

GREEN AND CIRCULAR ECONOMY

Sector Focus



Energy communities: The citizen impulse towards Ecological Transition

2022



Ajuntament de
Barcelona

 Barcelona
Activa

Summary



WHY DO ENERGY COMMUNITIES EMERGE?.....	3
TYPES OF ENERGY COMMUNITIES	5
CURRENT SITUATION.....	8
IMPACT OF ENERGY COMMUNITIES ON PROFESSIONAL PROFILES	10
ENERGY COMMUNITIES, IN FOCUS	12
SOURCES CONSULTED	13
ADDITIONAL WEBLIOGRAPHY	13

Why do energy communities emerge?

The social organisation of energy production, distribution and consumption has become a subject of public debate. In fact, it has always been, but in recent years there has been an **increase in collective awareness** of environmental sustainability and, because of technological change, there is also the possibility of altering the existing model. Thus, the **traditional model of energy production**, distribution and consumption has the following characteristics:

- Essentially, the **energy used comes from non-autochthonous, foreign sources**. For most countries in Western Europe, oil has been one of the most widely used sources of energy to date, and it has been imported.
- Most energy consumption comes from **non-renewable energy** sources.
- Energy is produced in a **centralised** way (in dams, nuclear power plants, ports...) and therefore a **powerful distribution system** is needed for it to reach companies and citizens.
- The production and distribution of energy is **in the hands of a small number of large companies** (oligopoly), which influences the type of service and the price of energy.



At the beginning of the 21st century, this model, more typical of the 20th century, is in question. The global environmental crisis, globalisation, increased ecological awareness and technological change facilitate the collective commitment to an **alternative energy production model**, which has the following characteristics:

- Energy dependency is valued as negative, which is why **proximity energy production** is promoted.
- Fosters an intensive use of **renewable energy sources**.
- Advocates for energy generation to be **distributed**, not centralised, which **eliminates the need for large infrastructures** for energy transport and distribution.
- **Citizenship, SMEs and public administrations** have the possibility of becoming involved in the production and distribution of energy, in what is known as the distributed generation model.



On the other hand, we must bear in mind that the **energy market is heavily regulated** because of the complexity of its production process and also because it is a basic necessity. Thus, there is strong regulation by the public administration to, in principle, ensure an affordable price for businesses and citizens. Therefore, official regulation (mainly defined by the European Union and its member states) is also in the process of ensuring the transition of the unsustainable, obsolete and centralised model to the new sustainable and distributed generation model.

Energy communities are diverse and voluntary groupings of citizens, SMEs and administrations that can become energy market operators with production, distribution and self-consumption capacity. In this way, citizens can also participate in the Energy Transition process which must increase the use of renewable energy sources as well as eliminate CO₂ emissions in the atmosphere and other negative externalities which encourage global warming.

Ultimately, energy communities can include ordinary citizens, companies, public administrations or small and medium-sized enterprises. They are born as a model of **citizen participation in the energy system** and their main function is to generate renewable energy through collective generation plants for shared self-consumption. These communities can carry out multiple activities such as producing, consuming, storing, or sharing energy.

Types of energy communities

The participation of citizens and communities in associative structures in energy projects must lead to a **transformation of the energy system**, as these community energy initiatives provide the opportunity for citizens to actively engage in energy issues, which until now have been excluded.

The concept of energy community refers to a set of collective actions linked to the production and consumption of energy that materialise **citizens' participation in the energy system**. Currently, under the concept of the energy community, a wide range of practices have been developed to manage community energy projects. The current legislation of the European Union (EU) and its transposition into the legislations of the Member States is recent. This has enabled a more clear definition of this type of initiatives and has structured the markets by providing more transparency, which is essential for their consolidation. The great innovation is the real possibility that citizens will also assume a new **role in energy production** (prosumer) in addition to the **role of consumer**.

Broadly speaking, the EU legislative framework formally recognises and defines **two specific types of energy communities**:

	Renewable Energy Communities (REC)	Citizen Energy Communities (CEC)
Definition	<p>A legal entity that:</p> <ul style="list-style-type: none"> ■ In accordance with applicable national law, it is based on the open and voluntary participation, is autonomous and effectively controlled by the partners or members who are located in the vicinity of the renewable energy projects that are owned and developed by the legal entity ■ Their members are natural persons, SMEs or local authorities, including towns. ■ Its main purpose is to provide environmental, economic and social benefits to its partners or members or to the local areas where it operates, rather than financial gains. 	<p>A legal entity that:</p> <ul style="list-style-type: none"> ■ Is based on voluntary and open participation, the effective control of which is exercised by partners or members who are natural persons, local authorities -including towns- or small companies. ■ The main goal is to offer environmental, economic or social benefits to its members or partners or to the town in which it operates, rather than to generate financial profits.

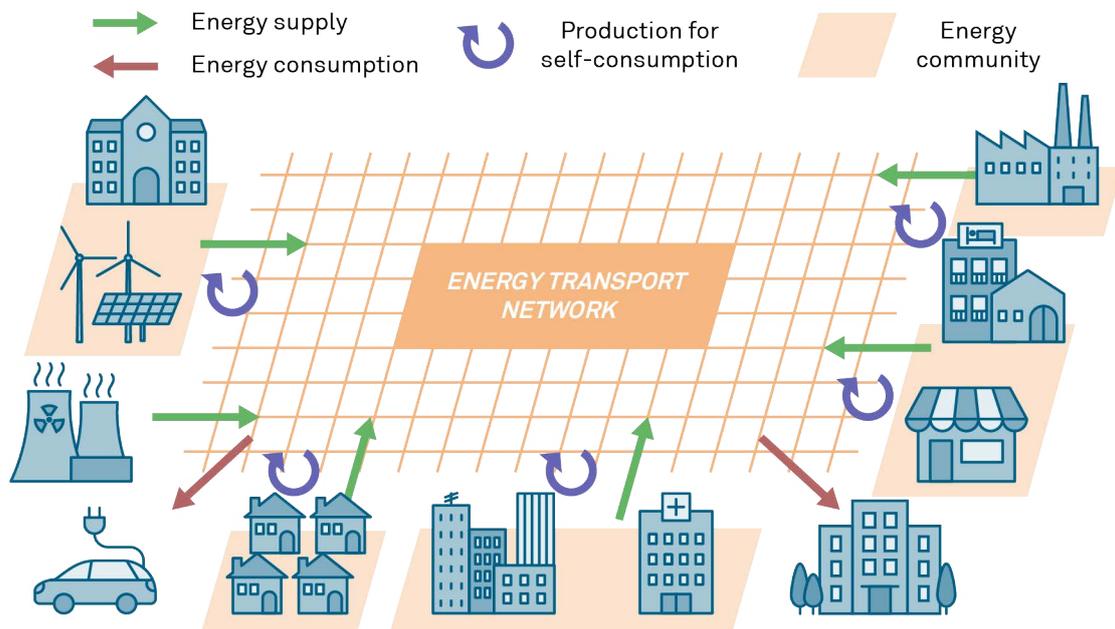
	Renewable Energy Communities (REC)	Citizen Energy Communities (CEC)
Conditions	<ul style="list-style-type: none"> Member States ensure that end consumers, particularly domestic consumers, have the right to participate in a renewable energy community while maintaining their rights and obligations as end consumers. If private companies participate, this cannot constitute their main commercial or professional activity. 	<ul style="list-style-type: none"> CECs, while not limited to renewable energies, are fundamentally very similar to RECs, both in terms of their operation and organisation (voluntary and open participation), as well as in terms of people who have the possibility of participating (natural persons, local authorities -including towns- and SMEs). As distinguishing elements between the two entities, we find that the CECs do not need to be, unlike the RECs, local. Thus, shared electricity allows members or partners to supply electricity from the community's generating facilities without being geographically close to the generating facilities.
Functions	<ul style="list-style-type: none"> Producing, consuming, storing and selling renewable energy, in particular through purchase and sale contracts for renewable electricity. Share within the renewable energy community the renewable energy produced by the production units owned by the community itself. Access all appropriate energy markets both directly and through non-discriminatory aggregation. 	<ul style="list-style-type: none"> CECs participate in energy generation -including renewable sources-, distribution, supply, consumption, aggregation and storage. They may also provide energy efficiency services as well as charging services for electric vehicles or other energy services to their members or partners.

Collective self-consumption communities are also worth mentioning. These are groups of consumers who agree to feed on electrical energy from production facilities close to consumption facilities and located within a radius of 500 metres (this limit will be progressively extended to make the operation of the energy community economically more viable).

In short, the different types of energy communities established by the regulations **differ significantly from traditional actors in the electricity market:**

- Income is intended to generate **environmental and socio-economic benefits** for the Community itself.
- The **citizens themselves hold control of the community** in such a way as to guarantee their autonomy and at the same time promote energy democratisation.
- Citizenship is empowered to have **fair access to local renewable energy resources** and to help, among other things, to combat energy poverty or create investment opportunities for local companies, to address the socio-economic needs of companies and citizens, as well as to invest in energy efficiency.

Figure 1. How does an Energy Community work?



Source: Prepared by the authors.

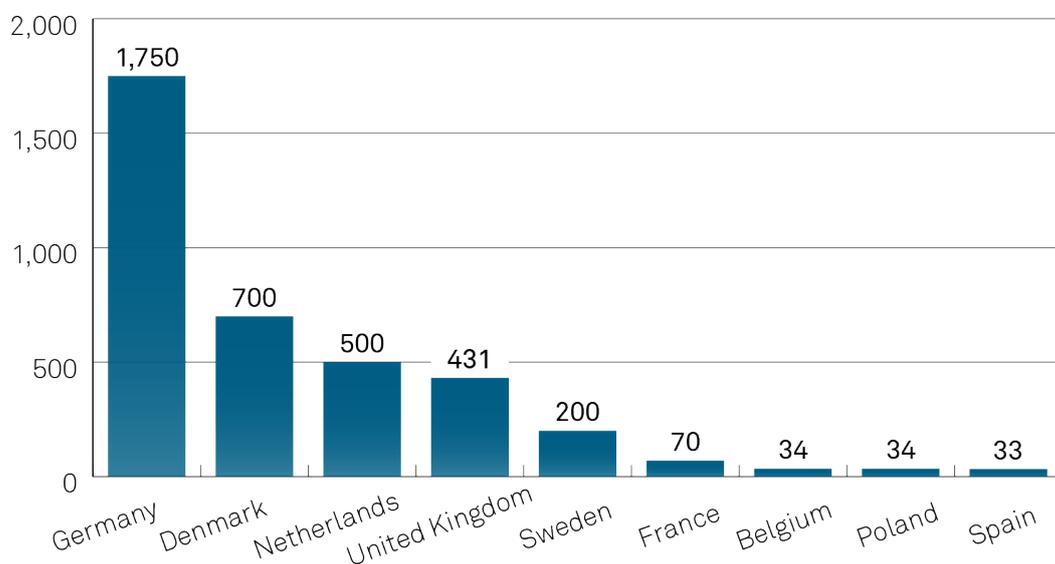
To summarise, the **main activities** developed by an energy community are:

- **Generation of renewable energy:** shared self-consumption and collective generation plants.
- **Energy distribution:** management and maintenance of wiring, transformers, etc.
- **Energy supply:** through the joint purchase of 100% renewable energy in the wholesale electricity market.
- **Exchange** of energy between individuals (peer to peer).
- **Energy aggregation:** offers flexibility and network balance services to the system operator (REE) and distributors.
- **Shared energy storage.**
- Provision of **energy efficiency services:** so that neighbours, shops and local industries pay the fair and necessary amount on their bill.
- Provision of **charging services for electric vehicles.**

Current situation

Broadly speaking, energy communities are processes where **energy transition** and **social innovation** come together as decentralised initiatives promoting practices of sustainable energy consumption and production. Energy communities reflect a fundamental change in the behaviour of consumers, who have traditionally played a passive role and now assume a co-owner role of renewable energy facilities -a conscious consumer and operator of the energy market. In Europe, as of 2019, there were about **3,500 renewable energy communities**, which are very diverse (cooperatives, ecological villages, small-scale heating organisations, among others) and have increased remarkably.

Figure 2. Approximate number of Energy communities in several countries. 2019



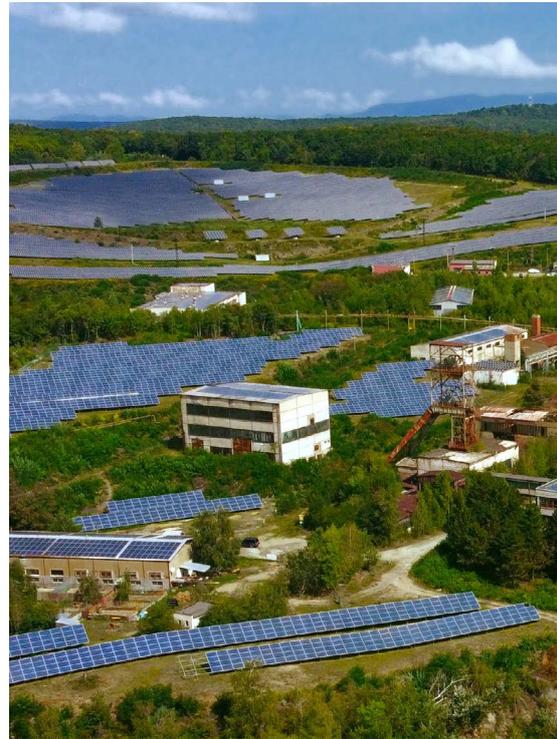
Source: Prepared by the authors based on the report Energy communities: an overview of energy and social innovation (European Commission)

An energy community has the ability to be an **active agent** in the electricity market through the figure of the **energy demand aggregator**, which brings together the various agents of the electricity system (consumers, small or large producers or prosumers, power storage systems with batteries, electric vehicle charging points, among other services) to act as a single entity and participate in the wholesale and retail electricity market, sell services to the system operator (Red Eléctrica Española) or balance sheet services to local energy distributors. This new agent will represent the various actors in the electricity market with a common interest: **obtaining energy at the minimum cost**. The demand aggregator, by receiving price signals from the system operator, will help to further integrate renewable energy into the network by injecting energy from its distributed resources (storage) or by reducing the community's energy demand.

Energy communities are one of the key elements in achieving the European Union's energy transition: by 2050, half of European citizens could produce up to half of the Union's renewable energy.

According to EU laws, energy communities can adopt **any form of legal entity**: association, cooperative, non-profit organisation or a limited liability society. It makes it easier for its citizens, together with other market players, to work together and invest in energy assets. This in turn helps to contribute to a more decarbonised and flexible energy system, as energy communities can act as one entity and access all the appropriate energy markets on equal terms with other market players.

In short, energy communities offer a means of **restructuring energy systems** by taking advantage of energy, enabling citizens to actively participate in the energy transition and offering direct potential benefits to citizens, such as increasing energy efficiency, reducing their electricity bills, reducing carbon emissions, as well as supporting the local economy and creating local jobs.



Impact of energy communities on professional profiles

The various sources consulted agree that the future development of Energy Transition will lead to the **creation of new jobs**. As long as the development of energy communities is facilitated by public authorities, growth will be sustained and lasting. The growth in the number of energy communities runs in parallel with social pressure for renewable energy and a job increase in this sector.

Thus, the professional profiles that will be positively affected by the development of energy communities would be all those that are already **linked to the Green Economy** (manufacturing, installation, maintenance of energy communities), as well as the profiles that include professionals who **provide technical and legal advice on the departure of energy communities**:



In the **construction and installation** of renewable energy systems, the jobs linked to the following areas are relevant:

- Design and projection of energy installations and management of renewable energy projects.
- Management of energy plants and specialisation in energy production from alternative and renewable sources such as methanisation, biomass or geothermal energy facilities.



In the **design and management of energy communities**, the market will demand new professional skills in:

- Assessment of the need to create local energy communities; awareness of the value of self-consumption and spread the need to belong and work for local energy communities; networking with other local energy communities; technical training in the analysis of energy data as well as in the organisation of legal structures and the management of processes before the Administration.
- Managing energy communities to control energy spending and distribution within the local energy community, as well as to interact with energy distributors and producers and data management and handling, interpreting power curves.
- Controlling and monitoring electrical supplies, knowing how to optimise and improve the efficiency of supplies or dynamising and accompanying a local energy community.
- More specifically, new jobs will be created in different positions in the management of energy communities: administration, communication and event management, customer management, technical advice, among others.



Similarly, the consolidation of energy communities will lead to an increase in demand for professional profiles traditionally linked to the field of **industrial installation, maintenance and industrial manufacturing of essential elements for the production of renewable energy**. Specifically:



More professional profiles will be needed in research focusing on increasing the efficiency of renewable energy generation devices and on energy storage and distribution systems, all of which are highly qualified professional profiles.



Increased employment opportunities are also expected in the design and consulting of renewable energy installation projects, legal advisory services and energy advice, all of which are highly qualified professional profiles.

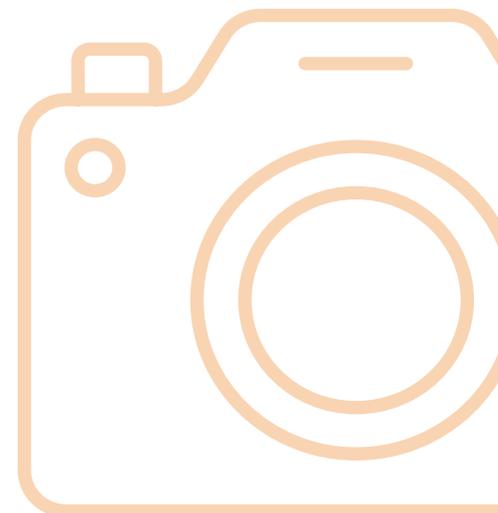


Finally, it is clear that more job opportunities will also be created in the installation and maintenance of new energy infrastructures: metal structure assemblers, electricians, plumbers, maintenance professionals, among others.

Energy communities, in focus

The main trend in energy communities is their **consolidation and increase**, all the more so since regulation at European level has been transposed into state legislation and given legal certainty. Some of the **possible trends** are:

- **Use of blockchain technology to efficiently and transparently manage the interaction of prosumers**, who are people or user entities in an energy community who produce more energy than they can consume and therefore sell it back online. Blockchain has proved useful for the rapid growth of distributed energy networks, achieving a new and democratising effect.
- In the initial state of development of energy communities in Europe, most projects target **sustainable energy generation**, but their roles are gradually expanding and it is logical to expect them to increase in new areas such as **energy supply, energy efficiency and electromobility**. Estimates suggest that by 2030, European energy communities could have about 17% of installed wind capacity and 21% of solar capacity.
- The development of energy communities involves expert knowledge and **specific support services** will be required through companies **that will propose a personalised project** depending on the characteristics of the energy community: size of installation according to the possibilities of each user in the community, offer turn-key services or management of optimal energy distribution and economic costs (monitoring and use of batteries software, for example).



Sources consulted

- Walker, G., and P. Devine-Wright. (2008). [Community renewable energy: What should it mean?](#)
- Diputació de Barcelona. (2021). [Guia per a l'impuls de comunitats energètiques amb perspectiva municipal.](#)
- European Commission. [Energy communities: an overview of energy and social innovation.](#)
- International Renewable Energy Agency. (2020). [Renewable Energy and Jobs Annual Review 2020.](#)
- Florence School of Regulation. (2020). [The future of renewable energy communities in the EU.](#)
- Oil Prices Are. (2020). ["Energy Communities" the Future Of Renewables?](#)
- Climate Reality. (2020). [Energizing the green economy: the growth of clean energy jobs.](#)
- Endesa. (2022). [Les comunitats energètiques locals, una altra manera de generar i consumir energia.](#)

Additional webliography

- Joan Vila i Triadú. (2021). [Comunitats energètiques, camí d'un món més sostenible.](#)
- [Grupo Enercoop.](#)
- El Independiente. (2021). [Comunidad Energética de Crevillent.](#)
- Projecte Merlon de la UE. [Merlon.](#)
- Energy Cities. (2022). [Energy Cities.](#)

Image credits

- NUNO MARQUES Cover image.
- NUNO MARQUES Summary image.
- ANNA SHVETS Pg. 3.
- SAM FORSON Pg. 4.
- RICHARD PALOCSÁNYI Pg. 9.
- KINDEL MEDIA Pg. 11.
- KINDEL MEDIA Pg. 12.

This report has been prepared by **Utrans**.