro-level Patterns:
 - Identify and map social traits and behaviours that influence energy communities.
 - Identify factors that drive energy consumption, production, and distribution practices.
 - Uncover patterns at the macro-level to guide project roadmap development for WP3.
- Active Stakeholder Engagement:
 - Define strategies to actively engage stakeholders and incorporate diverse energy usage patterns.
 - Develop tools for the onboarding process to promote EC adoption.
 - Design nudging and boosting mechanisms to facilitate behaviour change and enhance participation.

Value Creation and Exchange

- Relationship Between Social and Economic Value:
 - Analyse the relationship between social values, economic value, and value creation.
 - Explore how social values influence behaviours, leading to responsible energy consumption.
 - Highlight the interplay between social and behavioural factors in driving value creation.
- Leveraging Economic Value:
 - Leverage human resources, energy resources, technology, and community guidelines to create economic value.
 - Optimize the synergy between resources to enhance value creation and exchange.

Our next steps in work package 2 will include:

- Preparing an advanced and in-depth identification and mapping of stakeholders associated with each pilot study.
- Collecting more in-depth data by conducting simple surveys with or through reference persons in each pilot to gather more qualitative data and information.

- Preparing study guides and interview protocols tailored to relevant stakeholders in each pilot.
- Investigating in-depth the user needs, behavioural patterns, values, goals, drivers, and barriers of developing Energy Communities (ECs) within the identified pilot studies.
- Organizing and conducting interviews with stakeholders, capturing valuable insights.
- Analysing collected data, then consolidate and synthesize the insights.
- Identifying and defining user profiles for each pilot, considering both stakeholders and end-users.
- Organizing visits to each pilot location for agile contextual enquiries. Conduct on-site investigations to better understand the context and gather relevant information.
- Preparing final insights for the implementation of the work package 3.

By following these steps, we aim to establish a clear understanding of stakeholder needs, user profiles, and the factors influencing the development of Energy Communities. This knowledge will serve as a foundation for informed decision-making and the successful implementation of activities in WP3.

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