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Policy and regulation recommendations

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DISCLAIMER

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List of acronyms

Project title

LIFE-BECKON - Boosting Energy Communities massive deployment by equipping local authorities with comprehensive technical assistance cookbook, integrated services and capacity building

Project partners

R2M	R2M Solution SL (Project Coordinator)
CA	Climate Alliance European Secretariat
ENoLL	European Network of Living Labs
WEG	WEglobal
KK	City of Copenhagen
SOF	Sofia Energy Agency (SOFENA)
DAV	Diputación de Ávila
TAMK	Tampere University of Applied Sciences

Commonly used terms

APEA	Avila Province Energy Agency
BG	Bulgaria
CEC(s)	Citizen Energy Community(ies)
CER	Comunità di Energia Rinnovabile
DK	Denmark
DSO(s)	Distribution System Operator(s)
EC(s)	Energy Community(ies)
EIB	European Investment Bank
ELENA	European Local Energy Assistance
ERDF	European Regional Development Fund
ES	Spain
MPO	Metering Point Operator(s)
OSS	One-Stop-Shop
P2P	Peer-to-peer
REC(s)	Renewable Energy Community(ies)
RED II	Renewable Energy EU Directive – Recast to 2030
RRF	EU Recovery and Resilience Fund
TA	Technical Assistance
TAO(s)	Technical Assistance Office(s)
TSO(s)	Transmission System Operator(s)
VNM	Virtual Net Metering

Executive Summary

The transition toward a decentralized, renewable-based energy system in Europe increasingly relies on the active participation of citizens, municipalities, and local stakeholders through **energy sharing projects**. The **LIFE-BECKON project** supports this transition by equipping public authorities and local actors with practical tools and support mechanisms to facilitate the creation and scaling of **energy sharing projects through energy communities** across Europe, including **Technical Assistance Offices (TAOs)**, **capacity-building activities**, and a dedicated **LIFE-BECKON One-Stop-Shop platform**.[1]

Specifically, LIFE-BECKON focuses on energy communities, as they can play a significant role in accelerating renewable energy deployment, improving local energy resilience, and enhancing social acceptance of the energy transition. However, their development across Europe remains uneven and often limited by regulatory, administrative, and financial barriers. In particular, non-technical barriers—including administrative complexity, regulatory fragmentation, and limited access to financing—remain a major obstacle to renewable energy deployment and account for a significant share of the challenges faced by new projects.

Based on the experience gained through the LIFE-BECKON pilot regions (Denmark, Bulgaria, and Spain) and the engagement of replicators in other Member States (notably Germany and Italy), this report identifies **three key policy domains that most strongly affect the development and scalability of energy sharing projects through energy communities**, representing the core enabling conditions for energy communities:

1. Collective self-consumption,
2. Connection to the grid and cooperation with Distribution System Operators (DSOs),
3. Financial support and funding frameworks.

Collective self-consumption defines the legal and operational framework allowing citizens and organizations to share locally generated renewable energy. Collective self-consumption models enable multiple participants—such as residents of a building or members of a local cooperative—to share renewable energy generation, typically from photovoltaic installations. By reducing transaction costs and simplifying procedures, these models can significantly encourage citizen participation and local investment in renewable energy systems.

Grid connection and cooperation with DSOs determine whether energy communities can technically operate, exchange electricity with the broader system, and integrate distributed generation assets. The ability to connect generation assets to the electricity network and exchange energy among members depends on grid capacity, regulatory clarity, and the cooperation of DSOs. Where connection procedures are complex, costly, or uncertain, renewable energy projects may face delays or become economically unviable.

Access to financing remains a key barrier for community-led energy projects. Financial support and funding mechanisms determine whether communities can overcome initial investment barriers and

[1] https://www.oss-energy-community.eu/

develop viable projects. While several EU instruments support energy communities—including the European Energy Communities Facility, Cohesion Policy funds, and the LIFE programme—dedicated financial mechanisms at national and regional levels remain limited in many countries.

Technical Assistance Offices (TAOs) are designed to guide municipalities and local stakeholders throughout the process of developing energy communities—from initial concept and business planning to financing and operation. Clear regulatory frameworks, transparent grid access conditions, and targeted financial instruments are therefore essential to ensure that TAOs can effectively support community initiatives and scale them across Europe.

The recommendations presented in this report are primarily addressed to those actors who are in a position to shape, enable, and implement frameworks for energy sharing—most notably **policy and decision makers at the local and regional level, but also on the national level, if changes in national regulation and laws are concerned, and in some aspects on the EU level as well**. The former ones include representatives of municipal and regional governments, as well as **energy and climate agencies** that are actively seeking to promote or expand energy sharing through the development of energy communities.

The analysis conducted in this report identifies a number of **common barriers** across EU and pilot countries, including fragmented regulatory frameworks for energy sharing, administrative complexity in grid connection procedures, and insufficient access to dedicated financing instruments for community-led projects. At the same time, the analysis highlights several **policy opportunities** to strengthen the enabling environment for energy communities.

Overall, the findings demonstrate that **energy communities face similar structural challenges across Europe**, particularly in relation to regulatory fragmentation, grid integration, and financing conditions. Addressing these barriers through targeted policy reforms can significantly accelerate the deployment of community-based renewable energy systems.

In this context, strengthening **Technical Assistance Offices** and improving coordination between European, national, and local policies will be essential to ensure that energy communities can become a mainstream instrument of the European energy transition.

The following synthesis tables summarizes the main obstacles and policy recommendations identified in the project countries (Bulgaria, Denmark, Spain) and replicator countries (Germany and Italy as the most representative ones in terms of number of replicators), as well as at the EU level.

BARRIERS					
Collective self-consumption					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Legal framework still fragmented; no clear operational rules for energy sharing; unclear licensing rules for prosumers; no virtual net metering.	Minimum implementation of EU directives; electricity sharing restricted mainly to single buildings; ECs cannot own or operate local grids.	Administrative complexity; coordination among multiple electricity stakeholders; delays in validation by DSOs.	New energy-sharing framework (EnWG §42c) but high metering and administrative costs; complex contractual structure.	Geographic limitations (same substation); complex incentive schemes; administrative complexity for small communities.	Lack of harmonised implementation of RED II; definition of EC unclear and very diverse among Member States; different geographic restrictions and market rules among Member States.
Connection to the grid					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Bureaucratic procedures; lack of smart metering access; unclear balancing rules.	Grid capacity constraints; grid tariffs to allow energy sharing among different buildings too expensive; energy sharing limited to internal connections; delays in grid expansion.	Lengthy permitting processes; connection permits required before administrative authorisation; grid planning is inflexible.	Distribution grid congestion; slow smart-meter rollout; complex digital infrastructure requirements.	Grid integration is still evolving; regulatory complexity; coordination between multiple authorities.	Grid congestion across Europe; 1.7 TW of projects waiting for connection; old infrastructure and limited digitalisation; complex grid connection procedures; long permitting times.
Financial support and funding					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Limited dedicated funding; complex application processes for communities; reliance on EU/national grants.	Reliance on EU/national grants; limited access to large-scale financing for community projects.	Access to loans remains difficult; reliance on public grants; small projects seen as high-risk by banks.	Funding available (e.g., KfW loans) but complex application processes for small communities.	Support exists but reimbursement models require upfront capital; complexity of incentives.	Few instruments dedicated exclusively to ECs; funding often indirect through broader programmes.

RECOMMENDATIONS					
Collective self-consumption					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Establish clear legal status for ECs; introduce virtual net metering; simplify licensing requirements for small producers.	Allow energy sharing across buildings; permit ECs to manage local distribution infrastructure; extend regulatory support beyond minimum EU transposition.	Simplify administrative procedures; remove grid connection restrictions and technical barriers, improve coordination between stakeholders.	Simplify metering and billing procedures; reduce administrative and financial burden for small ECs; support digitalization of infrastructure and of DSOs' and MPOs' processes	Simplify support schemes; streamline administrative procedures; provide technical support for business planning.	Provide clearer EU guidance on energy sharing; support harmonisation of collective self-consumption frameworks.
Connection to the grid					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Establish legal framework for microgrids; ensure transparent access to metering data; simplify connection procedures.	Expand grid infrastructure; allow shared local networks; integrate ECs into flexibility markets.	Push strategic grid planning and grid expansion; accelerate connection permitting; strengthen coordination between stakeholders.	Push grid expansion and effective grid management; standardize grid connection; accelerate smart-meter deployment; simplify digital requirements for EC participation.	Continue grid reinforcement and simplified permitting; improve coordination with GSE and DSOs.	Prioritise grid investments; promote smart-grid technologies; require DSOs to integrate ECs into planning processes.
Financial support and funding					
Bulgaria	**Denmark**	**Spain**	**Germany**	**Italy**	**EU level**
Establish a national funding scheme for ECs; provide start-up grants and technical assistance.	Expand financial instruments (loans, guarantees) for EC projects; integrate EU Social Climate Fund support.	Develop public guarantee funds to facilitate debt financing; provide tailored funding for initial phases	Develop funds for the initiation of ECs; simplify access to public loans; expand guarantees for community projects.	Provide pre-financing mechanisms; simplify funding procedures for small communities.	Expand dedicated EU funding for ECs; strengthen technical assistance programmes and TAOs.

A few words on LIFE-BECKON

The LIFE-BECKON project (November 2022, April 2026) is **funded by the European Commission through the LIFE program**, which is one of the EU's financing instruments for environment and climate action. It belongs to the Life Clean Energy Transition sub-program.

LIFE-BECKON stimulates and boosts the **deployment of Energy Communities across Europe** by developing and delivering **comprehensive support mechanisms** for public authorities, promoters and Local Action Groups to better equip them to facilitate the creation of Energy Communities.

Figure 1. LIFE-BECKON partners.

LIFE-BECKON provides public authorities with the following support services, tested and validated in three **demonstration areas** such as **Copenhagen (Denmark)**, **Sofia (Bulgaria)**, and **Province of Ávila (Spain)**:

1. **Technical Assistance cookbook**, to equip Technical Assistance Offices of public authorities and relevant stakeholders with knowledge and learning material covering all the steps for the development of energy communities (initiation, design, implementation, operation).
2. **Capacity Building program**, developed via Train-the-Trainer approach.
3. Integrated **One-Stop-Shop (OSS) web platform**, a digital platform designed to connect citizens, municipalities, and suppliers to support the creation and growth of local energy communities. Key functions include (i) information and guidance on how to form or join an energy community; (ii) knowledge sharing through training resources and community discussions; (iii) funding and financial opportunities for renewable energy and efficiency projects; (iv) supplier and expert matchmaking to connect demand and service providers.

Besides the three demonstration areas, LIFE-BECKON already engaged a **community of 21 replicators** – composed mainly by municipalities, cities and energy agencies – receiving capacity building and soft technical assistance to apply LIFE-BECKON approach, knowledge and tools at the local level.

1. Introduction

EU Member States have introduced ambitious targets for the deployment of renewable energy installations. They have chosen to rely on wind and PV to meet these targets in the power sector, both of which have seen growth in most countries. However, most Member States did not constantly deploy renewable energy technologies but acted rather in a back-and-forth manner in the past ten years. As a result, a number of markets underperformed compared to their potential.

The main reason for the underperformance of renewables were non-technical barriers, such as the lack of business cases, weak support schemes, market entry barriers, administrative obstacles and grid related issues. In the past years, administrative (and grid) obstacles have become an increasingly important and pressing matter. Already today, administrative and grid issues make up about 46% of all identified barriers and this is expected to rise in the future. For some technologies, such as wind power and PV, a trend is emerging where administrative barriers become even more crucial than policy barriers related to support schemes.[2]

This report identifies **three key policy domains that most strongly affect the development and scalability of energy sharing projects through energy communities**, representing the core enabling conditions for energy communities:

1. Collective self-consumption,
2. Connection to the grid and cooperation with Distribution System Operators (DSOs),
3. Financial support and funding frameworks.

This report focuses on support schemes, market entry barriers, administrative obstacles and grid-related issues with particular focus on solar PV electricity production and does not consider heating and cooling production. It includes the feedback and recommendations, which were primarily elaborated based on the experiences and results of the LIFE-BECKON project.

The report aims at improving public policies, legal and regulatory environments on energy sharing projects at European and national level, especially in the LIFE-BECKON pilot countries Bulgaria, Denmark, Spain but also in Italy and Germany, where a significant number of LIFE-BECKON replicators are located.

[2] Cf. Technical support for RES policy development and implementation – Simplification of permission and administrative procedures for RES installations (RES Simplify). Interim report. eclareon, Öko-Institute, WindEurope and SolarPower Europe. European Commission, July 2021, p.15

2. Collective self-consumption

Self-consumption is a model where multiple households or businesses share locally produced electricity onsite, usually from renewable sources like solar panels. The energy is often generated by a renewable asset owner, which can be the building owner, a resident group, a cooperative / energy community or a private / municipal energy operator. In this model consumers of energy frequently own or have a share in a shared renewable energy system, e.g. as an energy community, which can consist of a group of citizens, businesses, etc. and is usually organized as a legal entity (e.g. cooperative or association). Actors who both generate electricity and use it themselves within the shared system are called prosumers. They can consume and share energy within a building or among different buildings.

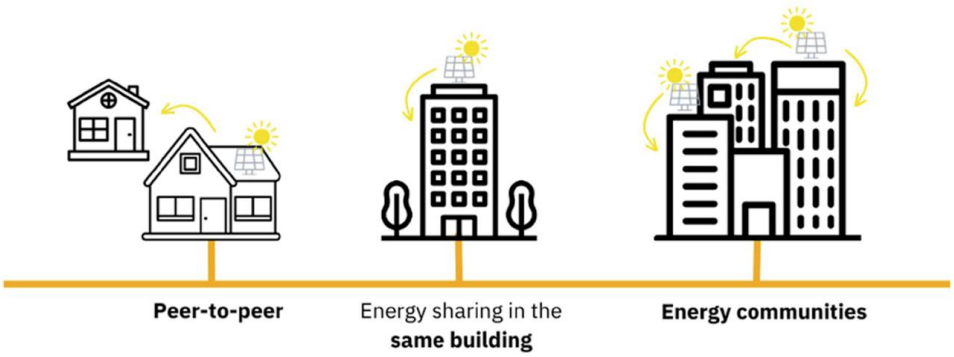


Figure: Energy Sharing–Implementation Models within the EU Framework[3]

According to the EU Framework, the following basic **implementation models for energy sharing** can be distinguished:[4]

Peer-to-peer (P2P) energy trading enables individual producers and consumers to buy and sell electricity directly with each other through digital platforms, typically using smart meters. It is usually decentralized and market-based, allowing participants to choose trading partners and prices rather than relying solely on a traditional utility.

Energy sharing within the same building refers to the local distribution of electricity (often from rooftop solar) among units in a single building or complex, such as apartments sharing power from a common photovoltaic system. This model is highly localized and typically coordinated through building management or a collective metering arrangement rather than an open market.

[3] https://eeg-hellweg-sauerland.de/wp-content/uploads/2026/03/Energysharing-EEG-Hellweg-Sauerland_Praxisvortrag-E4C_2026-03-10.pdf, p.10

[4] Based on the information from Kurzbericht Energy-Sharing, Umweltbundesamt Oktober 2023, p.18 https://www.umweltbundesamt.de/system/files/medien/11850/publikationen/06112023_46_2023_cc_energy_sharing.pdf

Energy communities are broader organizational structures where a group of citizens, businesses, or public entities jointly produce, manage, and share renewable energy across a neighborhood or region with collective governance. Energy communities are a **legal entity** where participants are allowed to do energy sharing (among other activities).[5]

The main differences between these models are scale and governance: P2P focuses on bilateral market transactions, building-level energy sharing focuses on internal allocation within one property, and energy communities emphasize collective ownership and community-wide participation in energy generation and management. P2P trading typically uses the public distribution grid and energy communities generally interact with the public grid, whereas energy sharing in the same building often uses an internal building network instead of the public grid. One of the biggest challenges is to allow energy sharing between different buildings to happen, thus avoiding grid connection constraints and amplifying the distance allowed between the generation unit and the consumers.

In the next subchapters are reported the main components, barriers and recommendations on collective self-consumption for the LIFE-BECKON pilot countries Bulgaria, Denmark, Spain, plus Italy and Germany, where a significant number of LIFE-BECKON replicators are located.

[5] Since different legal frameworks result in different structures and different requirements for energy sharing, one would consequently always have to refer to either "energy sharing within the framework of self-suppliers acting collectively," "energy sharing within the framework of a renewable energy community," or "energy sharing within the framework of a **citizen** energy community": Thus, the jointly acting self-suppliers and renewable energy communities established in the Renewable Energy Directive (RED II) may jointly use electricity and heat generated from renewable sources, whereas in a **citizen** energy community under the Electricity Market Directive (EU), the sharing of renewable and conventional electricity—but not heat—is to be permitted. Furthermore, the models differ in terms of their local anchoring: Collective self-supply is limited to residents of a building or apartment complex; the energy generated "on-site" may be shared. Members of the RE community, on the other hand, must be located near the respective RE projects, and their supply is likely to be provided regularly via the public grid. In the case of a **citizen** energy company, however, there is no locality requirement; the generation facilities it operates and its members could therefore be distributed throughout the entire territory of a member state. Here, too, supply to members is typically provided via the grid." Kurzbericht Energy-Sharing, p.18/19, based on Art. 2, Art. 16 Electricity Market Directive (EU) 2019/944, Art. 2 and on Art. 21, 22 Renewable Energy Directive (RED II) of the Clean Energy for Europeans package.

2.1 Bulgaria

Collective self-consumption—Policy recommendations

- Define a legal form for energy communities to simplify their registration and operation–in alignment with EU directives and best practices in community energy initiatives.
- Introduce virtual net metering mechanisms allowing energy allocation across multiple consumption points.
- Clarify licensing exemptions for small-scale renewable energy producers and energy communities.
- Develop standardized procedures for the registration and operation of energy communities.

The background

Bulgaria's framework governing energy communities has developed progressively in response to the requirements of the EU Renewable Energy Directive (2018/2001/EC - RED II) and the Internal Electricity Market Directive (2019/944/EC - IMED).

In 2023, amendments to the Renewable Energy Sources Act and the Energy Act formally introduced a legal definition of ECs—marking an essential step toward alignment with EU legislation.

These directives recognize two types of energy communities under national legislation as new market participants with the right to generate, store, share, and trade electricity—primarily from renewable sources:

- **Renewable Energy Communities (RECs)** under the RES Act (Закон за енергията от възобновяемиизточници - ЗЕВИ)[6]
- **Citizen Energy Communities (CECs)** under the Energy Act (Закон за енергетиката - ЗЕ)[7].

Both models are founded on shared principles such as voluntary and open participation, democratic governance, and prioritization of social, environmental, and economic benefits over profit generation. However, they differ in scope, geographic limitations, and operational rules.

Although both models are transposed into national law, the regulatory and operational framework for establishing and managing energy communities remains fragmented and incomplete, presenting several gaps:

- No dedicated registration procedure for energy communities.

[6] https://lex.bg/laws/ldoc/2135728864
[7] https://lex.bg/laws/ldoc/2135475623

- Lack of specific operational rules for market participation.
- Absence of detailed provisions for energy sharing and collective self-consumption.

Self-consumption and energy communities

Energy communities can produce, consume, store, and sell energy under the **Electricity Measurement Rules** (Правила за измерване на количеството електрическа енергия)[8] and the **Ordinance on Metering and Settlement of Electricity Quantities** (Наредба № 6/2014 г.).[9]

As of early 2026, Bulgaria is undergoing major transformation in its energy sector, moving toward the liberalization of electricity markets and the legal enabling of collective self-consumption and energy sharing. Following amendments to the Energy Act and proposed updates to electricity trading rules in January 2026, the regulatory framework is more aligned with EU directives, enabling prosumers, active customers, and energy communities to operate, sell, and share energy, particularly in preparation for the full market deregulation for households on January 1, 2026.

Bulgarian law defines prosumers under two different categories: Active Customers (Активниклиенти) and Self-Consumers of Renewable Energy (Потребители на собственаелектрическа енергия от ВЕИ). While both groups produce and consume electricity, their legal rights and market participation vary based on whether they engage in renewable-only generation, energy storage, or electricity trading.

The **Energy Act** (Закон за енергетиката - ЗЕ, §1, т. 75)[10] introduces the concept of Active Customers, referring to end consumers or groups of end consumers who generate, store, consume, and sell electricity. These customers are allowed to participate in aggregation, flexibility programs, and demand response schemes, provided that energy production is not their primary commercial activity. The law ensures that active customers cannot be subjected to discriminatory grid access fees or excessive administrative barriers imposed by network operators.

Furthermore, they are permitted to aggregate their production and participate in balancing markets, although they remain financially responsible for any imbalances unless they join a balancing group. One of the most significant advantages for active customers is that those with energy storage systems benefit from simplified grid access procedures and are exempt from additional grid fees for stored electricity.

However, the regulatory framework remains vague in key areas, particularly concerning balancing cost structures and the definition of a reasonable timeframe for grid connection.

Moreover, the **RES Act** (Закон за енергията от възобновяемиизточници - ЗЕВИ, чл. 18а)[11] defines Self-Consumers of Renewable Energy, specifically covering prosumers generating electricity exclusively from renewable sources. These self-consumers are entitled to produce, consume, store, and sell

[8] https://lex.bg/bg/laws/ldoc/2135960284
[9] https://lex.bg/laws/ldoc/2136150122
[10] https://lex.bg/laws/ldoc/2135475623
[11] https://lex.bg/laws/ldoc/2135728864

electricity while retaining their rights as end customers. The law mandates that network operators cannot impose discriminatory conditions on their grid access, ensuring equal treatment in market transactions. Self-consumers can sell excess electricity at market-based prices or through support schemes, but licensing and registration requirements remain unclear, creating uncertainty for small-scale prosumers who want to participate in the market. Unlike in some EU countries, as Bulgaria has not yet introduced Virtual Net Metering (VNM), self-consumers cannot virtually allocate their self-generated energy to multiple consumption points.

Challenges for prosumers in Bulgaria

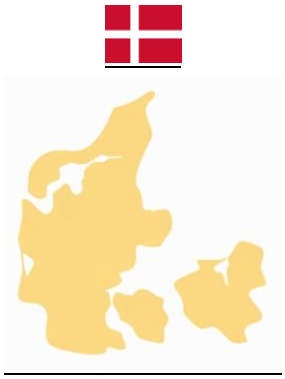
- Energy communities are **not recognized as distinct market participants** in the Power Market Rules, making it unclear how they should trade electricity or fulfill balancing responsibilities.
- **Lack of clear licensing exemptions for small-scale self-consumers**, exposing them to possible complex regulatory requirements, even when selling minimal amounts of electricity.
- **Grid connection delays and high costs**, particularly for those without energy storage.
- **Lack of real-time access to own metering data** (or even a retrospective access to verified dynamic consumption profile), as DSOs control energy flow information under the Personal Data Protection Act.
- **Lack of technical standards, safety requirements, or market participation rules for stored energy**, despite the law acknowledges energy storage as an essential component of decentralized electricity production.
- **No support mechanisms for energy storage and self-consumption**—regulations treat energy communities like standard market participants.

Collective self-consumption—Policy recommendations

- **Legal form and recognition**. Bulgaria should introduce a **dedicated legal definition and recognition of energy communities under the Energy Act and the RES Act**. This should establish RECs and CECs as distinct market participants with clearly defined rights and obligations. While current laws mirror basic EU definitions, they lack specificity. To address this, primary legislation must define key terms such as “voluntary and open participation”, “autonomy”, and “effective control” (e.g., one member–one vote), and introduce safeguards against covert commercial control or misuse. Proximity requirements for RECs should also be clarified in the primary legislation, leaving technical implementation to secondary acts. Furthermore, these laws must mandate a national registration system for energy communities, empower EWRC with oversight responsibilities, and introduce sanctions for violations of community principles (e.g., ineligible members or deviation from non-profit objectives).
- **Secondary legislative amendments**. To enable full market participation, **the Rules for Measuring Electricity (ПИКЕЕ) and the Electricity Market Rules (ПТЕЕ) should be updated**. These amendments must specify the roles of energy communities in metering, data exchange, and collective self-consumption, and allow for models such as VNM. Transparency, data access, and interoperability standards should also be introduced.

- **Introduce virtual net metering mechanisms** allowing energy allocation across multiple consumption points.
- **Clarify licensing exemptions** for small-scale renewable energy producers and energy communities.
- **Develop standardized procedures** for the registration and operation of energy communities.

2.2 Denmark



Collective self-consumption—Policy recommendations

- Enable electricity sharing across multiple buildings and neighbourhoods.
- Allow energy communities to develop and manage local energy infrastructure where appropriate.
- Simplify administrative procedures related to the establishment and operation of energy communities.
- Introduce additional regulatory incentives supporting citizen participation in renewable energy projects.

The background

Denmark has established a legal framework to support the development and integration of energy communities, aligning with both national policies and EU directives. The primary legislation governing energy communities includes the **Energy Supply Act (Elforsyningsloven)**[12] and the **Promotion of Renewable Energy Act (Lov om Fremme af Vedvarende Energi)**[13]. These laws provide the foundation for the establishment and operation of CECs and RECs in Denmark.

The transposition of EU directives, particularly the Electricity Market Directive (2019/944) and the Renewable Energy Directive (2018/2001), has significantly influenced Denmark's regulatory landscape. These directives promote the integration of renewable energy sources and the establishment of ECs, ensuring that Denmark's legal framework is in harmony with broader European energy policies.

In addition to primary legislation, Denmark has issued several Executive Orders to detail the implementation of the Energy Supply Act and the Promotion of Renewable Energy Act. These orders cover aspects such as electricity sharing, grid access, and cooperation between DSOs and energy

[12] https://www.retsinformation.dk/eli/lta/2020/119
[13] https://www.retsinformation.dk/eli/lta/2018/1003

communities. The Danish Energy Agency[14] also runs grant schemes to support community projects and information initiatives around energy.

Since 2020, it has been possible in Denmark to establish local energy communities with self-production of renewable energy. In Denmark, an estimated more than 20 new local energy communities have been established as of February 2026, including industrial energy communities, and many more are being established[15].

Energy communities build on the strong Danish tradition of cooperative societies and offer citizens and businesses a framework for locally and concretely taking ownership of the transition to renewable energy. They constitute a constructive alternative to the growing local resistance amongst citizens to large commercial renewable energy systems, which are being established around the country without involving the local population.

The promotion of energy communities should therefore be taken into consideration in the political negotiations on more solar and wind power on land, which the government initiated in September 2025 under the heading "Fair. Reasonable. Flexible"[16].

Despite the legal framework, there are still challenges to the full development of energy communities in Denmark. Regulatory and administrative barriers remain, and the government continues to work on further revisions to improve the enabling framework for energy communities.

The Danish minimum implementation

The implementation of the EU's rules for energy communities in Denmark has been conducted as a minimum implementation according to principles developed by the Ministry of Business.[17] These are principles that are consistently followed for Danish implementation of business-related EU regulation. New EU provisions are written into Danish legislation, but are limited in their effect based on consideration for Danish business interests in connection with international competitive conditions. With minimum implementation, consideration has been given to business interests linked to electricity producers, grid companies and electricity traders, but corresponding consideration has not been given to Danish citizens' and businesses' interests in promoting an energy-efficient transition to an electricity supply based on renewable energy and the establishment of energy communities.

This means that energy communities currently, due to special Danish legislation:

- Must not share electricity between neighbouring buildings via their own internal electricity connections.

[14] https://ens.dk/en

[15] Data fetched 20 February 2026 from https://datacvr.virk.dk, search for company names, which include the words "energifællesskab" or "fællesvarme"

[16] Ministry of Climate, Energy and Utilities: Fair. Fornuftig. Fleksibel. Vejen til mere sol og vind på land

[17] Erhvervsstyrelsen, 2019: Vejledning om Principper for implementering af erhvervsrettet EU-regulering

- Must not own, lease, or rent electricity grid, even though this could contribute to optimized local utilisation of the distribution grid. The restriction also applies to cables on properties owned by, for example, housing organisations, private landlords and allotment garden associations.

It also means that larger, commercial renewable energy systems in municipal case processing are given priority to the limited locations that can be approved for installation of renewable energy systems.

Challenges for prosumers in Denmark

- **Minimum implementation of EU directives**. The legal framework is ready, but not favorable.
- **Lack of coordination**. There is no national strategy for cooperation between energy communities, grid companies, and commercial developers. The Danish Planning Agency's guidelines do not give municipalities the ability to prioritize democratically anchored renewable energy projects.
- **Restrictions on local electricity sharing**. Energy communities have, despite possibilities in the EU directives, not been given the opportunity to own or lease parts of the electricity grid. Restrictive rules have been introduced regarding the establishment of direct lines, even though this could optimise local grid utilisation.
- **Restrictions at property level**. An amendment to the Electricity Supply Act in 2023 limited electricity sharing to building level. This has created additional barriers to the establishment of large solar panel and battery systems in collective housing forms, especially in cities.
- Energy can be shared only with the public infrastructure, so it comes with taxes.

Collective self-consumption—Policy recommendations

- **Enable electricity sharing across multiple buildings** and neighbourhoods.
- **Allow energy communities to develop and manage local energy infrastructure** where appropriate.
- **Simplify administrative procedures** related to the establishment and operation of energy communities.
- **Introduce additional regulatory incentives supporting citizen participation** in renewable energy projects.

2.3 Spain

Collective self-consumption—Policy recommendations

- Increase sharing radius from 2 km to 5 km to include more consumers in one project.
- Simplify grid connection and coordination with utilities.
- Update rules for storage and digital tools, remove barriers such as anti-dumping systems, define roles (e.g., self-consumption manager).
- Improve surplus compensation to encourage renewable self-consumption.

The background

In May 2021, Spain adopted the country's first Climate Change and Energy Transition Law, which commits the country to cutting emissions by 23% by 2030, compared with 1990 levels.[18] At the end of March 2022, the Spanish Ministry for the Ecological Transition and the Demographic Challenge (Miteco) approved a new package of measures, including the promotion of renewables (**Real Decreto-ley 6/2022**, de 29 de marzo).[19] The Integrated National Energy and Climate Plan for Spain for the period 2021-2030 aims to increase the share of renewable energy in final energy consumption of electricity to 74% in 2030. In the heating and cooling sector, the target is to increase the share of renewable heating and cooling (RES-H&C) to 31% by 2030.[20]

Self-consumption and energy communities

The Spanish legal system recognises the right to self-produce and self-consume renewable energy in multiple forms, which allows for flexibility in the self-consumption design. Collective self-consumption, sharing of self-produced electricity among customers connected at low voltage within a distance of 2000 m is also allowed. For collective self-consumption no grid fees are charged for the electricity exchanges within the scheme. Renewable Energy Communities are not fully regulated. **Royal Degree-law (RDL) 23/2020** partially transposed the RED II EU Directive, since it adopted the definition of these communities and entitled them to participate in auctions.[21]

[18] Clean energy for EU islands: Study on regulatory barriers and recommendation for clean energy transition on the islands, Spain, p.10
[19] Clean energy for EU islands, p.14
[20] Clean energy for EU islands, p.9. The Spanish target for 2030 is to reach a 28% share of renewables in the final energy consumption of the transport sector.
[21] Clean energy for EU islands, p.15

In terms of technical regulations, **Law 24/2013, of December 26, 2013,** of the Electricity Sector, establishes that self-consumption facilities connected at low voltage shall be executed in accordance with the provisions of the **Low Voltage Electrotechnical Regulation** (Reglamento Electrotécnico de Baja Tensión / REBT) and its complementary Technical Instructions (Instrucciones Técnicas complementarias / ITC-BT). According to ITC-BT-40, the connection of self-consumption of installations with surpluses of up to 100 kW and in all self-consumption installations without surpluses to low voltage networks will be admissible. For this reason, any self-consumption installation connected to low voltage networks will have an Electrical Installation Certificate (Certificado de Instalación eléctrica / CIE) signed by an authorized installation company and duly certified by the competent body of the autonomous community, which will ensure that it has been carried out in accordance with the provisions of the REBT.[22]

According to the REBT, if the installation has a power higher than 10 kW, it must have a technical project signed by a competent technician. Installations of lower power (up to 10 kW) are only required to have a Technical Design Report (Memoria Técnica de Diseño / MTD) according to the format of the autonomous community, signed by the authorized installation company. In the case of installations connected at high voltage, the applicable regulation will be the High Voltage Electrical Installations Regulation (Reglamento de Instalaciones Eléctricas de Alta Tensión / RAT) and its complementary Technical Instructions (Instrucciones Técnicas complementarias / ITC-RAT).[23]

Compensation of surpluses

Self-consumption in Spain is regulated mainly by: **Royal Decree 244/2019** regarding administrative, technical and economic conditions for self-consumption, and **Law 24/2013** concerning the general electricity sector framework. The regulation distinguishes three modalities:

- Without surplus – no injection to the grid.
- With surplus subject to compensation (simplified mechanism).
- With surplus not subject to compensation – surplus is sold on the electricity market

The mechanism for simplified compensation of surpluses is established in **Royal Degree 244/2019**. Within collective self-consumption, the following two typologies are eligible for simplified compensation:

- Collective self-consumption facilities without surpluses eligible for compensation.
- Collective self-consumption facilities with surpluses eligible for compensation. [24]

In either case, the generating installation shall be of renewable source, the power of the production facility must be equal to or less than 100 kW, the facility must not have been granted a specific additional remuneration regime, a self-consumption surplus compensation contract must have been

[22] Guía IDAE 024: de orientaciones a los municipios para el fomento del autoconsumo (versión v.4), p.14/15
[23] Guía IDEA 024, p.15
[24] Guía IDAE 026: Guía de autoconsumo colectivo (versión v.2.1). Departamento Solar y Autoconsumo, Guía 026 – IDAE, Instituto para la Diversificación y Ahorro de la Energía, Madrid, iulio de 2024, p.23

signed between producer and consumer, even if producer and consumer are the same natural or legal person.[25]

In order for consumption supply and ancillary services[26] contracts to be unified and meet the condition for eligibility for compensation, it is necessary that the production facilities must be connected to the consumer's internal network, and the consumer and the owner of the production facilities are the same natural or legal person. If the consumption of ancillary services is considered negligible ("insignificant") it will not be necessary to enter into this ancillary services contract and the above condition will be deemed to be fulfilled. This is the case, if

- It is about nearby installations in internal networks.
- These are renewable generation facilities, and the installed power is less than 100 kW.
- The energy consumed by auxiliary production services is, on an annual basis, less than 1% of the net energy generated by the facility.[27]

In the case of photovoltaic generation, this condition is generally met. If any of these three conditions are not met, a contract for ancillary services must be drawn up. Compliance with this condition shall be accredited by the authorized installation company in the project or technical report of the self-consumption installation.[28]

For small installations (≤100 kW), the usual mechanism is simplified compensation. During each billing period (usually monthly):

- The supplier calculates the value of electricity consumed from the grid.
- The value of surplus electricity injected is deducted from that amount.
- The result appears to be a reduction in the electricity bill.

This is not net-metering (kWh vs kWh) but economic net-billing (€ vs €). The simplified compensation mechanism consists of a balance in economic terms of each consumer's surplus energy during the billing period. The energy generated by the installation is reflected in the net generation meter and is distributed (individualized) among the associated consumers by applying the coefficients that have been communicated in an agreement. Thus, if an associated consumer does not use all the energy that corresponds to it, this surplus energy is transferred to the grid and its marketer will be responsible for its management in the electricity market. At the end of the billing period, one month, the retailer will make the compensation between the cost of the energy purchased from the grid and the value of the

[25] Guía IDAE 026, p.23

[26] Auxiliary production services are supporting functions and resources that are not part of the main production process but are essential for the overall operation, efficiency, and support of a manufacturing or industrial facility

[27] Guía IDAE 026, p.23

[28] Guía IDAE 026, p.24

surplus energy injected into the grid, so that the value of these surpluses will be deducted from the bill.[29]

Roles of electricity provider and DSO

Participants in an energy sharing system can use different electricity providers. These providers must present participants with a new contract. In many cases, issuing such a new contract involves a number of complications. The electricity provider must communicate the ideal coefficient for all participants. This may be made more difficult by the involvement of several electricity providers.[30]

The DSO is responsible for validating the energy sharing system by using a form to determine the main participating users and the corresponding coefficients. The process may seem simple at first glance, but in practice it often leads to significant delays and lengthy procedures. Even when the initially difficult implementation of individual self-consumption in 2020 has been improved, DSOs are finding it difficult to offer these new services.[31] Acceptance and recognition of a self-consumption or renewable energy generation system by the electricity grid is key to the commercialization of self-consumption. It implies that the electricity grid must be prepared to receive and manage the energy generated by these installations, which includes aspects such as:

- Grid connection: Ensuring that the self-consumption installation is correctly connected to the electricity grid, complying with technical and regulatory requirements.
- Injection of surpluses: Allowing self-consumption users to inject energy that they do not use in their daily consumption into the grid, which can be compensated financially.

Challenges for prosumers in Spain

- **Geographical restrictions**: Until recently, consumers sharing energy had to be located within 2 km of the facility. This limit hindered larger urban or industrial projects.
- **Coordination among multiple stakeholders** such as facility owners, participating consumers, distributors, retailers, public authorities. This creates challenges such as: determining energy allocation percentages, changes in participants, administrative and contractual management.
- **Grid connection and coordination with utility companies**: The Spanish model relies on the public power grid to share energy, which presents several challenges: grid connection restrictions, the need for coordination with utility companies, congestion or capacity constraints in certain areas.
- **Technical limitations**: Many facilities must install anti-dumping systems to comply with regulatory requirements, which means that some of the energy generated cannot be utilized.

[29] Guía IDAE 026, p.24. This economic value of this surplus energy can never be higher than the economic value of the hourly energy consumed from the grid in the billing period, i.e. the result will never be negative, p.25
[30] REScoop VPP Analyse, Umsetzungsstand von Energy Sharing in der EU. Roland Tual (RESC), Viola Theesfeld (BBEn), Malte Zieher (BBEn), Berlin 2023, p.39
[31] REScoop VPP Analyse, p.40

- **Incomplete or too rigid regulations**: The current framework is based primarily on **Royal Decree 244/2019,** which authorized collective self-consumption. However, complex administrative procedures and a lack of clarity for establishing energy communities still exist.
- **Compensation of surpluses**: the current compensation system for surplus energy that users inject into the grid is not very attractive and inhibits self-consumption.

Collective self-consumption—Policy recommendations

- **Geographical restrictions**: expand the radius of consumers sharing energy from within 2 km of the facility to 5 km, which would allow more consumers to be included in a single project (which recent planned reforms aim to).[32]
- **Grid connection and coordination with utility companies**: reduce grid connection restrictions and simplify processes with utility companies.
- **Technical limitations**: remove regulatory barriers and facilitate energy sharing by considering these issues in a new royal decree.[33]
- **Incomplete regulations**: adapt regulations to new technologies (storage, digital management).
- **Coordination among multiple stakeholders**: clarify specific legal concepts and responsibilities and, for example, create the role of "self-consumption manager" to centralize these tasks.[34]
- **Compensation of surpluses**: Establish a more favorable compensation system, thus incentivizing self-consumption and renewable energy production.

[32] https://elpais.com/economia/2025-10-03/el-gobierno-ultima-un-decreto-para-facilitar-el-autoconsumo-a-comunidades-de-vecinos-y-bajar-el-recibo.html

[33] https://www.energiasrenovableshoy.com/regulacion-energetica/espana-refuerza-su-apuesta-por-el-autoconsumo-colectivo-miteco-propone-nuevas-reglas-para-impulsar-la-energia-compartida/

[34] https://www.energiasrenovableshoy.com/regulacion-energetica/espana-refuerza-su-apuesta-por-el-autoconsumo-colectivo-miteco-propone-nuevas-reglas-para-impulsar-la-energia-compartida/\

2.4 Germany

Collective self-consumption—Policy recommendations

- Reduce bureaucracy and simplify contract models by providing standardized contracts.
- Allow a broader geographical flexibility (e.g., within a region or municipality).
- Reduce grid fees for locally shared electricity.
- Make it easier for energy communities stakeholders to participate by granting them privileged access.
- Simplify metering and billing systems by providing digital platform solutions to implement projects more quickly.
- Encourage and support DSOs and metering point operators to digitalize and standardise their processes.

The background

In German legislation, energy sharing is defined in accordance with Article 15a of the Directive on the Internal Electricity Market (EBM-RL). The key terms here are "joint electricity generation" and "spatially related electricity consumption" and the use of the public electricity grid.[35] Energy sharing makes it possible to share electricity from wind or solar power plants. Energy sharing plant operators can supply electricity to consumers via the public grid. As with all other electricity supplies, grid fees and levies apply, with the exception of the electricity tax for plants up to 2 MW and within a spatial context of generally up to 4.5 km.[36]

Regarding energy sharing, the new law (§42c EnWG) regulates the following:[37]

- Partial supply model: Energy sharing only covers the portion of electricity demand that is generated or temporarily stored at the same time. There is no requirement to supply the remaining electricity.
- Area/radius: From June 1, 2026, energy sharing can be implemented within a balancing area, and from June 1, 2028, also in neighboring balancing areas.
- Participants: Plant operators can be natural persons as well as partnerships with legal capacity and legal entities under private law (including citizen energy communities) whose members are all end consumers or legal entities under public law. Natural persons and legal entities are considered end consumers if they are municipalities, small and medium-sized enterprises

[35] Gesetzentwurf zum „Energy Sharing", WD 5 - 3000 - 179/24. Wissenschaftliche Dienste Deutscher Bundestag, Dec 09, 2024, p.4
[36] Factsheet Energy Sharing in Deutschland, Bündnis Bürgerenergie e.V.
[37] Factsheet Energy Sharing in Deutschland.

(SMEs) and provided that the operation of the plant does not primarily serve the commercial interests of the members.

- Purchasers: End consumers who purchase electricity as part of energy sharing and have concluded a supply contract with the plant operator, e.g., tenants in a building, SMEs, or public institutions, provided they consume the electricity themselves.
- 2-contract models
    - Supply contract between operator and consumer
    - Contract for shared use (regulates energy quantities, distribution key, remuneration if applicable).
- Technical specifications: ¼h balancing of electricity generation and consumption
- Service providers: Integration possible for, among other things, operation of the system, conclusion and billing of contracts, and fulfillment of grid access obligations.
- Exceptions to certain supplier obligations in Sections 5 and 40 to 42 of the Energy Industry Act (EnWG) for households with up to 30 kW of installed capacity or multi-party buildings with up to 100 kW.

In December 2025, the German Bundestag voted in favor of an **amendment to the Energy Industry Act (EnWG)**, with **Section 42c EnWG** creating new opportunities for energy sharing. The following aspects of the new regulations are positive for the commercialization of energy sharing:

- Establishment of a uniform, central internet platform for data exchange, which can significantly facilitate the practical implementation of local supply models, especially for grid operators.
- Limitation to SMEs, as larger companies can meet the energy industry requirements anyway.
- No restrictions on the number of participants or metering points that would hinder expansion.
- Simplifying the shared use of electrical energy as much as possible by allowing end consumers who share energy to require their electricity suppliers to bill taxes, levies, surcharges, and grid fees via the existing electricity supply contract.[38]

Challenges for prosumers in Germany

Despite this progress, major hurdles remain for the expansion of citizen energy companies. From the outset, energy sharing was a concept for citizen energy communities, citizen energy actors, and energy cooperatives in **EU law (Art. 22 Renewable Energy Directive)**. This was reinforced in **Art. 15a (10) EMD**, which states that, in the Commission's view, a level playing field for citizen energy communities should be created with regard to energy sharing:[39]

- The regulation includes **bureaucratic and metering costs**, which can reduce the economic efficiency of the systems.

[38] Entwurf, p.5-6
[39] Entwurf, p.6

- Processing requires **complex smart metering systems and data reconciliation** on a 1/4-hourly basis, as well as **integration into the systems of distribution network operators** (DNOs).
- **Double contractual obligation**: supply contract between operator and end consumer AND contract for shared use.
- **Operators must bill ancillary electricity costs** (levies, surcharges, taxes, grid fees) for solar power supplied themselves.

Collective self-consumption—Policy recommendations

The **EU law** (**Art. 15a EMD2)** aims to enable as many end consumers as possible to share energy. In contrast, the **Section 42c EnWG in the EnWG** states that energy sharing is not expected to become a mass business and neglects that energy sharing is a great opportunity for energy transition and an indispensable tool for enabling citizens to have a say in the energy transition, earn money from it, and participate in it.[40] The implementation of Section 42c EnWG in the EnWG amendment is therefore only a minimal implementation of EU law. The market ramp-up of energy sharing could be accelerated by the following (regulatory) measures:

- **Reduce bureaucracy and simplify contract models** by providing standardized contracts and reducing supplier obligations for energy communities
- **Allow a broader geographical flexibility** (e.g., within a region or municipality) and do not limit energy sharing to a single distribution network
- **Reduce grid fees for locally shared electricity** or **introduce energy sharing premium** (like in Italy) because local consumption reduces the load on the grid and should therefore be cheaper.
- **Strengthen energy communities** by enabling stakeholders to participate more easily, for example through clear legal definitions of energy communities and privileged access for cooperatives and municipalities.
- **Simplify metering and billing systems** by avoiding complex smart meter structures and providing digital platform solutions and standardized metering concepts to implement projects more quickly.

[40] Entwurf eines Gesetzes zur Änderung des Energiewirtschaftsrechts im Bereich der Endkundenmärkte, des Netzausbaus und der Netzregulierung (EnWG-Novelle) Positionspapier. Bündnis Bürgerenergie, 10. September 2024, p.1

2.5 Italy

Collective self-consumption—Policy recommendations

- Simplify administrative procedures related to the establishment and management of energy communities.
- Improve clarity and accessibility of incentive schemes for smaller community projects.
- Provide technical assistance and standardised business models for energy communities.
- Expand the geographic scope of energy sharing where technically feasible.

The background

Italy has been a forerunner within the European Union in advancing RECs at both legislative and practical levels. According to GSE statistics, as of April 9, 2025, Italy has developed 221 RECs along with numerous other types of distributed self-consumption organizations[41].

The majority of REC are small-to-medium size range with the installation 10 to 125 kW (most of them rely on rooftop PV generation with capacities below 125 kW). They are mainly located in municipalities with fewer than 5000 inhabitants (55 % of cases). Also, a few numbers of larger-scale projects exceeding 500 kW and reaching up to approximately 1000 kW have been identified (1042 kW of solar power installed in the province of Pordenone).

Italy adopted a first set of transitional rules on RECs in 2020, through the **Article 42-bis of the Law 8/2020**, allowing RECs members to share energy within the boundary of the same secondary substation (MV/LV). The size of each powerplant a REC can own or manage was initially set up at 200 kW and then increased to 1 MW with the **Legislative Decree 199/2021**, which provided for the complete implementation of the REDII Directive. CECs have been defined through the **Legislative Decree 210/2021**. Both definitions are similar and enjoy benefits from the same rights, although the sector of RECs is renewable energy, while CEC are limited to electricity. Their rights and enabling frameworks correspond to those of the Directives. The legislative and regulatory framework for RECs have been finalized through the approval of the **Resolution 727/2022**[42] from ARERA (Independent Energy Authority) and of the 414/2023 **Ministerial Decree**[43], which implemented a support scheme for energy sharing within RECs and will support up to 5 GW of capacity installed by 31 December,

[41] https://www.gse.it/servizi-per-te/autoconsumo/mappa-interattiva-delle-cabine-primarie
[42] https://ollum.it/blog/le-regolamentazioni-arera-sulle-comunita-energetiche/
[43] https://www.mase.gov.it/comunicati/energia-mase-pubblicato-decreto-cer

2027. Finally, on the 23rd of February 2024, the GSE published the implementing rules to officially register the RECs and start recording energy sharing.

Italy has incorporated the concept of the REC into its national legislation through **Legislative Decree No. 199/2021**[44]. **Resolution 727/2022/R/eel**[45] and **Decree n. 414 of 7 December 2023** have been clarified and operationalized through the rules issued by the Ministry of Environment and Energy Security (MASE), GSE and regulatory resolutions by the national authority ARERA[46]. In this resolution, RECs are formally incorporated within the broader framework of distributed self-consumption, which delineates the scope of Distributed Renewable Energy (DRE) utilization. The resolution also establishes corresponding economic settlement mechanisms and regulatory framework to support implementation.

Among the different types of configurations, Italian legislation on RECs defines a more comprehensive legal structure making RECs the configuration that receives the highest concentration of policy support. At the national level, RECs are eligible for incentive tariffs on shared energy, which are subsidized through a tiered system with a total capacity cap of 5 GW. In the meantime, some Regions approved regional laws to promote RECs as a tool to achieve their renewable energy targets and to implement specific financing schemes to support the startup phase.

Overall, many, but not all, aspects of the enabling framework for RECs have been transposed, and there are specific measures for RECs introduced in the national support scheme for renewables. While there is investment support and a premium tariff for energy sharing in place, these supports have had mixed results. First, applying, receiving and reporting around support for investment is complex for small/starting RECs. Furthermore, the support comes in the form of a reimbursement, which does not get rid of the need for raising upfront finance, which most RECs do not have. This has made most RECs reliant on third party investors or third party commercial service providers. Furthermore, while RECs can receive both investment support (up to 40% of the investment costs) along with the premium tariff, the tariff must be reduced according to the percentage of investment costs covered by the financing support. This scenario is difficult to simulate and requires trade-offs and an accurate business plan, which makes project development more complex.

Challenges for prosumers in Italy

- **Geographic limitations** (same substation).
- **Complex incentive schemes**.
- **Administrative complexity** for small communities.

[44] DECRETO LEGISLATIVO 8 novembre 2021, n. 199 - normattiva. Accessed: Apr. 09, 2025. [Online]. Available: https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2021-11-08;199.
[45] Delibera 27 dicembre 2022 727/2022/R/eel." Accessed: Apr. 09, 2025. [Online]. Available: https://www.arera.it/atti-e-provvedimenti/dettaglio/22/727-22.
[46] Decreto n. 414 del 7 dicembre 2023. Accessed: Apr. 09, 2025. [Online]. Available: https://www.gazzettaufficiale.it/eli/id/2024/02/07/24A00671/sg.

Collective self-consumption—Policy recommendations

- **Simplify administrative procedures** related to the establishment and management of energy communities.
- **Improve clarity and accessibility of incentive schemes** for smaller community projects.
- **Provide technical assistance and standardised business models** for energy communities.
- E**xpand the geographic scope of energy sharing** where technically feasible.

3. Connection to the grid and cooperation with DSOs

Grid connection is essential for the planning, implementation and operation of energy communities - and in many cases also for energy sharing[47].

- Energy exchange with members and the wider system depends on it—most energy communities are connected to the public grid to share local generation, import electricity when needed, and export excess production. Without a proper connection, the community cannot function technically or commercially.
- Grid capacity and technical limits determine whether renewable energy installations can be connected at all, and how much generation capacity a community can deploy. If the grid at a site is full or weak, planned projects may be delayed or not feasible.
- Integration into the grid enables flexibility and stability services, meaning communities can support grid balancing, reduce congestion, and provide demand response—all of which increase the value and reliability of the community's activities.
- Unclear or costly connection rules create barriers to investment and operation, increasing uncertainty and hindering scaling up of community projects.

As a result, grid connection is not just a technical necessity. It is a central determinant of whether an energy community can plan its assets, operate them effectively, and participate meaningfully in the energy system.

Issues related to grid connections and operation procedures can have a severe impact and halt overall renewable energy deployment in some Member States. The main grid connection issues very often result from inadequate grid capacities, which prompt discussions and negotiations over how one can connect to the grid and at what cost. These lead to project delays. Another challenge stems from conflicts with distribution and transmission grid operators over the interpretation of technical regulations, the access to data or the distribution of connection costs.[48]

Grid congestion and lack of connection capacity is the most frequent issue across Europe. Many distribution nodes simply cannot accept new generation or demand, especially solar. In Spain, about 83% of grid nodes are already saturated, leaving 0 MW available at some substations for new connections.[49] Across Europe, more than 1.7 TW of renewable and hybrid projects are stuck in grid connection queues, showing the scale of the bottleneck.[50] This hits energy communities hard because small projects have less bargaining power than utility-scale developers, connection queues often

[47] https://www.iea-isgan.org/wp-content/uploads/2024/06/2024-ISGAN-WG6-ETIP-SNET_Energy-communities-impact-on-grids-1.pdf

[48] Technical support for RES policy, p.16

[49] https://strategicenergy.eu/grid-collapsed-renewable/

[50] https://www.ess-news.com/2025/12/09/energy-storage-europe-association-grid-connection-reform-priority-lanes-storage-flexible-connection-agreements-cable-pooling-hybrid-connections/

require deposits or long waiting lists, and communities cannot start operations until the grid operator allocates capacity.

Another severe issue is the **mismatch between renewable production and local demand.** Energy communities rely heavily on solar PV, which creates operational challenges. Solar output peaks around midday, while household demand peaks morning and evening.[51] Without storage or demand flexibility, this leads to local overgeneration**,** grid voltage spikes and curtailment or low-value exports. Energy communities need batteries or flexible loads to smooth their production. This problem is particularly visible in Spain, where solar expansion has been extremely rapid. However, there is frequently a **lack of storage and of flexibility resources**, storage deployment has lagged behind renewables and is still an expensive cost-driver. EU auditors also note that policy support for community-level storage has been insufficient, slowing adoption.[52]

On the side of the grid operators, **distribution grids are frequently aging, under-dimensioned and designed for one-way electricity flows** from a central plant to consumers (and not in a bi-directional way). However, energy communities create two-way flows, especially for rooftop PV exports, peer-to-peer sharing, EV charging and heat pumps. Across Europe, infrastructure upgrades are lagging behind electrification and renewable growth.[53] For EC this means reverse power flow constraints, voltage control problems, and local transformer overload.

Slow digitalization and inadequate metering infrastructure (notably in Germany) are further inhibiting factors because ECs depend on smart meters and digital control systems. In Germany specifically, the slow rollout of smart meters has hindered community energy models. Some grid operators still lack bidirectional meters and digital infrastructure needed for energy sharing.[54] This makes it harder for ECs to track energy sharing among members, implement dynamic tariffs, and optimize local generation and consumption.

On the regulatory and administrative side, **complex grid connection procedures and long queues** are key issues. Even when technical capacity exists, administrative and regulatory procedures delay projects. Typical issues are multi-year connection processes, unclear rules on community energy trading, and large deposits required to join connection queues.[55] This discourages small actors and slows projects despite overall supportive EU policies.

[51] https://www.euronews.com/my-europe/2026/03/09/eu-fails-to-deliver-on-promise-of-local-energy-communities-eca-auditors-warn

[52] https://www.euronews.com/my-europe/2026/03/09/eu-fails-to-deliver-on-promise-of-local-energy-communities-eca-auditors-warn

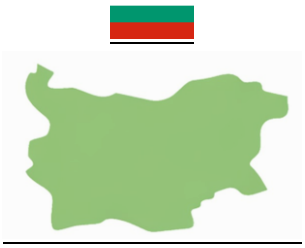
[53] https://ecfr.eu/article/a-brighter-future-why-upgrading-the-grid-is-vital-for-europes-competitiveness/

[54] https://pub.norden.org/nordicenergyresearch2023-03/germany

[55] https://www.euronews.com/my-europe/2026/03/09/eu-fails-to-deliver-on-promise-of-local-energy-communities-eca-auditors-warn

In the next subchapters are reported the main components, barriers and recommendations on grid connection and cooperation with DSOs for the LIFE-BECKON pilot countries Bulgaria, Denmark, Spain, plus Italy and Germany, where a significant number of LIFE-BECKON replicators are located.

3.1 Bulgaria



Connection to the grid—Policy recommendations

- Establish a legal framework for community microgrids and internal energy sharing networks.
- Simplify grid connection procedures for small renewable installations.
- Ensure transparent access to metering data for energy community members.
- Introduce simplified balancing arrangements for community energy projects.

The background

The electricity supply system in Bulgaria is divided into two networks, and paragraph 1, item 20 and 22 of the additional provisions of the **Energy Act (EA)** provides definitions thereto:

- Electricity transmission network is a combination of electric power lines and electric facilities serving for transmission, transformation of the electric power of high voltage to medium voltage and redistribution of electric flows.
- Electricity distribution network is a combination of electric power lines and electric facilities of high, medium and low voltage serving for distribution of electric power.

With regard to the connection to the transmission or to the distribution electricity networks, a more detailed regulation is included in **Ordinance No. 6 of 28th of March 2024** on the connection of sites to the electricity networks, issued by the Energy and Water Regulatory Commission (EWRC) (the "Ordinance")[56].

Energy communities (ECs) in Bulgaria have the right to connect to the grid, but face bureaucratic hurdles, limited capacity, and slow DSO cooperation in installing smart meters for net metering.

Key Legal and Operational Conditions for Grid Connection

[56] More info on national framework for connection to the electricity networks are available here: https://www.mi.government.bg/en/business-handbook-for-sme/connection-to-the-electricity-networks/#id1en

The **RES Act (ЗЕВИ)** and the **Energy Act (ЗЕ)** provide the main legislative framework for connecting small renewable energy installations to the grid in Bulgaria. These regulations have undergone amendments in recent years to simplify procedures, particularly for small-scale photovoltaic (PV) systems designed for self-consumption.

- **Installations up to 20 kW (for self-consumption only)**
  - No construction permit required if installed on single-family residential or villa buildings or in adjacent land.
  - The grid connection process is simplified: the owner submits a notification to the grid operator and signs an amendment to their existing supply contract.
- **Installations between 20 kW and 50 kW (for self-consumption only)**
  - Silent consent rule applies: if the municipal architect does not respond within one month, the construction permit is considered granted (Article 17(5) ЗЕВИ).
  - The total installed power must not exceed the grid connection capacity allocated to the building.
- **Installations above 50 kW or those selling excess energy**
  - A full administrative process applies, including a construction permit and a grid connection agreement with the DSO.
- **General grid connection process for small RES installations**
  - Application to the DSO for a connection feasibility study.
  - Technical assessment and issuance of conditions for connection.
  - Conclusion of a preliminary connection contract (valid for two years).
  - Construction of the installation and required grid infrastructure.
  - Signing of a final connection contract and integration into the grid.

As of the latest legislative updates, Bulgaria does not yet have a comprehensive or simplified regulatory framework governing the construction and use of internal electricity infrastructure for energy sharing within energy communities—commonly referred to as microgrids.

The lack of a dedicated microgrid framework remains a significant barrier. Energy communities currently cannot build and operate their own internal grids under simplified procedures, nor do they have clear rules for self-balancing and internal trading. For Bulgaria to align with EU best practices, future legal reforms should explicitly define microgrid ownership, grid-balancing responsibilities, and access to public grid infrastructure, ensuring that energy communities can efficiently share and distribute their locally produced renewable energy.

The **Electricity System Operator (ESO)**[57] operates Bulgaria's transmission network and is responsible for balancing the system. ESO will need to adapt its balancing and forecasting processes to accommodate energy communities once they become active market participants, particularly in cases where communities offer aggregated flexibility services.

[57] http://www.eso.bg/

The **DSOs** are responsible for managing the regional distribution grids, including connecting new generation capacity, such as prosumer installations and community-owned renewable\ projects. Importantly, DSOs are exclusively responsible for metering energy flows, including the installation, operation, and data management of smart metering infrastructure. This includes recording both energy injected into the grid by prosumers and communities and energy withdrawn for consumption. The effective participation of energy communities, particularly in virtual net metering and collective self-consumption, relies heavily on DSOs ensuring accurate, transparent, and accessible metering data.

The three main DSOs in Bulgaria are:

- **EVN Bulgaria[58] - Електроразпределение Юг** (Elektrorazpredelenie Yug)
- **Electrohold (formerly CEZ)**[59] - ЕРМ Запад (ERM Zapad)
- **Energo-Pro - Електроразпределение Север**[60] (Elektrorazpredelenie Sever).

Neither of the community models (RECs and CECs) considered in Bulgarian laws has a dedicated grid connection framework, which leads to several legal gaps and practical challenges:

- **No special rules for collective self-consumption or energy sharing**
  - Energy communities must register as individual producers, and each member must have a separate contract with the DSO.
  - There are no provisions for direct energy sharing among members via local grids or microgrids.
- **Microgrids and local distribution networks are not legally defined**
  - Current regulations do not provide a clear legal framework for communities to build and operate private electricity networks for internal energy sharing.
  - If an EC wants to share electricity among its members, it must use the public grid and pay distribution tariffs, making local energy sharing economically inefficient.
- **Unclear balancing rules for energy communities**
  - Energy communities have no special status in the balancing market and must either self-balance their production and consumption, which is unrealistic for small energy communities, or join an existing balancing group, which often requires costly agreements with commercial aggregators.
- **No simplified licensing for energy communities selling energy**
  - If an energy community wants to sell excess electricity, it must go through the same licensing process as commercial RES producers. There are no exemptions for small-scale energy communities, which discourages collective investment in renewables.

<u>Connection to the grid—Main barriers</u>

- **No special rules for collective self-consumption or energy sharing**

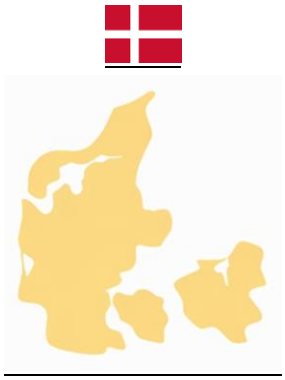
[58] https://www.evn.bg/
[59] http://www.electrohold.bg/
[60] http://www.energo-pro.bg/

  - Energy communities must register as individual producers, and each member must have a separate contract with the DSO.
  - There are no provisions for direct energy sharing among members via local grids or microgrids.
- **Microgrids and local distribution networks are not legally defined**
  - Current regulations do not provide a clear legal framework for communities to build and operate private electricity networks for internal energy sharing.
  - If an EC wants to share electricity among its members, it must use the public grid and pay distribution tariffs, making local energy sharing economically inefficient.
- **Unclear balancing rules for energy communities**
  - Energy communities have no special status in the balancing market and must either self-balance their production and consumption, which is unrealistic for small energy communities, or join an existing balancing group, which often requires costly agreements with commercial aggregators.
- **No simplified licensing for energy communities selling energy**
  - If an energy community wants to sell excess electricity, it must go through the same licensing process as commercial RES producers. There are no exemptions for small-scale energy communities, which discourages collective investment in renewables.

Connection to the grid—Policy recommendations

- **Establish a legal framework for community microgrids** and internal energy sharing networks.
- **Simplify grid connection procedures** for small renewable installations.
- **Ensure transparent access to metering data** for energy community members.
- **Introduce simplified balancing arrangements** for community energy projects.

3.2 Denmark



Connection to the grid—Policy recommendations

- Expand grid infrastructure to accommodate growing distributed renewable energy generation.
- Integrate energy communities into demand-response and flexibility markets.
- Strengthen cooperation mechanisms between DSOs and local energy communities.

The background

Denmark's electricity grid is divided into a transmission grid and a distribution grid. The transmission grid is owned by the public company Energinet. The transmission grid transports electricity from generation sites to the distribution grid and to/from abroad. The distribution grid is owned and operated by 44 distribution network companies.

Since December 2022, the Danish government has approved electricity-grid investments of DKK 6.1 billion. Energinet expects investments of around DKK 41 billion in the transmission grid from 2023 to 2026.

In Denmark, energy communities primarily connect to the grid through two models:

- **Behind-the-meter sharing**, limited to participants within a single building (e.g., a housing cooperative/andelsboligforening). Electricity is shared internally without utilizing the public collective grid, bypassing certain grid fees.
- **Collective public grid sharing**, for communities spanning multiple buildings or neighborhoods. In this model, with energy shared through the public electricity grid, participants remain subject to standard grid tariffs, taxes, and regulation, as the grid serves as the transport mechanism for the electricity.

Sharing through the collective grid remains subject to standard tariffs and taxes. Communities often function by coordinating flexible assets—such as EV chargers, heat pumps, and batteries—to provide grid services to distribution system operators (DSOs), potentially earning reduced grid tariffs in exchange for managing peak consumption.

Several district heating companies are already experiencing challenges due to insufficient grid capacity and long waiting times to receive confirmation that their electric-based plants can be connected to the grid.[61]

A well-developed electricity grid is crucial for the district heating sector, which in recent years has been–and still is–undergoing a major transition towards using electricity in heat production. This means more large heat pumps and electric boilers, and therefore a significantly greater demand for electricity.

In 2024, according to figures from the Danish District Heating Association, 33 new electric-based plants were established in the sector. Towards 2028, the Danish Energy Agency estimates that 98% of all new plant projects in the district heating industry will be based on electricity.

[61] https://dbdh.org/district-heating-utility-the-electricity-grid-is-our-biggest-obstacle/

Unfortunately, the new Danish rules for establishing internal electricity connections[62] limits internal electricity sharing to the building level, severely restricting energy communities' ability to share energy across property lines.

Smart meters and data platforms.

Denmark has been a frontrunner in the deployment of smart meters, achieving nearly complete coverage across the country. This extensive rollout has been instrumental in supporting the development and operation of energy communities, facilitating the integration of renewable energy sources, and enhancing energy efficiency.

The rollout of smart meters in Denmark began in earnest in 2014, driven by a national decision to install these meters for all residents. By the end of 2020, Denmark had achieved 99% smart meter coverage. The Radius-Kamstrup cooperation played a significant role in this achievement, installing 1 million remotely read electricity meters and meeting all safety standards within budget.

The Danish government mandated the installation of smart meters to enhance the digitalization of the energy sector and support the development of a smart electrical network. The comprehensive deployment of smart meters ensures that almost all households and businesses in Denmark have access to real-time energy consumption data.

Smart meters are a critical component in the operation of energy communities in Denmark. They provide the necessary data infrastructure to monitor, analyse, and optimize energy usage within the community. Smart meters provide real-time access to energy consumption data, enabling energy community members to monitor their energy usage and make informed decisions. This data is accessible through platforms like Energinet's ElOverblik165, which allows consumers to track their energy consumption patterns. This transparency encourages active participation in the energy market and promotes energy-saving behaviour among energy community members.

Smart meters facilitate the integration of distributed energy resources (DERs) such as solar panels and wind turbines. By providing accurate and timely data on energy production and consumption, smart meters help energy communities optimize the use of renewable energy sources and reduce reliance on fossil fuels. The data collected by smart meters supports advanced analytics and energy management practices. Energy communities can use this data to identify energy-saving opportunities, implement demand response programs, and improve overall energy efficiency.

The digitalization of the energy sector, supported by smart meters, enables the development of innovative energy solutions and business models which energy communities can leverage to enhance their operational efficiency and sustainability.

Connection to the grid—Main barriers

- **Grid capacity constraint**s.

[62] Adopted as part of ændringen af elforsyningsloven i 2023, lovforslag L37.

- **Energy sharing is limited to internal connection**s.
- **Delays in grid expansion**.
- **Inadequate local tariffing**. There is still a lack of a cost-reflective local tariff that reflects energy communities' contribution to grid balancing across voltage levels. The solution to be introduced in 2026 only covers the 0.4 kV level and does not give energy communities incentives for grid relief.

Connection to the grid—Policy recommendations

- **Expand grid infrastructure** to accommodate growing distributed renewable energy generation.
- **Integrate energy communities into demand-response and flexibility markets**.
- **Strengthen cooperation mechanisms between DSOs and local energy communities**.

3.3 Spain

Connection to the grid—Policy recommendations

- Accelerate the process of conveying connection permits to support a faster roll-out of ECs.
- Classify distribution grid development as projects of strategic interests.
- Consider the challenges of energy communities and involve a wider scope of stakeholders and strengthen their cooperation in grid development.
- Aim at a more agile grid planning which can quickly react to changes and market trends.

The background

In Spain, Red Eléctrica de España (REE) is the sole transmission system operator (TSO) in Spain. REE is dedicated to the transmission of electricity and the operation of the transmission electrical system (the national grid). DSOs then are responsible for expanding, maintaining and operating the distribution networks, designed to transfer the energy to the final consumers. [63]

[63] Clean energy for EU islands, p.8

Permission procedures

Permitting and authorisation procedures consist of many steps. Various actors from the national, regional, and local public administrations are involved in the permitting and authorisation process. For example, the **EIA (Environmental Impact Assessment)** will be processed at the National level when the installation is greater than 50 electrical MW (**Art. 3.13.d Law 24/2013**). In other cases the EIA will be processed at the Autonomous Community level.[64]

Renewable Energy installations shall apply for an access and a connection permit in order to connect the plant to a specific point in the distribution or transmission network and to have the permission to use the network (**art. 33.1 Law 24/2013 and article 2 Royal Decree 1183/2020**). These permits constitute the first step in the procedures to produce electricity. According to **RD 1183/2020 and Circular 1/2021 CNMC**, project developers must submit a single application for access and connection permits, i.e., they will be processed jointly in the same procedure. The system operator (TSO) or DSO will be the only contact point with the applicant. After assessing the availability of sufficient capacity and that the technical conditions are met, the TSO or DSO will grant the permits.

However, self-consumption projects of above 500 kW with surplus require a report not only from the DSO but also from the TSO and this substantially increases the procedures.[65] In addition, temporary priority is established as the general criterion to process all requests.[66] Rooftop PV installations for self-consumption, depending on their size and location, may benefit from a simplified and shorter procedure.[67] Units with an installed power up to 100 kW and connected to the low-voltage distribution system, should in principle not require an Environmental Impact Assessment or a Declaration of Public Utility for example. However, there are certain projects that have a very low environmental impact (for example solar PV on rooftops, or in urban areas) but the administrative authorisation cannot be started until the connection permit is available.

At the end of March 2022, the Spanish Ministry for the Ecological Transition and the Demographic Challenge (Miteco) approved a new package of measures, including the promotion of renewables (**Real Decreto-ley 6/2022**, de 29 de marzo). In the dispatching of generators to cover expected demand, renewable energy installations shall have priority under equal economic conditions in the market.[68]

[64] Clean energy for EU islands, p.14

[65] Clean energy for EU islands, p.21

[66] Clean energy for EU islands, p.71

[67] Regarding rooftop PV, self-consumption units without surplus of any installed capacity do not require an access and connection contract with the DSO, provided that there is already a contract for electricity supply to the consumer. Self-consumption units with surplus (of any modality) up to 15 kW and in urban land are also exempted from access and connection permits (art. 7 Royal Decree 244/2019; art. 17 Royal Decree 1183/2020). Other self-consumption units with surplus shall apply for the access and connection permits to the DSO. Units with an installed power between 15 kW and lower than 100 kW, article 4 of RD 1699/2011 regulates a simplified procedure. Units larger than 100 kW shall follow the procedure set in RD 1955/2000. Clean energy for EU islands, p.71

[68] Clean energy for EU islands, p.14

Grid planning and expansion

The modernisation plans for the transmission grids emanate from the central government conducted by Spain's General State Administration, the autonomous communities, the National Commission on Markets and Competition, REE and all of the sector actors. Demand and generation are not planned, but indicative forecasts are made to efficiently and effectively plan the transmission grid.

With the current evolution of the installation of renewables, such long planning periods are a major barrier, as they do not allow for substantial modifications to the transmission grid according to the needs of the moment. This is even worse considering that any installation of more than 0.5 MW in non-peninsular territories is considered to affect the transmission grid and therefore authorisation must be obtained from the transmission grid operator. This burdens project development.[69]

Some steps in the right direction have been taken. For example **RD-law 6/2022** has introduced a new obligation to invest in increasing access capacity for renewable generation and self-consumption in the fourth additional provision. Additionally, there is an obligation for DSOs to include in their annual investment plans actions to increase access capacity for new renewable generation and self-consumption.[70]

Connection to the grid—Main barriers

- **Complex procedures and bureaucracy** delay projects:
    - **Various actors** from the national, regional, and local public administrations are involved in the permitting and authorisation process.
    - Installations in urban areas or for PV on rooftops need a **network connection permission before the authorisation** of the Environmental Impact Assessment (EIA) can start.
    - Regarding permissions from DSOs, **temporary priority as the general criterion to process all requests** can lead to significant delays for the project.
    - **Self consumption projects of above 500 kW with surplus** require a **report from the DSO and the TSO**.
- **Transmission grids are not flexible enough** to react to the needs of the moment due to long grid planning periods and to forecasts instead of focusing on demand and energy generation.

Connection to the grid—Policy recommendations

[69] Current regulations on access and connection to the networks are set out in Royal Decree 1183/2020, of 29 December, on access and connection to the electricity transmission and distribution networks, and in Circular 1/2021, of 20 January, of the National Markets and Competition Commission, which establishes the methodology and conditions for access and connection to the transmission and distribution networks of electricity production facilities. Current regulation on grid connection requirements takes into account renewable energy sources that are coupled with storage or those that are used for self-consumption. Clean energy for EU islands, p.19

[70] Clean energy for EU islands, p.21

Based on the former analysis, the following actions in terms of regulation, cooperation and planning are highly recommended:

- **Accelerate the process of conveying connection permits** to support a faster roll-out of ECs.
- **Classify distribution grid development as projects of strategic interests** and / or increase evacuation capacity due to the concentration of renewable resources.[71]
- **Consider the challenges of energy communities in grid planning** and involve a wider scope of stakeholders in the preparation of these grid development plans.
- **Strengthen cooperation between TSO, DSOs, political leaders, and local stakeholders** to plan a network prepared for the challenges that arise in the medium term, taking into account the rising number of energy communities / collective self-consumption projects.
- **Aim at a more agile grid planning** which can quickly react to changes and market trends. Currently, once the plans are made, it is difficult to deviate or revise them, especially in the light of high energy prices.[72]

3.4 Germany

Connection to the grid—Policy recommendations

- Incentivize DSOs to invest in the expansion of distribution grids (capacities).
- Incentivize DSOs to manage grids more effectively because today grids are frequently operated below their potential.
- Streamline and standardize grid connection processes to accelerate project development, e.g., by providing digital portals.
- Introduce standardized data interfaces for the integration of local energy markets or storage facilities.
- Accelerate the rollout of smart metering.
- Develop flexibility markets to manage electricity demand.

The background

[71] Clean energy for EU islands, p.22
[72] Clean energy for EU islands, p.23

Energy communities (energy sharing in accordance with **Section 42c of the German Energy Industry Act (EnWG**)) face several structural challenges in Germany when it comes to grid connection and cooperation with distribution system operators (DSOs). These challenges can be broadly divided into technical, organizational, and regulatory problems.

Limited grid capacity in distribution networks

A key problem is the technical capacity of existing distribution grids. The energy transition is leading to a sharp increase in decentralized generators (PV, wind), storage facilities, and new loads (heat pumps, electric vehicles), all of which must be connected to the distribution grid. Many grids were historically built for one-way electricity flow (from the power plant to the consumer) and are not designed for many small feeders. Grid bottlenecks mean that new plants are only allowed to feed in to a limited extent or have to wait a long time for grid reinforcement.

For energy communities, this means that grid connections can often only be made with power limitations or additional investments, or that feed-in limitations reduce the economic viability of community projects.[73]

However, a new study reinforces that this is not just a technical issue but also a structural and economic one. Today's distribution grids are often operated below their potential because planning and regulation still follow outdated logics, while digitalization, flexibility, and storage are not yet used systematically enough to increase grid utilization.[74]

Long processing times and inconsistent connection processes

Germany has around 900 distribution grid operators, many of which are very small, resulting in highly fragmented processes. Different requirements and formats make standardized procedures difficult.[75] This increases the administrative effort involved in grid connection and extends processing times, e.g., due to connection requests. Uncertainty about connection costs and connection dates means that project development takes longer. In addition, higher transaction costs are incurred, e.g., due to expert opinions, grid studies, and coordination.

Regulatory and legal uncertainties

The regulatory framework for energy communities is still under development in Germany. Energy sharing was only enshrined in **Section 42c of the Energy Industry Act** in December 2025. Distribution system operators will only be required to enable energy sharing technically from June 1, 2026. Many

[73] https://www.vde.com/de/presse/pressemitteilungen/2024-06-17-turbo-fuer-energiewende

[74] Bestandsaufnahme Kostensenkungspotentiale im Verteilnetz. Analyse von Effizienzpotentialen und Ansätzen für Kostenmanagement im deutschen Stromnetz. Dr. Tim Meyer, 3EPunkt, Hamburg, 23 March 2026

[75] https://www.bne-online.de/themen/netze/

market roles (metering point operation, balancing, billing) are still complex. The biggest challenges in the regulatory area are:[76]

- Unclear responsibilities between network operators, metering point operators, and energy communities.
- Complex requirements for metering concepts, balancing groups, and billing systems.
- Difficult planning of economic operating models.

Data and communication interfaces with network operators

Decentralised energy production and consumption need flexible control and data exchange with the grid. However, this often proves difficult because many distribution grids are only digitized to a limited extent. The integration of local energy markets or community storage facilities requires standardized data interfaces, which are currently not yet sufficiently available. In addition, the rollout of smart meters is progressing slowly. At the same time, grid operators are facing increasing demands to flexibly control individual consumers, better forecast feed-in, and ensure grid stability due to the trend toward "all-electric" in the heating and mobility sectors as well.

Conflicts of interest between energy communities and grid operators

One structural problem is that energy communities and grid operators have different system logics and interests:

- Energy communities want local use of electricity, the lowest possible grid fees, and flexible local markets.
- Grid operators must ensure grid stability, comply with regulatory requirements, and secure investments economically.

This gives rise to conflicts, e.g., over grid fees, feed-in priorities, and flexible use of the grids.

Lack of standardization for energy community models

Many technical issues have not yet been resolved in a uniform manner, e.g., collective grid connection points, shared battery storage, virtual balancing groups, or grid-friendly control of systems. The industry is therefore working on standardized data sets and digital connection portals to speed up grid connections in the future.[77]

Connection to the grid—Main barriers

- Power **limitations**, additional investments, or feed-in limitations **for the connection to distribution grids** due to the limited grid capacities.

[76] https://www.zfk.de/energie/strom/handlungsbedarf-fuer-verteilernetzbetreiber-bei-zunehmend-limitierter-netzanschlusskapazitaet

[77] https://www.energieverbraucher.de/de/energy-sharing__3498/

- **Non-standardized procedures for connection processes** due to a high number of different small DSOs with different requirements.
- **Long handling times** for connection requests, uncertainty about connection costs and dates.
- **Complex market roles** (metering point operation, balancing, billing) and **unclear responsibilities** between network operators and metering point operators (MPOs) make the planning of operating models for energy communities difficult.
- **Limited digitization of distribution grids** to enable flexible control and data exchange for energy communities.

Connection to the grid—Policy recommendations

- **Incentivize DSOs to invest in the expansion of distribution grids** and in grid capacities.
- **Streamline and standardize grid connection processes** to accelerate project development of energy communities, e.g. by providing appropriate digital portals.
- **Introduce standardized data interfaces** for the integration of local energy markets or storage **facilities**.
- **Accelerate the rollout of smart meterin**g to enable energy communities flexible control of their operations and overall acceleration of digitalisation of DSO processes.
- **Develop flexibility markets** to manage electricity demand through storage and to balance fluctuating electricity generation—both can help energy sharing to bridge grid bottlenecks.

3.5 Italy

Connection to the grid—Policy recommendations

- Continue investments in grid modernisation and renewable integration infrastructure.
- Simplify permitting procedures for small-scale renewable energy installations.
- Strengthen coordination between grid operators, regulators and energy communities.

The background

Collective self-consumption represents an advanced mode for distributed energy management, of growing importance in the industrial, commercial and residential sectors. In Italy, this model is supported by an evolving regulatory framework and incentive mechanisms defined mainly by the **Decree Dec. 7, 2023, no. 414** (so-called CACER Decree) and the National Recovery and Resilience Plan

(NRP). These tools aim to make collective self-consumption a cost-effective option for reducing energy costs while promoting environmental sustainability.

In Italy, collective self-consumption is regulated by the GSE (Gestore dei Servizi Energetici), which is responsible for energy metering.

Collective self-consumption is specifically provided and regulated for groups of self-consumers acting collectively within the same building or condominium. Although not explicitly mentioned in the regulatory framework, collective self-consumption is not excluded for industrial and commercial settings. In these cases, solutions can be adopted to achieve economic benefits, provided the regulatory conditions are met.

Collective self-consumption offers numerous economic and operational advantages, including:

- **Sale of energy**. PV systems participating in collective self-consumption configurations can sell excess energy, generating an economic gain. This opportunity maximizes the return on investment.
- **Incentive on self-consumed energy**. The **CACER Decree (DM 414/2023)** establishes an incentive tariff for energy produced by renewable energy plants in collective self-consumption configurations. This tariff is recognized by the GSE in relation to the amount of self-consumed energy and helps reduce energy costs for participants.
- **Reduction in system charges for self-consumed energy**. For self-consumed energy, some system charges are deducted, further reducing the overall costs for system participants. This incentive cuts down the expenses associated with using the power grid for energy that is actually consumed within the collective self-consumption group.
- **Capital grant for municipalities with a population of less than 5,000**. Under the NRP, municipalities with a population of less than 5,000 are eligible for capital grants of up to 40 percent for the development of collective self-consumption configurations. This incentive represents a significant resource to make the model even more beneficial for small communities.
- **Greater economic benefit with electrification of consumption**. As electrification of consumption increases (e.g., electric mobility, heat pump heating, etc.), collective self-consumption becomes even more beneficial. The greater the participants' demand for electricity, the greater the economic efficiency from directly using the energy produced, reducing dependence on the power grid.
- **Greater flexibility than Energy Communities**. Collective self-consumption offers greater flexibility than energy communities, as it allows for modulation of incentive sharing among participants. This aspect allows for customization of economic management, adaptable to the specific needs of the members involved.

A collective self-consumption group (AUC) is easier to set up than a Renewable Energy Community / Comunità per le Energie Rinnovabile (CER): in fact, all that is needed is a decision from the apartment block meeting, through which the block itself, as a legal entity, can effectively set up the self-consumption group, manage the installations and receive the incentives. For the purpose of access to incentives, CER installations must be connected to the same primary substation as the final customers

who are part of the configuration, and can have a capacity of no more than 1 MW. At a later stage, the AUC may become an ERC or join an existing ERC . Prior to the entry of these entities into the energy community, however, the configuration of collective self-consumption will have to be dissolved. In perspective, a CER generates greater benefits than a group of AUCs[78].

Connection to the grid

Italy has recently implemented several policies and regulatory measures to facilitate the integration of renewable energy sources into the national electricity system. A key framework supporting this development includes the **NPRR and Legislative Decree No. 28/2023**, which introduces the Simplified Authorization Procedure, a mechanism designed to streamline the approval process for small-scale renewable energy projects . Additionally, Italy's **2023 Grid Development Plan** prioritizes enhancing grid resilience and expanding the integration of renewables through major infrastructure investments, including enhanced interconnections and subsea high-voltage direct current transmission lines. Collectively, these efforts aim to reinforce the grid's capacity to accommodate and distribute energy from diverse renewable sources. These regulatory advancements present new opportunities for CERs in Italy, such as expedited permitting processes for small-scale renewable plants and improved grid access to the national grid.

Connection to the grid—Main barriers

- **Grid integration is still evolving**.
- **Regulatory complexity**.
- **Coordination between multiple authorities**.

Connection to the grid—Policy recommendations

- **Continue investments in grid modernisation** and renewable integration infrastructure.
- **Simplify permitting procedures** for small-scale renewable energy installations.
- **Strengthen coordination between grid operators, regulators and energy communitie**s.

[78] https://www.enel.it/en-us/blog/guide/autoconsumo-collettivo

4. Financial support and funding

At the EU level, funding for energy communities (e.g., Renewable Energy Communities or Citizen Energy Communities) comes from a mix of dedicated initiatives, large EU programmes, financial instruments, and prizes / technical assistance.

Funding

The **European Energy Communities Facility** is the most targeted EU instrument specifically for energy communities. Its purpose is to develop business plans and project pipelines for community renewable energy and it provides project development funding, mentoring and capacity-building, networking and peer learning. It offers grants to citizen cooperatives, local authorities, and SME-led energy communities at a lump-sum of approx. €45,000 per community to roughly 140 energy communities across Europe per year.[79]

Another powerful key source so far was the **LIFE Programme** (EU environment and climate programme) which typically provided funding for clean energy transition projects, capacity building for energy communities and the replication of community energy models. However, after 2027 this programme will likely be renewed or replaced in the next EU budget period.

The **Horizon Europe** research programme funds innovation projects involving energy communities. Relevant calls include positive energy districts, local energy markets, community-based energy management and social innovation in energy transition. It requires international consortia and the funding amounts to €3–15 million per project.

Further powerful instruments on the EU level are **Cohesion Policy Funds**. There are two major structural funds support community energy projects: **European Regional Development Fund (ERDF)**[80] which can finance renewable installations owned by communities, energy efficiency in buildings and local energy infrastructure. This fund is managed by the EU member states individually, e.g., in Italy in the Marche region, ERDF is used to finance calls supporting the creation of renewable energy communities, including renewable generation and smart-grid technologies.[81] In addition, the **Cohesion Fund**[82] supports climate and energy projects in less-developed EU regions in the fields of community renewable systems, district heating, and local energy systems.

[79] https://energy.ec.europa.eu/topics/markets-and-consumers/energy-consumers-and-prosumers/energy-communities_en

[80] https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/european-regional-development-fund-erdf_en

[81] https://www.interregeurope.eu/find-policy-solutions/expert-support-reports/erdf-funds-for-energy-communities-in-marche-region?utm_source=chatgpt.com

[82] https://ec.europa.eu/regional_policy/funding/cohesion-fund_en

Financing

The **EU Recovery and Resilience Fund (RRF)** provides loans (and also grants) for ECs. In the recent guidelines of the Commission regarding the REPowerEU chapter of the Recovery and Resilience Plans, energy communities are highlighted as vehicles to tackle energy poverty However, this instrument is currently only used in Spain, Lithuania and Belgium (Wallonia).[83]

The **European Investment Bank (EIB)** provides significant financing and advisory support for energy community projects and infrastructure, prioritizing renewable energy, energy efficiency, and grid modernization. Key initiatives include, e.g., a €1.2 billion cooperation for German community energy, the ELENA facility for project development, and targeted loans for municipal infrastructure in 2026. The EIB support comprises[84]:

- **ELENA (European Local Energy Assistance)**: A grant-based technical assistance facility, run by the EIB, that supports project preparation for sustainable energy, including community-led projects.
- **Regional & Municipal Loans**: EIB finances infrastructure projects for local authorities, focusing on energy efficiency and network upgrades (e.g., DKB Renewable Energy[85] & Municipal Infrastructure II).
- **Risk-Sharing & Intermediary Lending**: The EIB works with local banks (e.g., Commerzbank partnership) to provide loans for smaller, community-level, or municipal projects.
- **Targeted Renewable Energy Loans**: Financing for solar, wind, and storage projects designed to strengthen local grid resilience

At EU level, only a few instruments are exclusively dedicated to energy communities, but many large EU programmes fund them indirectly, especially **LIFE, Horizon Europe**, and **Cohesion Policy**.

In the next subchapters are reported the main components, barriers and recommendations on financial support and funding for the LIFE-BECKON pilot countries Bulgaria, Denmark, Spain, plus Italy and Germany, where a significant number of LIFE-BECKON replicators are located.

[83] https://www.rescoop.eu/policy/financing-tracker/recovery-resilience-funds

[84] https://www.eib.org/en/projects/topics/energy-natural-resources/energy/index#:~:text=The%20EIB%20(European%20Investment%20Bank)%20finances%20sustainable,in%20investments%20in%20electricity%20networks%20and%20storage

[85] https://www.dkb.de/geschaeftskunden/erneuerbare-energien

4.1 Bulgaria

Financial support and funding—Policy recommendations

- Establishment of dedicated financing instruments with more flexible requirements, upfront financing options, and technical assistance for the community level (e.g. Local Action Groups) is crucial.
- Provide start-up grants and technical assistance for community energy initiatives.
- Facilitate access to low-interest loans through public financial institutions.

The background

The scarcity of a dedicated financial framework is one of the key obstacles to the development of energy communities in Bulgaria. Unlike conventional market actors, these communities are typically driven by non-market motivations, have limited financial resources, and rely heavily on voluntary work and local engagement. As a result, they face greater difficulties in obtaining financing, particularly when funding mechanisms are not tailored to their specific characteristics—such as restricted capital, non-profit orientation, and uneven administrative and project-development capacity.

Currently some financial frameworks are available.

Bulgaria started submitting projects to the **Modernisation Fund** later than other countries (only in 2023) and all the approved projects are related to grid modernisation and installing smart metering devices. Overall EUR 197 million was allocated in the first disbursement for four projects (3 deploying smart metre infrastructure, 1 with highest allocation of EUR 128 million for automation, digitalisation and development for the electricity network).

Bulgaria's **National Recovery and Resilience Plan**[86] includes a €312m investment for the digital transformation of the Electricity System Operator—Bulgaria's sole transmission system operator[87]. The investment to be implemented until 2026, will fund comprehensive modernisation of planning and operational processes. It aims to prepare the ground for increasing penetration of renewable sources and distributed generation and increase the flexibility of the operational management and monitoring of the electricity system. The objectives are to allow the integration of at least 4.5GW of new wind and solar capacity by 2026 (in addition to 1.8GW in 2020); and to increase use of cross-border transmission capacity by at least 1.2GW (in addition to 1.4GW in 2020).

[86] https://nextgeneration.bg/14
[87] https://www.eso.bg/doc?ctem

The new Energy Security Programme under the **European Economic Area (EEA) Financial Mechanism 2021–2028** will provide 25 million euros in support for Bulgaria[88]. The programme is operated by the Ministry of Energy in partnership with the Norwegian Water Resources and Energy Directorate, with an additional 4.1 million euros in national co-financing.

The memorandum builds on Bulgaria's partnership with Iceland, Liechtenstein and Norway. Under the new period, the country will receive a total of 132.8 million euros in financial support across three thematic priorities: the European green transition, democracy, rule of law and human rights, and social inclusion and sustainability.

Within this framework, support will go to RECs, strengthened energy security and interconnection in the Black Sea region, CO_2 capture and storage technologies, green energy solutions in public buildings, and the creation of an online platform for the **National Decarbonisation Fund**, and studies on pumped-storage hydropower will also be carried out.

In the previous period, under the **Renewable Energy, Energy Efficiency and Energy Security programme**, 24 Bulgarian municipalities modernised their street lighting; more than 20 public buildings were converted to near-zero energy consumption; and 17 industrial companies improved energy efficiency and upgraded production processes. Sustainable geothermal solutions were introduced in many kindergartens, nurseries and other municipal facilities, and more than 15 buildings implemented additional energy-efficiency measures.

Financial support and funding—Main barriers

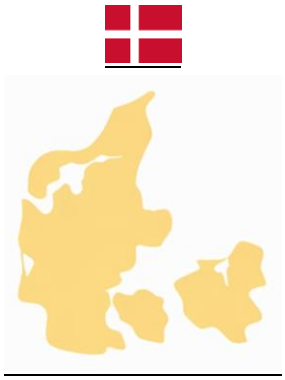
- **Limited dedicated funding**.
- **Communities lack access to capital**.
- **Reliance on EU programme**s.

Financial support and funding—Policy recommendations

- **Establish dedicated financing instruments** with more flexible requirements, upfront financing options, and technical assistance for the community level (e.g, Local Action Groups). Such targeted support is key to ensuring a real chance for energy communities to participate in the transition to a decentralized and equitable energy system, as well as to ensuring that citizen initiatives reach vulnerable groups—including energy and transport poor households—where the socio-economic impact of such projects would be most significant.
- **Provide start-up grants and technical assistance** for community energy initiatives.
- **Facilitate access to low-interest loans** through public financial institutions.

[88] https://www.me.government.bg/news/ministerstvoto-na-energetikata-poema-upravlenieto-na-novata-programa-energiina-sigurnost-po-finansoviya-mehanizam-na-eip-3730.html

4.2 Denmark



Financial support and funding—Policy recommendations

- Expand financing instruments tailored to community energy projects.
- Introduce guarantee schemes reducing financial risks for community investors.
- Encourage regional authorities to establish local funding programmes.

The background

In Denmark, financial support for energy communities is primarily facilitated through targeted government grants managed by the **Danish Energy Agency (Energistyrelsen**).[89] These funds support both local information initiatives and the development of clean energy solutions, such as organization and financing models. They are divided into two main categories:

- Information Projects, aiming to fund the dissemination of knowledge about renewable energy to local communities.
- Development Projects, aiming to fund larger initiatives that establish, organize, and operate local energy solutions.

Additionally, energy communities can explore broader green funding opportunities through the **Export and Investment Fund of Denmark (EIFO)**.[90] As Denmark's national promotional bank, EIFO provides various financial instruments, including equity, loans, and risk capital, which may be applicable to businesses and larger projects associated with energy transition and infrastructure.

A potential future support for energy communities in Denmark can come via the EU Social Climate Fund to provide targeted support to energy communities in energy-poor areas.

Furthermore, some regional governments offer specialized, low-interest loans or support schemes for local renewable energy installations (e.g., small wind turbines) to stimulate rural development.

Financial support and funding—Main barriers

- **Exclusion of large companies**. The EU's restrictions on large companies' participation in energy communities are implemented verbatim. Large companies are thus excluded from participating in energy communities, even though in Denmark they are often central actors in

[89] https://ens.dk/en
[90] https://eifo.dk/en

relation to green transition in smaller local communities and are generally not excluded from participating in cooperatively owned utility companies. This undermines the Danish cooperative democratic tradition.

- **Financial unbalance between rural and urban areas**. Energy communities can promote electrification in rural areas with collective heating supply based on shallow geothermal energy and thermonets. The 2024 amendment to the Heating Supply Act abolished municipal guarantees for this type of collective heating supply, which is suitable in rural areas, while the guarantee provision remains possible for collective heating supply in cities.

Financial support and funding—Policy recommendations

- **Expand financing instruments tailored to community energy projects.**
- **Introduce guarantee schemes** reducing financial risks for community investors.
- **Encourage regional authorities to establish local funding programmes**.

4.3 Spain

Financial support and funding—Policy recommendations

- Provide tailored financial instruments for energy communities to reduce their dependency on grants.
- Support the aggregation of small projects to achieve scale and attract investment.
- Promote crowdfunding and participatory financing.
- Create public guarantee funds to reduce risk for banks and facilitate access to credit.
- Improve the design of public aid by shifting it from one-time grants to ongoing, predictable programs.

The background

The financial situation of energy communities in Spain is improving compared with a few years ago, but it remains mixed and somewhat constrained. There is significant public funding and policy support, yet many communities still struggle with access to capital, complex financing structures, and scaling issues. Overall, energy communities in Spain rely heavily on public funding from EU and national programs.

The Key EU funding sources are **EU Recovery and Resilience / NextGenerationEU**. Spain channels these funds through the Regional Resilience Fund, which mobilizes up to €3.4 billion for regional

investments, including the energy transition. Part of this financing is distributed via loans, blended finance and intermediated funds to support renewable and community-scale projects.[91]

Spain has an exceptionally comprehensive strategy to support energy communities through its **Recovery and Resilience Fund**. The 100 million euros from the program mobilised for this plan on energy communities will be divided into three centrally managed programs: CE-Learn, CE-Plan and CE-Implement. These lines will be complemented by a network of Community Transformation Offices that, coordinated by the Institute for Diversification and Saving of Energy / **Instituto para la Diversificación y Ahorro de la Energía (IDAE)** and distributed throughout the territory, will accompany and advise energy communities throughout their development chain and will facilitate access to each line of aid. The programs are designed to support communities from early idea stage to full project implementation.[92]

- The first of the lines (**CE-Aprende**), in a simple concurrency regime, aims to help individuals or organisations interested in the constitution of an energy community to become familiar with the concept and identify future partners or members. It will subsidise actions such as the expenses associated with the revitalisation, promotion and publicity of the community.
- The second line (**CE-Planifica**), also of simple concurrence, is oriented to the approach and constitution of the energy community itself. This program includes the financing of studies and contract models or specialised technical assistance and legal advice.
- Once legally constituted, the energy community will be eligible for financing from the third line (**CE-Implementa**), which is articulated under a competitive bidding regime. Through it, comprehensive and transversal projects will be subsidised in the field of renewable electrical and thermal energy, energy efficiency or electric mobility.[93]

Until the second half of 2025, it allocated about €148.5 million to around 200 energy community projects.[94]

The European program and the Spanish program finance rooftop PV for shared self-consumption, storage and flexibility projects, feasibility studies and project development, and energy poverty initiatives.

Besides grants, **EU/EIB financing instruments** exist.[95] The European Investment Bank and its investment arm increasingly fund energy transition infrastructure and financial vehicles that indirectly

[91] https://www.eib.org/en/press/all/2024-210-eib-group-and-spanish-ministry-of-economy-sign-agreement-to-implement-the-regional-resilience-fund

[92] https://www.rescoop.eu/policy/financing-tracker/recovery-resilience-funds/spain-recovery-resilience-funds-2-2

[93] https://www.rescoop.eu/policy/financing-tracker/recovery-resilience-funds/spain-recovery-resilience-funds-2-2

[94] https://www.theguardian.com/environment/2025/nov/14/were-proud-to-be-pioneers-inside-spains-community-energy-revolution

[95] https://www.eif.org/press/all/spanish-regional-resilience-fund-invests-eur62-million-of-nextgenerationeu-funds-through-the-eif-qualitas-energy-credit-fund-to-support-renewable-energy-infrastructure

support energy communities and SME. However, most of these funds are not specifically tailored to small citizen energy communities, which limits accessibility.

In addition, **alternative financing and cooperative models** have emerged. Energy communities often rely on hybrid funding models: cooperative member shares, municipal funding, crowdfunding platforms, and ethical banks (e.g., Triodos or Coop57 in Spain). This mix is common because community projects are often too small or risky for traditional banks.

Despite progress, several structural issues remain, especially energy communities' limited access to debt financing. The fact that banks often view energy communities as small-scale, lacking collateral, dependent on grants makes loans for ECs in Spain harder to obtain.

To create a more favorable and attractive context for energy communities, the Spanish government is actively trying to scale energy communities as part of its energy transition. The policy goal is to fight energy poverty, accelerate rooftop solar deployment and democratize the energy system. Important enabling reforms include, e.g, the removal of the former "sun tax" on solar self-consumption in 2018 and the aforementioned expansion of shared self-consumption radius from 500 m to 2 km, enabling larger communities.[96]

Financial support and funding—Main barriers

- **Difficulties in accessing financing** due to high perceived risk for investors: Energy communities are small, innovative projects with uncertain returns, which reduces interest from banks and investment funds.[97]
- **Lack of collateral**: Since they are open-ended entities (members can join or leave), it is difficult to provide traditional collateral or guarantees.
- **Small scale of projects**: many projects are not large enough to attract institutional financing.[98]
- **Reliance on public subsidies**: although these have been key, access to them tends to decrease[99]
- **Reliance on members' funds or informal financing**, e.g. crowd funding.

Financial support and funding—Policy recommendations

- **Provide tailored financial instruments for energy communities** to reduce their dependency on grants and to access sustainable financial models.
- **Support the aggregation of small projects** by bringing together multiple communities to achieve scale and attract investment.

[96] https://www.theguardian.com/environment/2025/nov/14/were-proud-to-be-pioneers-inside-spains-community-energy-revolution
[97] https://www.idae.es/ayudas-y-financiacion/comunidades-energeticas
[98] https://media.timtul.com/media/web_asociacion3e/modelos-de-negocio-y-financiacion_20240903073805.pdf
[99] https://www.zafranet.com/noticias/espana-suma-659-comunidades-energeticas-pero-cae-el-acceso-a-financiacion-publica/

- **Promote crowdfunding and participatory financing** which is consistent with energy community-based nature.
- **Create public guarantee funds** to reduce risk for banks and facilitate access to credit.
- **Improve the design of public aid** by shifting it from one-time grants to ongoing, predictable programs, by simplifying application processes and expedite payments and by including funding for initial phases (design, studies, community engagement).

4.4 Germany

Financial support and funding—Policy recommendations

- Create a dedicated federal program for energy communities, for community establishment and management.
- Develop funding programs aimed at the early project phase to finance pre-development and feasibility studies and to reduce planning risks for energy communities
- Simplify and standardize the funding landscape.
- Introduce a one-stop shop for energy communities.
- Provide financing instruments such as government guarantees, risk funds for energy communities on the national level.

The background

Financing community energy projects, particularly ground-mounted PV projects, presents unique challenges for community energy stakeholders. Project development involves several complex phases—from initial assessments and permits to grid connection, construction, and operation. Each phase comes with specific risks, costs, and requirements regarding capital and planning certainty.[100]

Especially in the early project phase, high planning costs are often incurred even before it is clear whether a project can be realized. These funds are lost in the event of failure. A forward-looking, phase-appropriate financing strategy is therefore central to the success and long-term viability of ground-mounted PV community energy projects.

Successful financing is based on transparent communication, clearly defined structures and responsibilities, an understanding of and knowledge regarding banks' project requirements, expertise

[100] Finanzierung von Bürgerenergieprojekten, Leitfaden für PV-Freiflächenanlagen. Bündnis Bürgerenergie e.V., 15. Januar 2026, p.2

in negotiating with financial institutions, and customized financing models that meet the individual needs of the projects. Financing energy community projects usually requires the following steps:[101]

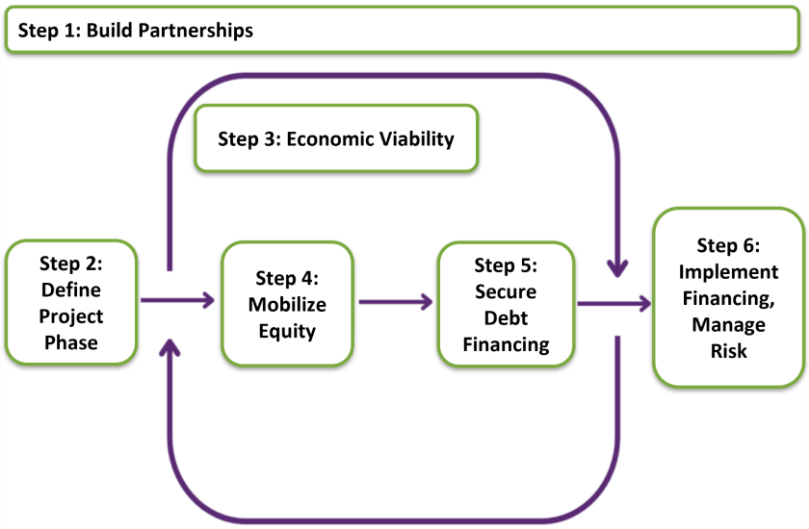


Figure: Six steps of financing for energy community projects.[102]

- **Step 1**: Establish reliable partnerships, e.g., with municipalities, regional energy agencies, and relevant partners.[103]
- **Step 2**: Clearly define project phases and identify financing needs and risks for each phase.[104]
- **Step 3**: Calculate profitability and continuously update these figures throughout the project development process.[105]
- **Step 4**: Mobilize equity as base financing, e.g., through fixed contributions in the form of membership shares in cooperatives. Alternatively, as mezzanine capital—a hybrid of equity and debt—e.g., through subordinated loans, which are treated as equity for economic purposes since, in the event of insolvency, they are repaid only after all other liabilities.[106]
- **Step 5**: Secure debt financing through, e.g,
    - **Traditional bank loans**: for ground-mounted PV systems, this typically requires substantial collateral as well as an equity ratio of approximately 25 to 50 percent.
    - **Government grants**: Depending on the timing of project planning, federal or state grant programs for ground-mounted PV systems may be available. Grants offer the opportunity to strengthen the equity base and significantly reduce the need for bank

[101] Finanzierung von Bürgerenergieprojekten, p.3
[102] Source: Finanzierung von Bürgerenergieprojekten, p.2
[103] Finanzierung von Bürgerenergieprojekten, p.4
[104] Finanzierung von Bürgerenergieprojekten, p.5
[105] Finanzierung von Bürgerenergieprojekten, p.6
[106] Finanzierung von Bürgerenergieprojekten, p.7-8

loans, and can facilitate access to debt financing, but are generally also associated with extensive conditions and administrative requirements.[107]

- Step 6: Implement financing and reduce risks.[108]

In Germany, there is no single, centralized subsidy exclusively for energy communities; rather, there is a combination of federal programs, Renewable Energy Sources Act (EEG) mechanisms, **Reconstruction Credit Institute / Kreditanstalt für Wiederaufbau (KfW) programs**[109], and state subsidies that support citizen energy projects. The financing of citizen energy projects usually consists of a combination of various instruments, which are divided into grants and subsidies as well as equity and debt capital.

The most important funding instruments are:

Funding specifically for community energy companies (national level)

The most important direct funding is the **Community Energy Companies for Onshore Wind Energy** program, implemented by the Federal Office for Economic Affairs and Export Control (BAFA) and financed by the Federal Ministry for Economic Affairs and Energy. A prerequisite is a minimum of 15 members in the citizen energy company. It covers the planning and permitting costs of citizen wind projects, with a grant of 70% of the costs (up to €300,000 per project), aimed at reducing the high financial risk during the project development phase. Repayment is only required if the project is successfully approved. This program is highly beneficial for the expansion of energy communities, as it minimizes the risk associated with preliminary planning costs (expert reports, studies, etc.), which are often the biggest hurdle for citizen-led projects.[110]

Funding via the EEG (national support scheme)

The most important structural support for citizen energy communities is the **Renewable Energy Sources Act (EEG)**. It provides mechanisms such as market premiums, feed-in tariffs, and exemption from tenders for small citizen energy projects—for example, citizen-led wind projects up to 18 MW generally do not have to participate in tenders. It also includes the definition and preferential treatment of citizen energy companies. Thus, while the EEG is not a traditional project subsidy, it is the most important economic foundation for community energy projects.[111]

[107] Finanzierung von Bürgerenergieprojekten, p.8

[108] Finanzierung von Bürgerenergieprojekten, p.9

[109] The Subsidy Loan / Förderkredit No. 270: Renewable Energy – Standard for Electricity and Heat is available for systems that generate electricity and heat, for grids and storage facilities, for photovoltaic, hydro, wind, and biogas projects, and much more. It is also available to non-profit applicants, such as energy communities, that feed at least a portion of the electricity or heat they generate into the grid. https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-(270)/

[110] https://www.bafa.de/DE/Wirtschaft/Beratung_Finanzierung/Buergerenergiegesellschaften/buergerenergiegesellschaften.html

[111] https://energiewende.bundeswirtschaftsministerium.de/EWD/Redaktion/Newsletter/2024/07/Meldung/direkt-erklaert.html

Community Energy Programs (Federal States)

Many federal states have their own programs, often for preliminary planning or participation, such as a **Community Energy Fund** (e.g., Thuringia) that subsidizes up to 80% of project costs (max. €200,000 per project).[112] In addition, there are consulting and start-up grants, e.g., consulting subsidies of up to €4,000 for citizen initiatives or support for establishing cooperatives, which is particularly important for the start-up phase of energy cooperatives.

However, these programs are far from sufficient to significantly accelerate the expansion of energy communities.

Financial support and funding—Main barriers

- **Many fragmented programs** exist, which are mostly project-specific, and not tailored to energy communities.
- **Mainly technology-specific programs** (for PV, wind, heating networks). However, energy communities incur additional costs, e.g., for member organization, governance structures, citizen participation, and legal structure (cooperative, association), which are usually not eligible for funding.
- **Limited funding in the early project phase**. The greatest risk for energy communities lies before implementation. Typical costs, which can amount to over €100,000, are incurred for feasibility studies, site analyses, permits, legal advice, and citizen participation. However, funding usually only becomes available after an investment decision has been made.
- **Very complex funding structures** with multiple funding agencies (federal, state, EU), different application procedures, much bureaucracy, and long approval times. This often poses a major hurdle for volunteer-run energy communities.
- **Difficulties with bank financing, equity capital, and risk mitigation** for energy communities, as banks often view community energy projects as risky.
- **Lack of understanding** of energy community actors **about the funding requirements of banks and financial institutions.**

Financial support and funding—Policy recommendations

- **Create a dedicated federal program for energy communities**, their establishment, community management, and local participation models.
- **Develop funding programs aimed at the early project phase** to finance pre-development and feasibility studies, reduce planning risks for energy communities, including also PV projects.
- **Simplify and standardize** the funding landscape and also introduce a one-stop shop for energy communities.

[112] https://www.buendnis-buergerenergie.de/fileadmin/user_upload/konvent_2024/25_WS11_Buergerwind_ThEGA.pdf

- **Provide financing instruments such as government guarantees**, **risk funds for energy communities** on the national level, special KfW loans for energy communities, or microfinance for small projects.

4.5 Italy

Financial support and funding—Policy recommendations

- Introduce pre-financing mechanisms reducing the need for upfront capital.
- Simplify reporting and administrative requirements for funding programmes.
- Expand regional funding schemes supporting the early stages of energy community development.

The background

Italy has established a relatively comprehensive financial support framework to promote the development of Renewable Energy Communities (REC) / Comunità di Energia Rinnovabile (CER). The current financing landscape combines national incentive schemes, investment grants funded through the EU Recovery and Resilience Facility, and revenue mechanisms linked to shared renewable electricity. These measures aim to accelerate the deployment of decentralized renewable generation while supporting citizen participation in the energy transition.

The main regulatory framework supporting energy communities in Italy was introduced through the **Ministerial Decree of 7 December 2023**[113] (often referred to as the "**CER Decree**"). This measure defines the operational rules for renewable energy communities and establishes financial incentives for collective self-consumption and energy sharing.

The decree provides two main forms of financial support:

- A premium tariff for shared renewable electricity, paid over a long-term period. This incentive is administered by the national energy services agency, Gestore dei Servizi Energetici (GSE).
- Capital investment grants to support the construction of renewable energy installations within communities.

[113] https://www.mase.gov.it/portale/-/energia-mase-pubblicato-decreto-cer

Together, these mechanisms form a national state-aid scheme under the **Recovery and Resilience Facility** with an overall budget of approximately €5.7 billion, specifically to support renewable energy communities and self-consumers.[114]

Furthermore, **many regional governments established specific support measures for RECs** (e.g, Campania,[115] Lombardia,[116] Emilia Romagna,[117] Sicilia,[118] Veneto,[119] Liguria,[120] Valle D'Aosta,[121] Friuli Venezia Giulia[122] and Basilicata), mainly awarding funds to cover the costs of feasibility studies or legal consultancy, but in some cases to cover or co-fund also the investment costs.

Results from the use of public funds for REC projects have been mixed. First, the trade-off between receiving investment support versus the premium tariff, is not always easy. Furthermore, accessing and reporting on received funds under the Recovery Funds is not easy for RECs with limited expertise. More importantly, the funds are set up as a reimbursement, meaning the REC, or a third party, must put up the money in order to pay initial expenses. This requires loans from a bank, wealthier members, or a third party investor. This has resulted in many community initiatives where the production installations are owned by third party investors, resulting in a reliance on commercial service providers. In the long run, this could prevent sustainable business models for grass-roots energy communities from emerging and/or corporate capture.[123]

Financial support and funding—Main barriers

- **Financing represents a critical barrier:** while the REC Decree and PNRR funding provide support, communities largely rely on public subsidies, with market-based financing instruments still underdeveloped, raising concerns about long-term sustainability.
- Support exists but **reimbursement models require upfront capital**.
- **Complexity of incentives**.

[114] https://ec.europa.eu/commission/presscorner/detail/da/ip_23_5787
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[123] https://www.rescoop.eu/policy/transposition-tracker/enabling-frameworks-support-schemes/italy

Financial support and funding—Policy recommendations

- **Introduce pre-financing mechanisms** reducing the need for upfront capital.
- **Simplify reporting and administrative requirements** for funding programmes.
- **Expand regional funding schemes** supporting the early stages of energy community development.

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Bulgaria

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