



SOCIALRES

Database of driving factors in social innovations in the energy sector

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Introduction

The aim of SocialRES is to close non-technological research gaps that impede the widespread uptake of social innovation business and service models in the European energy sector. Social innovation projects address broad social issues, in this case the clean energy transition, while also driving business forward. Several type of businesses and terms are used to cope with social innovations within the energy sector: local renewable projects (Dóci and Vasileiadou, 2015), sustainable energy communities (Romero-Rubio and de Andrés Díaz, 2015), community-owned means of renewable energy production (Walker, 2008).

In the SocialRES project three type of businesses have been considered associated with social innovation in the renewable energy sector: Cooperatives, Aggregators and Crowdfunding platforms. These businesses facilitate an increase in energy democracy by increasing the number of local (decentralised) clean energy projects and by allowing the consumer to take a more active role.

Based on a detailed analysis of 9 cases of social innovations implemented by crowdfunding platforms, cooperatives, and aggregators in 7 EU countries, one of the goals is to investigate enabling conditions and barriers for the generation of a portfolio of successful examples of social innovations.

The aim of this report is to define the main factors that drive citizens, investors and other stakeholders to contribute in social innovation schemes for clean-energy transition. This is done by a literature review of qualitative and quantitative elements (section “State of the Art”), the categorisation of motivations for social innovation in the energy sector (section “classification for driving factors in social innovations in the energy sector”) and the results of the first survey realised within the SocialRES project with the managers of aggregators, cooperatives, and crowdfunding platforms (section “Results of the survey”). The main result is a database of driving factors that will be used to analyse innovative business models as well as in the survey with participants of social innovations in the energy sector.



State of the Art

Driving factors for social innovations in the energy sector are heterogeneous. A first categorisation of these factors in the literature include norm-driven motivations and material incentives. Other factors can include subjective norms, which are psychological factors often influenced by social pressure, or spatial patterns, which can be a criterion to classify the motivations to join an energy community: while a “community of place” is based on social relationships in a specific geographical setting; other communities cover a larger geographical scope and are based on specific goals (Bauwens, 2016). These goals are heterogeneous and often related to political motivations as social equity, sustainable land-use or consumption reduction (Becker and Kunze, 2014). Moreover, integrating energy communities are often based on specific motivations associated to decision making processes, benefit distribution or ownership. Consequently, the factors that contribute to the integration and commitment within an energy community are complex. Meaning that are diverse and can vary during the time (Rogers *et al.*, 2008; Bauwens, 2019).

In this chapter the focus is done on research works dealing with the drivers and motivations that show participants of different social innovations within the energy sector. The goal was not to identify the success factors of these innovations.

Work taking into account the success factor (Warbroek *et al.*, 2019) have defined a categorization of potential success factors within social innovations in the energy sector:

- Factors related to the organisation itself
 - Project champions
 - Human capital
 - Size
 - Availability of time
 - Access to funds
 - Board diversity
- Interactions with the local community
 - Alignment with local values and frames of reference.
 - Alignment with the institutional characteristics of the local community
 - Visibility
 - Community involvement
 - Bonding capital
 - Bridging capital
- Governance settings and linkage to the government
 - Linkage to government
 - Linkage to intermediaries
 - Supportive government arrangement

Other authors have proposed a different taxonomy of the factors that influence the emergence and development of social innovations in the energy sector (Boon and Dieperink, 2014):



- Emergence of an occasion to establish social innovations in the energy sector
 - Fluctuating energy prices
 - A high level of environmental awareness within society
 - Dissatisfaction with inconsistent stimulation policies
 - Dissatisfaction with the national government's incompetence to meet environmental targets
 - Wish to become independent from energy corporations
 - Wish to become independent from energy exporting countries
 - Symbolic benefit in terms of a green image
 - Symbolic benefit in terms of enhancement of social cohesion
- Local perception of the energy community
 - High level of social cohesion
 - Availability of external expertise in terms of organisations that allow the transfer of knowledge
 - The absence of local opposition
 - Existence of other similar local renewable energy organisations
 - Expertise of suppliers of renewable energy and technologies
 - Visibility of renewable energy technologies
- Local support and acceptance of the energy community
 - High level of environmental awareness within society
 - A high level of social cohesion
 - The absence of local opposition
 - Visibility of renewable energy technologies
 - Co-ownership of locals
 - A non-constraining participation possibility for locals
 - Equal and fair distribution of potential benefits
 - The support of external parties
 - Possibility to provide feedback on energy consumed and/or generated
- Assessment of the applied renewable energy technology
 - Visibility of renewable energy technologies
 - Reliability in terms of a proven technology
 - Low initial investment costs
 - A short payback period

These factors are interrelated with the participation of different members on these communities. Therefore, the following work will focus on the motivations that show participants to integrate these communities. These motivations are often differentiated between personal motivations or willingness to provide benefits for society through energy communities. (Brummer, 2018) classified the societal benefits into seven different categories. These categories include subgroups as showed in this classification:

- Economic benefits
 - Financial benefit for the community
 - Benefit for marginalized regions or communities
 - Higher employment
 - Social inclusion



- Support of other community activities & services
- Education and acceptance
 - Knowledge about energy saving
 - How to run community projects
 - Examples for other communities
 - Positive attitude towards RE
 - Creating trust in RE
- Participation
 - Higher level of political participation
 - Financial participation
 - Behaviour change
 - Awareness rising
- Climate protection and sustainability
 - Influencing lifestyles
 - Climate awareness
 - Mental connection between energy consumption and climate change
- Community building and self-realization
 - Upgrading communities
 - Stronger community cohesiveness
 - More options to make own decisions
 - Community empowerment
 - Pride and joy
- RE generation targets
 - RE target reach
 - Direct participation in RE building
 - CE as a positive change agent
 - level playing field for market entrants
 - Financing of RE
 - Support transformation process
- Innovation
 - Technological innovation
 - New societal norms

(Serlavos, 2018) analysed different motivations to join energy communities in Switzerland. These motivations were classified into the following factors:

- Ecological motivations
- Personal motivations
- Infrastructural motivations
- Political motivations
- Social motivations
- Economical motivations

This ongoing project emphasises that the main motivations are ecological. Personal motivations are related to value changes (Pellicer-Sifres *et al.*, 2018). Infrastructural motivations are associated to territorial autonomy and political motivations are associated to the willingness to contribute to the energy policy (Schreuer, 2016). Social motivations



are associated to interpersonal relationships and the society consistency. Lastly, economical motivations include return on investment or access to cheaper energy.

Some authors analyse the economical motivations based on specific renewable energy investments and conclude that their results contradict a widespread narrative which perceives social innovations in the energy sector as a form of exclusively driven by environmental motivations. This is the case of two initiatives in Austria based on photovoltaics technique. The result indicate that the main motivations are economical: in one case the main factor is the annual interest payment received by participants, while in the second case is the possibility of owning the photovoltaics plant after 13 years.

Economical motivations are present in most of the literature that analyses the driven factors in social innovations within the energy sector. It is often claimed that investors are heterogenous individuals and that economic motivations can have different weight in their decisions. (Ebers Broughel and Hampl, 2018) analysed different motivations and their socio-demographic and socio-psychological profiles.

(Hoppe, Coenen and Bekendam, 2019) analysed the influence on energy conservation among households based on members of two energy cooperatives. This analyse included several motivations:

- Production of renewable energy
- Return on investment (related to appliances that use energy)
- Lower energy prices
- Transparency pricing
- Environmental issues
- Against nuclear energy
- Prevention of global climate change
- Organisation in local communities to reach societal goals
- Distrust large-scale traditional energy companies
- Against national government policies that support traditional energy systems

Within this analyse, the authors (Hoppe, Coenen and Bekendam, 2019) listed also the following subjective norms that can have more or less importance depending on each member of the energy community:

- I like to identify myself with a green energy supplier.
- I like to be seen as a person who saves energy.
- I like to be seen as a person who uses renewable energy.
- I like to be seen as a person who uses an electrical vehicle instead of a traditional fossil fuel vehicle.
- Saving energy is considered an important value among my friends and family.
- Generating one's own energy locally is considered important among my friends and family.



(Bauwens, 2016) investigated the heterogeneity among members of Community Renewable Energy projects in term of motivations based on the following motivations to join an energy cooperative in Belgium:

- The production of renewable energy
- The return on investments
- The electricity price
- The absence of connection charges
- The transparency of pricing
- The influence of others' advice

These results cannot be transposed to other countries as in Belgium the energy cooperatives can have competitive prices comparing to other companies.

The motivation to integrate a local renewable project can be arranged in different ways. (Dóci and Vasileiadou, 2015) for example organised into three main domains: gain, normative and hedonic. While the first motivation group gather gains mainly related to decreasing energy cost, the normative motivations addresses societal issues like the global climate change. The normative motivations include also a political motivation related to dealing directly and independently on energetic issues: “Let’s do it ourselves. We can do it better on our own”(Becker and Kunze, 2014; Dóci and Vasileiadou, 2015). Within the hedonic motivations, several type of motivations can be found: integrating in a community or having fun. People interested in technology and innovation that are fascinated by “DIY” (Do it yourself) approaches and love sharing with others this creativity applied to the energy domain, are also classified within the hedonic motivations. Beyond the technical innovations, the development of social innovations can also be a motivation to engage a community energy project (Mulugetta, Jackson and van der Horst, 2010) (Jalas *et al.*, 2017).

Some members of community energy projects expect a modification in attitudes towards technology, consumption, or equity (Rommel *et al.*, 2018). This is the case of the degrowth movement which is a heterogenous movement where different motivations can be identified when integrating an energy community: common development of low-tech systems in the energy field, a radical reduction of energy consumption or to avoid the power concentration into big energy utilities (Lizarralde and Tyl, 2018). This movement is inspired by authors that analysed the relation between human and technology, including the energy field (Illich, 1973, 1974).

Germany is often cited as an example for renewable energy development. Energy cooperatives have been an essential actor in the energy transition in Germany. (Yildiz *et al.*, 2015) analysed the development of these German cooperatives from an organization point of view focusing on financing and membership aspects. Democracy aspects are a central motivation for people joining these cooperatives. Democracy here is mainly referred to participation aspects and to the desire to influence energy policy. Concerning participation aspects, cooperative members perceive energy cooperatives as democratic organizations due to the fact that citizens can participate financially even with small investments and that the voting rights respect the one-person-one-vote principle. Moreover, cooperative members argue that facing other energy companies, cooperatives give the possibility to participate actively in organizational meetings.



Concerning the desire to influence energy policy, cooperative members show specific attitudes towards policies: They consider that citizens should be able to influence local energy policy but also other local community initiatives, “demanding more citizen participation in the society in general” (Yildiz et al., 2015).

Energy cooperatives are specific social innovations in the energy sector. There are several factor that differentiate this type of social innovations from other type of initiatives in the energy field (Beggio and Kusch, 2015; Heras-Saizarbitoria *et al.*, 2018):

- Voluntary and Open Membership
- Democratic Member Control
- Member Economic Participation
- Autonomy and Independence
- Education, Training and Information
- Co-operation among Co-operatives
- Concern for Community

Influencing energy policy is a motivation that can be linked to a willingness to decentralise the energy system and to enhance the energy self-sufficiency (Bomberg and McEwen, 2012; van der Schoor and Scholtens, 2015).

A more recent study about the motivations to participate in German community energy companies, concludes that environmental concerns as well as social and political goals are the most relevant motivations (Holstenkamp and Kahla, 2016). Other conclusions highlight differences between community and energy type:

- Members of cooperatives give less importance to economic motivations rather than members of other communities with limited partnership.
- Economic motivations are more present in wind energy project.
- Motivations that are hardly explained in other type of renewable are described in the bioenergy domain: For example, the security of energy supply.
- The more money is invested, the higher the motivation is on retour of investment.

Not all the members of the energy cooperatives have the same motivations and these differences are perceptible when analysing early members of the cooperatives and late coming members. While the former has mainly environmental motivations; the later focus more on material incentives attached to the energy supply (Bauwens, 2016).

The fair distribution of economic benefits of renewable projects is an important motivation in many cases and is often associated to a distributive justice (Mundaca, Busch and Schwer, 2018).

Being member of an energy cooperative can also influence the behaviour of households. Ecological and/or economical motivations can induce engagements in energy saving actions. Cooperative members engage more in energy savings members that non-members (Hoppe, Coenen and Bekendam, 2019). Other researches have focused on the motivations linked to the degree of investment and the scale of the community the citizen-investor participates. For members of large communities, return on investment is the most important determinant interest, while members of smaller communities have other motivations like environmental or social (Bauwens, 2019).



Despite different type of motivations, the weight of the economical motivation can also become a barrier when economic incentives for the projects are cut. (Romero-Rubio and de Andrés Díaz, 2015) analysed the difference between sustainable energy communities in Germany and Spain. The lack of a secure economic framework has made that the development of sustainable energy communities has been less successful in Spain. This framework includes economics incentives, like the investment protection or the state subsidies, but also other factors like the assistance for the establishment of energy cooperatives and the legal facilities to create cooperatives.

The community-owned means of renewable energy production can be based on different models depending on level of investment of the community members and the managerial control of the citizens involved within the community that host the renewable energy means. (Walker, 2008) analysed four types of community-owned means of renewable energy production in the UK: Cooperatives, Community charities, development trusts and companies where shares are owned by a local community organisation. Based on these organisations, an array of incentives was identified: local income generation, acceptance of the project by citizens concerned by the means, direct control and management of the means of renewable energy, lower energy cost, more reliably supply, ethical and environmental commitment to locally owned renewable means as well as better load and network management.

Linked to the network management, local community energy systems can enhance the energy autonomy of these communities, but they can also play an important role in the management of the global network (Koirala *et al.*, 2016).

Local projects are often a key incentive for many citizens. This is often the case of small-scale renewable projects; but it can also deal with new market mechanisms like “local energy markets” which allow renewable source owners to participate in the electricity market in a restricted market that aims to balance generation and demand at distribution network level (Mengelkamp *et al.*, 2019). The ethical and environmental commitment are motivations that can be centred in energy consumption responsibility (Frantzeskaki, Avelino and Loorbach, 2013) or in a motivation to shift to a completely renewable scenario (Hoffman and High-Pippert, 2010; Mattes, Huber and Koehrsen, 2015).

(Kalkbrenner and Roosen, 2016) focus on social motivations to go further than only environmental motivations. In order to analyse the attitude of citizen concerning community energy projects, they propose a conceptual framework based on three issues: community identity, trust and social norms. Beyond motivations to invest financial resources, motivations for volunteer work seems to be a higher motivation in many cases. The environmental motivation is therefore positively associated with the motivation of participation, either by a volunteer work or by investing financial resources. The community identity and high level of trust are important factors that enhances the motivation to participate in a local community energy project (Walker *et al.*, 2010; Greenberg, 2014; Goedkoop and Devine-Wright, 2016). Trust is often an important factor that allows the co-ownership of renewable energy means. Nevertheless, a specific framework that allows the co-ownership of renewable energy means is also a prerequisite to motivate the involvement and participation of citizens within community energy projects (Boon and Dieperink, 2014) (Koirala *et al.*, 2018).



Lastly, behavioural aspects under social pressure influence also the participation on community energy projects. Therefore, social norms seem to be an important factor that determines the citizen motivation to participate in a local community energy project (Greenberg, 2014; Kalkbrenner and Roosen, 2016).

Based on the empirical analyse of the wind power cooperative sector in four European countries, (Bauwens, Gotchev and Holstenkamp, 2016) identified two external factors that enhance the development of wind power cooperatives, as well as two individual factors that can be translated into personal motivations. While the external factors are related to support instruments for renewables and planning policies, the individual factors are linked to attitudes towards the cooperative model and local energy activism.



SocialRES classification for driving factors in social innovations in the energy sector

Based on the former literature revue, an internal classification has been defined for driving factors in social innovations in the energy sector.

This classification includes three main factors and six subfactors:

- Individual Goal oriented (Self-interested)
 - Personal development Motivation
 - Economical Motivation (material payoffs)
- Communal Goal oriented (based on Social norms)
 - Political Motivation
 - Territorial Motivation
 - Ecological Motivation
- Form/practise oriented
 - Social relationships Motivation

Based on these factors, an array of questions has been defined in order to perform a first survey in the frame of the SocialRES project:

- Personal development Motivation
 - Participants of my case study are wanting to change personal values (for example to modify the relationship human/nature or to simplify their life).
 - Participants are looking to develop new skills within my case study.
 - Participants of my case study are looking for a reduction of their energy consumption (moral motivation).
 - Participants are willing to modifying energy consumption patterns (Not only to reduce energy consumption, it could be for example to consume mainly when renewable electricity is injected to the grid or other active behavioural practice).
 - Participants are willing to test new technologies (for energy efficiency, renewable energies etc.).
- Economical Motivation (material payoffs)
 - Participants are looking for cheaper energy/electricity prices.
 - Participants are looking for economical return of the investment
- Political Motivation
 - Participants are willing to be actor of the energy/environmental policies.
 - Participants are willing to reduce fuel poverty.
 - Participants are looking for more fairness in energy tariff (price, tax, etc).



- Territorial Motivation
 - Participants are looking for a more resilient territory (increase the energy autonomy of the territory)
 - Participants are willing to improve competitiveness of the territory.
 - Participants are looking for job creation in the territory
- Ecological Motivation
 - Participants are looking for a local pollution reduction (focusing air quality).
 - Participants are willing to reduce climate change (carbon emission reduction).
 - Participants are looking for nuclear power reduction.
- Social relationships Motivation
 - Participants are willing to participate in the governance of the structure.
 - Participants are willing to equalize the gender participation within the energy sector.
 - Participants are looking for an equitable distribution of economic benefits.
 - Participants are willing to create new social practices in the community.
 - Participants joined the organisation because a peer suggest him/her.



Results of the survey

The objective of the questionnaire was to get a first collection of social innovation factors in the energy sector. The survey was sent to the managers of the use cases as well as to responsible of other energy cooperatives and crowdfunding platforms. It was asked to rely on their experience(s) to share their point of view on the participants / customers adhering to the concerned energy social innovation.

Descriptive statistics of participants profile

The total amount of answers was 34, most of them coming from founders or managers of cooperatives. Most participants in the survey come from "RES cooperative". Indeed, we observe that more than 70% of responses come from managers / actors of energy cooperatives (see Figure 1).

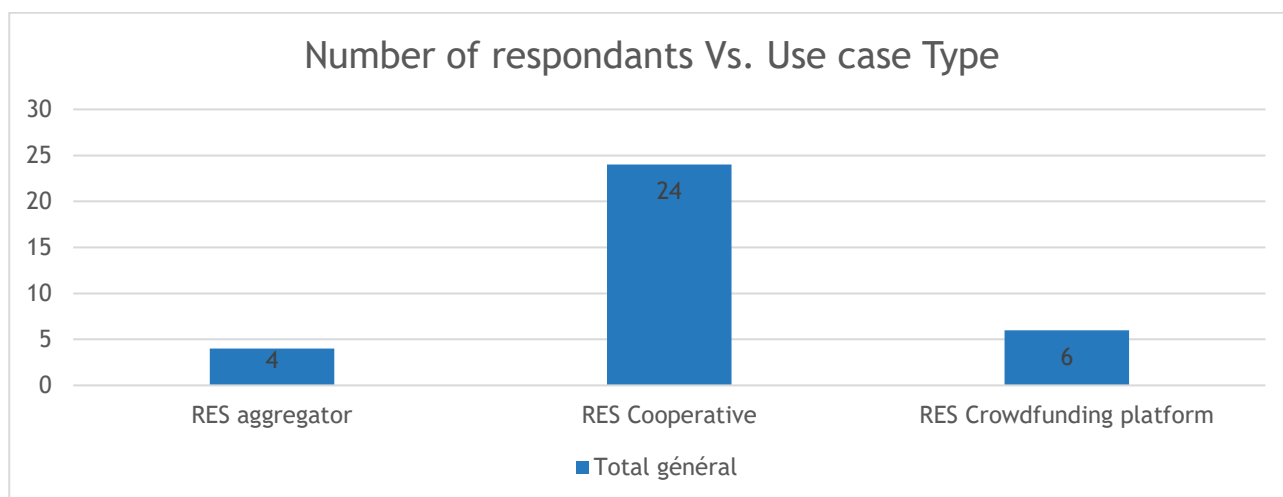


Figure 1. Number of responses per use case types

The expertise of the respondents and their experience in the organisations is relevant for a qualitative survey. In Figure 2 is presented the number of participants in the survey according to expertise. It appears that more than 70% are either "expert" (9 people) or "advanced" (13 people) in the field that concerns us.



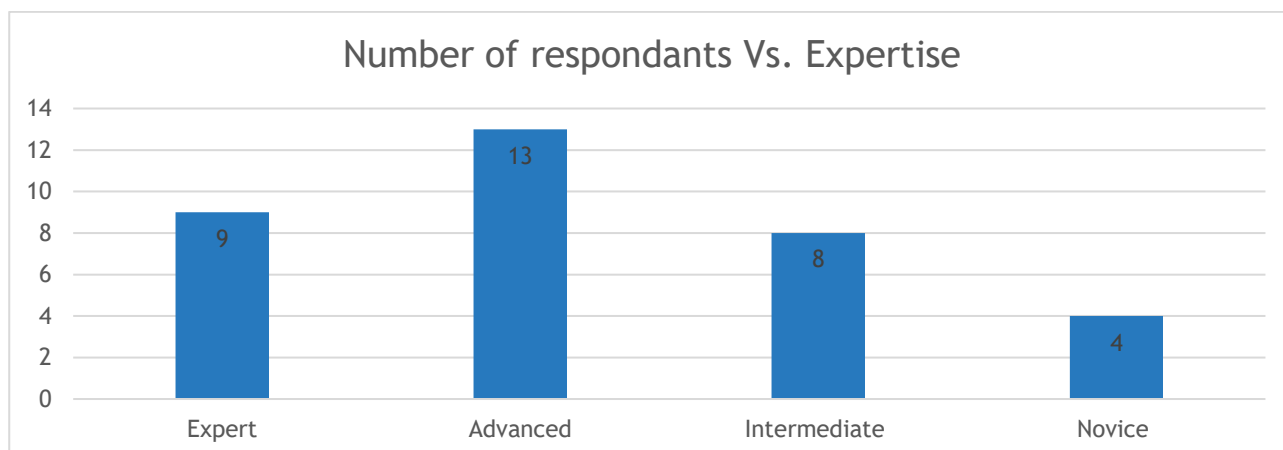


Figure 2. Number of responses according expertise in RES

In addition to expertise, we have a panel of participants with broad experience in their field. In Figure 3 we observe that more than a third of the panel has 7 or more years of experience in their organization.

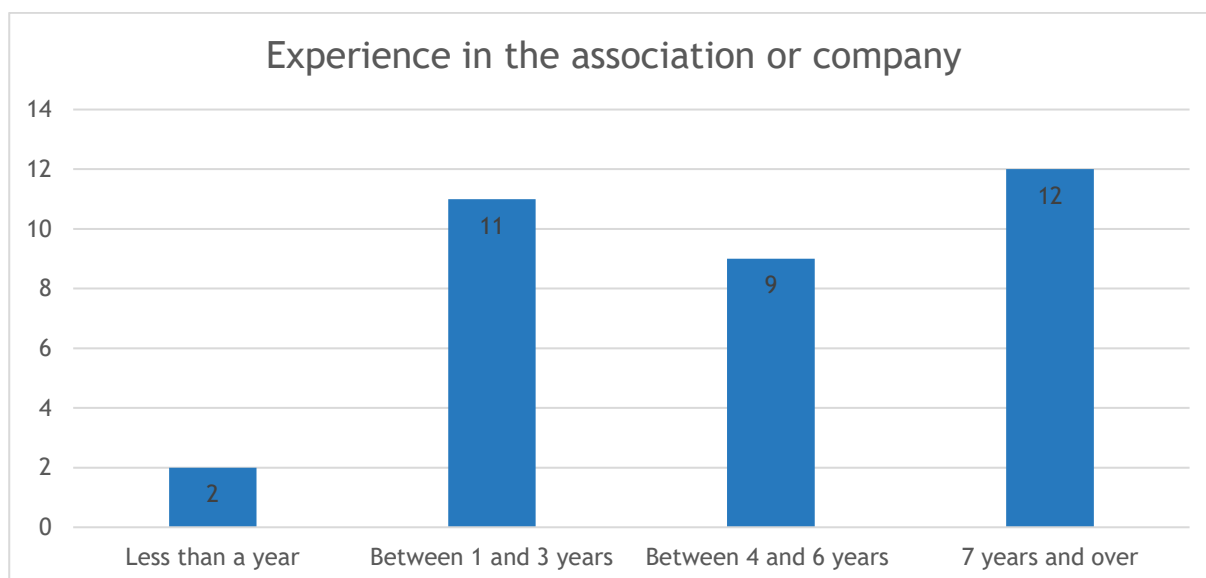


Figure 3. Number of respondents and their years of experience

Finally, a panel of diverse social innovations in the energy sector based in different European countries has been determined. We also notice a greater participation coming from Germany and Spain (see Figure 4). The great participation of these two countries can be explained by the influence members of the project consortium.



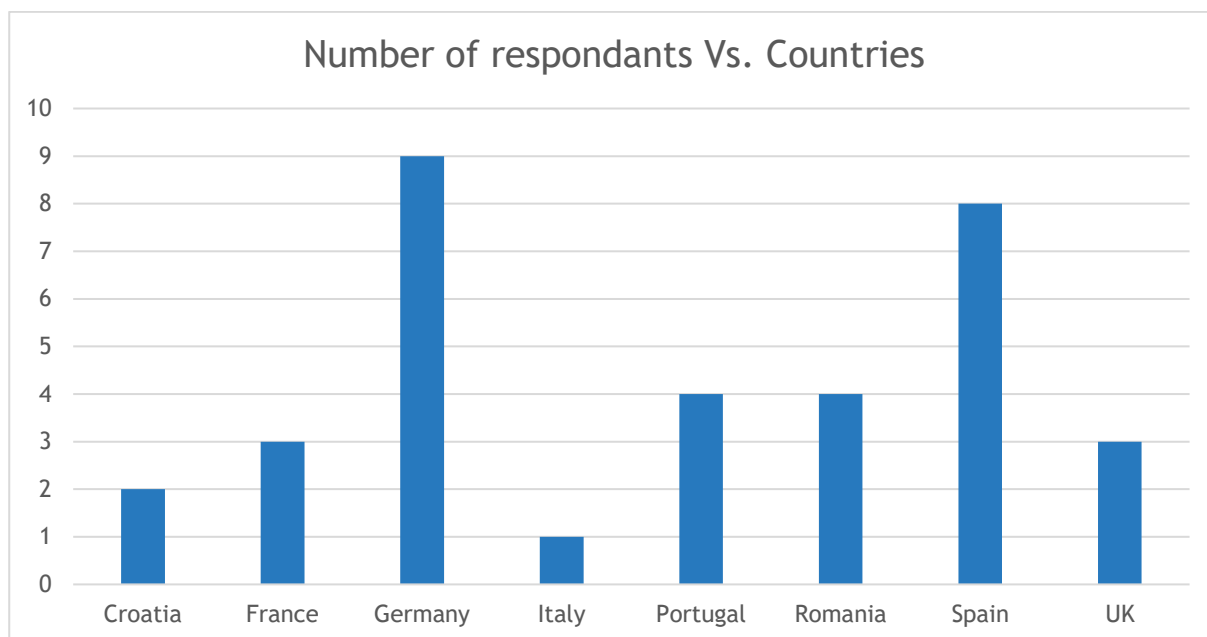


Figure 4. Number of respondents according their location

Based on this panel of responders, a direct question concerning the main motivation has been asked as well as specific question following the motivations classification presented here above.

Factors of motivations

Based on the former literature revue and classification presented in the previous section of the document, six factors of motivation have been identified:

- Personal development Motivation
- Economical Motivation (material payoffs)
- Political Motivation
- Territorial Motivation
- Ecological Motivation
- Social relationships Motivation

According the respondents of the survey, the main criteria for citizens to join social innovation project in the energy sector is the ecological criteria (cited 27 times) as well as the economic motivation (cited 26 times). The results are depicted in Figure 5.



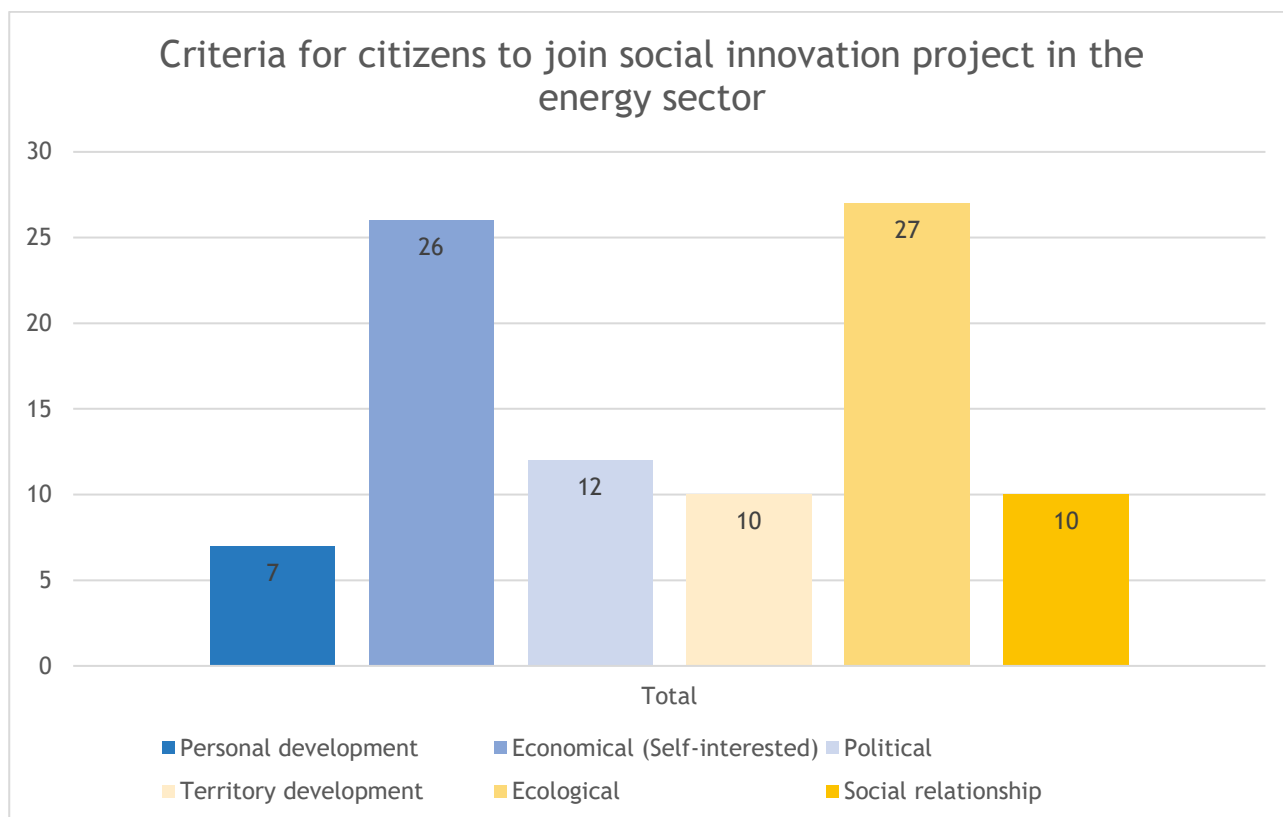


Figure 5. Main motivations for citizens according participants of survey

Within the ecological motivations, the main motivation is related to the climate change mitigation (see Figure 6). Indeed, the responders think that people remark more and more the connection between fossil fuel-based energy plants and climate change. Therefore, this global goal is getting more importance than local pollution related motivations. Concerning nuclear power reduction, answers are more heterogenous with a high motivation for responders from largely nuclearized like France.

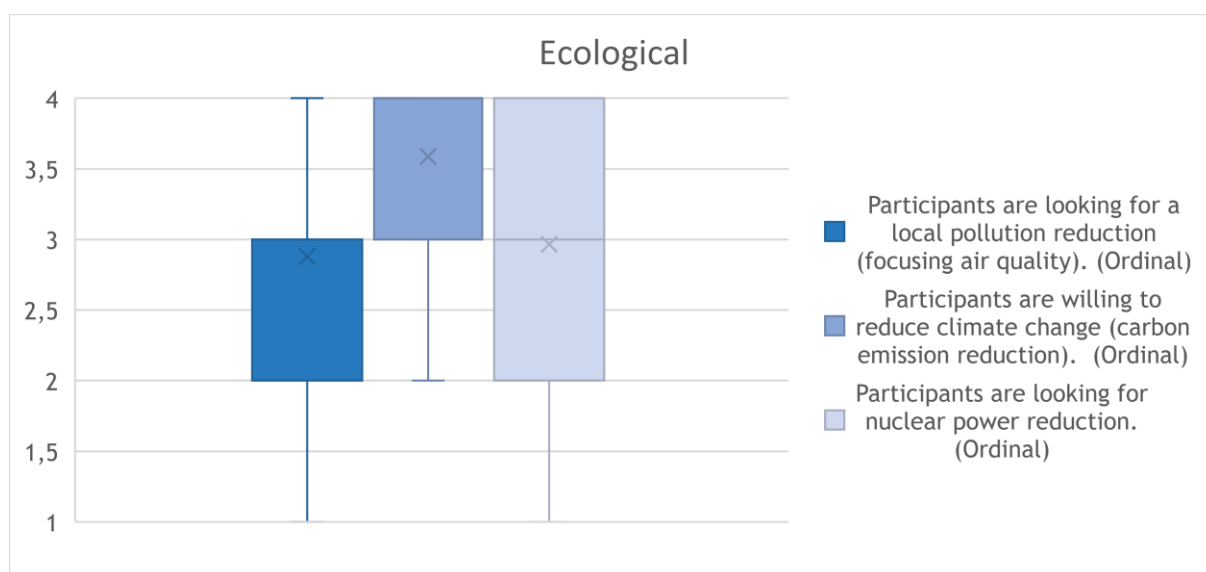


Figure 6. Detailed of the ecological factor of motivation



Within the economic motivations, managers think that participants are mostly looking for a return of investment (see Figure 7). This motivation is more scattered concerning the answers within the cooperative; indeed, the only answers that consider that return on investment is not important are answers from cooperatives. Participants are looking for an equitable distribution of economic benefits. This is especially true concerning the members of the cooperatives.

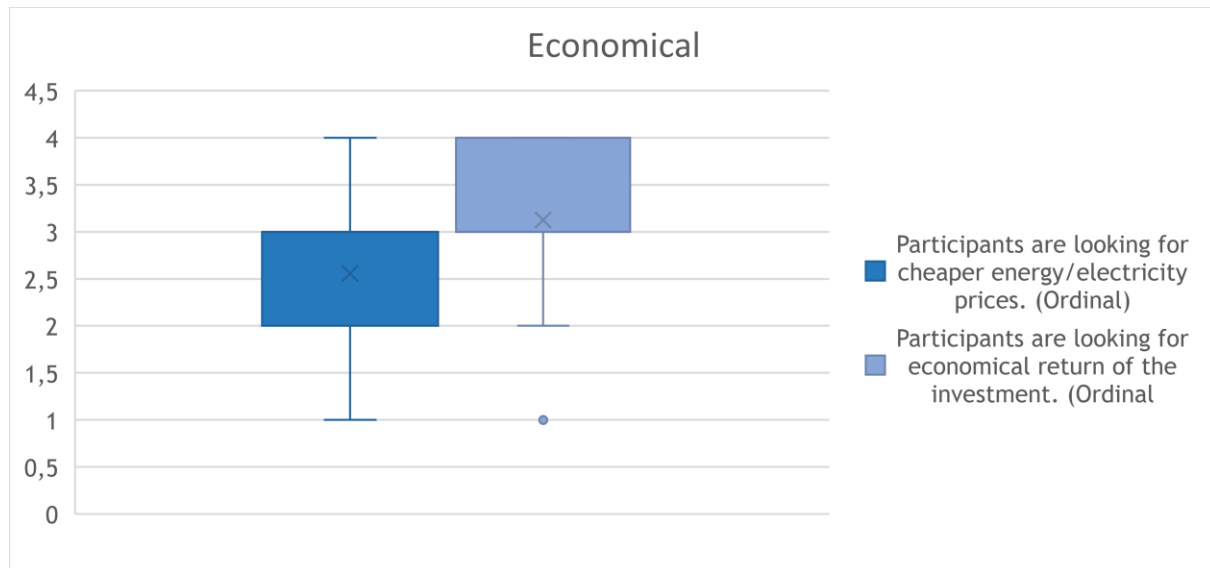


Figure 7. Detailed of the economical factor of motivation

Concerning political motivations, managers think that participants would like to be actors of the energy policies (see Figure 8). Nevertheless, other motivations like the reduction of fuel poverty or the fairness in energy tariff are almost as important as the first motivation.

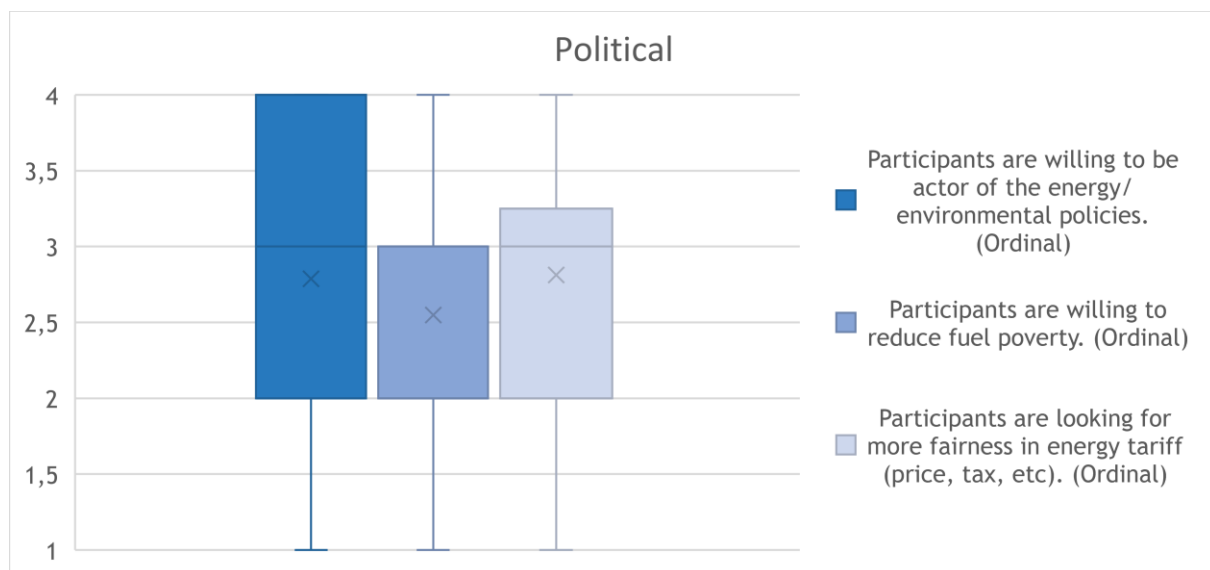


Figure 8. Detailed of the political factor of motivation



The territorial motivations are less important than other motivations, but the demand of a more resilient territory is identified as an important motivation by managers; meaning that they think that participants are looking to increase the energy autonomy when they integrate the energy social innovation in the energy sector. The detailed for the territorial factor of motivation is presented in Figure 9.

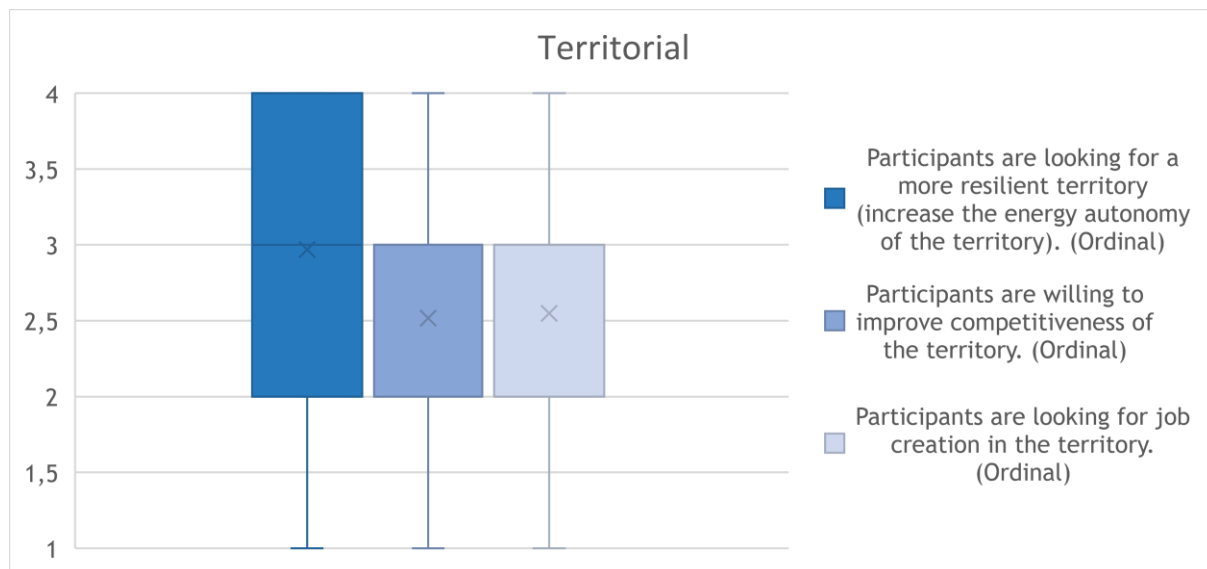


Figure 9. Detailed of the territorial factor of motivation

Lastly, “personal development” motivations can be very heterogeneous (see Figure 10), but in general all responders agree that even if it is not the main motivation, participants of a social innovation in the energy sector have often in mind the possibility to reduce energy consumption or to modify the consumption pattern.



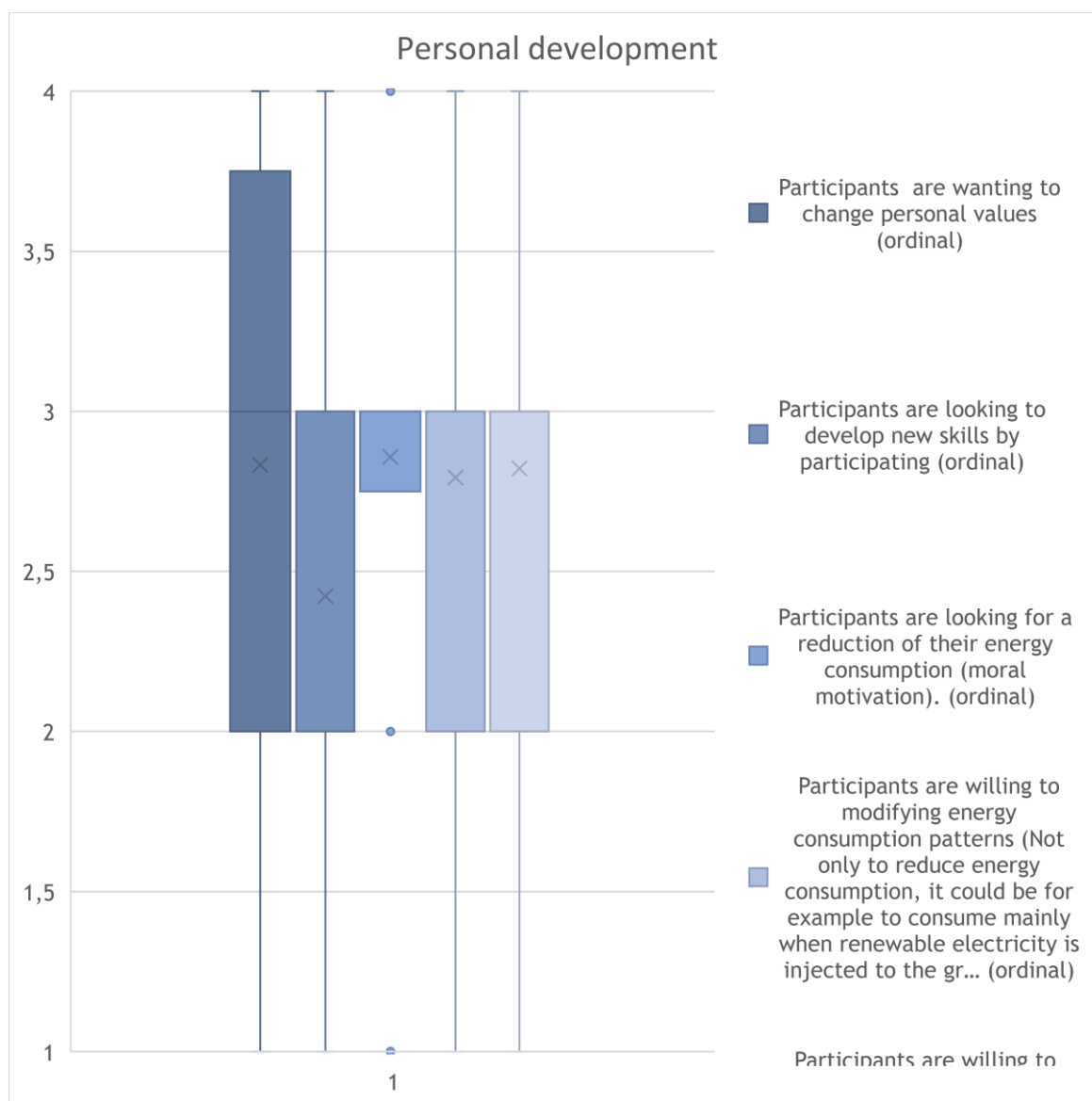


Figure 10. Detailed of the “personnal development” factor of motivation

Barriers to RES social innovation

Lastly, a detailed analyse have been done taking into account the barriers to launch a social innovation in the energy sector. There are 8 "key barriers" for social innovation coming from the literature (Unceta *et al.*, 2016):

- Lack of funding
- Passivity in society
- Administrative and bureaucratic barriers
- Absence of legal framework
- Lack of access to information needed
- Deficiency of society to open up the experience of other groups
- Lack of experience in carrying out social innovation projects
- Passivity and low level of stakeholder support



To better understand the driving factors, we have asked to respondents of the survey: “Check only those that concern your structure. Rank those you checked in the order of the most “most important” to “less important”.”

All the involved actors answered that the main barrier to launch social innovations in the energy sector is the passivity in the society (see the sum of the 3 most important barriers in the Table 1).

Table 1. Sum of the first to the third barriers

Representative of the number of people expressed	
The most important barrier	Total of total
	1st to 3rd
Absence of legal framework	17,65%
Administrative and bureaucratic barriers	23,53%
Deficiency of society to open up the experience of other groups	32,35%
Lack of access to information needed	35,29%
Lack of experience in carrying out social innovation projects	35,29%
Lack of funding	38,24%
Passivity and low level of stakeholder support	32,35%
Passivity in society	85,29%
Total	300,00%

Despite the high score for “passivity in society” barrier, the detailed analysis of responses shows differences between the typology of the actor.

In Table 2, we observe for RES aggregator, the first barrier is the “absence of legal framework” whereas responses are more “mixed” for RES crowdfunding platform.



Table 2. First barrier to join social innovation according the use case types

The most important barrier	Use case type			
	RES aggregator	RES Cooperative	RES Crowdfunding platform	Total
	1st	1st	1st	1st
Absence of legal framework	5,88%	2,94%		8,82%
Administrative and bureaucratic barriers	0,00%	8,82%		8,82%
Deficiency of society to open up the experience of other groups			2,94%	2,94%
Lack of access to information needed		11,76%		11,76%
Lack of experience in carrying out social innovation projects		2,94%	2,94%	5,88%
Lack of funding			5,88%	5,88%
Passivity and low level of stakeholder support	2,94%	8,82%		11,76%
Passivity in society	2,94%	35,29%	5,88%	44,12%
Total	11,76%	70,59%	17,65%	100,00%

The answers of the barriers positioned as the second most important barrier, enhances the result of the first analyse, positioning passivity in society as the main barrier (see Table 3).

In this case the lack of experience in carrying out social innovation projects is considered as an important barrier, mainly by cooperatives. This is related to the trade-off between the professionalisation and citizen participation within the cooperatives.



Table 3. Second barrier to join social innovation according the use case types

	Use case type			
	RES aggregator	RES Cooperative	RES Crowdfunding platform	Total
The most important barrier	2nd	2nd	2nd	2nd
Absence of legal framework		8,82%	0,00%	8,82%
Administrative and bureaucratic barriers	5,88%	2,94%	0,00%	8,82%
Deficiency of society to open up the experience of other groups		11,76%	2,94%	14,71%
Lack of access to information needed		5,88%	5,88%	11,76%
Lack of experience in carrying out social innovation projects	2,94%	14,71%	0,00%	17,65%
Lack of funding	2,94%	5,88%	0,00%	8,82%
Passivity and low level of stakeholder support		5,88%	0,00%	5,88%
Passivity in society		14,71%	8,82%	23,53%
Total	11,76%	70,59%	17,65%	100,00%

Lastly, as show in Table 4, the barriers that have been positioned as the third most important barrier show that lack of funding can be also a barrier to launch social innovations in the energy sector even it is rarely the main barrier (only in few answers coming from the crowdfunding platforms).

Table 4. Third barrier to join social innovation according the use case types

	Use case type			
	RES aggregator	RES Cooperative	RES Crowdfunding platform	Total
The most important barrier	3rd	3rd	3rd	3rd
Absence of legal framework				0,00%
Administrative and bureaucratic barriers	2,94%	2,94%	0,00%	5,88%
Deficiency of society to open up the experience of other groups	0,00%	14,71%	0,00%	14,71%
Lack of access to information needed	0,00%	8,82%	2,94%	11,76%
Lack of experience in carrying out social innovation projects	0,00%	5,88%	5,88%	11,76%
Lack of funding	0,00%	20,59%	2,94%	23,53%
Passivity and low level of stakeholder support	0,00%	11,76%	2,94%	14,71%
Passivity in society	8,82%	5,88%	2,94%	17,65%
Total	11,76%	70,59%	17,65%	100,00%



The same analyse can be presented grouping the answers by typology of social innovation in the energy sector.

Concerning energy aggregators, an important barrier is the absence of legal framework, clearly positioned as the main barrier for aggregators. For this profile of respondents, “the administrative and bureaucratic barriers” are also an important barrier for citizen to join social innovations (see Table 5).

Table 5. The three most important barriers according RES Aggregator

The most important barrier	Use case type			
	RES aggregator			Total
	1st	2nd	3rd	1st
Absence of legal framework	50,00%			50,00%
Administrative and bureaucratic barriers		50,00%	25,00%	75,00%
Deficiency of society to open up the experience of other groups			0,00%	0,00%
Lack of access to information needed			0,00%	0,00%
Lack of experience in carrying out social innovation projects		25,00%	0,00%	25,00%
Lack of funding		25,00%	0,00%	25,00%
Passivity and low level of stakeholder support	25,00%		0,00%	25,00%
Passivity in society	25,00%		75,00%	100,00%
Total	100,00%	100,00%	100,00%	300,00%

For cooperatives the lack of access to information needed is an important barrier as well as the administrative and bureaucratic barriers (see Table 6). These barriers might show that citizens cooperatives have not as many as direct or indirect links with the administration, as other type of companies might have.

Another barrier that is considered as important by cooperatives is the passivity and low level of stakeholder support.



Table 6. The three most important barriers according RES Cooperative

The most important barrier	Use case type			
	RES Cooperative			Total
	1st	2nd	3rd	1st
Absence of legal framework	4,17%	12,50%		16,67%
Administrative and bureaucratic barriers	12,50%	4,17%	4,17%	20,83%
Deficiency of society to open up the experience of other groups		16,67%	20,83%	37,50%
Lack of access to information needed	16,67%	8,33%	12,50%	37,50%
Lack of experience in carrying out social innovation projects	4,17%	20,83%	8,33%	33,33%
Lack of funding		8,33%	29,17%	37,50%
Passivity and low level of stakeholder support	12,50%	8,33%	16,67%	37,50%
Passivity in society	50,00%	20,83%	8,33%	79,17%
Total	100,00%	100,00%	100,00%	300,00%

For the RES Crowdfunding platform, the results are more "scattered" (see Table 7). "Passivity in society" is clearly the first barrier but then we find three other barriers with the same importance for them:

- Lack of access to information needed
- Lack of experience in carrying out social innovation projects
- Lack of funding

Table 7. The three most important barriers according RES Crowdfunding platform

The most important barrier	Use case type			
	RES Crowdfunding platform			Total
	1st	2nd	3rd	1st
Absence of legal framework		0,00%		0,00%
Administrative and bureaucratic barriers		0,00%	0,00%	0,00%
Deficiency of society to open up the experience of other groups	16,67%	16,67%	0,00%	33,33%
Lack of access to information needed		33,33%	16,67%	50,00%
Lack of experience in carrying out social innovation projects	16,67%	0,00%	33,33%	50,00%
Lack of funding	33,33%	0,00%	16,67%	50,00%
Passivity and low level of stakeholder support		0,00%	16,67%	16,67%
Passivity in society	33,33%	50,00%	16,67%	100,00%
Total	100,00%	100,00%	100,00%	300,00%



Conclusions

The goal of this document developed in the framework of the SocialRES project is the characterisation of driving factors for social innovation in the energy sector (aggregators, cooperatives, and crowdfunding platforms). It is presented as a database of driving factors.

The main motivations that drive citizens, investors and other stakeholders to contribute in social innovation schemes for clean-energy transition have been presented: individual goal oriented, including personal development motivations and economical motivation; communal goal oriented, including political motivation and territorial motivation and ecological motivation; and lastly the form oriented based on social relationships motivations.

The main barriers to launch a social innovation in the energy sector have been also presented: lack of funding, passivity in society, administrative and bureaucratic barriers, absence of legal framework, lack of access to information needed, deficiency of society to open up the experience of other groups, lack of experience in carrying out social innovation projects and passivity and low level of stakeholder support.

Based on these factors that drive citizens, investors and other stakeholders, a first survey has been realised within the SocialRES project with 34 managers of aggregators, cooperatives, and crowdfunding platforms, most of them coming founders or managers of cooperatives. It was asked to rely on their experience(s) to share their point of view on the participants / customers adhering to the concerned energy social innovation. Based on this survey, the main criteria for citizens to join social innovation project in the energy sector is the ecological criteria as well as the economic motivation. Moreover, most of the involved actors answered that the main barrier to launch social innovations in the energy sector is the passivity in the society.

Based on this inventory of driving factors, next actions within SocialRES project will be performed; mainly the analyse of innovative business models as well as the main survey of the project with participants of social innovations in the energy sector.



References

- Bauwens, T. (2016) 'Explaining the diversity of motivations behind community renewable energy', *Energy Policy*, 93, pp. 278-290. doi: 10.1016/j.enpol.2016.03.017.
- Bauwens, T. (2019) 'Analyzing the determinants of the size of investments by community renewable energy members: Findings and policy implications from Flanders', *Energy Policy*, 129, pp. 841-852. doi: 10.1016/j.enpol.2019.02.067.
- Bauwens, T., Gotchev, B. and Holstenkamp, L. (2016) 'What drives the development of community energy in Europe? The case of wind power cooperatives', *Energy Research & Social Science*, 13, pp. 136-147.
- Becker, S. and Kunze, C. (2014) 'Transcending community energy: collective and politically motivated projects in renewable energy (CPE) across Europe', *People, Place and Policy Online*, 8(3), pp. 180-191. doi: 10.3351/ppp.0008.0003.0004.
- Beggio, G. and Kusch, S. (2015) 'Renewable energy cooperatives: main features and success factors in collectively implementing energy transition', in *Quaesti Virtual Multidisciplinary Conference*, pp. 233-237.
- Bomberg, E. and McEwen, N. (2012) 'Mobilizing community energy', *Energy Policy*. (Renewable Energy in China), 51, pp. 435-444. doi: 10.1016/j.enpol.2012.08.045.
- Boon, F. P. and Dieperink, C. (2014) 'Local civil society based renewable energy organisations in the Netherlands: Exploring the factors that stimulate their emergence and development', *Energy Policy*, 69, pp. 297-307.
- Brummer, V. (2018) 'Community energy - benefits and barriers: A comparative literature review of Community Energy in the UK, Germany and the USA, the benefits it provides for society and the barriers it faces', *Renewable and Sustainable Energy Reviews*, 94, pp. 187-196. doi: 10.1016/j.rser.2018.06.013.
- Dóci, G. and Vasileiadou, E. (2015) "'Let's do it ourselves" Individual motivations for investing in renewables at community level', *Renewable and Sustainable Energy Reviews*, 49, pp. 41-50. doi: 10.1016/j.rser.2015.04.051.
- Ebers Broughel, A. and Hampl, N. (2018) 'Community financing of renewable energy projects in Austria and Switzerland: Profiles of potential investors', *Energy Policy*, 123, pp. 722-736. doi: 10.1016/j.enpol.2018.08.054.
- Frantzeskaki, N., Avelino, F. and Loorbach, D. (2013) 'Outliers or Frontrunners? Exploring the (Self-) Governance of Community- Owned Sustainable Energy in Scotland and the Netherlands', in Michalena, E. and Hills, J. M. (eds) *Renewable Energy Governance: Complexities and Challenges*. London: Springer (Lecture Notes in Energy), pp. 101-116. doi: 10.1007/978-1-4471-5595-9_6.
- Goedkoop, F. and Devine-Wright, P. (2016) 'Partnership or placation? The role of trust and justice in the shared ownership of renewable energy projects', *Energy Research & Social Science*, 17, pp. 135-146. doi: 10.1016/j.erss.2016.04.021.
- Greenberg, M. R. (2014) 'Energy policy and research: the underappreciation of trust', *Energy Research & Social Science*, 1, pp. 152-160.
- Heras-Saizarbitoria, I. et al. (2018) 'The emergence of renewable energy cooperatives in Spain: A review', *Renewable and Sustainable Energy Reviews*, 94, pp. 1036-1043. doi: 10.1016/j.rser.2018.06.049.
- Hoffman, S. M. and High-Pippert, A. (2010) 'From private lives to collective action: Recruitment and participation incentives for a community energy program', *Energy Policy*. (Special Section: Carbon Reduction at Community Scale), 38(12), pp. 7567-7574. doi: 10.1016/j.enpol.2009.06.054.



- Holstenkamp, L. and Kahla, F. (2016) 'What are community energy companies trying to accomplish? An empirical investigation of investment motives in the German case', *Energy Policy*, 97, pp. 112-122. doi: 10.1016/j.enpol.2016.07.010.
- Hoppe, T., Coenen, F. H. J. M. and Bekendam, M. T. (2019) 'Renewable Energy Cooperatives as a Stimulating Factor in Household Energy Savings', *Energies*, 12(7), p. 1188. doi: 10.3390/en12071188.
- Illich, I. (1974) *Energy and equity*. Calder & Boyars London. Available at: <http://dbco-op.org/text/energyandequity.pdf> (Accessed: 30 November 2015).
- Illich, Ivan (1973) *Tools for Conviviality*. Calder & Boyars. Available at: <http://www.abebooks.fr/Tools-Conviviality-ILLICH-Ivan-Calder-Boyars/9658183192/bd> (Accessed: 30 November 2015).
- Jalas, M. et al. (2017) 'Everyday experimentation in energy transition: A practice-theoretical view', *Journal of Cleaner Production*. (Experimentation for climate change solutions), 169, pp. 77-84. doi: 10.1016/j.jclepro.2017.03.034.
- Kalkbrenner, B. J. and Roosen, J. (2016) 'Citizens' willingness to participate in local renewable energy projects: The role of community and trust in Germany', *Energy Research & Social Science*. (Energy Transitions in Europe: Emerging Challenges, Innovative Approaches, and Possible Solutions), 13, pp. 60-70. doi: 10.1016/j.erss.2015.12.006.
- Koirala, B. P. et al. (2016) 'Energetic communities for community energy: A review of key issues and trends shaping integrated community energy systems', *Renewable and Sustainable Energy Reviews*, 56, pp. 722-744. doi: 10.1016/j.rser.2015.11.080.
- Koirala, B. P. et al. (2018) 'Trust, awareness, and independence: Insights from a socio-psychological factor analysis of citizen knowledge and participation in community energy systems', *Energy Research & Social Science*, 38, pp. 33-40. doi: 10.1016/j.erss.2018.01.009.
- Lizarralde, I. and Tyl, B. (2018) 'A framework for the integration of the conviviality concept in the design process', *Journal of Cleaner Production*. (Technology and Degrowth), 197, pp. 1766-1777. doi: 10.1016/j.jclepro.2017.03.108.
- Mattes, J., Huber, A. and Koehrsen, J. (2015) 'Energy transitions in small-scale regions - What we can learn from a regional innovation systems perspective', *Energy Policy*, 78, pp. 255-264. doi: 10.1016/j.enpol.2014.12.011.
- Mengelkamp, E. et al. (2019) 'The value of local electricity - A choice experiment among German residential customers', *Energy Policy*, 130, pp. 294-303. doi: 10.1016/j.enpol.2019.04.008.
- Mulugetta, Y., Jackson, T. and van der Horst, D. (2010) 'Carbon reduction at community scale', *Energy Policy*, 38(12), pp. 7541-7545.
- Mundaca, L., Busch, H. and Schwer, S. (2018) "'Successful" low-carbon energy transitions at the community level? An energy justice perspective', *Applied Energy*, 218, pp. 292-303. doi: 10.1016/j.apenergy.2018.02.146.
- Rogers, J. C. et al. (2008) 'Public perceptions of opportunities for community-based renewable energy projects', *Energy Policy*. (Transition towards Sustainable Energy Systems), 36(11), pp. 4217-4226. doi: 10.1016/j.enpol.2008.07.028.
- Romero-Rubio, C. and de Andrés Díaz, J. R. (2015) 'Sustainable energy communities: a study contrasting Spain and Germany', *Energy Policy*, 85, pp. 397-409.
- Rommel, J. et al. (2018) 'Community renewable energy at a crossroads: A think piece on degrowth, technology, and the democratization of the German energy system', *Journal of Cleaner Production*. (Technology and Degrowth), 197, pp. 1746-1753. doi: 10.1016/j.jclepro.2016.11.114.



van der Schoor, T. and Scholtens, B. (2015) 'Power to the people: Local community initiatives and the transition to sustainable energy', *Renewable and Sustainable Energy Reviews*, 43, pp. 666-675. doi: 10.1016/j.rser.2014.10.089.

Schreuer, A. (2016) 'The establishment of citizen power plants in Austria: A process of empowerment?', *Energy Research & Social Science*. (Energy Transitions in Europe: Emerging Challenges, Innovative Approaches, and Possible Solutions), 13, pp. 126-135. doi: 10.1016/j.erss.2015.12.003.

Serlavos, M. (2018) 'Les citoyens deviennent acteurs de la transition énergétique. L'exemple de l'énergie citoyenne en Suisse romande.', in *Volteface - La transition énergétique, Un projet de société*. Editions Charles Léopold Mayer. Available at: https://serval.unil.ch/notice/serval:BIB_87A8C207ACE7 (Accessed: 17 February 2020).

Unceta, A., Castro-Spila, J., & Garcia Fronti, J. (2016). Social innovation indicators. *Innovation: The European Journal of Social Science Research*, 29(2), 192-204.

Walker, G. (2008) 'What are the barriers and incentives for community-owned means of energy production and use?', *Energy Policy*. (Foresight Sustainable Energy Management and the Built Environment Project), 36(12), pp. 4401-4405. doi: 10.1016/j.enpol.2008.09.032.

Walker, G. *et al.* (2010) 'Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy', *Energy Policy*. (The Role of Trust in Managing Uncertainties in the Transition to a Sustainable Energy Economy, Special Section with Regular Papers), 38(6), pp. 2655-2663. doi: 10.1016/j.enpol.2009.05.055.

Warbroek, B. *et al.* (2019) 'Testing the social, organizational, and governance factors for success in local low carbon energy initiatives', *Energy Research & Social Science*, 58, p. 101269. doi: 10.1016/j.erss.2019.101269.

Yildiz, Ö. *et al.* (2015) 'Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda', *Energy Research & Social Science*, 6, pp. 59-73. doi: 10.1016/j.erss.2014.12.001.

