ASSET Study on

Energy Communities in the Clean Energy Package: Best Practices and Recommendations for Implementation

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About the ASSET project

The ASSET Project (Advanced System Studies for Energy Transition) aims at providing studies in support to EU policy making, research and innovation in the field of energy. Studies are in general focussed on the large-scale integration of renewable energy sources in the EU electricity system and consider, in particular, aspects related to consumer choices, demand-response, energy efficiency, smart meters and grids, storage, RES technologies, etc. Furthermore, connections between the electricity grid and other networks (gas, heating and cooling) as well as synergies between these networks are assessed.

The ASSET studies not only summarize the state-of-the-art in these domains, but also comprise detailed qualitative and quantitative analyses on the basis of recognized techniques in view of offering insights from a technology, policy (regulation, market design) and business point of view.

Disclaimer

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Executive summary

The goal of this report is to provide considerations and best practices for the implementation of Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs) introduced by the Clean Energy for all European Package (hereinafter referred to as the Clean Energy Package) in 2019. Building on existing research, this reports aims to contribute to the debate around the best implementation of the EU legal frameworks for energy communities.
The considerations and best practices presented in this study are our own and were formulated by extensive desk research and conversations with experts from energy community associations, regulatory entities, distribution system operators, private industry, researchers, and ministries from across the European Union.

The legal concept of Renewable Energy Communities and Citizens Energy Communities
Renewable and Citizen Energy Communities are defined separately in Articles 2 RED II and IEMD. Although they each have distinctive feature in terms of membership structure (different members can participate and exercise effective control for RECs and CECs), geographical limitations (proximity requirement for RECs) and governance principles (autonomy principle for RECs), they share a common core; they are legal entities based on open and voluntary participation, effectively controlled by its members, and whose primary purpose is to provide environmental, economic, or social benefits.
For each of the abstract elements (legal entity, membership criteria and effective control, autonomy, voluntary and open participated) included in the definitions, this report identifies different pathways of implementing them in national legislation, accompanied with the underlying balance of interest and trade-offs at stake when deciding on a certain implementation approach.
In any case, when implementing the legal concept of RECs and CECs, it is important for national authorities to keep in mind at all time that these new actors are essentially social concepts, as is reflected in the description of their primary purpose. Therefore, national authorities are advised to implement RECs and CECs in a way that enables them to fulfil this primary purpose and safeguard their value-over-profit mentality. An important means to do so is the community governance model, in particular its resilience vis-à-vis private interests in order to avoid elite-capture.
The Directives mentioned above restrict the effective control of the energy communities to specifically designated types of members (which are different for RECs and CECs).
Finally, the voluntary participation requirement of CECs and RECs involves that community members are allowed to leave the community under fair conditions. Member States should find the right balance between the right to leave of members and the solvability of the energy community, taking into account their size and financial capacity.

The geographical scope of Renewable Energy Communities
The Renewable Energy Directive restricts controlling members of RECs to be within the "proximity" of the renewable energy projects of the community. It is up to Member States, however, to define proximity. We currently observe four general ways membership in energy communities are geographically constrained: network-based restrictions, distance-based restrictions, administrative restrictions, and ad hoc restrictions. The pros and cons of these approaches are discussed in this report (see Section 1.13).
In a nutshell, we consider that the geographical scope of RECs should emphasise the "community" aspect of energy communities. Rather than taking an overly technical view, the geographical scope could be based on the sense of local community and a shared environment. However, the definition of the geographical scope should be sufficiently open to allow for local conditions to be taken into account (urban versus rural areas, centralized generation model versus decentralized generation model, etc.).
Whereas the definition of the geographical scope applying to controlling members of a REC is a question of governance rather than a technical question (recall, controlling members of a REC should be in the proximity of the community renewable energy projects), we consider that the

geographical scope of their activities is, in fact, a technical question worth asking and that may merit considering the network in which the activity happens.

Energy sharing
According to Article 16 IEMD and Article 22 REDII, CECs and RECs can share, within the energy community, "electricity produced by the production units owned by the community". We believe that it would be reasonable to explicitly include electricity produced by assets owned privately by community members as energy eligible for sharing in national transposition laws. In our view, a fundamental obligation of sharers should be to communicate with DSOs, suppliers, and relevant actors information on the electricity transfers within a sharing framework (i.e. quantity, sender, receiver, and time of transfer). This would efficiently and securely facilitate energy sharing within energy communities.

The operation of distribution networks by energy communities
The Clean Energy Package gives Member States the possibility to allow energy communities to "become distribution system operators" and "manage distribution networks in their area of operation". Such activity could provide energy communities significant incentives to the local optimisation of demand, supply, and power flows in general and lead to more efficient use of the grids.
If Member States decide to allow energy communities to become the distribution system operator of their area, they could design a dedicated type of distribution license for energy communities. Such a 'community distribution license' could last for a shorter period than usual distribution licences, so as to set up regular assessments of energy communities as network operator. Additionally, tasks and responsibilities attached (e.g. metering data management) to this licence could eventually be adapted for small actors such as energy communities.

Ensuring the protection of consumers rights
The Clean Energy Package emphasises the protection of community members as final customers and requires Member States to secure these rights, as well as the protection of the rights of non-members customers served by energy communities. Therefore, implementation laws should explicitly make energy communities subject to supplier and DSO consumer rights obligations when they formally take these roles. Also, if an energy community fails to comply with its obligations towards its consumer rights, penalties imposed on traditional market actors should be evenly applied to energy communities.
Accordingly, national authorities should oblige energy communities to include, in the energy sharing agreement, information on rights and obligations for end-customers participating in this activity.
Finally, in case of conflicts between the community and its members, the right to be helped by alternative dispute resolution bodies must also be guaranteed to community members. The model of alternative dispute resolution mechanisms is already well developed in the energy services sector and Ombudsmen have experiences to be easily replicated in the frame of energy communities.

Integration of energy communities into the energy landscape
Today, energy communities may face regulatory and economic barriers that disproportionately affect them with respect to their incumbent peers and other market actors. Accordingly, while energy communities should be subject to similar responsibilities and regulatory provisions as market actors performing similar activities, we consider that regulatory requirements related to access to activities (supply, aggregation, etc.) should be made less burdensome to ensure an easier integration of energy communities in the energy landscape. In that regard, as energy sector rules being originally designed for large players, adapting them to smaller actors would result in a more proportionate and non-discriminatory treatment, and would, in the end, contribute to the decentralisation of the energy sector. National authorities should consider a revision of their national regulatory framework around responsibilities and activities' exercise conditions for fair and effective integration of small actors (not only energy communities) in the long term.

Cooperation between energy communities and the area's DSO is important not only for efficient planning and operation of the system but also to enable the flourishing of energy communities themselves. National authorities should thus ensure a transparent cooperation of DSOs with energy communities, especially regarding connection requests. In that regard, the correct transposition of provisions in the IEMD applying to DSOs would be enough to ensure fair and non-discriminatory treatment of energy communities (Articles 31 and 32 IEMD).

A major objective of energy communities in the Clean Energy Package is to mobilise private capital for the energy transition (Energy Communities - Implementation of the Clean Energy Package). As energy-related projects are often capital intensive, RECs and CECs may need to seek external sources of funding. In that regard, national authorities could consider publicly supported loans and grants programs for projects that are of public interest and cannot access funds on favourable terms in the private financial markets.

Another way energy communities tend to be disadvantaged compared to traditional actors is on the access to information and know-how. Thus, it is crucial that Member States make administrative and regulatory processes as free of burden as possible for energy communities. Therefore, national authorities could set up neutral one-stop shops for energy communities that could assist current and prospective energy communities in navigating administrative processes, understanding regulation, providing technical advice (or directing energy communities to relevant sources), connect communities to technical service or finance providers, among others.

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List of abbreviations

CEC	Citizens Energy Community
CARES	Community and Renewable Energy Scheme
DSO	Distribution System Operator
EU	European Union
IEMD	Internal Electricity Market Directive
NRA	National Regulation Authority
REC	Renewable Energy Community
RED II	Renewable Energy Directive
SEC	Sustainable Energy Community
SME	Small and Medium Enterprises
SSE	Social and Solidarity Economy
TSO	Transmission System Operator

1. Introduction

1.1 Context

In 2019, the European Union (EU) presented the Clean Energy for all Europeans Package (hereinafter referred to as the Clean Energy Package), a broad set of measures designed to get the EU on a path to carbon neutrality while empowering consumers. Specifically, the Clean Energy Package promotes energy efficiency first, sets a target for the share of energy from renewable sources (gross final) consumed in the EU of at least 32% by 2030, provides guidance to EU Member States on meeting the Paris Agreement, expands consumer rights to make self-generation easier, and promotes cross-border cooperation to increase the reliability of supply and the efficiency of electricity markets (European Commission, 2019).
In the context of the expansion of consumer rights, the Clean Energy Package, with the recast of the Renewable Energy Directive (REDII) and the 2019 Internal Electricity Market Directive (IEMD), has introduced two new instruments with the aim of empowering citizens and achieving the following ambitions:

- Increasing citizen involvement and consumer empowerment, mobilising private capital and expanding customers rights
- Introduce flexibility to the grid, increase supply security
- Increase local acceptance of renewable energy projects
- Provide environmental, economic, social community benefits for members or the local areas.

1.2 Scope and goals of the study

The goal of this study is to provide considerations and best practices for the implementation of Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs). RECs are introduced in the 2018 recast of the Renewable Energy Directive (DIRECTIVE (EU) 2018/2001, 2018). CECs, on the other hand, are introduced in the 2019 Internal Electricity Market Directive (DIRECTIVE (EU) 2019/944, 2019). Hereafter we use the terms "RECs and CECs" and "energy communities" interchangeably. Note, however, that the term is equivocal and is often used in the literature as an umbrella term to cover different types of community energy initiatives that extend well beyond the concepts of REC and CEC as defined in the Clean Energy Package.
The considerations provide mechanisms to implement the relevant provisions while following the text and principles of the Directives, advance the explicit goals of the Clean Energy Package, and set solid foundations for the enabling framework.
We divide this report into key topics relevant to the transposition of the Directives and that are of special importance to establish the enabling framework for energy communities.

- The legal concept of RECs and CECs (membership criteria, governance model, open and voluntary participation of members).
- The geographical scope of RECs.
- Activities of RECs and CECs focusing on electricity sharing, network management.
- The protection of consumer rights.
- Integration in the energy landscape (level-playing field, market access, network tariffs, cooperation with network operators, access to finance and information).

For each of the topics, we provide a series of considerations that lawmakers and regulators in Member States can consider when deciding how to transpose and implement the Directives.

1.3 Source, methods and organisation of this report

The considerations presented in this study are our own and were formulated by extensive desk research and conversations with experts from energy community associations, regulatory entities, DSOs, private industry, researchers, and ministries from across the European Union.

We introduce the definition of REC, CEC, and related concept from the Clean Energy Package in Section **Error! Reference source not found.**. Section 3 relates to the implementation of the legal concepts of the REC and the CEC. Section 4 discusses and provides consideration on the geographical scope of RECs. Section 5 is dedicated to activities of energy sharing, network management, and the protection of consumer rights. Section 6 discusses measures for the successful integration of energy communities in the energy sector. Finally, Section 7 concludes this report.

1.4 Further reading

The interested reader is encouraged to explore the following literature that we found useful in learning about the implementation of energy communities in the Clean Energy Package and crafting this report. An extended set of related literature can be found at the end of this report.

- Caramizaru, A., & Uihlein, A. (2019). *Energy communities: an overview of energy and social innovation.*
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2. Energy communities in the Clean Energy Package

1.5 Definition of Renewable energy communities and Citizens energy communities

Article 2(16) REDII defines RECs as legal entities:

- That are based on open and voluntary participation;
- That are autonomous and effectively controlled by members (who are natural persons, SMEs, or local authorities) located in the proximity of the RES project that are owned by the REC;
- Whose primary purpose is to provide environmental, economic, or social community benefits for their shareholders or members or for the local areas where they operate rather than financial profits, and;
- That are allowed to produce, consume, store, share, supply, and sell renewable energy, provide aggregation, provide commercial energy services, and act as DSOs.

Article 2(11) IEMD defines CECs as legal entities

- That are based on voluntary and open participation;
- That are effectively controlled by members or shareholders who are natural persons, local authorities, including municipalities, or small enterprises;
- Whose primary purpose is to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits, and;
- That are allowed to engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders;

1.6 Common core and differences

The concepts of RECs and CECs share a common core in regards to the open and voluntary participation of their members, the diversity of actors involved (households, public authorities, and enterprises) and their goals. Specifically, both Directives state that the purpose an energy community should have is *"to provide environmental, economic or social community benefits for its shareholders or members or local areas where it operates, rather than financial profits"* (DIRECTIVE (EU) 2018/2001, 2018), (DIRECTIVE (EU) 2019/944, 2019).

Although CECs and RECs are intimately related concepts, they have important differences:

- CECs can be effectively controlled by natural persons, local authorities and small enterprises. On the other hand, RECs can be effectively controlled by natural persons, local authorities and small and medium enterprises, provided that these members are *"located in the proximity of the renewable energy projects that are owned and developed by the [REC]"* (DIRECTIVE (EU) 2018/2001, 2018), while there is no such restriction for CECs.
- The set of potential activities of RECs are centred around renewable energy sources. CECs, on the other hand, are constrained to electricity but not to renewable sources only, and their set of potential activities is wider (see Table 1**Error! Reference source not found.** for further details on the sets of potential activities of energy communities).

In certain circumstances, RECs can be considered as a subset of CECs. Unlike RECs, participation in CECs is not restricted to specific types of members, and the controlling members of CECs are not geographically bounded, unlike controlling members of RECs. Additionally, CECs are restricted to electricity but are not technology constrained, and RECs, on the other hand, can engage with other energy carriers (e.g. gas or heat) but are limited to renewable technologies. Accordingly, a REC developing renewable electricity projects only and of which no member exerting effective control would qualify as a medium enterprise would comply with the definition of CECs.

	Generation	***Consumption***	***Energy Sharing***	***Supply***	***Energy storage***	***Aggregation***	***Energy efficiency services***	***Charging services***	***Other energy services***	***Own, establish, purchase, manage and lease***	***Access all suitable markets***	***Cross-border participation***
Renewable Energy Communities	X	X	X	X	X	X				X	X	
Citizens Energy Communities	X	X	X	X	X	X	X	X	X	X	X	X

Table 1: Sets of potential activities for RECs and CECs as provided by the Clean Energy Package.

1.7 The enabling frameworks for RECs and CECs

The Clean Energy Package prescribes an enabling framework for CECs and RECs. This enabling framework should identify the basic rights that energy communities and their members are entitled to and include the following:

- Non-discriminatory treatment of energy communities with regards to their activities, rights and obligations as final customers, producers, suppliers, DSOs, or as other market participants
- That energy communities are subject to fair, proportionate and transparent procedures, including registration and licensing procedures, and cost-reflective network charges, as well as relevant charges, levies and taxes, ensuring that they contribute, in an adequate, fair and balanced way, to the overall cost-sharing of the system;
- That energy communities that supply energy or provide aggregation or other commercial energy services are subject to the provisions relevant for such activities;
- The requirement of cooperation by relevant DSO with energy communities to facilitate energy transfers within the community;

The REDII goes beyond the rights shared by CECs and mandates Member States to establish an enabling framework for RECs that, in addition to the points above, ensures the following:

- The removal of unjustified regulatory and administrative barriers of RECs,
- The charges, levies and taxes mentioned above and that are applied to RECs should be set in line with a transparent cost-benefit analysis of distributed energy sources developed by the national authorities;

- The participation in renewable energy communities is accessible to all consumers, including those in low-income or vulnerable households;
- Tools to facilitate access to finance and information are available;
- Regulatory and capacity-building support is provided to public authorities in enabling and setting up renewable energy communities, and in helping authorities to participate directly;
- Rules to secure the equal and non-discriminatory treatment of consumers that participate in the renewable energy community are in place.

Additionally, the IEMD explicitly calls for members of CECs to be allowed to leave the community and to be subject to the switching rules and fees mentioned in Article 12 (right to switch and rules on switching-related fees) of the same Directive.

1.8 Renewable self-consumers and active customers

Two separate concepts defined in the REDII are renewable self-consumers and jointly acting renewables self-consumers. Renewables self-consumers are final customers who generate renewable electricity within their premises for their own consumption. Jointly acting renewable self-consumers are a number of self-consumers located in the same building or multi-apartment block. Active customers, defined in the IEMD, are final customers or groups of jointly acting final customers that are entitled to generate, store, self-consume electricity, and participate in flexibility or energy efficiency schemes.
EU legislation does not require either individual self-consumers or jointly active renewables self-consumers to form an energy community nor to be part of an energy community to be entitled to perform renewables self-consumption. Within the context of RECs and CECs, the ability to become a renewables self-consumer or an active customer is a right that energy community members must retain, and jointly acting self-consumption is a potential activity to be performed within the energy community.

3. The legal concept of Renewable and Citizen Energy Communities

A shared understanding of what are REC and CEC is crucial to ensure that the dedicated regulatory framework for energy communities only benefit to entities that correctly embrace these concepts and advance the stated goals of the Directives. Critical terms relating to the legal concept of energy communities (autonomy, effective control, open and voluntary participation) are not always explicitly defined in the dedicated articles of the Directives. We endorse and align our understanding of these terms with the definitions provided in (REScoop, 2019) and further explain them below.
When defining the legal structure of energy communities, Member States should consider four dimensions to ensure the national framework complies with the purpose and the provisions of the Directives.

- The type of legal entity
- The membership criteria
- The governance model
- The entry and exit conditions

While certain types of legal entities seem naturally more adapted to embodying energy communities, particularly regarding the membership and the governance model, the Directives do not favour a particular one. However, the key objective of national authorities should be to ensure that energy communities, when being set up, comply with the requirements around their legal structure. The choice of the type of legal entity will impact the easiness of reaching compliance with these requirements.

1.9 Definition of the legal entity

The Directives provide that RECs and CECs must take the form of a legal entity, without mentioning the specific type of legal entity (e.g. limited liability company, cooperative, etc.). Member States have a certain degree of freedom in that regard and could decide, for instance, to designate a specific type of legal entity to form energy communities or even decide to leave the choice to communities' developers, as long as the entity's legal structure complies with the requirements (see section 1.5) established in the Directives (REScoop, 2019).

While most types of legal entities comply with the open and voluntary participation requirement, the non-for-profit requirement, as well as the restrictions on the participation of members and the effective control are not met by all types of legal entities. Consequently, certain types of legal entities (e.g. private companies) might not be a suitable legal vehicle, and might not comply with the EU legislation requirements. On the other hand, legal entities entailing a social and environmental component (e.g. associations and cooperatives), will most probably be a better fit for energy communities.

As a first approach, Member States could decide to confine energy communities to a specific type of legal entity. Restricting the type of legal entities allowed to form an energy community to specific models may ensure that the energy community legal vehicle is used as intended by the European legislators. Namely, that it is used to provide environmental, economic, or social benefits to its members or the local area in which the energy community operates. This option could reduce the risk of seeing energy communities developed for the sole purpose of benefiting from advantages attributed to energy communities (e.g. eased capacity connection request, dedicated tenders for capacity building, etc.). Nonetheless, national authorities must bear in mind the downsides of restrictions to the legal entity. First, an overly strict definition might impede or slow the creation of a fit-for-purpose legal entity that may emerge from the ground and restrict the range of possible developments in the future.

In this regard, an interesting illustration can be found in Greece, where in the context of Social and Solidarity Economy (SSE) framework, the concept of energy communities was introduced in company law and defined as a type of cooperative (Varvarousis & Tsitsirigkos, 2019). Progressively developed between 2011 and 2016, the SSE framework explicitly defines in the Greek law the concept of social enterprises. Like the EU operational definition given in the frame of the Social Business Initiative (European Commission - DG Internal Market & Services, 2015), the SSE framework builds the concept of social enterprises around three dimensions: an entrepreneurial dimension, a social dimension, and a dimension related to the governance structure. Different legal forms are recognised as defining the SSE sector by default, but the SSE status is also open to other types of legal forms. The last piece of development of the SSE framework, namely law 4430/2016, provides a set of five operational criteria differentiating socially-oriented businesses from profit-oriented businesses. The aforementioned criteria relate to (1) the aim and (2) governance model of the entity, (3) economic equity, (4) distribution of profits, and (5) the eligibility of membership.

In that context, the Greek law 4513/2018 (Greek Parliament, 2018) seeks to combine the SSE framework and the energy sector by creating a new type of civil cooperative exclusively active in the energy sector, the energy communities. The law recognises two types of energy communities: for-profit and not-for-profit. Despite being subject to the same provisions in terms of effective control, autonomy requirement, geographical scope and the set of activities they are allowed to perform, the two types of energy communities differ when it comes to the minimum number of members required to form the community, and most importantly regarding the distribution of surpluses. Whilst for-profit energy communities are allowed to distribute profit to their members after deduction of 10% for the formation of a regular reserve, the surpluses generated by non-for-profit energy communities must remain within the community.

To consider:

- Formalising the pursuit of environmental and social benefits in company law;
- Providing a detailed legal definition of environmental and social goals when transposing RECs and CECs' provisions in energy law.

For example:

- The Italian Società Benefit is a legal status for a company with a dual purpose of profit and societal and environmental benefits (English Information, 2020). This status allows the company's management to have a fiduciary duty to pursue "common benefits[1]" rather than individual financial profits (as it is commonly the case) for its shareholders
- The Greek Social cooperative enterprise is managed by its members with the principle of one member one vote. Profits are not distributed to members but to employees and any surplus must be reinvested.

The second approach is illustrated by the Walloon Decree[1] of 2d of Mai 2019 on "Renewable Energy Communities", where the legislator decided to not specify the type of legal entity and only mentions a "legal person". However, to assess and control the compliance of the community legal structure with the Directive, the decree establishes the obligation to provide the Walloon regulator with the internal rules of the community that concern autonomy and effective control.
Such legal provision contributes to preventing the emergence of situations like the ones observed in Germany under the frame of Citizens' Energy Companies (Tews, 2018). Despite their compliance with the requirements on the legal structure set by the law, it appeared that a large majority of these companies were in fact directed by professional energy project developers instead of being citizen-led. The example of Citizens' Energy Companies has shown that if national authorities are not able to ex-ante control the compliance of legal entity claiming to be an energy community with the intent of the legal framework, there is a risk for the legal vehicle being wrongly used, and for the sole purpose of benefiting from advantages.

To consider:
Energy community registers could be established by the NRA and would include the necessary information to assess if the legal structure of RECs and CECs complies with the effective control, autonomy, and non-for-profit requirements.

- When being set up, energy communities would register with the NRA and provide information on its legal structure that proves its compliance with the intent of the European legislator. In the case of RECs, registration with the NRA could be a requirement of the dedicated support schemes.

1.10 Membership criteria and its relation to the effective control by members

The Directives specify the types of undertakings allowed to join an energy community and the type of undertaking allowed to exert effective control over the community. These two concepts, even if related, should be understood separately.
Article 2(56) IEMD defines the concept of 'control' as the ability to exert decisive influence over an undertaking. Decisive influence can be exercised, among others, by the total or partial

[1] décret du 2 mai 2019 modifiant les décrets des 12 avril 2001 relatif à l'organisation du marché régional de l'électricité, du 19 décembre 2002 relatif à l'organisation du marché régional du gaz et du 19 janvier 2017 relatif à la méthodologie tarifaire applicable aux gestionnaires de réseau de distribution de gaz et d'électricité en vue de favoriser le développement des communautés d'énergie renouvelable

ownership of an undertaking, or by contracts attributing influence over the decisions of an undertaking. Whilst this definition relates to the unbundling of the energy sector, it also reveals the many ways in which control can be achieved. The aforementioned example relates to situations where control is given by contracts or rights (de jure effective control), but control can also be exerted by the direct or indirect influence an undertaking is able to exert over another (de facto effective control).

In the context of energy communities, the effective control requirement considers the type of actors and community members allowed to exert a decisive influence on the community through the attribution of decision-making power. The entities allowed to exert effective control vary for CEC and REC. For CECs, medium and large companies, are not allowed to exert control over the community. For RECs, only natural persons, local authorities, and small and medium enterprises, that are in proximity to the renewable energy projects developed by the community can exert control.

As provided by Recital 44 IEMD, "*membership of citizen energy communities should be open to all categories of entities. However, the decision-making powers within a CEC should be limited to those members or shareholders that are not engaged in large-scale commercial activity and for which the energy sector does not constitute a primary area of economic activity.*" Accordingly, for CECs decision-making power can be attributed, through voting rights, to natural persons, local authority, and small and medium enterprises. However, to comply with the definition provided by Article 2(11) IEMD, the effective control of the CEC must remain in the hands of natural persons, local authorities, and small enterprises. This means that while voting rights can be attributed to medium enterprises, their decision-making power should not amount to effective control of the community. In that regard, the application of democratic governance models (see Section 1.11) is essential.

Medium and large enterprises and those active in the energy sector should not be excluded from membership to CECs. Furthermore, excluding medium and large companies would unnecessarily deprive energy communities of benefits such as capital resources, economies of scale associated with large loads, access to expertise, among others. However, in this regard, it is important to point out that the participation of large entities could jeopardize the effective control exerted by entitled members. Even if deprived of decisive influence power, the major role these entities can have (e.g. trough technical or financial support) in the development and operation of energy communities' activities could provide them with de facto control.

Membership of RECs is open to natural persons, small and medium enterprises (SMEs), and local authorities. However, as stated by Article 2(16) REDII, effective control can only be exerted by members located in the proximity of renewable energy projects owned and operated by the community. In that regard, simple membership, which would not provide effective control, does not have to be restricted to persons located in the proximity of the project.

To consider:

Two membership categories: participating members and controlling members.

Participation in an energy community does not have to be restricted in implementation laws only to the type of members entitled to effective control by the Directives. The status of participating members would allow them to hold shares and participate in the community's activities, but they would not be entitled to exert decisive influencing power. As energy communities are not intended to generate individual financial benefits, but rather non-financial community benefits, we consider that the monetary participation of members should not affect their weight in the decision-making process.

- For instance:
  - A CEC controlled by households, a local retail market, and a local authority could be joined by a large enterprise. The latter member would hold shares of the community and engage with the rest of the members in energy sharing and other activities, but would not be able to exert effective control of the community. This member would be considered a "participating" member but not a "controlling" member.
  - A REC could be joined by a member (household, local authority, or SME) not located in the "proximity" of the REC's renewable energy projects. While this member could hold shares and participate in the community's activities, she/he would not be attributed voting rights. Thus, she/he would be a "participating" member.
- Figure 1 illustrates the distinction between membership and effective control.

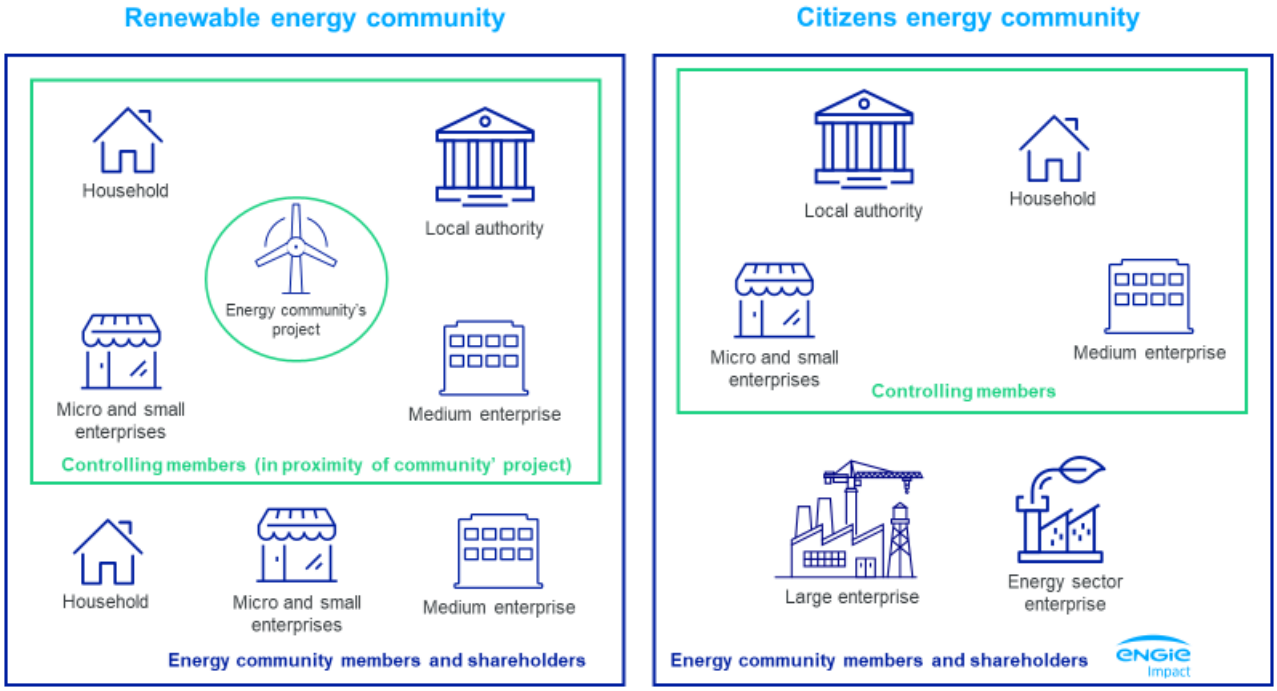

Figure 1: Membership and effective control criteria of RECs and CECs

1.11 Autonomy of the community and democratic governance model

Good governance practices are critical factors for the success of energy communities as their stated goals include increasing public acceptance of renewable energy projects and citizens' empowerment. These objectives cannot be reached if community members, in theory allowed to exert effective control, are not able to concretely influence the decision-making of the community. In other words, attributing voting rights to members is not per se enough to establish a governance model that guarantees the autonomy of the community.

The requirement for autonomy is introduced in REDII. The community must be autonomous vis-à-vis any member's private interest. This means that internal decision-making should be democratic and ensure that all members are adequately represented (e.g. independent of their investment amount). The autonomy requirement hence calls for the adoption of a democratic governance model where all members are represented and able to make their voices heard. Such a governance model implies that no member has a significantly stronger weight than others in the decision-making process. A right balance of power among members can be achieved by limiting the influence members can exert through the partial ownership of the community's assets and the repartition of voting rights. For the latter, different modalities exist and can consist, for instance, in imposing a cap on voting rights or applying the principle of one member – one vote.

To consider:
A limited number of shares and voting rights per member, to ensure that the private interest of a specific member does not overtake the decision-making of the community at the detriment of the collective will of the other members.
For example:

- The Greek Energy Communities framework limits the financial participation of members to 20% of the community capital, except for local authorities which are limited to 40% of the community capital if located on the mainland, and to 50% of the community capital for islanded municipalities of less than 3500 inhabitants.
- In Germany, no individual member of Citizens Energy Companies can hold more than 10% of voting rights.

Attention should be paid to the power relationship that may exist between members and the influence one might exert on the other. For example, suppose a municipality is a board member of a local association or controls it by financial or political means. If the municipality and the association form an energy community, the former would be able to influence the votes of the latter. Such power dynamics could give the municipality excessive weight in the community's decision-making process and threaten the autonomy of the community.

To consider:
Minimum standards for the degree of independence between community members (in terms of capital shares, voting rights, etc.).

- E.g. Members are not allowed to hold more than 40% stake in other community members

Additionally, national authorities must consider the community governance model as a way of safeguarding their intended purpose. Namely, that of providing environmental, economic, or social benefits to the community or the areas where it operates. As energy communities should not be profit-driven, it is our view that voting rights of members should not be tied to the capital injected to the REC or CEC. On that matter, the experience and decision-making

mechanisms of existing cooperatives could be replicated for the governance of energy communities. For instance, the Bridge Report on Energy Communities in the EU (Hannoset, Peeters, & Tuerk, 2019) presents the energy cooperative cases of Amelander Energie Coöperatie in the Netherlands and Ecopower CVBA in Flanders. Both energy communities do not attribute voting rights according to the numbers of shares of its members and apply the governance principle of "one member, one vote".

To consider:
The governance model of energy communities should reflect their purpose, namely pursuing environmental, economic or social benefits instead of pursuing financial profits. In that regard, **we consider that voting rights should not be tied to capital injection**. The intent of this proposal is to not disadvantage members with limited financial capabilities and include them in the community's decision-making process.

The second side of the autonomy requirement relates to the independence of the community with respect to the interests of external actors. In that regard, partnerships with traditional market actors should not undermine the community's independence. Relatedly, the Bridge Report on Energy Communities in the EU (Hannoset, Peeters, & Tuerk, 2019) points out to observed cases in Germany and Greece where despite advanced governance models, energy service companies succeeded in forming energy communities through organisations they have control over. In such cases, the members of the energy community will likely protect and promote the interests of their shareholders, namely energy service companies. Hence, the financial participation of energy services companies in an organisation entering a community should be limited to protect the autonomy of the community vis-à-vis external private interest.

To consider:
The financial participation of energy services providers in organisations who are energy community members should be restricted to a maximum number of shares.

1.12 Open and voluntary participation of members

Both Directives require the participation in energy communities to be open. The openness requirement implies that the energy community cannot arbitrarily refuse membership to applicants and materialises into a non-discriminatory entrance requirement. Hence, an applicant meeting the internal rules and requirements cannot be denied membership, similar to other associations in many Member States.
The REDII specifically requires Member States to ensure that "the participation in the renewable energy communities is accessible to all consumers, including those in low-income or vulnerable households". While each community may define different rules regarding participation (as long as they are complying with Article 16 IEMD and Article 22 REDII), access to membership could be tied to the purchase of shares of the legal entity forming the community. This would constitute a potential barrier for low-income households.

To consider:
Support for low-income and vulnerable citizens to join energy communities. This may be in the form of subsidised membership fees or direct subsidies to communities that actively reach out to incorporate low-income and vulnerable citizens.

The voluntary participation requirement involves that community members are allowed to leave the community under fair conditions. To the extent the members hold a share of the

energy community, this right relates to their rights as investors, not their rights as energy costumers. In the role of energy costumers, their rights need to be fully maintained. This includes the free choice of suppliers and the possibility to switch suppliers or aggregators as stipulated in Article 12 IEMD. This means that it is not allowed to lock members in or design the contract conditions in a way that it becomes prohibitively expensive to leave and to change suppliers or aggregators. Considerations related to the relationship customer-supplier of the community and its members, and to the right of the latter to switch supplier, are presented in section 1.17.

Meanwhile, as shareholders, the exit of members may trigger the reduction of capital for the community and a balance must be found between the right to leave the energy community and the sustainability of the community (in particular for small energy communities). Energy communities, depending on their size (in terms of number of members and projects), will face different constraints, and will apply different timeframes for the exit of their members. Member States should consider imposing limitations on the chosen delay for exiting the community, ensuring that it does not disproportionately harm consumers. These limitations should also take into account the diversity of energy communities in terms of size and financial capabilities, leaving them the opportunity to apply exiting delay adapted to their characteristics.

Equally, the rules applying to the exit of a member from the community must comply with the provisions laid down in Article 16(1) IEMD and should be communicated to applicants before their entry to ensure they are fully aware of exit conditions. For instance, the Luxembourg authorities will establish in the transposition law, a maximum delay of one year for exiting the community (Gouvernement du Grand-Duché de Luxembourg, 2019). Energy communities will also be allowed to define in their status, the exit delay, provided that it does not exceed one year.

To consider:

(1) Compulsory communication of basic rules regarding the rights and obligations of community members to energy community applicants. These rules relate, among others, to **voting rights, general assemblies, the composition of the community, exiting delay and conditions, charges and income distribution**, etc. This recommendation attempts to ensure informed consent of potential community members.

(2) A maximum delay for exiting the community established by law to reduce investment risks and ensure long-term solvability of energy communities. The delay time should duly protect the stability of the community (e.g. financial stability due to loss of capital).

4. The geographical scope of Renewable Energy Communities

The REDII introduces an element of geographical proximity for RECs. It states that RECs should be *"effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity."* The IEMD introduces no geographical requirements or restrictions for CECs.

How the geographical proximity is implemented has overarching impacts on the objectives of the Clean Energy Package. Most evidently, it affects the main goal of energy communities of providing *"environmental, economic, social community benefits for members and local areas"* as it restricts who can effectively control, and possibly join a REC. Additionally, the proximity requirement could have implications on the pool of available private capital and on the acceptance of renewable energy projects by the local population. Furthermore, the definition of proximity and the restriction on who can control the REC could have ripple effects (positive or negative) within and outside the community. For example, the availability of capital will influence the amount and type of community investments that are made and connected to the energy system.

The geographical proximity method has the potential to influence the accessibility *"to all consumers, including those in low-income or vulnerable households"* as required by the enabling framework of RECs. As Caramizaru and Uihlein point out (Caramizaru & Uihlein, 2019), Member States with a higher level of disposable incomes have a higher concentration of energy community initiatives. Thus, low-income areas could lag in energy community creation in relationship with their more affluent peers.

1.13 Approaches to define the geographical scope

Even though the RED II does not define the term proximity, we currently observe four general ways membership in energy communities are geographically constrained: network-based restrictions, distance-based restrictions, administrative restriction, and ad hoc restrictions.

Network-based restrictions use the topology of electric network topology and voltage levels to determine the previously cited "proximity" to renewable energy sources requirement of REDII. For example, Wallonia requires community member injections/withdrawals of electricity to be downstream of one or several medium/low voltage transformers (Décret du 2 Mai 2019, 2019).

Restrictions based on a maximum allowed distance between members of the community have been considered by the Flemish Regulator of the Electricity and Gas Market (VREG, 2019).

Other examples of **administrative restrictions** to the geographical scope of energy communities can be found in Greece and Germany. The Greek law requires at least 50% plus one of the community members to be related to the district the community headquarters are located (Greek Parliament, 2018). In the German "Citizens' Energy Companies" framework, at least 51% of the voting rights must belong to natural persons who have been residing in the district where the wind energy installation is to be installed (Bundesministerium für Wirtschaft und Energie, 2017).

Finally, some implementations give at least **partial discretion** to evaluate the geographical scope of RECs in an ad hoc manner. For example, the Walloon framework mentions that the connection points, in addition of meeting the topological requirements previously mentioned, must *"also to be located within a geographic perimeter mobilising the technically, socially, environmentally and economically optimal portion of the network to promote local collective self-consumption of electricity* (Décret du 2 Mai 2019, 2019)*."*

Each of the four general approaches to define and limit the scope of energy communities has its advantages and disadvantages.

Network-based approaches may reflect relevant technical, grid-related factors to consider when forming an energy community. For example, if an energy community will be primarily dedicated to energy sharing, defining its geographical scope based on the network may be a reasonable solution. Furthermore, network-based approaches may ease regulatory or bureaucratic burdens. For example, excluding members connected through high-voltage lines (i.e. in different low-voltage branches) may avoid the jurisdiction of the transmission level authority. While limiting community members to those on the same low-voltage branch may incur other costs or induce inefficiencies, the regulatory benefits may be significant and worth considering.

However, we fail to see the logic of network-based definitions of proximity when the goal of REDII is related to the governance of the community, that is, that the controlling members are in proximity to the renewable community's energy sources. Moreover, network-based restrictions may discriminate (or even prohibit) against activities and/or generation technologies. For instance, restricting connections to low voltage will likely discriminate against wind generation which is typically connected to medium voltage lines[2]. Finally, network-based restrictions could be opaque and unreasonable from an end customer's point of view.

Based on feedback received by the interviewed stakeholders, we are sceptical that network-based approaches should take a central role in restricting membership of the community. A key characteristic of energy communities is that they are a social concept, not one tied to

[2] Some cooperatives have assets connected to the high voltage network (e.g. Ecopower in Belgium or Som Energia in Spain)

activities or technologies. However, it is our view that network-based restrictions may be appropriate when defining the geographical scope of activities that have a clear relationship to network use (e.g. electricity sharing or collective self-consumption).

Distance-based implementations of the proximity requirement of the Directive have the advantage of being simple to understand and easy to implement by energy community members and stakeholders. However, uniform implementations of distance-based restrictions throughout a Member State may miss regional characteristics and implicitly discriminate regions or technologies. For example, in rural and sparsely populated areas, wind generation may be discriminated against by distance-based approaches. In general, it is our opinion that a distance-based definition of the concept of 'proximity' may be appropriate if measures are taken to counteract unintended consequences (e.g. discriminating against sparsely populated areas). In that regard, distance-based proximity requirements should be differentiated according to the area they apply (e.g. rural or urban).

Geographical scope restrictions of RECs based on administrative or political reasons can have the advantage of basing the REC perimeter to an already established and clear geographical area. Administrative restrictions may streamline bureaucratic and regulatory processes such as permitting and registration. Also, an administrative or political region such as a municipality, commune, or district may be a good proxy of a community (in the broad sense of the word). Restricting a REC to be within an existing community, again in the broad sense of the word, may advance the objective of producing 'environmental, economic, social community benefits for members or local areas'. However, administrative boundaries are a product of historical processes and decisions and may not be relevant to the definition of the energy community. Furthermore, if a REC owns and develops renewable energy sources in several (perhaps distant) municipalities, the local and community aspects of RECs may be undermined.

Ad hoc approaches to defining the geographical scope of a REC have the advantage of allowing to adapt to situations and realities of each prospective REC. However, ad hoc approaches may introduce further uncertainty, bureaucracy, and can be time consuming for the formation of a REC. Furthermore, the ability to adapt the geographical scope on a case-by-case basis may be misused too, for example, unreasonably reduce or increase the size and network access of a REC.

Of course, it is possible to combine the four approaches listed above. For example, the Flemish regulator proposes to determine the scope of an energy community combining administrative and distance methods. It proposes to allow community members to be in one (and possibly neighbouring municipalities) and within a radius of a to-be-determined number of kilometres around the production units to prevent the community from being too large. The Walloon legislation, on the other hand, uses a network-based approach, but leaves the regulator some discretion to interpret, on a case-by-case basis, the geographical restrictions.

To consider:

(1) Definition of the geographical scope that fosters inclusiveness and public acceptance.

(2) A geographical scope definition that emphasizes the 'community' aspect of energy communities. Rather than taking an overly technical view, the geographical scope could be based on the sense of local community and a shared environment, e.g. based on the shared space, experiences, resources defined at a neighbourhood, city, or village level.

While there is no quantitative metric to determine what a 'community' is, the geographical scope could rely on a mix of administrative and distance criteria.

For example:

- Germany's Citizen Energy Companies require at least 51% of the voting rights to be held by natural persons whose main residence has been in the district where the wind installation is to be erected for at least the past year (Bundesministerium für Wirtschaft und Energie, 2017).
- Greece's Energy Community law stipulates that a number of its members must reside or be headquartered in the region where the energy community is headquartered (Greek Parliament, 2018).
- The Flemish regulator proposes administrative (based on municipalities) restrictions to the geographical perimeter of an energy community and distance-based limitations to prevent RECs from becoming "too large."

(3) A geographical scope definition that considers local conditions.

- Regardless of the method chosen to define the geographical scope (technical, distance, or network-based) leaving some room to consider local conditions such as population density, composition of the load, or natural resources, when defining the geographical perimeter of energy communities may be desirable.

(4) Activity and technology awareness for the geographical scope of energy community activities.

For example:

- Narrow perimeters could be prohibitive for wind projects and network-based perimeters could make sense for self-consumption focused communities but not for others.
- As per the Walloon decree of May 2, 2019, electricity injections to the grid by energy communities should happen under a medium/low voltage transformer (Décret du 2 Mai 2019, 2019). While this may be fine for rooftop solar generation, it may disfavour wind generation. We would advise loosening up these restrictions for wind projects and others that are typically connected above the low voltage network.

1.14 The geographical scope of jointly acting renewables self-consumers

The activity of self-consumption introduced in the REDII is a concept related but separate from that of RECs and CECs. REDII defines a renewables self-consumer to be *"a final customer operating within its premises located within confined boundaries or, where permitted by a Member State, within other premises, who generates renewable electricity for its own consumption."* Furthermore, REDII defines jointly acting renewables self-consumers as *"a*

group of at least two jointly acting renewables self-consumers…who are located in the same building or multi-apartment block."

It is important to note that the geographical proximity requirement for renewable self-consumption was established to promote the ***activity*** of on-site self-consumption, which can be performed within or outside an energy community, whereas the proximity requirement for RECs acts as a constraint on who is allowed to exercise effective control of the community.

We previously expressed scepticism on using network-based approaches to restrict membership of energy communities. However, regarding jointly acting self-consumer schemes rather than energy communities, we believe that if Member States decide to extend the boundaries of jointly acting renewables self-consumers beyond local premises, they can reference the network-based approaches to geographically constraint collective self-consumption adopted in France and Spain. Whereas the definition of the geographical scope of energy communities is a question of governance rather than a technical question (recall, controlling members of a REC should be in the proximity of the community renewable energy projects), the geographical scope of jointly acting renewables self-consumption is a technical question that may merit considering the network in which the activity happens. In fact, we believe it is reasonable to set network-based restrictions to other energy community activities (e.g. sharing and jointly acting renewables self-consumption) that make clear use of the network.

To consider:

Differentiated geographical scope for energy community activities and scope for membership eligibility and effective control rights.

- For example, Member States could define administrative boundaries for energy community membership (as is the case in the Greek and German examples above) but restrict jointly acting renewables self-consumers to be under the same medium/low voltage distribution branch if that makes technical sense.
- Figure 2 illustrates how network-based restrictions for the activity of energy sharing can be combined with a proximity requirement for the REC based on distance or administrative boundaries.

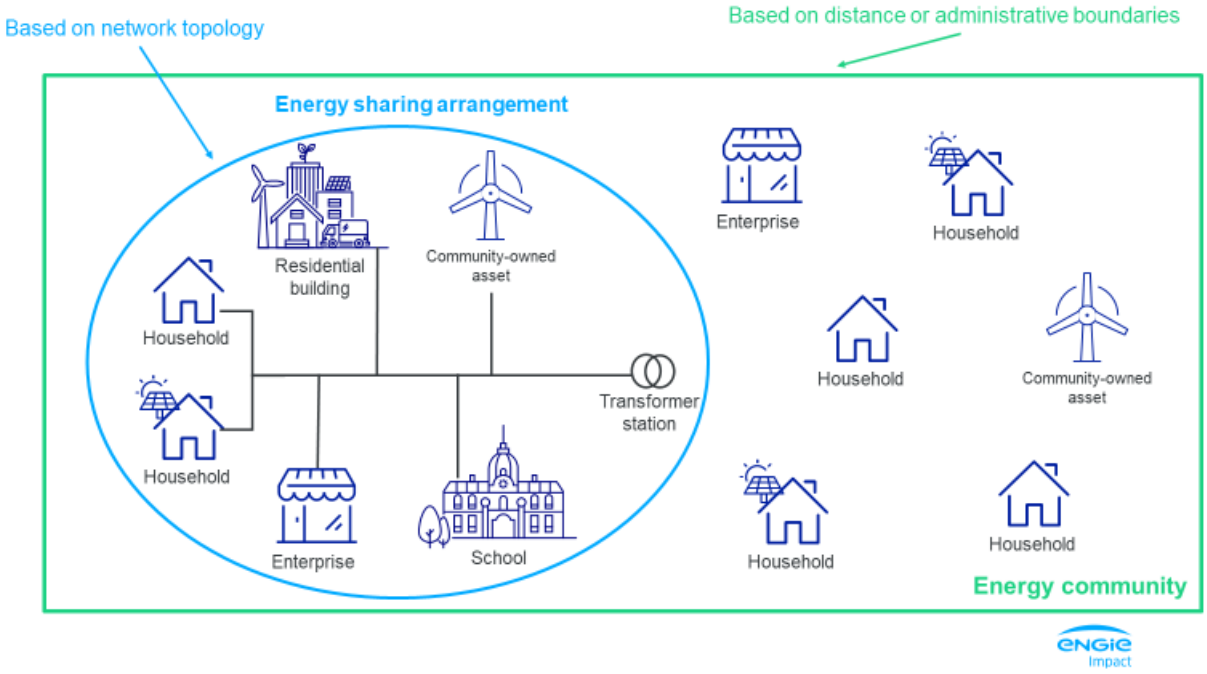

Figure 2: Proximity requirement of the renewable energy community and the geographical scope of energy sharing

5. Activities of the energy communities in the Clean Energy Package

The Directives provide an extensive list of energy sector-related activities that energy communities are allowed to perform. Those include generation, consumption, supply, energy sharing, energy storage, aggregation, and management of distribution networks for both RECs and CECs, as well as the provision of energy efficiency, charging, and other energy services for CECs. While regulation frameworks exist for most of these activities, energy sharing within energy communities and the operation of distribution networks by energy communities requires particular attention from national authorities when implementing the Directives. Additionally, guaranteeing the protection of consumer rights of community members, is a crucial element of the adoption of RECs and CECs models and their smooth integration into the current energy landscape.

Accordingly, this section focuses on the establishment of a fair and proportionate regulatory framework for the activities of energy sharing and network management, and the protection of consumers' rights.

v the process should not be unnecessarily cumbersome and that complicated procedures for RECs and CECs are prohibited.

Some requirements of electric supply licenses may be technically and economically prohibitive for new players like energy communities. The supplier "License Lite" in the United Kingdom[3] tackles this issue by transferring some supplier responsibilities to third party licensed suppliers. Specifically, the License Lite relieves the new supplier from being a direct party of the following industry codes:

- The Master Metering Agreement which sets out the terms for the provision of Metering Point Administration Services and procedures in relation to the Change of Supplier to any premise/metering point.
- The Distribution Connection and Use of System Agreement. It provides a single centralised document that relates to the connection to and use of the electricity distribution networks. It

[3] https://www.ofgem.gov.uk/licences-industry-codes-and-standards/licences/licence-lite

includes the charging methodologies for connection to, and use of, the electricity distribution networks.
- The Connection and Use of System Code, the contractual framework for connecting to and using the National Electricity Transmission System.
- The Balancing and Settlement Code which defines the rules and governance for the balancing mechanism and imbalance settlement processes of electricity in Great Britain.

We emphasise that the License Lite class does not exempt new suppliers from following the aforementioned codes. Rather, it allows them to come to an agreement with a third party that would take over the responsibilities.

To consider:
Allowing some requirements of supply licenses to be delegated to a third party (e.g. a licensed supplier). This would permit energy communities to engage in supply activities and avoid substantial up-front costs and technical know-how. An example is the "License Lite" program in the United Kingdom.

1.15 Electricity sharing

Electricity sharing is a commonly referred value proposition of energy communities among industrials and researchers. However, as electricity sharing, or sharing for short, is not precisely defined in the Clean Energy Package, we observe different understandings of this practice among Member States and stakeholders.

1.15.1 Definitions of sharing and supplying

According to Articles 16 EMD and 22 REDII, CECs and RECs can share, within the energy community, electricity produced by the production units owned by the REC or CEC and by its members.

To consider:
The Directives define "electricity produced by the production owned by the community" as eligible for sharing. **We believe that it would be reasonable to explicitly include electricity produced by assets owned privately by community members as energy eligible for sharing**.

We define sharing as **transfers of electricity produced by units owned by either the energy community or community members between members and/or the community itself**. Sharers of electricity could privately agree on a set of contractual commitments such as whether sharing involves monetary transactions or not. Under our definition, electricity sharing can be sporadic among a malleable set of sharers or regular and predictable. To illustrate our definition, consider the following examples.

- A community-owned solar installation that allocates production among members (e.g. allocating production equally among members).
- Member A could then agree to transfer all or a portion of his personal allocation to member B.
- Community member C, who privately owns a solar panel, could decide to transfer half of its production to member A.

The following, however, would not be examples of sharing under our definition.

- The community receives electricity from outside the community (whether from a supplier or via a bilateral transaction) and then distributes to the community members.
- Electricity from an outside source is transferred from community member A to community member B.

The activity of supply is defined in Article 2(12) IEMD as "*the sale, including the resale, of electricity to customers*". In general, typical residential supply contracts give consumers the right to consume as they please (while meeting contractual specifications such as maximum load) and paying a pre-agreed tariff. In that context, when consumers engage in a supply contract with a supplier, they transfer their responsibility of imbalances caused on the system to the supplier. That is, the supplier is in charge of procuring the net load[4] of its end consumers through a mix of over-the-counter contracts, day-ahead positions, and/or spot market bids and is financially responsible for any mismatch between net load and procured energy. Thus, supplying at the residential level is normally tied to the transferring of balance responsibility from end consumer to supplier.

1.15.2 Relationship between sharing and supplying

In our view, the fundamental difference between sharing and supplying is that energy sharing should not be necessarily tied to the transfer of balancing responsibility between sharers nor to the entity organising energy sharing. In that sense, sharing looks more like behind-the-meter production from a supplier's point of view. Supply on the other hand, whether it comes from traditional suppliers or communities acting as suppliers, is tied to the transfer of balance responsibility. Other differences regarding the obligations of sharers and suppliers are discussed in Section 1.15.4

From a balance responsibility point of view, shared electricity could be seen as behind-the-meter production. That is, unless otherwise specified in the sharing contract or with the sharers' supplier(s), received electricity from a sharing arrangement bears no imbalance penalties (just like behind-the-meter production or load). Let it be clear that the identified similarities between received energy from a sharing arrangement and behind-the-meter are *only from a balance responsibility point of view*. Of course, unlike behind-the-meter production, energy received from a sharing arrangement uses the public grid and thus may be subject to network tariffs.

To consider:

Hinging the distinction between supply and sharing on the transfer of balance responsibility.

Whereas supplying implies a balance responsibility transfer from the end consumer to the supplier, sharing should not. A consequence of this is that sharing could be viewed as possibly one-off or sporadic transactions (though not necessarily) and that no financial penalties would be imposed for not delivering. To the best of our knowledge, this definition has not been explicitly proposed before.

Now the question is, how electricity sharing fits within a context where the community members have individual supply contracts and share energy between themselves? From the supplier's point of view, the energy received by a sharer from another community member subtracts from the net load to be supplied.

Initially, energy sharing could make forecasting the electricity to be procured a harder challenge for suppliers. As sharing ceases to be a new phenomenon, suppliers will likely learn

[4] The net load to be supplied is the difference between a customer's (or group of customers) load and energy supplied from other sources (e.g. local generation).

and become better at forecasting electricity procurement in systems with electricity sharing. However, the complexity of sharing patterns may start to weigh in on the efficient operation of the electric system.
The complexity of sharing could be further exacerbated if the community members are served by multiple suppliers. If all members are served by the same supplier, sharing would not affect the aggregate energy procurement and should not add any more challenges than behind-the-meter generation does. On the other hand, if community members are served by different suppliers, energy sharing from member A to member B could effectively means that the supplier of A needs to increase the amount energy procurement for member A and the supplier of B should reduce the energy procurement for member B[5]. One can imagine how complexity can rapidly increase as the number of sharers and suppliers in a system increases. However, this is generally not the case today but may be in a future and a place with a high number of sharers and suppliers regrouped in one system.
In such a case, an option for the regulators could be to require the sharers to communicate in advance (e.g. a day before) and commit to a set of transactions and making them financially responsible for imbalances with respect to such commitment. However, such a requirement could be prohibitive for the activity of sharing and may not be justified, and is, in our opinion, hardly advisable. An option that we consider more appropriate is the one adopted in the frame of the French self-consumption scheme, relating to the activity of energy sharing (see Section 1.15.5). In this scheme, the suppliers of each collective self-consumer stay responsible for the imbalance those may cause, as it is usually the case in traditional supplier-customer contracts in France.

To consider:
Providing suppliers and DSOs with sharing information (e.g. type of decentralised production units, sharing schedules, past transactions, and/or future transactions) **that allow them to better estimate the future net load of their customers and learn about consumption patterns**. Good forecast of load and consumption patterns is an essential element for the efficient operation of the electric power system.

1.15.3 Electricity sharing and energy flows

Transfers from sharing schemes are potentially virtual (i.e. financial), rather than purely physical, energy transactions. That is, sharing has financial repercussions on who pays whom for energy but not necessarily on the physical network energy flows. If a sharing arrangement does not impact the network flows, power meters cannot 'detect' the shared electricity. Thus, sharers must communicate information on the sharing arrangement with the entity responsible for metering (e.g. the DSO) to facilitate billing and settlement.
Consider the example illustrated in Figure 3. The goal of this example is to show that sharing arrangements do not necessarily change power flows in the network. All four diagrams show a case with a house consuming 5 kWh, a small business consuming 5 kWh, and a solar unit producing 5 kWh during a settlement period. In the second diagram (no sharing), both loads are billed by their supplier and the solar facility sells the energy to the market. In the sharing arrangement 1, the solar facility shares its production with the small business. Thus, the house is billed by the supplier while the small business does not receive energy from the supplier during the illustrated settlement period. Finally, in the second sharing arrangement, the solar facility shares with the house while the business is supplied by its supplier. Without communication of sharing information with the supplier or the DSO, it is impossible to know whom the supplier should bill.

[5] This example considers the volume of self-produced energy to be smaller than the consumption volumes, meaning that there is no excess production. In a case where an excess production is shared, the sharing would not trigger an increase in energy procurement from member A's supplier but would still reduce the energy procurement from member B's supplier.

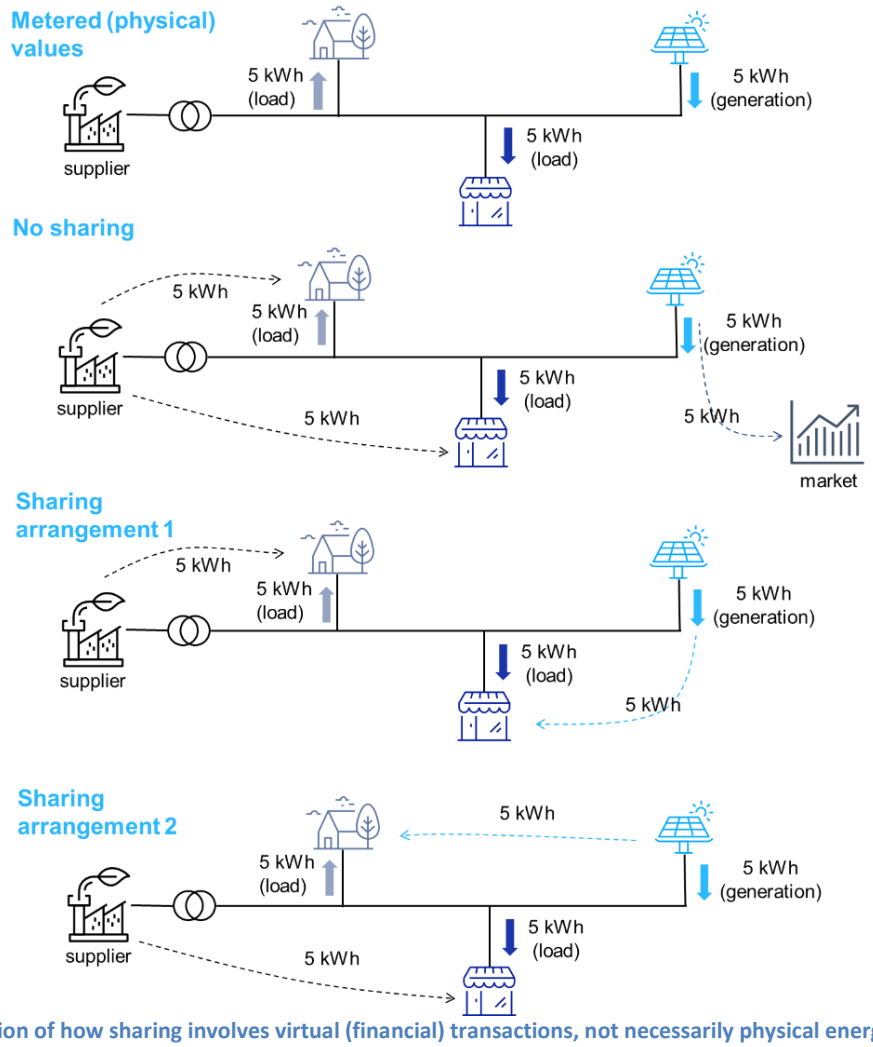

Figure 3: Illustration of how sharing involves virtual (financial) transactions, not necessarily physical energy transfers. The diagrams above show how three financial settlement scenarios are possible under a single set of energy flows.

Note that the potential virtual nature of energy sharing has implications for the question of network tariffs. In the example of Figure 3, the sharing arrangements have no impact at all on the operation of the electric system and thus on the network costs. Thus, the network fees for network cost recovery should be, *in theory and in aggregate*, equal in each of the three scenarios illustrated above (no sharing, arrangement 1, and arrangement 2). However, energy sharing will most likely have an impact on the operation of the system. In the short term, access to sharing may change the dispatch of resources and the system's energy mix. In the long term, incentives from access to sharing frameworks may alter the generation mix of the electricity system.

To consider:
If sharing arrangements have no significant impact on system and grid costs (as Illustrated in Figure 3), **the income from network fees and tariffs should not be altered by tariffs for shared electricity in order to remain cost-reflective**.

1.15.4 Rights and obligations of sharing and supplying

Article 10 paragraph 3 IEMD lists the elements that a customer-supplier contract must specify. Among them are the following:

- the identity and address of the supplier;

- the services provided, the service quality levels, and time for the initial connection;
- the types of maintenance service offered;
- the means to obtain up-to-date information on all applicable tariffs, maintenance charges, and bundled products or services;
- the duration of the contract, the conditions for renewal and termination of the contract and services;
- any compensation and the refund arrangements which apply if contracted service quality levels are not met;
- the method of initiating an out-of-court dispute settlement procedure;
- clearly communicated information relating to consumer rights.

Sharing, however, is a private and voluntary agreement between two or more end-users and should, in our opinion, not entail special rights beyond those associated with being final customers, active customers, renewable self-consumers, community members, and grid users. Moreover, the sharing agreement should not infringe on the aforementioned rights. Thus, in our view, responsibilities between sharers should be an agreement between private parties.
However, sharers should have responsibilities to the rest of the system since their actions do not happen in isolation: sharing will (typically) happen in the context of a public grid. Thus, sharers should be held responsible to perform the activity of sharing in ways that do not adversely impact the grid or in some circumstances, to pay for adverse impacts (e.g. through tariffs for grid usage). Obligations may include: registration of assets, monitoring and validation of asset performance and minimum power quality standards, providing DSOs with relevant operational information, providing relevant information for system planning, ensuring compliance with environmental regulation, and proper decommissioning of assets. For instance, in the frame of the French collective self-consumption, the Code de l'Énergie requires the DSO to gather from the collective self-consumers, (1) generation assets identification data, (2) the technical characteristics of the generation assets and their connection, and (3) the operating mode of the installations, specifying the surplus electricity produced. Additionally, the collective self-consumers have to communicate to the DSO the split of production from generating assets to each collective self-consumer at each metering step.
In our view, a fundamental obligation of sharers should be to communicate with DSOs, suppliers, and relevant actors the information to efficiently and securely facilitate sharing within energy communities. At a minimum, information on the electricity transfers done within a sharing framework (i.e. quantity, sender, receiver, and time of transfer) should be communicated ex-post with the metering responsible party for settlement purposes. Additionally, DSOs could ask for reasonable ex-ante information (e.g. forecasts of transfers) as long as these are duly justified, appropriate for the amount of electricity shared, and do not create barriers against sharing. Such ex-ante information could be useful for system operation (e.g. when procuring energy for supply or when calculating the available system capacity). Moreover, the information should be aligned with the timeframes for balancing, metering, and settlement.

To consider:
Requiring sharers to provide the DSO, supplier, and/or relevant actors information on the electricity transfers done within a sharing framework (i.e. quantity, sender, receiver, and time of transfer) **for settlement purposes**. Furthermore, ex-ante information could be requested by DSOs or suppliers to assist in the short-term planning of the system (e.g. for procurement of electricity and scheduling of resources).

1.15.5 An analysis of the French Collective self-consumption framework

The French collective-self consumption scheme is an example of a regulatory framework for electricity sharing. While this scheme is not a transposition of RECs or CECs, it provides useful

insights on how to organise and facilitate this activity. The scheme requires communicating with the DSO the percentage of production from generating assets[6] that is assigned to each collective self-consumer at each metering step. For example, in sharing arrangement 1 of Figure 3, the community would communicate 100% for the business and 0% for the house. In sharing arrangement 2, the values would be 0% for the small business and 100% for the house. The French scheme allows any allocation (e.g. 50% / 50%) as long as the allocated energy to each collective self-consumer does not exceed its load at each time step. These percentages and production measurements allow the DSO to calculate the residual load that was supplied to each customer by the supplier.
In our view, the French collective self-consumption is a good example of a minimalist approach to energy community-DSO cooperation to enable energy sharing. We consider it to be minimalist because it requires minimum pieces of information to be communicated to for the DSO and supplier(s) to calculate the external supply allocated to each collective-self consumer. Excluding the percentages or the production measurements makes the supply calculations impossible. Of course, the information exchange scheme could include further pieces of information (e.g. internal prices and compensation for sharing). However, if additional pieces of information do not contribute to the task of the DSO and supplier, communicating them would only add unnecessary weight to the communication infrastructure, protocols, and data management systems and create unnecessary privacy risks.

To consider:
A community-DSO-supplier information exchange framework to enable sharing that avoids communication of unnecessary information. This would contribute to leaner communication and data management infrastructure and the preservation of data privacy. The challenge for the regulator, however, is to determine what is necessary and unnecessary information for energy sharing schemes. The French collective self-consumption scheme discussed in this section is a good example of minimalist information exchange for sharing and collective self-consumption.

Note that collective self-consumption is only a special case of our general definition of sharing. In fact, the first example of energy sharing in Section 1.15.1, community-owned solar allocating production among members, is collective self-consumption. To enable a more general sharing scheme, the communication of information additional to those of the French scheme is likely needed. For example, in the French scheme, only proportions of *aggregate production* need to be calculated. In a more general setting, distinguishing production from individual generating units may be necessary to determine exactly who shares with who. However, information on individual sharing transactions (e.g. sender and receiver) may only be needed internally in the community and may add no value for the DSO and/or supplier(s).

1.15.6 Sharing and its relationship with renewable self-consumption and active customers

It is our view that it could be desirable to attempt to streamline regulation by including energy sharing, jointly acting renewable self-consumption, and jointly acting customers within a single framework. The framework would have to accommodate the fact that jointly acting renewables self-consumption and jointly active customer action can be performed outside an energy community and that the use of the public network for sharing and self-consumption may be subject to proportionate charges and tariffs. The framework would also need to accommodate the fact that energy sharing is just one of many activities that energy communities are entitled to perform.

[6] Generating assets include energy storage units in discharge mode.

To consider:
A single framework for jointly acting renewable self-consumers, jointly-acting active customers, and the activity of sharing. This means that:

- Independent of the transposition of energy communities-related provisions, Member States must develop a self-consumption framework for jointly acting renewable self-consumers and jointly acting active customers. To not duplicate transposition efforts, Member States could adopt a consolidated approach of collective self-consumption and sharing.
- The single framework should consider that renewable self-consumers and active customers have the right to operate outside an energy community.
- The framework should also consider that while tariffs and charges may not be levied for building-level self-consumption or sharing, tariffs and charges may apply when using the public network.

1.16 Operation of distribution networks

The Clean Energy Package gives Member States the possibility of allowing energy communities to *"become distribution system operators"* and *"manage distribution networks in their area of operation".* This could provide energy communities significant incentives to the local optimisation of demand, supply, and power flows in general and lead to more efficient use of the grids. This could also contribute to the mobilisation of private capital for the financing of grid investments, and more especially where grid expansions have been hindered due to local constraints (e.g. remote area, topological constraints, etc.)

Distribution networks are the physical connection links between end-users and the rest of the energy system. Operation of distribution networks is a critical activity and failures (e.g. service interruptions, low power quality, or poor customer service) could have far-reaching consequences for customers. Also, if an energy community ceases activities as a network operator, the "main" or incumbent DSO would have to cope with the consequences of any past mismanagement of the grid and increase the fees for network costs recovery for the DSO. If national authorities decide to grant energy communities the right to manage and operate distribution networks, they should also establish safeguards to ensure that quality of service and integrity of the grid are secured in the long term.

There does not seem to be a lot of experience of grids that are not managed by DSOs. The Netherlands has adopted an interesting approach towards the operation of distribution grids by energy communities (Hannoset, Peeters, & Tuerk, 2019). In 2015, the Dutch government established a regulatory sandbox framework for certain types of energy community projects that exempts them from some regulations. This regulatory sandbox enables, among others, energy communities to operate and manage distribution networks. The exemptions last for a maximum of 10 years and the government can impose restrictions to preserve imperative interests such as public safety and consumer protection. This approach allows national authorities to gather on-the-ground returns of experience and to identify the areas for further improvements of the scheme. Furthermore, imposing a rather short period for the operation of networks by energy communities de facto introduces a regular assessment of the performance of energy communities and provides an exit door for those that wish to cease this activity.

Article 30 IEMD (Designation of distribution system operators) leaves to Member States the determination of the period for which designated entities will be attributed to the task of distribution system operation. Member States could make use of this margin of freedom to design a dedicated type of distribution license for energy communities. This "community distribution license" could last for a shorter period than usual distribution licences, and tasks and responsibilities attached to this licence could potentially be adapted for small actors such as energy communities.

Regarding the ownership of the portion of the grid operated by energy communities, the delivery of the distribution licence must entitle them to conclude an agreement with the DSO of the area, under fair and non-discriminatory conditions. Deciding if the grid will be leased or bought by the community should be left to the discretion of both parties to the agreement. Contract terms and more specifically, prices applied should be approved by the NRA or the competent authorities.

To consider:
A "community distribution license" where energy communities are attributed the management of part of the network for a shorter amount of time (e.g. 10 years) **than regular DSOs**. The designation of energy communities as DSOs should be based on a proposal that complies with requirements set by law and decided by the competent authority in consultation with the DSO of the area. This recommendation intends to:

- Set up regular assessments of the performances of CECs and the regulatory framework.
- Allow CECs to withdraw from network management activity.

An important step of enabling energy communities to operate distribution networks relates to the interaction with the local DSO and the tariffs applied at the connection point. If the portion of the network managed by the community is connected to the main grid at the transmission level, these interactions will also have to be established with the transmission system operator (TSO). The connection tariffs therefore must be fair and proportionate and based on an accurate assessment of the incurred cost for the DSO (or TSO). In that regard, connection point tariffs should be subject to the approval of the NRA or the competent national authority. Also, charges at connection points should serve as a price signal for energy communities to align their behaviour (withdraw and injection in the main grid) with the needs of the system. That is, the charges structure should incentivise energy communities to optimise their operation to the benefit of the system. For instance, connection tariffs could be based on the system's peak demand, which would incentivise energy communities to deploy local flexibility capabilities to reduce system peak. Alternatively, connection tariffs could be based on a time-of-use energy component which would stimulate the energy communities to inject energy into the system when it is most needed.
The physical and structural changes energy communities might bring to the portion of the grid they operate could have significant consequences for the main DSO (or TSO) either directly or in the medium-long term. DSOs will have to take these changes into account when assessing the availability of flexibility within their grid and elaborating their network plan. Also, investments in the distribution infrastructure made by energy communities will impact the recovery of cost and could have decisive consequences if not well planned. Accordingly, we consider that before any investment in the distribution infrastructure is made, energy communities should present to the DSO their investment and updated cost recovery plan. In that process, the DSO would take the role of counsellor, ensuring such investment does not put financial sustainability of the community-operated network at risk. Investments cost recovery will most likely impact the grid tariffs applied to the customers located within the community distribution network. In that regard, Member States should also enforce oversight of community grid-investments by the national authority. The combination of these safeguard measures intends to ensure both long-term grid viability and that additional charges for end-users are not excessive and proportionate to the increased quality level of service.

To consider:
Consultation with the DSO prior to investments that affect the distribution network infrastructure and approval of these investments by the regulatory authority.

Access to metered data (and especially near-real-time metered data) is decisive for the efficient operation of electric networks. In most Member States, national authorities have designated the DSO as metering data managing party. As required by Article 23 of the IEMD, national authorities and metering data responsible parties are setting up data managing infrastructure to store and share data with eligible third parties. While energy communities operating grids should have access to relevant data, we consider that the data managing party designated by national authorities should remain the administrator of the digital infrastructure. The fragmentation of such infrastructure, is, in our view, unlikely to further support the operation of distribution networks by energy communities.
In order to keep a fluid retail market, we consider that DSO should be reassured on their primary role of metering data administrator and ultimately contribute to a level playing field that allows for fair competition between private parties and ensure that investment in data management and intelligent metering systems deliver the expected benefits.
In any case, energy communities managing a distribution network should comply with the same operational, safety, and maintenance standards than those traditional DSOs to guarantee the same quality-of-service level for end-users and the integrity of the grid in the long term. Also, one should notice that most energy communities will likely operate a portion of the grid with less than 100,000 customers and will hence be exempted from unbundling rules as per Article 35.4 of the IEMD.
As a general statement, we would like to emphasise that grid operation by energy communities is more likely to benefit to the electric system if good cooperation is established and coordination sought. The use of flexibility capabilities generated by the community will be possible if DSOs integrate these in their system planning. On the other hand, the technical support from DSOs to energy communities regarding investment decisions and day-to-day operational planning would greatly contribute to the success of energy communities in grid management.

1.17 Ensuring protection of consumers rights

The Clean Energy Package puts in place a comprehensive framework for consumer protection and information. It is important to ensure that an equivalent level of consumer protection and information is preserved with Energy Communities.
Both REDII and IEMD emphasise the protection of community members as final customers and require Member States to secure these rights, as well as the protection of the rights of non-members customers served by energy communities. Up to now, most obligations relating to consumer rights lean on the supplier and the DSO, but now energy communities will also have a role and obligations regarding consumer rights protection. With regards to energy services, consumers are guaranteed the rights to:

- an electricity connection so that households are connected to the local electricity network and supplied with electricity;
- a choice of electricity and gas suppliers as well as an easy and fast switch of suppliers and aggregators, without extra charges;
- clear contractual information and the right of withdrawal;
- accurate information on the consumption and billing based on it.

End-users entering an energy community will potentially have three levels of contractual arrangements: a contract with the community establishing his membership, a contract with its supplier, and with the DSO of its area. In addition, members could be part of the energy sharing arrangements.
Participation in RECs and CECs does not challenge energy consumer rights. In fact, it is likely that members will keep their relationship with their usual supplier and the DSO of the area. However, if the community acts as the supplier or the DSO of its members, the REC or CEC should bear the responsibility of protecting the rights of its customers.
While licensing and registration procedures should be made proportionate for energy communities, the Clean Energy Package provides that RECs and CECs should be subject to the

same obligations regarding consumer rights as energy service providers performing similar activities. That is, they should not benefit from a dedicated treatment. The licensing of an energy community as a supplier, an aggregator, or as a distribution network operator should trigger the application of the corresponding responsibilities toward its customers.
Also, supply contracts established between an energy community and its customers (whether a member of this community or not) must protect their basic contractual rights (Article 10 IEMD), establish fair switching rules (Article 12 IEMD) and provide accurate billing information (Article 18 IEMD). Such contracts must stipulate, among others:

- The type of services provided, the service quality levels offered;
- The duration of the contract, the conditions for renewal and termination;
- The method of initiating an out-of-court dispute settlement procedure;
- Compensation and the refund arrangements applying if contracted service quality levels are not met;
- A maximum delay of three weeks for switching supplier;
- No switching fees applied to households and small enterprises, or duly justified in accordance with Article 12.3 IEMD;
- The provisions of all billing information laid down in Annex I IEMD.

One should notice that once energy communities are registered and licensed as a supplier, they could potentially be appointed as supplier of last resort by national authorities, in accordance with Article 27 IEMD.
Similarly, when acting as a DSO, CECs must fulfil all the tasks attributed to DSO (Articles 31 and 34 IEMD). Finally, if an energy community fails to comply with its obligations towards its consumer rights, penalties imposed on traditional market actors should evenly apply to energy communities.

To consider:
Supplier and DSO consumer rights obligations for energy communities when they formally take these roles vis-à-vis their members and non-members customers.

- The supply contracts between an energy community and its customers must be established in accordance with Articles 10 (Basic contractual rights), 12 (Right to switch and rules on switching-related fees), and 18 (Bills and billing information) of the IEMD. The distribution contracts between an energy community and its customers must be established in accordance with Articles 31 (Tasks of distribution system operators) and 34 (Tasks of distribution system operators in data management) of the IEMD. The logic of bearing the same responsibilities toward consumer rights as traditional market actors should be replicated for each activity energy communities perform.
- Energy communities should be subject to the same treatment as traditional market actors when failing to comply with their contractual consumer rights obligations.

With regards to energy sharing, arranging and facilitating sharing by the energy community does not imply assuming the role of supplier (see Section 1.15). Thus, the energy community should not be subject to the obligations of suppliers. However, clear energy sharing arrangement information and the right to withdrawal from it must be guaranteed, so basic contractual rights of participants to sharing arrangements are not impeded.

To consider:
The guaranteed provision in the contractual arrangement of information on rights and obligations for end-customers participating in energy sharing. The right to withdrawal from this activity should be within the shortest timeframe possible.

Finally, in case of conflicts between the community and its members, the right to be helped by alternative dispute resolution bodies must also be guaranteed to community members. The model of alternative dispute resolution mechanisms is already well developed in the energy services sector and Ombudsmen have experiences to be easily replicated in the frame of energy communities.

To consider:
A dedicated dispute resolution mechanisms for potential conflicts between members and the community.

6. Integration of energy communities into the energy landscape

In the previous sections, we have studied topics that mostly concern the internal organization and activities of RECs and CECs. However, the smooth and efficient integration of energy communities into the broader energy landscape is crucial for their success. In this section, we discuss the topics of market access of energy communities, their access to information and financing, network tariffs for energy communities and their members, the levelling of the playing field for energy communities, and the DSO-energy community cooperation.
Member States should strive to set up an institutional interaction framework that contributes to the removal of unjustified regulatory and administrative barriers and to the monitoring of energy community development. Additionally, Member States should promote a framework that ensures institutional regulatory and capacity-building support from public authorities to enable the setup of RECs and CECs.

1.18 Level playing field for energy communities

The Directives intent to make RECs and CECs active in all (almost) branches of the energy sector. To perform each activity, energy service providers are subject to conditions and requirements. Energy communities should be applied these conditions in a non-discriminatory and proportionate manner.
Equal treatment of energy communities and other energy market actors would ease the legal integration of energy communities in the current energy services landscape, as it would not require a dedicated framework to be created by national legislators. Additionally, this option would ensure that by being subject to existing constraints, the participation of energy communities in the different activities they are allowed to perform, is aligned with their actual capabilities (finances, level of professionalism, time available, etc.).
However, energy sector rules being originally designed for large players, adapting the rules to smaller actors would result in a more proportionate treatment, and would, in the end, contribute to the decentralisation of the energy sector. However, this option presents two main drawbacks. First, it creates the risk of the legal vehicle being used to circumvent rules applying to non-energy community actors. Second, allowing energy communities to take on certain activities while they lack technical and financial ability to guarantee a minimum level of service could harm end-consumers.
In our understanding, the answer to the question of the level of regulation to be applied to energy communities' activities lies in the distinction between RECs and CECs. The REDII and the IEMD provide that RECs and CECs should be subject to fair, proportionate treatment when it comes to the activities they perform, registration and licensing procedures, and network

charges. In other words, Member States are entitled to adapt and lower existing regulatory constraints to establish a level-playing field for RECs and CECs. In addition, due to differences in membership structure and geographical scope, RECs are also entitled to additional privileges to provide a level playing field, such as dedicated support schemes as per Article 22(7) REDII.

To consider:
(1) Energy communities should be subject to similar responsibilities and regulatory provisions as market actors performing similar activities. This includes all activities listed in the Directives.
Meanwhile, regulatory constraints related to access to activities (supply, aggregation, etc.) **should be adapted to ensure the integration of energy communities** in the energy landscape. This concerns especially grid connection procedures as well as registration and licensing procedures, to better fit the different generation models (in terms of size and capacity) of energy communities (see Section 1.19). Additionally, dedicated tender procedures for RECs and revised supporting schemes could be designed by national authorities.
(2) National authorities should consider revision of their regulation around responsibilities and activities' exercise conditions for fair and effective integration of small actors (not only energy communities) in the long term.

One should consider the possibility for energy communities to access energy markets through aggregation, as a way for them to cope with energy sector regulations that would not be adapted to the smaller actors. Also, the experience of aggregators in bidding and their ability to mix different energy sources for more effective biddings could greatly benefit to energy communities.
Finally, the delegation of responsibilities tied to specific activities (e.g. balance responsibility, billing activities, etc.) to third parties would also enable energy communities to provide the required level of services when they might lack the technical and financial capabilities to guarantee it by itself.

To consider:
Simple procedures for energy communities to delegate the responsibilities to third parties.

- Delegating to third parties the responsibilities that accompany the activities performed by energy communities would allow them to overcome barriers to energy services provisions due to their small size and possible lack of expertise. This would, in the end, contribute to their participation in energy markets.
- Energy services companies interviewed in the frame of this study seem to agree that traditional market actors are willing to perform such responsibilities (against fair remuneration). They already have experience and strong capabilities in that field. In the end, this would also contribute to the evolution from a volume-based business model to a service-based one.

1.19 Market access

The Directives mandate market access of energy communities to all relevant markets, either directly or through aggregation in a non-discriminatory manner. Relevant markets for RECs are

renewable gas, heating, and electricity markets and relevant markets for CECs only include electricity markets. Of the latter one, RECs and CECs should be able to offer energy, capacity, and ancillary services in forward, day-ahead, and balancing (intra-day) markets as well as in over-the-counter markets. Access to markets is mandated by the Directives and beneficial to the viability of energy communities. In addition, it also helps to advance the Clean Energy Package's goals of communities providing social and economic benefits to society (including facilitating the integration of renewable energy sources) and mobilising private capital for the energy transition.

The Directives impose market access by energy communities through three main features: 1) it should *be "non-discriminatory"* or fair 2) *"all relevant markets"* should be accessible, and 3) market access can be *"direct or through aggregation."*

Our understanding of the element of fairness and non-discrimination lies in the principle of a level playing field: similar actors performing similar activities should have similar rights and obligations in the marketplace. Our understanding of the level playing field allows for different actors to be treated differently as long as the differences are properly justified. For example, suppose that a community-owned energy storage unit provides higher quality flexibility services (e.g. faster and more precise) than a conventional fossil-fuel generator. The principle of level playing field would allow higher compensation for flexibility services from the energy storage unit – even if the market product is not able to differentiate the quality of the service (e.g. due to lack of resolution of the relevant measurements). Providing a level playing field significantly addresses the elements of market access to all relevant markets through direct access or aggregation. The REDII calls for an enabling framework to promote RECs. Presumably, this would allow Member States to 'tilt' the playing field to promote RECs over other entities and forms of organisation.

Since existing examples of energy communities exhibit a diversity of purposes, governance models, sizes, and owned assets, it is hard to determine to which other market players they, in general, resemble as far as the question of market access is concerned. However, we identify two general models: 1) a community with large or medium scale central generation and 2) communities with small distributed generation. Naturally, energy communities could have feature characteristics of these two extreme models (i.e. a hybrid model). Figure 4 illustrates the two extreme models (the centralized and distributed generation models) and a hybrid between the two.

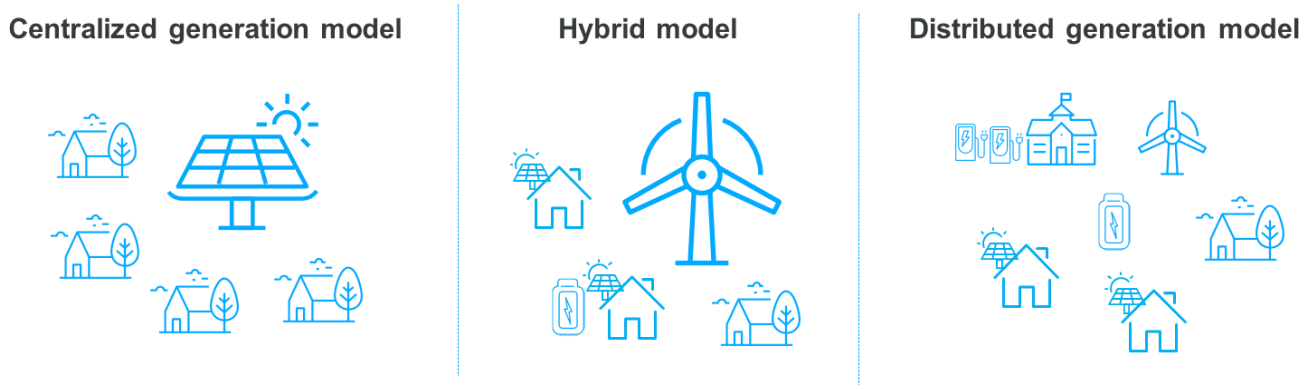

Figure 4 Illustration of the centralized, distributed, and hybrid generation models.

In the centralised model, we assume that the generation unit is large enough to directly participate in markets[7]. In this case, we consider that a level playing field for market participation implies being subject to the rights (e.g. support schemes) and obligations (e.g. licencing and minimum technical requirements) of the same plant operating outside the context of an energy community.

The advantages of equal treatment of community-owned and non-community owned generation include that it is a safeguard for the 'gaming' of the energy community

[7] If it is not the case that a community-owned centralized unit is large enough to participate directly in markets, the distributed model is more appropriate.

framework(s), reduced distortion of the marketplace, and the REC and CEC legislation standing on firmer legal grounds. A way of balancing the low level of professionalism of energy communities and relieving them of technical and economic barriers is the UK's supplier License Lite (see Section 5 for further details). A similar idea, whereby some obligations are delegated to a more capable third party, could be applied to licensing market access.

To consider:
Allowing energy communities to delegate market participation responsibilities to third parties. A related example is the UK's "License Lite" program for suppliers. **A similar arrangement could be put in place for market access**. It is important, however, to delegate rather than suppress responsibilities as these may be important for technical and economic reasons.

In the distributed model, all community-owned generation units are too small to participate directly in the markets. In this case, the community could act as an aggregator of these small units to gather enough capacity to participate in markets. In this case, we consider that energy communities could access the market as *aggregators* of the resources in their own communities. In such a case, we believe it is appropriate to allow energy communities, both RECs and CECs, to directly access electricity markets if they meet the characteristics and obligations set by Member States and Articles 13 and 17 IEMD. In fact, the IEMD explicitly allows CECs to perform the activity of aggregation and to access all electricity markets. If an energy community is unable (e.g. because its aggregated capacity is still too small) to access markets as aggregators, then they should have the right to contract with a third-party aggregator and enjoy the rights outlined in Article 13 IEMD which governs contracts with aggregators.
In a nutshell, it is our view that market access rules, and especially production licensing requirements, should differentiate generation units by their technical features instead of their owners. This would allow small actors operating small units to access more easily energy markets. On the other hand, to compensate for the potential lack of technical knowledge and of professionalism of energy communities, they should be offered the possibility to contract with other market actors to delegate against fair remuneration responsibilities tied to licensing and market participation. Alternatively, energy communities must be allowed to access energy markets through aggregation
However, providing a level playing field when accessing existing markets may not be enough to achieve fairness and non-discrimination for energy communities. Since most markets were designed at a time when the electric system was highly centralised (i.e. with production from large generators), the markets themselves may have inherent and structural biases against RECs, CECs, and other decentralised actors in today's energy system. Thus, a rethinking of markets and adoption of market reform ideas such as the ones proposed by (Pérez-Arriaga & Knittle, 2016) and (Robinson, 2019) may be necessary for a *true* level playing field for energy communities. Some of the proposed market reform ideas include revising bidding formats to reflect the operational constraints of new resources such as demand response and energy storage, better price signals for reserves and flexible resources, and accounting for the locational value of resources.

1.20 DSO cooperation

The Directives explicitly call for DSOs to cooperate with RECs and CECs to facilitate intracommunity energy transfers (i.e. to facilitate sharing of electricity). Regarding energy sharing, an important task of communities, suppliers, and DSOs is to agree on how to allocate local energy production and consumption among members for billing and cost assignment purposes. DSO has the visibility of how much is consumed by each community member and how much it is produced by each production facility (at the metering frequency). However, it does not have visibility on how the production is allocated among the members and the source

of the consumption. Thus, to determine the energy delivered by the supplier to each community member, the supplier must know how much local energy each member was allocated.
Based on current experiences with community and self-consumption schemes in Europe, it is reasonable to assume that most energy communities will be connected to the distribution level and have important contact with the local DSO. Some energy communities might be quite passive in nature, meaning that they will not engage in sophisticated control of their resources or market participation. However, some energy communities may well engage in active and sophisticated control of their assets, actively participate in various markets, and own assets that have important effects on the grid. Thus, per Articles 31 and 32 IEMD, DSOs have to actively cooperate with energy communities to:

- Ensure the long-term reliability of the system;
- Provide energy communities with information needed for effective access to and use of the system, including billing and metering arrangements that might preclude energy communities to engage in more advanced business models;
- Act as a neutral market facilitator under transparent, non-discriminatory, market-based procedures;
- Procure flexibility services;
- Develop the network development plan.

The decentralisation of generation assets and the increasing involvement of end-users as market participants is making distribution system planning an always more dynamic exercise. DSOs cannot consider the end-users located within their areas only as consumption points anymore, but also as generation and injection points. If energy communities are successful in developing their flexibility potential, DSO could directly benefit from it by internalising this potential. In that context, DSOs should seize the opportunity of cooperation with energy communities to integrate into their system planning the developments of communities' energy systems.

To consider:
(1) Ensuring transparent cooperation of DSOs with energy communities, especially regarding connection requests. In that regard, the correct transposition of provisions in the IEMD applying to DSOs would be enough to ensure fair and non-discriminatory treatment of energy communities (Articles 31 and 32 IEMD).
(2) Mechanisms for energy communities to provide input for distribution system planning and perhaps actively participate in it. This would advance the objective of providing benefits to society and local areas.

1.21 Access to finance and information

Access to private finance is often cited as an obstacle for the take-off of energy communities, e.g. by (Roberts, Bodman, & Rybski, 2014), (Gancheva, O'Brien, Crook, & Catarina, 2018), and (Vansintjan, 2019). Energy communities often are too small and risky to access loans with low-enough interest rates and favourable enough conditions.
A major objective of energy communities in the Clean Energy Package is also to mobilise private capital for the energy transition (Energy Communities - Implementation of the Clean Energy Package). However, as energy-related projects are often capital intensive, RECs and CECs may need to seek external sources of funding. Furthermore, an important intent of the Clean Energy Package is to empower citizens in the energy transition – something that cannot be achieved if, in practice, only entities with enough private capital can participate. In particular, REDII calls for Member States to provide an enabling framework to promote and facilitate the development of RECs which shall ensure that tools to facilitate access to finance

and information are available. Thus, it is our view that for Member States to successfully promote RECs, as the enabling framework calls for, easing access to finance for RECs is required.

There are several approaches to provide quality financing for communities that cannot find it in the private finance marketplace. For example, in Scotland, the Community and Renewable Energy Scheme (CARES)[8] provides grants for prospective energy communities to perform feasibility studies and loans for the development of a project. Another example is the Green Bonds program[9] in Denmark whose aim is to finance sustainability-related projects (e.g. water management, district heating, energy efficiency, and clean public transportation). A less-government centric approach to finance energy communities is RESCoop's MECISE project. MECISE leverages the benefits of aggregating community energy projects to access funds otherwise unavailable to small community projects, combine funds from private and public sources, and use their umbrella organisation to add credibility to individual community projects (Vansintjan, 2019). This way, RESCoop MECISE can provide "seed funding" and allow energy community projects time to further raise capital. An example of innovative financing schemes is the Som Energia Generation kWh program[10]. Through it, citizens can provide funds in €100 increments for a shared production facility. In return, investors receive a quantity of clean energy for self-consumption proportional to the investment made at production cost and the invested funds at the end of a 25-year period.

To consider:

Publicly supported loans and grants programs for projects that are of public interest and cannot access funds in favourable terms in the private financial markets.

- Examples are CARES[1] program in Scotland and the Green Bonds program[1] in Denmark.
- Member States could draw inspiration from the RESCoop MECISE project to incentivise the formation or put in place programs to leverage the aggregation of community projects when accessing funding.

Another way energy communities tend to be disadvantaged compared to traditional actors is on the access to information and know-how. Thus, it is crucial that Member States make administrative and regulatory processes as free of burden as possible. An interesting institution that could potentially aid in the navigation of administrative and regulatory process are "one-stop shops" previously applied to energy innovation of buildings (Boza-Kiss & Bertoldi, 2018). One-stop shops for energy communities could assist to current and prospective energy communities in navigating administrative processes, understanding regulation, providing technical advice (or directing energy communities to relevant sources), connect communities to technical service or finance providers, among others.

To consider:

One-stop shops to assist energy communities in navigating the different administrative, technical, and financial endeavours associated with creating an energy community.

- "One-stop shops" have been applied to energy innovation of buildings (Boza-Kiss & Bertoldi, 2018).

[8] https://www.localenergy.scot/
[9] https://www.kommunekredit.dk/en/green-bonds/
[10] https://www.generationkwh.org/

An interesting example of a framework national authorities could set up to support the development of energy communities is the Irish Sustainable Energy Community (SEC) Program[11]. Supervised by the Sustainable Energy Authority of Ireland (SEAI), the SEC program is a three-step scheme (learn-plan-do) that provides technical and financial support to energy communities. Figure 5 illustrates the SEC program journey.

Figure 5: Support and tools of the SEC program (source: Sustainable Energy Authority of Ireland)

The first step of the program is to join the SEC network which is composed of more than 300 energy communities. During this first phase, emerging communities connect with and learn from members of the network to identify and determine the type of projects they would like to develop. In the second phase, the community engages in a three-year partnership with the Sustainable Energy Authority of Ireland. During this phase, communities benefit from the technical support to establish an energy master plan and define the work plan. The third step is for the community to identify funding sources and applying to eligible ones.
In our opinion, the SEC program constitutes an effective and fit-for-purpose supporting scheme for the development of energy communities, as it promotes cooperation between communities and leaves them space to self-determine their projects while benefiting from technical and financial support from public authorities.

1.22 Network tariffs

Network tariffs are price components paid by electricity consumers to finance the past and future costs of building, and the cost of operating the electricity grid (Commission staff, 2015). While the main goal of network tariffs is to finance the grid, they also serve as important price signals for end consumers and energy communities.

[11] https://www.seai.ie/community-energy/sustainable-energy-communities/community-network/

Note:
The Directives intends to make energy communities and its members subject to non-discriminatory and cost-reflective tariffs. That is, energy communities and members should not be unfairly disadvantaged, but neither should they be given unjustified privileges. Thus, our recommendations address characteristics and issues brought forth by energy communities but could be more widely applied to non-energy community cases.
Furthermore, it is outside the scope of this work to make highly technical or specific recommendations. Instead, we intend that our recommendations will bring attention to specific issues brought forth by energy communities that should be considered when designing tariffs.

In a nutshell, the Directives call for RECs and CECs to be subject to cost-reflective and fair network charges. Additionally, the enabling framework of RECs calls for the non-discrimination of REC participants in their role as consumers. From this, we can deduce that REC members should be themselves subject to non-discriminatory tariffs as any other end consumer in the system. For individual and joint renewable self-consumers REDII calls for the self-generation that stays within the premise, to be free of charges[12].
However, under some tariff structures, this exemption may violate the principle of cost-reflectivity of tariffs. For example, if a tariff includes fixed network costs in the tariff's energy component, a so-called volumetric tariff, exempting self-generating electricity effectively means exempting self-consumers from paying into the system's fixed costs (which, by definition, do not change as a function of self-consumption). Furthermore, the lack of revenue needed to cover fixed costs could endanger the recovery of the network costs and/or push costs to end-users that are not members of the energy sharing arrangement. Thus, to comply with both the REDII and the principle of cost reflectivity and for networks to be financially healthy (i.e. they can recover their costs), volumetric-heavy tariffs may need to be revised.
Network tariffs are closely related to the Clean Energy Package objectives of increasing supply security. For one, the financial sustainability of the system, i.e. properly funding its network infrastructure, is fundamental to having a secure electricity supply. Tariff design is an important tool for sending end-users and energy communities economic signals that would guide them to operate and invest in ways that provide economic benefits for the electricity grids (Robinson, 2019).
Network tariff design is a broad and deep topic that is outside the scope of this report but it is worth listing good tariff design principles (Pérez-Arriaga & Knittle, 2016). The first key principle is ***cost reflectivity***, which means that the payments by RECs, CECs, and community members (and any network user, in fact) should be reflective of the cost it incurs in the system. In theory, an optimally cost-reflective tariff should reflect the long-run marginal cost an end-user and its behaviour incur on the system. In any case, network tariffs for energy communities should not trigger an increase in network charges paid by those outside consumers. The second key principle is ***cost recovery***. Because DSOs are typically monopolists, regulators define the network costs to be recovered. Finally, tariffs typically should **address distributional issues** (e.g. affordability and non-discrimination), they should be **transparent**, **simple** (as mandated in Article 18 IEMD), **and predictable**, and should **not expose the end customer to abrupt changes**, i.e. their changes should be gradual (Pérez-Arriaga & Knittle, 2016).
The concept of ex-post reimbursement of portions of the tariff has been identified in (Hannoset, Peeters, & Tuerk, 2019) and by some of the stakeholders that we have interviewed. The idea is to reimburse portions of the tariff (e.g. to communities or individual members) if their behaviour and that of their assets have contributed positively to the system and reduced overall costs (e.g. by leading to diverted investment costs). We identify two

[12] As mentioned in Article 21 (paragraph 3) REDII, fees or charges may be applied by Member States if the renewable generation is effectively supported by support schemes, the overall share of self-consumption exceeds 8% of the total installed capacity of the system (and other conditions are met), the self-generated energy is produced by installations exceeding 30 kW.

benefits of ex-post reimbursement over ex-ante reduction of the tariff (which in terms of accounting, are equivalent). First, there may be a behavioural aspect of a reimbursement that makes it more attractive to the end-customer and better at incentivizing behaviour. And second, an ex-post reimbursement takes the risk from the network operator's hand. Rather ex-ante rewarding for system benefits provided by energy communities and hoping that those benefits materialize (e.g. an avoided investment), the network operator would reimburse only if the benefits materialise.
Clear incentives and subsidies are also an element that had a wide consensus among the interviewed stakeholders. Rather than modifying the tariff to subsidise favoured technologies, it would be preferable to do so through clear and targeted subsidies. A strong argument for not providing implicit subsidies through tariffs is that the tariff's primary purpose should be to recover network costs. Adding further purposes to the tariff risks making it less transparent by obfuscating cost components. Furthermore, we advise Member States to consider energy communities as a means to extend renewable integration rather than an end in itself, although this should not be at the cost of eroding the social nature of the concept in terms of citizen empowerment. In this view, the challenge is to provide energy communities with access to existing RES support.

7. Conclusions

In June 2019, the EU fully adopted the Clean Energy Package. In the context of decarbonisation of European economies and decentralisation of the energy system, the Clean Energy Package institutionalises the concept of energy community by defining CECs and RECs in Article 16 IEMD and Article 22 REDII respectively.
Building upon existing literature and interviews with a broad range of energy stakeholders, this document provides a set of propositions to national authorities related to the main areas of concerns around the implementation of energy communities.
Essentially, this report also considers previous experiences of Member States with energy communities-related concepts as well as the latest development in national laws. We were able to collect returns of experiences of early implementations for the elaboration of our recommendations. In that regard, we strongly encourage Member States to cooperate and learn from each other.
Presenting a detailed technical analysis of each topic addressed is neither the intention nor in the scope of this report. Instead, we aim at providing guidance on the approach Member States should adopt when implementing energy communities. Our main message is that energy communities must embody their intended purpose. Namely, that of providing environmental, economic, or social benefits to their members or the areas where they operate. Energy communities should not be disproportionately favoured, but regulation and market rules need to be adapted to allow them to exist and thrive. Most importantly, citizens are eager to play a role in the energy transition and Member States should seize this opportunity by enabling grassroots movements to contribute to the decarbonisation of our societies. Finally, we would like to point out that the implementation of energy communities in the Clean Energy Package constitutes an exceptional opportunity for Member States to rethink their market design rules and enable the evolution of the energy sector toward a more citizens-led, sustainable, and decentralised system.

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