White Paper on Good Policy Practice

An analysis of enablers and barriers for social innovations in the energy sector

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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

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Table of contents

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SOCIALRES

List of Abbreviations

CEC	Citizen energy community
CEP	Clean energy package
EC	Energy community
EU	European Union
FiT	Feed in tariffs
IEMD	Internal market for electricity directive
RE	Renewable energy
REC	Renewable energy community
REDII	Recast renewable energy directive
RES	Renewable energy sources
PV	Photovoltaic

List of Tables

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1. Introduction

On the pathway towards a successful sustainable energy transition in Europe, the social dimension is becoming more and more important. The transformation of the energy system is dependent on broad public support due to the far-reaching changes that are associated with this shift. Therefore, technology-based solutions alone cannot be sufficient to reach the goals related to the European Green Deal. Hence, *social* innovations are important to ensure societal acceptance for a more sustainable energy system (see, among others: European Commission, 2019a, 2019b).

Social innovations can create support for the energy transition through citizen participation, both socially and financially. They support the achievement of social goals by empowering citizens, alleviating energy poverty, and increasing the general wellbeing of communities. In this way, social innovations in the energy sector have the potential to contribute to a low carbon energy transition (cf. Hoppe and Vries, 2019).

Against this background, the aim of this paper analyses the effectiveness of national policies and regulatory frameworks to support a climate that is conducive to the initiation, consolidation and upscaling of socially innovative organisations in the energy sector.

In general, the SocialRES project focuses at three key actor groups of social innovations in the renewable energy (RE) sector: energy communities, energy aggregators and crowdfunding platforms, whose characteristics are depicted in Chapter 2. Chapter 3 looks at the EU level legislative developments that will shape the market structure for social innovations in the upcoming years. Lastly, Chapter 4 summarises research findings from a series of interviews held with experts and practitioners in the energy field and the social innovations therein, laying out the principal barriers and enablers that these face in their national contexts.

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2. Overview: Social Innovations in the Energy Sector

2.1 Renewable Energy Communities

Renewable energy communities (RECs) have existed since the 1990s, when citizens in Germany and Denmark founded citizen-owned onshore wind farm projects. However, a regulatory framework for Energy Communities (ECs) was not yet in place and the initiatives could choose their own legal form and organisational structure. The number of citizen-led energy projects spiked in the early and mid-2000´s when countries like Germany provided heavy subsidies for RE generation, making RE projects a very lucrative business model.

Today, there are about 3400 RECs throughout the EU, with the vast majority of them being located in Germany, Denmark, the Netherlands, the UK and Sweden (RESCoop Mecise, 2019). Especially in the South of Germany, RECs are common practice and very well established and structured. In some southern and eastern European countries, like Spain, Portugal, Croatia, or Romania however, RECs are a rather new concept and just in the process of gaining more attention. Thus, many EU member states still lack a regulatory framework and clear definition for RECs.

In 2018, the EU, as part of the Clean Energy for all Europeans Package (CEP), published the following definition for RECs in *Article 2* of the *Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources*

> ‘Renewable Energy Community’ means a legal entity:
> (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;
> (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;
> (c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

The definition emphasizes the social aspect of RECs, it ensures that RECs exist to serve the local community and cannot not be used in the economic interest of large energy companies, energy-intensive companies, or single investors.

This definition allocates RECs within the broader family of social innovations, particularly as they are supposed to create new social relationships through bringing together citizens and giving them an active role in the energy transition.

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How do Renewable Energy Communities work?

RECs are membership-based organisations, most commonly in the form of cooperatives, with a local geographic scope. They are usually comprised of a group of natural persons, yet SMEs (whose primary activity is not energy related) and local authorities may become members as well. A key aspect of RECs is the collective ownership and management of the related asset(s). To qualify as a REC, no single member can hold a voting majority, ensuring that the community works for the benefit of all members (Lowitzsch, Hoicka and van Tulder, 2020). Energy projects governed by RECs tend to range from 5 kW to 5 MW or above, depending on where they are implemented and by whom. While energy generation is the most common activity, some RECs also engage in energy storage, energy efficiency services, heating systems, distribution, and even e-mobility (cf. IRENA, 2020).

The environmental and social benefits which RECs provide to their respective members can lead to a spill-over to the wider community. One example is the general spread of renewable and clean energy which is spurred by investments made by RECs (Dóci, Vasileiadou and Petersen, 2015). As the main purpose of an REC is to generate benefits for the community (IRENA, 2020), RECs usually reinvest a large share or all of their profits into their operations before providing any sort of dividend to their members.

2.2 Energy Aggregators

Energy aggregators are a more novel form of social innovation in the energy sector. Their accelerated rise is spurred by new technologies that are opening possibilities for profit making and citizen involvement. The *Directive (EU) 2019/944 on common rules for the internal market for electricity* (IEMD) defines, 'aggregation' as; "a function performed by a natural or legal person who combines multiple customer loads or generated electricity for sale, purchase or auction in any electricity market" (Article 2). The IEMD also defines 'independent aggregators' as "market participant[s] engaged in aggregation which are not affiliated to the customer's supplier". This distinction is made because various energy suppliers have already invested in aggregation competencies as a complementary business activity to their core activities.

Recent changes in the energy landscape enabled the spread of energy aggregators. Namely, the accelerated speed in the implementation of smart meters, other smart devices as well as regulatory changes (e.g. as part of the CEP elaborated in chapter 2). Still, with only around 41 independent aggregators and around 22 energy suppliers which are following a similar business model (ENTSO-E, 2019), aggregators are not yet mainstream in the European energy sector. The few active aggregators are mainly concentrated in Germany, the Netherlands, France, and the UK, with the rest of the EU lagging behind. However, as their role will become increasingly important with evolving technologies and energy grids , the EU has made early moves to integrate aggregators into the regulatory framework of the electricity system.

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How do Energy Aggregators work?

Energy aggregators work by aggregating (combining) the production or consumption of distributed energy sources. This allows decentralised actors, including regular households, to participate in the wholesale energy market. The aggregated energy demand or supply can provide grid-balancing services to system operators, who are willing to compensate consumers for their flexibility. The decentralised sources of demand and supply of aggregators can be controlled centrally depending on the needs of the grid (IRENA, 2019).

Aggregators are attractive because many consumers are enabled to participate and they contribute to the spread of other technologies. One such technology, that will enable more aggregation, is battery storage which can provide both demand and supply side flexibility by charging during times when generation exceeds demand and discharging when demand exceeds generation. Furthermore, aggregated loads generated by prosumers, generally through photovoltaic (PV) units, can compete on the wholesale market like a traditional power plant (IRENA, 2019). Aggregators also use smart technologies such as meters, thermostats, and other appliances to increase or lower electricity demand based on the balance requirements of the grid. This means that consumers do not need a battery or PV panels themselves, but can offer the consumption flexibility of their home.

Through aggregating household consumption flexibility, aggregators can offer ancillary services to in the energy market such as load balancing and demand response. Consumers can thus monetise their flexibility without any large up-front investment costs. This can bring financial benefits to the consumer but also reduce energy consumption and GHG emission through reducing the reliance on peaking plants which are often fossil fuel based.

2.3 Crowdfunding Platforms

As access to finance from traditional lenders like banks can be difficult for project developers in the RE sector, crowdfunding is gaining popularity in this context. RE crowdfunding platforms offer possibilities to diversify investment portfolios or invest directly in RE projects. Crowdfunding is sometimes even used by municipal governments to raise capital for RE projects and engage citizens in the energy transition.

Following this development, the EU recently adopted a regulation defining and standardising crowdfunding services. Article 2 of the *Regulation (EU) 2020/1503 on European crowdfunding services providers for business* defines crowdfunding services as the "matching of business funding interests of investors and project owners through the use of a crowdfunding platform, which consists of any of the following activities:

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(i) the facilitation of granting of loans;
(ii) the placing without a firm commitment basis,[…], of transferable securities and admitted instruments for crowdfunding purposes issued by project owners or a special purpose vehicle, and the reception and transmission of client orders, […], in relation to those transferable securities and admitted instruments for crowdfunding purposes."

As shown, this article provides a broad definition, which does not pertain exclusively to RE crowdfunding platforms. However, the EU-wide definition opens up the market for crowdfunding services and can increase investors' access to RE projects and help project owners access a larger pool of investors. So far, using crowdfunding platforms to fund renewable energy projects has become especially popular in the UK, the Netherlands, the USA and Germany (Candelise, 2016).

How do Crowdfunding Platforms work?

At the heart of crowdfunding lies the idea of pooling resources of individuals in a collective effort to support an idea or project (Alonso, 2017). Nowadays, crowdfunding activities take place primarily via online platforms. Projects and ideas are presented on the internet and money is collected via an online platform (Candelise, 2016). Crowdfunding initiatives can take two forms; Firstly, equity based where investors have ownership in the projects they invest in and share in the profits. Secondly, loan based where investors receive interest payments on their investment.

The interest rate, payment intervals and time period are all set during the crowdfunding stage of the project. This positions crowdfunding as a strong enabler of social projects, as they are supported by a large number of people spread across different regions that contribute, generally, small amounts of money. Often the investors see beyond the potential financial return of the project, but look for projects that lie close to their personal interests (Buysere *et al.*, 2012).

Thus, crowdfunding can be used as a tool to involve citizens living close to the project. Crowdfunding also allows consumers and citizens interested in RE and the energy transition to take an active role and become investors in RE projects (Candelise, 2016). In the RE sector, crowdfunding services respond to the necessity of improving access to capital, financing a worldwide transition to sustainable, low-carbon and green energy (Candelise, 2016).

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2.4 Relevance and benefits of social innovations for the energy transition

The case studies and interviews undertaken together with SocialRES partners and experts indicate how social innovations can support a clean, just and inclusive energy transition. Furthermore, it is suggested that social innovations can improve acceptance for renewable energy projects and strengthen energy democracy (see Chapter 4).

Public support for the expansion of renewable energies

Large-scale energy projects tend to be planned and implemented top down and imposed on local communities, forcing them into a merely passive role, thus often provoking local opposition. This lack of agency felt by citizens is often a barrier to the expansion of renewables (European Community Power Coalition, 2020). The aforementioned forms of social innovation, however, offer approaches to project design that actively involve affected communities. Studies show that community-driven energy projects bring about high levels of trust and acceptance among citizens (European Community Power Coalition, 2020). This increased acceptance results primarily from the generation of direct and indirect benefits for affected citizens and creates awareness for the need of the energy transition.

The link between financial benefits and acceptance for energy projects was repeatedly emphasized in the interviews carried out for this project and is also supported by scientific evidence (Hewitt *et al.*, 2019). Local citizens who make land available for wind turbines (e.g.) receive a share of the project's financial returns - a model that is widely used in Germany to create acceptance among those directly affected. In 2019, around 40% of local energy suppliers in Germany offered citizens and communities the opportunity to participate directly in the renewable energy projects they operate (Bolle, 2019).

Citizens can also benefit indirectly from the added value that projects generate for municipal facilities. RECs often install their systems on municipal buildings such as schools or community buildings. The savings on electricity bills resulting from the energy project can be invested in renovations or teaching materials, for example. (Bolle, 2019). Lennon, Dunphy and Sanvicente (2019, p. 35). found that citizens want to “see meaningful change and a transition to a low-carbon renewable energies system where they actually have real agency”. By involving citizens in the process of project planning and implementation and sharing the benefits, the clean energy transition becomes more transparent and understandable. Crowdfunding platforms are leaders in effectively informing investors about the impact achieved with their money. They serve as a “communication tool" that enables full transparency and open communication about project progress. When people are involved in a project, they are much more likely to appreciate its benefits and accept potential downsides. They are also able to mitigate negative impacts by, for example, actively participating in the selection of where wind turbines should be located in their neighbourhood (Alonso, 2017).

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Public support for renewable energy is also related to people's level of knowledge. The more people know about renewable energy, the more likely they are to support such technologies. Thus, increasing awareness and education are key to accomplish the transition to a clean, secure energy system (European Community Power Coalition, 2020).

Energy democracy and redistributive effects on income

Renewable energy projects, such as wind turbines implemented in structurally disadvantaged regions, are often perceived by the local population as land grabbing by wealthy urban residents, especially if these projects are implemented with community shares owned by non-local investors (Bolle, 2019). Acceptance is therefore also closely linked to a democratization of the planning and implementation process for energy projects.

Several experts point out that community-based energy projects are often more cost-effective than individual prosumership. By aggregating demand for renewable energy, better prices can be negotiated with installers, project developers, and equipment suppliers. This lowers the upfront investment required, making community-based energy projects accessible to less affluent households (IRENA, 2020). Because a buy in through shares or a small investment is possible, ECs and crowdfunding can unlock capital from middle income people who do not have the resources to install their own RES. It also enables citizens without the space for RE installations, such as their own roofs or gardens, to actively participate in RE projects. In addition, the cost of electricity generated from community-operated renewable energy plants can be cheaper than electricity offered to the community by other suppliers (IRENA, 2020). Furthermore, a community purchasing electricity from a traditional energy provider, typically only benefits the provider and its shareholders.

Social innovations like energy communities on the other hand, offer the opportunity to channel profits gained through energy production and sales back into the community and local infrastructure. In a report, the European Community Power Coalition (2020) cites the Wadebridge Renewable Energy Network (WREN) in the UK as an example: the grass roots social enterprise managed community funds generated from local commercial wind and solar farms and distributed them to local non-profit and voluntary organisations through votes in a network of local committees. This revitalized the community economically and socially through the revenue generated by small, local, and decentralised energy facilities.

Energy security (security of supply)

Energy security is still a major challenge in the transition of the energy system: how can the supply of regions without their own renewable energy resources be secured in the long term? Good energy storage concepts are a key to solve this challenge, but social innovations can also contribute to improved energy security.

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Energy aggregators in particular can help with the improved integration of renewable energy resources into the power grid by providing both demand-side and supply-side flexibility services. Decentralized energy storage allows to respond more flexibly to fluctuations on the demand side. On the supply side, portfolios of different decentralized energy sources can compensate for fluctuations in the provision of energy by individual sources. Energy aggregators can thus produce an optimized and stable energy supply on the basis of historical and forecast data on demand, generation, and prices (IRENA, 2019). Social innovations such as ECs and aggregators can further improve energy security in areas prone to power outages. When small, local, and decentralized energy sources are integrated into the energy market, energy supply is diversified. The aggregator acts as an intermediary between multiple players and a marketplace. Its added value can be twofold: it enables small players to reach the required size to be able to participate in some markets; and it enables the global optimization of all aggregated assets. This can reduce the risk of large-scale power outages.

In addition, distributed power systems and micro-grids can enable standalone operation, improving the resilience of the power grid in the face of extreme events (IRENA, 2020). The integration of aggregators improves the ability of the grid to service peak-time demand through the already existing capacity via demand response services (Burger *et al.*, 2016). This can increase the overall efficiency of the grid and reduces the demand for peaking plants, as the focus shifts from increasing generation to meet peak-demand to lowering peak-demand.

Strengthening the local economy

In a 2019 study on the merits of various community-based renewable energy models, respondents identified the generation of new employment and wealth creation opportunities for a majority of local people as one of the most important evaluation criteria (Lennon, Dunphy and Sanvicente, 2019). Moreover, various studies indicate that community energy projects (especially solar and wind) produced up to 8 times more local revenue than projects carried out by an external and investor-owned developer (Bolle, 2019; European Community Power Coalition, 2020). Social innovation projects also tend to support local or regional manufacturers of renewable energy installations, additionally boosting European innovation (European Community Power Coalition, 2020).

Community owned energy projects bring an extra income flow to the citizens that invest in them, as well as keeping the profits from the sale of generated electricity in the community. Aside from local citizens receiving a share of the profits, the local scope of energy communities means that the profits that are reinvested will go into further projects in the community. These can be expansions of existing or further RE projects. Other endeavours such as energy efficiency renovation programmes have also been pursued by energy communities. These provide further economic benefits to citizens and can stimulate the local economy by employing local contractors (Bauwens, 2019).

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It is also important to look beyond the financial returns that members can gain through community energy projects. Collective ownership and participation can strengthen social ties between members of the community. Bauwens (2017) showed that members of energy cooperatives with an orientation towards public benefit had stronger ties with other members as well as a stronger identification with the cooperative than members of cooperatives with a orientation towards mutual benefit. Energy communities can provide new avenues for social interaction between citizens and can increase their social capital (Bauwens and Defourny, 2017; Bauwens and Eyre, 2017).

These effects, together with the redistribution effects discussed above, can help strengthen the sense of belonging in a community and also significantly increase the acceptance of the energy transition.

2.5 Key take-aways

The socially innovative business models presented here have the potential to play an important role in the energy transition; socially, technologically, as well as economically. The key take-aways from the analysis are:

- Energy communities, crowdfunding platforms, and energy aggregators offer an alternative to prosumption for participating in the RE market. Collective undertakings often remove many of the barriers that individual prosumption faces. Such as prohibitively high up-front investment, complicated administrative processes, and space restrictions.
- Social innovations can strengthen energy democracy as more citizens with different income levels and living situations can actively participate and benefit.
- RECs and aggregators allow consumers broader access to wholesale electricity markets. In the past these markets were almost the exclusive domain of large centralized market actors.
- Active participation by citizens through socially innovative business models allows them to benefit financially from the energy transition. Locally owned RE projects also create more economic value for the local economy than those owned by remotely located investors. Citizens, local governments and local SMEs can all benefit from the economic value RECs bring to a region, but also from the positive social and environmental spillover-effects.
- Through equity and voting rights in RE projects citizens can actively help shape the energy transition.
- Decentralization and aggregation can increase the flexibility of the grid and reduce the need for fossil fuel run peaking power plants.
- Active participation in RE projects by citizens can strengthen social bonds and increase acceptance of the energy transition.

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3. Recent EU Level Regulatory Framework Developments

The Clean Energy Package (CEP) of 2018 gives new rights to consumers in the renewable energy sector and thus creates new opportunities for social innovations. The two most relevant directives for social innovations included in the CEP are the (*Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources*) and the *Directive (EU) 2019/944 of the European Parliament and of the Council on common rules for the internal market for electricity* 2019. Both lay out new rights and obligations for consumers, energy communities, energy providers and grid operators, as well as for member state governments on how to support socially innovative undertakings. Most importantly, these directives include the specific aim of strengthening and supporting social innovations, in particular renewable energy communities and energy aggregators (RECs).

The content of these directives has been thoroughly reviewed and analysed by a number of authors (Caramizaru and Uihlein, 2020; Castanié and RES Coop, 2020; Lowitzsch, Hoicka and van Tulder, 2020). In addition, the even more recent *Regulation (EU) 2020/1503 of the European Parliament and of the Council on European crowdfunding services providers for business* introduces provides a new regulatory framework for crowdfunding services in the EU, changing how investors, crowdfunding service providers, as well as project developers can operate in the crowdfunding finance space.

The following sections will focus on the potential impacts these legal changes could have on the focal social innovations which this study is focusing on: energy communities, energy aggregators, and renewable energy crowdfunding.

3.1 Renewable Energy Communities

Considering the social innovations we are focussing at in the SocialRES project, renewable energy communities (REC) are an explicit focus of the CEP. There were two similar but not completely overlapping definitions of “Citizen Energy Communities” (CECs) in the Internal Electricity Market directive (IEMD) and “Renewable Energy Communities” in the Renewable Energy Directive (REDII). While the regulatory framework surrounding these two subjects is very similar, the focus of this section will be on the rights that consumers and RECs themselves have gained from these directives and how these can promote their uptake.

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The **Recast Renewable Energy Directive (REDII)** is the most relevant regulation for renewable energy communities. Regarding its role in promoting RECs, *Article 22* of the Directive can be considered in three parts. First, it sets out the rights and obligations of final consumers wishing to join a REC. Secondly, it sets out the rights that RECs must guarantee to their members. Lastly, it outlines the rights that member states must grant to RECs and their obligation to develop an enabling framework.

The directive gives a legal definition to RECs. However, it does not prescribe a legal form for them (while member states are free to create one), but rather sets out the activities that RECs may carry out and standardises them throughout the EU. This standardisation is an important step to help RECs strengthen their legitimacy in the EU energy market. Furthermore, the directive uses strong language in its positive imperative and obliges members to enact the legislation set out in the directive as a starting point. This means that RECs will have a stronger market position if the directives are implemented in accordance with the letter of the directive. This position can be strengthened further if they are implemented in accordance with the spirit of the Directive as set out in the recitals of the Directive. Beyond this, it remains crucial for the further development of the decentralised renewable energy market that the directives are implemented within the deadlines.

Consumer Side

On the consumer side, the Directive sets out important rights which should make joining a REC easier and less risky. This means in particular that consumers who opt to join a REC or choose a REC as their energy supplier do not lose any rights as final energy consumers (REDII, Article 22/1). This means that their right to freedom of contract, the right to switch supplier, and other rights that exist at the national level, such as protection against sudden disconnection from the grid, are guaranteed. This can reduce the risk that consumers might feel when deciding to switch from a traditional energy supplier to an REC. Being able to obtain clear, correct and understandable key information from the REC and compare it with their current energy supply contracts helps consumers to make an informed choice. Similarly, the consumer retains the right of withdrawal, which gives them more flexibility to try a REC as an alternative energy supplier. These changes will make it easier for RECs to compete as energy suppliers on a level playing field, even without increasing their membership. Allowing more consumers to choose RECs as their energy supplier may increase their attractiveness. Although membership in a REC is voluntary and members should be able to divest at any time, the initial investment may still deter some consumers. However, it would also be reasonable to allow RECs to impose some divestment restrictions to enable their long-term financial planning and sustainability (Castanié, 2020). Member states will need to find a compromise between the interests of RECs and consumers in this area.

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Rights of Renewable Energy Communities

Looking at the rights of RECs, the directives provide a framework for reducing risk and uncertainty. The most general and fundamental aspect is that there is more clarity about what activities RECs can pursue and how their relationship with other market actors is regulated. This is important because it gives RECs or their members as individuals the possibility to appeal to the courts if they feel their rights as RECs have been violated. Importantly, *Article 22* also guarantees RECs the right to sell the energy they produce. This assurance can significantly reduce the risk of setting up a REC, as they can sell to directly to both members and non-members and compete for customers outside the REC or sell their generated electricity into the grid. The right to sell energy through renewable electricity power purchase agreements also provides them with an important tool to gain more long-term financial planning certainty. In addition, the main changes in terms of the development of framework conditions will take place at national level. The elements of the enabling framework are set out very clearly in the Directive and aim at giving RECs a stronger standing in the energy market. Member states must remove any identified regulatory or administrative barriers that affect RECs. The enabling frameworks will vary across member states as they must take into account diverse geographic, technological, demographic and cultural factors, thus excluding a "one-size-fits-all" model at the EU level (Lowitzsch, Hoicka and van Tulder, 2020). The aim, however, is to create a level playing field for RECs in the energy market, making them attractive to the average consumers and not just enthusiasts forming communities of interest (Bauwens, 2019). The level playing field will also help to decouple the rise and fall in the number of RECs from the availability of financial support schemes (Wierling *et al.*, 2018). Removing administrative barriers should also enable more people to start a REC and lead to the development of context specific "plug and play" solutions for buildings and neighbourhoods who want to start a REC. Furthermore, the enabling framework lays out a duty to cooperate between RECs and distribution system operators. This is also important as RECs can reach more potential customers. Although RECs need to pay network charges and other levies and taxes, these must be transparent and must not be discriminatory in any way. This in turn will allow for better financial planning and feasibility analysis and can help RECs in their early stages.

The recent developments in EU legislation, in particular concerning RECs, clearly show that the objective is to remove the dependence of RECs on financial support programmes and help them to compete in the free electricity market. Beyond the need to level the playing field for RECs, it is important to present RECs as a viable option for all consumers, not just enthusiasts, to encourage these consumers to choose a REC as their energy supplier or even to consider membership, as a REC brings many benefits - economic, environmental and social - to the community (see chapter 2.4). It is important that these changes are implemented now, at the beginning of the transition to a renewable energy supply, so that RECs can capture market share from the onset and be in a stronger long-term position to compete in RE generation and supply markets.

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3.2 Energy Aggregators

The CEP takes a similar approach to energy aggregators as it does to renewable energy communities. An explicit objective of the ***Internal Market for Electricity Regulation (IEMD)*** is to "facilitate aggregation of distributed demand and supply" (Article 1). The primary approach to achieving this is to create a level regulatory playing field for aggregators in the energy market, in the hope that the market produces these innovative goods and services. Aggregators and aggregation are primarily dealt with in the IEMD, but are mentioned and influenced by various articles in the REDII. The articles in the directives of the CEP also define the activities that aggregators can carry out and, importantly, the rights of consumers if they choose an aggregator as their energy supplier or if they choose to be a part of one. The following section looks at the main points raised by CEP and how these affect the role of aggregators in the EU electricity market.

Rights to Consumers

The IEMD and REDII offer some insights into the role that the EU wishes to assign to aggregators and the services that can be provided by them. The IEMD distinguishes between aggregation and independent aggregation, where an independent aggregator is not affiliated with the customer's supplier. *Article 13* of the IEMD states that customers do not need the consent of their electricity supplier to sign a separate contract with an independent aggregator and also protects consumers from being discriminated against by their supplier, whether administratively or technically. The easing of this process will enable many consumers to monetize their flexibility. If the administrative, financial and technical barriers are significantly reduced or removed, consumers with flexible energy production or consumption can more easily join an aggregator and be compensated for their contribution to the demand response services offered by the aggregator. Likewise, aggregators can offer an attractive value proposition to prosumers in terms of a "plug-and-play solution" for the sale of their surplus energy. The aggregation service would enable them to participate in the wholesale electricity market, resulting in higher prices for generated electricity for individual prosumers.

Rights of Aggregators

While the directives in the CEP give some guidelines about the potential role of aggregators in the energy market, member states are free to choose the "appropriate implementation model and approach to governance for independent aggregation" (Recital 39, IEMD). This means that decision making through the governance structures of aggregators, unlike RECs and CECs, does not need to be participatory. Aggregators can aim for profit maximisation and do not need to demonstrate social and environmental benefits like RECs. However, they must be transparent and ensure that the end customer "adequately benefits from their activities" (Recital 39, IEMD). Aggregators can thus, while being innovators and involving more citizens in the energy market, act as traditional profit maximising firms, making them attractive investment opportunities in the energy market

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of the future. This presents an opportunity for aggregators, as they do not rely on memberships in the way that RECs do, and can access different streams of finance. This also allows opportunities for incumbents to expand their activities to include aggregation and reach out to current customers as potential sources of demand and supply flexibility.

The legislation set out by the EU provides a roadmap for aggregators to become a successful and integral part of the EU electricity market landscape. However, the impact of the legislative changes is likely to be felt only in the medium to long term as consumers increasingly use products needed for widespread aggregations services; such as smart-meters, smart thermostats, electric cars, home battery systems, PV panels, and other technologies that support and enable the uptake of aggregators. As these technologies become more widespread, aggregators will be in a stronger position to provide ancillary services.

3.3 Crowdfunding Platforms

Crowdfunding platforms and private investors in the EU have recently received a new impetus for the future. *Regulation (EU) 2020/1503 of the European Parliament and of the Council on European crowdfunding services providers for business* published on the 7th October 2020 is the first and pan-European regulation for this form of alternative finance. Its aim is standardisation in an industry that is highly fragmented across the EU, with each country having its own unique regulatory framework for crowdfunding activities. This fragmentation has meant that it has never been possible to develop a crowdfunding platform with an EU-wide reach, something the regulation enables by freeing up cross-border capital flows. The regulation affects the three relevant actors in a crowdfunding circle, the operators of crowdfunding platforms, project developers, and retail investors. The fact that the EU applied a regulation in this area shows the importance of a clear and standardised regulatory framework across the Union, as actors in all member states can benefit from the regulatory changes. The following section examines how the new regulations create opportunities for CF platform providers, investors and developers.

Higher threshold

The Regulation applies only to crowdfunding projects with a consideration of EUR 5 million or less. This is significantly higher than the EUR 1 million threshold considered in previous rounds of negotiation. The higher threshold of EUR 5 million makes crowdfunding more attractive for the renewable energy sector as it allows CF platforms to offer investments in larger projects where investment requirements often exceed EUR 1 million, such as onshore wind projects. Likewise, it enables large projects to secure funding through CF platforms and with the scale of large projects; developers may be able to offer better returns for investors. Article 1 also states that CF service providers do not require authorisation as a credit institution (or a banking license); this was not the case in some members states, as this type of authorisation was required to facilitate credit. This

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amendment will make it easier for crowdfunding platforms to compete with traditional lenders such as banks in order to act as financiers of projects. They will also no longer have to provide investors with a prospectus, which would be required of a credit institution, as under the new Regulation a *Key Investment Information Sheet* will be sufficient. This change greatly reduces the costs of a crowdfunding campaign.

Standardised set-up and approval process

Crowdfunding service providers also benefit from the standardised set-up and approval process which member states must ensure. All necessary documentation and an outline of the process, including time frames, are clearly set out in *Article 12* of the Regulation. The national authority responsible for this approval process must follow the rules set out in the Regulation and may reject applications only if they do not comply with the requirements laid down and must state its legitimate reasons within three months of receiving the application. Therefore, the process should become more transparent and easier to follow, allowing for more market entrants and thus more choice and competition. Importantly, *Article 12* also allows CF service providers to operate in any EU country without requiring a physical presence there, which has so far been a major obstacle for CF service providers wishing to expand their activities. This change will allow CF platforms to offer a diverse portfolio of projects and opens the market to more potential investors.

Investor protection

Another priority of the Regulation is to ensure investor protection. *Article 11* requires CF service providers put in place prudential safeguards in the form of cash or insurance. While these obligations increase costs for the CF service providers, they offer reassurance to potential investors. Furthermore, the regulation lays out very clearly, in *Articles 19* to *21*, the information to which investors must be privy. Each project offered on the CF platform must have a *Key Investment Information Sheet*, which must give potential investors a "fair, clear, and not misleading" overview of the costs, financial and credit risks, fees associated with the CF service, project selection criteria and risks associated with CF services. In addition to the factsheets, potential investors will have to pass a knowledge test on their investment experience. This test must be provided and evaluated by the CF service provider to determine whether the investor is a sophisticated or non-sophisticated investor. As investing in a CF project is not the same as depositing money in a bank and is not covered by the deposit guarantee scheme or the investor compensation scheme. It is crucial that retail investors, particularly inexperienced ones, understand exactly what they are doing with their money and the risk involved. Although this in turn creates some additional costs for the CF service provider who needs to evaluate the knowledge test, it gives investors a better chance of making an informed decision and assures that they are not being taken advantage of. As a further safeguard for consumers, every ordinary investor is required to simulate his ability to bear losses, calculated on 10% of his net assets. CF service providers are required to enforce this and are also tasked with reviewing the simulations. Although this is again an additional expense for the CF service providers,

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it could prove to be a powerful tool to help ordinary investors internalise the risks associated with CF investments. It should deter investors from simply choosing the projects with the highest potential returns without understanding that these may also bear the highest financial risks. Lastly, the new Regulation will reduce the credit risk for the investor, as the abolition of a banking license requirement will allow CF investments to be granted as senior loans rather than subordinate loans. This means that if the project fails and has to be liquidated, CF investors have the same chance as traditional investors to recover part of their initial investment.

Overall, the Regulation on CF service providers aims at opening up the market at a pan-European level. It could unleash a lot of retails investors' capital, similar to what we have seen through brokerage apps, and encourage more average citizens to invest their money proactively. In particular, it allows for cross-border capital flows, giving projects in smaller or lower-income national markets access to new streams of finance. Regarding renewable energy projects, if the growth trend in ESG investing continues (Lipper Alpha Insight, 2020), this interest from retail investors may transfer to the CF market if the regulatory framework allows it to do so easily, and boost demand for investment in renewable energy projects.

3.4 Key take-aways

The regulatory changes at the EU level are still in the process of being transposed into national law by most member states. A crucial aspect will not only be the transposition of the directives into nation law, but also the translation of the legislation into regulation by the regulative authority in each member state.

The key take-aways are:

- The legitimacy that these new market entrants are receiving. For energy communities they become more than a citizen cooperative dealing in energy, but acquire a new and protected legal standing.
- The main efforts have fallen on consumer protection and consumer rights. Ensuring these will be an important step in the mainstreaming of these social innovations and citizen participation in the renewable energy field.
- The strengthening of social innovations will give citizens a more active and powerful role in the energy market. As energy communities and aggregators grow in size, they will move away from being passive price takers. For one, we will see more customers buying directly from generators such as ECs and cutting out traditional retailers. Secondly, as the capacity that socially innovative actors can bring to the wholesale market grows, their market power will increase.
- Social innovations will allow consumers a more proactive role in the governance of RE projects. Particularly with the participation of local authorities, social innovations will give citizens more influence on where RE projects are to be built and under what conditions.

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4. Policy Design: What's driving and hindering social innovation in the energy sector?

The seven case studies that are part of the SocialRES project and 38 expert interviews highlighted the barriers that actors in the field of social innovation in the renewable energy sector are currently face. We also looked at existing and potential enablers which they feel can effectively increase citizen participation in the energy transition and strengthen social innovations in the market.

4.1 Barriers to social innovation in the energy sector

Through the analysis of the interviews, case studies, and literature we have identified main barriers for social innovations in the renewable energy sector: administration and bureaucracy, the competitive framework, technological and digital infrastructure, financial barriers and a lack of awareness.

Administration and bureaucracy

One problem are seemingly good incentives by governing bodies or banks which turn out to be so complex in nature that they cannot be handled by voluntary work. This poses administrative barriers to access grants and funding for example.

Administrative and bureaucratic hurdles arise from the interconnectedness and number of actors involved in a RE project. Social innovations need time and money to draw up contracts for their members or investors, they must receive construction permits from local authorities, obtain grid connections and form contractual relationships with other electricity market actors such as retailers and DSOs. While this may not pose problems for large and experienced firms in the electricity market, in the case of ECs, who may not have any (or very few) full time employees, the amount of administration and bureaucracy can represent a major obstacle. In some cases, this can be overcome or mitigated by partnering with local authorities which can help with and accelerate certain processes, however this is not always an option. Without the time, experience and resources to navigate complex administrative processes, social innovations often find themselves at a disadvantage compared to traditional firms. Several experts we spoke to lamented the fact that new actors were largely left on their own to find their way around the administrative and bureaucratic systems that govern activities in the electricity market.

In other cases, the regulatory frameworks itself is not yet ready to integrate socially innovative business models. A concrete example arose in Romania where the national regulation on cooperatives required every single new member to be registered individually

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with the relevant authority in a lengthy bureaucratic process. This is because when the law was written it focused on agricultural cooperatives where the number of members will always stay limited and did not consider the possibility of mass consumers cooperatives. Romanians seeking to start a cooperative, for example to found an EC, can circumvent this by registering as a European Cooperative Society, however this brings new barriers such as needing 30,000 EUROS of subscribed capital which is a very high starting threshold in the national context.

With regards to achieving authorization from financial conduct authority (in this case for Crowdfunding in the UK), the process is quite stringent and equally time consuming. Administrative hurdles are equally seen in France and Spain, where instructions are very complex and time consuming, but at the same time small players do need such administrative support to start their operations in the first place.

Competitive framework

Policies designed to promote increases in renewable capacity often overlook smaller players such as ECs, making market entry and competing difficult. Furthermore, markets are still largely organised hierarchically and not suitable for decentralised grids. The power lies with large generators, distributors and energy suppliers. In countries like Spain, monopolies or oligopolies largely control the energy market, making proper competition very difficult for social innovators. In Portugal, technical barriers such as limited available capacity of the grid already poses as problem. Furthermore, the process of selling to the grid is very complex and available capacity is distributed competitively among all players in the market. This makes it very difficult for small players to gain a foothold in the market.

Size of firms make a big difference when competing in a market that historically only hosted large companies. Rules are often set out without regard for firms' size, meaning a firm with a few hundred or thousand clients must navigate the same regulatory framework as a firm with a hundred thousand or a million customers. Without the benefits of scale this puts an undue burden on smaller actors who must fulfil the same requirements as large firms and operate by the same rules, even when their intention may be to stay small and local. This is aggravated by the fact that small new-comers to the market have a very difficult time attracting and competing for the human resources that possess the legal and technical knowledge on how to enter and navigate the market. Size and resources also play a role in competitive tenders for RE projects. Participating in tenders in order to receive price premiums may be beneficial in order to make RE projects economical, but is costly in both time and resources. Large companies have the resources and experience to apply to compete in many project tenders, thus hedging their bets across a number of tenders, something that smaller actors do not have the capacity to do.

In general, the move away from feed-in tariffs to a more liberalised and competitive market, in which tenders play a bigger role, as observed in France and Germany, is viewed critically by many of the people we spoke to. The markets liberalisation and greater focus

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on competition forces business models to be profitable if they want to compete, this focus of profitability in the market place can conflict with the original intention of creating social and environmental value as is the goal of social innovators.

Lastly, while price of inputs for RE projects has steadily decreased, margins in the energy market are still low when competing at a small scale and without state-support. This makes market entry difficult for smaller decentralised actors as long amortisation period and meagre returns turn off individual investors and are not attractive for potential members of ECs or aggregators. This issue is particularly poignant in countries with very low retail electricity prices such as Romania and Croatia.

Technological and digital infrastructure

The development and uptake of socially innovative business models in the energy sector will depend heavily on the pace at which new technologies are deployed. Smart meters, smart appliances and thermostats, home battery systems and electric vehicles will all contribute to the pace of uptake of social innovations, in particular energy aggregators. Smart appliance and thermostats will better allow controlled flexible household consumption and thus enable better demand response. Prosumers will benefit greatly from more household battery systems or EVs which can be charged and discharge according to the needs of the grid or the home as well as the current market price of electricity. The rollout of the technological infrastructure which will facilitate the uptake of socially innovative business models is still slow in most EU countries. The main barrier in this case is still price and the perceived necessity of these technologies by the consumers.

These technological changes, when mainstreamed, will first need to overcome a phase of societal resistance and prove themselves as safe, trustworthy and beneficial. Privacy concerns have been raised regarding the widespread installation of smart meters as consumers are concerned that these can be used to infer personal household activity patterns. Despite personal data being protected by the EU and the IEMD requiring companies with access to smart meter data to comply with the EU's data protection rules, public concerns still linger. Another concern of smart homes, particularly of those joining an energy aggregator is the need to forfeit control of certain activities to external actors and computer algorithms. The concept of letting an algorithm decide when your EV is charging or when your heating or air conditioning can be turned up to the maximum is so far removed from the traditional idea of managing your household that it will inevitably take some time for consumers to accept and trust these processes.

Financial Barriers

The analysis of expert interviews showed that many barriers to social innovation in the renewable energy sector stem from misleading incentives set by the regulatory framework. For instance, many social innovators face financial barriers as funding is often only provided on a national level. Furthermore, especially in Germany, there is a strong focus on profitability of social innovations. Energy communities, for example, often need

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to participate in big projects to stay profitable. This goes against the DNA of ECs and is not in line with their traditionally rather risk-averse attitude. Feed-in tariffs recently declined in Germany, leading to fewer profitable projects being available and longer investment horizons. Here the issue of the tendering processes also arises (as described under competitive framework), meant to spur investment in RE projects but too often excluding smaller actors. Furthermore, as noted by an expert from Croatia, overly generous grant programmes (in this instance for household PV installations) can lead to market distortions such as inflated prices of ancillary services and an unwillingness to invest in projects without receiving a grant. According to an expert in Portugal, because crowdfunding investments are treated the same as any other investment, the incentive to invest via crowdfunding is rather low.

A further example comes from France where the *Bonus Participatif* is awarded to RE projects which include local investors from the project's proximity. This has successfully increased the use of crowdfunding and private investments in RE projects. However due to its geographic restriction it has failed to target urban citizens as the projects have largely been large scale PV constructed in suburban and rural areas. While urban citizens tend to have higher incomes and more savings they are not seen as a priority as they are not "needed" to qualify for the participatory bonus. A French expert also lamented the same feed in tariffs for small projects across the whole country. These lead to geographic discrepancies as a PV project in the south of France is significantly more economically attractive than one in the north.

Lack of awareness

Knowledge sharing and exchanging good practices is vital to the future survival of social innovation in the renewable energy sector. In the area of crowdfunding, the lack of clear Key Performance Indicators (KPIs) hinders investments and poses a barrier to acquiring new investors. For ECs, the adaptation to changing market structures is a difficult process and there is a need for an environment of feedback and exchange among them. In Croatia, experts stated that people are simply not aware of their investment options and possibilities to participate. While the issue of mistrust and financial illiteracy occurs in France and the UK, according to the interviewed experts.

Experts in every country mentioned that while the salience of the energy transitions is increasing among the public, people still focus more on how the change may affect them negatively rather than how they can take an active role and benefit from the changes occurring. The business models that this project is exploring are not necessarily known or understood very well outside of enthusiast circles. When it comes to participation through crowdfunding, it is not offered alongside traditional financial instruments to retail investors, meaning many do not know about it. Energy communities and aggregators suffer due to people simply not knowing about them, due to lack of marketing activities, and people being generally hesitant to put their money into business models they do not fully understand. Table 1Table 2 below lists barriers for energy communities, energy aggregators and crowdfunding platforms in the energy sector categorised by country.

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Table 1: Potential barriers to social innovations by country

Country	*Energy Communities*	*Energy Aggregators*	*Crowdfunding Platforms*
Croatia	Insufficient inclusion of citizens Cooperatives are not eligible to apply for national level Difficult to compete in tenders for feed-in and premium tariffs. Procurement regulations for municipalities	Consumers must self-consume or sell into the grid; no option for P2P trade or aggregation. Net metering for prosumers. Yearly production should not exceed yearly consumption. All production above consumption is sold at a reduced price. Technological barriers such as lack of smart metering. Grants for private PV installations only accessible once a year (yearly call) and so high that it disincentivises investment without the grant. PV installations on apartment block face lengthy approval processes and need to be approved by majority of owners in the buildings.	Regulatory framework is difficult to navigate as CF is regulated by more than one law. Local governments cannot start CF campaigns as they cannot owe debt directly to citizens. This excludes all models except for donation/reward models. General mistrust in business and banking. Lack of support from business support organisations for project developers and poor business plans.
France	ECs lack resources to compete against large companies in tender processes Feed-in tariffs are the same in the whole country without accounting for geographic specificities (i.e. more sun in the south of France).	Acceptance of people giving up (partial) control of energy intensive activities. (E.g. EV charging) Administrative complexity of entering the market.	Resistance and mistrust among citizens towards business developers. CF framework is not well developed to work with smaller scale projects. General aversion to unsecured investments.
Germany	Most of the smaller ECs will need to get on board with big players in order to exist in a sustainable way in the market; this contradicts the character of the idea behind an EC Declining feed-in tariff (fewer profitable projects)	A lack of clear definitions leads to unclear rights and duties of aggregators. Complexity of administrative processes for household PV (e.g. difficult to write KfW applications w/o professional help) Lack of smart metering	Investor prospectus requirements can greatly increase costs for CF campaigns. Aversion to unsecured investments.

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	Inappropriate expectations of installers Homogeneity of members (upper income bracket, experts, very enthusiastic citizens, no mainstream) Risk averse attitude of ECs Voluntary work makes introduction of professional structures difficult Search for new projects (many roofs are taken) Difficulty competing for tenders against large companies.		
Portugal	Lack of definition of ECs No regulatory framework for ECs High guarantees to the grid Rules are made for a centralised market Difficult for small players (ECs) to join market Phasing out of feed-in tariffs Lack of regulation on storage	Complex licensing systems creates bureaucratic hurdles. Lack of necessary infrastructure	Need to clarify KPIs Non-cooperative municipalities and state secretary of energy
Romania	Legal framework does not provide simple and clear overview. Cooperative framework is not adapted to mass consumer cooperatives. 30,000 EURO starting capital to form a European Cooperative society is high for Romania. Strong aversion to cooperatives due to socialist past.	Very long amortisation periods for household PV installations. The current regulation for balance responsible parties need to be rewritten to include aggregation activities. Acceptance of people giving up (partial) control of household energy activities. Low energy prices mean aggregators would operate on extremely thin margins.	Little disposable income for unsecured investments

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	Difficulty competing for and attracting skilled employees with knowledge of the Romanian energy market due to financial constraints. No clear framework for sharing profits within the community or handling losses. No framework for involvement of local governments in ECs	Low energy prices mean that the return for consumers in terms of pay-out and energy savings is too low to justify the effort of joining an aggregator.	
Spain	Energy activity is monopolised by large corporations Planning and regulation are designed only for the centralized and vertical model NECP 2021-2030 has not set quantified targets for social innovation (e.g. self-consumption, ECs, low-voltage storage etc.) Lack of regulation that promotes open market (i.e. active consumers, prosumers and ECs) Tax regulation does not encourage self-consumption Lack of awareness and energy education of society	Regulation favours centralisation not distribution Market power lies with large generators, distributors and energy suppliers. Lack of necessary infrastructure	Lack of administrative support No differentiation between social and traditional investment
United Kingdom	Withdrawal of feed-in tariffs ECs were removed the eligibility for Social Investment Tax Relief schemes. Procurement regulations for municipalities	Location of energy aggregator can become a barrier	Impression of insecure investment Policy gaps with regards to bonds issued by crowdfunding platforms Financial illiteracy Misalignment with current financial culture Complex and time intensive authorisation process

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4.2 Enablers of social innovation in the energy sector

One thing that became clear during the expert interviews is that actors in the field of social innovation in the renewable energy sector feel that citizens must become multipliers if we want to reach the necessary speed for the energy transition. Actively involving citizens in the energy transition process will facilitate social acceptance of new forms of energy supply and can at the same time fill gaps where traditional energy providers are currently not able to provide for the service-level that is needed. This includes the provision of energy in rural areas which were traditionally not connected to the grid, for example. An effective transition includes all stakeholders, big players who operate national energy grids and small players and social innovation to clear paths at community level.

The analysis of interviews and case studies shows that five things are key to enable social innovation in the renewable energy sector: National (and regional) citizen ownership targets, municipal involvement, decentralisation and prosumership, and incentivising financial mechanisms.

Municipal involvement

Many social innovation projects in the renewable energy sector are local in scale and often initiated by a group of neighbours or peers. These projects often target areas (roofs, fields etc.) that belong to the community. Thus, municipalities must be willing to cooperate with the social innovators and support such projects. Further, municipalities can play a central role in initiating cooperation between big players like municipal utilities and small players like energy communities. Cooperation between these stakeholders will uncover synergies and enable a more effective transition to green and sustainable energy. Beyond this, municipalities can also engage directly with social innovators like ECs and support them through advice and coaching. Support and cooperation from the local authority can greatly increase the chances of a community project getting off the ground. It can also be a mutually beneficial arrangement.

Local authorities have increasingly discovered the benefit of direct involvement in renewable energy projects. The governance structure of an EC allows the local authority a voice and a vote at every stage of the project development and operation. This allows them a say in who is hired for works on the project, where they can make the case for local SMEs, where future sites are to be built and how the profits are distributed. Joint projects have also allowed local authorities to get involved in ways they previously could not. In Croatia local authorities are not allowed to owe debt to their constituents, meaning they rely on third party crowdfunding platforms to hold the debt if they want to fund a RE project with citizen involvement. Municipal support also greatly increases trust in a project. It can be seen as a stamp of approval as potential investors or members immediately have more faith if their elected government also has a stake in it, as noted

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by an expert in the UK. It can be very helpful if local authorities promote crowdfunding projects, as their reach and their local acceptance can be much better.

In some cases, the rules for municipal involvement can be prohibitively rigid. As noted by experts from the UK and Croatia, public procurement regulations often mean municipalities are constrained to award projects solely based on cost criteria. This can work against socially innovative business models as they may not be able to compete with the low prices of larger project developers and there is no way for municipalities to account for their social value in their decisions to award projects.

Decentralisation and Prosumership

Prosumership is a central element in accelerating the energy transition. It is an important foundation for citizen involvement and can act as a catalyst for further involvement in the RE market such as through the social innovations discussed here. Prosumption gives people a personal stake in the renewable energy system and thus the energy transition, which through personal time and money invested can become an emotional interest. Moreover, the transformation from passive to active consumers shifts the focus of the energy model from the electricity supplier to the consumer. Consumers become more aware of the amount of energy they consume and what is needed to produce it. Prosumership can also play an important role in diversifying and decentralising the energy market. While household RE systems are not accessible to everyone due to price barriers, the presence of prosumers in a community can raise awareness of RE and increase enthusiasm to get involved. This is where social innovations like ECs and crowdfunding platforms can play an important role as they allow people to invest or buy in with shares and have a similar feeling of ownership and personal stake without needing to make an equally large investment. Lastly, increasing prosumership will enable the market entry of more aggregators. As more prosumers join aggregators, these will have more decentralised energy sources to pool and can play a stronger role in the wholesale energy market as virtual power plants.

The experts and practitioners we spoke to also explicitly highlighted the important role of prosumership. A German expert estimated that prosumership could be used to cover 25% of local energy needs and a Romanian expert raised the notion that prosumership could solve the problem of rural and remote households being poorly connected to conventional energy supply in Romania. According to most of the experts interviewed, prosumership will be key in the future energy system, not only because people are enthusiastic to take a stake in local energy production, but also because it could lead the way towards a shift where transportation costs and selling surplus energy can become viable, if the consumer only pays the part of the grid that is used. As shown in table 2 most countries have some sort of state support mechanism to incentivise prosumers. Usually in the form of favourable loans, grants, tax exemptions, or feed in tariffs. Historically, in countries like Germany and the UK, there was a focus on feed in tariffs, however with the phasing out of these, prosumers increasingly need to find innovative

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business models (mainly collective ones) in order to maintain profitability once the subsidies run out.

Incentivising financial mechanisms

The financial component in social innovation in the renewable energy sector is often overlooked. Citizens cannot be expected to engage themselves in renewable energies just for the good cause alone, it must also be profitable for them. Mechanisms like profit-sharing, state-subsidies or green bonds can be enablers to make the renewable energy sector more profitable. Moreover, new ideas will only start-off with financial support. Financial instruments can stimulate the demand for renewable energies and be used as a driver to engage house owners in renovation or PV installations. Crowdfunding platforms can also be a financial instrument to support new ideas, especially because they reach new actors who were formerly not engaged in social innovation. Particularly in the starting phase of new projects, crowdfunding enables project developers to raise the needed money in a short amount of time.

Of the countries we examined for this paper, all except Spain, Portugal and the UK (the latter two recently phased out their FiT schemes) had financial incentives which could benefit social innovations in one way or another. In France project developers who involve the local citizens through crowdfunding can receive a price premium through the *Bonus Participatif*. Many countries offer at least one form of incentive for private household PV installations and prosumership through some form of tax breaks or benefits (France, Romania), through favourable loan conditions (Germany) or direct grants (Croatia). While most countries still give a guaranteed price above the wholesale price to private producers these prices are being continuously lowered and self-consumption is becoming the increasingly attractive option. This however limits the incentive to install more capacity than is consumed on-site, as the returns for excess capacity are very low.

National (and regional) citizen ownership targets

A particular enabler that many of the interviewed experts pointed to is having national targets for citizen ownership of RE generation sites. They looked to the Netherlands where a target for 50% citizen ownership of RE generation locally was laid out for 2030. A 500 MW target set by the Scottish government for community owned energy generation for 2015 was exceeded and has since been increased to 2GW for 2030 showing how effective a political commitment from the top can be. Commitment from the top and the obligation for project developers to offer ownership shares to local authorities and citizens is an effective way to increase local participation quickly. Measures such as these have proven very successful in all EU countries where they have been adopted, namely Scotland, Denmark, and Belgium.

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The experts we interviewed from France were very hopeful that the lobbying efforts to introduce a similar policy for a 15% target of locally owned energy RE capacity by 2030 as this is seen as a strong enabler for increasing citizen participation. Explicit targets for local ownership and control of RE capacity could greatly benefit socially innovative actors who could play an important role in meeting the demand created by the targets. Furthermore, it could spur action by local governments which would be empowered to design their local level action plans to help achieve the national targets.

Table 2 below lists specific enablers for energy communities, energy aggregators and crowdfunding platforms in the energy sector categorised by country.

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Table 2: Potential enablers of social innovations per country

Country	*Energy Communities*	*Energy Aggregators*	*Crowdfunding Platforms*
Croatia	National program co-financed with regional funds In some cases, local governments have acted as partners in ECs.	The Environmental Protection and Energy Fund has a yearly call for applications to a grant supporting the installation of household PV.	Financial incentives / attractive interest rates Awareness raising (e.g. campaigns) EU label for European Crowdfunding Service Providers allows for cross-border business.
France	Strong support and interest observed from local authorities. National level stakeholder working-group to identify obstacles to ECs. Size limit for PV projects eligible for feed-in tariffs raised to 500kW.	Reduced VAT tax rate (10%) for household PV installations. Applies to the equipment, services and delivery.	2015 energy transition law introduced possibility of participation of local authorities. *Bonus Participatif* offers price support for RE projects which fulfil specific criteria regarding involvement of citizens in the project's proximity or the local government. (set for 20 years)
Germany	State-subsidies Partnering with businesses (e.g. to place PV on commercial roofs) CO2 price can increase competitiveness of RE projects Cooperation between big players and ECs (e.g. for decentralized projects)	Increase in EVs due to shifting consumer preferences and national EV targets. KFW Loans for household PV projects Smart meters necessary for self-consumption will also benefit rise of aggregators.	Possibility to reach citizens that do not want to become members of ECs
Portugal	Possibility to make use of green bonds Embrace more liberal offers (laws) Energy literacy Possibility to sell surplus energy Low minimum investment	Multi-family buildings' self-consumption	EU-support (E.g. Citizenergy)

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Romania	Low minimum buy-in fees for consumers	Promotion of prosumership through benefits. I.e. exemption from the green certificate tax, exemption from income tax on energy sales, can issue bills without being a legal entity. Cut red-tape for private PV project approval. Subsidies for household or small enterprise PV installations. Prosumer can generate up to 100kW.	CF linked with energy communities. EC members are able to invest in projects together.
Spain	Clear and stable regulations Energy suppliers taking the leap to offer photovoltaic roofs and renewable energy communities	Self-consumption Storage batteries Smart applications Definition of independent aggregator	Clear public policies and financial support would enable citizens to take the next step and invest in renewable energies via crowdfunding. Clear information on benefits for citizens is key
United Kingdom	Enthusiasm of citizens to participate in local clean energy production	Awareness creation, especially among businesses	Useful in starting phase of projects Market for funding net zero projects People reflecting differently about their money High rate of return Involvement of state actors can be beneficial Corporate citizenship

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4.3 Key take-aways

Through the interviews, case study analysis and comparative analysis across the seven countries, we see that the common barriers still arise from the fact that the new market actors discussed in this paper are competing in a market that historically only comprised a very small number of large, vertically integrated firms and operated in a centralised manner. The social innovations discussed in this paper do not fit these criteria, as they are smaller and decentralised, making it difficult to obtain a strong foothold in the market. This is highlighted by the fact that many social innovations still rely on some sort of government support, be it municipal involvement and partnerships or state level subsidies, covered in the enablers chapter. The most important trends in terms of barrier and enables of success we observed across the analysed countries studied are the following.

- The currently established administrative and bureaucratic processes are set-up for large, vertically-integrated firms, this makes market entry, operation, and expansion costly and time consuming. Administration and bureaucracy are also a barrier when applying for grants and competing for tenders.
- Socially innovative market entrants often lack the human resource expertise to navigate complex markets and support scheme applications. They also have difficulty competing for qualified personnel.
- Citizen involvement at the individual level can help spur the growth of social innovations in the energy market. Private PV installations, electric vehicles, and smart appliances all allow consumer to get accustomed to the idea of new market actors through direct involvement and newfound awareness of how they can take an active role in the energy market. In the majority of the countries analyzed there are government support schemes to increase individual involvement, which can be the gateway to collective involvement.
- There is still a lack of awareness on the side of the consumer about the opportunities for direct involvement in the energy market. This can in large parts be attributed to the fact that the social innovations do not have the necessary budget to market to consumers or engage in other forms of awareness raising.
- Cultural factors affect the spread of social innovations and must be addressed through policy and business strategy. This can be observed in Germans' aversion to unsecured investment or Romanians' distrust of cooperatives.
- Local governments have a strong role to play in promoting new business models and increasing their legitimacy with the public. Local governments can also benefit from involvement in crowdfunding activities or energy communities both financially and through being involved in the governance of RE projects.

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5. Conclusion

In this paper we have shown that social innovations like energy communities, energy aggregators, and crowdfunding platforms can play an integral role in the renewable energy market. The regulatory framework is changing rapidly to allow room for growth of these new business models. Many positive steps are being taken in the right direction at the EU level through the directives and regulations outlined in this paper. However, at the national level, competition at scale is still difficult for these socially innovative businesses. Furthermore, the transposition of the CEP directives is sluggish in many member states and how the "enabling framework" for renewables energy communities will be shaped is unclear.

In order for the EU and its member states to reach the 2050 climate targets there needs to be a high level of social buy-in, in order to push through the changes necessary to achieve the targets. Citizen participation and enhanced energy democracy is one of the paths to achieving this. Attractive opportunities for citizen involvement, in the form of renewable energy communities, energy aggregators, or crowdfunding platforms can also increase capital flows towards renewable energy, mainly by redirecting private investments and savings.

The energy transition is one of the largest systemic changes we are currently facing. The scope and impact of the changes on citizens' lives are significant and there will be local resistance to these centrally proposed measures. Thus, a socially well-balanced governance of the energy transition will be important to ensure social acceptance of the energy transition. Socially innovative business models allow direct involvement and thus not only a financial stake, but also an emotional attachment to the transition which allows citizens to identify themselves with the overall goals of the Green New Deal.

Within the framework of the Just Transition social innovations can also play a crucial role as they can create new jobs at the local level and redistribute incomes from traditional energy companies to citizens and municipalities. Community ownership can generate more local revenues and have positive spill-over effects not only for related local industries, but also for social capital and trust within a community. As part of the Just Transition, renewable energy projects should be judged not only on the generated energy and revenue, but also regarding the social value that they bring to local communities. Social innovations like RECs are currently still forced to compete as equals with traditional market actors, even though their motivations and ambitions may be vastly different.

Social innovations are still struggling to properly establish themselves as mainstream players in the renewable energy market. Their novelty means that there are still regulatory gaps regarding their rights to conduct certain activities. Their decentralised and small-scale operations often result that they struggle in centralised markets without governmental support and subsidies. Their thin margins and reliance on government

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support, like feed-in-tariffs, means they are vulnerable to policy changes and find it difficult to commit to long term strategic plans.

The research also shows that while there are cultural factors and individual national policies that enable or hinder the development of social innovations, there are more similarities than differences across the EU countries observed. This gives rise to opportunities for more standardised business models that can be translated across the EU context. The SocialRES project, through analysis of business models and policy frameworks will contribute to the proliferation of best practices across the EU.

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