CEER

Council of European Energy Regulators

Fostering energy markets, empowering **consumers**.

Customers and Retail Markets and Distribution Systems Working Groups

Regulatory Aspects of Self-Consumption and Energy Communities

CEER Report

Ref: C18-CRM9_DS7-05-03
25 June 2019

Council of European Energy Regulators asbl
Cours Saint-Michel 30a, Box F – 1040 Brussels, Belgium
Arrondissement judiciaire de Bruxelles – RPM 0861.035.445

INFORMATION PAGE

Abstract

This document, C18-CRM9_DS7-07-01, sets out CEER's consideration of "Regulatory Aspects of Self-Consumption and Citizen Energy Communities".

This document seeks to analyse the regulatory implications of new and developing practices, such as self-consumption, Citizen Energy Communities and Renewable Energy Communities. CEER developed a regulatory approach to analyse these developments in the energy market. To input into this process, the National Regulatory Authorities (NRAs) were asked to describe current and near-future examples of self-consumers and energy communities in their countries, from both a regulatory and consumers' perspective.

The analysis is based on several case studies submitted by NRAs. The document will serve as both an overview of ongoing developments in the respective Member States and also address regulatory challenges at an early stage, to enable innovation whilst ensuring that consumers benefit from these new practices.

Target Audience

NRAs, European Commission, energy suppliers, traders, Citizen Energy Community representative groups, third party intermediaries, gas/electricity customers, gas/electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Self-consumption, Citizen Energy Communities, Renewable Energy Communities, Clean Energy Package, DSOs, energy storage, flexibility.

If you have any queries relating to this paper, please contact:
CEER Secretariat
Tel. +32 (0)2 788 73 30
Email: brussels@ceer.eu

Related Documents

CEER documents

- Conclusions Paper on Incentives Schemes for Regulating Distribution System Operators, including for innovation, CEER, February 2018 Ref: C17-DS-37-05,
- CEER Regulatory White Paper on Renewable Self-Consumers and Energy Communities, CEER White Paper series on the European Commission's Clean Energy Proposals, July 2017
- ACER-CEER Regulatory White Paper on The Role of the DSO, ACER-CEER White Paper series (paper #2) on the European Commission's Clean Energy Proposals", ACER/CEER, May 2017
- ACER-CEER Regulatory White Paper on Facilitating Flexibility, ACER-CEER White Paper series (paper #3) on the European Commission's Clean Energy Proposals", ACER/CEER, May 2017
- CEER Position Paper on Renewable Energy Self-Generation, CEER, September 2016 Ref: C16-SDE-55-03
- CEER Position Paper on Principles for the Valuation of Flexibility, CEER, July 2016 Ref: C16-FTF-09-03
- Conclusions Paper on The Future Role of the DSO, CEER, July 2015, Ref. C15-DSO-16-03,

External documents

- Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity (recast) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L0944
- Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG
- Conclusions of the 9th meeting of the Citizens' Energy Forum ", European Commission, May 2017 https://ec.europa.eu/energy/sites/ener/files/documents/conclusions.pdf

Table of Contents

List of Figures

List of Tables

EXECUTIVE SUMMARY

Background

Community-driven energy projects have been part of the European energy landscape since its inception in the early 20th century. The recent growth of decentralised renewable energy technologies has made direct participation in energy production and management more accessible. As a result, many community-led projects have been instrumental in the local deployment of renewable energy.

Community energy encompasses projects at a collective level, which seek to extend opportunities beyond that of individuals acting in isolation. With the recently finalised Clean Energy Package (CEP), the European Commission formally recognises community energy projects by providing new definitions for “Renewable Energy Communities” (RECs) and “Citizen Energy Communities” (CECs). Throughout this document the term “energy communities” is used to refer to CECs and RECs collectively. The CEP also aims to strengthen the rights and clarify the obligations of grid users engaged in both individual and collective self-consumption.

Objectives and Contents of the Document

This paper aims to define concepts, show implications and raise questions to support informed discussions among stakeholders and National Regulatory Authorities (NRAs) in the perspective of Clean Energy Package (CEP) implementation at a national level. The paper also analyses the regulatory implications of the formal recognition of citizen and renewable energy communities and arising issues such as collective self-consumption.

The document begins by defining the concepts of self-consumption, collective self-consumption and energy communities. It then provides an overview of ongoing developments in the respective Member States (MS) and examines the main regulatory aspects of self-consuming, selling and sharing of electricity. Additionally, it analyses the impact of electricity sharing schemes on consumer rights and consumer protection. Energy sharing and local matching are common objectives of communities that pose further challenges, particularly, the coordination between the supplier(s) and the community in the case of consumers that are only partly supplied by the community.

The paper then discusses the role communities can play in providing flexibility to both the market and grid operators, building on previous CEER work on the topic of flexibility in distribution systems. It also discusses the specific regulatory questions that arise where communities manage their demand in a coordinated way and enter flexibility markets. It outlines the requirement for adequate price signals, to ensure that flexibility is used where and when it can provide the most value to the system as a whole, and not just to the energy community it is serving by passing costs onto those outside the community.

The final area of analysis is on the issue of owning, operating and managing electricity networks. This is one of the most critical areas for the potential of energy communities. The challenge for both NRAs and energy communities is to enable the benefits of energy communities to develop in a way that is compatible with the principles of the 3rd Package – specifically free trade across the European grid to maximise the most cost-efficient operation of generation. This paper builds on previous CEER work regarding the principles of regulation of DSOs, by analysing how these different principles can be applied to energy communities to ensure consumers remain protected.

Brief Summary of the Conclusions

CEER welcomes the role of both Citizen Energy Communities and Renewable Energy Communities as mechanisms to help reach the EU's decarbonisation targets and to involve citizens more strongly in energy matters. CEER considers that the formal recognition of energy communities in the EU policy framework is likely to make them more prevalent but also – due to national transposition – diverse. However, CEER wants to ensure that energy communities do not become a vehicle to circumvent existing market principles, such as unbundling, consumer rights or the cost sharing principles applied to energy grids. Furthermore, CEER stresses the need to ensure that energy communities do not avoid costs to the benefit of their customers, whilst passing them onto the wider customer base.

Energy communities should be able to compete on a level playing field, meaning the regulatory framework should be such that they do not face undue barriers nor create undue distortions in existing markets.

The provisions adopted in the CEP remain relatively open to interpretation, and transposition into national law will be critical to the viability and valuable role of such communities. Each MS should ensure that the following areas of the regulatory framework are sufficiently addressed:

I. **Consumer rights** – Energy communities may more closely link generation and supply and it is important that participants of energy communities maintain the same consumer rights, for example, around switching supplier to ensure quality of service and contractual certainty.
II. **Balancing and flexibility** – Energy communities could help to enable the flexibility potential of customers and therefore more effectively integrate renewables and new technologies, e.g. electric vehicles (EVs), into the grid. Effective market design is essential to ensure this reduces system costs overall, and not just for those within the energy community. Multiple suppliers to consumers will also need to be managed effectively through clear contractual arrangements and data transparency, but this is the same issue as with third party aggregation and not CEC specific.
III. **The business model and market design** – Local consumption should still respond to effective market price signals. The 3rd Package is based on trading electricity within large bidding zones to ensure the most cost-efficient operation of generation.
IV. **Grid ownership, operation and development** – Energy communities owning grid infrastructure remains optional for MS. However, if and where this approach is adopted, it should avoid duplication of assets, ensure economic efficiency, be subject to appropriate regulation in line with the regulatory framework for DSOs and ensure customers receive an adequate level of quality of service.

1 Introduction

Community driven energy projects have been part of the European energy landscape since its inception in the early 20th century. In recent years, the development of decentralised renewable energy technologies has made direct participation in energy production and management more accessible. In many EU Member States (MS) various types of projects and initiatives have emerged in the energy sector and, arguably, have been an important driver in the deployment of renewable energy. With its "Clean Energy for all Europeans" package (CEP) initially published on 30 November 2016, the European Commission proposed for the first time to formally recognise community energy projects in European legislation. After over two years of negotiations, the CEP has been finalised and includes a definition for "Renewable Energy Communities" (RECs) in the recast Renewable Energy Directive (RED II)[1] and for "Citizen Energy Communities" (CECs) in the recast Electricity Market Directive[2]. Throughout this document the term "energy communities" is used to refer to CECs and RECs collectively. The CEP also aims to strengthen the rights and clarify the obligations of grid users engaged in either individual or collective self-consumption by clarifying these terms.

CEER has observed this evolution with interest and published a white paper with its initial reaction to the CEP proposal in 2017. Since then, CEER has continued to develop its thinking on the potential regulatory implications of the formal recognition of CECs and RECs, and on the regulatory aspects of legal frameworks for collective self-consumption, which are already emerging in various MS.

This CEER report formalises initial reflections about (collective) self-consumption and energy communities. When it comes to consumer rights, the new Electricity Market Directive and RED II do not define a full framework for energy communities or their members. This framework needs to be specified by each MS in accordance with the new Electricity Market Directive - especially article 16 - and within general principles set by both directives. This report also contains views on which framework could be applied by each MS to ensure efficient consumer protection.

Chapter 2 clarifies the definitions of energy community and self-consumption in their various forms. To better understand these concepts, CEER has looked at a number of case studies of existing energy initiatives that could be considered energy communities. The high-level outcome of this review is summarised in Chapter 3 and the detailed case studies can be found in Annex 2. To refine its understanding of the activities of energy communities, the drafting team for this paper also met with both EU and national level stakeholders.

Building on the case studies reported to CEER and the new EU legal framework, this report analyses the aspects of energy communities that CEER considers the most relevant and potentially critical from a regulatory point of view.

[1] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, amending Directive 2009/28/EC.
[2] Directive (EU) 2019/944 of the European Parliament and of the Council on common rules for the internal market in electricity, amending Directive 2012/27/EU.

In Chapters 4 to 6, the main regulatory aspects of self-consuming, selling and sharing of electricity are discussed. CEER sees a specific need to analyse the impact of electricity sharing schemes on consumer rights and consumer protection. Energy sharing and local matching, which are common objectives of communities, pose further challenges, such as the coordination between the supplier(s) and the community in the case of consumers partly supplied through the community.

Chapter 5 discusses the role communities can play in providing flexibility to the market and to grid operators. This paper builds on previous work CEER has done on the topic of flexibility in distribution systems, and discusses the specific regulatory questions that arise when communities manage their demand in a coordinated way and valuate their flexibility in markets.

Chapter 6 analyses the regulatory aspect of grid ownership and operation through energy communities. Building on previous CEER work regarding the principles of regulation of Distribution System Operators (DSOs), this report analyses how the different principles NRAs apply to the regulation of DSOs can be applied to energy communities.

2 Definitions and Legal Framework: Self-consumption and Energy Communities

This section aims to clarify the definitions of self-consumption, collective self-consumption and energy communities and to present the new legal framework. These definitions are based on the legal framework set by the CEP, which are not necessarily aligned with existing projects that CEER has analysed in the context of this report. These discrepancies will be shown in chapter 2. Figure 1 provides a brief overview of the three definitions, before addressing all three in more detail throughout this chapter.

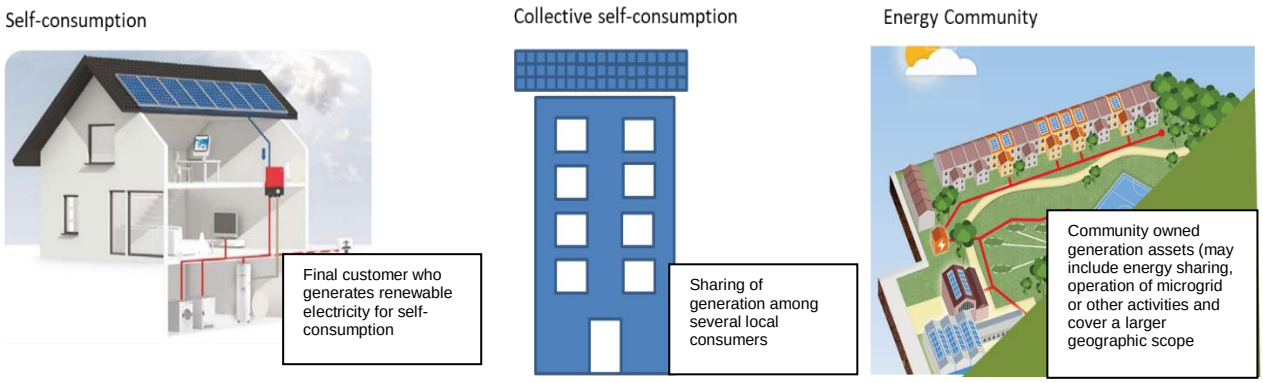

Figure 1 Diagram showing self-consumption, collective self-consumption and energy community

2.1 Individual Self-Consumption

Self-consumption is not a new concept, and individual self-consumers, meaning final customers that consume energy they produce on site are relatively widespread in many MS. Both the recast Electricity Market Directive[3] and the RED II[4] introduce new definitions formally recognising self-consumers. In both cases, final consumers are entitled to consume and store electricity they have produced within their premises and to sell this electricity. Both definitions also explicitly allow MS to extend the domain of these activities beyond the self-consumers' own premises. But cases in which these activities represent a professional actor's primary commercial or professional activity are excluded.

In terms of differences, renewable self-consumers are limited to producing electricity from renewable sources, whereas the definition of active customers also explicitly includes activities beyond energy generation such as the participation in flexibility or energy efficiency schemes.

[3] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity (recast) Article 2 (6) : *'active customer' means a final customer, or a group of jointly acting final customers, who consumes or stores electricity generated within their premises located within confined boundaries or, where allowed by a Member State, within other premises, or sell self-generated electricity or participates in flexibility or energy efficiency schemes, provided that these activities do not constitute their primary commercial or professional activity;*

[4] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) Article 2 (14): *'renewables self-consumer' means 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, and who may store or sell self-generated renewable electricity, provided that, for a non-household renewables self-consumer, those activities do not constitute its primary commercial or professional activity;*

2.2 Collective Self-Consumption

In recent years, development of a sharing economy, along with the increased financial viability of self-consumption, has led to an increased interest in direct sharing of electricity between producers or self-consumers and other final customers. Whilst collective self-consumption has been recognised in certain national legal frameworks – such as France and Austria – or within pilot projects, the CEP marks the first time that this concept is formally being recognised in EU-level legislation.

In the Electricity Market Directive, the concept of active customers includes groups of jointly acting customers, whereas the RED II defines jointly acting renewable self-consumers in a separate definition[5]. This definition is restricted to groups of renewable self-consumers who are located in the same building or multi-apartment block and does not explicitly allow MS to extend the geographic scope.

2.3 Energy Communities

The Clean Energy Package introduces energy communities into European legislation. The definitions of "Citizen Energy Community" (CEC) in the recast electricity market Directive[6] and of "Renewable Energy Community" (REC) in the RED II[7] are similar but have some critical differences.

Both types of energy communities are entities that are set up as a legal person. They are defined by their structure. They must be effectively controlled by their shareholders or members, and their primary objective is to provide environmental, economic and social community benefits rather than financial profits. Although similar in their nature, there are a number of differences in the definition of citizen and renewable energy communities. The main differences are summarised in Table 1.

[5] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) Article 2 (15): 'j*ointly acting renewables self-consumers' means a group of at least two jointly acting renewables self-consumers in accordance with point (14) who are located in the same building or multi-apartment block*;

[6] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity (recast) Article 2 (11) *'citizens energy community' means a legal entity that: (a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises; (b) has for its primary purpose 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 (c) may 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*;

[7] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) Article 2 (16): '*renewable energy community' means a legal entity: (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities; (c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits*;

	Citizen Energy Community	Renewable Energy Community
Membership	Natural persons, local authorities, including municipalities, or small enterprises and microenterprises	Natural persons, local authorities, including municipalities, or small enterprises and microenterprises, provided that for private undertakings their participation does not constitute their primary commercial or professional activity
Geographic limitation	No geographic limitation, MS can choose to allow cross-border Citizen Energy Communities	The shareholders or members must be located in the proximity of the renewable energy projects that are owned and developed by the Renewable Energy Community
Allowed activities	Limited to activities in the electricity sector. Electricity generation, distribution and supply, consumption, aggregation, storage or energy efficiency services, generation of renewable electricity, charging services for electric vehicles or provide other energy services to its shareholders or members	Can be active in all energy sectors. Production, consumption and selling of renewable energy
Technologies	Technology neutral	Limited to renewable energy technologies

Table 1 – Characteristic differences between Citizen Energy Communities and Renewable Energy Communities

In terms of regulatory treatment, the key difference between CECs and RECs lies in the nature of the Directives from which they emerge. While CECs are formally recognised as a market actor in the recast Electricity Market Directive (Article 16), the text purely aims to create a level playing field for them in the energy market. RECs on the other hand, emerge from the REDII (Article 22) which updates the framework for the promotion of energy from renewable sources. In that sense, the REDII foresees that MS provide an enabling framework that is subject to the provisions relevant for the different activities (supplier, aggregator, etc.) to promote and facilitate the development of RECs. For example, according to the REDII, MS shall take into account specificities of RECs when designing support schemes in order to allow them to compete for support on an equal footing with other market participants.

Throughout this document, the authors refer to CECs or RECs where they touch on aspects that only concerns the specific type of community. Where statements apply to both REC and CEC, the authors refer to them as “energy communities”.

3 Summary of the Case Studies and Regulatory Issues of Self-consumption and Energy Communities

To better understand the concepts of self-consumption and energy communities, CEER has analysed a number of existing energy initiatives that could be considered energy communities. The findings of these case studies are summarised in this chapter. The detailed descriptions of the case studies are collected in Annex 2.

3.1 Self-Consumption

While individual self-consumption is possible in most MS, collective self-consumption is an emerging concept. Some MS have already put forward legal frameworks for collective self-consumption, or are in the process of developing new ones.
The specifics of the models vary, and different solutions were chosen to ensure compatibility with the principles set by the 3rd Package and national law emerging from it.

- **Scope:** In many cases, collective self-consumption is currently limited to cases that do not involve the use of the public grid (e.g. in Austria), but can be extended further, for example, to consumers located behind the same MV/LV transformer (e.g. in France).
- **Legal structure**: In some cases, customers wishing to engage in collective self-consumption need to form a legal entity, as is the case in France. In other cases, the arrangements can be less formal.
- **Technologies**: Most MS have chosen to restrict collective self-consumption to renewable energy, with some exceptions for high efficiency cogeneration.
- **Consumer protection**: Most frameworks safeguard the right for consumers to choose their supplier individually.
- **Network charges and taxes**: MS generally do not apply network charges on electricity exchanged without the use of the public grid. Taxation of collectively self-consumed electricity is handled differently in various countries. Some choose to apply exemptions (within limits) from electricity taxes, whereas others apply the full tax rate on all consumer electricity.

3.2 Energy Communities

CEER reviewed a few projects which can be identified as potential energy communities. Most of these were local initiatives in the energy sector developed as pilot projects or within the existing legal framework. Some are citizen led projects while others emerged under the impulse of innovation projects. The projects CEER identified through case studies can be categorised into the following types:

- **Community owned generation assets**: This is currently the most common type of energy community. The members of such communities usually do not self-consume the energy produced, but sell it to a supplier. The income is typically shared with members and/or reinvested in energy projects. The activities of such communities can be larger and can include a social component – for example the provision of energy efficiency services – but usually do not consist of an active role in energy markets.
- **Virtual sharing over the grid**: Some energy communities, which own and operate generation assets, do not only share the profits, but also share the energy produced among their members. This type of sharing can be organised through a common supplier, who takes care of the matching between production and consumption and supplies additional energy if needed. A community can also be a vehicle to organise collective self-consumption e.g. in France

- **Sharing of local production through community grids**: A third level of integration of energy communities consists whereby energy is physically shared through a community grid. These kinds of communities have emerged in different contexts. For example, energy grids on islands without connection to the mainland, or in other remote locations can be community owned. These communities are typically not a new phenomenon, and have emerged from a need to generate electricity away from the main grid. A more recent development CEER has observed through case studies are initiatives that aim to set up local grids in areas with existing grid connections. Some of these initiatives are driven by the local communities' wish to consume local energy. On the other hand, projects have also emerged under the impulse of energy companies in a drive to innovate in the smart grid space and to create microgrids, which can function in an islanded space.

Several case studies identified would not qualify as CEC or REC under the CEP framework because they involve an energy company or benefit from exemptions as pilot projects. This does not necessarily mean that such projects will be prohibited in a post-CEP framework but instead will simply not be able to explicitly claim the rights of energy communities.

3.3 Regulatory Issues

The diverse reality of (collective) self-consumption and energy communities, and the wide scope of the definitions in the CEP means that active consumers, renewable self-consumers and (renewable/citizens) energy communities touch upon many different areas of regulation. Particularly within the realm of consumer protection and network regulation, including supplier and network charging arrangements.

Certain aspects of energy communities, such as community ownership of simple generation assets or direct services to the local community (e.g. advice on energy efficiency or initiatives to help reducing energy poverty) are largely unproblematic from a regulatory point of view.

However, energy sharing, be it directly or within energy communities, in some respects defies the classical supplier-customer relationship. Energy communities may act as a supplier, as a service provider (e.g. providing aggregation services) or, if allowed by the relevant MS, as a grid operator. These activities fall under the realm of the Electricity Market Regulation[8], and consequently need particular attention from a regulatory point of view.

This paper presents a first CEER assessment of the most relevant aspects of energy communities. Given that the EU framework leaves a lot of liberty to MS for the transposition, the criticality of many of these aspects will depend on how the principles of the Directive(s) are reflected in national laws. This paper hence remains at a relatively high level and, in some cases aims to raise relevant questions rather than provide prescriptive solutions.

The following chapters (4-6) examine the regulatory issues linked to three key functions of self-consumption and energy communities:

- Chapter 4 - Self-consuming, selling and sharing electricity;
- Chapter 5 - Managing electricity consumption and providing flexibility; and
- Chapter 6 - Owning, operating and managing electricity networks.

[8] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.

For each of these functions, we analyse questions linked to (i) business models and market design; (ii) technical and network considerations; and (iii) consumer rights and protection.

4 Self-consuming, Selling and Sharing Electricity

Summary of the chapter

- Energy sharing can take varying forms with varying levels of commitment by the parties involved.
- The community can be a de-facto supplier, taking on the form of existing "supplier light" models depending on national regulatory frameworks.
- The energy from collectively used or community production assets can be consumed on top of the traditional supply from the supplier.
    - The CEP introduces a right to engage in this kind of sharing, independently from the traditional supplier.
    - If energy is shared through the public grid, adequate grid fees apply. Any savings through local sharing must reflect a benefit for the grid.
    - Overall, the supplier whose customer is engaged in electricity sharing will sell less energy directly to the consumer, but will still have to cover consumption when self-generation is not possible. This will likely coincide with high market prices. These suppliers are also likely to be confronted with a higher balancing risk compared to having a "passive" consumer. Overall, this leads to additional costs (per kWh sold), which needs to be recovered in one way or another.
    - Suppliers often also have public service obligations which are currently recovered based on the energy supplied (e.g. taxes and fees per kWh supplied). MS will need to decide whether the community needs to fulfil these obligations, or if the supplier remains responsible for recovering these costs and if fees based on energy are the most appropriate way to achieve this.
- Consumer rights need to be safeguarded, even if customers engage in sharing:
    - Consumers cannot be forced into a sharing scheme or community, and cannot be prevented from joining one as long as they fulfil the technical criteria.
    - Consumers need to be adequately informed of the conditions of their supply, regardless of it source.
    - Consumers need to be able to choose their supplier freely, and are free to change without undue barriers.

4.1 Overview

Participants in local energy projects often aim to share local energy and consume the energy produced within the project. This leads to new relationships between those who are producing, distributing and supplying, either within a community, or through collective self-consumption schemes.

4.2 Business Models and Market Design

Since there is no physical way to ensure that local production goes to local consumers (except through full islanding), collective self-consumption and community energy schemes use various contractual tools to allocate production to their stakeholders.

In these situations, the community acts as a producer, and a *de facto* supplier, either through a standard supply contract, or, more commonly, through local sharing or collective self-consumption schemes that are more adapted to the size of the community. Such energy sharing schemes are emerging in different MS, with varying arrangements.

Business models in the UK

In the UK, several models have been developed to allow alternative supply arrangements for actors that are not operating under a full supply license. These are set out below:

- **Licence exempt**; Supply exemptions are available for small suppliers that are providing electricity they have generated themselves with generation devices of a capacity of up to 5MW, of which no more than 2.5MW can be supplied to domestic customers.[9] The supplier is required to have a commercial agreement with a licensed supplier to provide key industry services[10].
- **White Label:** A third party supplier works in partnership with a licensed supplier to offer branded products. For example, the White Label typically recruits and manages the customer interface (often locally) and licence requirements, such as code compliance and consumer protection, sit with the licensed supplier.
- **Licensed Lite Supplier:** A new route to market to help new suppliers reduce the high-cost, high-competency barriers of establishing and operating a supply business. It does this by partnering with an existing licensed supplier to deliver some of the more costly and technically challenging parts of a licence. The supplier is fully licensed and responsible for all other aspects.
- **Sleeving/third party netting**: This is a variant of a standard power purchase agreement (PPA). In a PPA, a buyer generally agrees to take off power from a producer at conditions agreed in advance. Sleeving/third party netting is a PPA between a licensed supplier and a producer, which links the generation directly to the customer. It is in general used by non-residential producers or prosumers wanting to sell electricity directly to a final customer. The licensed supplier emulates a peer-to-peer trade sharing arrangement by taking the electricity in question into its balancing perimeter and delivering it to the final customer. In that respect, the involved supplier manages the imbalance risk of the exchange.

Some MS introduced the possibility for entities that are not fully licenced suppliers to take over certain supplier tasks, as illustrated by the example of the UK in the textbox above. These models generally have a licensed supplier involved to safeguard consumer rights and the link to energy markets. White label supply, for example, also exists in the Netherlands, but the underlying licensed supplier needs to have the contractual relationship with the customer and remains responsible for processes such as billing.

Some MS, such as France and Austria, have developed a framework for collective self-consumption, where energy can be shared within a group of customers, without requiring the direct involvement of a supplier. With the new provisions from the CEP, this kind of direct sharing of electricity will become a right, without necessarily requiring active involvement from the supplier of the remaining electricity[11].

[9] Licence exemptions (for generation, distribution and supply) are set-out in the 2001 Electricity (Class Exemptions from the Requirement for a Licence) Order. The order details four classes where licence exemptions are permitted: class A (small suppliers), class B (resale), class C (on-site supply) and class D (offshore supply). Class A allows for the supply of up to 5MW of own-generated electricity (but no more than 2.5MW to domestic premises).

[10] The commercial agreement would include the following services: licensed supplier passes on costs of using public network; metering services; affirmation to DNO of agency relationship between the exempt and licensed suppliers for purposes of the National Terms of Connection agreement; top-up, back-up and spill arrangements to meet customer demand where the exempt supplier's generation facility cannot and to manage excess generation.

[11] See Article 16, paragraph 2a (e) of the Directive (EU) 2019/944 on common rules for the internal market in electricity (recast).

Local Matching and Virtual Energy Sharing

Jointly acting active consumers or energy communities that collectively self-consume, or act as a supplier to their members, will often try to match the local generation with local demand to increase the ability of consuming locally generated electricity. This can be done through 'virtual energy sharing' which aims to allocate the energy produced to another consumer in the same imbalance settlement period and is ideally coupled to demand management if demand or production have some degree of flexibility. Demand management will be further discussed in chapter 5. Virtual energy sharing has been considered for energy communities where it is limited to community members living in a certain area, but also on a larger scale among geographically distant customers.

4.3 Technical and Network Considerations

Most publications on peer-to-peer energy sharing cite one benefit very prominently: decreased dependency on the grid and ultimately the avoidance of network costs.

However, virtual energy sharing will only have a positive technical impact on network costs if it incentivises its participants to change their consumption or production pattern in a way that is consistent with the needs of the system. This will only happen if consumption is actively managed by the participants of the sharing scheme and the physical limitations of the network or the power system is taken into consideration. This is not a trivial task and requires deep knowledge of the grid, as it implies accounting for the grid's technical current and voltage limits adjusted for real-time losses, in order to avoid network constraints.

To truly reduce network costs, measures such as load management for local sharing have to avoid grid constraint persistently. Therefore, it is critical that the measures are also effective during extreme situations, both on a diurnal and seasonal basis.

Given the difficulty of exactly aligning price signals with grid constraints, there is a desire to ensure that participants in energy sharing schemes receive price signals that are at least as effective as those sent to "standard" customers. This is necessary both to ensure that:

- Virtual energy sharing schemes bring incentives that are generally efficient; and
- Network cost are distributed evenly and fairly without discriminating against vulnerable customers and those who are not able to participate in peer-to-peer energy sharing or self-generation.

To this effect, the CEP states that where electricity is shared over the public network, it will still be subject to the cost-reflective, fair and transparent network charges, and CEER strongly agrees with this principle. Any mechanisms involving virtual net metering or peer-to-peer arrangements that are used in energy communities, should be subject to normal market principles and charges and any savings in network charges for collective self-consumption should reflect a value for the grid.

For this reason, in its *Position Paper on Renewable Self-Generation*[12] from 2016, CEER already advised to avoid net-metering of self-generation as it implies that the system acts as free storage. It reduces consumers' time-value sensitivity to volatile energy prices and hence undermines efforts to enhance flexibility and to develop a wider demand-side response with consumers playing a more active market role. The principle of exchanging energy strictly in the same imbalance settlement period should also be applied to virtual energy sharing, either local or distant.

The Bethesda Project[13]

A not-for-profit Energy Local Club (ELC), called "Cyd Ynni – Ynni Lleol" has been formed with households and the electricity producers as members. At present, the main generator is the National Trust owned hydro scheme and over 100 households are involved. More community owned hydro schemes are in planning. All households have smart energy meters installed to show when and how much power they are using. Through the smart meters, the consumers receive information and advice to help them match their electricity use to local generation, for example choosing to turn their washing machine on when they know the local hydro scheme is working at full pelt. Members agree to pay a price ("match tariff") to the generator when they match their energy demand to the energy generated locally. The partner energy supplier "Co-operative Energy" sells extra power when there is not enough local electricity generated. They send each household the bill for their total power use.

Coordination Between Local and "Back-up" Supply

The possibility of local exchange of energy, be it through collective self-consumption, sharing the output of a co-owned production asset, or peer-to-peer trading, raises the question of the relationship between the supplier and the local source of supply. Locally shared production may provide for part of the consumption, but in most cases, a "back-up" supplier will still be needed to meet demand when the local production is not generating.

This means that a single customer, with the same delivery point, could have various sources of supply such as:

- A licensed supplier;
- A "local supply"; and
- Energy purchased through a virtual sharing platform.

Currently, the regulatory framework for supply is well-defined, and suppliers' obligations are clearly stated. They cover:

- Obligations related to customer protection and information; and
- Obligations related to balance responsibility: the supplier is responsible for minimizing the difference between the consumption of its customers and the energy sourced (generated under his balance perimeter or bought) and pay for any remaining imbalances (the imbalance price per imbalance settlement period).

[12] CEER Position Paper on Renewable Energy Self-Generation, CEER, September 2016 Ref: C16-SDE-55-03
[13] Bethesda Project, http://www.energylocal.co.uk/cyd-ynni/

On the other hand, there is currently no general framework stating what the responsibilities of a "local supply source" or of an energy sharing platform are in terms of customer protection and information. This will be one of the challenges in transposing the CEP dispositions in national law.

Regarding balancing responsibility, the main challenges will be to allocate energy volumes between a supplier, a local source and a platform that supplies the same customer because they directly affect balancing responsibility. The methods to do so may be different for industrial sites and residential customers.

If no shared balancing responsibility scheme is implemented, the supplier remains responsible for balancing the whole metering point: the customer gets what it can/or wants, from the local production/trading platform, and the supplier supplies the remaining part, to match consumption. In such situations, the supplier will probably provide comparatively more energy when it is expensive (in the evening for instance), and comparatively less when it is cheap (e.g. on sunny afternoons). Therefore, it will incur more cost per/kWh sold. The supplier also has a higher risk of incurring imbalances, which will most probably be charged to the customer.

In many MS, the supplier also performs public service tasks such as collecting network charges or levies based on the energy consumed. The national legislators will have to specify if local communities and energy platforms must collect them, or if the supplier is still in charge of collecting network charges and levies for all the electricity consumed by its customers (including the kWh obtained from a local source/energy trading platform). Firstly, it would mean an additional administrative burden on local communities or energy platforms. Secondly, it means an additional cost for the supplier.

If MS decide to make the supplier responsible for most of the tasks associated with supply, even for the kWh provided by other sources, different aspects have to be taken into account. For instance, if the licensed supplier needs to explicitly agree with such a deal, they could try to charge more to customers that are part of an energy community. This brings the risk that some customers will not be able to find a satisfactory supplier offer because they are part of an energy community.

If suppliers are obliged to offer customers within an energy community the same conditions that apply to any other customer of the same type, then there is no risk of direct discrimination of customers who take part in an energy community. But, this situation leads to a risk of free riding and cross-subsidisation, since the extra costs associated to the higher imbalance risk and, possibly, higher average cost of energy from the grid will in the end be borne by all customers.

This cross-subsidisation is not a new phenomenon. Even within a single consumer segment, there will be some difference of consumption pattern, and thus of cost generated. But this is manageable if these differences remain negligible. The risk here is that the difference between members of energy communities and other consumers will be significant.

4.4 Consumer Rights and Protection Considerations

This sub-chapter will consider the different stages of participation in sharing arrangements – be it directly or within a community – and the potential associated regulatory issues.

CEER agrees with the general provisions of the CEP, which guarantee that consumers' rights shall not be impacted through their participation in energy sharing, be it directly, or through an energy community.

With respect to self-consumption and energy sharing within an energy community, two dimensions need to be considered separately. The first is the status of the individual participant of the community as an energy customer supplied by the community, either through a conventional supply arrangement or through sharing arrangements organised within the community. In this role of energy consumer, the participant is governed by energy market rules, the details of which will mainly depend on the rules defined by each MS after transposition of both Directives. The second dimension is the membership or shareholdership of the energy community. Depending on the legal principles applicable in each MS, the contractual arrangements may have no direct impact on consumer rights and energy consumer protection legislation should still prevail.

The first right for consumers in terms of energy communities, is that they should be able to freely choose whether they want to enter into sharing arrangements, an energy community or neither. For example, a tenant renting a property within a building with a PV plant which is shared among different flat owners have the right to choose if they want to participate in the self-generation and self-consumption model or if they to choose a form of supply completely independent of the energy community of the building. Conversely, they should also not be prevented from joining an existing energy community or sharing arrangement.

During the lifetime of an energy community, the consumer should keep his right to be well-informed of pre-contractual information, as defined in Article 10 of the recast Electricity Market Directive[14]. The consumer should also be informed of the price of his supply contract, including the price of the shared energy, if the arrangements are such that an energy price can be determined. In this perspective, one regulatory issue could be the provisions of the contracts concluded between the energy community and the consumers, particularly regarding each participant's share of energy consumption.

Consumer rights for collective self-consumers in France

In France, the current legal framework (pre-CEP) for the collective self-consumption scheme, states that the "organising legal entity" is not subject to the specific pre-contractual information obligations regarding electricity supply contracts. In particular, the provisions of annex VII regarding the minimum requirements for billing and billing information based on actual consumption of the Directive 2012/27/EU on energy efficiency do not apply to the "organising legal entities".

They do not have the obligation to offer a one-year contract to consumers.

[14] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity (recast) Article 10, paragraph 2 "…*Conditions shall be fair and well known in advance. In any case, this information shall be provided prior to the conclusion or confirmation of the contract. Where contracts are concluded through intermediaries, the information relating to the matters set out in this paragraph shall also be provided prior to the conclusion of the contract. Final customers shall be provided with a summary of the key contractual conditions in a prominent manner and in concise and simple language…*"

The "organising legal entity" is also not obliged to offer identical tariffs to every consumer with the same characteristics (in order to maintain tariff equalisation) and may therefore offer different prices to consumers belonging to the same category. The risk is obviously a potential discrimination between consumers.

The framework for energy communities should also guarantee the right to change supplier. This right is stated in the CEP, however, in some cases consumers may not be able to effectively change supplier. For instance, if the supplier is closely linked to the local community or the supply offer includes some of the community's services, such as shared ownership of production or storage assets, the provision of services linked to energy sharing or to consumption management. Such ties may require a long-term commitment from the customer, especially if consumption management projects require investment (storage, connected objects, insulation work, etc.). Although consumers will remain legally entitled to change supplier, they may find it more difficult to do so in such cases. Contracts with energy communities should therefore guarantee that taking part in an energy community does not hinder the effective right to change supplier.

For consumers that are sharing energy, whether within a community or directly with other active consumers, the question of switching supplier not only regards the external supplier, but also the part of supply that is shared by other consumers. The Directives are not explicit whether switching provisions apply to such arrangements in an equivalent manner.

When or where an energy community acts as a supplier, Article 12(3) of the recast Electricity Directive applies[15].

It may be considered, even if the relationship between the consumer and the energy community is mainly contractual, that termination fees should also be proportionate when the member or the shareholder leaves the energy community. In the French collective self-consumption model, for instance, the consumer linked to an organising legal entity may not have the right to terminate the contract at any time without a charge and may be subject to the termination conditions set out in the contract between the consumer and the "organising legal person".

Consumers that participate in an energy community or engage in energy sharing should not lose access to protection measures for vulnerable consumers, as provided by the legal framework of individual MS. Especially where such protection measures are in place through obligations on suppliers and/or DSOs, safeguarding consumer protection will need to be given particular attention within the national transposition of the Directives where communities take on tasks of suppliers or DSOs. This aspect is particularly relevant for RECs, given that the REDII explicitly provides RECs need to be accessible to vulnerable consumers and low-income consumers.

[15] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity Article 12(3): *Member States may permit suppliers or market participants engaged in aggregation to charge customers contract termination fees where those customers voluntarily terminate fixed-term, fixed-price electricity supply contracts before their maturity, provided that such fees are part of a contract that the customer has voluntarily entered into and that such fees are clearly communicated to the customer before the contract is entered into. Such fees shall be proportionate and shall not exceed the direct economic loss to the supplier or the market participant engaged in aggregation resulting from the customer's termination of the contract, including the costs of any bundled investments or services that have already been provided to the customer as part of the contract. The burden of proving the direct economic loss shall be on the supplier or market participant engaged in aggregation, and the permissibility of contract termination fees shall be monitored by the regulatory authority, or by an other competent national authority*.

Energy Cheques in France

In France, for the beneficiaries of the energy cheque or "voucher", payment of the electricity share coming from the local producer is currently not possible. "Organising legal entities" are not recognised as legal entities or organisations to which the refund of the energy check is open. Therefore, they cannot be part of this system.

Finally, the consumer should have access to alternative dispute resolution mechanisms as provides in Article 26 of the recast Electricity Market Directive[16].

It is currently unclear to what extent members or shareholders of energy communities and self-consumers engaging in sharing will benefit from out-of-court dispute resolution mechanisms when the energy community is acting as a supplier.

[16] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity Article 26 (1): *Member States shall ensure that final customers have access to simple, fair, transparent, independent, effective and efficient out-of-court mechanisms for the settlement of disputes concerning rights and obligations established under this Directive, through an independent mechanism such as an energy ombudsman or a consumer body, or through a regulatory authority. Where the final customer is a consumer within the meaning of Directive 2013/11/EU of the European Parliament and of the Council (23), such out-of-court dispute settlement mechanisms shall comply with the quality requirements of Directive 2013/11/EU and shall provide, where warranted, for systems of reimbursement and compensation*.

5 Managing Electricity Consumption and Providing Flexibility

Summary of the chapter

- Flexibility or consumption management are often part of the business or essence of energy communities.
- Regulatory issues linked with flexibility or consumption management are in most cases not specific to energy communities. However, the development of energy communities may bring new perspectives to already existing regulatory issues.
- An energy community can offer flexibility, which may be valuable at system level, but at the same time may generate constraints on the local network.
- Consumers' basic rights should also be protected when consumers are part of an energy community offering flexibility or consumption management.
- Energy communities can facilitate the access of consumers to energy markets and to flexibility or consumption management services, but energy communities offering flexibility and consumption management services could generate some difficulties for consumers, especially for vulnerable ones.
- Active consumers or energy communities should be aware that they are responsible for their imbalances as stated in the CEP.

5.1 Overview

The activities of active consumers and energy communities analysed by CEER for this paper (see Annex 2 for the full description of case studies) are not limited to passively consuming the energy that is produced within the energy community. They often strive to increase the level of self-consumption by managing their demand, be it directly, or by using various forms of energy storage. This demand management gives them a certain level of flexibility that they can seek value from in different ways depending on the market framework they operate in. Demand management is often paired with efficiency measures to reduce consumption overall.

The recast Electricity Market Directive also explicitly allows CECs to provide electric vehicle charging services, which can provide considerable flexibility. The REDII opens RECs up to different forms of energy, enabling energy communities to market flexibility in electricity markets while engaging in sector coupling activities such as heat storage or, possibly, power-to-gas.

5.2 Business Models and Market Design

Community activities that CEER reviewed in the context of this paper often aimed to access the flexibility of their members, for instance by providing demand management technology or to collectively add flexibility potential, for example by using heat or battery storage. Unleashing the flexibility potential of their members is often part of the energy community's business model, either directly or indirectly.

In some cases, this flexibility is used to increase (collective) self-consumption, which leads to cost savings in terms of energy that has to be bought from wholesale markets. The aggregation of demand and shifting of demand patterns can also allow energy communities to consume when spot markets offer lower prices, if they have access to market price signals. Alternatively, other initiatives aimed at reducing their grid costs, either by consuming less energy from the grid or by reducing their (collective) connection capacity.

There is potential for energy communities to generate revenue through participation in flexibility mechanisms such as balancing, ancillary services, etc. However, these markets are currently still complex to access for small players, who may face high relative costs. This business model has only been observed in a minority of cases. As the recast Electricity Market Directive gives active consumers and energy communities the right to access these markets directly through aggregators, this could become a more prevalent model in the future.

In some cases, the use of flexibility and consumption management can even be a way to achieve independence from the rest of the power system, making islanding technically possible, for example for outage situations, or, in very specific cases where this decreases overall costs for society, to create independent microgrids (see chapter 6.3).

For some energy communities, consumption management services also serve another purpose, by empowering their members, and making them more aware of consumption patterns to potentially reduce their consumption overall. In these cases, consumption management is not directly aimed at economic benefit, but it is considered a necessary feature to respect the community's values of empowering electricity consumers.

From a regulatory standpoint, most of the questions raised by consumption management and flexibility services are not specific to energy communities, but generally apply to the development of flexible demand and aggregation. Indeed, at first consideration, the existence of energy communities changes little to the development of flexible distributed assets in the grid, especially in markets where aggregation is already possible. The same can be said of – sometimes aggregated – demand side response resources.

The deployment of flexible assets, and aggregation of flexibility resources raises a number of regulatory issues ranging from technical considerations over market design, to customer information. These questions, however, are not specific to energy communities and are being analysed in detail in other CEER papers[17][18].

Nevertheless, the development of energy communities can bring a new perspective to already existing regulatory issues. For example, the focus on social and environmental objectives rather than economic gains, may make them less focussed on market-based price signals. Usually, market participants such as aggregators value flexibility on energy markets and markets that are designed to reflect the state of the power system. It therefore ensures that flexibility is used where and when it is the most valuable to the system as a whole.

If an energy community aims to maximise the value of its flexibility on the markets, the same holds true. However, if it uses its flexibility for other goals, without trying to maximise its profit (increased self-consumption rates for instance), it may act in a way that is suboptimal for the power system. In the worst cases, the community will incur extra costs on the system.

[17] CEER Position Paper on Principles for Valuation of Flexibility, Ref. C16-FTF-09-03, 12 July 2016.
[18] CEER Conclusions Paper on Flexibility Use at Distribution Level, Ref: C18-DS-42-04, 17 July 2018.

5.3 Technical and Network Considerations

From a technical point of view, there is the issue of coordination between the various levels and scales of the energy system. For instance, an energy community can offer flexibility, which may be valuable at a system level, but at the same time may generate constraints on the local network. Given the local concentration of many energy communities, this risk is bigger than with conventional aggregators, whose portfolio usually covers a larger region. In some cases, the flexibility could then generate more costs than benefits for the whole system.

This difficulty was already mentioned in the *CEER Conclusions paper on Incentive Schemes for Regulating Distribution System Operators*, including for innovation[19], which insists on the need to keep a holistic view, to ensure a coordinated whole system approach. Coordination regarding network issues will be addressed by TSOs and DSOs, but if a lot of small energy communities were to be created, this task become more difficult.

5.3.1 Consumer Rights and Protection Considerations

Basic consumer rights should also be protected when consumers are part of an energy community offering flexibility or consumption management services. For instance, consumers participating in an energy community should be able to choose a flexibility or consumption management service provider outside the energy community. This is provided in Article 12 of the Electricity Market Directive.[20]

Energy communities can facilitate the access of consumers to energy markets and to flexibility or consumption management services, as is provided in Article 22 of the REDII[21] and in Articles 15 and 16 of the Electricity Market Directive[22]

[19] CEER Conclusions Paper on Incentives Schemes for Regulating Distribution System Operators, including for innovation, Ref. C17-DS-37-05, 19 February 2018.

[20] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity Article 12 (3): *Member States may permit suppliers or market participants engaged in aggregation to charge customers contract termination fees (…). Such fees shall be proportionate and shall not exceed the direct economic loss to the supplier or the market participant engaged in aggregation resulting from the customer's termination of the contract, including the costs of any bundled investments or services that have already been provided to the customer as part of the contract…;*

[21] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) Article 22: "2. Member States shall ensure that renewable energy communities are entitled to (…) (c) access all suitable energy markets both directly or through aggregation in a non-discriminatory manner". (…) 4. Member States shall provide an enabling framework to promote and facilitate the development of renewable energy communities. That framework shall ensure, inter alia, that: (…) (b) renewable energy communities that supply energy or provide aggregation or other commercial energy services are subject to the provisions relevant for such activities; (…) (e) renewable energy communities are not subject to discriminatory treatment with regard to their activities, rights and obligations as final customers, producers, suppliers, distribution system operators, or as other market participants".

[22] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity Article 15 (2) *a. Member States shall ensure that active consumers: (…), (c) are entitled to participate in flexibility and energy efficiency schemes*; and Article 16 (3a): *Member States shall ensure that citizens energy communities: (a) can access all electricity markets either directly or through aggregation in a non-discriminatory manner; (…).*

Furthermore, the latter two articles in the Electricity Market Directive underline that active consumers or energy communities should be responsible for their imbalances[23].

At the same time, energy communities offering flexibility and consumption management services could generate some difficulties for consumers, especially for vulnerable ones.

As described in chapter 4 on energy sharing and supply, if consumption management or flexibility projects require investment, especially long-term investment, consumers could be tied to the energy community and could be preserved for instance from leaving the energy community, or from choosing freely a flexibility or consumption management service provider outside the energy community.

For vulnerable consumers, the situation could be more complex. Vulnerable consumers who usually do not have important flexibility potential, could be forced, by entering an energy community proposing flexibility or consumption management services, to reduce their basic consumption, which could lead to a dangerous situation. At the same time, shared assets used by the energy community as a whole could provide vulnerable consumers access to the benefits the new flexibility markets offer. However, these shared assets could also imply more important costs for vulnerable consumers as part of the energy community.

[23] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market in electricity Article 15 (1): *a. Member States shall ensure that active consumers: (…) (f) are financially responsible for the imbalances they cause in the electricity system. To this extent they shall be balance responsible parties or shall delegate their balance responsibility in accordance with Article 5 of the* Regulation (EU) 2019/943*;* and Article 16 (3): *a. Member States shall ensure that citizens energy communities: (…) (c) shall be financially responsible for the imbalances they cause in the electricity system* ; to that extent they shall be balance responsible parties or shall delegate their balancing responsibility in accordance with Article 5 of Regulation (EU) 2019/943;

6 Owning, Operating and Managing Electricity Networks

Summary of the chapter

- Consumers are entitled to reliable and safe electricity networks, regardless of the structure or size of the grid operator. If a network is managed by a community led enterprise, the quality standards need to remain at the same level as those of a comparable DSO over the lifetime of the community.
- CECs acting as grid operators need to handle data according to the provisions set in the General Data Protection Regulation (GDPR) and other data protection legislation on European and national level.
- CECs performing distribution services have to operate costs efficiently and to ensure their long-term financial viability.
- Their operation has to be compatible with the principles of the 3rd package, thus not only optimise local flows but also to support the overall system.
- Community-led DSOs have to act in a non-discriminatory manner towards other market actors (suppliers, producers, aggregators, service providers and connected consumers who are not members of the CEC). Furthermore, a clear separation of market roles is important to strengthen the role of all DSOs as market facilitators.
- The establishment of parallel private networks is generally considered unfavourable.

6.1 Overview

The recast Electricity Market Directive (Art. 16 (2b)) states that MS may provide that CECs are entitled to own, establish, purchase or lease distribution networks and to autonomously manage them subject to conditions set out in the directive. There are no such provisions with respect to RECs in the RED II.

From a regulatory perspective grid management and ownership are two of the most critical aspects of the framework for CECs, as defined in the new EU legislation. On the one hand, regulators are responsible for overseeing an efficient development and management of grid infrastructure. New entities that are possibly building parallel grids outside the realm of traditional and regulated DSOs is critical in this context. On the other hand, regulators need to be especially mindful of grid-related activities carried out by entities which may produce and supply electricity, such as energy communities. The European energy market structure resides on the principle of unbundling between grid and markets and foresees the role of market facilitator for the DSO. Any exception to this principle could reduce trust in such markets.

6.2 Business Models and Market Design

Concessions and licensing

In most MS, concession systems are in place, which avoid a proliferation of DSO networks. Commonly, only companies that hold a licence or concession can develop an electricity or gas network in any given area. This means that – in many legal frameworks – an energy community would need to apply for a licence or concession if it wants to develop and operate a network on public land. However, some communities have expressed interest in developing small networks to facilitate sharing of electricity between their members. Such networks commonly

start at a very small scale, for instance aiming to regroup a few consumers behind one interface with the public grid. This approach enables common energy management – for example with the aim to maximise self-consumption.

The economic driver of such efforts often seems to lie in expected savings in grid fees compared to a situation with individual connections. Depending on the specifics of national concession legislation, such efforts may or may not fall under the realm of DSO activities and may or may not be limited to networks situated on private land. This also explains why community-owned or operated networks are currently rare. This makes the discussions around community networks more abstract than other aspects discussed in this paper.

6.3 Technical and Network Considerations

While not unique to energy communities, the concept of microgrids raises interest across Europe and poses certain questions in the context of the current grid regulation model. It is indeed an inherent feature of many microgrid projects to manage local flows in a way to maximise the utilisation of local resources. This is, in some ways, fundamentally opposed to the notion of the grid as a neutral "copper plate", which enables free trade across the European grid, as foreseen by the 3rd Package.

This being said, the optimisation of flows in microgrids also provides a number of advantages at a local level and, potentially, for the overall system. An efficient management of local flows could reduce strain on upstream networks and reduce the need for new infrastructure at that level, provided it could be maintained on a continuous basis throughout the year and during periods of high demand or excess renewable generation. It also has the potential to reduce losses and increase resiliency of the local network.

The challenge for both NRAs and project developers, regardless of whether they are CECs or not, is to unleash the benefits of microgrids in a way that is compatible with the principles of the European energy market. The answer may depend on the size and structure of the microgrid, whether it has the status of DSO and whether it is located exclusively on private land, or partly on public land.

Regardless of the size of a community owned or operated grid, certain principles of grid regulation should be followed in the interest of consumers and proper functioning of markets. The principles that CEER defined in its *Conclusion Paper on Incentives Schemes for Regulating Distribution System Operators, including for innovation*[24] hold true, regardless of the size and ownership structure of an entity that manages and operates a grid, and should apply to the regulation of grids operated by energy communities.

Ensuring a level-playing field

In the context of the European energy market, DSOs are far more than simple grid companies. Over the past decade, their role has evolved into one of market facilitator, linking market actors and customers. As was discussed in a recent *CEER Conclusion Paper on New Services and DSO Involvement.*[25] In this role of a market facilitator, it is key that the DSO acts in a non-

[24] CEER Conclusions Paper on Incentives Schemes for Regulating Distribution System Operators, including for innovation, February2018, C17-DS-37-05.
[25] CEER Conclusions Paper on New Services and DSO Involvement, 22 March 2019,Ref: C18-DS-46-08.

discriminatory manner to all parties involved. This remains true if a CEC essentially takes on the role of DSO – for example after successfully participating in a tender for a concession.

In such cases, CEER believes that CECs should fall under the regulatory regime applicable to any other DSO of the same size under the national regulatory regime. In many MS, if the DSO has less than 100 000 customers, the unbundling regime is less stringent. In those cases, the CEC owned DSO could act as a producer or supplier through the same legal entity as the DSO and would not need to create a separate brand for its non-DSO activities. However, the CEC acting as DSO would not be exempt from the obligation to act in a non-discriminatory way towards other suppliers, producers, aggregators, service providers or connected customers that are not members of the CEC. It would consequently be difficult for such a grid to be designed and operated in a way that prioritises the CEC's assets.

Promoting cost efficiency

DSOs perform their core tasks in a way which meets the reasonable expectations of network users and other stakeholders in the most efficient and economical way. NRAs are tasked to oversee the economic efficiency of DSOs in the interest of consumers. The same principles should apply to energy community grid assets. Although CECs are often set up with the aim to save money e.g. by using local resources in a cost-efficient way, cost efficiency of grid operation needs to be assessed beyond the purely local dimension. A local microgrid set up to reduce the reliance on the DSO grid – for example by reducing the collective connection capacity – may seem economical in the short-term. However, in many cases, the savings largely occur through passing the costs onto other consumers rather than real cost savings for the overall system. If the concept is applied more widely, DSOs will adapt the unitary grid fees, hence reducing the savings.

In addition, there are scale effects in planning and operating networks. Taking parts of a network out of the responsibility of a DSO, to create a community owned, smaller, DSO, may increase costs in the long run. The same holds true for CECs establishing parallel private networks in areas where DSO networks exist. Such a setup is generally not economically efficient and should be avoided in order to achieve the best outcome for consumers.

Ensuring financial viability

In addition to cost efficiency of network operation, the long-term financial viability of a network and its operation model is a critical part of the regulatory regime. In larger networks, maintenance and investments tend to be managed in a way that the financial burden is spread over time, hence creating a relatively constant cost of operation to be covered by a large number of customers. However, in a very small network large investments naturally arise in irregular fashion. For example, the replacement of a transformer can represent a considerable cost if spread across a small number of users. CECs running their own grid may have an incentive to keep cost for their members low rather than building up the financial reserves needed to be able to react to potential sudden investment needs. At the end of the life of expensive assets, members of the community may be faced with a sudden increase of participation costs, which may incentivise them to look for an alternative to the community network. Especially in the light of the provision that members may leave a community if they wish to do so representing a considerable risk to the long-term financial viability of such communities.

If the operation of such small-scale grids is allowed under the legal framework of a MS, regulation needs to ensure that the grid fees paid by energy community members cover the long-term financial needs of that grid. If tariffs are set in a way that only takes into account short-term needs, there is a risk that such networks will be used by consumers to avoid paying their fair share of grid cost.

Easton Energy Group – A community owned microgrid to share solar energy

The project aims to put 120kW of solar PV on 60 houses on two streets in Easton, Bristol. To do this, they are proposing to build their own microgrid: a mini grid which connects generators and consumers together using its own private wires and infrastructure. The model relies on an exemption which allows a supplier providing 2.5MW or less of power to houses to be licence exempt – avoiding the related costs.

The programme aims to open up renewables to a more diverse group of people – who would ordinarily not have access. The project also believes it will benefit community groups who get a better price for their electricity by selling to households directly, rather than exporting it to the grid.

Owning their own grid is, however, risky. If consumers decide to switch away, the group can be left with an unviable financial model.

Improving quality of service

Consumers are entitled to reliable and above all safe electricity networks, regardless of the structure and size of their grid operator. If a network is managed by a community led enterprise, the quality standards need to remain at the same level as those of a comparable DSO. It is important to note that this quality of service needs to be sustained over a long period of time, which can be a challenge for very small grid operators, as CECs may tend to be.

Quality of service also incorporates increasing levels of digitalisation and advanced data provision, both for settlement and for enabling access to new markets including those for flexibility. Where metering is the responsibility of DSOs, for example, it has to be ensured that a CEC operating a grid sets up metering infrastructure that is of an equivalent granularity and performance as other DSOs in the country. The data they collect needs to be provided to customers as well as potential third party suppliers and service providers in an efficient and effective way.

Innovative energy community projects have proven that they can be at the forefront of the digitalisation of the electricity sector, for example by trialling technologies such as blockchain to certify peer-to-peer energy transfers. In cooperating with other DSOs, as well as market participants, CEC's relying on innovative technology to operate a grid will need to ensure a level of data quality and reliability that is in line with current best practice.

Facilitating innovation

Although energy communities in many cases strive to innovate in the way energy is produced and consumed, with respect to network aspects, it is the NRA's role to ensure that these innovations benefit consumers of the whole system. Innovation, or technological progress, as seen by NRAs, is a means to achieve the overarching regulatory goals of cost efficiency and

an adequate quality of service and security of supply. In the case of CECs and ownership (or operation) of a grid, the introduction of an energy community would mean substituting one natural monopoly with another. The innovative solution developed by communities should not endanger the financial viability of the grid and should not undermine working markets and consumer protection.

Ensuring security of supply

CECs generally strive to provide the same or a higher level of local quality and security of supply as DSOs. While this objective could often be achieved initially, through new assets and the use of novel energy management technologies, it must ensure that the quality of supply remains adequate over the lifetime of the community. While DSOs can spread their continuous improvement cost by socialising high investments for specific parts of the grid among all their customers, small energy communities risk exposure to very high investments on an irregular basis, for example if a transformer needs replacement.

Ensuring adequate security of supply and power quality in a small network is a constant challenge for the operators of island systems. Some islands have a community owned and operated electricity grid which, if not (sufficiently) connected to the mainland, needs to be supplied by local generation. Historically, this has often been done through diesel generators, though some communities strive to replace these with renewable generators. Island grids tend to deliver electricity at a higher cost than the mainland grid, sometimes with limited quality of supply. Innovative microgrid technologies can be an opportunity to improve security of supply and reduce cost in such cases.

Isle of Eigg (UK)– decarbonising an island system

Eigg Electric is a community owned, managed and maintained company – which provides electricity from renewable sources for all of the island residents. Historically, Eigg hasn't been connected to mainland electricity supply and so has always been reliant on expensive diesel generators.

The system takes power from three renewable sources to ensure the island is provided with a continuous reliable electricity supply with minimal use of fossil fuel generators.

Power is distributed from the renewable sources via a 11km long underground cable that was laid to form an electricity grid for Eigg. This grid delivers electricity around the island, while transformers convert the power to domestic voltage into homes and businesses.

Each house has a maximum use limit of 5kW at any one time and every business 10kW. When more is energy produced than the island can use, the excess is used to heat community buildings.

Another aspect of security of supply is cybersecurity, a rising concern in the energy sector that requires considerable resources and know-how. Small entities such as energy communities may not be able to ensure adequate protection against cyber threats, hence creating a weak point in the electricity system and jeopardising the wider network. In short, the NRAs and other competent authorities need to be able to supervise and enforce a sufficient level of cybersecurity, even in small networks.

Introducing a holistic view

CECs – especially when managing a network – generally aim to manage local energy resources more efficiently. In practice, this can, however, lead to prioritisation of the community's assets against other market participants. Besides the concerns around discrimination, such a prioritisation may be inefficient at the whole system scale. While the general principles of non-discriminatory treatment of all market actors by DSOs apply to communities operating networks and NRAs, connecting DSOs have to work towards designing network tariffs that ensure that communities, as well as all other grid users are incentivised to use their resources in a way that benefits the system from a holistic point of view.

This emphasis on whole system efficiency stems from NRA's who wish to ensure the best possible deal for consumers. In this context, CEER also considers that efforts aiming to make community grids independent from the DSO grid and the wider electricity system should be evaluated with great care. In most cases, defecting the grid – be it as an individual or a community – is not cost efficient when maintaining a high security of supply. Even in cases where the direct savings of an avoided grid connection are higher than the cost of keeping a grid autonomous, the societal impact of grid defection is often negative, as remaining users will have to pay for possible stranded assets, which will increase the overall cost. Completely autonomous community grids should be considered only in well-justified cases, for example in certain islands or where communities are so remote that the overall cost of maintaining their connection is higher than the cost of ensuring security of supply in an independent grid.

Energy revolt – holistic energy management at a neighbourhood level

Luxembourgish project developer Energy Revolt is developing several housing projects that aim to collectively manage the energy consumption and production of either an apartment building or of several buildings in a neighbourhood with the aim to optimise self-consumption and to limit the impact on the electricity grid.

The developer applies for a single connection point for the consumption of several individual units, a solar PV installation, a battery and a heat pump, which is combined with heat storage. The overall energy consumption and production is managed holistically to reduce the need for capacity and energy from the grid. The particularity of these pilot projects is that the customer buys twenty years of energy services when he buys the house. As long as they keep within limits of reasonable consumption, they do not to pay for energy supply.

While currently limited to one apartment block or block of attached houses, meaning the microgrid connecting the units remains on private land, the concept could technically be scaled to larger areas. Such holistic local energy management would, however, be difficult to marry with supplier choice and the long-term commitment limits the incentive to choose an alternative supply model.

Ensuring that DSOs safeguard customer privacy

CECs acting as grid operators will be confronted with personal data as well as commercially sensitive data. These datasets – in particular metering data – will become increasingly relevant for the operation of grids, but will need to be treated in accordance with the GDPR and other data protection legislation on a European and national level. This can represent a considerable administrative burden for small entities.

Ensuring that DSOs act as neutral market facilitators

As noted in the paragraph “ensuring a level playing field” in this sub-chapter, CEER advocates for a clear separation of market roles, and in particular for strengthening the role of DSOs as market facilitators. In this logic, CEER envisions a regulatory framework, within which grid operators will have to become increasingly open to source services such as flexibility services from third parties through market-based mechanisms.

In the context of CECs, this represents both a challenge and an opportunity. In their role as grid operator, they will have to remain open to third party services, if such solutions allow a more efficient operation of the grid. On the other hand, CECs that are able to actively manage their electricity production and consumption may use their collective flexibility to provide services to DSOs and other grid operators.

6.4 Consumer Rights and Protection Considerations

Fundamentally, each individual customer must benefit from the level of consumer protection foreseen by the Directives (see chapter 2.1), regardless of the grid they are connected to. This includes the freedom to choose a supplier and balancing responsible party, and the right to an adequate level of service and power quality.

As a general rule, CEC’s that act as DSOs are bound to the same rules as other DSOs and consumers should be able to expect the same level of service from a CEC grid operator as from other DSOs.

In countries where DSOs are responsible for metering community DSOs need to offer equivalent data quality and availability as other DSOs in the country, including smart meter functionalities if foreseen in the MS. Consumers need to have access to their data in a way that allows them to control their consumption and to interact with electricity markets in the same way as consumers connected to other DSOs do.

Where a supplier centric supply model is in place, communities need to ensure that they can interact with suppliers in a way that all suppliers can serve consumers as well as they do within other DSO grids.

As stated before, the same standards of quality of supply and quality of service should apply to community grids as to other DSOs. If community grids do not deliver the expected services, consumers need to have access to the equivalent right to compensation and dispute resolution as they have with other DSOs. To ensure this, CEER believes that the terms and conditions applicable to customers of community grids should be subject to the same level of regulatory oversight as they are for other DSOs.

In the case of private grid arrangements that are not formally recognised as DSOs, questions such as metering responsibility and contribution to grid costs need to be defined in a way that safeguards the principles of non-discrimination. In any case, consumers and members/shareholders of the community need to have access to complaint mechanisms that ensure their rights are effectively safeguarded. Equally, they must have access to compensation if they are adversely affected by grid issues caused by the community. Given the legal form and existence of such microgrid entities are largely dependent on national legal frameworks, the specifics of how these are ensured are best defined in national law.

7 Conclusions

Energy communities are fundamentally not a new phenomenon, but are likely to become more prevalent and more diverse following their formal recognition in the new EU policy framework. CEER welcomes CECs and RECs as instruments that will help reach the EU's decarbonisation targets and involve citizens more strongly in energy matters.

However, CEER believes that energy communities should not become a vehicle to circumvent existing market principles, such as unbundling, consumer rights or the cost sharing principles applied to energy grids. Energy communities should be able to compete on a level playing field, meaning the regulatory framework should be such that they do not face undue barriers nor create undue distortions in existing markets.

The provisions adopted in the CEP remain relatively open to interpretation, and transposition into national law will be critical to the viability and role of energy communities. The case studies analysed by CEER in the context of this paper have shown that in certain MS, energy communities have emerged and thrived without a specific framework. Many of the examples encountered in the analysis, such as community-owned generation assets are perfectly compatible with the existing legal framework, and their economic rational depends on factors such as subsidy scheme design rather than specific recognition in the legal framework. Other local energy projects are in fact driven by energy companies. However, they may not qualify for the status of energy community under the new EU provisions despite delivering value to customers on a local level and being included by the European framework.

CECs carry a lot of innovation potential and propose solutions that may lead to questioning of the principles in the current regulatory framework and other current practices - this should be encouraged. MS and regulators should facilitate this in a technology neutral way in both legislation and the regulatory framework. Where community activities bring benefits to the system, such as reduced grid cost, energy communities, along with other actors, should be adequately incentivized and remunerated.

The main characteristic of energy communities as defined in the EU Directives – their citizen centric structure – is not in itself a major consideration from the point of view of energy regulation. Energy communities and jointly acting customers – potentially enabled by a favourable legal framework – are, however, likely to engage in new kinds of activities, which raises several regulatory questions in the following main areas:

Local matching and virtual energy sharing
The Electricity Market Directive clearly notes that where electricity is shared over the public network, it shall still be subject to the relevant charges and is also the belief of CEER. Adequate grid charges need to be applied to any sharing or peer to peer trading activities insofar that exchanges are carried out using the public grid.

Coordination between local and back-up supply
With the development of energy communities, situations where a point of delivery is supplied by more than one entity will become more common, which may raise new questions of coordination. A mixed supply from sharing within an energy community and one or more external suppliers creates a new layer of complexity for the consumers' balancing situation. The issues faced are similar to those raised by aggregation and should be addressed through well-designed contractual arrangements and data transparency.

Consumption management and flexibility

Energy communities can be a means to unleash the flexibility potential of consumers and to more effectively integrate renewable resources and new technologies such as electric vehicles into the grid. However, market design is critical to ensure energy communities are incentivised to develop in a way that leads to an overall reduction of system costs. There is the risk that, given inefficient incentives, community coordination leads to higher grid usage, or inefficient market outcomes.

From a regulatory standpoint, most of the questions brought by consumption management and flexibility services are not specific to energy communities. Indeed, at first consideration, the existence of energy communities changes little to the flexibility business, where aggregation is already a subject[26]. The same can be said of the consumption management related business. It brings regulatory issues of its own, mainly on good practices and customer information, but none are specific to energy communities. CEER therefore has no additional recommendations regarding the functioning of energy communities.

Owning, operating and managing electricity networks

The question of grid ownership of energy communities, while made optional for MS in the CEP, remains an area of concern for regulators for several reasons:

- Energy communities deploying local grids in areas where a DSO grid already exists may lead to unnecessary duplication of assets and cost;
- If an energy community also acts as a producer or suppliers, the principles of unbundling are jeopardised, and become increasingly difficult to enforce with increasing numbers of small actors;
- DSOs of a certain size have shown that scale effects can lead to an economically more efficient grid operation. A move to smaller grids could, in turn, lead to higher system costs;
- Economic regulation of grid operators incentivises a sustainable management and development of grids. Small entities facing little regulatory pressure may develop grids in a way that cannot be sustained in the long run; and
- DSOs are incentivised to provide consumers with a high quality of service that is constantly improving . With smaller entities that are not efficiently regulated, it becomes more difficult to ensure an adequate quality of service.

Regardless of the size of a community owned or operated grid, certain principles of grid regulation should be followed in the interest of consumers and for good functioning of markets. The principles that CEER defined in its *Conclusion Paper on Incentives Schemes for Regulating Distribution System Operators* , *including for innovation*[27] hold true, regardless of the size and ownership structure of an entity that manages and operates a grid, and should apply to the regulation of grids operated by energy communities.

Consumer rights

Business models based on energy sharing are starting to blur the concept of electricity supplier, meaning consumer rights regarding access to information, contractual certainty and quality of service with respect to their electricity supply may be more difficult to apply and enforce.

[26] CEER Position Paper on Principles for the Valuation of Flexibility, CEER, July 2016 Ref: C16-FTF-09-03.
[27] CEER Conclusions Paper on Incentives Schemes for Regulating Distribution System Operators, including for innovation, CEER, February 2018 Ref: C17-DS-37-05.

Depending on the form of an energy community, it may reduce the exposure of the consumer to the retail market, hence reducing the consumer's incentive to choose an adequate supply product. In cases where participation in a community is linked to both capital investment and commitment towards a supplier, the free choice of supplier may effectively be hampered, even if guaranteed through general legal provisions

Business model and market design

The market structure established through the 3rd Package is based on constraint free trade of electricity within large bidding zones and optimised exchanges between bidding zones to ensure the most cost-efficient operation of generation resources. Maximisation of local consumption goes against that principle and, if scaled more generally, may alter the principles of trade.

Recognising that the implementation of the CEP at national level will be one of the main priorities for NRAs in the coming years, CEER has gathered a number of national experiences across the EU on various customer-related elements of the recast Electricity Market Directive and has prepared a series of case study reports to share these. While the present report addresses self-consumption and energy communities, two other reports address consumer empowerment and technology aspects.

CEER hopes that this series of case studies will contribute to a heightened awareness and understanding of the new provisions adopted in the recast Electricity Market Directive and the REDII. In addition, this work could help facilitate the implementation of these Directives and assist NRAs, policymakers, market actors and consumers in the application of the newly established rules.

Annex 1 – List of Abbreviations

Term	Definition
CEC	Citizen Energy Community
CEER	Council of European Energy Regulators
CEP	Clean Energy for All Europeans package
DSO	Distribution System Operator
EC	Energy Community
ELL	Energy Local Club
EV	Electric Vehicle
kWh	Kilo Watt hour
LV	Low Voltage
MS	Member States
MV	Medium Voltage
MW	Mega Watt
NRAs	National Regulatory Authorities
PPA	Power Purchase agreement
PV	Photovoltaics
REC	Renewable Energy Community
RED II	Renewable Energy Directive from December 2018
GDPR	General Data Protection Regulation

Annex 2 – Case Studies Considered

1. Easton Energy Group – A community owned microgrid to share solar energy
2. Isle of Eigg – decarbonising an island system
3. Bethesda - Cyd Ynni
4. Gower Regeneration
5. Owen Square
6. Udny Community Wind Turbine
7. EON Simris
8. Energy community pilot projects in Luxembourg

1 Easton Energy Group – A community owned microgrid to share solar energy

The project aims to put 120kW of solar on 60 houses on two streets in Easton, Bristol. To do this, they're building their own micro-grid: a mini grid which connects generators and consumers together using its own private wires and infrastructure. The model relies on an exemption which allows a supplier providing 2.5MW or less of power to houses to be license exempt – avoiding the related costs.

The programme aims to open up renewables to a more diverse group of people – who wouldn't ordinarily have access. The project also believes it'll benefit community groups who get a better price for their electricity by selling to households directly, rather than exporting it to the grid. Owning their own grid is, however, risky. If customers decide to switch away, the group can be left in the red financially.

Services
Generation: The project aims to put 120 kW of solar on 60 houses.

Shareholder structure
A community shareholder scheme is envisaged (Company not yet set up).
Entry/exit: assumed to be voluntary, participation however is conditional to residence in catchment area.

Conditions for participation: Conditions for participation is to live in project location.

Link to wholesale/retail markets
Supplier: The community would self-supply.
Market activity: Retail, local wholesale through licensed supplier to provide half-hourly settlements, pooling of local generation, providing set price for generation and top-up price.

Size of community
Self-perception: Local supply model to open up renewables to more diverse group of consumers who otherwise would not install PV and benefit from cheaper bills.
Size: Two streets in Bristol

Drivers / participant advantage
Monetary? Desire to reduce energy bills for consumers who participate in scheme.
Energy focus? Yes, electricity main focus, but projects in same community group have also developed experience with ground source heat pumps.
Renewables? Yes, project developed to increase local use.

Consumer rights
Supplier choice: Ensured, customers would be able to switch away from Easton Energy Group.

More information
http://www.eastonenergygroup.org/

2 Isle of Eigg – decarbonising an island system

Eigg Electric is a community owned, managed and maintained company – which provides electricity for all of the island residents from renewable sources. Historically, Eigg hasn't been connected to mainland electricity supply and so has always been reliant on expensive diesel generators.
The system takes power from, 3 renewable sources to ensure the island is provided with a continuous reliable electricity supply with minimal use of fossil fuel generators.
Power is distributed from the renewables via 11km of underground cable that was laid to form an electricity grid for Eigg. This grid delivers electricity around the island, while transformers convert the power to domestic voltage into homes and businesses.
Each house has a maximum use limit at any one time of 5kW and every business 10kW. When more is produced than the island can use, the excess is used to heat community buildings.

Services
Generation: Hydro (100kW+12kW), wind(4x6kW), solar (50kW), diesel backup (2x80kW)
Storage: Battery storage to cover 24hr consumption, used for frequency management
Load Management: Load monitoring through OWL meters

Demand-side response: In case of oversupply (mainly in winter), community facilities will see their space heating activated

Other services: Distribution grid (11km underground cabling)

Shareholder structure
Community owned, managed, and maintained. Operated by Eigg Electric Ltd, wholly owned subsidiary of Isle of Eigg Heritage Trust

Conditions for participation: Capacity restrictions (5 kW household, 10 kW business)

Link to wholesale/retail markets
Supplier: Sole supplier as islanded system
Market activity: None as no mainland connection

Size of community
Self-perception: Powering the community with renewables; first (and only) organisation to bring uninterrupted power to island
Size: 87 (island residents)

Drivers / participant advantage
Monetary? No.
Energy focus? Yes
Renewables? *Primary focus with diesel generation as backup*

Consumer rights
Supplier choice: No supplier choice as islanded system

More information
http://www.isleofeigg.org/eigg-electric/

3 Bethesda - Cyd Ynni

The project aims to demonstrate the workings of the tools, systems and partnerships needed to make local energy work. Energy Local has designed a local market through Energy Local Clubs – which enables households to club together to show when they're using locally generated renewable power. The scheme matches local electricity consumption to the amount generated locally in each half hour.

Whenever participants are paying for electricity that is matched to locally generated power (like hydro) money is passed directly on - with no middle man. This creates better value for the customer as well as the hydro: based on what a small hydro would normally be paid, customers may pay around 14p per kWh – compared to around 8.5p using this model.

Where participants use more than that what's produced locally, additional power is purchased via partner energy supplier Co-Operative Energy.

Participants are also encouraged to start to understand when they use power throughout the day – encouraging a shift of demand away from peak periods. In the absence of smart meters – participants are asked to keep an energy diary and to make decisions based on when they use the most amount of power and the cost of using power at that time of the day. For example, using a slow cooker throughout the day, rather than cooking in the evening.

Services
Generation: Hydro
Load Management: Local matching incentivised through 'match tariff'; information relayed to households via smart meters/monitors.

Shareholder structure
This is a not for profit Energy Local Club, members are of local community and local hydro plant. Current main generator is the National Trust which owns the Hydro generation scheme.
Governance: Energy Local CIC (Community Interest Company) with 4 paid directors
Entry/exit: More than 100 households currently involved for trail participation, recruited via public drive
Conditions for participation: Matched consumption from hydro plant is remunerated at 7p/kWh; top-up energy is purchased by household on ToU tariff basis (4 categories per day varying from 14p/kWh evening peak to 7.25p/kWh overnight

Link to wholesale/retail markets
Supplier: Co-Op Energy
Market activity: No wider market activity; no trading. Customers purchase additional electricity which may not be available via attached hydro scheme via Co-Operative Energy

Size of community
Size: 100+ households participating in initial trial

Drivers / participant advantage
Energy focus? Main objective is to encourage local matching with generation at local hydro plant
Renewables? Renewable base load provided through local hydro plant

Consumer rights
Supplier choice: No, scheme operates through Co-Op Energy
Protection for vulnerable customers: Through co-op energy as supplier
Billing: Through co-op energy as supplier

More information
http://www.energylocal.co.uk/cyd-ynni/

4 Gower Regeneration

Gower Regeneration is Wales' first community owned solar farm which sits on the site of an old coal mine in rural Swansea. The project will provide clean energy for the demands of 300 houses – and it was energised on 31st March 2017.

As well as providing renewable energy, Gower Regeneration will reinvest its profits (estimated at £500k through the 30 year life of the project) into developing the local economy. Specifically, they intend on supporting ecologically sensitive land-based livelihoods to trade from one of the project founder's base, the Gower Heritage Centre – and in doing so, engineer shorter supply chains for local consumers, producers and the environment to benefit from.

Investors will have a 5% return and local people have been offered priority allocation of shares.

Services
Generation: Solar (1 MW)

Shareholder structure
Community co-ownership of solar farm (up to 5% return) with local people offered priority allocation of shares

Governance: Co-ownership of solar farm

Entry/exit: Purchase of shares / sale of share¨

Conditions for participation: Preferential treatment for local citizens for purchasing shares

Link to wholesale/retail markets

Supplier: No supply activity
Market activity: Sale of generated presumably sold on the wholesale market, profits are generated here which form financing model and ultimate raison d'etre for the community scheme

Drivers / participant advantage
Monetary? Profit-focus to reinvest in local community
Energy focus? Yes, local electricity generation forms the premise of the business model; Solar Farm asset is now also used as an educational asset for local schools
Renewables? Yes, abatement of over 11500 tonnes of CO2 envisaged across lifetime of solar farm

Consumer rights
Supplier choice: Not applicable

More information
https://bit.ly/2Hb8mA2

5 Owen Square

The group facilitates and lobbies for the installation of local generation capacity. Drawing on the fact that the cost of energy is rising faster than inflation and the fact that new homes which integrate electric heat pumps, heat networks and maximum density PV are more decoupled from this increase in energy costs.
The group argues that installing new local generation reduces electricity and gas imports, whilst increasing income from electricity exports – by enabling communities to be energy independent and self-sufficient in a sustainable way.

The underlining thinking is that community microgrids increase the match between generation and demand. The group has several projects which showcase this and work with a wide array of stakeholders including the community members themselves.

Services
Other Services: Community Energy Umbrella group with various projects

Link to wholesale/retail markets
Supplier: Good Energy, Line Jump
Market activity: Co-ordination of community energy groups with generators, suppliers and tech companies.

Drivers / participant advantage
Monetary? Generally projects will have monetary benefits – like cheaper energy. Almost all of the projects focus on directly matching local generation to local consumption.
Energy focus? Yes, many projects also have an element of energy education and demand side response. Imploring users to buy and use energy in a smarter way.
Renewables? Yes, a mix of solar, wind and hydro

Consumer rights
Protection for vulnerable customers: Some projects have some insight and focus on using locally generated renewables to tackle local fuel poverty.

More information
https://www.regensw.co.uk/Handlers/Download.ashx?IDMF=a211532e-3310-4fb0-830e-48dbb9952ea7

6 Udny Community Wind Turbine

The group took out a loan from Triodos Bank to get their turbine up and running (after abandoning the initial plan of using various grant schemes as this would have rendered them ineligible for the FIT).
The turbine was installed in May 2011 and has been generating income for the community ever since. It's wholly owned by the local community and the funds generated from the turbine are invested in the local area on local projects.
The turbine is expected to generate funds of £4-5 million for the community over the 20-year lifetime of the project.
The trust looks to support projects which fit certain criteria (community action, community organisations, charitable support, environmental action, community health&wellbeing) and local residents are engaged on where the money should go.

Services
Generation: Wind (800 kW)

Shareholder structure
Wind turbine is owned by Community Trust which allocates the raised funds for community projects on grant basis
Governance: Community trust structure
Entry/exit: Project is held within Community Trust structure, no participation
Conditions for participation: Community projects can access funds from surplus revenue generated by wind turbine, if they comply with five main aims, community action, community organisations, charitable support, environmental action, community health and well-being

Link to wholesale/retail markets
Market activity: No direct activity; sale of electricity generates profit (incl. FiT)

Size of community
Self-perception: Local community in vicinity of wind turbine

Drivers / participant advantage
Monetary? Yes (benefits from electricity generation to be reinvested in community)
Energy focus? No, it appears primary utility is generation of funds to be used for community projects
Renewables? Yes, wind generation; revenue derived from FiT

More information
https://www.localenergy.scot/media/42447/Udny-Case-Study.pdf

7 EON Simris

E.ON has established a renewable and local energy system in Simris, located outside Simrishamn in Sweden. The basic idea of the system is to increase the possibilities for a higher proportion of renewable electricity, based on local conditions.

The purpose of the demonstration project is to test the prerequisites for creating smart grids where local areas can become self-sufficient with renewable electricity and where the consumer gains greater control over and participation in the production of electricity.
The hope is also that the smaller players' motivation to use the electricity efficiently and to offer flexibility that can help balance the system increases. The project also has the ambition that more local actors will install microproduction in the form of solar cells on their own roofs, where E.ON in the project offers a discount on solar cell and battery installation to increase customer interest in participating in demand response.

This project is part of a larger EU project, InterFlex, which aims to use flexibility to optimize local-scale electricity systems.

Services
Generation: Wind (500 kW), Solar (440 kW), Diesel backup
Storage: Energy storage in the form of a battery is also established and will be able to contribute energy to the system for shorter periods of time. The energy storage (a battery power of 800 kW and storage capacity 330 kWh) will be used to balance the local power system and, along with an advanced control system, will ensure that the correct voltage and frequency are maintained in the local area network.
Load Management: The idea is also that local customers should be able to help balance the system by allowing some flexibility in their electricity usage. Customers are offered equipment that can control usage of water heaters or heat pumps, funded by the project, as well as discounted solar / battery packs.

Shareholder structure
The distribution system operator E.ON owns and operates this local energy system. It is run as a demonstration project.
Entry/exit: Households living within the local network are offered to join the load management program as active customers.
Conditions for participation: Since the network is a distribution network all customers within the network are participating passively. Customers that choose to be active customers will need to install equipment that can control usage of water heaters or heat pumps or install solar / battery packs.

Link to wholesale/retail markets
Market activity: none

Size of community
Self-perception: Local energy system
Size: 150 households where some 30 households are active customers.

Drivers / participant advantage
Monetary? no
Energy focus? Yes, Eon is testing the ability for a small network to be self-reliant.

Renewables? Yes, one focus is to test the viability of the network with solar and wind generation in combination with battery storage and smart control devices for heat pumps and water heaters and smart control devices for heat pumps and water heaters.

Consumer rights
Supplier choice: Yes, customers are free to choose supplier.
Billing: Active customers are paid for contributing to load management in the network.

More information
https://www.eon.se/en_US/samhaelle---utveckling/local-energy-systems/we-are-renewing-simris.html

8 Energy community pilot projects in Luxembourg

A project developer proposes to trial energy management projects on a very local level (several individual houses / one apartment building). The aim is to use a common energy management approach to optimise the use of PV generation, batteries, heat pumps and heat storage in view of reducing the capacity collectively needed from the grid.
The developer has different projects that all have slightly different governance structures:
Project 1: One apartment building with 4 entities and a common PV installation (22.5 kWp) with a battery system. Each apartment has their own heat pump and heat storage. The project development company takes on the role of building manager and handles energy management.
Project 2: Three individual houses with a common PV installation (30 kWp) and a battery owned by the cooperative. The electric connection is granted to a technical building, which belongs to the cooperative and hosts the battery and heat pumps. The house owners rent the energy system from the cooperative. The project development company takes on the role of building manager and handles energy management.
Project 3: Two apartment buildings with 6 apartments each

Services
Generation: PV based generation (shared between residential units), Ground source heat pumps (one for each individual residential unit)
Storage: Battery storage, hot water storage (individual per residential unit)

Other Services: Energy management system

Shareholder structure
The “Community” is organised by the property developer, who also builds and sells the houses/flats. The houses are sold including a 20 years rent contract for the energy infrastructure (electricity & heat) which includes additional grid sourced electricity energy cost (incl. grid energy needed).

Link to wholesale/retail markets
Community tries to maximise self-consumption, but is not autonomous from the grid. The community signs an energy supply contract (common to all “members”) for its remaining electricity needs. No active participation in wholesale energy markets, as these are seen as too complex.
The community has one single connection point to the grid, and the end-users are not considered grid customers.

Size of community
1-2 apartment buildings of 4-6 units
3 individual houses
Concept is designed to be scaleable

Drivers / participant advantage
The main driver is the maximisation of the use of self-produced electricity on site. By commonly optimising PV production, battery storage, heat pump and heat storage, the aim is to use all self-generated energy on-site. Heat is considered an important form of energy storage and energy is buffered through heat storages as well as batteries. In the long run, heat storage in the ground using heat pumps is envisioned

Members buy the house including a 20 years rental agreement on energy infrastructure and management and are in this way independent from energy market prices, although the initial investment is higher.
The common energy management allows to minimise the capacity of the (common) grid connection, hence saving on grid cost by reducing grid impact.

Consumer rights
The end-user is not an individual grid customer and hence does not have a choice of supplier while in his long-term energy management agreement.
The electric infrastructure allows for the installation of individual meters for each residential unit without any changes to the infrastructure. This should enable any customer wishing to leave the community to become a grid customer
There is no per kWh billing, but the customer has to adhere to a certain code of conduct (e.g. not to install “inefficient” appliances, such as a sauna), and to use energy within the framework for which the energy system was dimensioned.

Framework
Marketed as pilot projects, but without formal exception from the legal framework, as no exceptions are foreseen for pilot projects
A common grid connection for multiple houses, who opt not to be individual customers is within the grey zone, and argued through an interpretation of a paragraph of the grid connection code which allows for a connection of different houses through one common building service room.

Annex 3 – Examples of legal frameworks for collective self-consumption

	France	Luxembourg	Austria
Legal basis	Modification of the energy code (ordonnance du 27 juillet 2016 relative à l'autoconsommation d'électricité)	Proposed modification of the electricity markets law (« Loi modifiée du 1er août 2007 relative à l'organisation du marché de l'électricité ») – currently under debate in parliament. ".	Collective self generation was introduced into the the Austrian Green Electricity Act and the Austrian Electricity Act in 2017
Scope and structure:	**Extent of community:** The law allows collective self-generation of customers situated under the same MV/LV transformer. The possibility to increase this perimeter is currently under debate in parliament **Eligible technologies:** Legally speaking, all generation, but in practice solar panels only. **Legal structure:** The law states that all participants must be part of a same legal person, that represents the community. The law does not specify what this legal entity should be. In practice, it is often an ad hoc association.	**Extent of community**: The draft law foresees two types of communities: local communities, consisting of customers and generators situated behind the same MV/LV transformer and "virtual communities", consisting of any final customers and generators **Eligible technologies:** From renewable energy sources and/or high efficiency cogeneration **Legal structure:** The legal form is not specified, only that it needs to be a moral person specifically created for this purpose. This is to ensure that the participation is truly voluntary.	**Extent of community:** A collective self-generation system produces electricity to cover the energy demand of a group of jointly acting renewable self-consumers, precondition are smart meters. **Eligible technologies:** The framework is not limited to collective self-generation of electricity from renewable energy sources and high efficiency cogeneration, it legally speaking covers all generation. **Legal structure:** According to the law eligibility for participation is granted to legal or natural persons as well as registered partnerships
Consumer aspects	**Supplier choice**: maintained on in individual basis **Billing:** The community is in charge of attributing the energy produced locally to each participant. Consumption is then billed on an individual basis. The part that is not self-produced is billed the standard way by the supplier, taxes included, and the part that is self-produced is paid for according to the contract that links the self-consumers together, taxes included. Each supplier also recovers the network bill of its own customers, including the part for the use of the local network by locally produced energy.	**Supplier choice**: Maintained. In practice, individual customers will need to leave the community to, for example, choose their supplier individually. **Billing:** The supplier bills the community as a whole, who is responsible for attributing quantities to individual members. This task can be outsources to a third party	**Supplier choice**: Excess electricity is fed into the grid based on a contract signed with an energy supplier. Each participant can choose his/her own supplier to cover the demand that is not met by the self-generation system. – So the participant's right to switch supplier individually is granted. **Billing:** Each customer is billed separately for the energy consumed from the grid (separate suppliers) (?)
Taxes, levies and network charges	Taxes and levies are due on all the energy consumed, whether supplied or collectively self-produced (on the contrary, small individual self-consumers won't pay taxes on self-consumed energy)	Local Energy Communities, are, within limits, exempt from the electricity tax and from levies for the "Mécanisme de compensation" (renewable support mechanism) for the locally produced energy consumed within the community. They are also treated as a single customer with respect to grid charges.	Network costs, taxes and levies do not incur for the electricity consumed directly from the self-generation system

	France	Luxembourg	Austria
		Virtual energy communities are eligible for a refund of the electricity tax and from levies for the “Mécanisme de compensation” (renewable support mechanism) within limits for the locally produced energy consumed within the community. The individual member of the virtual community will pay the full network tariff due on his grid consumption, including the collectively self-consumer electricity.	

About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 38 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment friendly, harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

CEER wishes to thank in particular the following regulatory experts for their work in preparing this report: Maud Brassart (CRE), Xavier Hansen (ILR), Pauline Henriot (CRE), Eva Lacher (E-Control), Luca Lo Schiavo (ARERA), Olivia Powis (Ofgem), Jerker Sidén (Ei), Lars Ström (Ei), Stefan Vögel (E-Control)

More information is available at www.ceer.eu.