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SOCIALRES

Report on potential to adopt the developed business models

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 837758.

Acknowledgement

This report has been produced within the SocialRES project "Fostering socially innovative and inclusive strategies for empowering citizens in the renewable energy market of the future".

WIP Renewable Energies coordinates the SocialRES project.

The consortium involves 13 partners in 9 European Countries.The logos of the partners cooperating in this project are shown below and information about them is available in this report and at the website: www.socialres.eu

This report has been written by Iban Lizarralde, Audrey Abi Akle, Mikhail Hamwi, and Basma Samir from ESTIA. The authors thankfully acknowledge the valuable contributions from all project partners.

Disclaimer

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1. Technical References

Project Acronym	SocialRES
Project Title	Fostering socially innovative and inclusive strategies for empowering citizens in the renewable energy market of the future
Project Coordinator	Silvia Caneva WIP – Renewable Energies silvia.caneva@wip-munich.de
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Dissemination level*	PU
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Contributing beneficiary/ies	-
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*PU = Public

v	Date	Beneficiary	Author
1.0	16/12/2022	ESTIA	Mikhail Hamwi, Iban Lizarralde, Audrey Abi Akle, Basma Samir
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4. Introduction

During the SocialRES project, three main economic models have been analysed in order to create value to answer to the three main challenges of the European energy system: security, affordability and sustainability. These three economic models (aggregation, energy cooperatives and crowdfunding) include several business models. Moreover, synergies between them have allowed the emergence of original new business models.

Aggregation as an innovative solution can stabilise and minimise the risk of failure when energy system is under pressure as well as facilitate the integration of renewable energy technologies. Aggregators can add value by aggregating electrical generation and load. Lastly, aggregating load can generate electric flexibility and allow new market actors to join the flexibility market services. Beyond aggregation, P2P energy platform business models that is inspired by the sharing economy concept have been reviewed and presented. The peer-to-peer markets involve decentralised, more autonomous and flexible P2P networks emerged almost from the bottom up. Prosumers and consumers interact through a P2P platform to bid and directly sell and buy electricity and other services.

Energy cooperatives include more and more activities based on these categories of aggregation. The result is that companies that do not follow an equity-based proportion for decision making but the one-member-one-vote principle can be supported by second level cooperatives that integrate aggregation services.

Despite direct participation in energy cooperatives, citizen can fund renewable project by crowdfunded based models. These methods of pooling small amounts of capital from a potentially large pool of interested funders can also be in line with energy cooperative values and allows to fund a project by the participation of large number of people usually using web-based platforms. Consequently, jointly-owned and democratically-controlled energy cooperatives can enlarge their scope to citizens who are not willing to participate directly in the governance of the company.

This report on the potential to adopt the developed business models includes the methodology that have been followed to identify and emerge new business models combining existing models that have been identified during the SocialRES project.

Based on this methodology, the document includes also the results of the SocialRES Hackathon. This workshop was held in Valladolid, Spain in November 2022 and was organised as a whole day event to renew the existing social innovation groups and give them new business opportunities that can be directly implemented together with new partners.

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5. New social innovations in the energy sector

Research on social innovation over the past 20 years was initially very much inspired by practical experiences with social innovations. More recently, research on social innovation is increasingly motivated by the need to provide insights into better ways to stimulate problem-solving. New social practices are needed, able to cope with great societal challenges in a successful way.

Stuchi et al., (2022) highlight the promotion of new perspectives for the transformation of urban public road spaces aligned to decision making in favour of a sustainable and equitable urban mobility system, consistent with the National Policy of Urban Mobility. Participatory governance involves designing new forms of collaboration and partnerships between public, social, economic, knowledge, and civic actors. It is important to note that the conditions of negotiation, responsibilities, empowerment, and connections between actors from different sectors vary widely. The study identified co-construction and co-design supported mainly through opinion surveys and participatory idea workshops. As a result, the study provides elements for the discussion of public policies in line with the challenges of sustainable urban mobility in the 21st century.

Springle et al.,(2022) used a social innovation lab methodology as well as key interviews as tools to engage stakeholders of different backgrounds to identify the challenges and opportunities related to the role of compostable bioplastic food packaging and foodservice ware in a circular economy.

A social innovation lab is a process that strategically brings together a cross-section of stakeholders through a series of interactive workshops to "[emphasize] not only imagining high potential interventions but also gaining system sight, redefining problems, and identifying opportunities in the broader context with the potential to tip systems in positive directions" (Westley et al., 2015).

The study focuses on business models that can be applied for social eHealth innovations and the role of intermediaries or brokers that reduce transaction costs and stimulate comparative advantage. The study finds that the broker business models is expected to close a gap that today exists in the eHealth market for social innovations because absence of makers that bring together buyers and sellers, facilitate transactions, create dialogue and stimulate the two sides of the market (Vimarlund et al., 2021).

Schartinger et al., (2020) proposed nine types of social innovations derived from a process dynamic view. The nine types result from the interplay between the two dimensions: the domain and degree of interaction.

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The nine types are described as follows.

Company-based social innovation is driven by companies and focuses on the internal structure of the company. Patterns of implementation are fragmented, meaning that companies normally implement isolated solutions.

Entrepreneurial social innovation refers to social innovation that is based on a new balance between economic and social goals. This is the realm of social enterprises, socio-economic enterprises.

Disruptive social innovations are based on disruptive (e.g., digital) business models (Bria et al., 2015; Gaggioli, 2017) and are often financed by venture capital. Initiatives that are characteristic for the mode of the shared economy (on sharing/marketing individually owned goods) fall under here. They are disruptive because they often act against given political standards or regulations.

Temporary niche stands for a type of social innovations that come out of civil society and are limited in time and space. They are often driven by highly engaged individuals who aim at solving a specific local problem, a specific need of local groups/society and/ or their empowerment.

Community-based social innovations have a strong focus on self-organization, in some cases they aim at strengthening local communities. They address a broader local community and the organization of the network needs a certain degree of professionalization. Local politicians are often involved, financial support by (local) government funding is used as far as possible.

Global movement-based social innovation is anchored in civil society. Imitation, learning and adaption are the key modes of interaction. There are some social innovations that become adapted all around the world. Cooperative modes of car sharing, activities to protect and empower women, regionalization of food consumption are examples.

Experimental social innovations base on public funding, are organized as projects and thus limited in time and space. Those publicly funded projects cover a broad range of activities, and the projects need a certain degree of professionalization due to the formal conditions and terms of reference of the calls.

Embedded social innovation stands for a type of social innovation that is based on funding programs. This type of social innovation also builds on financial resources from government. It could be specific calls for new solutions in a certain practice field or the resources provided in the context of implementation.

Top-down social innovations base on central political programs that combine incentives, support, nudging, regulation and prohibitions. The model of interaction is hierarchical, but the dynamic depends on the acceptance and the active involvement of the people addressed.

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6. SocialRES methodology for new business models development

The proposed methodology for the workshop consists of an introduction and three main parts (Figure 1).

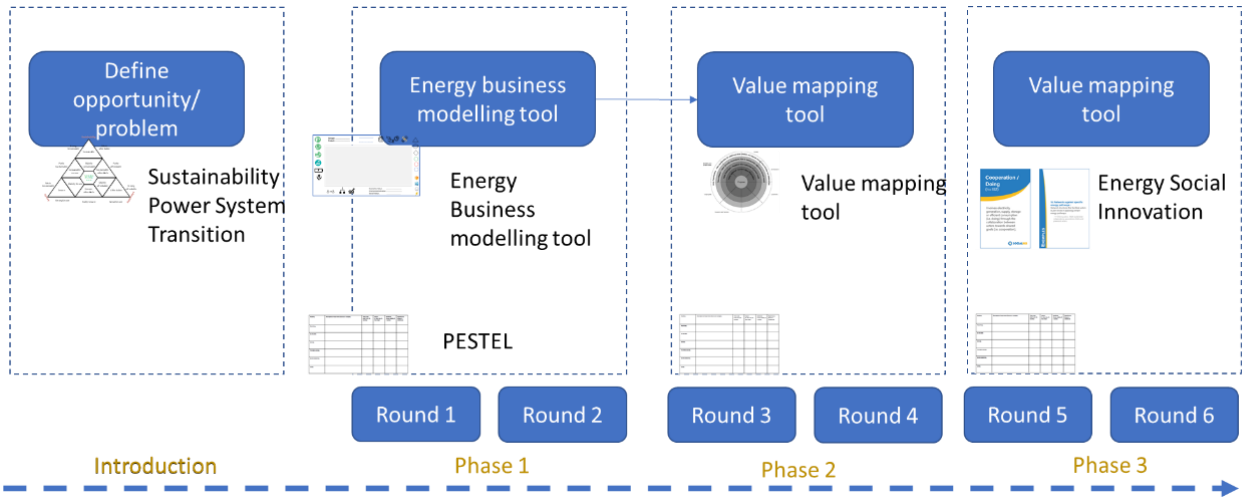

Figure 1 Social innovation methodology of SocialRES workshop

6.1. Introduction: define an opportunity/ problem

The first part is about defining the context and discover opportunity or problem associated with social innovation and power system transition. The Sustainable Power System Triangle (SPST) is adapted from the "integrative sustainability triangle" of Kleine and Hauff (2009). SPST consists of three variables that compete with each other. The triangle consists of three pillars that indicated by the European Commission as guiding dimensions for the future power system design. The three dimensions are affordability, environmental sustainability and security "energy trilemma" (Roddis et al., 2016). The triangle represents the trade-off between the three the dimensions and users will map the influence of their project idea on the three pillar and determines any harmony and conflict.

Regarding the application of the SPST, once the project idea is defined, participants are invited to use the triangle to integrate the three pillars of energy transition: security, sustainability and affordability. The integration is based on the following 3 steps.

6.1.1. General assignment

Identify one commonly recognised indicator: e.g. ecological: carbon emission; social: energy justice. What is the direct effect of this indicator? With which area of the triangle is this indicator associated?

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For example: carbon emission has a pressure on the atmosphere, thus it has no relationship with affordability and security, and it fits within “Mainly sustainable”.

6.1.2. Secondary assignment

The next step is to identify a more specific indicator within the scope of the indicator. For example, *reducing the carbon emission from the activity related to household electricity consumption* (or transport, tourism, etc.).

6.1.3. Find conflict and harmony within the triangle

Indicators are not a simple issue. They might fit to more than one of the dimensions addressed by the SPST. An indicator may relate differently to each of the energy transition dimensions, leading to a contradiction. For example: *reducing the carbon emission from the activity related to household electricity consumption* can be in conflict with affordability (low competitivity of renewable energy) and security (fluctuation nature of renewable energy resources).

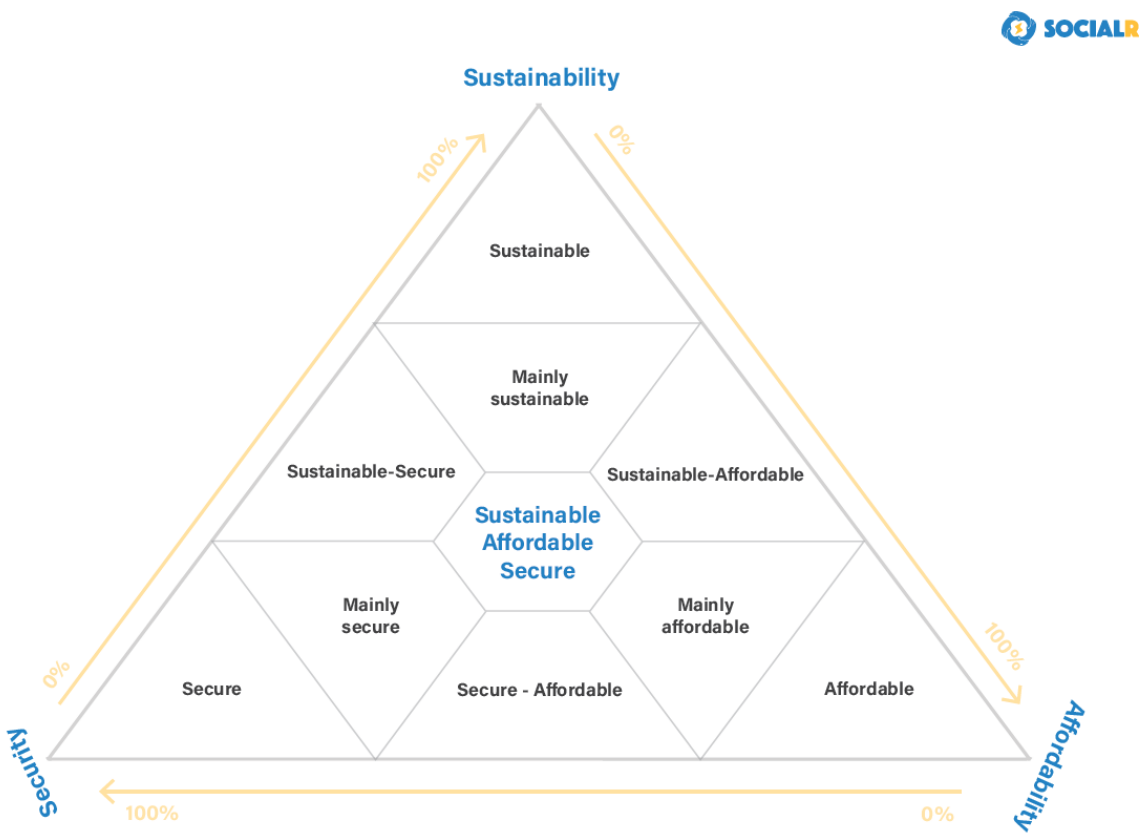

Figure 2 Sustainability power system triangle. Adopted from (Kleine and Hauff 2009)

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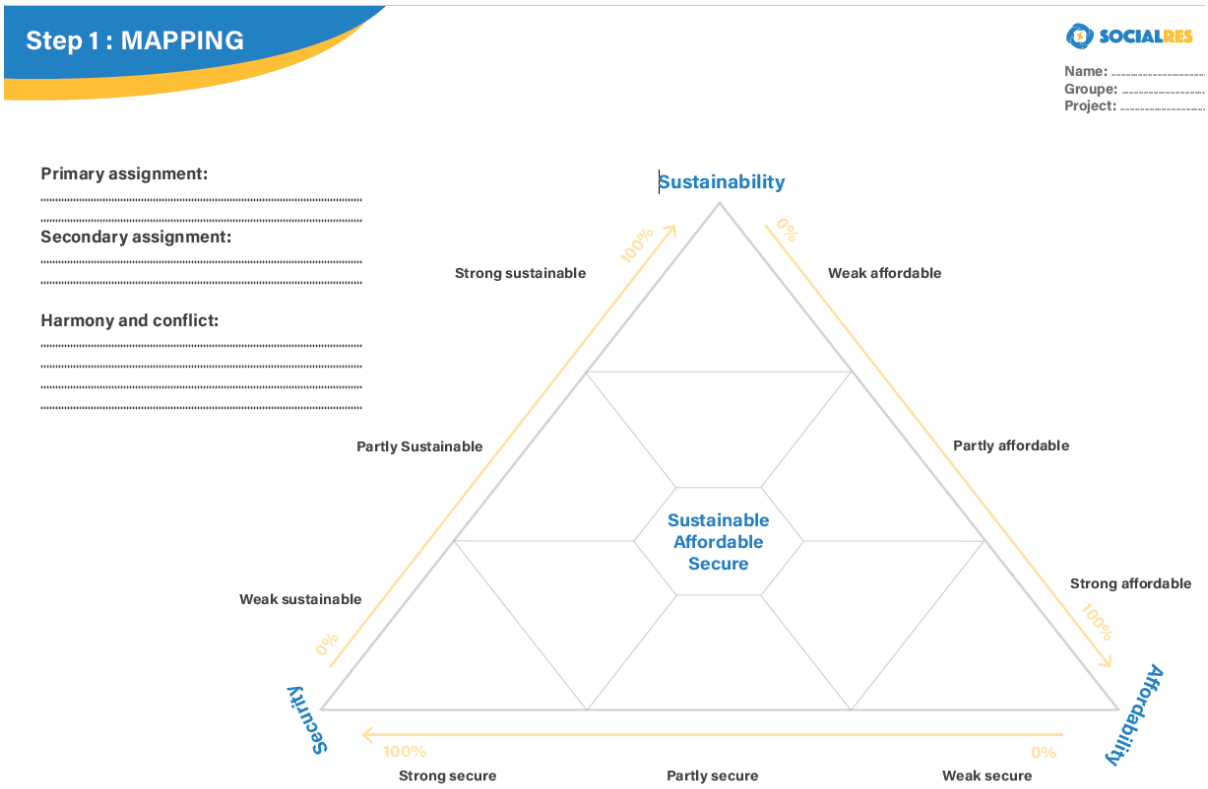

Figure 3 Sustainability power triangle template used in the workshop

6.2. Energy business modelling

The tool is designed to support visualisation of different stakeholders and their relationships. The tool consists of the following elements.

Stakeholder's roles

- Owned by: referring to the energy technology owner
- Financed by: indicating the actor who provides the funds for the project
- Hosted by: referring to propriety owner of the place where renewable energy technologies are installed

Key stakeholders

- Individual: refer mainly an individual actor (e.g. consumer, prosumer)
- Third-party: refer mainly to private company intervention (e.g. RE project developer)
- Community: refer mainly to group of people with common interest and specific organisational structure (e.g. cooperative)

Type of exchange

- Product: product-oriented services. Here, the business model is mainly geared towards sales of products, but some extra services are added

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- Service (use): traditional product still plays a central role, but the business model is not geared towards selling products. The product stays in ownership with the provider, and is made available in a different form, and sometimes shared by a number of users
- Result: client and provider in principle agree on a result, and there is no pre-determined product involved
- Electricity

Transaction type
- Flow of Electricity: an agreement to transfer electricity
- Flow of money: making a payment

Investment model
- Donation-based: funders donate without expecting monetary compensation
- Reward-based: crowdfunders may receive a token gift of appreciation for backing a project or pre-ordering a product or service
- Lending-based: lenders obtain a fixed-interest debt, providing for repayment of principal according to an agreed schedule
- Equity-based: an offer of securities for sale by a private business to the general public

Energy related activities
- Production of solar energy
- Production of biofuel energy
- Production of wind energy
- Energy storage system
- Energy efficiency
- Electric vehicle

Electricity trade
- Peer to peer
- Production aggregation
- Flexibility aggregation

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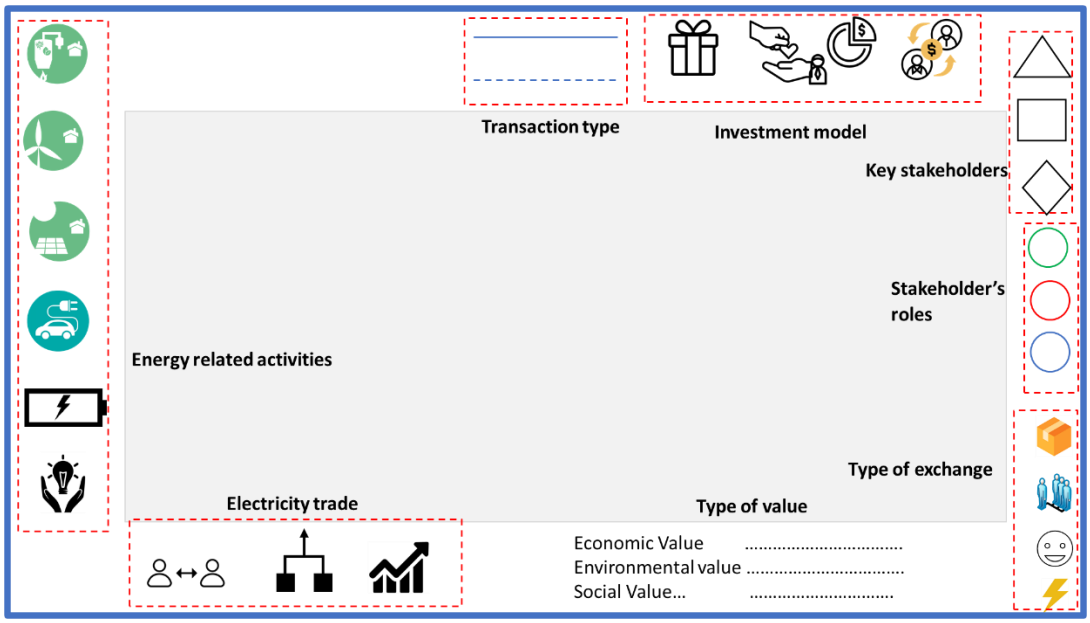

Figure 4 Energy business modelling tool

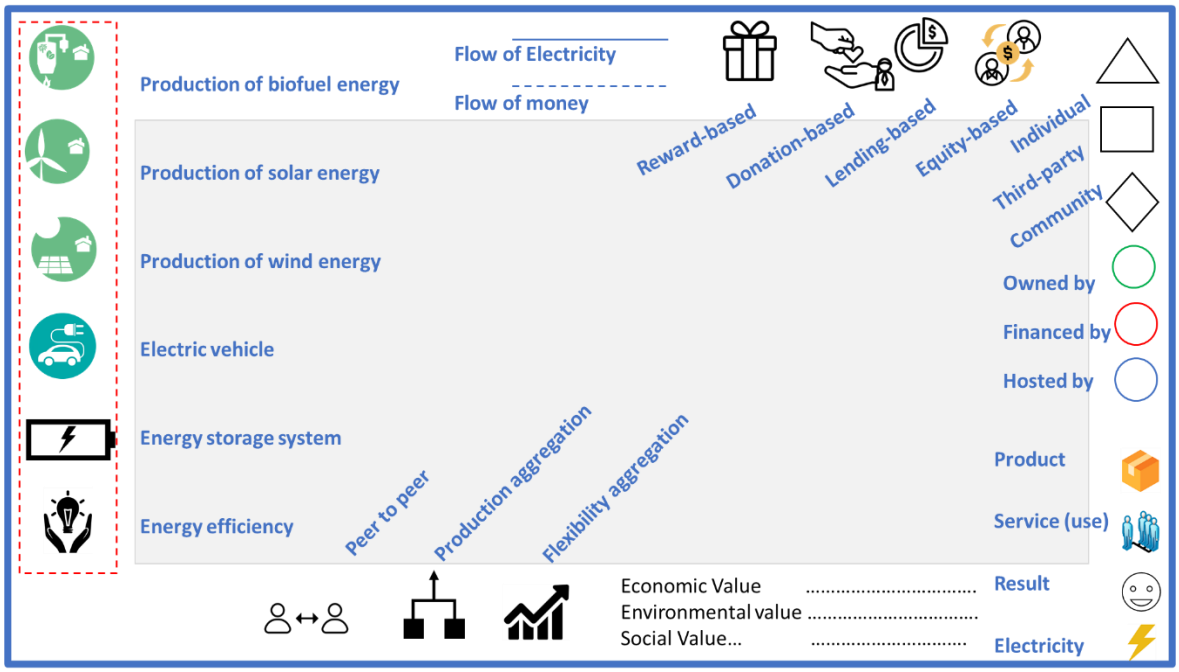

Figure 5 Energy business modelling tool elements

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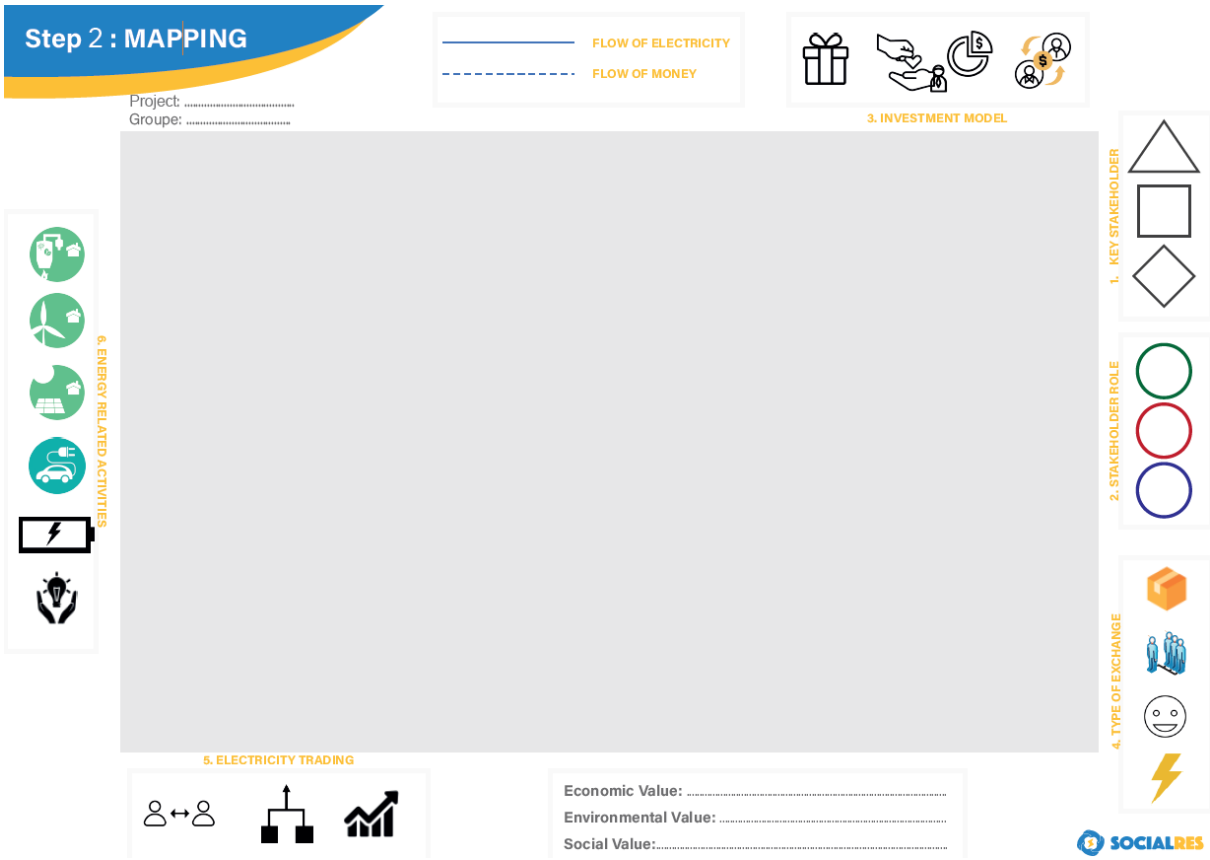

Figure 6 Business modelling template used during the workshop

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6.3. Value mapping

A "value mapping tool" is conceived to help companies create value propositions to support sustainable business modelling. The tool adopts a qualitative approach to value analysis.

Tool application aims at:

- Understanding the positive and negative aspect of the value proposition
- Identifying conflicting values (i.e where one stakeholder benefit creates a negative for another stakeholder
- Identifying opportunities for business mode redesign and realignment of interests

6.3.1. Value analysis

Value destroyed can take various forms, but in the sustainability context is mostly concerning damaging environmental and social impacts of business activities (e.g., pollution).

Missed value opportunities represent situations where individual stakeholders squander or fail to capitalise on existing assets, resources and capabilities, and are operating below industry best practice. New value opportunities help expand the business into new markets and introduce new products and services that offer enhanced benefits to stakeholders.

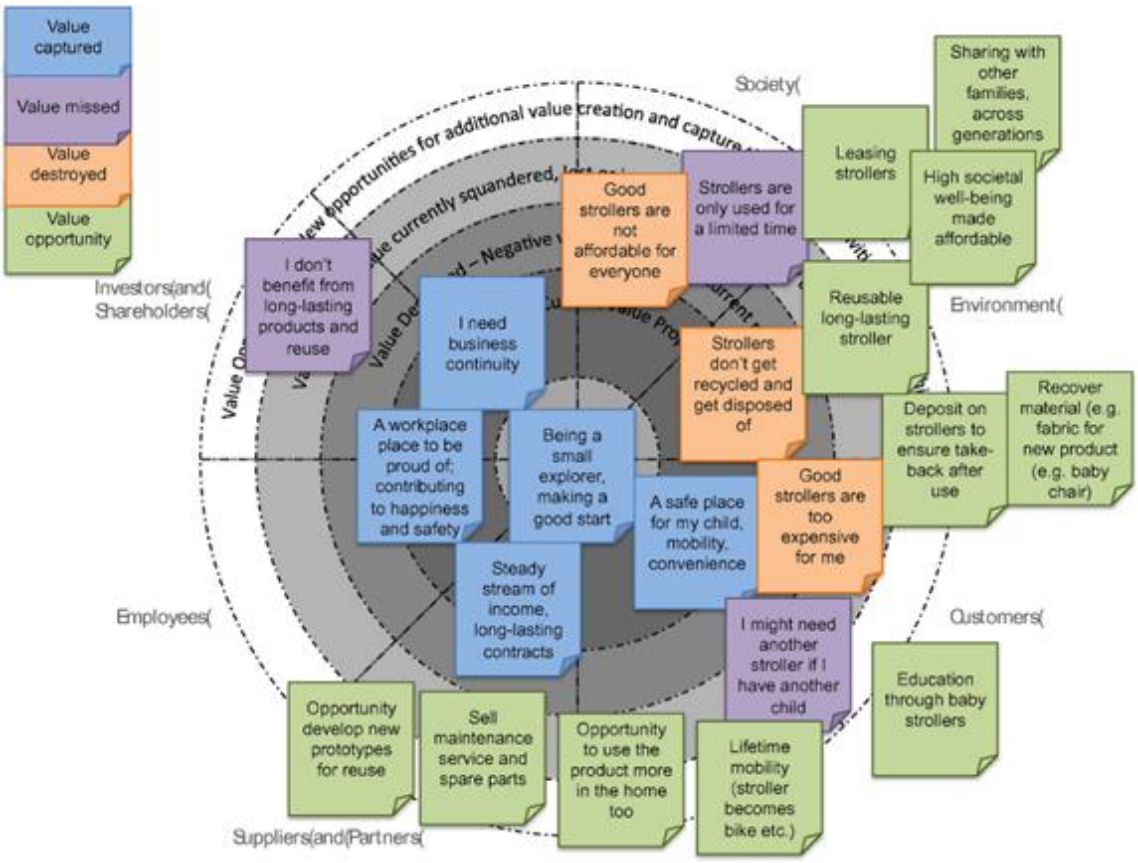

Figure 7 Example of value mapping tool application

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The Cambridge Value Mapping Tool defines a guided step-by-step process through the following questions:

1. What is the unit of analysis e.g., product, service, company, industry?
2. Who are the stakeholders for the unit of analysis?
3. What is the purpose of the unit of analysis?
4. What is the current value captured?
5. What is the value missed and/or destroyed?
6. What is the value surplus and/or absence?
7. What are the new value opportunities?

6.3.2. Application steps

It is defined by a short introduction of the sustainability challenges and by a short introduction of the tool: real example illustrates the terminology of value capture, missed value and new opportunities.

Participant should define the unit of analysis (product, service, industry). Stakeholder groups are identified by the participants. The purpose is discussed: why the organisation is in operation. A facilitated brainstorming is then used to populate the tool. For each stakeholder segment, the value capture, destroyed, missed and exploration of new opportunities are identified.

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6.4. Energy innovation cards

Wittmayer et al. (2022) proposed a matrix of Energy Social Innovation types. The matrix consists of two variables: manifestations and social interaction (Wittmayer et al., 2022). Variable "manifestation" expressed through new ways of doing, thinking and/or organising energy. Social relations expressed through "social interactions", there are four forms of social interactions: cooperation, exchange, competition and conflict.

		Social interaction			
		Cooperation	Exchange	Competition	Conflict
Manifestations	Doing	1: cooperation/doing	4: exchange/doing	7: competition/doing	10: conflict/doing
	Thinking	2: cooperation/thinking	5: exchange/thinking	8: competition/thinking	11: conflict/thinking
	Organising	3: cooperation/organising	6: exchange/organising	9: competition/organising	12: conflict/organising

Figure 8 Typology of Energy Social Innovation. Source: (Wittmayer et al., 2022)

6.4.1. Social relations

- Cooperation: is interaction that occurs when people work together to achieve shared goals
- Exchange: is a voluntary interaction from which all parties expect some reward
- Competition: is a struggle over scarce resource that is regulated by shared rules
- Conflict: is a struggle over scarce resource that is not regulated by shared rules

6.4.2. Manifestations

- Doing: practice related to energy technologies and physical composition of the energy system: e.x production, consumption and storage
- Organising: governance and organisational structure within initiatives and within energy system. e.x structure for networking and knowledge exchange
- Thinking: form of knowledge and normative framing including values and perceptions. e.x expert knowledge on battery technologies or on energy regulation

For the application, the typology has been transformed into a type of tool with cards to facilitate the usage.

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Figure 9 Social innovation cards. Adopted from (Wittmayer et al., 2022) part 1

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Figure 10 Social innovation cards. Adopted from (Wittmayer et al., 2022) part 2

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Figure 11 Social innovation cards. Adopted from (Wittmayer et al., 2022) part 3

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6.5. PESTEL

To support the identification of general opportunities and threats for the value chain, the PESTEL framework can be used. PESTEL is often used by a company to scan their environment for emerging issues that may influence their success and strategy. Applying PESTEL involves searching the external environment of the company for significant issues or trends related to the following headings: political, economic, social, technological, environmental and legal.

PESTEL instructions:

1. Identify issues or trends that are or could have an impact on the target value chain;
2. Capture details of the information source or an illustrative example of the trend, as this will be useful to provide credibility to the analysis;
3. For each issue that has identified estimate.

The Impact – What level of impact could the issue have on the value chain? Use a scale from 1-5 where: 1 = Potential to create limited change within a limited part of the value chain, and 5 = Potential to revolutionise or destroy the entire value chain.
The Likelihood – How likely is it that the issue will have an impact on the value chain? Use a scale where: 1= Very unlikely, 5= Very likely.

Groupe: .....
Project:.....

Heading	Description of issue/trend [Source or example]	Time scale (0-6/7-24/ 24+ months)	Impact (1= Very low, 5= Very high)	Likelihood (1=very unlikely, 5 = certain)	Significance (Impact x Likelihood)
POLITICAL					
ECONOMIC					
SOCIAL					
TECHNOLOGICAL					
ENVIRONMENTAL					
LEGAL					

Figure 12 PESTEL Framework

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7. Results

The SocialRES Hackathon was held in Valladolid, Spain, on the 9th November 2022. This workshop was organised using the methodology presented in this document. The workshop included all the SocialRES use cases as well as all the scientific partners. Based on the steps proposed in this document, the participants worked on three specific sectors:

- New social innovations in the mobility sector and mainly related to electromobility;
- The collective renewable energy projects and the social innovations related to these projects;
- The heating domain and the specific business models that can be applied within this domain and
- The services that can be offered to individuals based on a social innovation perspective.

The participants contribute to all domains as the workshop was prepared in a "world café" way. The following subsections present the results obtained during the workshop and represent in a graphical way the proposed models together with the identified values, barriers and opportunities.

7.1. Social thermal heating (biomass and excess heat)

Based on the inputs of four groups, the "social thermal heating" section obtained the following results:

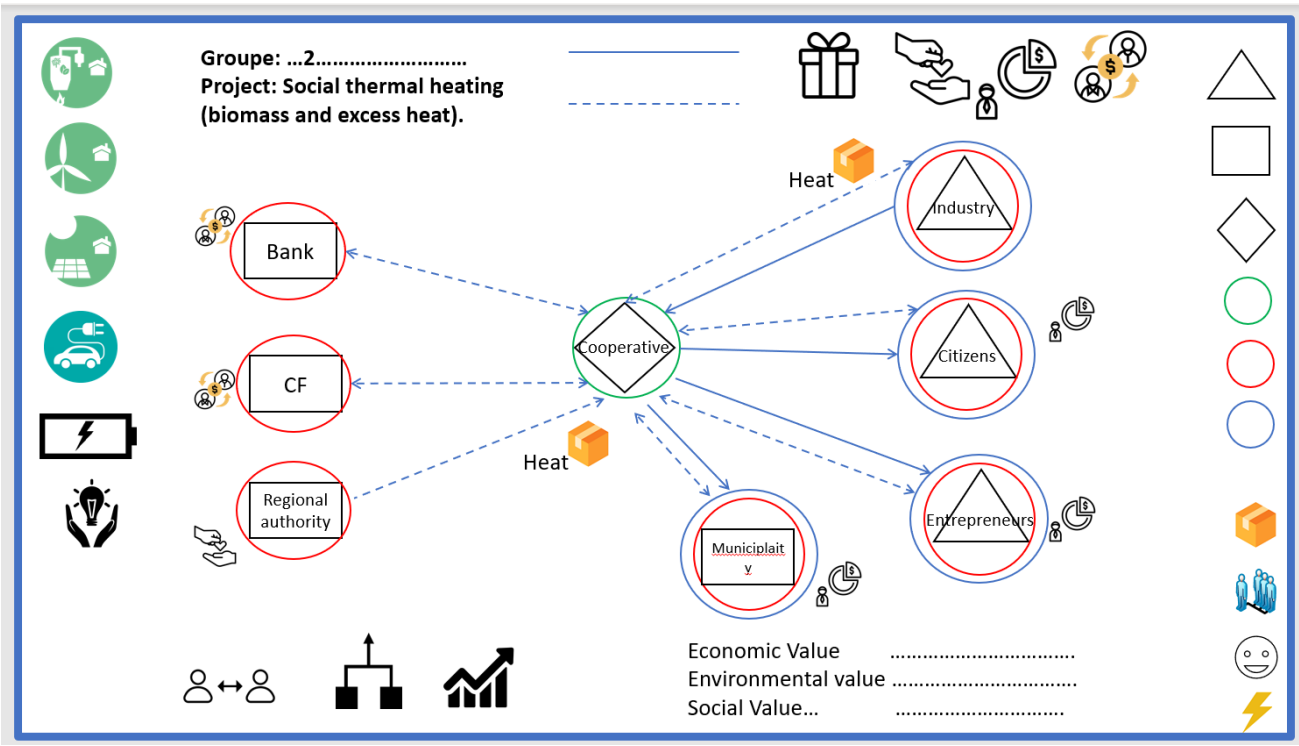

Figure 13: Social thermal heating modelling map

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Participants worked on an energy cooperative based solution that host the means of the heating system and that offers a heating system to different stakeholders. The model is funded by mechanisms that includes public and private shareholders and a crowdfunding mechanism.

The energy cooperatives that work in the heating domain exist already in Germany were several urban heating systems are developed and owned by energy cooperatives. It is an opportunity that has been identified by other SocialRES use cases, but several barriers have emerged during the analyse:

- During the SociaRES project, I-ENER has analysed deeper this business model, mainly based on the experience of LCF. The main barrier is the necessary CAPEX for big urban heating systems. Due to this barrier, current urban heating systems within I-ENER's territory scope, are developed by collective actors. Nevertheless I-ENER has worked on a business model in a narrower scope seeking smaller systems (schools, industrial heating system).
- Other case studies expounded their lack of experience in this domain and the incompatibilities of sharing technical staff on different domains such as photovoltaics and heating.
- Technical barriers included heating needs in some regions that are lower than central and northern Europe and therefore do not justify a such important investment.
- Moreover, access to biomass resources can also be a critical factor. In the case of Croatia for example, biomass resources are massively exported to Germany.

	Value proposition	**Value creation**	**Value capture**
Solar thermal heating + biomass	Safe and cheap energy, reducing energy poverty, reducing CO2	Establishment of EC for installation and management of heating system	Payback to shareholders/ backers Regional value chain
Excess heat + retrofit incentives	Increased energy efficiency, reuse waste to heat and reduce energy consumption	Bring on industries as energy producer and create reward model incentivize retrofitting	
		Energy security	

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7.2. Collective photovoltaic social innovations

Several business models for collective photovoltaic social innovations have been identified among SocialRES case studies. These models include specific funding models (social bonds for municipalities, cooperative sharing models). They also include different aims: municipalities willing to boost local economy, projects to give access to affordable electricity to low-income households.

Lastly, these models vary from one State to another due to the legal framework differences. In some cases feed-in tariffs can be applied and the financial model stands for public support. While some countries have already developed a clear framework for sharing electricity, others still lack for a clear legal framework. In some cases, collective self-consumption legal framework can be applied to these kinds of projects. In the case of France for example, within a scope of 20 km, sharing the photovoltaic production can be possible in some rural areas.

During the workshop, a specific model to give access to affordable electricity to low-income households was analysed.

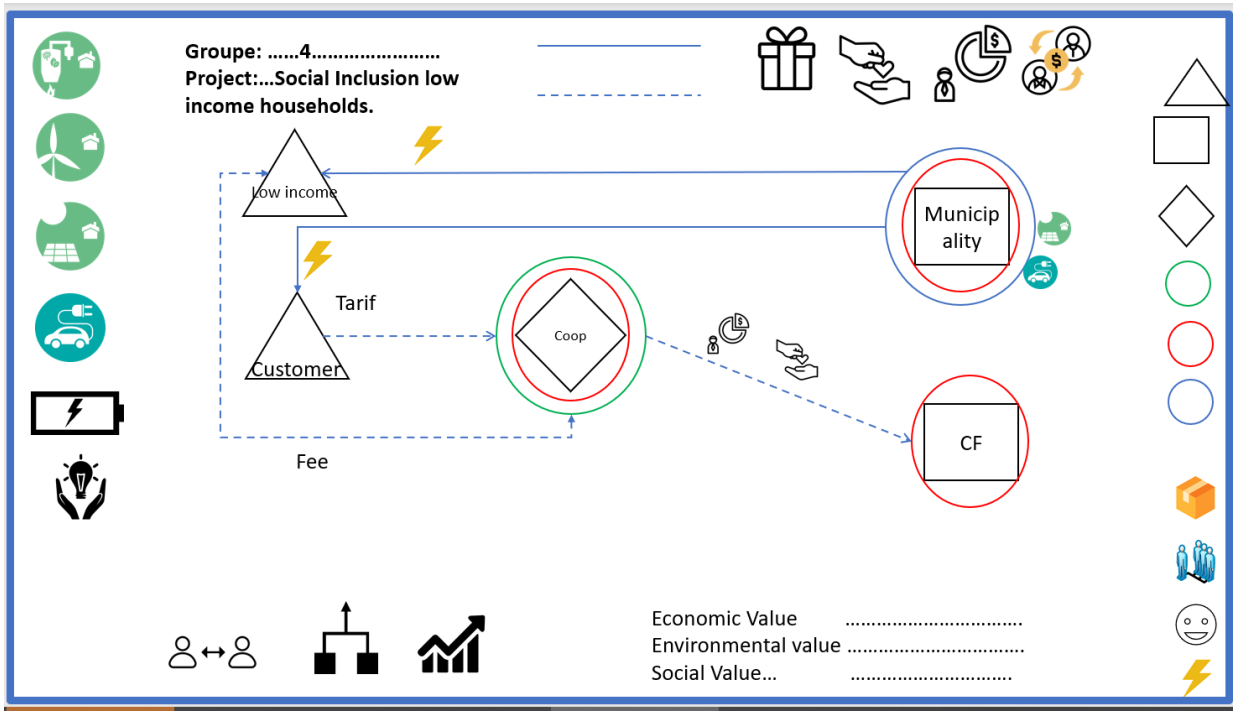

Figure 14: Collective photovoltaic social innovation for low-income households

The main barriers to develop a model to give access to affordable electricity to low-income households are the administrative barriers. Existing examples include complex financial structures combining companies and associations. Municipalities have often an important role in these kinds of models: they can give access to existing roofs; they can also develop a photovoltaic project to provide municipal buildings with electricity and share the electricity that has not been used (during weekends or during vacations).

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Energy cooperatives have developed specific models with municipalities. Crowdfunding platforms can also include an added value to this kind of models. Indeed, in some cases crowdlending models could be applied to the combination of municipalities and cooperatives joint models while in other cases crowdfunding based on donation can be the best option.

Value proposition	Value creation	Value capture
Affordable energy for low-income households (HH) Social inclusion for low income HH in energy. Sense of contribution to socially acceptable energy transition	Funding: Upfront investment Long-term financing of social fund Activities: campaigns PV installation Contract agreements with financers Managing a company	Generation RE Collecting donations Member fees
Municipality meets social inclusion and environmental targets Raised quality of life and awareness on social/energy issue	Energy efficiency Local jobs creation Energy security	All economic value is captured in the community using crowdfunding, heat

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7.3. Energy services for citizens based on social innovations

More and more actors propose services for citizens based in a social innovation pattern. Energy cooperative members face demands from their members in order to support them on energy efficiency actions or renewable energy projects such as individual self-consumption projects. Aggregating loads, generation or flexibility can be done by gathering an important number of citizens.

P2P platforms are proposing also original models so that individuals can participate actively to the energy transition. Among these models, during the workshop the SocialRES partners focused on a model to offer energy efficiency measures to citizens by original models combining energy cooperatives, crowdfunding platforms and P2P platforms. These savings can be obtained by auditing and consulting households energy consumption and identifying energy efficiency opportunities.

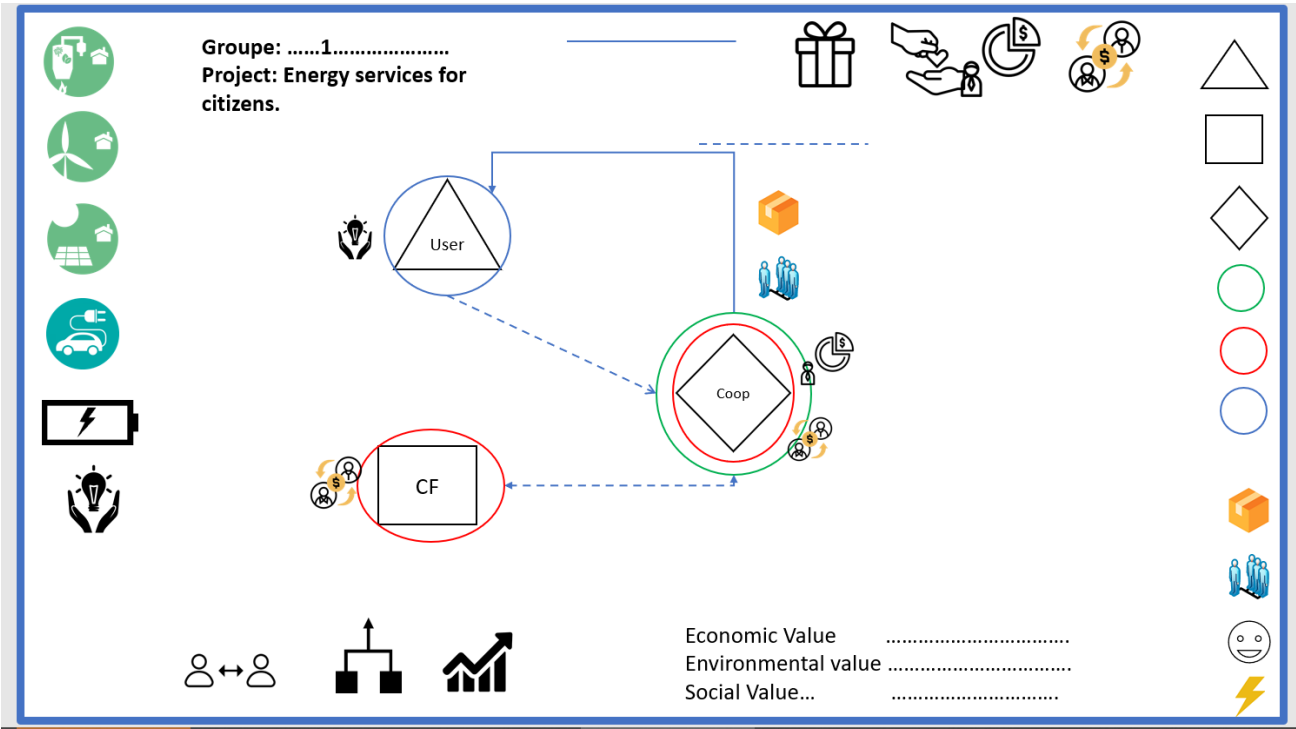

Figure 15: Energy efficiency services for citizens

Energy cooperatives usually offers services for energy efficiency, but these activities are economically not viable and are often funded by other revenue models of the cooperative. Collaborations with other entities are necessary in order to have easier access to the information needed to implement these types of actions. Moreover, passivity of citizens has also been identified as a main barrier. Energy efficiency actions need specific efforts from a behavioural point of view and these kinds of changes are difficult to implement in many cases. Some use cases have identified flexibility action based on the same model of energy efficiency. These actions can allow new revenue models for the entity that has deployed, often an aggregator or an energy cooperative.

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Value proposition	Value creation	Value capture
Program to offer energy efficiency measures through saving	Auditing and consulting households' energy consumption to identify Energy Efficiency (EE) opportunity	Fees paid by the program to charges according to their energy saving
Offline services: Audits Energy "check" Maintenance Advice on financing Online services: Energy + benchmarking Price comparison and advice on energy efficiency Financial energy efficiency jobs created Carbon trade on HH level	Infrastructure Pool of experts measuring technologies in HH Portfolio of providers of energy service Money for launching the company	Fees paid by the customer Fee system efficiency Fees for extra services
	Useful data which can be used for modelling Training energy users	

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7.4. Electromobility

Lastly, a specific domain was analysed using the same method. The more and more social innovations in the energy sector include mobility functions. Among the new European energy cooperatives, a large number of cooperatives deal with mobility aspects. There are original synergies to be exploited based often in the interactions between renewable energy sources and electric vehicles.

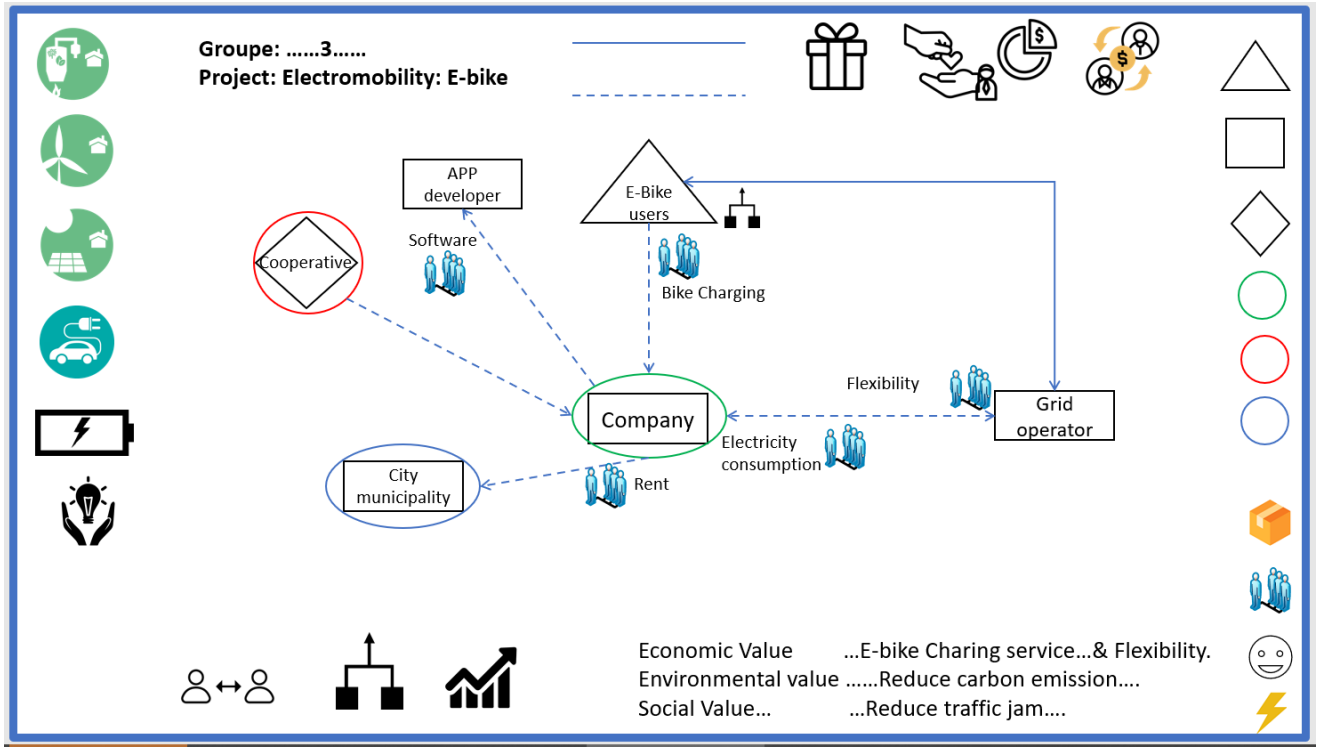

Figure 16: Social innovations for electromobility

Mobility solutions are often based on public policies either for collective transportation system or more recently for individual transportation services funded by municipalities. Recently, energy cooperatives have developed new activities to develop social innovations in the usage of shared vehicles. More and more vehicles within these systems are electric vehicles, which allow energy cooperatives to close the loop with electricity generation projects or even with electricity retailing business models.

Vehicles can be electric car but also electric bikes and specific bikes like cargo bikes. Even if often electricity is used as the energy vector, in some cases biogas have been identified as energy vector. All these parameters have been considered to deploy original business models. Nevertheless, sharing vehicles need a major behavioural change between citizens and all the use cases have identified this factor as the main barrier.

Original aspects of the business models identified within this domain include the opportunities for P2P new services and flexibility actions. Peer to peer platforms can

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include in their services the possibility of using the electricity produced by the citizens to supply the electricity to charge the electric vehicle that is positioned in a geographically different place. From a demand response point of view, original opportunities have been identified. Indeed, electric vehicles are high-capacity flexible loads that can be managed by an energy cooperative or an aggregator and therefore offer new services for the grid manager to improve the robustness of the European electricity system.

	Value proposition	**Value creation**	**Value capture**
Secure street electric bike charging	Ease if use security health time	Use of public electric light infrastructure to charge e-bike Security of storage/ app	Charing Storage/ security Flexibility ads
Biogas production from organic residues	Replacing fossil vehicle Security of supply Circular economy Lower fuel price	Transform of organic waste or produce biofuel for vehicle	Coop sells biogas to customer
Public bike sharing	Make bikes more affordable	Electric bike suppliers	Leasing

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