FEASIBILITY STUDY: MUNICIPAL ENERGY COMMUNITIES IN BULGARIA

Assignment Contract to
Service Contract No. AA-010584-001/CC15138 TACON

Authors: ENERGY AGENCY OF PLOVDIV & RESCOOP.EU

December 2024

Contents

Abbreviations

- CEC - Citizen Energy Community
- DSO - Distribution System Operator
- EC - Energy Community
- NECP - National Energy and Climate Plan
- NRRP - National Resilience and Recovery Plan
- REC - Renewable Energy Community
- SECAP - Sustainable Energy and Climate Action Plan
- SEDA - Sustainable Energy Development Agency
- TSO - Transmission System Operator

Executive Summary

This report explores existing municipality-driven energy communities in Bulgaria, alongside best practice examples from other South-Eastern European Member States. It draws key conclusions on the success factors and challenges related to their implementation. The report summarizes various operational models and highlights elements that may be particularly beneficial for local authorities in Bulgaria. Additionally, it provides an overview of the current legal, technical, and organizational frameworks in Bulgaria that could support the adoption of these practices.

To establish a supportive environment for Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs), the report reviews the relevant policy and legal background in both Bulgaria and the wider South-Eastern European region. It outlines the legislative and procedural amendments necessary to enable the development and integration of RECs and CECs in Bulgaria.

Finally, the report introduces a decision-making tool designed for local authorities. This tool assists in evaluating the technical and financial parameters of an energy community project. It supports feasibility assessments by examining energy performance, financial viability, and the potential for citizen involvement in both REC and CEC initiatives.

1. Introduction

1.1. Context

Over the past decade, the green energy transition has become a central policy priority across Europe, strongly supported by the European Institutions. Numerous key policy documents and directives set forth by the European Commission have been adopted to regulate the legal relationships between individual actors and public institutions allowing them to take up an active role in the energy system.

For the energy transition to be truly successful, it must be fully supported by EU citizens. This requires that the transition be socially acceptable and fair, ensuring tangible benefits for local actors (including citizens) and the local economy.

This report has been developed in response to recent changes in both the European and Bulgarian legislative frameworks related to the development and implementation of so-called energy communities. Across various EU Member States, energy communities have been evolving over the past decade, serving as successful models for promoting energy savings and reducing climate impact at the local level.

In Bulgaria, however, the concept of energy communities remains relatively new. Accordingly, the national legislative frameworks necessary for their establishment and effective operation are still being introduced and adapted.

Energy communities are citizen-driven initiatives that can take on various legal forms. They bring together a diverse group of actors —such as friends, neighbours, small and medium-sized enterprises (SMEs), and local authorities—motivated by the shared goal of investing in renewable energy production and/or storage capacity. These communities enable the joint use of locally produced renewable energy and often provide the opportunity to sell excess energy back to the grid. In some cases, they also offer free energy supply to energy-poor and vulnerable households.

Experiences from other EU countries show that energy communities deliver significant social, environmental, and economic benefits. They empower citizens to actively participate in the energy transition, stimulate local clean energy production, and foster trust and cooperation within the community.

Importantly, local authorities—particularly municipalities—play a critical role in supporting and mainstreaming energy communities in the Bulgarian context. Through policies that promote energy efficiency and renewable energy, municipalities can build citizen trust and facilitate long-term, multi-stakeholder partnerships. Energy communities can serve as flagships of this vision, advancing inclusive and sustainable local development that benefits the entire community.

1.2. Scope

This report focuses on energy communities initiated and driven by local authorities, specifically municipal energy communities. It explores their potential for development as collaborative initiatives between municipalities (as public bodies) and citizens (as natural persons). The analysis draws on best practices from existing energy community projects across the EU with a particular focus on South-Eastern Europe, including examples from Albania, Bosnia and Herzegovina, Croatia, Greece, and others.

The structure of the report follows the framework outlined in the Mission Letter and is divided into three main sections:

- Assignment 1 provides a detailed overview of municipality-led energy community projects in Bulgaria. It also reviews relevant EU-funded initiatives aimed at promoting and mainstreaming the concept of energy communities within the country.
- Assignment 2 presents successful examples from other South-Eastern European countries. It assesses the feasibility of adapting these practices to the Bulgarian context and outlines the legal, technical, and operational considerations necessary for their transfer and integration into Bulgaria's existing framework.
- Assignment 3 introduces an Excel-based decision-making tool designed for local authorities. This tool supports the evaluation of the technical and financial feasibility of municipal energy community projects and can guide municipalities in the process of establishing such initiatives.

2. Assignments

2.1. Assignment 1: Best practices in Bulgaria

2.1.1. Bulgarian and EU projects for energy communities

Bulgaria has considerable experience in renewable energy sources (RES)-based electricity and heat generation, gained through participation in both national and EU-funded projects. Its legislation and grid operation procedures are well aligned with RES capacities for self-consumption. However, RES-based self-consumption and prosuming are currently not regulated within the Bulgarian energy market, and net metering is not implemented. Most RES generation facilities are operated by regular (commercial) market actors and are owned by private entities, lacking the principles of "community" ownership and non-commercial operation.

EU-funded projects in Bulgaria have primarily focused on exploring the potential for deploying RES capacities for self-consumption and prosuming, rather than developing fully-fledged energy communities. These initiatives have mostly involved pilot or "sandbox" projects that test RES generation facilities with storage, aimed at self-sufficient use or prosuming. While these pilots were not fully integrated into the real-life grid environment, they adapted to grid rules and sparked important discussions on grid integration challenges.

These projects have mainly addressed the technological aspects of integrating RES generation into the grid but have not tackled the social dimensions of energy communities. Nevertheless, they have contributed valuable hands-on experience, creating a foundation that supports the further development of the energy community concept in Bulgaria.

The exploration of energy communities in Bulgaria has also benefited from EU-funded projects that brought in a variety of facilitation tools and best practices from across Europe. These include best practice databases, RES potential mapping, guidelines for RES deployment, as well as online maps and platforms. Such resources have inspired and motivated local actions, particularly targeting municipalities and citizens, to foster the growth of energy communities at the local level.

Early projects on energy communities in Bulgaria primarily focused on collective actions as community energy projects rather than fully developed Renewable Energy Communities (RECs) or Citizen Energy Communities (CECs). For example:

- LIGHTNESSdid not specifically target Bulgaria but showcased RES initiatives that support the market uptake of Citizen Energy Communities.
- CONGREGATElinked collective actions with residential renovation activities.
- Other projects piloted platforms like one-stop-shops for collective actions (Up-Stairs) and online information hubs (Shares) to provide broader support to energy communities. For instance, the Municipality of Asenovgrad established a one-stop-shop to facilitate residential building renovation, inspired by Up-Stairs. Shares created an online platform offering resources to support various collective actions, including energy communities.

The second generation of energy community projects in Bulgaria has increasingly addressed national and EU framework conditions, aiming to find appropriate models for implementing EC pilots and developing supportive policy mechanisms:

- POWER-E-COMdeveloped adaptable regulatory frameworks tailored to national needs and provided training and capacity-building materials for energy communities.
- LIFE-Beckon empowered local action groups to promote ECs by establishing Technical Assistance Offices, capacity building programs, and integrated one-stop-shop services.

Some projects targeted citizens directly to encourage energy community formation:

- Tandems explored cooperation models between citizens, local governments, and energy communities, involving municipalities such as Gabrovo and Burgas to activate citizen participation.
- Solar cities run by the municipalities of Burgas and Sofia, provided data on rooftop solar potential in residential buildings to help residents make informed decisions on establishing RECs and CECs.

Furthermore, a number of EU projects have piloted new community energy applications or self-production models compatible with community energy initiatives:

- SUNRISE implemented small-scale household PV plants in Dupnitsa and Blagoevgrad to test plug-and-play self-consumption and prosuming technologies.
- ConnectHeat, the only EC project addressing heating and cooling, is developing a geothermal heating and cooling community system in Plovdiv, featuring individual heat pumps and solar thermal collectors, aiming for near-zero energy consumption and Passivhaus certification.
- RECinMEDsupports REC creation and functioning in the Mediterranean region, with Smolyan as the Bulgarian pilot municipality.

Currently, two ongoing initiatives have the potential provide technical, financial and organizational support to emerging energy communities in Bulgaria. Both initiatives are expected to play a crucial role in accelerating the uptake of energy communities in Bulgaria in the coming years.

- The European Energy Communities Facility assists emerging communities in developing solid business plans for renewable energy projects.

- The Encom Hub designs, validates, and scales up services supporting citizen-, SME-, and public authority-owned energy communities.

Overall, the development of energy communities in Bulgaria has evolved naturally from a focus on technology and grid integration toward greater social engagement and consumer empowerment. Projects have facilitated access to information, tools, guidelines, and stakeholder matchmaking across the renewable energy value chain.

Although several municipalities – such as Gabrovo, Burgas, Sofia, Asenovgrad, Plovdiv, Dupnitsa, Botevgrad, etc. – have launched pilot energy communities, most acted primarily as facilitators of such initiatives. Municipalities signed up as enablers rather than lead actors in community engagement activities.

.

2.1.2. CASE STUDY 1: Gabrovo Energy Community

Figure 1 Aerial view of CEC Gabrovo

1. Mission and Objectives

The Gabrovo Civil Energy Community (CEC Gabrovo) was established by the Municipality of Gabrovo in response to rising electricity prices and the opportunities offered by the Clean Energy Packages and the Renewable Energy Directive and the Internal Electricity Market Design Directive in particular. Its main objective is to supply clean, locally generated electricity for public use, whilst empowering citizens to actively participate in the energy transition and share in the financial benefits of renewable energy investments.

2. Strategy

The EC Gabrovo prioritizes:

- Utilizing municipal rooftops for solar power generation.
- Creating accessible investment opportunities for citizens.
- Ensuring fixed returns and stable energy pricing over a 10-year period.
- Retaining all generated electricity within the municipal and public domains wherever feasible.

3. Organisational Structure and Governance

- Legal form: Association established under the Bulgarian Obligations and Contracts Law.
- Governance: Managed by representatives appointed by the Municipality of Gabrovo.
- Ownership: The PV installation is owned by the Civil Energy Community throughout the 10-year operational period, after which ownership transfers permanently to the municipality.

4. Activities

- Construction of a 100 kWp photovoltaic plant on the roof of the municipal non-hazardous waste disposal facility.
- Sale of electricity to municipal entities at a fixed rate via Power Purchase Agreements (PPAs).
- Inclusion of 73 members—citizens and SMEs—as financial contributors.
- Administration of returns and dividends to community participants.
- Management of grid coordination and electricity sales processes.

5. Business Model

- Energy Use: Approximately 55% of the electricity is consumed directly on-site at the waste disposal facility.
- Electricity Sale: Energy is sold to municipal consumers at a fixed price of 0.23 BGN/kWh for the first three years.
- Price Adjustment Mechanism: After each three-year cycle, prices are reassessed based on EWRC solar price forecasts and grid charges to ensure sustainability and limit volatility.
- Excess Electricity: Between 20–30% of production is sold on the open market to cover operational costs. Any surplus revenue may be distributed as bonuses or retained in a reserve fund, as decided by the CEC General Assembly.
- Return on Investment: Community members are guaranteed a 22% return on investment over 10 years.

6. Mix of Goods and Services

- Goods: Renewable electricity supplied for public consumption.
- Services: Investment returns, cooperative governance, energy education, and active participation in the green transition.

7. Financing Mix and Partnerships

- Initial Capital: €80,000 (including VAT), contributed by 73 citizens and entities.
- Contributions: Individual investments ranged from BGN 500 to BGN 5,000.
- Municipal Support: The municipality provides administrative assistance, roof space, and engineering documentation for the project.
- Legal Framework: A joint activity agreement governs cooperation, ownership transfer, and benefit-sharing among stakeholders.

8. Socio-Economic and Environmental Impacts

For the Municipality:

- Access to clean electricity at predictable, below-market prices.
- Ownership of the installation after 10 years.
- Progress toward climate goals and an enhanced reputation for sustainability.

For Citizens:

- Fixed dividends and a new opportunity for green investment.
- Access to locally generated clean energy whenever feasible.
- Inclusion in a pioneering model of citizen participation in energy.

Joint Benefits:

- Increased local energy autonomy and security.
- Enhanced energy literacy among community members.
- Symbolic transformation of a landfill into a renewable energy hub.
- Greater access to renewable energy, especially for apartment dwellers and lower-income households.

2.1.3. CASE STUDY 2: Burgas Energy Community

Figure 2 Aerial view of the Slaveikov Swimming Hall where CEC Burgas will be constructed

1. Mission and Objectives

The Burgas Civil Energy Community (CEC Burgas – Slaveykov Swimming Hall) is a municipality-driven initiative inspired by the Gabrovo model. Its mission is to develop citizen-owned renewable energy projects that advance the city's energy sustainability goals, reduce electricity costs for public services, and create opportunities for citizens and local organizations to invest in clean energy.

2. Strategy

CEC Burgas follows a strategic approach focused on:

- Utilizing municipally owned rooftops for solar power generation.
- Encouraging broad participation from citizens, SMEs, NGOs, and municipal enterprises.
- Offering fixed investment returns and stable energy prices.
- Building municipal capacity to scale up renewable energy and community energy projects.

3. Organisational Structure and Governance

- Legal form: Association under the Bulgarian Obligations and Contracts Law.
- Capital: BGN 431,802.78 (including VAT).
- Governance: Managed by the Municipality of Burgas.
- Ownership: The PV installation is municipally owned, becoming a permanent municipal asset after 10 years.

4. Activities

- Construction of a 420 kWp rooftop solar installation on the municipally owned Slaveykov Swimming Hall.
- Sale of electricity under a fixed-rate agreement with the Civil Energy Community.
- Financial participation of 131 individuals and legal entities, including municipal enterprises.
- Administrative management of electricity sales, investor returns, and partner coordination.

5. Business Model

- Energy Use: Approximately 85% of electricity generated is consumed onsite by the swimming hall, ensuring high efficiency.
- Electricity Sale: Energy is sold to the municipality at a fixed price of 0.13 BGN/kWh for the first 3 years.
- Price Adjustment: Every 3 years, the fixed price is reviewed based on national solar energy forecasts and grid charges. If the difference exceeds 20%, the sale price is adjusted accordingly.

- Excess Energy: Around 15% of electricity is sold on the free market, generating additional revenue used for operational costs, bonuses, or reserve funds.
- Return on Investment: Investors receive a guaranteed 30% ROI over 10 years.

5. Mix of Goods and Services

- Goods: Clean electricity for municipal use and, where possible, for sale to other consumers.
- Services: Investment opportunities with guaranteed returns, access to energy knowledge, and inclusive civic participation.

6. Financing Mix and Partnerships

- Capital Contributions: Citizens and legal entities invested between BGN 500 and 10,000.
- Municipal Enterprises: Eleven municipal companies invested BGN 10,000 each following City Council approval.
- Municipal Contribution: Provision of roof space, engineering documentation, and administrative support.
- Legal Framework: A joint activity agreement defines cooperation terms and responsibilities.

7. Socio-Economic and Environmental Impacts

For the Municipality:

- Stable access to affordable green electricity.
- Full ownership of the installation after 10 years.
- Progress toward climate and sustainability goals.

For Citizens and Local Stakeholders:

- Secure and transparent investment with 30% ROI.
- Broader access to renewable energy participation, especially for those unable to install their own systems.
- Enhanced sense of ownership and empowerment in the city's clean energy future.

Shared Impacts:

- Reduced reliance on external electricity providers.
- Increased local capacity for renewable energy development and management.
- Educational benefits through hands-on involvement.
- Promotion of fairness and inclusivity in the energy transition.

2.1.4. Key success factors and challenges

Success factors

1. Municipal Leadership and Institutional Support

- The Municipalities of Gabrovo and Burgas serve as initiators, project managers, and primary consumers of the renewable energy produced.
- They provide essential administrative capacity, engineering expertise, and secure project infrastructure, including municipal rooftops at the waste disposal facility in Gabrovo and the swimming pool in Burgas.
- This leadership builds public trust, lowers coordination costs, and guarantees long-term project commitment.

2. Optimal Use of Existing Municipal Infrastructure

- PV systems are installed on the rooftops of municipal buildings rather than on ground or greenfield sites.
- This avoids land-use conflicts and exemplifies smart utilization of underused assets.

3. Inclusive, Community-Driven Investment Model

- Investments are open to citizens and legal entities with accessible entry points (BGN 500–5,000 in Gabrovo, BGN 500–10,000 in Burgas).
- Investors become energy community members, receiving fixed ROIs of 22% (Gabrovo) and 30% (Burgas) over 10 years, alongside options to consume energy at fixed prices.
- This approach lowers barriers to green investments and fosters energy democratization, enabling broad participation regardless of income or housing type.

4. Clear Legal and Governance Framework

- The projects operate as associations under Bulgarian Contracts Law, supporting shared ownership and collective decision-making.
- A Joint Activity Agreement clearly defines roles, energy allocation, pricing, and dividend guarantees, ensuring transparency and predictability.
- Municipal management ensures legal compliance, accountability, and efficient operation.

5. Guaranteed Energy Offtake and Revenue Stability

- Energy is primarily consumed by municipal entities, ensuring stable demand.
- Municipalities pay a fixed price covering grid costs, securing reliable revenue for the community.
- After 10 years, the installations transfer to municipal ownership, maximizing long-term value and sustainability.

6. Environmental and Social Impact

- The projects advance decarbonization and boost local renewable energy production.
- Citizens gain practical exposure to clean energy and cooperative models, raising awareness and local capacity.
- Notably, the rooftop PV installations symbolize environmental regeneration—transforming a waste disposal site in Gabrovo into a clean energy landmark.

7. Economic Predictability and Risk Mitigation

- Fixed energy prices and guaranteed returns protect municipalities and investors from energy market fluctuations.
- Long-term contracts and predetermined returns reduce investment risk, enhancing project attractiveness compared to conventional financial products.

Challenges and Mitigation Strategies

1. Regulatory and Legal Complexity

- *Challenge:* National regulations lag or lack clarity on energy communities, grid access, and taxation despite supportive EU laws.
- *Mitigation:* Engage strong legal counsel, maintain proactive dialogue with regulators, and leverage pilot-friendly regulatory provisions.

2. Grid Integration and Technical Constraints

- *Challenge:* Delays and technical limitations may arise when connecting community PV systems to the grid, including capacity and reverse flow issues.
- *Mitigation:* Coordinate early with grid operators, optimize load matching using municipal buildings, and assess feasibility of energy storage solutions.

3. Long-Term Maintenance and Performance Monitoring

- *Challenge:* PV systems require ongoing monitoring, preventive maintenance, and possible component replacements over 10 years.
- *Mitigation:* Secure operation and maintenance contracts and allocate a dedicated maintenance reserve fund.

4. Financial Management and Dividend Distribution

- *Challenge:* Ensuring consistent and transparent dividend payments, especially amid variable cash flows due to operational challenges.
- *Mitigation:* Implement strong financial governance, conduct independent audits, and provide regular performance reports to members.

5. Stakeholder Coordination and Communication

- *Challenge:* Managing expectations and communication among diverse participants with different expertise and engagement levels.
- *Mitigation:* Develop a clear communication plan, hold regular updates and educational sessions, and ensure democratic decision-making.

6. Limitations of Energy Usage Rights

- *Challenge:* Currently, energy consumption rights are limited, with all produced energy used by municipal buildings.
- *Mitigation:* Transparently communicate the current framework and implement phased plans (e.g., virtual net metering) to enable citizen consumption as regulations evolve.

7. Economic Uncertainty

- *Challenge:* Inflation, currency fluctuations, or shifts in energy markets could reduce fixed returns' real value.
- *Mitigation:* Include inflation-indexed contract terms and maintain financial contingency buffers.

8. Public Awareness and Engagement Fatigue

- *Challenge:* Initial enthusiasm may wane if participants don't see tangible benefits or if communication declines.
- *Mitigation:* Organize regular events, share performance reports and success stories, and highlight the project's environmental and community impact.

2.1.5. Comparative assessment of the Bulgarian energy communities

The following table provides a side-by-side comparison of the key features, operational models, and governance structures of the Civil Energy Communities (CECs) in Gabrovo and Burgas. A detailed description of their legal forms and operational frameworks is available in Section 2.2.2.

Table 1 Comprative assessment of the EC Gabrovo and EC Burgas

	EC Gabrovo	EC Burgas
Organizational aspects		
EC form	Citizen energy community	Citizen energy community
Initiator	Municipality of Gabrovo	Municipality of Burgas
Members/shareholders	Municipality, citizens and legal entities	Municipality, citizens and legal entities, incl. municipal enterprises
Rationale for the City Council to implement the EC	Art. 21, par. 2 and par. 1, p. 23 Local Governance Law and art. 57 of the Order for the requirements and procedures	Art. 21, par. 1, 8, p. 23, Local Governance Law, Art.51, pa.2, Art. 51a, par.4 and in relation to Art. 31 and the following of

	to manage municipal property rights in public enterprises and commercial associations with municipal capital on the participation of the Municipality in civil associations and signing contracts for shared activities	Section IX of the Order for the requirements and procedures to manage municipal property rights in commercial associations, civil associations and signing contracts for shared activities by Municipality of Burgas
Shareholder requirements	From 500 to 5000 BGN The share of the Municipality is 80 BGN	From 500 to 10 000 BGN The share of the Municipality is 10 000 BGN
Members/shareholders	73	131
Participation structure	Citizens - 67 NPOs - 1 Companies - 4 Municipality of Gabrovo - 1	Citizens - 92 NGOs - 4 Companies - 27 Municipal companies – 7 Municipality of Burgas - 1
Total investment	160 180 BGN, incl. VAT	450302BGN, incl. VAT
Legal types	Association according to the Obligations and Contracts Law	Association according to the Obligations and Contracts Law
	Constituent Assembly	Constituent Assembly
Management bodies	General Assembly	General Assembly
Manager	Authorized representative from the municipality, approved by the general assembly of the CEC	Association Manager allocated by the Mayor following a decision of the City Council approved by the general assembly of the CEC
Registration **number**	ID 181071764	ID 181277878
Guaranteed purchase of the produced energy	Energy consumed by the regional non-hazardous landfill and other municipal buildings: 1. Municipal administrative buildings 2. Hristo Botev Sports Stadium 3. Orlovets Sports Hall 4. Vuzrajdane Hall 5. Municipal enterprise "Welfair" – administrative building and other	Energy consumed by the Slaveikov Swimming Hall and other municipal buildings
Technical aspects		
RES type	Rooftop Photovoltaic power plant	Rooftop Photovoltaic power plant
Capacity	100 kWp	420 kWp
Location	Non-hazardous waste landfill by the city of Gabrovo	Slaveikov Swimming Hall

Ownership of the EC site/building	Public municipal property	Public municipal property
Ownership of the PV installations	Municipality of Gabrovo	Municipality of Burgas

2.2. Assignment 2: Feasibility study

The feasibility assessment of municipality-driven energy communities in Bulgaria draws on best practices from other EU countries alongside the current national enabling framework conditions. It is important to highlight that Bulgaria only recently introduced Renewable and Civil Energy Communities (RECs/CECs) into its legislation in December 2023. As of now, the country has not yet developed a comprehensive legal and regulatory framework to support and guide the uptake of energy communities.

Currently, only one energy community has been formally established in Bulgaria, with another in progress, limiting the practical experience available for drawing robust conclusions. Consequently, this feasibility study relies primarily on theoretical regulatory conditions and international good practices, rather than on extensive local operational insights.

Bulgaria's enabling framework remains very limited and is not comparable to the more mature systems in other EU countries with long histories of energy market unbundling, active citizen participation, and well-developed business and financial models for energy community establishment. Furthermore, the focus on municipality-driven initiatives narrows the scope even more, as most energy communities in Europe have traditionally been initiated and driven by private citizen groups.

According to REScoop.eu's Transposition Tracker, Bulgaria currently scores a "dark orange" rating, indicating substantial deficiencies in the transposition of European energy community legislation into national law. Bulgaria falls into a group of member states, mostly from Eastern Europe—including Austria, Croatia, Estonia, Finland, Hungary, Luxembourg, Malta, Poland, Romania, and Slovakia—with similarly limited frameworks.

Moreover, Bulgaria is categorized among the EU member states with less favorable frameworks for energy communities by the EU Energy Communities Facility. According to REScoop.eu's Finance Tracker, Bulgaria either lacks available data or scores "dark red," indicating a significant absence of information on financing mechanisms and support for energy communities or related initiatives.

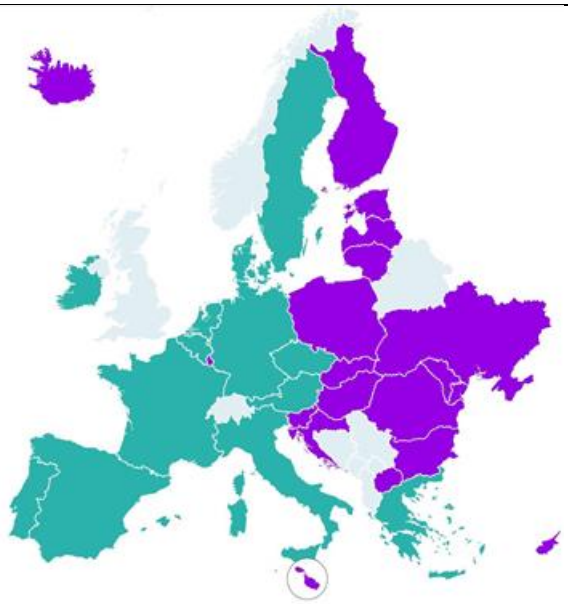

Figure 3 Eligibility of members states according to the EU energy community Facility

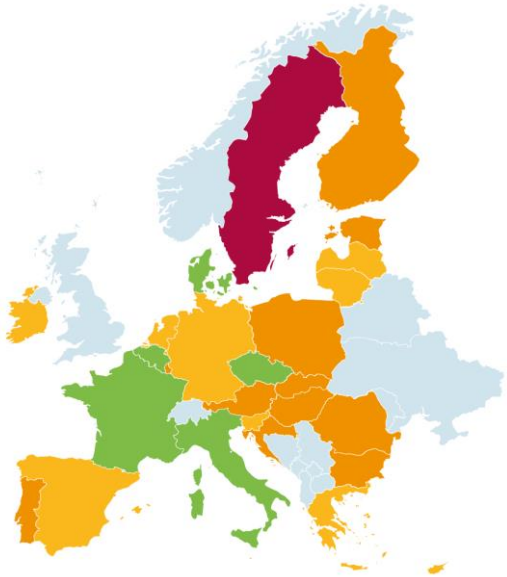

Figure 4 REScoop transposition tracker (Source: REC & CEC definitions - REScoop.eu)

One of the most critical issues facing the development of Citizen and Renewable Energy Communities (CECs/RECs) in Bulgaria is the effective participation of citizens. Currently, there is no designated authority tasked with overseeing the implementation and enforcement of energy community policies, creating a governance gap that hinders progress.

Several challenges remain only partially addressed, including the need for:

- Further elaboration and clarification of the definitions of RECs and CECs at the national level,
- Clearer specification of the core principles governing energy communities and their operational procedures,
- Enhanced coherence between various legal and regulatory definitions relating to energy communities.

Moreover, Bulgaria must complete the unbundling of its energy market to fully embrace the energy community concept and enable effective market participation by all actors—particularly citizens, who lie at the heart of CECs/RECs. This requires a multi-factor approach involving:

- Removal of unjustified regulatory and administrative barriers to entry,
- Mandating Distribution System Operators (DSOs) to actively cooperate with energy communities and support local energy sharing initiatives,
- Ensuring fair, proportionate, and transparent processes for registration and licensing of energy communities,

- Developing financing tools and support schemes to facilitate the growth and sustainability of energy communities,
- Guaranteeing non-discrimination of all market participants, especially individual citizens,
- Securing fair and accessible energy provision for energy-poor households and vulnerable consumers,
- Building the capacity of public authorities to effectively support the establishment and operation of energy communities,
- Raising public awareness and promoting the energy community concept through targeted information campaigns.

Given these realities, the overview of best practices featured in this report focuses primarily on Eastern EU member states, whose experiences in establishing energy communities and developing energy markets bear closer resemblance to Bulgaria's current context compared to Western EU countries. This regional focus ensures that lessons learned, and models adopted are more applicable and realistic for Bulgaria's energy transition.

Key Differences Between SEE and CWE Energy Communities

Aspect	Central & Western Europe (CWE)	South-East Europe (SEE) similar to Bulgarian status
Legal Framework	Early and complete transposition of EU directives; clear national definitions and support schemes.	Delayed or partial transposition; vague legal status and unclear procedures for ECs.
Institutional Support	Active public support via grants, subsidies, and streamlined approval processes.	Weak institutional backing; limited financial instruments or administrative assistance.
Civic Engagement	Strong tradition of cooperatives and local ownership models.	Low trust in collectives (post-communist legacy), limited civic initiative.
Financing & Incentives	Diverse financing tools: citizen shares, green banks, tax breaks.	Few or no tailored financial instruments; high upfront costs and limited access to credit.
Awareness & Capacity	High public awareness, technical know-how, and community leadership.	Low awareness, limited technical expertise, and institutional capacity.

The development of energy communities (ECs) in South-East Europe—including Bulgaria—reflects broader regional trends shaped by both enabling factors and persistent barriers. These trends provide valuable insight into the context and challenges Bulgaria faces in scaling up municipality-driven energy communities.

Enabling Factors in South-East Europe

- High Renewable Energy Potential: The region benefits from abundant solar, wind, hydro, and geothermal resources—creating favorable conditions for decentralized renewable energy production.
- EU and International Funding Support: Programs such as the European Green Deal, Just Transition Fund, LIFE Programme, and Horizon Europe offer financial resources to kickstart and scale EC initiatives.
- Rising Energy Prices: Increasing costs of conventional energy sources make local, community-based energy generation more attractive and economically viable.
- Existing Community Structures: Housing associations, cooperatives, and local civic groups—some with legacy from earlier periods—can be revitalized to serve as governance or implementation platforms for ECs.
- Policy Momentum: EU-level directives and pressure, along with national energy and climate strategies, are pushing governments toward clean energy reforms and opening a window of opportunity for EC adoption.

Barriers and Challenges in South-East Europe

Institutional & Legal Barriers

- Slow, partial, or inconsistent transposition of EU directives (e.g., Renewable Energy Directive II, Internal Electricity Market Directive).
- Lack of clear national definitions, responsibilities, and procedures for establishing and operating ECs.
- Complex, costly, or absent licensing, metering, and grid access frameworks.

Financial Constraints

- Limited access to public financial support mechanisms such as grants, low-interest loans, or tax reliefs.
- Reluctance from commercial banks to finance small-scale, citizen-led energy projects.
- Low household income levels reduce citizens' ability to contribute initial investment capital.

Social & Cultural Challenges

- Limited awareness and technical literacy about EC models among citizens and local authorities.
- Public skepticism and low trust in collective or cooperative structures, often rooted in negative past experiences.
- Lack of community facilitators or leaders to initiate and sustain EC development processes.

Technical Limitations

- Scarcity of skilled technical experts, consultants, or aggregators who can support project development.
- Outdated or insufficiently maintained local energy infrastructure.
- Lack of enabling digital tools such as smart metering, demand-side response, and real-time monitoring systems.

Table 2 EC challenges and solutions per tacked by other EU countries

Challenge Category	Specific Challenge	Solution Approach	Implementation Examples
Administrative & Regulatory	Complex permitting/licensing	**Centralized support hubs**	One-stop shops (AT, BE) Dedicated EC desks (NL)
	Fragmented policies	**Standardized EC statutes** **Fast-track procedures**	Model bylaws (EU) Pre-approved RES zones (DK)
Grid Management	Congestion at distribution level	**Dynamic grid optimization**	Smart meters + time-varying pricing (AT) Blockchain P2P (DE, IT)
	Connection delays/costs	**Prioritized EC grid access** **Local storage integration**	Battery subsidies (RO) Municipal microgrids (ES)
Social Equity	Exclusion of vulnerable groups	**Mandatory inclusion mechanisms**	Energy shares for low-income households (LV, SE) "Solidarity kWh" funds (BE)
	Urban space limitations	**Public asset activation** **Multi-use RES zoning**	Rooftop solar on schools (EU-wide) Agrivoltaic reserves (LT, DK)
Financial Barriers	High capital costs	**Blended finance instruments**	Green bonds (BE, SE) Crowdfunding platforms (HR)
	Unbankable projects	**Guaranteed revenue streams** **Fiscal incentives**	Feed-in premiums (DK) Tax exemptions (SE)
Community Engagement	Low public awareness	**Structured participation models**	Energy councils (LT) Citizen assemblies (FR)
	Trust deficits	**Transparent co-governance**	Municipal-citizen cooperatives (DK) Open-book accounting (DE)

Recommendations to overcome these barriers in Bulgaria

To enable the effective development of municipality-driven energy communities (ECs) in Bulgaria, the following priority actions are recommended:

1. Accelerate Legislative Alignment
   - Align national legislation with EU directives (RED II, IEMD) by clearly defining RECs and CECs.
   - Clarify roles, rights, and responsibilities of EC actors (citizens, municipalities, DSOs).
   - Establish a competent national authority to oversee implementation and monitor progress.

2. Develop National Support Schemes
   - Introduce dedicated financial mechanisms: start-up grants, soft loans, tax incentives.
   - Provide technical assistance programs to guide project development and operations.
   - Ensure streamlined registration and licensing procedures tailored for ECs.

3. Invest in Awareness and Capacity Building
   - Launch national awareness campaigns to educate the public and municipalities on the benefits of ECs.
   - Train local facilitators, municipal staff, and technical experts.
   - Support peer-to-peer learning and community energy networks.

4. Promote Pilot Projects
   - Prioritize lighthouse projects in public buildings (e.g. schools, swimming halls) and social housing to build trust and showcase impact.
   - Document and disseminate best practices to foster replication and upscaling.

5. Leverage EU and International Funds
   - Use EU funding (LIFE, Horizon Europe, Just Transition, Green Deal) to:
     - De-risk investments through guarantees and blended finance.
     - Upgrade infrastructure (e.g. smart meters, energy storage).
     - Support community ownership models and citizen participation tools.

2.2.1. Good practices for EC implementation across EU

According to the Community Energy Municipal Guide published by REScoop.eu and Energy Cities, municipalities can engage in EC projects in four main capacities or roles:

1. Municipal Sponsor: The municipality supports the EC passively, without direct investment or involvement in construction.
2. Municipal Contractor: The municipality purchases energy or contracts services related to the EC without ownership.
3. Municipal Co-Owner: The municipality partners and co-owns local renewable energy projects alongside the community.

4. Municipal Utility: The municipality acts as an active member or shareholder within the energy community.

This analysis in this report focuses on municipalities acting as co-owners or participants in ECs, either newly established or operational. Implementation mechanisms include:

- Leasing municipal property (e.g., rooftops) for RES installations and sharing ownership with the community (models from Austria, Belgium).
- Establishing municipal generation assets that allow citizens to purchase shares.
- Driving EC establishment without ownership but participating in governance and management (examples from Spain, UK).

Distribution of Benefits in Municipality-Citizen EC Cooperation

Energy communities typically distribute benefits by:

- Sharing produced energy among members.
- Self-consuming energy and distributing profits from energy sales to consumers and/or grid operators.
- Reinvesting profits in local social welfare, energy, or climate initiatives (non-profit distribution).

Key Success Factors

- Strong political will to support and promote energy communities.
- Dedicated municipal staff assigned to support EC development and operation.
- Building trust with citizens as active participants and shareholders.

Table 3 Good EC practices by deployed technology

Technology	Municipal Role	Specific Practices	Key Benefits
PV Electricity	Enabler	Lease municipal rooftops/land at low rates for community PV projects	Lowers project costs; unlocks public assets
	Developer/Partner	Install PV on municipal buildings; share surplus energy/dividends with citizens via subscription/citizen shares	Direct citizen benefits; anchors demand
	Innovator	Pilot agrivoltaics on municipal farms in partnership with local farmers	Dual land use; supports rural economy

Solar Thermal	Investor/Operator	Develop solar thermal plants for municipal buildings; allocate shares/ discounted heat to citizens	Reduces energy poverty; decarbonizes heat
	Infrastructure Lead	Integrate solar thermal into **district heating networks**; offer community connection rights	Scales impact; leverages existing infrastructure
Biogas/Biomass	Feedstock Hub	Centralize organic waste collection (e.g., schools, parks) for community biogas plants	Ensures supply; cuts waste disposal costs
	Plant Operator	Build municipal-owned biomass heating plants; sell heat to ECs at cost-covering rates	Stabilizes energy prices; guarantees supply
	Hybrid Model	Co-invest in plants where citizens are **shareholders AND feedstock suppliers** (e.g., farmers, households)	Circular economy; shared ownership
Wind	Enabler	Lease municipal land for wind farms; **fast-track permitting**	Accelerates projects; reduces red tape
	Co-Investor	Take equity in community wind projects; reinvest profits in local services	De-risks private investment; funds public goods
	Community Model	Structure projects so citizens are **co-owners** (e.g., cooperatives) with priority energy rights	Ensures local acceptance; democratizes benefits

National and Local Policy

The development of municipal energy communities across Europe is deeply rooted in long-term municipal policies and commitments to sustainable energy development. Alongside implementing national legislation supporting renewable energy, many municipalities actively promote their own community energy goals through local action plans and strategic roadmaps. Successful progress relies on strong linkages between national and local policy frameworks, as well as alignment with overarching EU-level policies and trends.

- National policies

In Bulgaria, legislation on 'renewable energy communities' (RECs) and 'citizen energy communities' (CECs) has only recently been adopted (see Sect. 2.2.2), leaving limited precedents for their development. Currently, the initiatives in the Municipalities of Gabrovo and Burgas serve as primary examples to study and build upon. In contrast, other EU countries have developed national, regional, and local policies supporting energy communities over extended periods, establishing comprehensive enabling frameworks—including legislation, regulatory measures, financing instruments, and grid access provisions. Within Eastern Europe, apart from Bulgaria, only Greece and Croatia have adopted such definitions to date.

Austria: Austria's enabling framework for energy communities includes the implementation of smart metering systems and dynamic pricing. Administrative burdens are reduced through one-stop-shop initiatives, and special provisions ensure that vulnerable groups can access shares in energy communities.

Belgium: Belgium stands out as a frontrunner in energy communities, supported by strong regional policies and a deep-rooted cooperative tradition. Over 500,000 citizens participate in energy communities, with municipalities playing a key enabling role. Success factors include regionally tailored policies, the introduction of financing tools, and flexible grid operation and access arrangements for energy communities.

Denmark: Denmark pioneers energy communities as part of its anti-nuclear energy strategy, with municipalities often acting as enablers through policy support, public investments, and active citizen engagement. Trust built over decades through cooperative energy culture, decentralized energy production (with 75% of renewables locally owned), and high municipal ambitions—targeting 100% renewable energy use by 2030—are key to its success.

Greece: In 2018, Greece became the first EU Member State to formally recognize energy communities as legal entities. However, this recognition was not fully aligned with EU legislation, leading to the emergence of "shell" energy communities that distorted the energy market. To counter this, the government introduced feed-in tariffs combined with auctions to restrict grid access for such entities. Currently, there are no incentives or government support mechanisms to further develop energy communities.

Croatia: Croatia adopted formal definitions for 'renewable energy communities' and 'citizen energy communities' in 2021. However, the absence of a supportive legal and administrative framework has so far prevented significant uptake or establishment of such communities.

- Local policies

The successful establishment and development of energy communities (ECs) hinge on strong political will and visionary policymaking by local authorities. Typically, this vision is embedded in long-term municipal policies and sustainable energy goals. Alongside national legislation supporting renewable

energy, many municipalities promote their own dedicated objectives for community energy through local action plans, roadmaps, and well-publicized initiatives.

Examples of Municipal Leadership and Community Energy Initiatives Across Europe:

- **Brabant (Belgium)**: The Carbon-Neutral City Coalition has installed over 200 solar systems on schools and hospitals under the *Leuven Klimaatneutraal* project. Citizens actively participate through bond investments, strengthening local engagement and financing.
- **Strasbourg (France)**: The city supports the creation of a solar energy community by providing public rooftops and holding an equity stake in the cooperative. The community is expanding to include rooftops from local businesses, apartment blocks, and industrial sites.
- **Valencia (Spain)**: Dedicated Energy Offices promote citizen-driven energy communities by guiding interested residents through the process of turning their ideas into operational projects, fostering grassroots participation.
- **Plymouth (UK)**: The city council spearheads the Plymouth Energy Community (PEC), providing ongoing staff support for its operations without holding ownership shares, demonstrating a facilitative municipal role.
- **Copenhagen (Denmark)**: Driven by the ambitious *CPH 2025 Climate Plan*, 98% of households are connected to municipal renewable and waste heat systems. The plan mandates active citizen involvement in energy projects, reflecting a deeply embedded cooperative culture.
- **Cluj-Napoca (Romania)**: The city aims for 50% renewable energy in municipal facilities by 2025. Its cooperative model allows citizens to invest directly, producing solar electricity for public buildings and supplying over 500 households.
- **Chalki Energy Community (Greece)**: A municipality-operated initiative established under the Covenant of Mayors, Chalki's community includes more than 150 members. It focuses on solar self-consumption for 60+ members and plans to develop a 1 MW wave energy park. The community also hosts environmental education events and collaborates with the Electra Community to enhance knowledge exchange.
- **Minoan Energy (Greece)**: Greece's largest energy community, established on Crete, supports local citizens, SMEs, and regional authorities in participating democratically in the renewable energy transition. It plans a 1 MW PV plant to benefit 60 vulnerable households, with subsidies from the Region and community funding. The initiative aims to influence regional energy policy and foster an inclusive energy transition.

- Advocacy and Lobby

The development of energy communities (ECs) in South-Eastern Europe hinges on strong advocacy and coordinated lobbying efforts at local, regional, and national levels. Building extensive networks and partnerships among stakeholders is crucial to create a critical mass that can effectively push for the adoption of enabling regulatory, legal, and operational frameworks.

Leading Examples and Initiatives:

- **Sweden**: A leader in heating-based energy communities, with approximately 60% of homes heated via municipal district heating networks. Municipalities are mandated to implement climate plans that prioritize green energy production and actively encourage citizen participation through supportive financial schemes.
- **Green Energy Cooperative – ZEZ (Croatia)**: Established in 2013 to promote energy cooperatives as viable models for energy transition and climate action, ZEZ unites five municipalities and solar companies with around 20 cooperative members. It has facilitated several renewable energy projects, including the energy-independent Kaštel Lukšić school and the Solarna Pecka installation.
- **Electra Energy (Greece)**: Founded in 2016 as a social enterprise, Electra empowers citizens, SMEs, and municipalities to foster an inclusive and just energy transition. Its work spans consultancy, advocacy, education, and research, primarily supporting other energy communities by providing information, fostering partnerships, and building networks. Electra collaborates with municipalities, universities, national organizations, and EU-level institutions.

Stakeholder engagement and networking

The municipal energy communities may be driven by local authorities, but they also call for extensive engagement of local stakeholders – citizens, SMEs, NGOs, etc. – and their activation to support the development of a local energy community. These actors can be strong allies in favour of the local sustainable development and thus their close cooperation led by the Municipality is key to the successful energy community application.

- Municipal Leadership

The municipality's leadership role is central to the success of an energy community initiative. As the flagship driver, the municipality must demonstrate strong commitment and clear determination to build an energy community that delivers tangible benefits to residents. This leadership often aligns with broader commitments to EU or national policies—such as the Covenant of Mayors—or addresses urgent local needs, like providing free or affordable energy to vulnerable households.

Energy communities that emerge organically from real community needs, rather than existing solely as formal entities, tend to gain stronger support and active participation from citizens, who recognize themselves as the primary beneficiaries.

The municipality of **Styria (Austria)** leases its rooftops at low rates and thus citizens can co-own solar panels on public buildings. It powers over 120 households and profits fund local energy efficiency projects.

In **Eeklo** (Belgium) the municipality lease public land to Ecopower's wind farms and Ghent partners on solar projects through access to public rooftops.

Wolfhagen (Germany) has supported the creation of citizen cooperative which now owns a 25% share of the municipal energy company.

Cooperative Énergie Partagée (France) funds solar panels on schools and social housing under the ambition to have 20% RES deployed on public building by 2030.

The **energy community of Karditsa - ESEK (Greece)** is a good example of targeted and evolving policy for sustainable development – it started in 2010 as an energy cooperative with the aim to exploit local biomass resources and in 2012, the community created a solid biofuel enterprise. In 2019, ESEK was converted to energy community; it also has an ESCO element. The main driver was creation of a local value chain in the region, reducing the energy poverty and increasing the job creation.

Solar in Kute (Albania) was established in 2020 to fight the Pocem hydro plant project and prove that a small community may become fully energy independent. It has deployed a rooftop PV installation on municipal buildings and facilities and has ambitions to power the entire village with renewable energy from residential RES installations. The main drivers were the Municipality and its villagers who also participate in the public life (chair of village, school staff, city council members, DSO, etc).

The **energy community Apsyrtides (Croatia)** is the first energy cooperative in Croatia that has 2 municipalities (Islands of Cres and Lošinj) in active cooperative membership and through campaigning based on their municipal leaderships 23 new community members were recruited.

Has Municipality & Kline Commune (Albania & Kosovo) have joint, cross-border municipal cooperation on the deployment of highly energy efficient indoor and outdoor lighting powered by solar facilities on public buildings. It is a project run by the two municipalities to trigger local investment in LED lightning to reduce energy costs and GHG emissions and provide better services.

Other Balkan cities such as **Porec (Croatia), Mostar (Bosnia and Herzegovina) and Kragujevac (Serbia)** are joining forces under the Balkan Solar Roofs project to support and inspire other municipalities in deploying solar generation capacities. For the purpose, they organise capacity building and training for other municipalities and have prepared communication campaigning materials to promote public and private solar installations for the wider audiences.

Cooperative de Energie (Romania) was established in 2019 as the first energy cooperative in Romania to produce and supply renewable electricity to the local community.

- Stakeholder Support

The energy community (EC) concept has gained significant momentum, making strong policy support and advocacy by a dedicated community of practitioners essential for its continued success. Collaboration among diverse stakeholders plays a critical role in scaling up ECs and securing the necessary funding for their establishment and ongoing operation.

Beyond financial and operational support, stakeholder involvement also demonstrates a commitment to green policies, enhancing their public image and reinforcing their sense of social responsibility.

A key element of comprehensive support for energy communities is the implementation of one-stop shop initiatives. These provide tailored assistance and guidance throughout the entire EC lifecycle — from initial information and advisory services to legal support, establishment processes, and business model development — ensuring smoother, more effective development of both Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs).

Green Energy Cooperative - ZEZ (Croatia) has a partnership of public and private stakeholders - 5 municipalities and also solar companies.

In Demark, it is common to have public-private-citizen circular economy projects in which excess heat from industries is distributed to residential users through municipal infrastructure. Moreover, citizens invest in local wind and/or solar parks powering local industries.

Sweden excels in municipally driven energy communities, leveraging district heating, wind power, and industrial symbiosis. Over 90% of Swedish municipalities have climate action plans, often integrating citizen participation.

The city of Tartu (Estonia) collaborates with Tartu University and citizens on energy communities and distributes the energy produced to low-income households.

Another example of multi stakeholder cooperation is ESEK energy community (Greece) in which 6 municipalities, SMEs, and mostly citizens benefit from it.

Minoan Energy (Greece) is driven by 3 municipalities, supermarket and agricultural cooperatives, municipal services, citizens, energy poor households, and even a local church. The EC cooperates with other fellow island ECs across Greece. It has a Board of Directors that is consulted by researchers.

Križevci (Croatia) supports the local KLIK energy cooperative through office and budget to help consulting individual households and companies or farmers on energy topics and inspire informed decision making. It also provides a showroom for various companies to exhibit their best sustainable products.

Advancing RES technologies and other supporting community services

Energy generation technologies, including renewable energy sources (RES), lie at the core of any energy community. The municipality holds the primary responsibility for assessing their feasibility, as well as for the technical design, planning, and execution of the installations.

Typically, the energy generation capacity within an EC is tailored to meet the specific needs of municipal buildings. However, forward-looking planning often includes the expansion of these capacities or the integration of additional RES technologies to complement existing infrastructure.

Moreover, in line with the EU Directives, energy communities have the potential to develop and offer a range of supporting services to their members and the broader community, enhancing the overall value and impact of the initiative.

The energy community Minoan Energy **(Greece)** is supplying solar energy to earthquake victims and municipal buildings in the affected areas and is monitoring the electricity consumption through metering. It also intends to expand to pumped hydro storage, wind, biogas, and batteries. The EC provides other activities on production, collective self-consumption, education, and technical consultations on deployment of energy technologies.

Hyperion **(Greece)** is a non-for-profit energy community established in 2019 for collective self-consumption through virtual metering. It utilizes solar energy and providers other activities such as education and teambuilding. It will also develop energy saving consultancy through its cooperation with the Greek Passive House institute.

The ESEK **energy community** supports a local municipal school through heat energy produced by local wood pellets in a biomass boiler installed by the EC. It is envisaged that more municipal biomass boilers are deployed (there are about 40 schools in the area) to reduce the carbon footprint of the municipality. In future, the EC intends to implement a community solar project that will cover the electricity needs of the members by virtual net metering and net metering.

In the **Ardennes (Belgium/Luxemburg)**, the energy communities utilises forest biomass residues for energy purposes in the local district heating plant. The heat is then shared in a microgrid linking 5 villages.

In **Belgium**, energy communities based on wind energy are common – citizens co-own shares in these generation facilities that power the local private buildings and profits are reinvested in the local climate projects.

In **Uppsala (Sweden)**, citizens invest in solar arrays on municipal land through the local energy community and also take advantage of AI-manged waste heat supply.

Malauny (France) has the ambition to achieve 75% energy autonomy by 2030 through involving citizens in its "Énergies Collectives" cooperative that is responsible for energy production through biomass, hydroelectricity and rooftop solar facility.

In **Alba Iulia (Romania)**, the solar-powered EV chaging stations are linked to virtual grid and citizens can trade energy through blockchain. The energy traded is supplied through a 1 MW solar power plant distributed over 10 public rooftops.

Wildpoldsried (Germany) tests peer-to-peer energy trading using blockchain for its smart renewable microgrid. The municipality supports the process through streamlining permits for citizen-owned generation facilities.

Rokiskis Municipality (Lithuania) operates a biomass boiler network fueled by agricultural waste. While the citizens own shares in the cooperative running the plant, the municipality manages the distribution network.

The **Municipality of Rezekne (Latvia)** leases the land and rooftops of its municipal buildings to the citizen-led cooperative Rezekne Energy and thus achieves up to 30% energy savings for its premises.

Feldheim Energie (Germany) is a cooperative of citizens and farmers operating on 55 wind turbines, biogas plant, and battery storage. It owns a local smart grid disconnected from national networks.

Cooperative Enostra (Italy) utilizes virtual grid in which citizens, SMEs, and the municipality share energy.

Community Activation and Campaigning

Broad social campaigning is crucial to garner support for the energy community. Focusing on pressing local issues helps make the message relevant, but equally important is the way these messages are communicated. Clear, accessible communication not only informs the community but also motivates and activates its members to participate.

- **Community engagement and activation**

Campaigns that feature well-known and trusted community members or "familiar faces" add significant value to promoting the energy community, especially during fundraising stages. It is important for the EC to have a recognizable "face" — someone relatable who can clearly and confidently explain its background, purpose, and participation terms to the community.

In 2021, the President of the energy community Minoan Energy **(Greece)** pitched the need for energy communities in a visible radio show to speak on the energy crisis and the stemming demand for energy production. It also touched upon the need to reduce municipal energy bills and achieve decarbonization. The EC stakeholders also supported the campaigning through outreaching to all Crete citizens on the topics of self-consumption and how it contributes to reducing the energy costs and alleviating energy poverty.

The environmental and energy offices of Croatian municipalities aim to educate their citizens on the topics of energy communities and technical aspects of energy projects. For this purpose, they promote the platform "On the sunny side" for relevant information and educational materials on.

The Balkan Solar Roof has developed an online poster-making tool for promoting public and private solar installations, and also suggests a contest and media outreach campaigning to support and strengthen these processes. The municipal leadership in the energy community of the Islands of **Cres and Lošinj (Croatia)** were crucial in delivering a communication campaign for the local citizens on their intention to building a community PV power plant. The campaign utilized a Q&A video with well-known community members to build trust and confidence among the locals.

Romania' s only Energy community is fully based on civil engagement through their desire to bring the Romanian consumer to the centre of the energy market. Starting in 2019, with 15 members, now it has nearly 1 000 members. Its base business is acquiring an energy supply company that produces green electricity. The EC provides attractive returns of investment to its members.

- Social and gender dimension

Energy communities have the potential to make a significant contribution to social and gender equity, especially in small local communities where inequalities and social segregation may exist. Often, excess energy generated by ECs is sold externally, yet it could instead be shared with vulnerable households or used in solidarity initiatives to support underrepresented community members.

Silega (Belgium) has established solar rooftop installations on social housing buildings and schools and allows tenants to share energy. This mechanism has led to 30% energy bill reduction.

GoBiGas Plant in Gothenburg (Sweden) converts waste to biogas, supplying 60 000 homes; and the publicly owned Göteborg Energi allocates profits to social initiatives.

GEG Énergies Citoyennes (France) partners with citizens via the cooperative Energies Citoyennes Locales and solar panels are installed on public buildings (schools, social housing) powering over 400 households. The citizens hold 40% of the voting rights and the profits are used to fund local energy transition projects.

Rekvere municipality (Estoania) developed a 1.5 solar park on municipal land whose shares are accessible for citizens and local business via cooperative. The profits are used to fun local sustainability projects.

The **municipality of Saarde (Estonia)** leases municipal land for wind turbines and shares the revenues with residents through a local cooperative; other revenues are reinvested in public services.

Barcelona (Spain) requires 20% of generated power from solar installation on large buildings for vulnerable households. More than 10 municipal building host solar panels for shared energy use and citizens can co-invest in solar projects.

Valencia Energia (Spain) prioritises vulnerable districts for energy community development and aims at delivering 27 ECs by 2030.

In **Wolfhagen (Germany)**, the municipal utility Stadtwerke Wolfhagen co-owns wind/solar parks with a citizen cooperative. The citizens hold 25% ownership of local renewable projects. Thus, it supplies 100% renewable power to the town and the profits fund local social projects (e.g., kindergartens, EV charging).

In **Napoli (Italy)**, the municipality and citizen cooperative "Energy Sharing" supply energy to over 200 households in deprived neighbourhoods through solar installations.

In **Talsi Municipality (Latvia)**, the citizens have shares in the hybrid wind-solar park through their cooperative Talsi Energy and the profits fund local schools.

Wencoop **(Greece)** is the first and only all-female energy community in Greece established in 2021 to improve the inclusiveness of women in energy communities. It builds on a women-led initiative in the Greek Association of Women Entrepreneurs and accepts only female entrepreneurs and association members. It has deployed two solar parks of 1 MWp each to sell energy to the grid, so that Association members from all across Greece can participate and benefits from it. In future, they plan to also self-consume. The financial model leans on a bank loan and crowdfunding.

Vlora **(Albania)** is established in 2019 to support energy poor women and women-led households. It utilizes solar energy from a rooftop installation of a public school and also gives away small energy saving devices to support the households.

Energy Cooperative Elektropionir **(Serbia)** was founded in 2019 by citizens (led by a female chair) to empower their community to actively participate in the energy transition. It is developing a solar generation project. Its stakeholders are national level representatives (Ministry of Mining and Energy, DSO, Chamber of Commerce and Industry, consumer associations), PV developers, and also other fellow energy cooperatives and NGOs.

Minoan Energy **(Greece)** has set an ambitious goal to eliminate the energy poverty in Crete and provide equal access to energy for all islanders. Following a destructive earthquake in 2021, the municipalities of Minoa Pediadas, Archanes-Asterousia and Viannos leased land at a very low price for the construction of two collective solar parks. The second 1 MW PV park provides 100 earthquake victims, low-income families, with free electricity; part of the energy is also used in public buildings in affected municipalities.

Financial Instruments and Fund raising

A crucial factor in the successful development of energy communities in Europe is national government support. In some Member States, such as Italy and the Netherlands, dedicated national funds are available to help small municipalities initiate renewable energy projects. However, this practice is largely absent in Southern and Eastern Europe, where energy communities often rely on a mix of financing instruments — including self-financing, crowdfunding, and loans—to get started.

- Self-financing

The simplest and quickest way to finance a municipal energy community project is through the municipal or state budget. This approach is straightforward for local authorities; however, for smaller communities such as villages, the required investment may exceed what the municipal budget can support.

Hannover (Germany) sustains the proKlima Fund that provides finance for solar and wind projects co-owned by citizens.

In **Skuodas and Taurage (Lithuania)** citizens co-invest in PV parks via municipal-managed shares and surplus energy sold to the grid. This has led to reduction of the energy costs of public buildings by app. 30%.

The **Panevėžys City Solar District Heating (Lithuania)** engages with citizens via their billed energy saving and thus they become part of the solar plant operation.

Gulbene Municipality (Latvia) manages the local biomass district heating for which the citizens provide part of their forest for feedstock and in return receive revenue through reduction of their heating bills.

In **Kuldīga Solar Energy Community (Latvia)** citizens invest in the community via municipal bonds and the excess energy sold to grid operator.

- Crowdfunding

The primary fundraising method for energy communities is crowdfunding, which involves raising funds directly from community members through targeted campaigns. In energy communities, these voluntary contributions are legally recognized as shares and may be returned to investors with a small interest. A key motivation for citizens to invest is the potential financial return, so the expected interest must be clearly articulated and defined in the energy community's shareholder agreement. Additionally, crowdfunding efforts can be enhanced by extensive outreach campaigns and can be facilitated through popular or dedicated crowdfunding platforms.

In 2018, Green Energy Cooperative - ZEZ and Križevci (Croatia) cooperated in an innovative crowdfunding micro loan campaign for two solar power plants. It succeeded in collecting the total investment of 50 000 EUR in 10 days for the first solar project and in 2 days for the second. The annual return on the investment was 3,5-4% depending on the plant. Its success was due to the extensive and lively national and local media coverage by the media, information distribution and municipal representation.

In 2022, the islands of Cres-Lošinj (Croatia) collected more than 100 000 EUR in just 3 through crowdfunding. With the sum, the local authority purchased land and prepared the project documentation for the Filozići solar power plant.

Hyperion's (Greece) financial model leans on a blended crowdfunding - contributions of its members and donations for poor households.

- Blending finance

In addition to self-financing and crowdfunding, municipalities may leverage dedicated state or EU funding, loans, and other private financial instruments to support the deployment of energy community installations. There are successful examples of blending various financial sources to accelerate the development of energy communities. However, a solid financial plan and thorough financial engineering must be in place before the deployment of generation facilities to ensure viability and sustainability.

Green Energy Cooperative - ZEZ (Croatia) supports itself financially through EU-funded projects and providing research for RES companies (installers, project designers, etc.). It has developed an open crowdfunding platform to support renewable projects in Croatia. It has also applied crowdfunding to some of its projects, incl. 60 KWp installation in the city of Krizevci. Other projects are: energy independent school Kaštel Lukšić, and Solarna Pecka.

The rooftop PV installation on municipal buildings and facilities in Solar in Kute (Albania) were financed through Swiss Embassy instrument and crowdfunding.

Wencoop's (Greece) financial model leans on a blend of a bank loan and crowdfunding.

Overall success factors for the establishment and operation of Municipal EC

Several critical factors support the mainstreaming, establishment, and development of Municipal Energy Communities (MECs) at the local level.

First, strong local energy leadership combined with enabling national frameworks is essential. Clear, supportive legislation, as seen in Greece and Croatia, alongside active policy advocacy and regulatory easing, fosters EC growth. Across the Balkans, municipalities engage in related projects promoting the concept. Local demand for energy transition positions municipalities as primary initiators of community energy projects. Small local communities, such as villages and islands, often excel due to close-knit social structures and shared heritage. Additionally, supporting networks and clusters facilitate faster EC development.

Second, energy communities may emerge either as new municipal initiatives (e.g., Gabrovo, Burgas) or evolve from longstanding partnerships and collaborations (e.g., ESEK). A history of development contributes to operational clarity, resilience, and local economic benefits, including job creation. Successful ECs rely on a clear concept with robust business and financial models communicated effectively to attract support (e.g., Minoan Energy, Electra Energy). Holistic support services—such as one-stop shops—covering the entire EC lifecycle are crucial for smooth implementation.

Energy communities are versatile entities spanning regulatory, legal, technological, and social dimensions. They may begin as single municipal projects supplying local needs, but their true potential lies in catalysing community-driven energy transitions through services, events, networking, and campaigns. Technologically, ECs are expected to expand beyond initial RES installations—integrating photovoltaics, biomass, geothermal, wind, and wave energy—to boost energy independence.

Yet, the core of ECs is “community”: fostering collective strength, trust, and citizen engagement. Promoting ECs with citizen-focused communication—including social media, interactive events, demonstrations, and roadshows—is vital. ECs also offer opportunities to enhance democracy and inclusiveness by benefiting vulnerable or underrepresented groups (e.g., Wencoop, Vlora).

Finally, dedicated financial instruments are crucial to alleviate community burdens and ensure sustainable projects, especially for smaller settlements. These funds should start as public initiatives supporting EC establishment but evolve into self-sustaining, possibly revolving funds. Collaboration with the banking sector and blended financing mechanisms can further support growth. Since fundraising remains a challenging aspect, establishing online and crowdfunding platforms (e.g., ZEZ) is essential.

Key Implications

- Establish strong political and legal frameworks at national and local levels to enable, simplify, and accelerate EC establishment and operation.
- Ensure clear leadership and commitment from local authorities toward sustainable and green energy transitions.
- Activate and engage local communities—including citizens and SMEs—to support and invest in municipal ECs.
- Deploy technological and social innovations to enhance EC performance.
- Recognize RES energy generation as central to ECs, while expanding the range of community services offered.
- Provide accessible, dedicated public and private funds, blended financial instruments, and user-friendly platforms to support and monitor EC fundraising efforts.

2.2.2. Bulgarian context for transfer of good practices

Policy framework

The concept of energy communities is relatively new within Bulgarian legislation, with ongoing efforts to integrate it into broader legislative frameworks. A key national priority in the energy sector is to accelerate the adoption of renewable energy sources (RES), promote self-consumption, and support the development of renewable energy communities alongside the necessary infrastructure for transmission, distribution, and storage of renewable energy.

Recent amendments to the Energy Law (enacted on 17 November 2023) mark significant progress by formally introducing civil energy communities, active customers, and aggregators as new market participants. The amendments also aim to enhance consumer protection by enabling fixed-term, fixed-price contracts as well as dynamic pricing contracts for customers equipped with smart metering devices. This is also linked to the pillar for the liberalisation of the energy market in the National Energy and Climate Plan (NECP, ver. 14.06.2024).

National level

At the national level in Bulgaria, energy communities are not widely referenced in most strategic documents except for the National Energy and Climate Plan (NECP), where they receive more focused attention. During public consultations, stakeholders requested clearer targets, policies, and programs to support the development of energy communities, extending beyond electricity to heating and cooling. However, these requests have not yet been fully addressed.

The NECP highlights the role of energy communities in three key areas: reducing greenhouse gas emissions (Decarbonization), improving energy efficiency, and enhancing market flexibility (Energy Security). It aims for a 34.8% share of renewable energy sources (RES) in final energy consumption by 2030, partly through

creating a favorable framework that encourages renewable self-consumption and the establishment of energy communities.

Specific NECP actions related to energy communities include:

1. Simplifying administrative and grid access procedures for RES electricity generation, with an analysis of existing regulatory barriers to self-consumption and energy communities led by SEDA.
2. Mandating the integration of RES in regional and local infrastructure planning and modernization, including urban, industrial, residential, transport, and energy infrastructure such as district heating and cooling networks, gas networks, and alternative fuels.

The NECP also supports the development of regional heating and cooling networks that incorporate renewable energy and encourage local investment and participation as renewable energy communities.

Modeling scenarios in the NECP suggest focusing on investment measures by 2030 to boost household energy independence through energy communities, with a long-term outlook towards decentralized electricity production supporting renewable energy communities by 2040.

The NECP claims that the national policies create framework conditions for the development of community energy generation and self-consumption that aims to trigger the interest and participation of the local population in clean energy generation. Some of the specific actions to improve the facilitation process are the municipal contact points for RES procedures (details below), the guidebook for the procedures for construction and reconstruction of RES energy facilities by SEDA, and awareness raising and campaigning - for local and regional authorities the efforts are focused on exchange of best practices for renewable energy production between local and regional development initiatives, training programmes to strengthen the regulatory, technical and financial expertise and to better understand the available funding opportunities; and for the citizens, the information provision should be facilitated by technology providers. Examples of such are not presented.

According to the NECP, within the Pillar “Energy Efficiency”, the latest amendments to the Energy Law are formulated to support the development of the citizen energy communities as key to reducing the dependence on fossil-fuels (firewood and coal). For the consumers, it is envisaged that irrational regulatory and administrative barriers are removed, new regulatory requirements to the sale of energy and other energy services are applied, and partnerships with the distribution operator for electricity or heating are ensured. The new administrative procedures need to be fair, proportionate and transparent and thus ensure application of regulated prices for network services, application of non-discriminatory treatment of communities in terms of activities, rights, and obligations as end-users, and equal participation of all users in the community, incl. energy poor households and vulnerable customers. For the public authorities, it is envisaged to facilitate access to regulatory and financial support and capacity building in facilitating the creation of energy communities and their direct participation on the energy market, as well as the introduction of rules ensuring equal and non-discriminatory treatment of consumers, participating in citizen energy communities.

Another major role of the ECs is related to ensuring the market flexibility and integration and namely of:

- Creating the right conditions and strengthening the optimization of energy consumption on the wholesale electricity or balancing market through individuals or aggregators,
- Upgrading the transmission network to ease the internal congestion and increase the interconnection capacities.

The process of full liberalisation of the energy market is set to start on July 7, 2025 and the deregulation of the prices may take up to 6 months. The ECs are one of the interventions to support market integration so that consumers are encouraged to participate more actively and efficiently in the market and thus give them an opportunity to smoothly transition from partially to the fully liberalised market of electricity.

It must be mentioned that no specifics on the implementation mechanisms for ECs are given in the NECP. Moreover, the National Recovery and Resilience Plan (NRRP) does not mention the energy communities and supporting mechanisms for their mainstreaming and legal establishment. Likewise, prospects for their financing are also not mentioned. This is in stark contrast to the policy on self-consumption capacities which have been enforced and its first calls implemented in 2024. This makes the future policy planning for energy communities uncertain and unclear.

Finally, the ECs are briefly mentioned in the Roadmap to climate neutrality and Long-term strategy to climate change mitigation by 2050 as supporting the increase of the RES generation and empowering the consumers to become actors on the energy market.

In summary, some general observations related to the national policies on ECs enforcement and their future development are:

- ECs are a supporting rather than a priority policy in the NECP and lack strong representation in the NRRP,
- Multiple supporting purposes of the ECs policy development are mentioned - energy efficiency, decarbonisation, free and flexible market, fossil fuel phase out,
- There is almost no discrimination between renewable energy communities and citizen energy communities,
- Municipalities as drivers and initiators of ECs are not discussed; however, the need for capacity building for the municipal experts in this domain is recognized and actions are envisaged,
- ECs are being addressed in the context of electricity generation and less for heating and cooling generation,
- Unclear roles and timeline for mainstreaming and promoting the EC policy.

Local level

It is natural for the local authorities to follow the national policy framework and thus act upon it and embed its implications in their local strategic documents. On the local level, the municipalities are obliged to develop and keep updated Energy Efficiency Plans (Art. 12, Energy Efficiency Law) and Long-term strategies for encouraging the utilisation of RES energy (Art. 10, Renewables Law). The Sustainable Energy and Climate Action Plan (SECAPs) under the Covenant of Mayors initiative are also recognized as equal to these and may be developed in their place. The local policies for enforcement of energy efficiency and RES actions are to be proclaimed and mainstreamed through these documents. However, none of the municipalities in Bulgaria has announced a cohesive policy for supporting the energy communities on its territory.

The successful implementation of energy communities (ECs) at the local level in Bulgaria heavily depends on the motivation and engagement of local policy actors who must embed EC-related priorities within municipal strategic frameworks and actively promote them among citizens.

Key responsibilities of local actors include:

- Mayor: Responsible for developing the long-term municipal strategy for renewable energy and biofuels use, aligned with the National Energy and Climate Plan (NECP). The Mayor must submit this strategy for approval by the Municipal Council (Renewables Act, Art. 10, par. 1).
- Municipal Council: Acknowledges and approves the long-term strategies encouraging renewable energy use (Renewables Act, Art. 9).
- Regional Governor: Oversees procurement of national policies related to renewable electricity, heat, and cooling production and consumption, thus having a coordinating role (Renewables Act, Art. 8).

Currently, municipal efforts mainly focus on renewable energy generation for self-consumption, predominantly solar-thermal projects funded through state or municipal resources. Community-driven energy generation facilities remain largely unimplemented, with only two known municipality-led EC examples: Gabrovo and Burgas (see Sect. 2.1.2 for details).

The NECP recognizes the important role of local authorities in planning and expanding renewable energy use within their territories. Municipalities are also responsible for issuing permits related to the construction of renewable energy power plants, positioning them to take a more proactive role in renewable energy investment.

Recent legislative amendments strengthen this role by obliging municipalities to establish administrative service centers (Renewables Law, Art. 22), tasked with:

- Organizing administrative services for issuing building and use permits or commissioning certificates for energy facilities, including renewable energy installations.
- Informing Distribution System Operators (DSO) or Transmission System Operators (TSO) of construction permits linked to grid connection contracts.

- Coordinating timelines for facility construction and commissioning.

This provision is mandated to be implemented across all 265 municipalities within four months of enforcement, though current progress data is unavailable.

These duties position municipalities as key facilitators of renewable energy deployment, providing a favorable environment for initiating municipal renewable projects and engaging local communities.

In conclusion, energy communities are a relatively new concept within Bulgaria's energy policy framework. As such, they have yet to gain strong political momentum, dedicated technical or financial support, or widespread promotion. Significant work remains to address regulatory, technical, and administrative challenges before energy communities can be rolled out on a large scale.

Currently, municipalities are primarily seen as facilitators rather than initiators or main drivers of energy communities. Nonetheless, the municipal energy communities in Gabrovo and Burgas represent promising examples that could serve as models for replication and encouragement in other municipalities.

Legal framework

In Bulgaria, the legal framework for energy communities has recently been established. In the fall of 2023, the normative acts legitimizing the establishment of energy communities were adopted and published in State Gazette N86.

A definition of energy community was introduced into Bulgarian legislation in alignment with Directive (EU) 2018/2001 of the European Parliament and Council on the promotion of the use of energy from renewable sources. According to the Energy Law, a civil energy community (i.e., a citizen energy community) is a legal entity authorized to produce energy—including renewable energy—distribute, supply, consume, aggregate, and store electricity (including for electric vehicles), or provide energy services to its members or shareholders.

Concurrently, the concept of renewable energy community was introduced in the Renewables Law, defining it as a 'community for renewable energy.' Such a community may produce, consume, store, and sell excess renewable energy as an equal market participant. It is permitted to share energy produced by installations owned within the community. The relevant provisions ensure non-discriminatory access to all suitable electricity markets.

The legal forms under which energy communities may operate are regulated but currently lack clarity and precision. Article 92b of the Energy Law explicitly specifies the legal forms in which an energy community may exist. These include commercial enterprises, cooperatives, non-profit associations under the Condominium Management Act, or associations under the Obligations and Contracts Act.

However, it should be noted that there is an error in terminology: homeowners' associations under the Condominium Management Act are mistakenly referred to as non-profit associations, which is incorrect. Additionally, the legislation omits non-profit associations under the Law on Non-Profit Legal Entities, which represents a significant oversight.

The possible legal forms for the establishment of an EC are presented in the table below:

Table 4 Legal forms of energy communities according to the Bulgarian Legislation, Art. 92b (2), Energy Act

Legal form	Members/ shareholders			Benefits / Pros	Limitations / Cons
	Municipalities	Legal persons	Natural persons		
Association under the Obligations and Contracts Act[1]	yes	yes	yes	▫ Minimal administrative and bureaucratic burden to establish and operate, ▫ No complex registration procedures that may have restrictions and/or claims; Only a registration (Bulstat) with the Registry Agency is required, ▫ The association can perform economic activity and make profits, ▫ This legal form has proven itself over the past 30 years in a variety of areas - participation in tenders, public procurement, and other initiatives.	▫ It is not a legal entity, but an unpersonified entity (i.e. does not have a representing party), ▫ Transfer of rights and shares is done only with the consent of all the other shareholders, ▫ Relatively scarce legal regulation – only 8 articles in the Obligations and Contracts Act (Art. 357-364) regulate it.
Association with limited liability[2]	yes	yes	yes	▫ Of all commercial association forms, this one has the greatest versatility and can act in many areas, ▫ Relatively easy registration - the capital requirement is 2 BGN, ▫ Well-regulated under the Commercial Act.	▫ Transfer of shares between the shareholders is free, but to third parties, it must be done through a Decision of the General Assembly of Shareholders, ▫ A lot of the decisions and especially important ones require the consent of the other shareholders; even, some of them require unanimous decision of all shareholders.

[1] ДЗЗД – Дружество по ЗЗД
[2] ООД – Дружество с ограничена отговорност

Shareholders Association[3]	yes	yes	yes	▫ A typical capital company where capital dominates personal participation, ▫ Relatively easy decision-making process and procedures, some require only a decision of the Board of Directors or the Supervisory Board, and not the General Assembly, ▫ Easy and convenient transfer of rights and shares between shareholders and external parties.	▫ Relatively complex and difficult establishment and registration, ▫ Minimum capital requirement – not less than EUR 25,000, ▫ Relatively complex bookkeeping, in which in some cases an audit by a licensed accountant is required, which leads to additional costs.
Cooperatives[4]	no	no	yes	▫ Regulated in the Cooperatives Act and are mostly applied in the agricultural sector for production of goods, ▫ Regulations largely comply with the agricultural sector and are unpopular in other areas, ▫ The leading role of the personality may be considered an advantage - each member, regardless of the size of their share, has an equal vote; but this may also be associated with some inconveniences.	▫ Relatively more complex registration – a minimum of 7 natural persons is required, ▫ A relatively complex decision-making process and functioning of multiple bodies – General Assembly, Management Board, Control Board. ▫ The legal regulation to a significant extent is aimed at farmers and has very little application in other areas.
Homeowners' Associations under the Condominium Management Act[5]	Yes, if they have ownership within the EC	Yes, if they have ownership within the EC	Yes, if they have ownership within the EC	▫ Relatively easy establishment and operation, ▫ Easier decision-making, esp. following the latest amendments to the Condominium Management Act in 2023.	▫ Applied only in the cases of condominium ownership and has no application in other areas.
Legal persons with	yes	yes	yes	▫ Relatively easy establishment, without any particular restrictive requirements for	▫ Not easy and straightforward decision-making process, where, in addition to the

[3] АД – Акционерно дружество
[4] Кооперация
[5] Сдружения на собствениците по ЗУЕС

non-profit purpose[6]				associations for private benefit – a minimum of 3 members is required (NB: For associations in public benefit, a minimum of 7 members is required and there are many requirements and restrictions), ▫ Widely popular in the last 30 years, ▫ Well-regulated under the Non-Profit Legal Entities Act.	Management Board, a significant part of the decisions is taken by the General Assembly, ▫ Failure to take into account the actual contribution of individual members, with each member having 1 vote despite the size of their share.

[6] Юридически лица с нестопанска цел

In the Municipality of Gabrovo, the initiative to establish an energy community was launched prior to the enforcement of the amendments and supplements to the Renewables Act and the Energy Act, promulgated in State Gazette No. 86, dated 13.10.2023. These legal amendments were the first to formally recognize and regulate the establishment and operation of energy communities in Bulgaria.

Despite the lack of a formal legal framework at the time, the Municipalities of Gabrovo and Burgas moved forward by adopting a public-private partnership model. This innovative approach enabled the joint construction of photovoltaic (PV) plants, co-financed by the municipality and its citizens. The energy generated is primarily used to meet the electricity needs of municipal buildings, and the revenues or savings from the energy consumed are shared among the stakeholders, i.e., the municipality and participating citizens.

The chosen model mirrors the consortium principle commonly used in EU-funded projects and other inter-institutional collaborations. In such structures, each party maintains its legal identity, operational and financial independence, while entering a contractual relationship based on clearly defined roles, rights, and obligations.

In order to start the process, a justification and a draft City Council Decision are prepared for the City/Municipal Council, which:

- gives consent for the Municipality to participate in a company under the Obligations and Contracts Law with a specific name, duration and conditions, that are described in detail in the draft contract for the main construction of photovoltaic plant with a certain capacity and parameters according to a selected technical and price offer,
- approves a proposed draft of the Joint Activity Agreement,
- appoints a person to represent the Municipality in the Constituent Assembly and General Assembly by proposing an authorized person from the Municipality or a Manager of the company to be established,
- gives consent for the Municipality to provide for the purposes of the company specific rooftop space of a specific municipal building(s), on which a photovoltaic power plant is to be implemented, the energy from which is to be used mainly for the needs of the specific building(s),
- agrees for the Municipality to participate in the energy community with a specific financial contribution,
- gives consent for the Municipality to purchase the energy produced by the Energy Community for the needs of the specific municipal building(s) and/or for other municipal sites/properties and owe payment of the value of the electricity used on site at a fixed price,
- gives consent for the Municipality to purchase the produced energy at the value determined by the financial model in BGN per kilowatt hour (BGN/KWh),
- gives consent for the Municipality to publish, even in advance, the invitation for the establishment of the Energy Community.

The legal form of the Energy Community is a company established under the Obligations and Contracts Act, with a term of 10 years starting from the moment the investment becomes operational. The company is registered with the Bulstat Register at the Registry Agency, and VAT registration is carried out with the National Revenue Agency.

The Joint Activities Agreement governs the relationships between the parties involved in the creation and operation of the Energy Community. It outlines the type of installation to be constructed, its capacity, construction site, the required documentation for implementation, ownership structure, on-site energy consumption, the fixed price of electricity used on-site, and the indicative total project cost.

The Agreement encompasses the following key activities:

- Preparation of a financial (business) model;
- Design and construction: delivery, installation, and commissioning of a renewable energy source (RES) generation facility—specifically a photovoltaic (PV) power plant—under an EPC contract and in accordance with the Spatial Planning and Development Act;
- Delivery, installation, and commissioning of systems for the management, monitoring, and control of the energy generation facility, as well as RES energy storage systems (batteries) for municipal properties and buildings.

The purpose of the agreement is to enable collaboration and the pooling of efforts and resources by all parties to establish an association under the Obligations and Contracts Act for the development and operation of energy generation facilities.

The Municipality is responsible for the design and construction of the PV installation, including delivery, installation, and commissioning, pursuant to Article 147, paragraph 1, item 14a of the Spatial Planning and Development Act. This includes engineering and construction activities related to system management, monitoring, and control, as well as the installation of RES energy storage systems for municipal properties, under Article 147, item 14 of the same Act.

Citizens participate by contributing financial resources and, in return, receive a portion of the value of the electricity either used at a fixed price or sold on the open energy market. Each signatory to the Cooperation Agreement is entitled to use the energy produced by the Energy Community in accordance with the terms specified in the Agreement, including the pricing and other relevant provisions of the energy supply chain.

Application of the provisions for the legal form of an EC in Bulgaria in practice. The cases of Gabrovo and Burgas

The establishment of the Energy Community is initiated by the Municipalities Gabrovo and Burgas and is carried out through the signing of **a Joint Activity Agreement (Agreement)** between the municipalities and various natural and legal persons.

In the **Agreement**, an 'energy community' means all the parties taken together and acting to achieve the objectives of the Agreement within the framework of what has been agreed under that Agreement. The Energy Community exists as a cooperation/partnership agreement, and in order to achieve its objectives,

its activity is carried out on behalf of the Municipality at the expense of the Energy Community – the Municipality is in contractual relations with third parties.

The goals of the Energy Community are achieved through the design, construction and commissioning of a photovoltaic power plant with financial resources raised by the members, the provision of the produced electricity for the needs of municipal properties, the sale of the produced excess energy on the free market and its use for the needs of the Municipality.

The responsibilities of the Municipalities of Gabrovo and Burgas under the **Agreement** are to:

- prepare a financial (business) model for the operation of the energy community, its financial model of income/expenditure and return of investment,
- design a RES energy production facility and/or energy storage facility,
- provide municipal property (building rooftop) for the deployment of the installation,
- carry out financial and administrative management of the energy community,
- carry out maintenance and operation of the implemented RES energy generation facility on their own behalf and at the expense of the energy community.

The municipalities of Gabrovo and Burgas raise funds and manage them in accordance with the goals of the Energy Community. Also, they manage and operate the acquired assets and do not have the right to make arrangements with them during the EC lifetime, unless there is a unanimous decision of all its members. The municipalities remain the sole owners of the installation, and the members of the energy community participate only with financial contributions without this being related to acquisition of ownership over the installation.

The energy community in the Municipality of Gabrovo has 73 members, and the one in the Municipality of Burgas - 131. The parties participate through a financial contribution. In addition to their financial contribution, the municipalities of Gabrovo and Burgas participate in the EC through the preparation of a financial (business) model for the operation of the community, the provision of a land property and rooftops of municipal buildings to realise the investment, and the purchase of the produced energy for the needs of specific municipal properties.

The Agreement defines the price of energy consumed by the community members. The Municipality of Gabrovo purchases the produced electricity at a price of 0.23 BGN/kWh, and the Municipality of Burgas – 0.13 BGN/kWh. In EC Gabrovo, after the expiration of 3 years, a new financial and economic analysis is made and an updated price offer is presented. The Agreement of EC Gabrovo postulates that: “Each Party shall have the right to use the electricity produced by the EC by paying to the EC the fixed price of the electricity determined by paying all necessary additional costs and fees for the distribution of the energy and its administration. This cannot lead to a change of the energy trader serving the Municipality of Gabrovo due to legislative restrictions.”

The Agreement regulates in detail the rights and obligations of all parties, including:

- the right to participate in decision-making concerning the implementation of the Agreement under the provisions of the Agreement,
- the participation in the distribution of profits and losses according to its share, limited to the amount of its investment.

The **management** of the Energy Community is carried out with regard to the operation and exploitation of the installation by the owner of the facility – the respective municipality. The Agreement regulates the municipal representative to run the EC – in the case of EC Gabrovo it is a municipal expert to represent the community and in the case of Burgas, the Mayor authorizes an EC manager following City Council decision to represent the EC to third parties and institutions.

Decisions are taken by a qualified majority – more than 75% of the votes of the shareholders present at the Assembly. Each shareholder has the right to **one vote regardless of the size of their share** in the company.

The Agreement regulates the accession to and resignation of the EC of existing and new members. The community members are not allowed to transfer to third parties the rights and obligations acquired under the Agreement. It is allowed to transfer rights and obligations only upon resignation and universal succession. There is also freedom of resignation for a shareholder who can withdraw at any time and upon resignation has the right to receive their initial instalment calculated according to a proposed formula within 3 years from the moment of termination of their participation. There is an opportunity for new members to join after the implementation of the investment as long as they still meet the requirements of the contract.

The Agreement also has a section on termination, where it is postulated that the Agreement will be automatically terminated after the expiration of the agreed 10 years from the moment of realization of the investment, i.e. commissioning of the installation.

There is also an opportunity for each shareholder to request termination of the Agreement in case of failure to realize the investment by the Municipality in time, and a penalty is also provided for the defaulting party in the amount of the legal interest on the funds paid by the parties from the date of entry into force of the Agreement until the date of payment of the amount due.

The Agreement may be amended and supplemented after a decision of the shareholders. At the end of the Agreement, it is regulated that the disputes are resolved in good faith and through negotiations between the parties.

Organizational framework

The Energy Community exists as a cooperation/partnership agreement or a treaty for the establishment of an EC. In order to achieve the objectives, its activities are carried out by the Municipality on behalf of the Municipality and members and at the expense of the entire Energy Community.

The organizational distribution of tasks in a municipality driven energy community are focused in the Municipality. Its responsibilities within and towards the EC may be defined as follows:

- Development of a financial (business) model,
- Fund raising according to the defined minimum and maximum contributions,
- Construction of a RES installation (part. PV) - design, delivery, installation and commissioning on the basis of the developed financial (business) model, which are an integral part of the contract - with funds raised by the partners, within a period not longer than the period specified in the model,
- Provision of the energy produced for the needs of specific municipal buildings and/or other sites/properties owned by the municipality,
- Sale of the excess energy produced on the free market to other individuals or legal entities and/or its use for the needs of the municipality,
- Deployment of storage facilities (batteries) for the produced energy after an analysis proving their economic viability,
- Signing a contract for administrative management and accounting services,
- Signing a contract with an electricity trader for sale on the free market,
- Signing an insurance for the installation for the entire period of operation of the Energy Community,
- Maintenance and exploitation of the RES installation on behalf of the Municipality itself and the members/shareholders.

Eligible members/shareholders of a municipal energy community may be:

- any legally capable natural person, a Bulgarian citizen,
- local authorities, including municipalities,
- non-governmental organizations, and
- small or medium-sized enterprises.

The accession procedure for members/shareholders is carried out electronically. The interested parties send a template declaration. After confirmation by the EC representative, the EC manager sends a draft Agreement with their data completed for the person to sign under the relevant ID number and return it along with an attached payment document for their respective share. The Agreement signing can be done on site in the Municipality or via scanned copy sent by an email.

In order to raise the funds necessary for the launch of the EC project, the Municipality determines the minimum and maximum thresholds with which individuals and legal entities can join the energy community. In order to achieve the EC objectives, the share of participation of each party is determined to reflect the contribution to the EC:

- Municipalities participate through the implementation of the activities for the preparation of energy generation facilities and/or storage of energy:
  - Provision of municipal property for the implementation of the installation,

- Financial and administrative management of the EC,
- Maintenance and operation of the implemented RES energy generation facility on its own behalf and at the expense of the EC.

- Municipalities manage the funds raised and are responsible for their spending according to the Agreement and enforced legislation,
- Municipalities manage and operate the RES generation facility and cannot make arrangement with it during the EC lifetime unless there is an explicit unanimous decision of all EC members,
- Each party (municipalities, citizens, SMEs, etc.) participates in the EC through the monetary contribution made by it upon signing an Agreement.

When the required investment amount is reached, the Municipality consolidates the Agreement, notifies the members/shareholders and starts the RES energy generation facilities realization.

The EC management is done by the Municipality as a sole owner of the RES generation facilities. The members appoint and authorize a municipal employee to represent the EC to:

- Open a bank account, to dispose of the revenues and to incur the expenses on behalf of the EC, according to the Agreement,
- Represent the EC before third parties wishing to join the EC as energy consumers,
- Convene and conduct meetings of the shareholders for decision-making and organize their subsequent implementation.

Operational framework for EC establishment

The operational steps for EC establishment and development on behalf of a Municipality are summarizes below. Table 3 summarizes the actions that the Municipality needs to undertake for its EC installations to access the grid.

The framework outlined below is a general one and depending on the case may be altered:

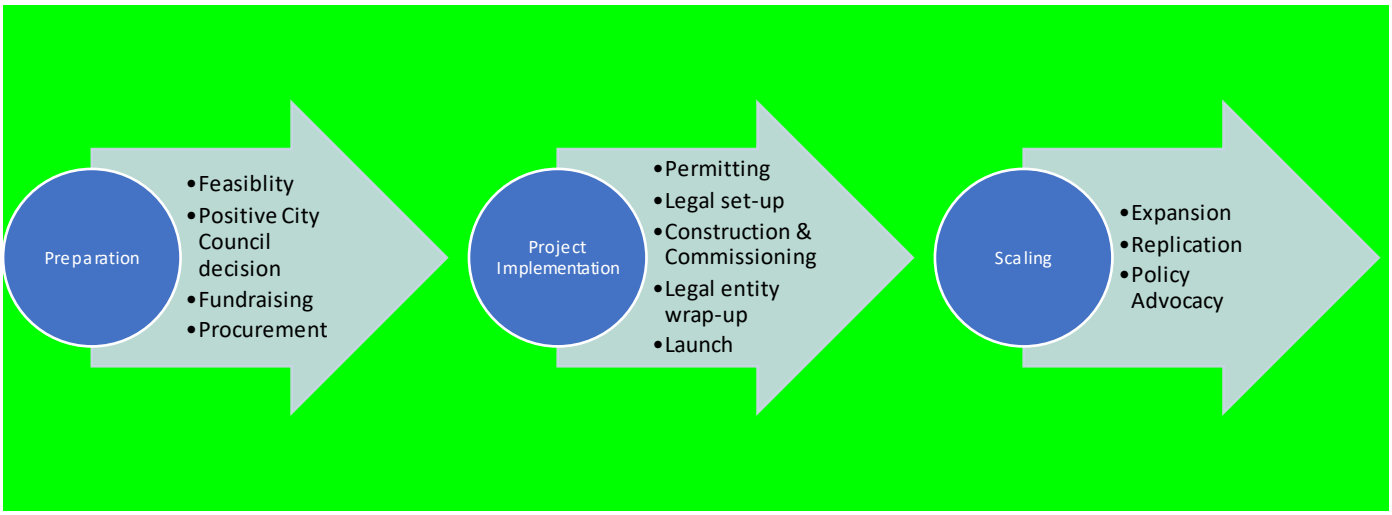

Figure 5 Step-by-step EC establishment process

Phase 1: Preparation

1. Feasibility and Planning
    1.1. Feasibility Analysis
        - Financial model and business case developed by the Municipality.
        - Assessment of risks, expected ROI and energy needs.
    1.2. EC Proposal by Mayor
        - Formal presentation to the City Council.
    1.3. Decision by City Council
        - Legal decision to create an energy community under the Obligations and Contracts Law.

2. Fundraising and Community Engagement
    2.1. Public Invitation to Join EC
        - Call to citizens, SMEs, NGOs to invest in the EC (BGN 500–5000).
    2.2. Public Announcement
        - Communicates readiness and mobilizes interest.

3. Procurement Preparation
    3.1. Launch of Public Tender
        - EPC contractor selection process begins.
    3.2. Negotiation and Signing of EPC Contract

Phase 2: Pilot Project Implementation

Realizing the first EC installation and demonstrating feasibility on a municipal building.

4. Permitting and Legal Setup
   - 4.1. Request for Grid Access Study
     - Municipality initiates connection process with DSO.
   - 4.2. Bank Guarantee to DSO
     - BGN 50,000/MW deposited.
   - 4.3. Issuance of Building Permit
     - Municipality provides legal authorization for construction.

5. Construction and Commissioning
   - 5.1. Launch of Construction
     - EPC contractor begins on-site work at the roof of the waste disposal facility.
   - 5.2. Final Inspection and Acceptance
     - Municipal commission signs off on completion.
   - 5.3. Notification to DSO
     - Compliance with RES law for generation/storage facilities.
   - 5.4. Insurance of Installation
     - Risk coverage initiated.
   - 5.5. Energy Purchase Agreement
     - Municipality agrees to buy energy at fixed rate.

6. Legal Entity Finalization
   - 6.1. EC Company Legally Established
     - Signing of a member contract under the Contracts Law.
   - 6.2. Registration in BULSTAT
   - 6.3. Opening of EC Bank Account

7. Operational Launch
   - 7.1. Technical Operation and Financial Monitoring
     - Performance tracked; regular updates to members.

Phase 3: Scaling

Building on the pilot's success to expand participation, impact, and replication potential.

8. Expansion of Participation
   - Open future calls for more citizens, SMEs, and public authorities to join future projects
   - Use the pilot as a proof of concept to promote similar ECs in other neighborhoods or regions.
9. Replication of the Model

- Apply the same framework to additional public buildings or underutilized municipal spaces.
- Potential to develop multi-site EC networks under a federated structure.

10. Policy Advocacy and Model Refinement

- Share lessons learned with other municipalities and national-level stakeholders.
- Advocate for supportive regulation (e.g., virtual net metering, streamlined grid access).

The detailed procedures depending on the mode of usage, size and legal requirements are shown in the following table.

Table 5 Grid access procedures for PV installations selling excess energy to the grid

PV installation		
<5MW for self-consumption	< 30kW for excess energy sale	>30kW<1MW for excess energy sale
Investment design and construction permit		
Permitting mode – simplified procedure under Art. 25a, par.1 of the Renewables Act	**Permitting mode** – simplified procedure under Art. 147, par.1, item 14 of Spatial Planning and Development Act	**Permitting mode** – simplified procedure under Art. 147, par. 1, item 14 of Spatial Planning and Development Act
Documentation needed: ▫ Technical design by a licensed technical expert with limited or full design license. **Before construction** **Documents to the (Distribution System Operator (DSO)** ▫ Notice to the operator of corresponding power distribution network or closed power distribution network, ▫ Additional agreement (annex) to the Contract for access and transmission provided by the Utility operator in which the technical requirements of the	**Documentation needed:** ▫ Technical design by a licensed technical expert with limited or full design license. **Before construction** **Documents to the Distribution System Operator (DSO)** ▫ Request for a study for connection to the power distribution network, ▫ Guarantee in the form of a deposit or bank guarantee in the amount of BGN 50 000 for each megawatt (MW) of connected capacity of the future energy site.	**Documentation needed:** ▫ Technical design by a licensed technical expert with limited or full design license. **Before construction** **Documents to the Distribution System Operator (DSO)** ▫ Request for a study for connection to the power distribution network, ▫ Guarantee in the form of a deposit or bank guarantee in the amount of BGN 50 000 for each megawatt (MW) of connected capacity of the future energy site.

installation to be linked to the grid are defined. The additional Agreement is signed before the issuance of a construction permit for the energy facility. **Documents to the Municipality** ▫ Request for issuance of a construction permit (for installations <5 MW – without approval of an investment project and conformity assessment), ▫ A document of ownership, of an established right to build or of the right to build in someone else's property.	No warranty is due if the installation has an installed electrical power of up to 10.8 kW inclusive and the connection is different from a three-phase connection. **Documents to the Municipality** ▫ Request for issuance of a construction permit (for installations <1 MW – without approval of an investment project and conformity assessment), ▫ A document of ownership, of an established right to build or of the right to build in someone else's property.	**Documents to the Municipality** ▫ Request for issuance of a construction permit (for installations <1 MW – without approval of an investment project and conformity assessment), ▫ A document of ownership, of an established right to build or of the right to build in someone else's property.
Deployment and commissioning of the PV installation		
<u>After construction</u> Notification of completed installation according to the technical documentation sent to the Energy Utility and Chief City Architect <u>Commissioning</u> The installer company commissions the self-consumption power plant into the grid in a limited operational mode.	<u>After construction</u> **Documents to the DSO** Application for installation of the power plant, which includes: ▫ As build drawings reflecting the actual execution of the installation, ▫ Protective devices setup protocols, ▫ Protocols of functional tests of the protective devices issued by an	<u>After construction</u> **Documents to the DSO** Application for installation of the power plant, which includes: ▫ As build drawings reflecting the actual execution of the installation, ▫ Protective devices setup protocols,

	independent accredited laboratory, indicating the accreditation number, type of control body, type of test equipment and calibration, operator who carried out the checks, analysis and evaluation of the results, ▫ Valid accreditation certificates of the certified laboratories carrying out the measurements and tests of the equipment used, ▫ Declarations of conformity with the essential requirements of safety standards, technical standards, as well as all imperative requirements regulated in the current regulations, as well as for the creation of technical documentation, ▫ Declaration for installation of the site by a technical person who performed the installation, ▫ Declaration for installation of the site by a construction engineer, designer of Construction part. Declaration for acceptance of the general terms and conditions for access to the electricity distribution network, according to the template of the respective DSO.	▫ Protocols of functional tests of protective devices issued by an independent accredited laboratory, indicating the accreditation number, type of control body, type of test equipment and calibration, operator who carried out the checks, analysis and evaluation of the results, ▫ Valid accreditation certificates of the certified laboratories carrying out the measurements and tests of the equipment used, ▫ Declarations of conformity with the essential requirements of safety standards, technical standards, as well as all imperative requirements regulated in the current regulations, as well as for the creation of technical documentation, ▫ Declaration for installation of the site by a technical person who performed the installation, ▫ Declaration for installation of the site by a construction engineer, designer of the Construction part. Application for Contract for access to the distribution network, which includes: ▫ List of operational personnel of the site, ▫ Assessment of the potential under Art. 19 (1) of the Renewables Law when this is mandatory under the Ordinance under Art. 19 (3) of the Renewables Law,

		▫ A document certifying the right of ownership or real right of use. **Acceptance Committee** Sites with 6th construction category are not subject to commissioning, and the acknowledgement of the suitability of the site and its compliance with the technical requirements is carried out by signing a tripartite statement of findings between the manufacturer, the distribution network operator and the technical person who carried out the construction and installation work. The Investor submits a request in a standard form to the respective operator for scheduling a date for site inspection. Upon establishing the compliance of the site with the requirements of the grid contract, a statement of findings is signed between the electricity network operator and the person who has signed the contract for access to the grid, as well as an access and transmission contract with the electricity network operator.
	<u>Deployment of Electricity meter</u> The DSO installs an electricity meter when the power plant is entirely for selling the energy produced. When the power plant is for self-consumption, the DSO replaces the existing electricity meter with a two-way one.	<u>Deployment of Electricity meter</u> The DSO installs an electricity meter when the power plant is entirely for selling the energy produced. When the power plant is for self-consumption, the DSO replaces the existing electricity meter with a two-way one.

	<u>Commissioning</u> The investor submits an application for connection of the power plant to the DSO, to which it attaches a declaration from the buyer of the electricity and a coordinator of the balancing group for the existence of a valid contract for the purchase of the electricity produced by the site and a signed access contract or a declaration for acceptance of the general conditions for access to the distribution network. The DSO organizes the preparation for the access of the installation to the grid, and the installer company puts the power plant into operation.	<u>Commissioning</u> The investor submits an application for connection of the power plant to the DSO, to which it attaches a declaration from the buyer of the electricity and a coordinator of the balancing group for the existence of a valid contract for the purchase of the electricity produced by the site and a signed access contract or a declaration for acceptance of the general conditions for access to the distribution network. The DSO organizes the preparation for the access of the installation to the grid, and the installer company puts the power plant into operation.

Proposed Business model framework

1. Business Model Type: Hybrid Public-Citizen Ownership via Association

Legal form: *Association under the Obligations and Contracts Law (Закон за задълженията и договорите – ЗЗД)*

Justification:

- Simple to establish and operate
- Suitable for mixed municipal–citizen ownership
- No capital requirement
- Allows for internal rules on profit use and dividend payments

This form avoids the higher complexity of a cooperative and the administrative burden of setting up a Special Purpose Vehicle (SPV), while allowing for long-term partnership and reinvestment.

2. Ownership Structure

Municipality:

- Contributes land/rooftop (e.g., on a landfill or public building)
- Leads permitting, DSO engagement, procurement, and administration
- Becomes primary off-taker at fixed price and assumes ownership after 10 or 20 years

Citizens, SMEs, NGOs:

- Contribute financially (e.g., BGN 500–5000 per investor)
- Receive guaranteed return (e.g., 30% over 10 or 20 years)
- Benefit from co-governance and future energy access where legally allowed

3. Governance Model

Multi-stakeholder board:

- 1–2 municipal representatives
- 2–3 elected citizen/investor representatives
- 1 optional technical advisor or expert

Rules & Agreements:

- General Assembly (all members) approves strategic decisions
- Internal statute outlines rights, voting, dividends, exit conditions
- Fixed-rate energy supply agreement between the CEC and the Municipality

4. Revenue and Financial Model

Primary revenue stream:

- Sale of electricity to municipal buildings at a fixed long-term rate, including grid charges, VAT-exempt under current legislation.

Secondary revenue stream (optional):

- *Sale of surplus energy (10–20%)* on the *free market* if municipal demand does not fully absorb production. This provides additional income and flexibility, while maintaining the community focus.

Dividend policy:

- Fixed return to citizen members, with any remaining profit reinvested or allocated per the Association's rules.

Capital structure:

- Public-citizen financing
- Potential for leveraging national/EU funds for replication

5. Local Benefit Distribution

Social:

- Enables citizen participation without owning a roof, landfill or technical know-how
- Potential for cross-subsidizing energy-poor households
- Builds trust in community-based investment

Environmental:

- Converts underutilized assets (e.g., landfill, buildings) into clean energy sources
- Contributes directly to local SECAP goals

Economic:

- Reduces municipal electricity costs
- Offers citizens a stable return and hedge against inflation
- Partial integration into market mechanisms via limited electricity sales

6. Scaling Pathway

- Begin with one pilot site focused on municipal consumption.
- Use results to:
  - Build reputation and public confidence
  - Expand to new buildings or sites
  - Gradually diversify customers if regulatory changes allow direct supply to citizens

7. Why Not SPV or Cooperative?

Model	Advantages	Disadvantages
Association (ZZD)	Fast, low-cost, flexible, inclusive	No limited liability; requires careful governance
SPV (Ltd.)	Legal clarity, bankability	High cost, administrative burden, VAT liability, not citizen-friendly
Cooperative	Democratic, citizen-focused	Complex and unsuitable for single-project RE investments

Conclusion: The *association model under ZZD* balances simplicity, inclusiveness, and financial feasibility. It supports mixed ownership, clear community benefit, and optional market participation to ensure economic resilience.

2.2.3. Practical recommendations for EC establishment in Bulgaria

1. Anchor the CEC in a Clear Municipal Commitment

What to prioritize:

- Ensure the mayor and city council adopt a formal resolution supporting the establishment of a CEC.
- Secure municipal ownership or access to a viable site (e.g., municipal landfill, enterprises, rooftop of public building) to host the RES installation.
- Use the municipality's administrative capacity to lead permitting, grid access procedures, and contractor selection.

What to avoid:

- Launching the initiative without explicit council support or municipal leadership—this causes legal and administrative delays later.

2. Choose a Feasible, Symbolic Pilot Site

What to prioritize:

- Use underutilized or symbolic municipal assets (e.g., closed landfill, public building roof) to demonstrate innovation and low conflict over space use.
- Ensure the site has guaranteed long-term consumption (e.g., municipal buildings or enterprises) to secure revenue and simplify energy delivery.

What to avoid:

Starting with private rooftops or dispersed assets that complicate permitting, grid access, and ownership.

3. Start Simple: Use a Familiar Legal Form

What to prioritize:

- Register the CEC as an association under the Obligations and Contracts Law to avoid complex licensing and reporting requirements.
- Focus on shared ownership of a single RES installation and simple rules: fixed investment tiers, flat returns, and clear energy allocation.

What to avoid:

- Over-engineering governance or attempting complex energy allocation or billing schemes that rely on mechanisms (net metering or virtual net metering) not yet available under national regulation.

4. Offer a Clear Value Proposition to Citizens

What to prioritize:

- Fix the electricity price and dividend return for the full duration (e.g., 10 or 20 years).
- Highlight the dual benefit: financial return (certain % ROI over 10 or 20 years) and access to community-generated clean energy.
- Make participation accessible (e.g., entry points from BGN 500).

What to avoid:

- Promising energy delivery to individual homes from the start—focus first on municipal consumption to build trust and operational proof.

5. Structure Contributions and Benefits Transparently

What to prioritize:

- Define fixed investment brackets and link dividends to them.
- Clarify citizen rights: voting, energy access, return rates, and conditions for exit.
- Ensure VAT exemptions apply by aligning pricing and ownership with EU/Bulgarian regulation.

What to avoid:

- Vague rules on energy pricing or overly complex dividend structures that confuse or deter participants.

6. Mobilize Early Contributors Strategically

What to prioritize:

- Begin with internal municipal staff and close community leaders to generate social proof.
- Open public invitations in phases—first to citizens, then SMEs and NGOs.
- Emphasize shared ownership, not donation.

What to avoid:

- Broad public launch without a core founding group, as it weakens initial momentum.

7. Simplify Permitting Through Municipal Control

What to prioritize:

- Municipality should lead the permitting process for construction, DSO connection, and building permit issuance.
- Deposit the grid connection guarantee (e.g., BGN 50,000/MW) to reduce barriers for the community.

What to avoid:

- Delegating permitting steps to the CEC members or external partners without experience.

8. Ensure Long-Term Vision and Ownership Transfer

What to prioritize:

- Plan 10 or 20-year ownership model: community-led in the initial phase, transfer of installation to the municipality after the contract expires.
- Use this arrangement to motivate municipal leadership and long-term alignment.

What to avoid:

- Leaving ownership and O&M responsibilities ambiguous beyond the initial operational period.

9. Use Local Expertise and Partnerships

What to prioritize:

- Partner with local energy agencies, cooperatives, or consultants familiar with Bulgarian permitting, EPC contracting, and EU law.
- Engage DSO early to avoid technical barriers at the connection stage.

What to avoid:

- Attempting to run the technical or legal process without specialized support.

10. Communicate Success Proactively

What to prioritize:

- Publish clear, regular updates on financial performance, social impact, and energy generated.
- Use this success to build trust for future rounds of investment and replication in other areas.

What to avoid:

- Keeping the project quiet during its pilot phase—momentum builds with visibility.

2.3. Assignment 3: Decision-making tool for municipal energy communities

2.3.1. Objective & purpose

The Energy Communities Decision-Making Tool is designed to assist local authorities in evaluating the feasibility of their planned municipal energy community projects. It functions as a self-assessment instrument for financial viability and readiness to launch a fundraising campaign.

Operating at the orientation level of energy community establishment, the tool calculates and estimates key business and financial model parameters crucial for a successful energy community project. It generates essential data that can be presented to potential investors or shareholders to demonstrate the project's attractiveness and sustainability.

This tool is specifically tailored for Bulgarian municipalities, with input data and variables adaptable to reflect evolving market conditions.

2.3.2. Applications

The Energy Communities Decision-Making Tool is designed to assist local authorities in the initial decision-making stages of planning an energy community. It focuses on key input data such as the municipal project scope, investment volume, potential shareholders, and technical specifics of the energy community installation, including energy generation, feed-in, and self-consumption.

The tool estimates costs, benefits, profits, and losses over multiple years, enabling users to assess the financial viability of their project. It offers adjustable variables, allowing for fine-tuning and simulation of different scenarios to evaluate the project's long-term sustainability.

Functioning as a dynamic simulation calculator, the tool provides real-time feedback by updating outputs immediately based on any changes made to the input parameters.

2.3.3. Input and output data. Operation

The tool addresses two main energy community scenarios tailored to the Bulgarian context:

- **Scenario 1:** Municipality-led energy community, where investment payback to community members is made through regular equal installments over the project duration. These payments include a small dividend and are funded primarily by revenues from electricity sales to municipal buildings, and potentially from excess electricity sales.
- **Scenario 2:** Self-established energy community operating independently within its legal form (not led by the municipality).

The tool incorporates the following input and calculated data to generate financial indicators for the entire project, as well as detailed installment payment schedules for the energy community members.

Table 6 Input and output data

Input data	Calculations	Results-financial indicators
EC energy price (BGN/kWh)	Municipality revenues Municipality energy savings	
Market price (BGN/kWh)		Net present value (NPV) Simple Payback Period The discounted Payback The internal rate of return (IRR)
Tariff (BGN/kWh)		
Grid fee (BGN/kWh)		
CAPEX		
OPEX (Land plot/rooftop rent and O&M	Cost per installed KW (BGN)	
Office and Administrative Costs	Annual expenses per member	
Cost Grid connection + EPC	Cost of PV per KW (BGN)	
Losses %	Electricity production kWh	
Capacity (KWp)		
Annual solar yield (kWh/kW)		
CO2 Country (gCO2/kWhe)	CO2 emissions savings	
Project Lifetime		
Community members and their shares of the total investment	Annual Dividend allocation by years during the project duration	
	Estimated annual revenue per years (BGN) Estimated total revenues (BGN)	
	Net annual profit per years (BGN) Total profit (BGN) Average annual profit (BGN)	

How to use the tool

The blank cells in the sheets "Input info", "CAPEX", "OPEX", and "Revenues" are where you enter the required data. The green and yellow cells in these tables display automatically calculated results based on your inputs.

If the investment project duration exceeds 10 years, additional columns will be added to all relevant tables to accommodate the extended timeline.

Once all necessary information is correctly entered in the "Input info", "CAPEX", "OPEX", and "Revenues" sheets, the results will be automatically calculated and visually presented in the "Calculation" tab.

On the "Calculation" tab, the only manual input required is the Discount Rate, which should be entered in the green field. All other values will be automatically transferred or calculated.

Table 7 Input parameters

CAPEX	cost of installing solar per kW; Rooftop solar installation: cost of solar panels, inverters, mounting systems, wiring, and installation; additional infrastructure: connecting to the grid, smart meters, and energy storage (if applicable); Permits and administrative costs: legal and regulatory expenses for project approval
OPEX	regular maintenance and repair costs for the solar installations; cost of using energy management tools to monitor performance; annual insurance premiums to cover the solar assets
Installed capacity	total kW installed on municipal rooftops
Number of buildings	number of municipal buildings included in the project
Number of households	number of HHs participating in the project
Solar irradiance	local irradiance value to estimate annual energy generation
Electricity tariff	current electricity price in the region
Grants/ Loans / Crowdfunding	financing structure for the project – EU and national grants for renewable energy projects; direct investment by citizens to participate in the project; municipal bonds or low-interest loans to finance the remaining CAPEX

Energy savings / Revenue	calculation of savings and revenues generated by selling excess energy

Table 8 Output parameters

CAPEX and OPEX breakdown	a clear view of the project's capital and operating costs
Energy generation	total solar energy generated annually, self-consumed by buildings and households, and surplus energy sold to the grid
Payback period	number of years to break even
Annual savings per HH	amount saved by each participating household
Total energy savings	reduction in electricity costs for the municipality
Return on investment	annual return based on energy savings and sales

3. Conclusion

Energy communities (ECs) represent a promising approach to enhancing energy efficiency both locally and nationally, increasing the share of renewables in local energy balances, alleviating energy poverty, and promoting energy independence and climate resilience.

Energy Communities have the potential to catalyze rapid transformations within the energy system, triggering new market interactions—even in contexts where the energy market is not yet fully liberalized. They bring multiple benefits, including:

- Implementing projects that improve energy efficiency and reduce greenhouse gas emissions.
- Alleviating energy poverty by generating affordable energy and providing community services accessible to all citizens.
- Encouraging citizen engagement by incentivizing local participation in the green energy transition and sustainable energy planning.
- Accelerating local economies through the creation and expansion of energy-related value chains, as well as generating jobs and employment opportunities.

Municipal leadership plays a crucial role in mainstreaming and legitimizing energy communities, especially in South-East Europe including Bulgaria. While this report emphasizes municipality-driven ECs, it recognizes that the core actors are the citizens themselves who invest their trust and resources in establishing and operating these initiatives.

This report focuses on the Bulgarian policy and operational framework for the establishment and operation of energy communities, with a particular focus on municipalities as the main driving force. It claims that local authorities are key actors in implementing EC policies across Europe, including Bulgaria, where they must act as initiators, motivators, and sources of inspiration for local stakeholders to join and invest in these initiatives.

Key Sections:

1. First Energy Communities in Bulgaria – Gabrovo and Burgas: These communities serve as inspiring examples of emerging ECs that embody the community spirit by making advanced energy projects accessible to all citizens. The cooperation between citizens, local authorities, and SMEs demonstrated by EC Gabrovo and EC Burgas proves that successful energy communities are achievable in Bulgaria. They can be considered flagship municipality-driven ECs in the country.
2. Successful Experiences in South-Eastern Europe: The report presents examples from Greece, Croatia, and other Balkan countries, clustered across policy, technical/technological, community, and promotional domains. It highlights best practices and draws lessons relevant for replicating success in the Bulgarian context.

3. Bulgarian Framework Conditions: An overview of Bulgaria's policy, legal, organizational, and operational frameworks that can support successful EC experiences is provided.

4. Financial Viability Assessment Tool: The report proposes an Excel-based decision-making tool for municipalities to evaluate the financial viability of their energy community business cases. This tool helps municipal experts assess technical and financial parameters and provides an overview of potential future projects.

Drawing from the current Bulgarian framework and operational examples, the report underscores the urgent need to establish a comprehensive legislative and policy framework at the national level. Such a framework is vital to support the growth and operation of energy communities, enabling local initiatives to flourish and contribute effectively to Bulgaria's energy transition.

Annex 1. EU projects for Energy Communities in Bulgaria

Project/ Initiative	Bulgarian partner	Donor, Duration	Summary
European Energy Communities Facility	Energy Agency of Plovdiv	LIFE 2024 - 2027	The European Energy Communities Facility aims to support and empower energy communities across Europe by helping them develop and implement solid business plans for their renewable energy projects.
Energy Community HUB	Cleantech Bulgaria	LIFE 2024 - 2026	Encom Hub supports the development of energy communities owned and run by citizens, SMEs, and public authorities by designing, validating, and scaling up EC supporting services.
RECinMED	Municipality of Smolyan	Interreg 2024 - 2026	RECinMED seeks to promote sustainability and energy independence in the Mediterranean area by encouraging the development of multiple communities of renewable energy sources that are inclusive and involve collaboration between different stakeholders.
POWER-E-COM	Black Sea Energy Research Centre	LIFE 2023 - 2026	POWER-E-COM project aims to empower citizens to take a more active role in the energy transition by supporting the development of models and tools that facilitate the creation of energy communities.
ConnectHeat	Energy Agency of Plovdiv	LIFE 2022 - 2025	ConnectHeat develops an enabling policy framework for the development of community energy initiatives, aiming at decarbonising the heating and cooling sector through a wide range of technical solutions and systems mainly based on the integration of local RES (solar thermal, biomass, waste heat, etc.).
LIFE-Beckon	Sofia Energy Agency	LIFE 2022 - 2025	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.
SUNRISE	Habitat for Humanity Bulgaria	EUKI 2022 - 2025	SUNRISE project supports homeowners, tenants, and consumers to install their own small-scale PV plants to generate their own electricity and contribute to the strategic national

			goals. Hence, the project enables self-consumption and puts consumers at the heart of the low-carbon transition for unleashing private investment in renewable energies.
Tandems	EnEffect	LIFE 2022 - 2025	Tandems project aims to encourage the development of energy communities as vehicles for energy transition including citizens in every step, engage local governments and policy makers to support and invest in these communities as well as create replicable and informative strategies, which provide helpful guidance for future communal energy projects.
Shares	Black Sea Energy Research Centre	Horizon 2020 2021 - 2024	Shares supported a great diversity of collective actions, contributing to increased energy efficiency, optimised energy management as well as a higher share of renewables.
SunSharing	Green Synergy Cluster	EUKI 2022 - 2024	SunSharing project encouraged consumers to establish energy communities by embedding the financial model into a crowdfunding community. It is not pilot oriented, but rather towards policy investigation, mapping and promotion of good practices and cross-border knowledge transfer.
Solar cities	Burgas Municipality	EUKI 2021 - 2023	Solar cities project aimed at informing citizens, businesses, and public institutions on the potential of unused roof spaces to generate electricity from photovoltaic installations through an online platform for the energy generation potential.
Up-Stairs	Sofia Energy Center	Horizon 2020 2020 - 2023	Up-Stairs aimed at accelerating the creation of energy communities through flexible and iterative business model frameworks for one stop shops for local collective actions which support local stakeholders and facilitate citizen participation in the energy transition.
LIGHTNESS	Sofia Energy Agency	Horizon 2020 2020 - 2023	LIGHTNESS increased the renewable energy capacity through social engagement, a regulatory roadmap, a low-cost technological package and innovative business models by involving more than 500 households and 30 tertiary buildings.
CONGREGATE	Eneffect	EUKI 2020 - 2023	CONGREGATE project promoted the establishment of public-private renewable energy cooperatives by conducting a case study and supporting feasibility studies in the participating municipalities.

Annex 2. Establishment of municipal centers for information on procedures for construction or reconstruction of RES capacities, Art. 22 of the RES Law

Чл. 22. (Изм. - ДВ, бр. 86 от 2023 г., в сила от 13.10.2023 г.) (1) Към всяка община се създава център за административно обслужване, който при подадено искане от потребители на административни услуги предоставя указания и информация за процедурите при изграждане, реконструкция или основен ремонт на енергийни обекти и съоръжения за производство на енергия от възобновяеми източници.

(2) Центърът по ал. 1 организира процедурите за предоставяне на административни услуги по издаване на разрешение за строеж и/или на разрешение за ползване или удостоверение за въвеждането в експлоатация на енергийни обекти и съоръжения за производство на енергия от възобновяеми източници и на съоръжения за присъединяването им към съответната мрежа, включително при реконструкция и модернизация на съществуващи енергийни обекти и съоръжения за производство на енергия от възобновяеми източници.

(3) Центърът по ал. 1 чрез интернет страницата на общината и по друг подходящ начин оповестява наръчника по чл. 7, ал. 2, т. 16.

(4) За издаване на разрешение за строеж за изграждане на обект за производство на енергия от възобновяеми източници се подава искане в съответния център за административно обслужване, за което следва да са изпълнени разпоредбите на глава осма, раздел II от Закона за устройство на територията.

(5) Центърът по ал. 1 предоставя на оператора на преносната или на съответната електроразпределителна мрежа информация за всяко издадено разрешение за строеж, включително за случаите по чл. 17, ал. 5, което е основание за сключване на договор за присъединяване. Центърът за административно обслужване предоставя на оператора необходимите документи, удостоверяващи вещното право върху имота, върху който ще се изгради енергийният обект, и издадената виза за проектиране.

(6) Центърът по ал. 1 организира съгласуване на график за изграждане на заявения обект и въвеждането му в експлоатация между заявителя, компетентните органи по Закона за устройство на територията и оператора на съответната мрежа, към която се присъединява обектът.

(7) Графикът по ал. 6 следва да предвижда срок за издаване на разрешението за ползване или удостоверението за въвеждане в експлоатация не повече от две години от подаване на искането по ал. 4, освен когато лицето, подало искането, не е поискало по-дълъг срок. За енергийни обекти и съоръжения за производство на електрическа енергия от възобновяеми източници с обща инсталирана мощност до 150 kW, както и при реконструкция или модернизация този срок е не по-дълъг от една година. Графикът и предвидените в него срокове обвързват заявителя, компетентните органи по Закона за устройство на територията и оператора на съответната мрежа, към която ще бъде присъединен енергийният обект.

(8) Съответният срок по ал. 7 се удължава с периода на провеждане на процедури по съдебно и извънсъдебно решаване на спорове във връзка с подаденото искане.

Annex 3. Legal bodies eligible to be energy communities, Art. 92b of the Energy Act

Чл. 92б. (Нов - ДВ, бр. 86 от 2023 г., в сила от 13.10.2023 г.) (1) Крайните клиенти, включително битовите, може да участват в гражданска енергийна общност, без да губят правата или задълженията си като крайни клиенти и без да изпълняват необосновани или дискриминационни условия или процедури, които биха възпрепятствали участието им в гражданската енергийна общност. При участие на предприятия в граждански енергийни общности тяхното участие не трябва да е свързано с основната им търговска или професионална дейност.

(2) Гражданските енергийни общности може да се организират под формата на търговско дружество, кооперация, сдружение с нестопанска цел по реда на Закона за управление на етажната собственост или гражданско дружество по Закона за задълженията и договорите при спазване на изискванията на този закон.

(3) Отношенията между членовете на гражданската енергийна общност се определят с устав или договор според избраната организационна форма, който съдържа задължително следното:

1. основните цели, свързани с екологични, икономически и/или социални ползи на членове и/или района;

2. условията относно развитието на проекти за производството, потребяването, съхранението, продажбата и/или споделянето на енергия в рамките на общността съобразно предмета на дейност на общността и правата и задълженията на членовете на общността във връзка с това;

3. условията за набиране и разходване на средствата относно екологичните, икономическите и/или социалните дейности и цели на общността;

4. условията и реда за защита правата на членовете на общността като потребители на енергия;

5. видовете фондове, условията за разпределяне на дивиденти и начина за определяне на техния размер.

(4) Гражданските енергийни общности:

1. може да произвеждат, потребяват, съхраняват и продават излишните количества енергия като равнопоставен участник на пазарите на енергия при определените в този закон и в подзаконовите нормативни актове по прилагането му условия, включително чрез споразумения за закупуване на електрическа енергия;

2. може да споделят в рамките на общността енергията, произведена от инсталации, притежавани от общността, при зачитане на правата и задълженията на членовете като потребители;

3. имат достъп по недискриминационен начин до всички подходящи пазари на енергия.

(5) Развитието на гражданските енергийни общности се насърчава чрез:

1. премахване на необоснованите регулаторни и административни пречки;

2. прилагане на изискванията на този закон при продажба на енергия и други енергийни услуги;

3. осигуряване на сътрудничество със съответния оператор на разпределителна мрежа и/или топлопреносно предприятие за преноса на енергията в общността;

4. прилагане от страна на компетентните органи на справедливи, пропорционални и прозрачни административни процедури, включително регистрация и лицензиране, които гарантират, че за всички ползватели на мрежите се прилагат регулирани цени за мрежови услуги, които следва да допринасят по адекватен, справедлив и балансиран начин за разпределянето на общите разходи за системата в съответствие с прозрачен анализ на разходите и ползите на разпределените енергийни ресурси;

5. прилагане на недискриминационно третиране към общностите по отношение на дейностите, правата и задълженията им като крайни потребители, производители, доставчици или като други участници на пазара;

6. достъпност на всички потребители за участие в общности, включително домакинство в положение на енергийна бедност или уязвимите клиенти;

7. улесняване на достъпа до финансиране и информация;

8. предоставяне на регулаторна подкрепа и помощ за изграждане на капацитет на публичните органи при улесняването и създаването на енергийни общности и при улесняването на прякото им участие;

9. въвеждане на правила за гарантиране на еднаквото и недискриминационно третиране на потребителите, участващи в гражданската енергийна общност.