

Handbook of identified barriers and enablers

Report D3.2

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Preface

SHAREs supports the set-up of new and the expansion of existing energy communities, as well as collective actions, by providing local heroes with the framework and communication tools to reach out to those without the time, resources, information or digital skills to be an early adopter.

This reports aims to support policy developers in turning legal and regulatory frameworks friendlier for energy communities by providing a profound literature review on enablers and barriers to energy community development, including academic papers and related project reports, as well as an overview of country-specific enablers and barriers identified in the SHAREs partner countries.

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1 | Introduction

1.1 The SHAREs project – an overview

The SHAREs objective is to cover a great variety of collective actions that will contribute to increased energy efficiency and/or optimised energy management and/or integrated a higher share of renewables. Thus, the term “energy communities” in SHAREs refers to all forms of collective actions by and for consumers such as cooperatives, collective purchase groups or other consumer-driven initiatives. In countries that have already transposed European law regarding energy communities, the focus lies on renewable and citizen energy communities. Pioneers pass on their first-hand experience to aspiring energy communities through a mentoring scheme. This ensures the establishment of a strong network. In addition, pioneers are supported by the materials developed in the project. At least 20 emerging energy communities (pilots) in the six partner countries will be directly supported in setting up their energy communities (ECs) or any type of collective action. Through their feedback, the materials developed in the project will be tested and improved. The pilots cover various forms of energy communities in a broader sense, including a cross-border energy community between Austria and Hungary. Potential communities drive the successful realization of the SHAREs project. They are approached through various multipliers in partner countries and on a European Union (EU) level. The partners’ strong national networks and European outreach ensure that the SHAREs Gateway can be strategically placed to reach the next local heroes that aim to found their energy community. SHAREs supports local heroes in establishing/expanding their energy community by creating a country-specific platform (SHAREs Gateway), which consists of two parts:

- ▶ A country-specific implementation toolkit to equip local heroes with the technical and logistical capacity to set up their energy community (such as legal framework, model contracts, technical and IT solutions, business models, etc.); and
- ▶ The building blocks of a tailored “pick-and-mix” communication campaign to enable local heroes to promote their energy community or collective action effectively to their most relevant consumer groups.

Rather than starting from scratch, SHAREs will make the most of existing initiatives, project results, open-source solutions, existing data standards and national as well as European tools, and will compile them into one single gateway. Where possible, SHAREs builds upon existing platforms and initiatives. To ensure the applicability of the results in practice, SHAREs envisages regular input from and exchange with relevant policy makers. The SHAREs Gateway combines the knowledge and tools of existing initiatives with the input of established energy communities and policy makers. After being tested by at least 20 energy communities in the six European countries and improved afterwards based on their feedback, the SHAREs Gateway will be made available to all relevant stakeholders across Europe.

1.2 Scope of this report

Task 3.2 aims at spotting inhibitive legal, regulatory and socioeconomic aspects within the overall frameworks regarding energy communities. In order to get a complete picture of obstacles in founding, preserving and expanding energy communities, several methodological approaches need to be applied. Therefore, Task 3.2 consists of two parts: (1) the pioneer circle is interviewed to gather international hands-on experience with legal and socioeconomic restrictions and pioneers’ opinions on possible remedies. (2) Simultaneously, desk research is conducted and comprehensive dialogues with policy developers are initiated. This allows complementing the

experience of energy communities with the perspective of the policy developers who determine the frameworks in which energy communities operate.

A handbook of barriers and enablers for the implementation/build-up/uptake of energy communities aims to support policy developers in making legal and regulatory frameworks more easily understood by energy communities (D3.2). The handbook consists of legal, regulatory and socioeconomic challenges as well as suggestions on how to overcome these efficiently. The handbook is country-specific and, once finished, will be provided to each policy-developer working group and disseminated broadly in WP7.

2 | Literature review

Energy communities and community-driven actions become an important part of the European energy landscape through the Clean Energy for all Europeans package since it ensures reaching overall EU energy targets. Started at a small mainly voluntarily scale, recent growth of decentralised renewable energy technologies has made large scale utilization of renewable energy and energy communities possible – best examples being local deployment of renewable energy and climate protection. Such recent developments are narrated in literature, focusing on different aspects of energy community advancements. This section provides literature review on enablers and barriers to energy community development, including academic papers and related project reports.

Literature review suggests that barriers to the energy community development across European states are common and largely call for significant policy support on national or municipal level. In many countries reviewed, energy communities and community-driven actions face wide range of barriers and challenges that blocks the potential from being unleashed. However, there are also opportunities and enablers that support the development of energy communities.

Khadem Sh., et al (2020) developed a report on community energy policy and barriers in the frames of **Pan European Technology Energy Research Approach (PANTERA)** project under European Union's Horizon 2020 Coordination and Support Action Programme. The project covers the following countries: **Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia**. The report focuses on identifying the key policies for consumers' empowerment and the missing links/barriers in related policies of the low spending countries according to their National Energy and Climate Plans (NECP). The main outcome of this PANTERA project deliverable is of high importance for providing recommendations. The findings create/sketch a profile of the analysed countries and contribute to the PANTERA RICAP process in relation to the community energy policy and barriers.

The report concludes that the EU targets of 55% and 100% in emission reduction in European electricity markets by 2030 and 2050 respectively compared to emissions in 1990 will be achieved mainly through energy citizens' empowerment. Hence, it demonstrates the necessity of developing an effective framework for the establishment of local energy markets. The report calls for revisions of both the Electricity and the Renewables Directives, which should shape the introduction of local energy markets in the European energy system. Therefore, the report contains a detailed analysis of the EU member states approach to their community energy policies and requirements of the European legislation, which the selected member states are obliged to transform into national legislation.

The report analyses energy policies including NECPs and other EU relevant documents in the PANTERA target countries considering aspects of consumer engagement and citizen empowerment in the energy field. Through this analysis, the **relevant barriers and gaps are spotted, highlighted and linked to the technology gaps that have been identified**. There has been no special methodology applied to prepare the report. The report is based on surveys of PANTERA target countries and benchmarking of the current state of policy and thus identifies barriers. At the same time, a review on the recent initiatives that have been taken so far to empower energy citizen at national level has been conducted. The provided review also covers how the national energy plan and related policies adopt the EU definitions such as, energy communities (REC and CEC) or other communities to achieve the national and EU targets.

According to the analysis, **significant number of EU member states, especially low activity countries (i.e., low spending countries in smart grid investments according to PANTERA project), do not have policies and measures for renewable energy communities in the national legislation**. They only introduce such policies in

their NECPs without further operationalisation. Only a few member states explicitly provide some targets for renewable energy communities in their NECPs.

The study claims that **one of the barriers are administrative burdens related to the framework for the self-consumption of electricity from renewable sources and the renewable community**. Other measures related to the integration of RES are the demand-side response, energy storage or flexibility aggregation and prosumers. There is no clear separation between the description of local and wholesale energy market in the EU directives on the one hand side, and the regulations for energy consumers/communities to participate in these market mechanisms on the other hand side.

The assessment of the related policies of the 16 member states in focus concludes that **a common understanding of the potential roles of energy communities is missing. It is also unclear which national energy transition objectives the energy communities (especially CECs) might be able to contribute to**. Even though, it is promising that most member states positively acknowledge the role of energy citizens, local energy markets and energy communities, **their understanding on the role of these players in the markets is very limited**. This becomes more obvious when considering that most NECPs are not accompanied by concrete policies and effective measures. Additionally, the details are not provided and the policies are usually vague or incomplete. The main outcome of this report is of high importance for providing recommendations, building a profile of the countries and contributing to the PANTERA RICAP process. Below is a summary of gaps identified with recommendations.

- ▶ Moderate awareness of policy makers in these Member States which sometimes acceptable, but still it is not sufficient;
- ▶ Lack of support from local authorities and/or local energy agencies to empower and incentivise citizens for establishing energy communities;
- ▶ The policies presented in most of NECPs suffer from lack of clarity that results in low level of engagement of citizens;
- ▶ There is a lack of an effective mechanism that adjusts the tariffs to enable usage of different RES technologies. The financial incentives are of highest importance to solve the barriers related to the resistance of the consumers against the change and transition;
- ▶ Almost none of member states for which the energy policies are analysed, have targets directly related to the engagement of empowered energy citizens in energy markets and energy transition or to the local energy market mechanisms;
- ▶ An important weakness is the lack of clarity in the usage of consistent terminology across the NECPs provided by Member States;
- ▶ Fuzzy regulation of aggregators' business model is observed. For example, it is possible for medium and small consumers equipped with electric heating and air conditioning, as well as consumers with own energy storage capacity can be aggregated. However, as the number of such consumers will increase, there is a need for a robust model that provides details of potential gains, energy savings and procedures for communication with respective operators for aggregation including automation and remote control;
- ▶ In some cases, consumers have no free access to their data, which would enable them to manage and control their consumption and production;
- ▶ The analysis also considers undue the development of smart metering and advanced data management systems.

Based on the gap and barrier analysis, the report defines enablers that should empower energy communities, energy sharing and collective action of consumers which are summarized below:

- ▶ Introduce quantitative policy targets for evaluating the effective contribution of empowered energy citizens in energy markets;
- ▶ Define detailed measures for enabling energy communities as a key for customer-centric energy transition;
- ▶ Emphasize more on energy efficiency, energy storage, devising market instruments and new models and mechanisms to ease the contribution of energy citizens in energy transition and to achieve the targets presented in Clean Energy for all Europeans package;
- ▶ Regarding the market and for providing a competitive market structure, an effective tariff mechanism must be provided with a plan to gradually move from a supportive tariff plan, to a competitive tariff mechanism, as the respective renewable technologies are becoming more mature and economically more viable;
- ▶ Important enablers that allow energy communities to have access to the market and undertake its core functions are smart metering and advanced metering data management. An appropriate regulatory framework should be in place to promote development of smart metering and data management.
- ▶ Establishing aggregators and energy communities will enable electricity consumers to reduce both the electricity costs of the system and the costs for consumers which are engaged in the aggregation;
- ▶ Day-ahead and intra-day markets to be on place with appropriate regulatory framework that will ensure the access of all participants (individual or aggregated) to the market. Final consumers may thus participate in organised electricity markets either directly or by aggregation if they have higher capacities. Otherwise, final consumers may participate in organised electricity markets excluding aggregation.

Vasco Brummer (2018) reviewed the experience of the **UK, the USA and Germany** to summarize the benefits and barriers for energy communities in those countries. Due to the lack of common definition, the author defines the meaning of energy community for the purposes of the paper as “any activity that involves the generation or distribution of heat or electricity with the involvement of any of the forms of community”.

The information about benefits and barriers is mainly collected through analysing existing peer-reviewed articles. The articles were selected from Google Scholar, WorldCat and JSTOR using specific keywords and afterwards non-relevant ones were excluded. Having all relevant articles, the author analysed the content to find out benefits and barriers in each of the three selected countries.

Identified benefits and barriers are summarized in the table below:

Table 1: Summary of benefits and barriers identified by Vasco Brummer (2018)

Benefit		Barrier	
Economic benefits	Education and acceptance	Organizational issues / Legal framework / Planning requirements	
RE generation targets		Lack of resources / expertise / resilience	
Climate protection and sustainability	Community building and self-realization	Discrimination against incumbents	
Participation		Lack of institutional and political support	
Innovation	Participation	Skepticism about community energy	
		Saturation effect	

Relevant for all selected countries

Relevant for some selected countries

Lazdins, R et al (2021) review the scientific literature published during 2015-2021 to find solutions for PV energy communities. The analysis is based on 64 publications and focuses on several barriers for the energy communities: policy, trading model, economic assessment, business models, energy management, demand response, modelling tools and consumer adoption. The conclusion is that there is a need for significant improvement to promote energy communities in each area, a community focused policy which among others deals with non-motivating tariff systems, improved communication between involved parties and addressing the issue of lobbying from large companies. Peer-to-peer trading solution is also required for an efficient trading model. The author also concludes that PV energy communities are cost-efficient and the benefit among others depends on market remuneration, tariff system and use of PV energy for the self-consumption. Not all existing business models are suitable for PV energy communities - the business model should be simple to engage consumers and to increase social acceptance levels. From a technical point of view, energy management and demand response, as well as modelling tools contribute to cost reduction and efficiency of PV energy communities. Another important barrier is consumer adoption, which depends on social and financial factors, political view, level of available information and education.

As policy is a key for developing energy communities, it is important to fit the target society. The role of priorities in the society while developing the policy is considered as an important factor by **Alexander Stauch, Karoline Gamma (2020)**. The authors evaluate the effect of two different solar remuneration models based on Swiss electricity customers' (n = 496) willingness to pay. Under the first model the solar power has been directly offered to customers for the consumption, while the second model has considered financial compensation instead of physical power flows. The results show that the first model has been accepted by green electricity customers. Those even are less willing to accept the offer if financial compensation would have been offered. On the other hand, less pro-environmental customers are interested in financial benefits.

Friends of the Earth Ireland in collaboration with other organizations have analysed barriers of developing energy communities across **Ireland** and recommend specific and national policy measures to address those barriers.

The report describes four identified barriers and policy recommendations to remove/overcome them. The first barrier is related to the **connection to the national electricity grid**, which authors describe as complicated, long, costly and risky. Suggested actions include grid connection prioritization for community owned projects. The second barrier concerns the **unsecure and unfair electricity uptake prices** from the community owned energy projects. To overcome such a barrier, the report provides several measures, including establishment of specific renewable energy support schemes for community owned micro generation and auto producer RES, tailoring net-metering program and obliging electricity utilities to sign fair PPAs. The third barrier depicts **lack of national support measures** to help community owned project development. Recommended steps include creation of grant programs for developing community owned projects at initial stage, support programs for access to finance, promoting tax incentives and amending existing grant aids to support all forms of renewable energy, including solar, biomass and heat pumps. The last and fourth barrier relates to the **regulatory hurdles preventing local grids and off-grid communities**. Authors recommend lifting regulations, promoting smart grids, and thus enabling development of the community owned micro grids.

Finally, the report provides national policy measures to support energy community development in Ireland. Those recommendations include development of National Community Energy Strategy, defining share of the energy communities in achieving national renewable energy targets, creation of intermediary local authorities to support potential energy community developers to navigate through the process, developing local renewable energy strategies for each county and lastly, involving public in each step of decision making.

Aoidh A., et al, developed the Local Energy Community (LECo) policy paper identifying common barriers to community energy development through the PESTLE (Political, Economic, Social, Technological, Legislative and Environmental) analysis, covering 5 European countries: **Finland, Ireland, Norway, Sweden and Germany**.

Based on individual country PESTLE analysis, the policy paper identifies common barriers preventing development of community energy projects. Common political barriers mainly relate to missing prior experience, lack of political support in local representatives, non-supportive energy agencies, no RES support schemes, lack of national strategies for energy communities and targets. Common economic barriers mainly relate to the lack of access to finance, grants, unfair and insufficient feed in tariffs, unstandardized PPAs, impossible third-party-offtake, insufficient incentives for renewable heat projects, complicated tax rules, no tax exemptions. Common social barriers identify lack of experience with cooperatives and civic activism, lack of trust in the cooperative models. Common technological barriers concern to the lack of knowledge and experience to design, plan, procure, implement and commission a community energy projects, lack of expertise for operation and maintenance. Common legislative barriers include complicated legal framework, lengthy and tiring bureaucracy, administrative barriers to grid connection including complicated application procedures, costs, time, complexity for an ordinary citizen, impossible to fairly operate micro-grids. Lastly, common environmental barriers mainly relate to the low environmental awareness, conflict between biodiversity protection and RES development.

Apart from those common and generic barriers, the policy paper describes specific PESTLE barriers for each observed country. Some of country specific barriers are:

- ▶ Increasing share of elderly people in remote areas, who are less interested in long-term investments (case of **Finland and Sweden**);
- ▶ Low electricity prices creating less interest in communities to invest in community energy (case of **Norway**);
- ▶ Lack of support schemes for renewable energies in the heat and transport sectors (case of **Germany**).

The report on barriers and threats to the people-owned energy revolution by **Friends of the Earth Europe (2021)** provides analysis of barriers and threats for community energy project in **Germany, France, the Netherlands and Denmark**. According to the report, community energy project implies any project that creates collective or public (i.e., municipal) ownership of renewable energy by a community or group of citizens, such as municipal projects and cooperative projects. Main outcomes of the report are identified barriers and threats based on the analysis as well as solutions and recommendations for overcoming them.

The first barrier is related to grid access. According to the report, community energy projects should be able to have **grid access in order to sell their energy. However, it is blocked in many cases**. Therefore, the recommendation to overcome this barrier is to treat grid as a common asset and operate it as a public good. At the same time, municipalities, which are operating grids, should ensure decentralization of the grid for the benefit of locally owned energy system. The second barrier is related to access to financial capital. People, who intend to develop a collective action, usually have lack of funds. This is an even more severe issue in the vulnerable groups of low-income areas, as they simply do not have the financial capital to invest. Moreover, it is linked to the previous barrier because financial institutions will not grant credits for collective actions when they realize grid access is at risk. As a recommendation, development of seed funds or loan guarantee mechanisms are proposed. The third barrier is related to the legal framework. In many countries specific legal framework does not exist for RECs which hinder its development. The report emphasizes the importance of full transposition of legal requirement for REC from the directives into national legislation. The fourth identified barrier is about bureaucracy and permissions. It is related to new community projects which often face bureaucracy issues during the development phase of the project for permits and grid connections. Hence, such challenging procedures often overwhelm community projects and result in their cancellation. **The report proposes to create one national contact point on governmental level to support community projects in the country while it can provide all necessary information in one place and guide them through the process.**

The report also identifies threats faced by community energy. Unlike the barriers mentioned above those threats might negatively affect existing projects. One of these threats is related to substituting feed-in tariffs with

auctions. This creates competition among community projects to win auctions and financial support against each other, which slows down large-scale development of community projects. Authors suggest to have dedicated feed-in tariffs for RECs. In instances where bidding must be used, auctions shall be designed in a way to incorporate social and economic benefits RECs bring to local area.

A report on Energy communities in different national settings – barriers, enablers and best practices, is developed by the New Clean Energy Communities project as part of Changing European Energy System (**NEWCOMERS**) European Union’s Horizon 2020 research and innovation programme. The report is based on prior research and the national characteristics in the six studied NEWCOMERS countries: **Germany, Italy, the Netherlands, Slovenia, Sweden, and the United Kingdom**. Those six countries are compared with the aim to identify barriers and enablers for new clean energy communities to emerge in different national settings and to discuss the potentials for sharing insight. The focus for the analysis lies on socio-economic conditions, the technical system, the institutional setting, and actors on the electricity market.

The report highlights important aspects for the emergence of ECs and explains socio-economic conditions such as urban and rural aspects, education, trust, GDP and households’ economy in relation to electricity prices. In the technical systems the author describes countries’ electricity generation mix, related emissions, and the electricity grid in order to identify barriers and enablers in different national settings and to reveal the potential for sharing cross-country experience. At the same time, under the institutional setting need for policies and regulations exclusively for energy communities are discussed. Additionally, countries’ existing subsidy schemes and support for renewables and energy communities are presented. Lastly, main government actors and institutions responsible for energy policy and regulation are described for actors on the electricity market in all six countries.

Based on the analysis the report identifies barriers and enablers under above mentioned four main categories:

Table 2: Summary of enablers and barriers for socio-economic conditions identified by the report of NEWCOMERS

Enabler	Barrier
Trust	Lack of knowledge
Access to financial support such as subsidies or grants	Low disposable income
Corporate banks; low interest loans	High membership fee
Crowdfunding	
Values such as self-ownership and locally produced energy	

Table 3: Summary of enablers and barriers for technical systems identified by the report of NEWCOMERS

Enabler	Barrier
Dependency on foreign fossil fuels resources	Availability of cheap domestic central energy sources
Decentralized system	Centralized energy production systems
Prosumerism	Individual ownership of PVs
Reduction in carbon emissions	No incentives for DSOs to connect small operators to the grid
Renewable energy technology options available	High grid connection costs

Micro grids facilitating peer to peer market	
Smart meters and/or regulation allowing shared electricity in a block of flats	
Net metering, virtual net metering, virtual power plant	

Table 4: Summary of enablers and barriers for institutional setting identified by the report of NEWCOMERS

Enabler	Barrier
A clear definition will enable policies and incentive programmes specifically targeting ECs	Narrow definitions will exclude initiatives and discourage newcomers
Liberalized markets	Too broad definition will include everything, also those with multi-national companies
Regulations exclusively for EC and allow for special treatment	Closed monopolised markets
Stable regulatory framework for EC	Lack of tailor-made policies for ECs
Policies and outcomes promoting ECs at all levels	Finance of EC
State funding and subsidy mechanism, state or municipality provided debt securities	Regulations, e.g. requirements on bank license
CO ₂ taxation	Energy prices set by market mechanism, no correlation for externalities
Low installation costs of RES compared to conventional energy	Bureaucracy and administration

Table 5: Summary of enablers and barriers Actors identified by the report of NEWCOMERS

Enabler	Barrier
Multitude, variety of actors on the market	Few dominating market actors
SME economy, small energy companies, consumer-owned companies and competition and unbundling	Large energy companies and state owned energy companies
Active consumers	Lack of access to politicians and policy makers
Collaboration and networks	
Advisory service centres and umbrella organizations	

Peeters L., et al (2021) review existing literature on local energy community (LEC) barriers and challenges. The authors present successful cases of energy communities in Europe and provide analysis of barriers and enablers in the context of realized projects. Barriers are grouped in three major categories: socio-economic, technical and institutional and regulatory. Each category of barriers is discussed in detail based on existing literature and authors' examination whether those barriers and challenges are specifically faced by local energy communities or are generic and could be applicable also for other business models of renewable energy production and consumption. Authors discuss the following barriers in each category:

Socio-economic: community engagement and buy-in, hurdles for engaging vulnerable customers, lack of expertise and professionals, lack of cognitive legitimacy, lack of access to finance, lack of successful business cases, organizational problems related to insufficient volunteers, lack of available public space for energy projects and not flexible corporate laws.

Technical: lab tested solutions are not always feasible in real life, intermittency of local production and need for expensive storage applications, no proper remuneration for local grid balancing and slow roll-out of smart meters.

Institutional and legal: non-supportive network tariffs, no incentives for collective storage, excluding vulnerable customers from private grids, lengthy tendering process, need of new administrative rules to accommodate needs of LECs, no flexible permits for new technologies and business models.

Following the detailed examination of barriers, Peeters L., et al present enablers in an innovative manner: instead of describing enablers for each barrier, authors analyze four best practices of implemented local energy communities in Europe and discuss enablers for each particular project. Doing so, authors additionally evaluate whether those enablers were specific to the considered projects or could be replicable for other LECs as well. They conclude that the three analysed cases - Ecopower (Belgium), ElektrizitätsWerke SchönaueG (Germany) Ameland Energie Coöperatie (Netherlands), are replicable given their business models, initial funding arrangements, inclusiveness and other factors. The fourth case, Samsø Island (Denmark), is a fascinating story to be shared around the world for promotional purposes. It is less replicable due to the exceptional funding and support the project received at each stage.

Though written several years ago, the **“Financial Barriers and Existing Solutions”** report provides in-depth overview of barriers faced by local energy communities which are still valid nowadays. Additionally, it claims that the main barriers to financing renewable energy community projects are not primarily financial in nature but indirectly or directly linked to the cultural, political, economic, legal and administrative obstacles. The report was developed by the partners of the REScoop (Renewable Energy Sources Cooperatives) 20-20-20 project in cooperation with financial operators, REScoop project developers, energy experts and cooperative model experts. The study covers 10 European countries, including 7 REScoop 20-20-20 project’s consortium: Belgium, Denmark, Germany, France, Italy, the Netherlands and the United Kingdom and 3 selected countries: Croatia, Greece and Spain. Even though the report discusses legal frameworks for RES and energy communities and citizen-based investment features in selected countries, we will summarize only barriers and proposed solutions. The study distinguishes three main categories of the factors translated into the financial barriers:

- ▶ Cultural and political;
- ▶ Economic and management;
- ▶ Legal and administrative.

Cultural and political factors are major ones negatively affecting financing of the Renewable energy communities. Under cultural factors authors underline that in some European countries lack of experience and knowledge on establishing cooperatives discourage, on the one hand, citizens to join efforts for developing cooperatives and, on the other hand, financial operators to trust such business models. In some countries local governments are reluctant to support REScoops that eventually shrinks opportunities to finance cooperatives. Lack of strong national or local political support is often, if not always, reflected in available funding and financial support mechanisms for the renewable energy projects. The economic and managerial factors mainly concern to: (1) the lack of capital and knowledge available during the pre-planning (project planning and identification of RES site/type) stage, (2) the lack of financial guarantees that is crucial for citizens to obtain loans, (3) and the size of the project, which in some cases is small and therefore not interesting for financial operators to evaluate or is large and requires involvement of several financial operators. As political and economic factors, legal and

administrative factors directly and/or indirectly affect financing of a REScoop. One of the common and major challenge is access to the grid that is often time-consuming and costly. Authors point out that the frequent changes in regulations, especially on RES support scheme terms and conditions, is one of the major factors, influencing financial operators to hold issuing loans or have stricter requirements. Finally, the legislative hurdles include the main shortcomings of public offering regulations in several countries that are not in favour for REScoop, therefore, limit their access to equity capital. For unlocking financial barriers, authors suggest convincing citizens in investing in a REScoop, thus encouraging them to share risks across several REScoop projects. Once there is a strong demand from citizens to develop REScoops and invest in them, proper policies, support schemes and streamlined grid access will unlock further funds to realize citizen driven renewable energy communities.

2.1 Summary of Literature Review

The literature review of selected academic papers and related project reports on factors enabling or hindering energy community development revealed that interested stakeholders on national level need greater support in favour of large-scale adoption of the EC models across Europe. Currently, the energy communities' expansion is still impeded by various country-specific challenges. Furthermore, the analysis of effective enabling conditions demonstrates potential solutions and recommendations. Though some country specific enablers and barriers are observed across the literature, most of them are common or at least used to be common for the majority of European countries. The most common barriers and enablers are summarized, grouped in categories and provided in Table 6 below.

Table 6: Overview of common barriers and enables

Category	Barriers for the implementation or expansion of energy communities/collective actions	Enablers for the implementation or expansion of energy communities/collective actions
Political	Factors that national government may influence the development of economy or a certain industry in general and/or implementation/build-up/uptake of energy communities.	
	Lack of clear policies and measures for energy communities in the national legislation	Robust and clear energy policies and measures
	Lack of support from local authorities and/or local energy agencies to empower and incentivise citizens for establishing energy communities	Establishment of national and/or local energy agencies for the support of citizens
	Lack of institutional and political support	
	Lack of political support in local representatives, non-supportive energy agencies, no RES support schemes, lack of national strategies for energy communities and targets.	
Economic	Factors that directly impact Energy Community/consumers and have resonating long term economic effects	
	Lack of financial incentives due to non-cost reflective energy prices	CO ₂ taxation
	Lack of access to finance, grants, not fair and insufficient feed in tariffs	

Category	Barriers for the implementation or expansion of energy communities/collective actions	Enablers for the implementation or expansion of energy communities/collective actions
Social	Factors that influence developments of energy communities from society point of view in general such as cultural trends, demographics, population analytics acceptance of the technologies and etc.	
	Lack of understanding of the potential roles of energy communities	Building Trust and knowledge on energy communities and RE technologies
	Lack of knowledge and trust	
	Lack of experience with collective actions and/or energy communities	
Technological	Factors that may affect the operations of the energy communities and energy sector in general as well as factors related to innovations in technology	
	Lack of smart metering and advanced data management systems.	Deployment of smart meters
	Grid connection including complicated application procedures, costs, time and complexity	Low installation costs of RES compared to conventional energy
Legislative	Factors that affect legal and regulatory framework of the energy sector and implementation/build-up/uptake of energy communities	
	Administrative burdens related to the framework for the self-consumption of electricity from renewable sources and the renewable community	Regulations exclusively for EC and allow for special treatment
	Centralized energy production systems and Few dominating market actors	Decentralized system
Environmental	Factors that influence or are determined by the surrounding environment	
	Low environmental awareness, conflict between biodiversity protection and RES development.	Reduction in carbon emissions

3 | Input from pioneers

A strong transnational network of pioneers, who have expertise in building up energy communities, supports the SHAREs project on multiple levels. One important task is to provide their input on existing barriers and enablers on the European and national level.

The role of the pioneers is very diverse. To get the best output for SHAREs, the pioneers will be divided into two groups:

- ▶ The first group of pioneers forms the **transnational pioneer circle**. They take part in the pioneer circle kick-off meeting, give their feedback on the legal framework, the regulatory and socioeconomic barriers for energy communities and help to find the most appropriate transnational platforms and tools through participation in the round table. They are also involved in transnational and national communication activities;
- ▶ The second group contributes to the **pioneer mentoring scheme**, helps finding the right tools on national or even local level and takes part in national communication activities.

During the **kick-off meeting** the transnational pioneer circle worked on the legal, regulatory, and socioeconomic barriers that they encountered. The aim was to supplement an inventory of real-life challenges faced by energy communities. These obstacles were identified by gathering international hands-on experience about legal and socioeconomic restrictions and pioneers' opinions on the matter/possible solutions. In order to get hands-on experience, three phases were considered: Start-up / planning phase, Implementation phase, Expansion/growth phase. For the first two project phases the Strengths / enablers (the enabling environment) Weaknesses/barriers (hampering the action); and for the growth phase any Opportunities and threats (mid-to long-term perspective) were discussed. The results of the inputs from the pioneers are listed in the same structure in Table 7.

Table 7: Summary of inputs from pioneers

Start-up / planning phase	Implementation phase	Expansion / growth phase
Strengths/ Enablers	Strengths/ Enablers	Opportunities
<ul style="list-style-type: none"> • Strongly motivated and engaged local people, groups, companies and municipalities; • Examples from other community in Europe to rely on/ a visionary example from PIONEERS • Attractive incentives 	<ul style="list-style-type: none"> • Sufficient incentives in place (tax breaks, grid fee reductions, feed-in tariff, market premium); • Existing network of support groups to get information and help existing groups/communities you build your trust on • Regional/local authorities support implementation 	<ul style="list-style-type: none"> • New business models (E-Mobility, Energy Sharing, Tenant model, PPA etc.) increasing awareness in target groups outside the usual actors ("RECs reaching the mainstream"); • Competent network - ability and willingness to cooperate across company-borders is given; • With energy sharing we can find strong support for new RES-installations Include new members into the community/multiply the models in other places National / regional RES-E share target for 2030

Weaknesses / Barriers	Weaknesses / Barriers	Threads
<ul style="list-style-type: none"> • Limited number of motivated and engaged local people, groups, companies and municipalities; • Lack of trust; • Lack of Information dependency on incumbents RES-communities want to save the climate and want to save money. The latter often is not possible due to missing framework; • General political framework not implemented in many countries; • Impact of inertia on the citizen engagement; • Low GDP Independency on fossil fuel; • Cheap domestic energy sources; • Individual PV ownership; • Inconsistency with national social policies; • Insecurity about legal forms or business models applicable/eligible; • High insecurity due to auctioning system/tenders. 	<ul style="list-style-type: none"> • Insecurity - incentives could be lowered, tenders, no grid access, low electricity prices); • Lack of legal framework for next steps of Cooperatives (producing electricity in community, using it and selling it = Energy Sharing); • Citizen engagement must be kept high; • Financing needs; • Lack of clarity on your business model; • High membership fee; • Inadequate grid access; • Definition of REC/CEC; • Difficulty accessing financial capital; • Bureaucracy and permitting Nimbyism and local backlash against RE; • Authorities unfamiliar with topics (long licensing durations); • Stop-and go with budget available for investment subsidies; • Complicated subsidy schemes 	<ul style="list-style-type: none"> • Complex business models (smart meter needed, complicated subsidies schemes, complicated REC/CEC definition); • market disruptions like "crazy" EPEX; • Finding a good balance between voluntary and professional work; • Finding good employees; • Generation gap: Often engaged, retired people who work voluntarily but need to find young successors; • Lack of resources: staff, trained end engaged people; • Lack of knowledge; • Lack of smart meter rollout; • Incentives could be lowered, e.g. investment subsidies, when RECs or CECs are successful / burden budgets; • High financing costs due to investment insecurities or because of being an SME compared to utilities.

Needs / Solutions to overcome barriers	Needs / Solutions	Needs / Solutions
<ul style="list-style-type: none"> • A network of experts/ practitioners willing to mentor new communities; • A gateway / network to find visionary PIONEERS; • Legal and technical support for initial due diligence and to kick-start the projects; • Public awareness/education campaigns; • Commitment from local authorities to support energy community (spatial plans, council decisions) = "Covenant of Mayors 2.0"; • Mentorship programme/support to guide local initiatives. • One-Stop shop offering information; 	<ul style="list-style-type: none"> • RED II transposed into national law public awareness/education campaigns; • 2-3 robust viable business models that are easy to set up, which could be easily replicated; • Expert business model discussions and service partners with the parallel mindset; • One-stop shop for licensing and or for incentive schemes. 	<ul style="list-style-type: none"> • Market actors cooperate or offer professional services needed public awareness/education campaigns information exchange on peers level with groups in the same business; • Fast track for energy communities. Experienced peers to discuss challenges like crazy EPEX with fair competition between energy utilities, SMEs, associations.

4 | Summary of barriers and enablers in the SHAREs countries

Each of the SHAREs countries has its own characteristics and policy on place, which determine the attitude toward energy communities and cooperation in general, preferences of its citizens and other factors that affect their development. While the enablers and barriers for the energy communities can be grouped in a few common categories, the reasons behind each of those might differ by country.

Table 8 below summarizes the key enablers and barriers faced by SHAREs countries. It shows that technological barriers related to DSOs (Distribution system operators), as well as access to the finance and policy related barriers are common in all countries, while specificities are different. Low electricity prices appeared to be significant barrier in three countries, which makes RES projects less financially attractive. The barriers related to the citizen awareness and capacity building to involve them in the coordinated actions are another barrier to be addressed.

Detailed summary of identified enablers and barriers in each SHAREs countries is provided in chapters 5-11. Besides description of the enablers and barriers, the possible solution to overcome the barrier or enhance the enablers are suggested.

Table 8: Summary of barriers and enablers in the SHAREs countries

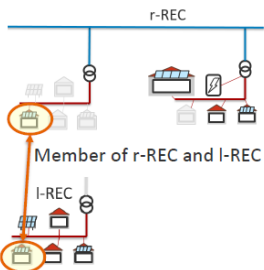
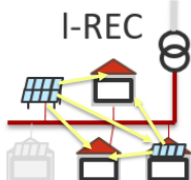
	Austria	Bulgaria	Croatia	Germany	Georgia	Hungary
DSO related technical barriers (Connection, metering and IT systems)	B		B	B	B	B
Communication	B			B		
Access to finance and Support scheme	B	B	B	B	B	E
entry Barrier - complexity	B					
Qualified personnel	B					
Legislation as a barrier		B	B		B	B
Lack of awareness, resources and experience among citizens		B	B	B		B
Citizen involvement		B	B		B	E
Low electricity prices				B	B	B
RES potential					E	
Net-metering experience					E	E

5 | Austria

In Austria, the European legislation, i.e. the RED II and the Internal Electricity Market Directive (EMD), have been implemented regarding to energy communities. The provisions relevant for RECs (in the EAG and ElWOG) came into force in July 2021. Since then, the establishment of energy communities has been possible. With the entry into force of the amendment to the System Charges Ordinance (November 2021), the reductions in grid charges for RECs were defined. Thus, all legal framework conditions are in place to establish and operate an REC.

Nevertheless, some barriers exist that hinder the final uptake of RECs/CECs on a large scale. Based on the desk research done in Chapter 2, the pioneer interviews described in Chapter 3, and intensive dialogues with pilots and other relevant stakeholders, the following barriers have been identified as the most urgent ones in Austria.

Barrier 1: IT processes on the DSOs side (multiple generation plants per REC)

Type:	Technical
Stakeholders:	DSOs, policy developers
Description of the barrier:	<p>Since important IT processes still have to be adapted on the grid operator side, it is currently not possible that participants of an REC can be assigned to more than one generation plant.</p> <p>As a transitional solution for the operation of RECs with multiple generation plants, participants still can only be assigned to one specific plant. However, RECs with multiple plants can already be established and put into operation using this transitional solution.</p> <p>As soon as the necessary IT processes are fully implemented (probably by the 3rd quarter of 2022) already existing and new RECs will automatically be transferred to the intended regular operation (see right info-graph).</p>   <p>Starting from 1.1.2024 one Customer can participate in multiple RECs, e.g. in a local REC (I-REC) and regional REC (r-REC), see left info-graph.</p>
Possible solution:	<p>Stakeholder processes are ongoing. According to the current plan, the implementation of the missing IT-processes should be completed in October. The implementation process of IT solutions should be closely monitored by political decision-markers. If possible or necessary, measures should be taken to move the process forward.</p>

Barrier 2: Smart meters – putting into operation

Type:	Technical
Stakeholders:	DSOs, policy developers

Barrier 2: Smart meters – putting into operation

Description of the barrier:	<p>In Austria, the local grid operator (DSO) shall, irrespective of the project plan on the roll-out of smart meters, provide end consumers with a smart meter upon request. If the installation of a smart meter is requested in connection with the establishment of an energy community, the grid operator shall install smart meters within two months (§ 16e par 1 ElWOG 2010).</p> <p>However, the ElWOG unfortunately only regulates the installation, not the putting into operation of the smart meter. The mere installation, without putting into operation, naturally has no added value for the customer and thus delays the establishment or participation in an energy community.</p>
Possible solution:	The ElWOG should be adapted accordingly and, in addition to the installation, should also specify a time frame for the putting into operation.

Barrier 3: Non-availability of professional communication material

Type:	Social, economic
Stakeholders:	Local heroes, supporting organisations
Description of the barrier:	<p>According to dialogues with Austrian pilots, the non-availability of professional communication material to engage more consumers to take part in RECs once they are established is a barrier that hinders RECs to grow. Generally, local heroes are no communication experts, but more technical focused people. Creating target-groups specific material to convince big parts of the neighbourhood to take part in the action can be quite expensive and time consuming.</p>
Possible solution:	This is a gap we can close within the SHAREs project. We develop and offer target group specific communication strategies and white-label materials for free.

Barrier 4: Smart meters – Opt-in

Type:	Social
Stakeholders:	DSOs, policy developers, supporting organisations
Description of the barrier:	<p>In order to participate in an energy community, the transmission of quarter-hourly values to the network operator is a prerequisite. In Austria, this requires not only the installation of a smart meter, but also a so-called "opt-in", i.e. the active consent to the transmission of quarter-hourly values, see options below:</p> <p>Standard: The electricity meter measures the electricity consumption once a day and sends the total daily electricity consumption to the respective network operator once a day. The data is stored and can be viewed by the consumers.</p> <p>Opt-out: Electricity consumption is measured once a year and transmitted to the respective network operator. Data storage is deactivated. Grid feed-in, e.g. via a PV system, is not possible in this case.</p> <p>Opt-in: The electricity meter measures the electricity consumption every 15 minutes and sends these quarter-hourly values to the respective network</p>

Barrier 4: Smart meters – Opt-in

	<p>operator all at once every day. The data is stored and can be viewed by the consumers.</p> <p>This could possibly hamper the expansion of energy communities. Consumers could have reservations regarding the transmission of quarterly hour values (uncertainty regarding possible costs, data security, etc.). Furthermore, the necessity of a proactive action on the side of the consumer is always an additional barrier.</p>
Possible solution:	Information campaign to increase knowledge about smart meters and to reduce reservations regarding the use of smart meters.

Barrier 5: 50% market premium

Type:	Economic
Stakeholders:	Policy developers
Description of the barrier:	<p>Renewable-energy-sources-based electricity generation plants of RECs and CECs are (partly) eligible within the market premium support framework.</p> <p>The market premium is calculated based on the amount of electricity fed into the public electricity grid. No market premium is granted for electricity allocated to the members of the energy community [EIWOG §80 (2)]. I.e. electricity quantities generated (from a generation plant eligible for a market premium) but not consumed within an energy community can be subsidized.</p> <p>However, RECs and CECs, unlike all other plant operators, would not receive the market premium for 100% but only for a maximum of 50% of the energy generated (per plant).</p> <p>This restriction of the subsidy to 50% of produced green electricity not used in the energy community could hamper the set-up of energy communities.</p>
Possible solution:	Open stakeholder discussion if 100% of generated green electricity should be subsidized in the market premium scheme. If considered useful, adapt respective regulations.

Barrier 6: Ensuring competition and price transparency

Type:	Economic
Stakeholders:	Local heroes, supporting organisations
Description of the barrier:	Service providers skim off possible profits generated by reduced network tariffs and other socialised cost reductions for energy communities.
Possible solution:	Develop and offer tariff calculator for energy communities to compare service providers and their costs.

Barrier 7: Complexity as entry barrier 1/3 – How to start?

Type:	Social, economic
Stakeholders:	Local heroes, supporting organisations
Description of the barrier:	The legal and regulatory framework for energy communities in Austria has already been largely clarified. However, it is not always easy for local heroes to find out which type of energy community/collective action is suitable for them, and which regulations are relevant for them. Despite the existing legal framework, initiators of collective actions are often overwhelmed or confused by the complexity of these regulations and do not know where to start.
Possible solution:	Tool developed within the SHAREs project This is a gap we can close within the SHAREs project. The idea is to develop an online query tool which leads local heroes through the most important initial questions when thinking about setting up an energy community (type of generation, number of members, proximity of members, etc.). The tool should help local heroes to identify the optimal type of energy community/collective actions for their specific conditions. The results could also contain a list of Austrian service providers that can help with the implementation of the respective type of energy community.

Barrier 8: Complexity as entry barrier 2/3 – Finding your energy community

Type:	Social
Stakeholders:	Policy developers, supporting organisations
Description of the barrier:	Currently, there is no easy way to find out for citizens where they can find the next energy community in their proximity. Thus, if they are interested to take part in an energy community they have to rely on hearsay, newspaper articles, or google search.
Possible solution:	An easy-to-use tool that shows you all possible energy communities based on postcode (or address) or metering point number. The DSOs could establish online tools, which show potential REC members in real-time, via entering their metering point number, to which 400 V low voltage side of a certain/clearly defined transformer station ("Trafo- bzw. Transformatorstation") and to which 1 kV to 36 kV medium voltage side of a certain/clearly defined transformer substation ("Umspannwerk"), and which bus bar of this Umspannwerk the metering point is allocated to. Furthermore all already existing local or regional RECs and contact possibilities relevant for that metering point should be shown automatically too.

Barrier 9: Complexity as entry barrier 3/3 – Information on network area

Type:	Technical
Stakeholders:	Policy developers, DSOs
Description of the barrier:	When founding an energy community in Austria, there are two possibilities depending on the proximity of the members: the local REC (generation and

	<p>consumption installations can be connected to network levels 6 and 7 only) or the regional REC (generation and consumption installations can be connected to grid levels 5 to 7 and the bus bar of network level 4).</p> <p>The information on which part of the distribution network the respective generation and consumption installations are located must be made available by network operators within 2 weeks. The network operator should also provide information on whether the connection is located in the local or regional area of a specific energy community.</p> <p>Asking the network operator for information, waiting for two weeks, ask again if the information is not provided on time: all this could hamper citizens from taking part in an energy community. The necessity of a proactive action on the side of the consumer is always an additional barrier, furthermore communication with the network operator often is seen as complicated and bureaucratic, overall for a first information.</p>
Possible solution:	<p>Online tool, that gives me details on the part of the distribution network my generation or consumption installation is located; this tool could also give me information on existing energy communities in my regional or local area (see also barrier 8; these tools already exist for some network areas, overall solution see barrier 8 above.</p>

Barrier 10: PV modules: lack of qualified stuff, long delivery times

Type:	Social
Stakeholders:	Policy developers
Description of the barrier:	<p>Triggered by the currently very high energy prices, the already high demand for roof-top PV plants has risen even further. Further intensified by the shortage of skilled workers (especially PV module mounters), REC members are currently waiting for several months up to more than a year from ordering to installing a PV system.</p>
Possible solution:	<p>Counteracting the shortage of skilled workers (especially PV module mounters) with appropriate measures. An example is the "Elektropraktiker" training program.</p>

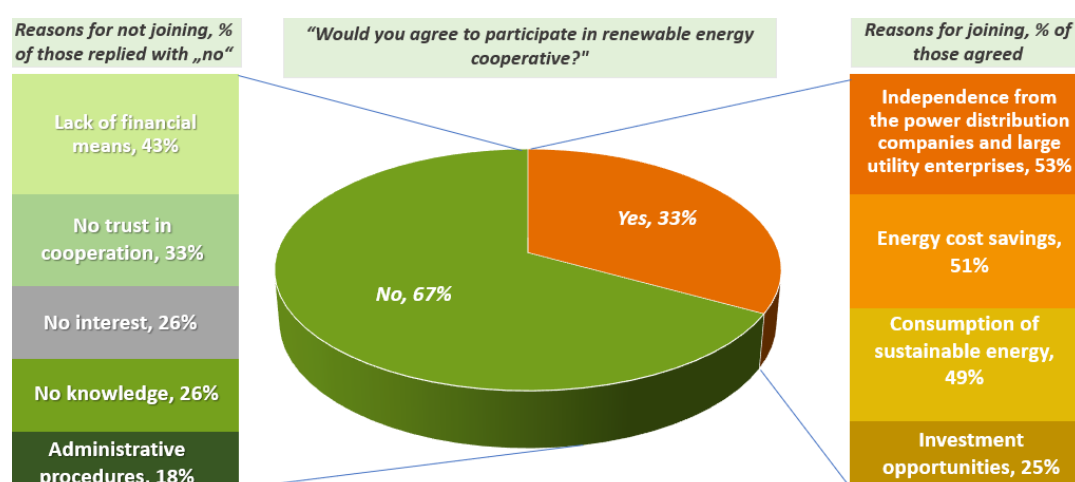
6 | Bulgaria

All categories of pre-defined barriers concern the case of energy community framework in Bulgaria as of the beginning of 2022. Although the national legislation does not forbid any type of collective action, the current legal and regulatory provisions create number of hurdles for potentially interested parties. As RED II and IEMD directives have not been transposed yet, the missing legal definition of CEC/ REC models is the first and foremost issue that prevents citizens, small businesses, and municipal actors from taking the risk associated with the creation of an energy community. The delay of the transposition in both directives, which were expected to initiate the first legislative changes for energy consumer empowerment by the end of June 2021 as of the official deadline, in addition to missing community-related targets or support schemes in the recent Bulgarian policy planning documents (for instance the NECP, the National Recovery and Resilience Plan or the Territorial JTP) showcase the order priority which policy makers in the country put on citizens participation in the energy transition process.

To great extent the political barriers justify the existence of economic ones such as missing public or private sources of financing at preferential conditions. As Bulgaria is one of the poorest member states in the EU, the lack of financial resources to cover the initial investment share in ECs expectedly present an important obstacle. A national representative study on the social acceptance of renewable energy in Bulgaria, conducted by Trifonova (2021)¹ in the beginning of 2021, proves this expectation. According to the data collected, only 33% of the 1034 respondents would participate in a renewable energy community. The main reason for not deciding in favor of such an initiative lays in the unavailability of financial resources as Figure 1 illustrates below. Furthermore, social and cultural barriers should not be underestimated. The lack of trust in cooperation or insufficient knowledge rank next among the possible motives for abstaining.

Due to the high degree of centralization in the planning and dispatching in the national energy networks as well as the missing money problem, there are several technological barriers which significantly delay the connection of new distributed renewable energy capacity in general. Specific provisions regulating the grid connection priority for ECs or the flexible management of the energy flows between their participants are not in place.

Figure 1: Willingness to participate in a renewable energy community and reasons for (not) joining (Results of national representative survey among Bulgarian citizens)



¹ Trifonova, Mariya (2021): Social acceptance of renewable energy sources and the technologies for their utilization. Available at https://www.uni-sofia.bg/index.php/bul/content/download/248293/1637967/version/1/file/Report_RES.pdf

Barrier 1: Lack of long-term and consistent national policy incentivizing citizens participation in the energy transition

Type:	Political
Stakeholders:	Policy developers, Citizens organizations, Media
Description of the barrier:	<p>Most strategic documents concerning the energy sector which are in place in Bulgaria put their focus on large-scale capital-intensive projects. The Integrated National Energy and Climate Plan of the Republic of Bulgaria 2021-2030 encourages on paper the establishment of local energy communities and recommends the adoption of legislative measures that allow more active participation in the energy market. However, the document does not introduce specific indicative targets towards collective models or citizens/ renewable energy communities. The National Recovery and Resilience plan which was approved by the EC in April 2022 distributes more than 20% of its overall funds for investments in new large-scale RES capacity, but only 1% will support citizens to equip their homes with installations utilizing renewable energy for water heating or power generation needs. No specific schemes for social innovation and community action in the process of energy transitions are available in the country.</p>
Possible solution:	<p>More pressure by citizens organization, media and EU institutions on Bulgarian institutions and government for policy actions which will enable Bulgarian society to engage with the just and inclusive energy sector transformation.</p>

Barrier 2: Lack of legal provisions and framework regulating ECs

Type:	Legislative
Stakeholders:	Policy developers, administration, energy regulator and energy agencies
Description of the barrier:	<p>The current energy legislation lacks provisions on the establishment, legal form, and functioning of energy communities (e.g., it does not define rights and obligations of producers, consumers, aggregators).</p> <p>Peer-to-peer market and community owned micro grids need to be facilitated through additional legal provisions.</p> <p>Additionally, there are no adequate governmental incentives that encourage the investment in renewable energy sources.</p>
Possible solution:	<p>Establishment of a comprehensive regulatory framework for energy communities in line with the European RED II directive, and regulatory and legal certainty for the sector.</p> <p>Introduction of net-metering scheme</p>

Barrier 3: Conflicting legal provisions currently in place

Type:	Legislative
Stakeholders:	Policy developers, energy communities, citizens
Description of the barrier:	There are several legal provisions that lead to controversial situations. For example, if an economically or energy-poor household receiving social or energy benefits becomes a co-owner of a photovoltaic installation that supplies electricity to the grid, its earning of even 1 cent from the electricity supplied to the grid will be a prerequisite of losing its right to social and energy benefits.
Possible solution:	Revision of regulations

Barrier 4: Tax complexities

Type:	Legislative , Economic
Stakeholders:	Policy developers, citizens
Description of the barrier:	Owners of installations generating electricity from renewable energy sources are subject to numerous taxes, fees and administrative payments. Sometimes the total amount of these liabilities exceeds the profit from the sale of the surplus energy produced. Investors with installations that are connected to the grid must pay a number of fees and taxes, such as an access fee, a 5% tax on the proceeds from the sale of surplus and / or a 10% corporate tax on the income from the sale of electricity.
Possible solution:	Adoption of clear rules governing tax rates and possibilities of taxing individual members of an energy community

Barrier 5: Shortage of financial incentives

Type:	Economic
Stakeholders:	Pilots, Pioneers
Description of the barrier:	The high levels of upfront investment, lack of public funding for support or specialized non-financial assistance programs are among the main barriers. Unfortunately, a small proportion of individuals and households have a sufficiently high disposable income to invest in renewable electricity installations with entirely own funds. Additionally, community energy projects are rarely supported by banking institutions.
Possible solution:	Mobilizing financial instruments (for example in the form of low-interest loans or grants) or direct public funding to help low- and middle-income households and small and medium-sized enterprises support investment and participation in energy communities Introducing net-metering scheme

Barrier 6: Lack of public awareness about socio-economic impact

Type:	Social
Stakeholders:	Citizens
Description of the barrier:	Citizens are not sufficiently informed about the benefits of renewable energy technology. In particular, renewable energy is mainly associated with positive environmental effects and less often with its socio-economic impact. This can partially be explained by the lack of expert information in the public sphere as well as the lack of public awareness about the governmental institutions that manage the transition to low-carbon technologies and their wider use.
Possible solution:	Development of information campaigns to inform and educate citizens, SMEs, and municipalities about the benefits of energy communities; Introducing mentoring programs

Barrier 7: Lack of knowledge about the technology

Type:	Social
Stakeholders:	Citizens
Description of the barrier:	On the one hand, citizens have difficulties in underspending the process of energy production and storage. On the other hand, there is a lack of knowledge and experience in energy community management technologies. The absence of pioneers in the country that could explain firsthand the technical methodology further demotivates citizens to take the first step.
Possible solution:	Creation of a “one-stop shop” center in each municipality

Barrier 8: Lack of administrative capacity

Type:	Social
Stakeholders:	Administration, citizens
Description of the barrier:	Citizens mainly rely on the assistance of their municipality to find structured and up-to-date information on how they could benefit from renewable resources for energy production. At the same time, local authorities lack knowledge and expertise on this subject matter, which prevents the establishment of energy communities.
Possible solution:	Active participation of municipalities in international educational programs and seminars for knowledge exchange.

Barrier 9: Bureaucracy

Type:	Legislative
Stakeholders:	Administration, citizens
Description of the barrier:	The current legislation gives power to multiple state bodies with competence in the development of renewable energy projects. Therefore, the process of initial installation requires serious expert knowledge to navigate the network of administrative and regulatory procedures. For this reason, many potential investors are discouraged feeling lost among the many institutional requirements.
Possible solution:	Introduction of a single administrative contact point throughout the process

Barrier 10: Historical burden

Type:	Social
Stakeholders:	Citizens
Description of the barrier:	Historical burdens and worldviews significantly affect the interest in participating in an energy community. These problems are particularly critical for the citizens of post-communist countries like Bulgaria, where communities and cooperatives often evoke memories of the violent collectivization of the communist regime.
Possible solution:	Promotion of good practices of voluntary cooperative ownership and governance initiatives developed in post-communist countries

7 | Croatia

Barrier 1: Lacking and missing legislation

Type:	Political
Stakeholders:	Policy developers (experts and state institutions), supporting organizations, Pioneers
Description of the barrier:	Current legislation (as of end 2021) considers Citizen Energy Communities and Renewable Energy Communities. However, CEC are currently limited to only one transformer point and one local authority. Furthermore, it is only possible to establish CEC under the non-profit legal entity type. This limits scope and reduces interest of citizens. Secondary legislation is still pending for both CEC and REC.-
Possible solution:	Change definition and scope of CEC with the main Electricity Market Act to be fully in line with Directive. Promptly develop needed secondary legislation. Include citizens and relevant stakeholders in process.

Barrier 2: Lack of smart meter rollout

Type:	Political, Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Rollout of smart meters overall in Croatia is very limited in scope. There is no clear strategy or indication when will the wider rollout of smart meters be completed throughout the Country. It is usually done on case-by- case basis as per request. Main constraints are cost and lack of clear political will.
Possible solution:	Changes in legislation requiring faster rollout of smart meters by suppliers/DSOs.

Barrier 3: Limited access to finance and support schemes

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, Policy developers
Description of the barrier:	Due to economic situation and average income, citizens overall have limited resources to invest in RES and EE regardless of the estimated payback period. Some limited financing support mechanisms exist typically in form of direct grants (up to certain percentage of total investment). All usually require upfront financing by the investor themselves. There are not tax deductions, favourable loans or long-term financing support mechanisms available (long-term in sense they are non-stop available to investors, i.e. low interest rate loans)
Possible solution:	Increase awareness among financial institutions, change national and regional financing approaches from intermittent schemes focused only on co-financing investment to long-term approaches such as tax deductions, lower VAT,

favourable interests on loans, and supporting collective actions over single large investor's projects.

Barrier 4: Limited experience with citizen energy in general

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, Policy Makers, supporting organizations
Description of the barrier:	Croatia has very limited experience with citizen energy. In recent years there have been some, however, limited developments primarily linked to energy cooperatives. No formal energy communities or other forms have been up to date established and operational (linked to Barrier 1). There is an issue that with some segments of general public, there is still a negative connotation to the concept of collective actions/cooperatives due to historic circumstances.
Possible solution:	Large-scale communication and awareness campaigns. Transparency and access to information from relevant institutions and stakeholders (Gateway development). Removal of barrier 1.

Barrier 5: Lack of resources (time, knowledge and base financing) to kick-off with collective actions

Type:	Social, Political
Stakeholders:	Pilots, Pioneers, supporting organisations
Description of the barrier:	In initial phase collective actions are typically dependant on volunteering efforts and support by external organisations. As the whole process, particularly in the context of country like Croatia where there no energy communities set up yet, is very time consuming and requiring specific expertise, this is often the limiting factor. Furthermore, the progress is often hindered by lack of understanding by needed local stakeholders and support groups (i.e. LAs).
Possible solution:	Creating strong partnerships and motivation campaigns. Policy developers need to develop support schemes to facilitate establishment of energy communities.

Enabler 1: Citizens as an active market actors (aggregation)

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, supporting organisations
Description of the enabler:	Considering current situation regarding energy supply/demand and rising prices, aggregation as an innovative solution can stabilise and minimise the risk of failure when energy system is under pressure as well as facilitate the integration of RES technologies. These forms of collective actions can add value by aggregating supply and demand, either separately or in one single portfolio. Also, energy cooperatives/communities supported by aggregators can sell the generated

	electricity in the wholesale energy market achieving more competitive and, therefore, more affordable electricity for their members.
Possible solution:	Creating strong partnerships with the pioneers in this area with possible replication of good practice examples from EU through synergies with other successful projects.

8 | Germany

Barrier 1: Low electricity prices at the stock exchange

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	If electricity is currently sold on the market, the low electricity exchange price is not sufficient to refinance new RE plants.
Possible solution:	As long as it is not possible to refinance economically via the electricity market or another marketing instrument, the further expansion of renewable energies is dependent on the existing support system. This could be the existing feed-in tariff or market premium.

Barrier 2: Complex structures in the financing of projects

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	The structuring of project and project financing requires very detailed financial and contractual preparatory work. Many collective actions like to resort to project financing. It has the advantage that the financing decision can be based on a transparent structure of a financial body created for this purpose. This can be assessed more easily within the framework of forecast calculations. In the meantime, shades of grey are mingling into the supposedly purely segregated world of financing between "project financing" and "corporate financing". Up to now, the imbalance of a project financing and the associated support measures, such as the injection of fresh money from outside, were regarded as a clear default event, but recently there have been signs that the principle of a "limited recourse" (limited recourse to the initiators during the term of the loan) is also being accepted as a third way. This plays a role, for example, in project financing of collective actions, when joint venture structures develop between a project financing structure (the citizen project) and a strong creditworthiness provider (for example, the municipal utility).
Possible solution:	Joint venture structures between a strong creditworthiness provider and the collective actions should be easily possible and transparent.

Barrier 3: Necessary collateral in the event of financing bottlenecks

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	The possibility of preventing defaults in cases of financial bottlenecks in a regulated manner and long before the loan is terminated and collateral realised is often a decisive argument for many banks in favour of granting a loan.
Possible solution:	Energy community funds could be a solution for collective actions to have a secure ground for new projects.

Barrier 4: Voluntary structure

Type:	Social
Stakeholders:	Pilots, Pioneers
Description of the barrier:	Due to the voluntary structure of collective actions, many participants lack the scope to get involved beyond their membership. Diverging ideas among the members can be a limiting factor for the further development of an energy community. For example, members sometimes prefer to maintain proven business areas rather than develop new and complex business models.
Possible solution:	Creating capacities for member activation and public relations is a prerequisite for tapping into further target groups and successfully introducing new business models. (Employee structure)

Barrier 5: Lack of time to acquire the necessary strategic knowledge

Type:	Social
Stakeholders:	Pilots, Pioneers
Description of the barrier:	Many collective actions are looking for new fields of business that they can develop despite the fact that they are mostly volunteers. However, they often lack the time to acquire the necessary strategic knowledge. Although an internal strategy development with the active involvement of the members would be desirable, it often fails due to the workload of the board through everyday tasks. The development potential of collective actions therefore often remains untapped. These questions are usually accompanied by the desire for further diversification of business models: breaking new ground and implementing business areas that are detached from the previous business model.
Possible solution:	For the expansion or diversification of the business areas, the development of full-time structures or the establishment of strategic cooperations is therefore important.

Barrier 6: Lack of time to establish strategic partnerships

Type:	Social
Stakeholders:	Pilots, Pioneers
Description of the barrier:	Time and energy are often not enough for more extensive activities, such as the interactive design of the general assembly, updating the website or creating a new flyer.
Possible solution:	The extent to which members are prepared to support changes or become more involved in the collective actions can be determined through surveys.

Barrier 7: Lack of time to communicate

Type:	Social
Stakeholders:	Pilots, Pioneers
Description of the barrier:	Time and energy are often not enough for more extensive activities, such as the interactive design of the general assembly, updating the website or creating a new flyer.

Possible solution:	The extent to which members are prepared to support changes or become more involved in the collective actions can be determined through surveys.
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Barrier 8: Lack of smart meter rollout

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	The technological factors differ depending on the business models. In general, it can be said that technical barriers can usually also be solved technically but can have an impact on the economic viability of the projects. However, especially for new business models such as energy sharing, the rollout of smart meters is lacking in Germany.
Possible solution:	Incentives for flexible electricity use and production

Barrier 9: Produce and forget mentality

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	The electricity market currently does not promote the use of electricity on site. Due to a lack of economic incentives, the electricity from community plants is largely fed directly into the grid and sold according to fixed compensation rates. This promotes a produce and forget mentality. New technological solutions are not stimulated.
Possible solution:	Incentives for regional electricity use

Barrier 10: Environmental protection vs climate protection

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	In the past, environmental protection has always moved people when the environmental problem was easily perceivable, when it affected many people and when there was a small and clearly definable group of polluters. In many respects, all of this is missing in climate protection, which is why climate-damaging emissions are hardly decreasing. A hopeful development is that more and more people see climate change as problematic.
Possible solution:	Communication about climate crisis

Barrier 11: Economical benefits vs climate protection

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Growing awareness of the problem is an essential prerequisite for the willingness to change in politics and society. In 2016, for example, more than half of the people were still opposed to higher taxes on fossil fuels to promote climate protection. In 2019, fewer people, 42%, already rejected this. Nevertheless, this is not yet a majority in favour of such measures, and there is a great deal of dissent about

	sensible ways forward. In many cases, the activities necessary for climate protection are virtually at odds with societal ideas of economic growth and prosperity.
Possible solution:	It is therefore important to find ways to support the willingness of the general population to support the necessary changes and to implement them on a personal level. Due to their regionality and proximity to citizens, energy communities are well placed to implement climate protection measures together with their members and citizens. (Communication about regional value creation)

Barrier 12: Global climate crisis vs regional climate protection

Type:	Social
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Many options for action at the political and individual level are perceived as irrelevant because their contribution to solving the global problem is only small and they are still politically unpopular.
Possible solution:	Communication about local emissions

Barrier 13: Tenders

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	The main activity of collective actions in Germany was and still is the project planning and operation of photovoltaic plants. In recent years, the legal framework has been changed several times to the disadvantage of collective actions. Especially for photovoltaic projects, a downturn is to be expected since mid-2019. This year's survey of energy cooperatives by the DGRV, for example, shows, that only 54% of respondents still want to be active in small and mediums sized photovoltaic plants up to 750 kW (compared to 71 % in 2018), due to the special cutback in the photovoltaic segment. In the tenders for wind energy and large-scale photovoltaic plants, collective actions are still hardly given a chance and, in addition to administrative hurdles, they are also deterred by the high economic risk.
Possible solution:	De-minimis regulations

Barrier 14: Expiration of the feed-in tariff

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	At the end of 2021, the first systems that are remunerated under the Renewable Energy Sources Act (EEG) will cease to receive statutory subsidies. This mainly affects private system operators with small photovoltaic systems with an installed capacity of up to approx. 5 kW. But also collective actions will soon have to decide on the future use of their systems and the marketing of the electricity. For all renewable energy plants, there are essentially three options available: Continued operation of the existing plant, construction of a new plant at the same location or sale or decommissioning of the plant. It remains to be seen whether the envisaged market value will enable continued economic operation. This would be particularly important for cooperative local

	heating networks, as the majority of the main heat sources are bioenergy plants subsidised under the EEG.
Possible solution:	Establish new business models

Barrier 15: No energy sharing

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Alternative marketing options, as specified by the EU, have not been taken into account so far. In the Renewable Energies Directive, for example, "energy sharing" - the joint generation, distribution and consumption of energy - was stipulated. The EEG 2021 is silent about that.
Possible solution:	Development of clear regulations and models is needed

Barrier 16: Project development costs for participation in tenders

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Before a company can participate in a tender, it has to incur considerable project development costs - for example for expert opinions or permits. These costs are lost if the company is not awarded a contract. Since most collective actions only plan one larger project, e.g. a wind turbine, they cannot compensate for a total loss with other, successfully awarded projects. In this respect, the risk of losing the citizens' capital entrusted to them is far too high for those responsible.
Possible solution:	Energy community funds

Barrier 17: Joint supply via the public electricity grid is not possible

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Another problem for collective actions: they can rarely use the electricity from their solar power system directly from their own roof. The members often do not live in the same building but are widely scattered. The public grid cannot be used to distribute the electricity either. Therefore, not only the generation, but also the communal supply of electricity from smaller local suppliers and thus the cooperative supply of members must be facilitated.
Possible solution:	Equalisation of joint self-sufficiency and individual self-sufficiency

Barrier 18: Complex structure of the tenant model

Type:	Legislative
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Although the tenant model is promoted by legal framework conditions, the number of projects implemented remains below expectations. Tenant models are often seen as "complicated". This is due to the wide range of tasks from the necessary property, energy and customer data management, tariff and meter recording and contract

	management to billing or switching processes, or the customer communication associated with all these points.
Possible solution:	Development of clear regulations and models is needed

9 | Georgia

In Georgia, legislation regarding energy communities has not been transposed yet. Georgia, as a contracting party of the EU Energy Community, has obligation to transpose the legislation and implement it in upcoming years. However, Georgia has successfully implementation of net-metering regulation, including group net-metering allowance (so called virtual net metering). This is the only initiative of collective action in the energy sector with involvement of the final consumers. There are several enablers that make the net-metering popular in Georgia but at the same time significant barriers hinder further development. Implementation of European style regulations for the energy communities is expected to bring new opportunities but challenges. The barriers and enables for the energy communities foreseen at the moment based on experience of the net-metering and existing circumstance are summarized below.

Barrier 1: Lack of clear national legislation

Type:	Political
Stakeholders:	Policy developers, supporting organizations, Pioneers
Description of the barrier:	While net-metering regulation is on place, current legislation does not consider energy communities. Under current legislation it is not possible to define the organizational structure which will allow a company to efficiently perform collective actions in the energy sector.
Possible solution:	Georgia has to transpose EU legislation related to Energy Communities and adapted for the contracted parties of EU Energy Community.

Barrier 2: Access to Finance

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, Policy developers
Description of the barrier:	<p>Access to finance is limited for several reasons:</p> <ul style="list-style-type: none"> • Project has long payback period and financial institutions are not interested in; • Financial institutions ask for collateral with a value significantly higher than the asset to be created; • Capacity to create bankable product.
Possible solution:	Series of measures to be implemented to reduce barriers. Among the measures can be considered: increase awareness among financial institutions, state policy to promote financing energy communities and providing collateral.

Barrier 3: Connection to the grid

Type:	Technical
Stakeholders:	Pilots, Pioneers, DSOs, Policy developers

Description of the barrier:	Distribution grid code of Georgia defines easy procedures for distributed RES connection to the distribution grid (for microgenerators up to 500 KW). There exists so called one-stop-shop approach, with short deadlines and reasonable connection fees that makes microgeneration development and connection to the grid feasible for businesses and households. However, the procedures and IT systems to be developed might create barrier for integration of generation capacities. Integration of renewable energy sources in the network under energy community arrangement is a critical one. DSOs do not welcome integration of prosumers in the network.
Possible solution:	The regulation needs to address the challenge and regulate the connection in a manner not to create unnecessary cost and bureaucracy for the energy communities. Technical readiness of DSOs should be guaranteed.

Barrier 4: Low electricity price

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the barrier:	Georgia is on the way of the market liberalization. However, price regulation, with preferential pricing for household customer, is still on place. Low prices make the RE project financially less attractive.
Possible solution:	Policy developers has to rethink price regulation and defined adequate support schemes to make RE projects profitable.

Barrier 5: Experience with communities

Type:	Social, Economic
Stakeholders:	Pilots, Pioneers, Policy Makers, supporting organizations
Description of the barrier:	Georgian does not have an experience, and even have bad experience from the Soviet Union, with the communities. This is true in other areas as well. While agricultural cooperatives are well promoted, still there is not big progress.
Possible solution:	Awareness campaign is crucial to show the benefit of collective action. Demonstrations and successful project showed to be efficient tools to convince people to be involved.

Barrier 6: Lack of support schemes

Type:	Political
Stakeholders:	Pilots, Pioneers, Policy Makers, supporting organizations
Description of the barrier:	At the moment there is not support scheme to promote energy communities in the country. No consulting, financial, price or other mechanisms are in place to facilitate establishment of energy communities.

Possible solution:	Policy developers need to develop support schemes to facilitate establishment of energy communities.
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Enabler 1: Dependency on imported energy

Type:	Social, Economic
Stakeholders:	Policy developers, supporting organizations
Description of the enabler:	Energy Import dependency in Georgia increases over years. Increase in electricity generation doesn't catch demand increase rate. While there are significant problems in construction of centralized RES plans in Georgia, distributed generation is gaining additional value
Possible solution:	Georgia has to support development of distribution generation, collective actions and energy sharing and compensate energy demand growth at consumption points

Enabler 2: Significant RES potential

Type:	Technical
Stakeholders:	Pilots, Policy developers
Description of the enabler:	Georgia has significant volume of RES potential, while in hydro – only 20% of economic potential is utilized, for wind and solar there around 1% utilization rate. For distributed generation, solar energy is much more accessible for businesses and population and therefore higher value of annual irradiation is making solar PV projects economically more feasible compared to central European states
Possible solution:	Widespread development of small-scale PV generation must become part of national policy and accessible by wider range consumers

Enabler 3: Net metering experience

Type:	Legislative
Stakeholders:	Pilots, Pioneers, DSOs, Policy developers
Description of the Enabler:	Georgia became successful in implementation of net-metering regulation, including group net-metering allowance (so called virtual net metering). Liberal approach to this regard caused creation of up to 20MW capacity of micro solar PV plants from in the period 2020-2021 years due to the increased interest from businesses, also from households. Maximum allowed capacity threshold for micro power plants in Georgia which can participate in net-metering equals to 500 KW
Possible solution:	Net metering regulation (mostly group net metering) must be developed and enhanced for local energy communities

Enabler 4: Market liberalisation

Type:	Political
Stakeholders:	Pilots, Pioneers, Policy Makers
Description of the Enabler:	Georgia is on the way of the market liberalization. In 2022 is planned competitive market launch, with hourly trade on Georgian energy exchange. That must improve price formation in Georgia on real basis and increase of roles of new market players
Possible solution:	Gradual market opening to be continued, not only on wholesale but also on retail markets

10 | Hungary

In Hungary, EMD and RED II directives have been transposed by the amendment of the existing national legislation governing the national electricity market. However, REC has been defined as a sub-type of CECs in the national law and the scope of its activity is limited to electricity. Hence, relevant gaps in the legislation concerning their establishment and operation should be filled. The possibility to produce and consume renewable electricity by customers has already been regulated by the VET under the term of household sized power plants which is a micro power plant connected to a low voltage system with an interconnection capacity of less than 50 kVA at any given connection point. Detailed rules of energy sharing are missing.

It should be noted that various support schemes will be available for consumers aiming to establish collective actions. However, recently, there is no advantage for a community energy initiative to register as an energy community and, therefore, no incentive. In addition to subsidies, specific financial measures need to be rethought and dismantled to promote community energy more effectively.

Barrier 1: No energy sharing

Type:	Legislative
Stakeholders:	Pilots, Policy Makers, DSOs
Description of the barrier:	Only the definition of energy sharing was accepted in the transition process, details are missing. Energy authority and DSOs are not motivated to define detailed rules.
Possible solution:	Detailed rules in favour of energy sharing should be required, referring to the REDII and EMD directives. This may also require broad social support.

Barrier 2: Improper definition of energy communities

Type:	Legislative
Stakeholders:	Pilots, Policy Makers
Description of the barrier:	Renewable energy communities are defined as a special case of citizen energy communities limited to the field of electricity. Possible legal form of CECs is limited to cooperatives and not-for-profit companies which narrows the scope of cooperation. However, the participation of large companies in energy communities is not restricted, contrary to the directives.
Possible solution:	The possibility of regulatory sandbox could be extended to the legal form of energy communities, so definition could be revised according to good practice.

Barrier 3: Low energy prices for households and local authorities

Type:	Economic
Stakeholders:	Pilots, Policy Makers
Description of the barrier:	Social tariffs or “universal” utility prices are defined by the government and available for every household, local municipalities and public institutions. This artificially low price discourages consumers saving energy or investing in energy efficiency or renewable energy. Keeping energy prices artificially low is very costly for the state, as the losses of state and municipal energy companies have to be compensated.

Possible solution:	Social tariff system must be revised and should focus on energy poor households. Saved public expenditure can be reallocated to support collective actions on energy efficiency and renewable energy.
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Barrier 4: No practice of cooperation

Type:	Social
Stakeholders:	Pilots, Policy Makers, Local heroes
Description of the barrier:	Only the definition of energy sharing was accepted in the transition process, but Energy Authority and DSOs are
Possible solution:	Justified

Barrier 5: Lack of smart meters

Type:	Technical
Stakeholders:	Pilots, DSOs, Potential communities, Local heroes
Description of the barrier:	Very few smart meters are in use and very few people know about them. There is currently no tariff to take advantage of it.
Possible solution:	Information campaign and support scheme on smart metering would help the penetration of smart meters. New tariffs for flexible consumption would also help this.

Barrier 6: Unjustified grid tariff

Type:	Legislative, economic
Stakeholders:	Pilots, Policy Makers, DSOs
Description of the barrier:	Grid tariff is the same for local sharing and feed in to high voltage system, so it is not proportional to the usage of the grid.
Possible solution:	New tariff system is needed with justified grid costs that encourage sharing energy locally.

Barrier 7: New installation of wind power plants is banned

Type:	Legislative
Stakeholders:	Pilots, Policy Makers
Description of the barrier:	A government decree has made impossible to install new wind power plants in Hungary as it defines a minimum distance of 12 kms from any settlements. There is no such place all over in Hungary.
Possible solution:	The governmental decree must be revised and allow local communities to build their own wind power plants, they would complement solar power generation, increasing security of supply.

Enabler 1: Regulatory sandbox

Type:	Legislative
Stakeholders:	Pilots, Policy Makers
Description of the enabler:	Regulatory sandbox will be available from September 2022 to test new regulations
Possible solution:	Pilots can apply for a regulatory sandbox testing a new regulation for max. 3 years. Energy authority will evaluate the applications and later the tests, if they are successful the new regulation will come into force and be available for all other energy communities and collective actions.

Enabler 2: Support schemes for energy communities

Type:	Economic
Stakeholders:	Pilots, Policy Makers, Potential communities, Local heroes
Description of the enabler:	Calls for pilot projects starting energy communities are and will be available in the following years.
Possible solution:	Innovative pilot projects have already started establishing and operating the first energy communities in Hungary. RRF, Cohesion Fund and Modernisation Fund calls will be coming in the following years supporting energy communities to start.

Enabler 3: Closure of annual net metering

Type:	Economic and regulatory
Stakeholders:	Pilots, Policy Makers, Local heroes
Description of the enabler:	By the end of 2023 the annual net metering will not be available for new PV installations.
Possible solution:	Annual net metering is very favourable and popular for individual prosumers as they can feed their surplus production into the grid and consume later for free. This option will not be available for installation put in operation from 2024, so prosumers will be encouraged to share their surplus energy in the local grid.

11 | Conclusions and Recommendations

Energy communities, defined in the European Clean Energy Package as such, are not a new arrangement. Energy communities in various forms already exist in majority European countries, however, establishing regulatory framework in the European legislation will promote to a larger scale development of this jointly actin consumer forms in more harmonized way. In order to achieve targets, set in the EU legislation, level playing field must be created for the establishment of local Energy communities by consumers and undue barriers shall be removed at national level. This report focuses on identifying barriers and enablers for the development of local energy communities and the following recommendations are based on the main findings stemming from the literature review and country analyses.

As for the conclusions, there are different barriers that must be analysed and overcome, such are: political barriers mainly relate to missing prior experience, lack of political support in local representatives, non-supportive energy agencies, no RES support schemes, lack of national strategies for energy communities and targets. Common economic barriers mainly relate to the lack of access to finance, grants, unfair and insufficient feed in tariffs, unstandardized PPAs, impossible third-party-offtake, insufficient incentives for renewable heat projects, complicated tax rules, no tax exemptions. Common social barriers identify lack of experience with cooperatives and civic activism, lack of trust in the cooperative models. Common technological barriers concern to the lack of knowledge and experience to design, plan, procure, implement and commission a community energy projects, lack of expertise for operation and maintenance. Common legislative barriers include complicated legal framework, lengthy and tiring bureaucracy, administrative barriers to grid connection including complicated application procedures, costs, time, complexity for an ordinary citizen, impossible to fairly operate micro-grids. Lastly, common environmental barriers mainly relate to the low environmental awareness, conflict between biodiversity protection and RES development.

Recommendations:

- ▶ Policies and measures for renewable energy communities must be included in the national legislation. Moreover, not only to transpose Clean Energy Package requirements into national legislation but also to introduce energy community development policies in their NECPs with further operationalisation, which may mean to explicitly provide targets for renewable energy communities in their NECPs. Also, state policies must be clear which national energy transition objectives the energy communities might be able to contribute to.
- ▶ Awareness of policy makers is moderate, though it is promising that most member states positively acknowledge the role of energy citizens, local energy markets and energy communities. It is clear that the understanding among the member states on the role of these players must be risen and efforts must be increased for improved awareness on both policy making and local authority levels.
- ▶ In order to create a competitive market structure, an effective tariff mechanism must be introduced with a plan to gradually move from a supportive tariff plan, to a competitive mechanism, as the respective renewable technologies are becoming more mature and economically more viable. The conclusion is that there is a need for significant improvement to promote energy communities with introducing motivating tariff systems and to improve communication between involved parties.
- ▶ Important enablers that allow energy communities to have access to the market and undertake its core functions, are smart metering and advanced metering data management. An appropriate regulatory framework should be in place to promote development of smart metering and data management. Therefore, without proper development of smart metering and advanced data

management systems, it is not possible for full scale utilization of overall functionalities of energy communities.

- ▶ One of the widespread identified barriers is about bureaucracy and permissions. It is related to new community projects, which often face bureaucracy issues during the development phase of the project for permits and grid connections. Hence, such challenging procedures often overwhelm community projects and result in their cancellation. The recommendations are as follows:
 - One national contact point on governmental level to support community projects in the country while it can provide all necessary information in one place and guide them through the process.
 - Suggested actions include grid connection prioritization for community owned projects. Community energy projects should be able to have grid access in order to sell their energy.
 - Treat grid as a common asset and operate it as a public good. Municipalities, which are operating grids, should ensure decentralization of the grid for the benefit of locally owned energy system.
- ▶ Unsecure and unfair electricity export prices to the grid from the community owned energy projects must be solved in a way including establishment of specific renewable energy support schemes for community owned micro generation and auto producer RES, tailoring net-metering program and obliging electricity utilities to sign fair PPAs and allowing Peer-to-peer trading solution for an efficient trading model.
- ▶ Access to financial capital is identified as one of the main barriers. Interested parties, who intend to develop a collective action, usually have lack of funds. This is an even more severe issue in the vulnerable groups of low-income areas, as they simply do not have the financial capital to invest. Furthermore, national support measures to help community owned project development must be enhanced. Recommended steps include creation of grant programs for developing community owned projects at initial stage, support programs for access to finance, promoting tax incentives and amending existing grant aids to support all forms of renewable energy, including solar, biomass and heat pumps.
- ▶ Off-grid and local smart grid solutions may become one of the driving forces for the development of local energy communities. Regulatory hurdles prevent the establishment of local grids and off-grid communities. It is recommended to lift regulations, promote smart grids, and thus enable development of the community owned micro grids.

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