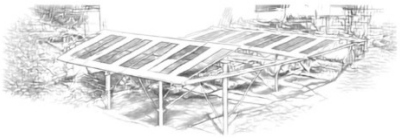
Citizen Energy in Central and Eastern Europe (CEE): Projects Tell Their Stories

Lessons learned, reflections and real-world experiences from DBU-supported projects across the CEE region









TECHNISCHE UNIVERSITÄT BERLIN

DBU Deutsche Bundesstiftung Umwelt

2026

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Technische Universität Berlin (TU Berlin)

CITIZEN ENERGY PUBLICATION

Imprint

Title of the publication: Citizen Energy in Central and Eastern Europe (CEE): Projects Tell Their Stories. Lessons learned, reflections and real-world experiences from DBU-supported projects across the CEE region

Published by: Technische Universität Berlin, Environmental Assessments Research Group (Fachgebiet Umweltprüfungen). Straße des 17. Juni 135 10623 Berlin Germany

Editors: MSc. Roland Lleshi, MSc. Saeed Najd Ataei Sarkarabad, Prof. Dr. Gesa Geißler

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Year of Publication: November, 2026

DOI: https://doi.org/10.14279/depositonce-26901

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Reference: Lleshi, R., Sarkarabad, S. N. A., & Geißler, G. (Eds.). (2026). Citizen Energy in Central and Eastern Europe (CEE): Projects Tell Their Stories. Lessons learned, reflections and real-world experiences from DBU-supported projects across the CEE region. Technische Universität Berlin, Environmental Assessments Research Group.

Cover map credits: mapchart.net
Cover sketches-original pictures credit: Solidarity Economy Centre Association, Electra Energy and Marie Halbach

Contact / Website: https://www.tu.berlin/en/umweltpruefungen

Project: Conditions for success and requirements for concepts to establish citizen energy initiatives in Central and Eastern European countries - opportunities and limitations to support the energy transition

Project funded by: German Federal Environmental Foundation/ Deutsche Bundesstiftung Umwelt (DBU).

sponsored by DBU

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Foreword by Dr Cornelia Soetbeer, Head of Department at the DBU

The energy transition in Europe is inconceivable without the participation of citizens. In recent years this insight has taken hold not only in Germany but across Europe, and it increasingly shapes the energy-policy debate in Germany's neighbouring and partner countries in Central and Eastern Europe. The decentralised generation of electricity from renewables is bound up with a technological development that opens up new forms of civic engagement: individuals, municipalities, small businesses and start-ups are stepping forward as initiators of energy projects, taking on a more proactive role in shaping their own energy and system needs than was possible under a centralised system dominated by a handful of large utilities.

Citizen energy concepts - whether organised as citizen energy cooperatives, citizen energy communities, renewable energy communities, or other organisational forms - aim to advance the energy transition through decentralised, citizen-led power generation, management, and sharing, while realising a participatory energy system oriented towards societal values. At the European level, this idea acquired a binding framework when citizen energy concepts were incorporated into the Clean Energy for All Europeans package. These European energy policy requirements have triggered national legal adjustment processes in numerous Central and Eastern European countries. Moreover, they have prompted a more intensive engagement with the concept of citizen energy - a process that has unfolded very differently from country to country and has progressed to varying degrees depending on legal, financial, cultural, and institutional conditions.

The values of citizen energy projects extend far beyond environmental benefit. They empower local communities through strengthened regional value creation, creating local jobs, reducing dependence on energy imports, and thereby contributing to greater energy security. At the same time, they drive the expansion of renewable energy while directly involving citizens in decision-making processes. This involvement in particular proves to be an important lever for local acceptance of energy infrastructure - an aspect whose importance can hardly be overstated given the accelerated expansion of renewables that is now required. Citizen energy is thus becoming a central building block on the European Union's path towards a greenhouse-gas-neutral energy system by 2050.

Against this backdrop, the German Federal Environmental Foundation - Deutsche Bundesstiftung Umwelt, DBU has for several years been working, through its international project funding, to specifically strengthen citizen energy in the countries of Central and Eastern Europe. This funding pursues two closely linked goals: on the one hand, to support model projects that actively involve citizens in the energy transition through innovative approaches; on the other, to help create and further develop, on the ground, the framework conditions needed for citizen energy concepts, to convey knowledge and skills on sustainable citizen energy in innovative ways, and to network the relevant actors across national borders.

To place this work on a sound knowledge base, the DBU, together with the Technical University of Berlin (TU Berlin), the University of Natural Resources and Life Sciences, Vienna (BOKU) and international partners, has developed country profiles, as factsheets, for nineteen states of Central and Eastern Europe, ranging from Albania and Bosnia and Herzegovina, through the Baltic states, to Poland, Romania, and Ukraine. These snapshot

profiles summarise key information on the use of renewable energy sources, national legislation, relevant stakeholders and the respective framework conditions for citizen energy, forming an important foundation for the projects that have emerged within this funding programme.

This funding work has by now given rise to a wide range of concrete initiatives, which can be grouped into five thematic clusters: (1) *capacity building in local communities*; (2) *empowering marginalised and underrepresented citizens*; (3) *developing pilot community energy projects*; (4) *feasibility studies for integrating energy communities into new neighbourhood developments*; and (5) *institutionalising capacities and knowledge exchange in the field of citizen energy*[1]. The funded projects span from Albania, Bulgaria, and Bosnia and Herzegovina, through Greece, Croatia, Latvia, and the Republic of Moldova, to North Macedonia, Slovakia, the Czech Republic, and Hungary - testimony to the thematic and geographic reach of this funding focus.

This edited volume takes these diverse experiences as an occasion to combine the knowledge generated through the DBU's international funding programme and to make it accessible to a wider interested audience. The contributions examine the legal, economic, and social framework conditions for citizen energy in various countries of Central and Eastern Europe. The authors of the chapters present exemplary projects and the insights derived from them, and discuss hindering factors, success factors as well as lessons learned for building viable citizen energy structures. The volume thus pursues a twofold purpose: to foster exchange between research, practice, and policy in the region, and to help strengthen awareness of the importance of citizen energy as a driver of a just and citizen-centred energy transition in Central and Eastern Europe. We hope that the contributions gathered here will inform and inspire everyone interested in working towards a sustainable, participatory and citizen-driven energy future.

The funding cluster on the topic of citizen energy was conceived and managed by the following DBU staff members: Dr Volker Wachendörfer (retired), Dr Jörg Lefèvre, Melanie Vogelpohl, Dr Alexander Bittner, Claudia Domel, Romana Cermanova and Dr Nicole Freyer-Wille. A sincere thank you goes to all for their vision, dedication, and excellent management of this important initiative.

[1] (for more information DBU Citizen Energy Cluster: https://www.dbu.de/foerderung/projektfoerderung/internationale-projekte/buergerenergie/)

Acknowledgements

We would like to express our gratitude to all project partners and contributors who shared their project experiences, actions, reflections and lessons learned for this publication. Their willingness to reflect openly on achievements, challenges and lessons learned has made this collection of project stories possible. Special thanks go also to other actors across Central and Eastern Europe (CEE) who continue to advance citizen energy initiatives in diverse and often challenging contexts.

We also thank the Deutsche Bundesstiftung Umwelt (DBU) - German Federal Environmental Foundation for its continued support of collaborative research and practice on citizen energy in the region, and for enabling the exchange of knowledge and experience that underpins this publication. In accordance with its mission and guiding principles, the DBU supports innovative, exemplary, and solution-oriented projects aimed at protecting the environment, with a special focus on small and medium-sized enterprises. It is one of the largest foundations in Europe; since beginning its work in 1991 (founded in 1990), it has supported more than 11,500 projects with approximately 2.18 billion euros in funding.

By funding collaborative and exploratory projects under its funding cluster Citizen Energy, DBU contributes to strengthening knowledge, local capacities and practical experimentation that support a more inclusive and decentralised energy transition. The foundation has been actively supporting many more projects than those presented in this publication. The contributions included here were selected according to thematic interest, the publication's criteria, and the timing of project implementation. All DBU-funded projects in the CEE region are shown on the cover map (colour-filled circles: featured in this document; no-colour-filled circles: not featured). All citizen energy topic projects can be viewed on the DBU Citizen Energy Cluster website, where ongoing and new projects continue to be funded.

The publication is issued by the Technische Universität Berlin (TU Berlin) – Technical University of Berlin as part of its ongoing work on citizen energy in Central and Eastern Europe, under the DBU-funded project *Citizen Energy in Central and Eastern European Countries*. TU Berlin has been actively engaged in research, knowledge exchange and stakeholder collaboration on citizen energy, working closely with DBU, local initiatives, researchers and practitioners across the region since 2021. Through this publication, TU Berlin aims to provide a shared space for presenting experiences from diverse pilot and research projects and to bring these insights together in one document and make them accessible to a broader audience interested in the development of citizen energy in CEE.

We would also like to warmly thank Tamara Mitrofanenko and Prof. Dr. Johann Köppel for their valuable contributions to the first DBU-funded project "*Scientific investigation of the framework conditions for citizen energy in Central and Eastern European countries*". Their expertise and dedication significantly enriched the project's outcomes.

Last but not least, we extend our sincere thanks to Federica Longi for her support in organising and successfully running events, and also to our TU Berlin colleague Dr Dörte Grunzig for her excellent organisational support throughout all project activities.

Executive summary

Citizen energy in Central and Eastern Europe (CEE) is moving from policy ambition to local practice, often under rules and markets that are still catching up, and is already a real part of the energy transition. This publication brings together lessons from DBU-supported projects in Albania, Bulgaria, Czechia, Greece, Hungary, Latvia and North Macedonia, with German partners involved in several projects. The purpose of the document is to inform practitioners, municipalities, funders and policymakers who might need evidence of what works or what does not work on the ground, not another theoretical framework. A broader public can also find useful information from the perspective of project implementers.

The regional starting point for CE in CEE countries is harder than in Western Europe. Legal recognition of renewable and citizen energy communities often exists, but secondary rules, smart metering, grid access and finance lag behind. Capacity is stretched, trust is uneven or unstable due to cooperative experiences linked to the communist past, and disputed renewable booms can slow uptake. Some CEE countries are further ahead while others still have no formally registered initiatives. This shows the variety of different settings. EU rules and donor funding matter precisely because the market alone does not yet deliver community-led projects.

The country chapters show different entry points rather than one model. The Albanian project combined gender analysis, photovoltaic training and a roadmap so women, youth and energy-poor households could actively participate. Bulgaria's project implemented in Bansko treats participation as design, not publicity, while facing incomplete energy-sharing rules. The other Bulgarian project sketches a low-carbon pathway for the Trakia Economic Zone. Czechia's CommUnion professionalised the umbrella Union for Community Energy (UKEN) and helped open electricity sharing. Greece and North Macedonia piloted community urban agrivoltaics. Hungary built municipal partnerships, advisory capacity and a federation of registered energy communities. Latvia registered its first rural energy community in Kalniena in 2025. Skopje's climate assembly in North Macedonia produced 19 highly relevant air-pollution recommendations that the Skopje City Council adopted unanimously.

Across these cases, the same conditions persist. Regulated legal definitions are a starting point, not an enabling framework. Hands-on tools, local coordinators and municipal anchoring turn interest into action, but pilots stagnate without finance, grid cooperation and follow-up to the next stage. At all stages and levels, projects have to be designed with inclusion in mind, the earlier the better. Cross-border mentoring helps only if models are adapted to specific contexts. On this evidence, citizen energy can decentralise value and build acceptance, provided secondary rules, early-stage finance, intermediary capacity and citizen ownership advance together.

I. Introduction

Citizen energy (CE)[2], based on open and voluntary participation and effective control by its members, can take various legal forms such as cooperatives, associations, social enterprises, among others (Rescoop.eu, 2019). In recent years, it has emerged as a visible and increasingly important pillar of Europe's energy transition. Through these models, citizens, local initiatives and municipalities are organising to produce, share, manage and democratically govern local renewable energy, delivering environmental, economic and social community benefits while fostering local value creation, such as more jobs (Rescoop.eu, 2019). By 2050, energy citizens (e.g. households, small enterprises and collective initiatives producing electricity) could meet up to about 45% of the EU's electricity demand; citizen energy communities could account for roughly 37% of that citizen-produced electricity (Caramizaru & Uihlein, 2020; Rescoop.eu MECISE, 2019). Community-driven energy production in Europe draws on the experience of farmer and community-owned wind projects that expanded in the late 20th century, particularly in Denmark and later in Germany, where cooperative ownership models enabled local investment in and collective governance of wind energy installations (Bauwens et al., 2016). In recent years, these grassroots citizen energy initiatives have managed to evolve into well organised networks of citizen-led initiatives across Europe. Organisations such as REScoop.eu bring together thousands of energy communities and millions of citizens in Europe, representing their interests at the European level (Koltunov et al., 2023).

The official acknowledgement of energy communities reached a major turning point with the European Union's Clean Energy Package in 2019, which introduced two legal concepts that now shape much of the implementation landscape: Renewable Energy Communities (RECs) under the Renewable Energy Directive and Citizen Energy Communities (CECs) under the Internal Electricity Market Directive. These frameworks formally recognise collective citizen participation and aim to enable communities to access, produce, consume, and share energy within the electricity market (Caramizaru & Uihlein, 2020).

However, these policies are not a silver bullet. Across Europe the implementation of RECs and CECs has revealed persistent frictions, including uneven transposition into national law, complex or unclear administrative procedures, and tensions between intended community benefits and market realities (Rescoop.eu & ClientEarth, 2020). The concepts themselves are interpreted differently across countries, and without strong enabling conditions they risk remaining underutilised or being reduced to technical forms of collective self-consumption with limited community governance (Rescoop.eu & ClientEarth, 2020).

The development of citizen energy (CE) in Central and Eastern Europe (CEE) countries, is also strongly influenced by EU policies and its direct support. Yet the regional starting conditions are distinct from those in Western European countries and often tougher. For comparison, Germany has a long-established citizen-energy sector, with an estimated

[2] The term Citizen Energy is used as an umbrella term including Renewable Energy Communities, Citizen Energy Communities, Energy Cooperatives and any other non-formal initiative (e.g. it can a be a research project, a concrete pilot project, awareness raising project) working for the further development of the CE topic.

several thousand initiatives under broader definitions, while citizen energy across the CEE countries featured here is at different stages of development (Bukovszki & Haliza, 2024). Greece and Czechia are growing at a faster pace, while most of the other countries still operate with only a handful of initiatives, as in the case of Bulgaria or have not yet established any formally registered initiatives, as in Albania and North Macedonia (Bukovszki & Haliza, 2024; Corasaniti et al., 2025; Koltunov et al., 2023).

Many CEE countries still face weak, unclear, or frequently changing national policy frameworks, combined with limited or poorly accessible financing, and a lack of practical guidance on how to translate legal provisions into projects on the ground (Busch et al., 2021). Capacity is a recurring bottleneck: too few qualified people across relevant stakeholder groups (including municipalities, civil society, and market actors) have hands-on experience with CE governance models (Hanke et al., 2021). Beyond policy and skills, deeper social and institutional constraints persist, including challenges related to trust and scepticism, social cohesion, and administrative complexity, which can delay or undermine community energy initiatives (Arnould & Quiroz, 2022; Walker & Devine-Wright, 2008). Many power systems remain centralised and fossil-fuel dependent, while in several CEE countries low household electricity prices provide limited incentives for citizen-led investments (Arnould & Quiroz, 2022). Simultaneously, the region is trying to move away from coal and expand renewable generation, driven by falling wind and solar costs and coal's declining competitiveness under EU rules. Growing clean energy and accelerating electrification can stabilise prices and reduce geopolitical risks, as reliance on fossil fuel imports continues to expose CEE countries to price shocks and supply disruptions (Czyżak & Lagurashvili, 2025).

Where policy definitions exist but enabling safeguards remain weak, there is a risk of CE being captured by large capital or corporate actors, turning 'community' into branding rather than a mechanism of democratic participation and local benefits (Cots, 2025). Energy poverty and unequal access further complicate the picture: those who could benefit most from lower energy costs and increased resilience are often the least able to participate, due to financial constraints, limited access, and capacity barriers (Koukoufikis et al., 2023). Finally, political context matters. In hybrid or transitional governance settings, or where authoritarian tendencies are growing, mistrust can become self-reinforcing, reducing incentives to rebuild trust, shrinking civic space, and increasing perceived risk for long-term community initiatives (Bâra et al., 2025; Letki, 2004).

In this context of many challenges but also opportunities, EU policy and donor funding play a critical role, yet CE continue to face substantial barriers in accessing financing, particularly for early-stage development and project implementation (Arnould & Quiroz, 2022). In response, alongside other European funders and support networks, the DBU has helped strengthen CE in CEE by backing active actors, enabling investigation, building capacity, and creating space for learning-by-doing, often through research and development[3], pilots, and partnership-based initiatives that reduce early-stage risk. Such targeted "injections" matter because they make it possible to test models, develop local competence, and demonstrate credible pathways in contexts where the market alone would not deliver community-led solutions.

[3] In the context of CE projects, the term "research and development" refers to short-term pilot projects. These projects focus on awareness-raising, examining existing conditions, policy work, and testing citizen energy initiatives on the ground – often non-formal entities.

Looking ahead, there are still a number of developments that give reason for optimism regarding the creation of a supportive environment for CE in CEE. Support for citizen energy at EU level continues to expand through initiatives such as the European Energy Communities Facility (European Commission, 2024; European Energy Communities Facility, 2024). In parallel, national umbrella organisations and communities of practice have developed across Europe, including in CEE (Roberts, 2022; REScoop.eu, 2022). National frameworks in large parts of the CEE region are improving, while pilot projects across Europe demonstrate that citizen energy can function even in challenging contexts when governance, skills, financing, and trust-building are deliberately addressed (Hockenos, 2025).

EU financial support mechanisms such as the European Energy Communities Facility established in 2025 play an important role by providing direct financial assistance and capacity-building support to emerging energy communities, helping to bridge early-stage funding gaps. The Modernisation Fund and other EU financial instruments are supporting community energy in CEE countries through dedicated funding programmes such as Komunerg in Czechia (Rescoop.eu, 2023). Realising this ambition will depend on stronger enforcement of enabling frameworks for energy communities (Rescoop.eu, 2026).

Ultimately, this publication aims to bridge the gap between policy ambition and on-the-ground reality by documenting the experiences of concrete projects across CEE countries that are already finalised or ongoing, offering a grounded perspective on how citizen energy initiatives are developed in practice, what works, what remains challenging, and under which conditions such initiatives can take root and evolve while being an example for others to replicate what works well and avoid faults.

1.1. Purpose of the publication

This publication contributes to the growing momentum of CE development in CEE by bringing together a set of applied experiences in a collective knowledge document that is greater than the sum of its parts. It sheds light on the DBU-supported projects across CEE countries on the challenges faced, shares actions taken and strategies or know-how that projects have tested in diverse CEE settings, concluding with lessons learned and experience that may be relevant elsewhere. Since at least 2018, DBU has placed a strategic focus on citizen energy in CEE, with continued funding aiming to promote the involvement of citizens and other local stakeholders in the energy transition for a more decentralised energy sector.

These practical experiences are mainly in CE initiative governance, capacity building, the implementation of concrete CE pilots, and community engagement. By making these project experiences from seven CEE countries and Germany, as well as transferable insights, visible, without pretending there is a single model that fits all, the aim is to support a more robust citizen energy ecosystem across the region, showcase relevant work done to this point, inspire future work and strengthen the foundations for wider societal participation in Europe’s energy transition. A further purpose of the publication is to provide a communication platform through which different projects can present what they set out to achieve, what they learned along the way, and how their experiences may inform future initiatives in the region.

This publication is primarily addressed to practitioners, local initiatives and municipalities across CEE who are exploring or already working with citizen energy and are interested in connecting with other stakeholders and learning from these project experiences in the region. By presenting reflections from implemented projects in an accessible and practice-oriented

manner, the aim is to reach those who seek inspiration, orientation and insights into how citizen energy initiatives can be developed and sustained in different socio-political contexts.

Secondly, the publication addresses a broader group of stakeholders, including funding organisations, policy actors at different levels, researchers and support organisations interested in the advancement of citizen energy in CEE. It is also intended for a wider interested public who wishes to better understand how collaborative citizen energy initiatives are emerging across the region and what they can contribute to local energy transitions. Through this multi-layered approach, the publication seeks to make project-based knowledge visible and useful beyond the individual initiatives themselves, encouraging exchange, learning and further development of citizen energy across diverse contexts.

1.2. Structure of the document

The document opens with a remark presenting the perspective of DBU and its support for citizen energy-related initiatives in the CEE region. This is followed by an introduction that outlines the broader context of citizen energy in Europe and specifically in CEE, explains the purpose of the publication and provides some guidance on how to navigate its contents.

The main body of the publication consists of project chapters grouped by country. Each chapter is authored by representatives of the implementing project partners from the respective country or countries involved when it is a cross-country project. To ensure a coherent reading experience, the chapters follow a broadly similar structure while allowing projects to tell their own stories. The chapters bring together diverse project experiences from across countries, offering practical insights into how citizen energy initiatives are developed and implemented in different contexts – all featured projects here have received support from DB. The publication concludes with a synthesis chapter that brings together cross-cutting insights from all contributors, highlighting common lessons learned, emerging approaches and future perspectives for citizen energy development in CEE.

1.3. Country chapters

Each chapter begins with a brief project snapshot, presenting key facts about the initiative - who was involved, where and when it took place, and its core idea. The chapter then explains why the project was initiated, grounding it in a concrete local challenge or opportunity. This is followed by an outline of what the project aimed to achieve, highlighting its main goals in simple terms. The core of the chapter tells the story of what was done, describing the methods, tools, and key activities through illustrative examples. It then reflects on what changed as a result, including both tangible outputs (such as events, materials, or installations) and less visible impacts like skills gained, partnerships formed, or shifts in awareness. Building on this, the chapters identify what was learned, openly discussing what worked well, what proved challenging, and the key lessons emerging from the experience. These insights are complemented by practical tips and transferable takeaways for others working in similar contexts. Finally, each chapter concludes with a short outlook, outlining how this type of work could develop further in the country and what future opportunities or needs remain. At the time the contributions were prepared, some of the featured projects had been completed, while others were still being implemented. The chapters therefore reflect different stages of implementation, and some results were not yet available for reporting. The presentation of the country chapters is organised in alphabetical order by country.

II. Albania: Building Gender- and Socially Just Energy Communities in Albania: *Empowering Citizens in the Energy Transition*

Authors: Valbona Mazreku (Milieukontakt Albania), Arion Sauku (Milieukontakt Albania), Johannes Baumann (WECF Germany), Katharina Habersbrunner (WECF Germany)

Project Snapshot

Core Idea	-	The project empowered women, youth, and vulnerable households to actively participate in renewable energy solutions through training, policy engagement, and a practical roadmap for inclusive energy communities.
Organisation	-	Milieukontakt (Albania) and WECF - Women Engage for a Common Future (Germany)
Country	-	Albania (with international exchange from Germany, Austria, Greece and Croatia)
Funding	-	Deutsche Bundesstiftung Umwelt, DBU; Elektrizitätswerke Schönau (EWS)
Timeline	-	November 2023 until December 2025
Scale	-	National and regional

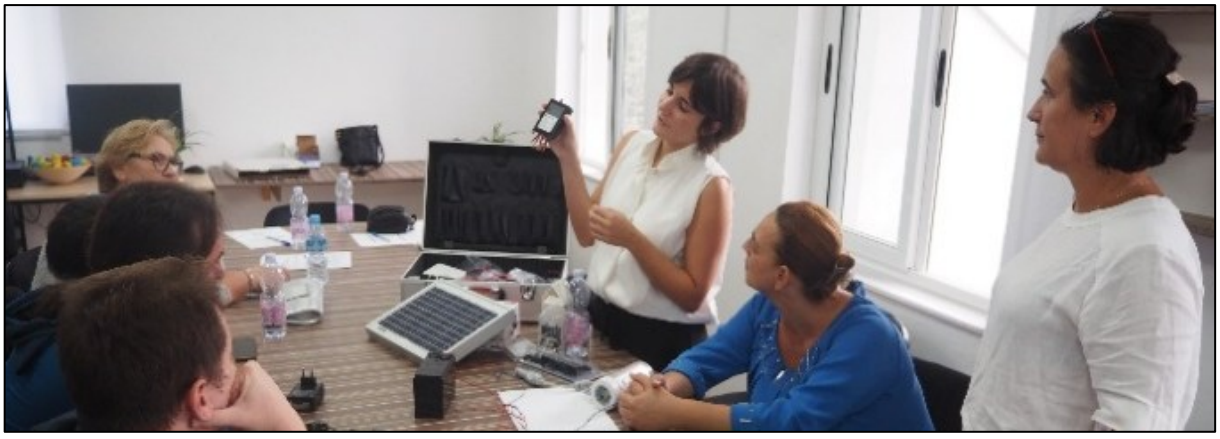


Image 1: Photovoltaic training with local participants in 2024 in Përmet, Albania. Photo credit: Mileukontakt

1. Why This Project

Albania is often described as a country rich in renewable energy, as the national electricity system relies heavily on hydropower, which provides most of the country's electricity (OECD, 2024). However, this dependence also makes the energy system vulnerable. Changes in rainfall patterns and increasing climate uncertainty affect water availability, creating risks for energy security and price stability (OECD, 2024). At the same time, Albania is working towards European Union integration and has committed to diversify energy production, increase energy efficiency, and expand renewable energy sources such as solar and wind.

Despite this progress, the energy transition and energy democratisation in Albania has not yet fully reached all citizens. Renewable energy investments are often perceived as large-scale or investor-driven initiatives, rather than opportunities accessible to local communities. Women entrepreneurs, particularly in rural areas, face limited access to technical knowledge and financing. Low-income households experience energy poverty and struggle to invest in renewable solutions. Young people show a strong interest in sustainability but lack opportunities to gain practical experience (Habersbrunner et al., 2025).

In addition, regulatory and administrative procedures for renewable energy projects are often complex and difficult to navigate. Citizens and small businesses frequently encounter unclear permitting processes, limited institutional guidance, and financial barriers like missing incentives for energy production. These challenges slow down the adoption of renewable energy solutions at local level and reduce citizen participation.
The project **“**Gender and Socially Just Energy Communities in Albania” was developed to respond to these challenges. Its main objective was to make renewable energy more accessible and inclusive by empowering citizens, especially women, youth, and vulnerable groups, to actively participate in energy production and decision-making. By strengthening skills, improving awareness, and supporting policy dialogue, the project aimed to create the conditions for community-based renewable energy initiatives that generate environmental, social, and economic benefits (Habersbrunner et al., 2025).

2. What We Wanted to Achieve

Overall, the project focused on three main goals:
First, we aimed to empower citizens to participate in renewable energy solutions by providing practical knowledge, technical skills, and accessible tools. Renewable energy should not remain an abstract concept but become a realistic option for everyday users.
Second, we aimed to strengthen gender equality and social inclusion in the energy sector. Women, low-income households, and young people often face structural barriers (e.g., existing gender roles, women studying STEM subjects (science, technology, engineering, mathematics) subjects, hiring practices of companies in the sector, time constraints) to participation, and the project sought to reduce these barriers through targeted support.
Third, we aimed to improve the enabling environment for renewable energy communities in Albania. This involved identifying legal and administrative obstacles, promoting policy dialogue, and developing practical guidance for municipalities, civil society organisations, and citizens.
To achieve these goals, the project followed a step-by-step approach combining research, capacity building, community engagement, and policy advocacy. Each activity informed the next, ensuring that the project produced both practical impact and long-term knowledge.

3. What we did: Method, Tools and Innovative Character

3.1. Method and Tools

The project began with research to understand the current situation of gender equality and citizen participation in Albania’s energy sector. Surveys and consultations were conducted with stakeholders from energy institutions, municipalities, utility companies, NGOs, and other relevant actors.

The research revealed several important findings: Gender considerations are not systematically integrated into energy policies, and the energy sector remains largely male-dominated. Women entrepreneurs, particularly in rural areas, face limited access to training and financing. At the same time, young people expressed a strong interest in renewable energy but reported limited opportunities for practical involvement.
The research also highlighted a gap between policy ambitions and practical implementation. While Albania has adopted legislation promoting renewable energy, citizens often struggle to understand procedures and access support. These findings provided the foundation for the project's next steps.

Mapping legal and administrative barriers
The project focused on understanding the procedures required for renewable energy projects, particularly for self-consumers and community initiatives. This included reviewing national legislation and conducting interviews with households, small businesses, and potential investors.
The analysis showed that many citizens face complex and time-consuming procedures when attempting to install renewable energy systems. Technical requirements for grid connection are often unclear, administrative processes lack transparency, financial incentives for energy production are not in place, and institutional coordination (e.g., between a participating municipality and the Electricity Distribution Operator-OSHEE) is missing. Even motivated citizens may abandon projects due to uncertainty, lack of transparent procedures or guidance.
By identifying these barriers, the project helped translate policy discussions into practical recommendations for improving procedures and supporting citizen participation.

Building skills through training and capacity development
A central part of the project focused on capacity building and knowledge transfer. Practical training activities were organised to help participants understand renewable energy technologies and their applications.
One key activity was a photovoltaic (PV) training workshop held in Përmet town in September 2024. The workshop brought together women entrepreneurs, energy-poor households, and young people recruited in cooperation with local partners with whom Milieukontakt Albania had previous experience supporting women and youth entrepreneurs in ecotourism services. Participants learned how solar systems work, explored business models and financing opportunities, and gained hands-on experience assembling PV components. The training provided both technical knowledge and confidence to consider renewable energy investments. The project also developed a university-level qualification programme titled *"Renewable Energy: The Path to a Sustainable Future."* The curriculum was tested at the University of Vlora and engaged around forty students. The programme combined theoretical knowledge with practical exercises and introduced students to the concept of energy communities and sustainable energy business models.
In addition, international exchanges with renewable energy communities in Germany, Austria, and Croatia provided valuable insights into successful community energy models. These

exchanges helped participants understand governance structures, financing mechanisms, and strategies for inclusive participation.

Engaging policymakers and stakeholders
The project also promoted dialogue between stakeholders and policymakers. Roundtables and workshops were organised to present findings and discuss recommendations for improving the regulatory environment.
Participants engaged through open and formal invitations, included representatives from government institutions, municipalities, civil society organisations, and private sector actors. These discussions highlighted the importance of pilot projects, improved financial mechanisms, and stronger cooperation between institutions and communities. The policy dialogue helped raise awareness of the importance of citizen energy initiatives and created a platform for continued collaboration.

3.2. Innovative Character (stories from the field)

During the PV training in Përmet, a participant who managed a small rural guesthouse asked a simple question:

"*Who can guide me through the process if I want to install solar panels?*"

This question captured the essence of the project. Many citizens are interested in renewable energy but lack clear information, trustworthy guidance, and confidence in the process. The training helped participants understand practical steps, evaluate costs and benefits, and recognise that renewable energy solutions can be a realistic solution when proper support exists. Moments like this demonstrated the importance of accessible knowledge and community-based support in the energy transition, which we not only provided through our trainings but with practical tools such as the "Roadmap for socially and gender just energy communities in Albania".

4. What We Achieved

The project produced several important results:

1. It generated knowledge and practical tools, including a gender analysis of the energy sector, legal recommendations, training materials, and a roadmap for the establishment of renewable energy communities. These resources provide long-term support for practitioners and policymakers.
2. Strengthened skills and awareness among participants. Training activities improved understanding of renewable energy technologies and increased confidence in engaging with energy initiatives.
3. Promoted social inclusion by encouraging the participation of women, youth, and vulnerable households in energy discussions and activities.
4. Contributed to policy dialogue and stakeholder cooperation. Discussions with public institutions and local authorities helped identify practical solutions for improving procedures and supporting community initiatives.
5. Finally, the project helped position renewable energy communities as a viable approach for sustainable local development.

Developing a practical Roadmap

One of the project's most important outcomes was the development of a comprehensive roadmap for establishing socially and gender-just energy communities in Albania.

The roadmap provides practical guidance for municipalities, NGOs, and citizen groups interested in developing renewable energy initiatives. It includes steps for community engagement, cooperative planning, legal compliance, financial strategies, and technical implementation.

The roadmap is structured in two main parts. The first focuses on improving the broader environment for energy communities by addressing legal frameworks, technical procedures, public awareness, and financing opportunities. The second part provides step-by-step guidance for establishing an energy community, from forming a founding group to implementing and scaling projects.

This practical tool aims to make renewable energy accessible and understandable, helping communities move from interest to action.

5. What We Learned

Several factors contributed to the project's success. The combination of research and practical activities ensured that interventions were based on real needs. Hands-on training proved particularly effective in building confidence and understanding. The development of a practical roadmap provided a clear and reusable resource for future initiatives.

However, challenges also emerged. Regulatory and administrative procedures still remain complex, and the absence of detailed secondary legislation creates uncertainty for small-scale projects. Financing remains a major barrier, particularly for low-income households and small entrepreneurs. In some communities, the concept of cooperatives still carries negative associations due to the communist past of Albania, requiring careful communication and awareness-raising.

These challenges highlight the need for continued policy development and institutional support.

6. Transferable Insights

The project generated several lessons that may be useful for similar initiatives:

First, practical pilot projects can build trust and demonstrate feasibility more effectively than theoretical discussions.

Second, clear and accessible information is essential to support citizen participation.

Third, inclusion must be intentional, ensuring that women and vulnerable groups have meaningful opportunities to participate and lead.

Fourth, cooperation with municipalities is critical for long-term sustainability. Finally, technical knowledge, financial viability, and community engagement must be developed together as a learning-by-doing process that can yield results.

7. Looking Ahead

Albania has strong potential to expand community-based renewable energy initiatives. The country's renewable resources, growing public awareness, and policy commitments create favourable conditions for development.

However, several conditions are necessary for success, which are depicted in the following table:

Table 1. Necessary conditions for CE success

Regulatory frameworks	Suitable legal form for registration and operation that would also ensure fair benefits and protection for members.
Capacity Building	The need to build the capacities to support implementation of local energy projects and the establishment of energy communities
Institutional Cooperation	Strengthen and push for cooperation between public authorities, civil society, and communities. The important role of local government in promoting such initiatives, announcing new pilot projects towards expanding the energy community model nationwide.
Financial instruments	Ensure equitable access for vulnerable groups. Grants and earmarked funds dedicated to energy communities.
Compliance and good environmental governance	Investments in Renewable Energy Communities (RECs) must remain fully aligned with environmental policy principles. Project development must avoid conflicts over land use and must not encroach upon protected areas. Finding the right balance between increasing clean energy production and safeguarding the environment is essential for a truly sustainable energy transition.

In conclusion, the project “Gender and Socially Just Energy Communities in Albania” demonstrates that the energy transition is not only a technological transformation but also a social process. Citizen energy communities can play a key role in Albania’s sustainable development by promoting local investment, reducing energy poverty, and strengthening social cohesion. By empowering citizens, strengthening gender equality, and promoting community participation, the project contributes to a more inclusive and sustainable energy future.

The experience shows that renewable energy becomes truly transformative when people are actively involved. With continued support, clear policies, and community engagement, Albania can build an energy transition that benefits all citizens.

III. Bulgaria

3.1. Project I: Green Energy Neighborhoods for the Bansko Region: *Participation as a practical pathway to establish energy communities in Bulgaria*

Authors: Martin J. Ivanov, PhD (IPS-BAS & FSSB), Dragomir Tzanev, PhD (EnEffect)

Project Snapshot

Core Idea	-	The project develops a participation-based approach for identifying, co-designing, and implementing one or more viable energy-community models in the Bansko region. It draws lessons from the first Bulgarian pilot in Gabrovo while adapting the approach to Bansko's tourism economy, seasonal energy demand, and municipal infrastructure and the still-evolving national legal and technical framework.
Organisation	-	Federation of Social NGOs in Bulgaria (FSSB) and EnEffect – Center for Energy Efficiency
Country	-	Bulgaria
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	December 2025 – December 2027
Scale	-	Regional scale-Bansko region



Image 2: Project kick-off, Culture house hall, Bansko, 27 April 2026. Photo credit: FSSB

1. Why This Project

In Bulgaria, Energy Communities (ECs) are still relatively new, even though the green energy transition is widely discussed. Over the last two decades the country has experienced a rapid and contested introduction of renewable energies. The initial 2007-2012 boom in wind and photovoltaic installations was

followed by an abrupt halt in policy support and considerable public controversy. Interestingly enough, only the photovoltaic path was renewed afterwards, partially due to the rapid decrease of its market price, but there was practically no new wind installation after 2013. This historical trajectory matters, because it shaped the public image of “renewables” – they are connected with non-transparent rules, unclear costs and unfair benefits, while practical implementation is mostly linked with PV technologies (Ivanov, 2019).

Against this background, we do not understand energy communities as a purely technical solution. We see them as a form of social innovation: a way for citizens, municipalities and local businesses to jointly own and manage (renewable) energy assets for community benefit. In order to achieve that we need to build trust, establish transparent rules and connect credible local partners.

Bansko provides a distinctive setting in which to test our participatory approach. The region is strongly shaped by winter tourism and has pronounced seasonality. Thus, energy demand peaks in winter. Hotels and related services are sensitive to electricity and heating prices, and households experience volatility in monthly bills, provoking interest in alternative heating technologies. At the same time, the local development is influenced by external investors and infrastructure decisions taken outside the municipality, which limits local control over long-term energy costs (FSSB, 2025). A community energy could therefore offer a pragmatic alternative: keeping part of the value created locally, stabilising costs, and enhancing community benefit.

The initial screening has already revealed very different types of opportunity. Public infrastructure such as wastewater-treatment and pumping facilities may offer stable daytime electricity demand and is less dependent on still-missing energy-sharing mechanisms. Apartment hotels may provide suitable roof space and a pre-existing community of owners, but their multiple electricity accounts, mixed ownership and uncertain summer occupancy make them legally and organisationally more complex. The municipal district-heating system is strategically important because it can make better use of local biomass and contribute to cleaner air, but its full rehabilitation requires investment far beyond what a small local community could mobilise alone. These contrasts confirm why technical, financial, regulatory and social feasibility must be assessed together before pilot cases are selected.

2. What We Want to Achieve

The DBU-funded project “Green Energy Neighbourhoods for the Bansko Region”, started end of 2025, aims to support the establishment of a local energy community and to document a participatory approach that is transferable to other Bulgarian municipalities (FSSB, 2025). The project is implemented by FSSB and EnEffect with the support of the Municipality of Bansko.

The main goal is to move from the abstract legal concept of an energy community to a locally functioning model with a clear governance structure, a viable investment plan and a mutually agreed benefit-sharing logic. Instead of

treating citizens as passive recipients of information, the project understands them as co-designers of the process.

For citizens and local businesses, this is important, because it can reduce exposure to price volatility and create predictable benefits. For the municipality, it matters because it creates a credible pathway to energy and climate targets without relying only on external investors and/or EU funding. For the broader Bulgarian context, the project contributes to institutional learning: it documents what is possible under current law and what still needs to change in regulation and infrastructure.

3. What We Did: Method, Tools and Innovative Character

3.1. Methods and tools

The project's core contribution is an iterative participatory approach rooted in service-design logic. Thus, participation is not added as a communication layer on top of the technical work but precedes it. A "Green Energy Neighbourhood" is understood as a structured process of co-creation that gradually transforms initial interest into civic commitment (FSSB, 2025).

The starting point is a simple but critical observation that energy communities in Bulgaria cannot be built through information campaigns alone. They require a carefully staged process that allows local actors to understand, test, reshape and co-own the model. The underlying logic follows the iterative principles of the service design methodology (Stickdorn et al., 2018). Instead of designing the final structure first and then asking people to join, we move through cycles of exploration, prototyping and refinement. Each stage generates feedback that informs the next step. The community model is therefore not imposed, it evolves through structured and facilitated interaction. The project proposal outlines this as an iterative process, based on the service design logic (Image 3). his iterative logic is not merely theoretical, it reflects prior experience from participatory projects, including the described MiParque initiative (FSSB, 2025), where participatory design methods (Braun et al., 2023) were used to co-create public space interventions with local stakeholders. In that case, solutions did not emerge from a single planning round but from repeated cycles of prototyping, feedback and adjustment. The key insight was that durable outcomes arise when stakeholders see their input materialise in the evolving solution. We apply the same logic in Bansko. Rather than presenting a finished "energy communities' package," we begin by mapping actors and interests. This is followed by joint sessions where different governance options are not only explained but critically discussed. Draft organisational structures are treated as prototypes. Financial models are presented as scenarios open to revision. Each workshop generates new questions, which are then integrated into the next iteration of the solution. The emphasis is therefore not only on persuasion but on empowerment. For example, when participants raise concerns about risk allocation or exit options, these concerns shall not be addressed defensively. Instead, they are incorporated into revised governance drafts. When questions arise about minimum investment size or payback periods, alternative scenarios are developed and presented in subsequent sessions. This process matters for

practical reasons it increases transparency, builds ownership, and reduces implementation risk. The added value is that participation is not understood as consultation, but as a design process. The community energy becomes viable not because it is technically sound, but because it has been collectively shaped, tested and refined under real local conditions. This approach reflects the core idea that the (social) innovation lies not primarily in the technology, but in the methodology of building a governance structure that can endure within Bulgaria's evolving regulatory and infrastructural framework.



Image 3: Service design process. Photo credit: Martin J. Ivanov

The Bulgarian legal framework: what the law allows and what the system still limits. Bulgarian law has recognised two types of EC: Citizen Energy Communities and Renewable Energy Communities since 2023. A further practical step followed in February 2026, when a new chapter of the Electricity Trading Rules introduced a formal basis for active customers and energy communities to participate in the electricity market and to allocate locally produced electricity among their members. This legal opening is significant, but it has not yet become a simple operational pathway. Distribution-system operators still need standardised internal procedures for registering and processing energy-sharing arrangements. Effective sharing also requires remotely readable meters capable of providing data for the 15-minute settlement periods used by the electricity market. For households and apartment buildings, there is still no simple and affordable mechanism for replacing existing meters at scale. The broader supporting environment also remains incomplete. Bulgaria has no specialised one-stop shop, standard contractual package or targeted financing mechanism that can guide citizens, municipalities and small businesses through registration, grid connection, financing and operation. Regulated household electricity prices further weaken the immediate economic incentive for residential participation, while commercial banks do not yet offer products designed specifically for energy communities. The result is a clear gap between legal recognition and practical usability.

For this reason, the first Bulgarian models continue to depend heavily on a large public or commercial consumer with stable and predictable demand, combined with a municipality willing to provide institutional credibility, coordination and access to a suitable site.

Finally, Bulgaria's energy governance has been characterised by frequent amendments and abrupt policy reversals in the renewable energy sector (Ivanov,

2019). This does not directly determine the future of EC, but it influences expectations: participants ask whether rules will remain stable, and municipalities are cautious about long-term commitments. For this reason, our methodology explicitly includes a stage of ‘institutional risk mapping’ where regulatory, administrative and technical uncertainties are discussed openly. Against this legal and technical backdrop, the experience of the first community energy in Gabrovo becomes particularly instructive. It is not a model to copy but as a first honest account of what those constraints mean when you try to build something from scratch.

4. What We Achieved

By the end of the first implementation period (June 2026), the project’s principal achievements were institutional, analytical and methodological rather than technological. A regular coordination structure was established between FSSB,

EnEffect, and Bansko Municipality with a local coordinator acting on site. Between February and June 2026, sixteen internal and joint working meetings were held, and the public kick-off event took place in Bansko on 27 April. This continuous interaction helped move the discussion from general support for renewable energy towards practical questions about governance, membership, investment volumes, risk and the distribution of benefits. A comprehensive communication strategy and action plan were completed. The strategy identifies eight main stakeholder groups and deliberately treats communication as part of the participation process rather than only as project publicity. Plain-language materials, key messages and content for a dedicated section of the Bansko municipality website were prepared and put online. The municipal website was selected as the first trusted public channel, while the more interactive platform for submitting ideas and expressing interest will be introduced once a basic level of awareness and understanding has been established.

A regulatory analysis was also completed and adapted to the specific conditions of Bansko. Initial stakeholder groups and possible pilot contexts were identified, including public infrastructure with predictable consumption, wastewater and water facilities, tourism businesses, apartment hotels and the municipal district-heating company. The district-heating company provides a concrete example of how the project is moving from broad possibilities towards case-specific diagnosis. EnEffect conducted two site visits, inspected the facility with its management and reviewed production data from the previous three years. A follow-up technical visit by the Austrian boiler manufacturer Polytechnik in July 2026 identified obsolete and non-functioning control software, and the resulting inability to operate the system automatically, as major causes of inefficiency and high generation costs. The case is therefore strategically important, but it is not a straightforward community-financed pilot. Its rehabilitation is likely to require phased technical modernisation and a combination of municipal, public and external investment, with community participation playing a complementary rather than exclusive financing role.

The next steps are to complete the needs and perceptions assessment, consolidate the stakeholder map, obtain reliable consumption and ownership

data and evaluate the potential cases against technical, financial, regulatory and social criteria. This process will support the selection of one or two initiatives for detailed co-design and legal, financial and technical structuring.

5. What We Learned[4]

The Gabrovo initiative is widely recognised as Bulgaria's first operational EC. Established in 2023 with the active involvement of the Municipality of Gabrovo and the technical facilitation of EnEffect, the initiative attracted broad local participation and national attention. The first photovoltaic installation was financed through a structured citizen investment model and became a reference point for subsequent initiatives. Following this pilot, a second energy community was formed in Gabrovo, and similar initiatives have been initiated in Burgas and discussed in Sofia, indicating that the model has begun to diffuse beyond its original context. The project built a 181-kW photovoltaic installation at the regional non-hazardous waste landfill. It combined municipal participation with investment by citizens and SMEs, using a transparent profitability model and a structured investment window. Electricity is used primarily for the needs of the landfill operator, while surplus electricity was sold to other municipal sites and revenues were distributed proportionally (Gabrovo Energy Community, 2023).

Our methodological choices in Bansko are strongly shaped by the experiences in Gabrovo. One major insight is that a local coordinator, who is a municipal employee, played a key role in day-to-day communication and administrative coordination (Gabrovo Energy Community, 2023). Then, the techno-economic modelling and project design, supported by the EU-funded project TANDEMS, was the unlocking factor that convinced both the municipal administration and governance structure, and the individual investors, of the viability of the project.

However, what did not work well in Gabrovo is just as important for replication as what worked. A first challenge was legal and administrative ambiguity: practical implementation required repeated interpretation of rules and careful administrative navigation. A second challenge was the limited scope for genuine 'energy sharing' due to the subsidised energy prices, the lack of widespread smart metering and the still-centralised operational logic of the grid. A third challenge was communication. The public needed continuous clarification that this was not another speculative renewable project but a community-owned model with transparent rules.

Finally, the pilot showed how dependent early projects are on strong municipal commitment and a capable local coordinator. Without this anchoring, transaction costs would likely have been too high for citizens to stay engaged.

6. Transferable Insights

The practical lesson for replication is therefore not only 'how to finance' but also 'how to organise': clear municipal support, a trusted local person, and a communication strategy that is sustained beyond the launch moment (Gabrovo Energy Community, 2023). A second transferable lesson concerns sequencing.

[4] Gabrovo as a reference case: what worked well and what didn't, key lessons from the community energy

Participation should not begin by immediately asking people to register, invest or submit project proposals. In Bansko, the communication process therefore starts with awareness and basic understanding through a familiar and trusted municipal channel. It then moves towards direct dialogue, stakeholder research and discussion of concrete options, before opening a more interactive platform

for ideas and commitments. This sequence reduces the risk of inviting participation before people understand the possible models, costs, rights and responsibilities.

7. Looking Ahead

The main lesson from our work so far is that energy communities in Bulgaria will scale only if policy transposition is matched by systemic enabling conditions. Legal definitions are a starting point, not a solution. Secondary regulation, practical guidance for municipalities, and investments in digital infrastructure such as smart metering will determine whether community energy remains an exception or becomes a standard option.

At the same time, the Bansko project shall test whether participation can compensate for some institutional and regulatory weaknesses of the Bulgarian case. If people understand the rules and see that benefits are transparent, they will probably be more willing to accept administrative delays and technical limitations. In a green transition history marked by contested renewable policies, community energy must be built on transparency, simple rules and visible local benefits.

For practitioners, the practical advice is to invest early in governance discussions, not only in feasibility studies. People rarely oppose renewables as such; they oppose unclear costs, unclear control and unclear distribution of benefits. If these issues are addressed openly, energy communities can become a stable part of the local development toolbox.

Bulgaria

3.2. Project II: 0-carbon Trakia Economic Zone (C0TEZ): Foresight. *A Smart Regional Grid: Circularity and Decarbonisation*

Authors: Petar Lulchev M.Sc. and Prof. Dr. Arch. Georgi P. Georgiev (Georgiev Consulting GmbH)

Project Snapshot

Core Idea	-	The C0TEZ project proposes a foresight-based roadmap for transforming Eastern Europe's largest industrial zone - Trakia Economic Zone (TEZ) in Bulgaria, particularly its Carbon Neutral Industrial Park CNIP - into a low-carbon, circular, electrified mixed use large-scale industrial ecosystem through smart utilities management (including a cutting-edge smart grid), sustainable mobility, and a green financing model, creating a scalable blueprint for the EU.
Organisation	-	Dr. Georgiev Consulting GmbH, Cluster Trakia Economic Zone
Country	-	Bulgaria
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	November 2024 to November 2026
Scale	-	Regional scale - Plovdiv region



Image 4: TEZ and CNIP presented by the project coordinator G. P. Georgiev. Photo credit: BTA-Korrespondent in Plovdiv, Bulgaria - Presiana Valkanova

1. Why This Project

The Trakia Economic Zone (TEZ) in the region of Plovdiv, Bulgaria, is part of the most impactful industrial zone in South-Eastern Europe, focusing on the development of its

Carbon Neutral Industrial Park (CNIP) and its transformation towards high-tech, low-carbon industrial developments and operations. It focuses on designing a resource-efficient large-area energy mixed-use community including principles and aspects of circularity and decentralisation, as well as an economy with a focus on sustainable energy.
The focus has been A: the elaboration of a future general picture for a regional energy grid, incl. future energy demand and supply capacities and facilities - exploring the possibilities for preliminary sizing of the electricity generation and storage systems, literature review of novelties and good practices on the relevant energy systems elements and use cases, B: also in the energy efficiency and decarbonisation (resource efficiency increase) context - a review of the transportation systems and road traffic in the Plovdiv area, and preliminary planning for an electrified urban railway (S-Bahn) which has anyway been foreseen but not yet agreed - for the sake of bringing citizens and goods sustainably anywhere needed in the region, with a main focus on TEZ and CNIP as an economic driver, and C: the elaboration of a framework for the provision of green financing instruments for all involved stakeholders as well as for a large-scale unified utilities management system and organisational entity.

2. What We Wanted to Achieve

The leading vision of C0TEZ is the electric metropolitan area as a sustainable development goal, where relevant processes and functions are considered towards a low-emissions multi-use regional complex. Certainly, A: Energy management (demand/supply in the temporal context, especially about renewables; and legal aspects of energy generation, transportation and storage) and B: where storage is needed - are decisive, and therefore the relevant most promising and suitable solutions are being considered. On the other side, a diversified decentralised electric generation portfolio is under consideration, where sunpower, biowaste-energy and a new generation of previously conventional high-capacity energy power generation power stations may be the necessary solutions.
The C0TEZ (0-carbon Trakia Economic Zone) project strongly focuses on overall sustainable regional development as the leading domain - development should consider the region holistically and its various aspects, challenges, and opportunities, rather than focusing solely on standalone industrial and energy supply development (Solakova, 2025). Thus, the project's goal is the elaboration of a comprehensive decarbonisation masterplan for the development of CNIP as part of TEZ in the region of Plovdiv, Bulgaria, which is to be replicated within the transition process of the entire TEZ, and multiple other large-scale industrial projects in Germany and Europe. In other words - to provide a validated long-term Strategic Foresight including feasibility methodology for the sustainable future development of the energy, resource, and infrastructure systems of the CNIP, which will also serve as a replication model for the entire country and Europe. This goal is going to be achieved through the performance of a Strategic Foresight which investigates relevant challenges and explores opportunities and solutions for a set of identified important aspects.
The paper herein presents the Foresight Methodology and Structure, as well as primarily the Initial System Requirements defined, as well as considering some energy system elements, and having first thoughts on the overall grid and future transportation systems.

3. What We Did: Method, Tools and Innovative Character

3.1. Method and tools

The methodology parts for the C0TEZ planning work have thus far included:

- Industrial energy considerations and preliminary calculations;
    - Initial planning of the energy generation and storage capacities in consideration of the initially planned industrial capacities.
- Literature and best practices review;

    - Initial investigation of the challenges and opportunities for agriphotovoltaics (APV).
    - Literature investigation for the comparison of different energy storage systems (ESS).
- Regional mobility
    - Initial investigation of the air quality and road traffic situation in Plovdiv and the surrounding area.
    - Initial planning for a proposed urban railway (S-Bahn) for Plovdiv - review of existing information and public initiatives, and additional refinement of the concept.
- Formulation of a green financing model for the overall necessary CNIP and TEZ smart grid infrastructure and management projects, as well as the future industrial investment projects, together with the leading relevant funds and financial institutions globally and in Europe.
- Constant collaboration on design and validation of the CNIP green financing based low-carbon industrial zone development roadmap, together with leading financing and industrial partners from Germany, Europe and globally. Including utilities and energy management, as well as circularity, and of course transportation and logistics as part of the entire picture.
- Constant verification and validation, with relevant stakeholders from TEZ, globally leading enterprises in smart grid solutions, green financing organisations, experts, NGOs.

3.2. Innovative Character

The innovative character in the C0TEZ project is precisely the large-scale combination of sustainable aspects as foundational principles in the design and development of the CNIP and TEZ, and the direct inclusion of the region in the plan for mutual benefits. A project of such scale and type has not yet been realised in Europe, which is the reason why the DBU has decided to fund such a strategic project. Another innovative aspect is the elaboration of this strategic plan/foresight as a replicable model which can be applied throughout the country, Europe, and beyond, with the goal of creating a closer symbiotic relationship between industrial sites and their regional communities. Other involved innovative aspects are the following:

- Green financing model(s) are being designed and planned to be applied where the achievement of sustainable goals is strictly connected to the provided funding. Additionally, a regional Emissions Trading System (ETS) is planned to be interconnected with the green financing instruments. With these funding frameworks, investors will have an even greater incentive to develop their industrial processes in a sustainable way since these goals will be backed up by solid financial instruments.
- All industrial, commercial, and in the future also residential, facilities in CNIP and TEZ will be a part of a large-scale energy community of mixed type, meaning that the produced and stored energy is optimally shared, transferred, and used according to live monitored data and trends.
- Utilities management will be centralised at CNIP with Operator Matitza being the entity responsible for the operation of the decentralised A. Industrial Zone and B. Energy grid. This will streamline the utilities provision process and their overall management and make it easier for investors to plan their developments and

communicate closely with the utilities entity. Operator Maritsa will be, in practice, a “one-stop-shop” for all the utility provision and development needs of CNIP’s and TEZ’ stakeholders.

CNIP with Operator Maritza will also manage the Emissions Trading System (ETS) for all enterprises settled there - one more “one-stop-shop” asset for TEZ and CNIP, and an especially attractive one for the future investing and operating enterprises there.

4. What We Achieved

Smart grid master plan - energy community of mixed use with a decentralised utilities management system and large-scale, enabled by green financing and regional ETS management - Operator Maritsa.

The intermittent nature of renewable energy necessitates the establishment of efficient links between the grid, energy generation and storage facilities, the consumers, and the recuperation systems. Thus, a smart grid for the CNIP will optimally coordinate energy generation, storage, consumption, and recuperation of energy where possible, while balancing power fluctuations. This will be achieved through the development of the CNIP as a shared energy community of mixed use managed by a unified utilities management system and entity at a large scale. Technologically, this will be achieved through the use of ICT technologies and decentralised energy management and monitoring systems which will enable advanced control over energy production, distribution, consumption, trading, storage, and recuperation. Operator Maritsa will be the centralised utility management entity which will assist in developments planning and utilities provision.

Financially, CNIP and TEZ will integrate green financing instruments, such as green bonds, and regional ETS. This will ensure that investors, industrial companies, and developers will have an incentive to develop their industrial processes in a sustainable way or improve their existing systems, while having relatively easy access to funding. For example, the planned CHP plant will have an incentive to use cutting-edge and optimally efficient systems to extract as much energy as possible while producing as few emissions as possible.

C0TEZ: *Energy planning and sizing considerations*

Initial considerations on the energy planning and sizing for CNIP/TEZ in the context of the foreseen smart grid were performed, including initial estimations for a 4,000 m^2 industrial building and a 75 MW power demand.

Firstly, the amount of energy produced in Bulgaria in 2023 was 40 255 GWh according to the International Energy Agency 2026. More than 2/3 of the energy generated is from nuclear and coal sources, and these are followed by solar PVs, hydropower, and natural gas (IEA).

Secondly, the entirety of TEZ currently consumes 50 MW of electric power from the national grid - there is little to no electricity generated on the industrial zone’s premises. Additionally, for the CNIP, initial industrial capacities and facilities are already planned, with expected future electrical power demand of around 637 MW - to be viewed in Table 2.

However, the power demand for the CNIP is ultimately planned to reach 1 GW. If that load ran continuously throughout the year (8,760 hours), annual electricity demand would be 8,760 GWh, about one-fifth of currently available annual national grid capacity. This amount of energy cannot be sustainably provided by the national grid, so new sustainable generation and storage must be developed for the CNIP.

Table 2: The initially planned energy demand and supply facilities, and their expected electrical power consumption and output, including their initial and further development with time - all units are in MW

Industrial facility	**2030**	**2035**	**Total**
Microelectronics and batteries	60	80	140
Logistics	10	12	22
Data centre	120	330	450
PV production and recycling	15	10	25
Generation capacity	**-**	**-**	**-**
PVs	143	300	443
Biogas, gas and hydrogen (CHP)	150	300	450
Nuclear	-	-	-
Storage system	**-**	**-**	**-**
Li-Ion batteries	125	325	450

Table 2 shows that there are already planned electricity generation and storage capacities and systems; however, a more detailed sizing of the overall power system is needed before further development is initiated.

Table 3 Initial cost estimation for a PV + Energy storage system installation for a 4,000 m2 industrial building (roof and southern facade), and comparison to electricity from the national grid.

System	Capacity	CAPEX [€]	OPEX [€/y]
PV [kW]	78.3	550000	11000
Li-Ion [kWh]	600	180000	5400
CAES [kWh]	600	210000	6300
System cost comparison	1 year [€]	9 years [€]	10 years [€]
National grid electricity	102856.2	925706.1	1028562.3
PV+Li-Ion	746400	877600	894000
PV+CAES	777300	915700	933000

Table 4: CAPEX and OPEX comparison for a PV + Li-Ion storage system installation with a power requirement of 75 MW, and electricity from the national grid for the same amount of power

System	1 year [€]	5 years [€]	10 years [€]
PV+Li-Ion ESS	59805000	65025000	71550000
National grid electricity	16011423	80057115	160114230

Tables 3 and 4 therefore compare the cost of meeting the same assumed demand - 4,000 m² building in Table 3 and a 75 MW requirement in Table 4 - either from the national grid or from PV plus storage. Under the cost and tariff assumptions in those tables, on-site PV + storage becomes cheaper than grid electricity within about a decade, and more so if the PV lifetime of 30+ years[5] is taken into account. That case is strongest for typical industrial and manufacturing loads. For very high, near-continuous loads such as data centres, rooftop PV + batteries alone are not sufficient; other options (including agrivoltaics on agricultural or compatible NATURA 2000 land, or additional firm generation) should be examined.

Moreover, the literature review on APVs has so far yielded the following considerations and recommendations (Fraunhofer ISE, 2017; Zikeli, S. et al., 2019).

- Benefits:
  - Dual use of land area - could be overall more valuable;
  - To allow arable land to be kept for agriculture;
    - inclusive livestock, beekeeping, biodiversity, paludiculture, etc.;
  - Incentive for double business - both agricultural and energy produce;
  - Synergies - weather protection, water retention, irrigation/PV cleaning systems;
    - Plovdiv in summer - dry and hot weather - potential lower plant heat exposure and water savings;
  - Could be implemented in NATURA 2000 areas, and combine it with paludicultures' utilisation;
- Challenges:
  - Lower agricultural yield - depending on the regional conditions and crops;
  - Higher costs of APVs compared to regular PV installations;

Legislation and standards - currently no APV legislation in Bulgaria - APVs not allowed;

4.1. C0TEZ: Regional mobility considerations

This aspect is important to be considered for the following reasons:

- The Plovdiv region is a highly economically active area;
- However, Plovdiv is the economic and logistics centre;
- Challenging regional mobility:
  - The city and its roads, including surrounding roads, are regularly congested with significant increases in travel times;
  - People are commuting both to and from the city;
  - Currently cars are the most viable transportation option;
  - Public transport services are of poor quality and insufficient;
  - Emissions in the city are high due to large amounts of car traffic;

Thus, viable mobility alternatives are required for the whole region. The development of transportation systems will facilitate further residential, commercial, and industrial development. Image 5 shows the road network in Plovdiv and its congested sections.

[5] The economic comparisons and conclusions are based on the specific cost, savings, and performance assumptions presented in Tables 3 and 4 and should be validated against current market quotations, site-specific conditions, and prevailing electricity tariffs before any investment decision.

A proposed alternative is the creation of an S-Bahn-style urban railway using existing railway lines. However, changes still need to be made:

- Raising the railway where needed and creating dedicated overpasses;
- Eliminating level crossings with the roads - to improve safety and reliability;
- Developing new stations in relevant locations to have meaningful network coverage;

The proposed urban railway network concept can be viewed on image 5. (banker.bg, 2022) (MTC, 2022) (BTA, 2023) (asenovgrad.net, 2023) (National Board of Tourism - Bulgaria, 2023) (Regional Administration Plovdiv, 2023)

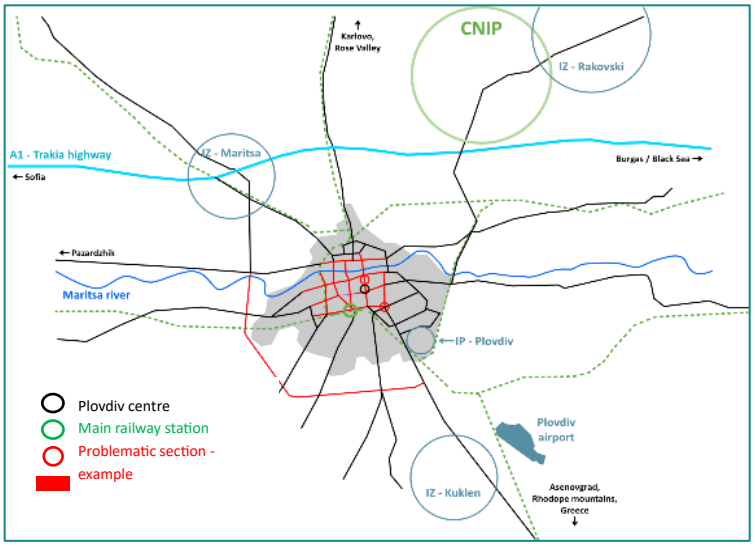


Image 5: Road and railway map of Plovdiv and its surroundings. Photo credit: Georgi Georgiev

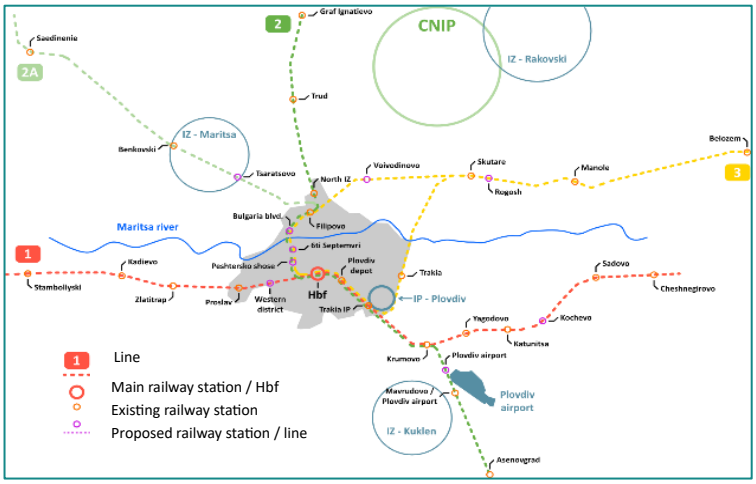


Image 6: Possible urban railway (S-Bahn) network for Plovdiv. Photo credit: Georgi Georgiev

5. What We Learned

- Firstly, the project team emphasises the obvious need for central planning and management of the CNIP development process, as well as the low-carbon transition of the entire TEZ. including utilities management.
- The project team is negotiating with globally and EU-wide leading green financing providers on particular green financing opportunities. CNIP needs flagship investors, and means of sustainable financing for investors and stakeholders in TEZ.

- It has to be noted that for the work that has been done thus far, some assumptions have been made, due to the preliminary phase of the planning. However, with the advancement of the CNIP development plan, greater detail will be added and assumptions will be clarified. Examples of such assumptions are: public approval and regular usage of the proposed urban railway; the development and implementation of APV legislation in Bulgaria; energy grid elements investment projects; general assumptions for the initial calculations; etc. Thus, more detailed work is to be carried out for all aspects of the development plan.
- An important lesson learnt is the need for a smart energy management system if the energy is to be efficiently generated, stored, used, traded, and recuperated. To achieve greater overall sustainability, the presence of renewable energy sources and ways to store energy is only half of the problem - there also needs to be a smart system at the foundation of the design which will monitor the energy flow, the needs of the consumers, and will make informed decisions to make sure that all the energy is captured and used optimally.
- There is a critical need to survey the public's opinion in the Plovdiv area and their attitude towards the creation of an urban railway.
    - Additionally, various urban and transportation planning experts will also be surveyed.

6. Transferable Insights

- To develop industrial zones and parks with the goal of being sustainable, there should be a foundational focus, from the ground up, on all levels of sustainability
- This will ensure that the design follows this focus from the beginning and every development is structured around this, rather than adding sustainability measures haphazardly.
- The eco-industrial park or zone should be developed as a connected and integral part of the region, and should not be treated as something existing in its own bubble. This will ensure that the development will provide greater benefits to the region, will create more opportunities for increasing social sustainability, and will create more opportunities for the local communities.
- Smart energy management is key for optimising the energy generation and usage. Only having the renewable and circular energy infrastructure is not enough to achieve the optimal generation-usage cycle. There should be constant monitoring of various aspects (weather, consumption, usage patterns, energy prices) and the live adjustment of energy storage, usage, and trading.
- Green financing is necessary and should be considered for every eco-industrial park to ensure that sustainable goals will be achieved while providing return on investment to the involved stakeholders.
- The choice of various transport modes should be provided so that people can have viable alternatives to car transportation whenever possible, thus bringing both environmental and social benefits. These can include: less road traffic in the region, lower overall emissions from cars, health benefits from walking or taking a bike, employees spending less on fuel and maintenance for their cars, etc.
- APVs should be considered as a viable solution for optimising land use and creating new synergies between energy and agricultural production. This is significant because this will create more opportunities for collaboration than conflict between industry and agriculture in terms of land use.

7. Looking ahead

The next work steps described below coincide well with the C0TEs work plan for 2026. These steps can be summarised by further considerations, definitions, and preliminary design/engineering of the following:

- The more detailed preliminary CNIP smart energy grid, based on considerations and sizing of the following:
  - Electrical power generation capacities;
  - Energy storage systems;
  - Agriphotovoltaics (APV) recommendations;
  - Smart energy management and installation;
  - Emissions calculations;
  - Energy community design considerations;
  - Multilateral benefits in the context of smart energy grids efficiency - agriculture innovation - climate change effects utilisation (making agriculture significantly more efficient through implementing APV in combination with local food processing)
- Transport and logistics systems - regional mobility, and industrial park logistics:
  - Plovdiv urban railway (S-Bahn) - more detailed overall plan of the electric transport network;
  - Industrial Park connections - bus lines, dedicated bike paths, EV-networks incl. charging and utilisation for internal and regional logistics - links to circularity, etc.;
- Further consideration on the overall industrial zone development management - utilities, carbon reduction & emissions management services, green financing, and infrastructure development provision;
- Designing a sustainable green financing solution which is to be offered by and in collaboration with TEZ.
- Collaboration with relevant thematic networks and knowledge carriers from the relevant subdomains of the complex interdisciplinary system of systems envisaged and necessary at CNIP.
- As next significant steps – a) design and validation of a CNIP smart grid management unit, and b) design and execution of projects under the European Innovation Fund (large-scale undertakings with key flagship investors) - on setting up and developing the core smart grid infrastructure and management systems, including for the overall utilities management.
- Green financing models - the setting up of the concrete future financing framework for CNIP and TEZ which will include green financing instruments and a regional ETS model.
- Setting up of the detailed framework of the unified utilities management system under Operator Maritsa as the managing entity.

Considerations and framework development on centralised regional ETS management by Operator Maritsa for stakeholders in CNIP and TEZ.

IV. Czechia: CommUnion – Community Energy Unions in the Czech Republic and Germany

Authors: Janina Kosel (BBEn), David Blažek (Frank Bold Society), Aron Tkadleček (Hnutí DUHA)

Project Snapshot

Core Idea	-	The project aimed to democratise and decarbonise the Czech energy sector by building a professional community energy movement - drawing on German experience to empower umbrella organisations (UKEN) while enabling the German partner to develop new consultancy and coaching services.
Organisation	-	Bündnis Bürgerenergie e.V. (BBEn, Germany); Frank Bold Society, Hnutí DUHA – Friends of the Earth (Czech Republic)
Country	-	Czech Republic, Germany
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	January 2023 – December 2025
Scale	-	Cross-national and national level



Image 7: UKEN's Annual General Meeting, 27.3.2025. Photo credit: Petr Zewlakk Vrabec

1. Why This Project

The context of the Czech Republic energy sector is that it heavily relies on coal and fossil fuels. Approximately half of electricity comes from coal. The energy sector is to a large extent controlled by large corporations, which both own and maintain the infrastructure as distributors and at the same time operate as the biggest electricity traders (Ciarreta &

Zarraga, 2017). At the turn of 2021 and 2022, we in organisation Frank Bold and Hnutí DUHA saw a window of opportunity to change the Czech energy system. We brought the concept of community energy into the debate on decarbonisation, which, in the Czech context, acts as a highly disruptive element with its emphasis on democratisation and decentralisation. An element that can broaden the debate on how to achieve ambitious climate goals.

A specific legislative window of opportunity was the transposition of the RED II (Renewable Energy Directive), which was transposed into Czech law from January 1st 2024 in the so-called “Lex RES II” and “Lex RES III.” Lex RES II introduced the concept of energy communities into Czech law and brought in energy sharing.

2. What We Wanted to Achieve

CommUnion is a Czech-German partnership that has built a strong ecosystem for community energy in the Czech Republic by professionalising the newly founded Union for Community Energy (UKEN), while simultaneously strengthening the consultancy and coaching capacity of Bündnis Bürgerenergie (BBEn) in Germany - bridging the experience gap between Western and Central European citizen energy movements.

Whereas BBEn in Germany is a long-established umbrella organisation, which represents over 500, 000 citizens, and community energy has a long tradition in the country, the situation in Czechia is quite different. Despite the fact that there existed a vital ecosystem of democratic energy cooperatives before the communist era too, the idea of community energy was barely present both in the praxis and public space a few years ago. Organisations Frank Bold and Hnutí DUHA decided to bring this idea to the public. First, Union for Community Energy was initiated as a label for gathering actors who were interested in the topic and jointly pursuing political changes, which would enable community energy deployment. Later UKEN became institutionalised and formalised the membership. The goal for the Czech Republic was to strengthen UKEN as the key player in community energy - grow membership, professionalise the organisation, and build expertise through mentoring from BBEn. And hand in hand overcome barriers to community energy development - legislation, awareness and practical know-how.

In Germany, the situation in the energy sector seems better in the point of reliance on coal; however, the aim of meeting 80% renewable electricity target by 2030 signalled the need to expand citizen energy (EEG, 2023). The goal for Germany was to strengthen BBEn's position by developing new consultancy and coaching services, transferable to other EU countries.

3. What We Did: Method, Tools and Innovative Character

3.1. Method and Tools

Building UKEN in Czechia, from an Informal Coalition to a Professional Organisation - Starting as an informal group of 15 stakeholders interested in community energy in March 2022, through the years UKEN became an official interested association and grew to more than one hundred members by 2025. Newly formed energy communities, municipalities, private enterprises and NGOs are represented.

There were three working groups for UKEN members established: *Legislative*, *Project Know-How*, *Grants & Funding*. The Legislative group actively monitors the regulation process,

collects feedback from members and collect points for advocacy work. The Project Know-How group focuses on technical and organisational challenges of the energy communities and shares good practice. The Grants & Funding group monitors the financial opportunities and focuses on discussing sustainable financial models for energy communities. The working groups meet regularly online approximately once every two months. All members meet once a year in person at the General Assembly, which elects a council and approves an Annual Action Plan. UKEN team - of the UKEN main coordinator, coordinators of the working groups and PR specialist expanded in autumn 2024. Previously, the personal capacities of Frank Bold and Hnutí DUHA were invested in the UKEN work, now internal capacities are engaged too, as UKEN managed to build its own team.

Legislative Advocacy and Policy Influence - The UKEN key role showed up in collaborative formulation of common positions and policy recommendations with members. Therefore, UKEN was established as a key partner for Czech public institutions (Energy Regulatory Office, Ministry of Industry and Trade, Ministry of Environment). An important part of the work on advocacy was participation in the Energy Regulatory Office's working group preparing implementing legislation for electricity sharing.

UKEN performed successful pushback against conventional electricity suppliers' attempts to delay the launch of electricity sharing. Finally, the Lex RES II, introducing energy sharing was approved by all political parties represented in parliament and electricity sharing successfully launched in August 2024. By the end of 2025, more than 1 GWh of electricity had already been shared. By the beginning of 2026, cumulative shared electricity had reached 63 GWh (Elektroenergetické datové centrum, 2026), roughly the annual consumption of a town of 15–20 thousand households. Lex RES II has also introduced the legal form of energy communities according to the European RED II directive. There were more than one hundred communities registered at the beginning of the year 2026. In the second phase, in the Lex RES III approval, UKEN proposals were partially incorporated into the bill. Sharing from batteries, flexibility and EV charging stations were enabled.

Practical Support and Education - A little less visible, but at least as important as the political and legislative role was the practical support of energy communities' deployment. Alongside opening the possibility of energy sharing there emerged a strongly felt need to practically show how to carry out the process. Therefore, UKEN team conducted the manual *How to Start Sharing Electricity* - step-by-step guide for energy communities. For the narrowed topic of wind energy, the manual *How to Prepare for Sharing from Wind Farms w*as written in cooperation with the relevant actors. UKEN achieved a broad personal outreach and delivered over 50 presentations for professionals, mayors, and the general public and 10 half-to two-day training sessions. In cooperation with the Ministry of Environment was formed the Platform *for Establishing Energy Communities*, based on networking and sharing good practices examples for pilot energy communities' projects. Both advocacy and educational work of UKEN were heavily supported by significant media outreach. UKEN and its positions, recommendations or views were presented in 350 media outputs, 14 TV appearances and reached of 35 million views. Members of the coordination team wrote 50 articles on the UKEN website, published 24 press releases. UKEN LinkedIn collected 1,500 followers, 700 of which in one year. Newsletters have approximately 10 editions per year, and the subscriber base grew to five thousand contacts.

Cross-Country Support - Czech-German cooperation was an important factor behind what we have achieved in Czechia. UKEN, a young Czech association, benefited from mentoring

and knowledge sharing from the association of similar type, but a much richer history and fruitful experience - German BBEn. We held regular online calls and personal meetings in Berlin and Brno, covering topics such as member acquisition strategies, organisational development, PR, policy advice or financing.

The advisory board also played an important role; actors from various sectors were represented - the European umbrella organisation for energy cooperatives RESCOOP.EU, Open Society Foundation, Bürgerenergie Thüringen and Czech solar association - sector organisation for the solar business companies. Three in-person meetings with advisory board members took place. Developing BBEn's Consultancy Services in Germany - Within the CommUnion project, Bündnis Bürgerenergie e.V. (BBEn) further developed its role as a support and consultancy hub for community energy actors in Germany. While BBEn has traditionally focused on networking and advocacy for citizen energy, the project enabled the establishment of a structured consultancy and coaching offer designed to support citizen energy initiatives, energy cooperatives, and municipalities in implementing concrete projects.

The demand for such advisory services has increased significantly in recent years. Citizen energy actors are often confronted with complex regulatory requirements, financing challenges, and organisational questions. At the same time, cooperation with municipalities is becoming increasingly important, and there is growing international interest in the experiences of the German citizen energy movement. Against this background, one of the project's goals was to further develop BBEn as a central advisory and knowledge hub for community energy. As part of this effort, internal structures for consultancy services were first established. These include defined processes for handling advisory requests, a pricing model, contract templates, and a collection of methods for advisory workshops. The consultancy approach combines process-oriented and technical expertise and is delivered through online sessions or on-site workshops.

The newly developed advisory services were tested through pilot coaching activities. In Germany, for example, a citizen energy initiative in Heikendorf was supported in preparing the establishment of a citizen energy community. The coaching focused, among other things, on deciding whether to establish a new cooperative or instead create a local branch of an existing nearby energy cooperative as part of participation in a wind energy project. This pilot phase provided valuable insights into the advisory needs of municipalities and citizen energy initiatives and helped further refine the consultancy services.

Another project activity was a consultation in Czechia, where in 2024, BBEn supported the newly founded Hnutí DUHA Energy Cooperative, initiated by the project partners, which aims to establish one of the first bottom-up citizen energy initiatives in the Czech context. The advisory process included two preparatory online meetings with the cooperative's board and team members, followed by a full-day workshop in Prague in November 2024. The workshop focused on strengthening internal team structures, defining criteria for evaluating potential projects, and identifying realistic next steps for the cooperative's first pilot project.

In parallel, a series of practice-oriented guides was developed to address key challenges faced by citizen energy projects and to form a knowledge base for BBEn's advisory services. These include guides on tendering procedures and exemptions for citizen energy companies, quality criteria for citizen energy communities, and photovoltaic installations on municipal roofs with participation of citizen energy communities.

Two guides are particularly central as they address structural challenges for citizen energy.

- *The guide on financing citizen energy projects* explains how projects can be financed through a combination of equity, cooperative participation, loans, and public funding schemes. As access to financing often represents one of the biggest barriers for citizen energy projects, this guide provides important guidance for developing viable business models.
- *The guide on cooperation models between municipalities and citizen energy cooperatives* in wind and solar projects, with a particular focus on the GmbH & Co. KG model, addresses the growing importance of municipal cooperation for the expansion of renewable energy. It demonstrates how joint project structures can be designed to strengthen local value creation, enable citizen participation, and increase local acceptance of renewable energy projects.

All guides were complemented by accompanying webinars, which facilitated exchange with practitioners and also served as entry points to BBEn's consultancy services. In this way, the project contributes to establishing BBEn as a long-term advisory and knowledge centre for citizen energy in Germany and beyond.

3.2. Innovative Character

Besides the innovation of introducing community energy in the Czech context itself, the innovative nature of the project can be seen primarily in integrating previously fragmented approaches to the development of community energy into a comprehensive, practice-oriented support system. In the Czech context, the transition from isolated initiatives to an institutionally anchored platform (UKEN), which simultaneously serves advocacy, coordination, and educational roles, represented a fundamental shift. The innovation was particularly evident in the integration of legislative work with practical implementation on the ground, where the organisation not only helped shape the regulatory framework for electricity sharing but also reacted with great flexibility and provided methodological and capacity-building support for its practical implementation.

Another significant innovation was the ability to link the national level with international cooperation, particularly through systematic mentoring by the German organisation BBEn, which enabled the transfer of best practices to the Czech context and secondly, using advisory board knowledge to form and prioritise ways of activities.

4. What We Achieved

In the Czech context, the three crucial aspects that were achieved were:

- Approving energy sharing legislation and opening the possibility of energy communities establishment
- Bringing the topic of community energy to public space and attracting broad public interest
- Forming UKEN as a strong and long-term sustainably working sector association for actors in the field of community energy

5. What We Learned

We appreciated the structure of regular partner meetings, which maintained momentum and knowledge sharing. Also, the advisory board was a valuable source of independent perspective on strategic questions. It has shown that knowledge transfer works in both

directions - both Czechia and Germany benefited mutually. Cross-border cooperation certainly has a bigger potential for the wider Central European region.

On the other hand, we realised that despite cross-country mentoring being valuable, context matters - not everything is transferable one to one. For the advocacy work, legislative windows of opportunity are crucial and positions and recommendations must be prepared in advance. The possibility of implementing energy sharing in Germany was affected by political uncertainty - government collapse in November 2024 - which prevented planned legislative activities.

In Czechia, energy communities that emerged after the Energy Sharing regulation are organised mainly through municipalities and companies, not through bottom-up cooperatives as in Germany. Therefore, some experiences had a limited transferability of the Western model. This observation also shows a limitation of implementing community energy “from above” in the context of a semi-periphery of the global economy, with structural outflow of capital.

UKEN coverage of both energy communities, municipalities and private sector actors seems unique and contributes to the success in advocacy work. Combining legislative advocacy with practical project support makes UKEN relevant for members and policy-makers alike. On the other hand, UKEN has to reflect the first-ever member outflow of eight actors now. Diverse members have diverse needs; there is a pattern of discrepancy between energy communities' requirements for clear legislative support of non-profit and local based initiatives and the private sector preferring a more flexible approach and energy sharing with minimum restrictions.

The strong media strategy in Czechia paid off. Community energy went from an unknown topic to mainstream coverage. Practical examples and manuals proved to be the most effective tools for motivating new actors.

With regard to the establishment of the Hnutí DUHA energy cooperative initiative, the advisory process provided by BBEn revealed an important insight: instead of building large volunteer structures or developing complex theoretical business models, the cooperative should focus on forming a small, motivated core team and implementing a first tangible pilot project. This pragmatic approach - summarised by the principle “progress over perfection” – proved particularly relevant for emerging citizen energy initiatives in Central and Eastern Europe, where practical experience and visible results are crucial for building momentum and credibility.

6. Transferable Insights

- Start with a flexible coalition and formalise gradually - an informal platform can effectively mobilise stakeholders at the beginning, but institutionalisation (clear membership, governance, annual assembly) is essential for long-term credibility and policy influence.
- Combine advocacy with hands-on implementation support - policy influence is significantly stronger when accompanied by practical tools such as manuals, training, and real-world pilot support for stakeholders.
- Use legislative “windows of opportunity” strategically - readiness to act during momentum (as in the energy crisis in our case) is critical; policy proposals must be prepared in advance to be effective when political momentum emerges.

- Ensure strong cross-border knowledge exchange, but adapt it locally - international mentoring (e.g. Czech-German cooperation) accelerates development, but models must be adapted to institutional, cultural, and market differences.
- Expect heterogeneity within stakeholder coalitions - diverse membership (NGOs, municipalities, private sector) increases impact and enables pushing progressive changes but requires careful balancing of expectations and interests.
- Maintain continuous feedback loops between practice and policy-linking real-world implementation experience with legislative advocacy - improves both relevance and feasibility.

7. Looking Ahead

The reality of energy sharing in energy communities in Czechia faces significant challenges. Electricity sharing is up and running, but mass adoption remains to be seen. The communities' economic model based solely on mediation of electricity sharing from solar panels of the community members, without owning the energy sources and involving other energy sources than solar energy, does not seem able to generate a sustainable economic model for the sustainable community functioning - first and foremost the personnel costs. Important regulations remain to be implemented to enable successful community energy deployment. There are technical barriers which make energy sharing difficult. The positive effect of local energy sharing for the grid is not taken into account in the price for distribution. Communities face reduced capacity of the grid and cannot build and connect new energy sources. Subsidies will also be a key factor, UKEN is engaged in preparing the Komunerg programme under the Modernisation Fund intended for energy communities.

Additionally, from a German perspective, the project highlighted how strongly the further development of citizen energy depends on political framework conditions – and at the same time how important continuous professional preparation and advocacy are. This became particularly visible in the case of energy sharing. In November 2025, a legal basis for energy sharing was established in Germany for the first time. This finally anchored a long-standing key demand of Bündnis Bürgerenergie e.V. (BBEn) in law. However, BBEn emphasises that this breakthrough is only a first step: from the association’s perspective, implementation remains incomplete, economically still only partially viable, and difficult to apply in practice. In particular, missing incentives, legal uncertainties, and continuing barriers related to smart meters and digitalisation are slowing down broader adoption.

For the project, this had two implications. On the one hand, it confirmed that BBEn’s consultancy services, guides and webinars address exactly the right structural challenges. In an environment where new legal opportunities are emerging but are not yet fully workable in practice, citizen energy actors need orientation, contextualisation and concrete support in developing viable business models. On the other hand, it also became clear that legal introduction and practical applicability do not automatically coincide. The debates in 2025 brought energy sharing more strongly into the political spotlight and strengthened it as a future model for citizen energy, but they also demonstrated that further improvements are needed for the legal framework to become an effective instrument for local value creation, participation and system flexibility. In this sense, the project underlines from a German perspective how important it is to closely link policy work, knowledge dissemination and practical advisory services.

V. Greece and North Macedonia: Solar Community Garden. Pioneering Community-Led Urban Agrivoltaics in Greece and North Macedonia

Authors: Dimitris Kitsikopoulos, Ioanna Angelaki, Alexandros Koutras (Electra Energy), Aleksander Gjorgjievski (ASSED Sunrise)

Project Snapshot

Core Idea	-	Develop and demonstrate a scalable, community-based urban agrivoltaic model that combines solar energy generation with food production — the first of its kind in both countries.
Organisation	-	Electra Energy cooperative (Greece), ASSED Sunrise (North Macedonia) and CommonEn Energy Community (Greece)
Country	-	Greece (Ioannina) | North Macedonia (Skopje)
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	2023–2026
Scale	-	Two pilot systems of ~5–10 kWp each. Cross-national in Greece (Ioannina) and North Macedonia (Skopje)



Image 8: The semi-transparent agriPV in EPROPSI in Ioannina (May 2026). Photo Credit: Electra Energy

1. Why This Project

Greece and North Macedonia are countries where citizen energy is still finding its feet. Energy communities - cooperative models that allow citizens, municipalities and local SMEs to jointly produce, save, and manage energy - are legally recognised but face numerous barriers: fragmented regulation, limited public awareness, scarce financing instruments, and a lack of practical know-how at the local level.

Agrivoltaics (Agri-PV), which combine solar panels and agricultural cultivation on the same land, take this challenge one step further. While the technology exists, no community-led

urban agrivoltaic project had ever been implemented in either country. Cities in the region face a triple pressure: the need to decarbonise energy systems, the shrinking of local food supply chains, and increasing social vulnerability due to energy poverty and high energy prices. The Solar Community Garden was conceived as a direct response to this gap - a living proof-of-concept that citizens, municipalities and local organisations can join forces to build something genuinely new. If it can be done here, it can be done anywhere in the Balkans and beyond.

2. What We Wanted to Achieve

The project's goals were both practical and systemic. On the ground, the aim was to design and install two small-scale urban agrivoltaic systems - one in Ioannina (Greece) and one in Skopje (North Macedonia) -capable of producing clean electricity for on-site use, covering some of the energy needs of local facilities, and growing organic food as part of community life.

But the broader ambition ran deeper. The team wanted to:

- Co-create the systems with local citizens and stakeholders from the very beginning, ensuring genuine community ownership;
- Map and engage local actors -municipalities, NGOs, universities, research centres, schools, and businesses - to build durable local ecosystems;
- Develop a replicable business model that others can adapt, particularly in CEE and Balkan contexts where citizen energy is emerging;
- Connect the two pilot cities across national borders, enabling cross-country knowledge exchange between Greek and Macedonian practitioners;
- Feed into European-level policy support and knowledge-sharing through forums, publications, and partnerships.

3. What We Did: Methods, Tools, and Innovative Character

3.1. Methods

Balanced Readiness Level Assessment

The team applied the Balanced Readiness Level (BRL) framework - developed by J. Vik (2021) - to assess the maturity of the community agrivoltaic concept across five dimensions: Technology (TRL), Regulatory (RRL), Market (MRL), Organisational (ORL), and Acceptance (ARL). The analysis showed that while the technology itself and public acceptance are relatively advanced, the main bottlenecks lie in the regulatory, market, and organisational dimensions. This framework helped the team communicate clearly where barriers exist and prioritise their advocacy and capacity-building activities.

3.2. Tools and instruments

Co-creation with stakeholders (local actors): building alliances from day one

The project opened not with equipment or permits, but with conversations. Both Electra Energy in Ioannina and ASSED Sunrise in Skopje began by systematically mapping the local landscape: who were the key players, what did they know, what did they need, and how could the Solar Community Garden become relevant to their world? In Ioannina, this led to connections with the Municipality, local businesses, engineers, educators, and, critically, the Epirus Living Lab, a multi-stakeholder innovation ecosystem bringing together academic, civic, and entrepreneurial actors. In Skopje, ASSED Sunrise reached out to multiple municipalities (Municipality of Center, Gjorce Petrov, and Aerodrom), academic institutions, and existing agricultural cooperatives.

This relational groundwork proved essential. Without it, finding a viable site, one of the project's biggest challenges, would have been nearly impossible.



Image 9: Workshop in Ioannina. Photo credit: Epirus Living Lab

Co-creation with stakeholders (energy professionals): workshops and events that changed the frame

One of the highlights was the organisation of workshops and events in Skopje and Ioannina, as well as in Athens, specifically focused on urban agrivoltaics. These participatory sessions gathered specialists from the energy community sector, municipal planners, and researchers to co-define what an ideal community-led Agri-PV system would look like for urban contexts.

The results were structured into a priority framework across several dimensions: organisational model, stakeholder composition, business model, and technology/process choices. The top-priority features that emerged were: an energy community governance model, active involvement of citizens and municipality, self-consumption of electricity, semi-transparent solar panels to allow organic crop growth, and smart electricity management systems to optimise self-consumption. This output directly shaped the design approach for both pilots.



Image 10: Workshop in Skopje. Photo credit: ASSED Sunrise

Co-creation with stakeholders (new partners): a story of social innovation with EPROPSI

In Ioannina, after an initial search for municipal land proved unsuccessful (a planning authority rejected the application on grounds that solar installations are not explicitly listed as permitted uses in public spaces - a common regulatory ambiguity in Greece), a solution emerged from within the community itself. A member of the CommonEn energy community proposed an alternative: the premises of EPROPSI, the *Society for the Promotion of Mental Health* in Ioannina.

EPROPSI operates a residential facility for people with mental health challenges, housed in a historic building in the city centre, owned by the Holy Metropolis (Church) of Ioannina. After a series of meetings with both the organisation and the Church, all parties agreed: the lease would be renewed, and the agrivoltaic system would be built to benefit the facility's residents. The expected quantitative impact in Ioannina and Skopje is 9.8 MWh produced annually and 196 MWh over the project lifetime; 3.9 tCO2 savings annually and 78 tCO2 savings over the project lifetime; 0.5–1 tonne of vegetables production annually and 10–20 tonnes of vegetables over the project lifetime; savings from reduced electricity bills and vegetable production of €2,700 annually and €54,000 over the project lifetime; 23 direct beneficiaries with access to food and energy; 440 annual visitors (schools, researchers); and 45 people trained annually (students, practitioners).

This is more than a site selection story. The integration of the Solar Community Garden with a mental health facility opened up an entirely new dimension of social impact: the therapeutic value of gardening and connection with nature for the residents, the production of local food

contributing to the facility's nutritional needs, and educational activities bringing schools and local citizens to the site in ways that help break the stigma around mental illness. Community-driven problem solving, at its best.

3.3. Innovative character (Stories from the field)

The Onassis Foundation and SolarHub recognition

The innovative character of the project was recognised by the Onassis Foundation, which offered a €10,000 donation and promotional support — a signal of credibility that strengthened the team's ability to engage other funders and partners. It also attracted the strong interest of SolarHub, a Greek-Turkish excellence hub focused on solar technologies. Several SolarHub partners emerged as key collaborators: METU University contributed knowledge transfer, Brite Solar served as the technology provider for nano-technology semi-transparent PV panels, and CRES and CERTH offered design guidance.

The Energy Communities Forum: how community-based agriPVs should look like?

Working with European community energy partners, the project team coordinated the first-ever open session on "Community AgriSolar" at the annual Energy Communities Forum of RESCoop.eu. Over 40 participants joined — representing energy communities, municipalities, research institutions, and civil society from across Europe. The participatory session helped draw out the key characteristics of community-based agriPVs and establish agrivoltaics as a legitimate and pressing topic within the citizen energy movement, while also giving the project significant visibility. The community-based agriPV concept developed at the Forum was further enriched through input from the workshops in Ioannina and Skopje, and presented as a scientific poster at the Municipalities Hearth Summit held in Athens in 2024.

4. What We Achieved

Despite the implementation timeline being longer than originally planned, the project has generated meaningful outcomes across multiple dimensions:

Table 5. What was achieved

Tangible Outputs • Agrivoltaic system (5.4 kWp) installed at the EPROPSI facility in Ioannina, generating renewable energy for the facility • Site secured and preparatory work completed for the North Macedonia pilot in Skopje	Community & Systemic Impact • New collaboration with EPROPSI integrating energy, food, and mental health • Municipal partnerships in both cities, aligned with local climate strategies
• Research framework and replicable business model documented • Scientific poster presented at the HEARTH Summit • Pathway for energy cooperatives developed for North Macedonia	• EU SolarHub project collaboration and knowledge transfer • €10,000 Onassis Foundation donation and promotional support 40+ practitioners engaged at the first Community AgriSolar session in Europe and 300+ participants in events and workshops

5. What We Learned

What worked well

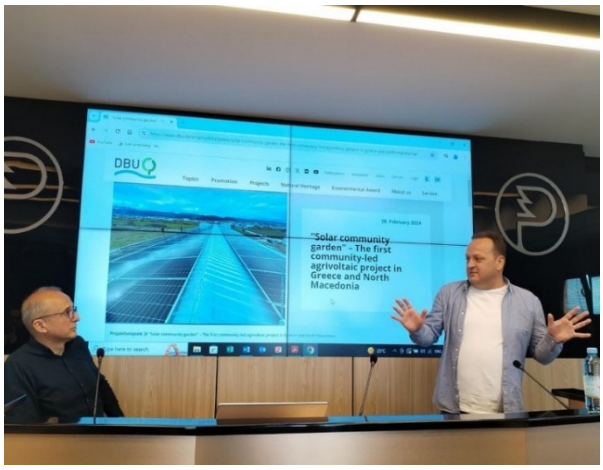


Image 11. Presentation at the SunSharing event in Skopje. Photo credit: ASSED Sunrise

- *Community-driven problem solving*: The best solutions came from within the local networks. The EPROPSI site idea in Ioannina and the Gorce Petrov collaboration in Skopje were both identified and driven by community members, not top-down planning.
- *Early and wide stakeholder engagement*: Investing time in relationships before anything else paid off - in credibility, in site access, and in momentum.
- *Aligning with municipal strategies:* Linking the project explicitly to the Municipality of Ioannina's 2030 Climate Neutral City plan opened doors to joint research, school visits, and public visibility, even when the municipality could not provide land.
- *Cross-border networking*: Working across two distinct regulatory environments allowed each team to benchmark progress and co-develop solutions, while the joint Greek-Macedonian dimension carried symbolic value for European stakeholders - signalling that citizen-led energy transition can bridge national boundaries in a region where cross-border cooperation remains underexplored.
- *Adaptive management and flexibility*: When the initial plan to install the agrivoltaic system on municipal land was blocked by regulatory ambiguity, the team did not stall - it pivoted. By staying embedded in the local community and keeping communication channels open, a new and ultimately richer opportunity emerged: the collaboration with EPROPSI. This experience confirmed that building in decision-making flexibility - and treating setbacks as signals to explore alternative pathways - proved essential for keeping the project on track.

What proved difficult

- *Finding suitable urban land*: This was the most significant and time-consuming challenge in both cities. Regulatory ambiguity, competing uses, and institutional inertia created repeated delays.
- *Regulatory gaps*: In Greece, PV installations on public land exist in a legal grey zone. In North Macedonia, the absence of an energy communities law means that the cooperative model has no clear legal vehicle. Both contexts require urgent policy attention.



Image 12: Meeting with EPROPSI personnel in Ioannina. Photo credit: Electra Energy

- *Reliance on non-local suppliers*: Equipment and even installation expertise largely came from outside Ioannina. This raised costs and coordination complexity. Future projects should source locally wherever possible.
- *Funding uncertainty*: Promising co-financing from USAID for the North Macedonia pilot was affected by international political events beyond the project's control, causing delays.

6. Transferable Insights

For practitioners starting similar work:

- Start with people, not technology (that could follow). Build your local ecosystem before you think about panels or permits. Trust takes time and is worth every hour.
- Anchor to municipal plans. Find out what your local authority is already committed to (climate plans, urban renewal strategies, school programmes) and connect your project to it.
- Expect regulatory surprises and plan for them. Permitting in urban areas is harder than you think. Budget time, legal support, and patience.
- Source locally. Use local engineers, technicians, gardening experts, and suppliers as much as possible. It saves money, time, builds local capacity, and keeps the community spirit genuine.
- Use the BRL framework. Assessing your project across Technical, Regulatory, Market, Organisational, and Acceptance dimensions helps you identify real bottlenecks and communicate them to funders and policy makers.
- Think multi-benefit from the start. The combination of energy + food + mental health at the EPROPSI site multiplied the project's social value and stakeholder support. Don't limit your ambition to one benefit stream.
- Go to European forums. The Community AgriSolar session at the Energy Communities Forum in Prague opened connections, built credibility, and helped shape a European conversation. Small projects can have big reach.

7. Looking Ahead

Citizen Energy in Greece and North Macedonia

We are optimistic, but clear-eyed. Both countries have the social capital, the sunlight, and the civic motivation to make citizen energy a real force. What is missing is an enabling institutional infrastructure: clearer laws, simpler permitting procedures, accessible financing tools, and a generation of local practitioners who know-how to design, build and operate these systems.

The Solar Community Garden is pointing toward exactly that. Drawing on everything learned during this project, Electra Energy is developing an end-to-end economically viable service for *Community-led Urban Agrivoltaics* - covering site selection, permitting, engineering, community engagement, financing facilitation, and operations. The goal is to extract the know-how from the Ioannina and Skopje pilots and turn it into a replicable, scalable service model that other cities across Greece and the Balkans can access.

VI. **Hungary**: HU-GE Transformator – HUngarian-GErman Cooperation for TRANSFORMing Community Energy *(1.0 and 2.0)*

Authors: Janina Kosel (BBEn), Anita Szőllőssy (SEC) and Dávid Gelencsér (SEC)

Project Snapshot

Core Idea	-	Supporting the decentralisation of the energy system in both countries. A Hungarian-German cooperation to strengthen community energy through cross-border learning, knowledge exchange, advisory support, municipal partnerships, and the development of new community-led energy models.
Organisation	-	Bündnis Bürgerenergie e.V. (BBEn, Germany); Solidarity Economy Centre Association (SEC, Hungary)
Country	-	Hungary with exchange activities in Germany
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	First phase: 2023 - 2024 / Second phase: 2025 - 2027
Scale	-	Cross-national but also national level down to municipal level



Image 13: Márton Fabók at the 3rd Community Energy Conference on energy communities opportunities. Photo credit: Solidarity Economy Centre Association

1. Why This Project

Although the topic of community energy has spread rapidly across Europe in recent years, there are significant differences between countries. While countries like Germany have

already built a strong network of citizen-led energy initiatives, the movement is only beginning to take shape in Hungary.

While the maturity level of citizen energy is different in both countries, the challenges are often similar: grid access difficulties, squeeze-out in renewables auctions, as well as underdeveloped regulatory frameworks (especially energy sharing) (The Smarter E Europe, 2024; CEE Bankwatch Network, 2025).

That is why it is important to continue the exchange of knowledge, business models, and consultancy methodologies between the Hungarian and German community energy sectors, and also to develop new, community-led business models and support flagship projects. The reason for this project collaboration is to support the transformation process through the cross-border flow of in-depth experiences and knowledge.

2. What We Wanted to Achieve

The main goals, both in Hungary and Germany, are to strengthen cooperation with local municipalities in order to promote and strengthen community energy, expand the stakeholder network, and develop new community-led business models and flagship projects.

Collaboration between municipalities and locals in energy communities enables resources, expertise, and decision-making to be shared. At best, this leads to more effective and community-driven renewable energy projects. Additionally, by working together, municipalities and citizen groups can enhance local resilience, economic benefits, and energy independence, fostering long-term community well-being.

BBEn specifically aims to extend its advisory services to municipalities in collaboration with citizen energy communities, supporting their development and creating new opportunities for participation in wind projects. SEC has already started to focus on those dedicated, experimental, open and inclusive mayors and municipalities that have the willingness to learn and find new ways together for their community energy projects. In the long term, these demonstration plans and cases will be vital in showing a vision to the Hungarian public about how a sustainable and democratic energy system can be built bottom-up.

3. What We Did: Method, Tools and Innovative Character

3.1. Method and Tools

In the earlier phase (2023-2024), BBEn introduced new services such as coaching for citizen energy communities to support the crucial expansion of community energy, while SEC developed a key facilitator entity called Transzformátor Community Energy Development Agency Centre to facilitate the community energy scene in Hungary. The second phase of cooperation started in 2025, which is actually a continuation of the previous work, only expanding its scope by broadening the geographic range, expanding the stakeholder network and developing new business models.

First phase HU-GE 1.0 (2023 - 2024)

Cooperation, sharing of knowledge and experience were key priorities during the first phase of the project. There were regular online meetings designed to foster mutual learning as much as possible between both project partners.

On the Hungarian side, one of the highlights of the project was a week-long study trip to Germany, where the Hungarian project team had the opportunity to learn about numerous community initiatives across the country, explore potentially adaptable business models, and build relationships.

The study trip to Germany proved to be a key impulse for the further course of the project, as it provided participants with deeper insights into the practical implementation and scaling of community energy. It became particularly clear how strongly the success of community energy projects depends on the interplay between enabling policy frameworks, professional organisational structures, and effective cooperation with municipalities. Through direct exchange with experienced practitioners, participants, such as our project partners, were able to identify concrete solutions to common challenges, such as financing, governance, and project development. At the same time, the trip highlighted the political and structural conditions required to establish community energy as a long-term pillar of the energy transition. It therefore not only offered practical guidance for the Hungarian partners, but also generated important impulses for the further development of advisory and support approaches within the project as a whole.

In Hungary, the cornerstone of the project's first phase was the establishment of Transzformátor, a community energy coordination agency. Transzformátor was established as an independent agency under SEC, with its own organisational profile, structure, operational processes, and communication strategy. As part of this, the organisation's guiding principles, vision, and mission were developed.

In addition, a number of activities were carried out to lay the groundwork for the organisation and, of course, efforts to establish a professional basis were also begun. For example, the website was launched, a social media presence was established, a variety of informational materials on the topic of community energy were produced, policy proposals were drafted to serve the interests of the Hungarian energy communities and a range of professional events and workshops were held. Furthermore, at national level, the First Community Energy Conference was organised by Transzformátor, attended by more than 100 participants.

The German partner within the HU-GE Transformator project, Bündnis Bürgerenergie e.V. (BBEn) further developed its role as a central advisory and support organisation for community energy actors. While BBEn has traditionally been active in networking, advocacy, and knowledge dissemination, the project marked an important step towards the development of structured and professionalised consultancy and coaching services. These services are designed to support citizen energy communities, emerging initiatives, and municipalities in implementing concrete energy projects.

This development responded to a growing demand for targeted advisory services. Community energy actors are increasingly confronted with more complex regulatory frameworks, new business models, and organisational challenges—particularly when it comes to scaling activities beyond voluntary engagement. At the same time, cooperation with municipalities is gaining strategic importance, while international interest in the experiences of the German citizen energy movement continues to grow. Against this background, the project contributed to positioning BBEn more strongly as a central knowledge and advisory hub for community energy at the national level.

As part of the project, internal structures and processes for delivering consultancy services were established within BBEn. This included the development of clear workflows for handling

advisory requests, the definition of thematic focus areas, the creation of pricing models and contract templates, as well as the development of a methodological toolkit for workshops and coaching formats. The advisory approach combines process-oriented support with technical expertise and is delivered through both online formats and on-site workshops.

The newly developed advisory services were tested and further refined through pilot advisory processes with selected citizen energy communities and local stakeholders. These pilot processes focused on key challenges such as organisational development, professionalisation, and the identification of viable business models, for example in the fields of photovoltaics, wind energy, and heat. The experiences gained during the project provided valuable insights into the specific support needs of community energy actors and municipalities, thereby laying an important foundation for the further development and scaling of BBEn's advisory service activities beyond the project.

Another key component of the support services developed within the project was the guidelines, which were specifically designed to address current challenges and needs of citizen energy communities. In total, three guidelines were developed:

- *one on collective self-consumption within buildings*
- *one on strategy development for citizen energy communities*
- *one on cooperation models between municipalities and citizen energy actors in wind and solar projects.*

The selection of these topics reflects key fields of action in current community energy practice. The guideline on collective self-consumption was developed in response to new regulatory frameworks that open up new opportunities but are still associated with significant practical uncertainties. Its aim was therefore to provide guidance and practical support for implementation. The guideline on strategy development addresses the growing need for many citizen energy communities to professionalise their activities and establish sustainable structures, particularly in the transition from voluntary to professional operations. The guideline on cooperation models with municipalities reflects the increasing importance of local partnerships, which are crucial for the implementation of larger projects, especially in the areas of wind and ground-mounted photovoltaics. Together, these guidelines make an important contribution to structured knowledge transfer and support citizen energy actors in successfully navigating an increasingly complex market and regulatory environment.

Second phase HU-GE 2.0 (2025 - 2027)

Building on previous work, the second phase began in 2025, when one of the most important tasks in Hungary was the mapping of local government initiatives related to community energy. This work helped SEC connect with a number of potential partner municipalities and gain a clearer picture of how local actors are thinking about citizen-led energy projects. Through these conversations, colleagues of SEC were able to better understand the motivations, opportunities, and challenges that local governments face when considering community energy initiatives.

In practice, this process resulted in a database with contacts from more than sixty different municipalities, initiatives, umbrella organisations, and associations. To assist in the selection process, SEC has developed a set of criteria to help identify potential partners — looking at factors such as previous experience with energy projects, cooperation with local residents, community-oriented thinking and long-term strategies. Based on this groundwork, SEC

contacted more than 50 organisations and municipalities and then conducted almost 20 interviews.

One of the most important outcomes of this research was the number of new partnerships. These collaborations have taken different forms: in some places the research work continued in greater depth with study visits, while in others advisory processes or workshops were launched to support local initiatives more directly. During the field visits, great emphasis was placed on gaining a better understanding of more sustainable, community-based district heating services. An important goal was to explore modernisation opportunities and lay the groundwork for how district heating services can work well in combination with energy communities. For example, colleagues of SEC visited the town of Szentes, where geothermal energy provides almost the entire capacity. SEC also examined the Pannonhalma Community Energy, where, in addition to community energy activities, the development of their district heating system was also discussed.

Among the consulting collaborations, it is worth highlighting a few ongoing ones that were based on previous cooperation. For example, SEC worked with the district heating company of Szeged to explore ways of integrating community energy solutions and involving energy users more actively in local energy systems. In Budapest's 6th district, a joint EUCF project with the local government is currently underway, focusing on how community organisations can play a role in the energy-efficient renovation of residential buildings. Cooperation has also continued with the Tiszamente Community Energy, where partners are working towards a regional energy concept that strengthens cooperative models and community participation.

Networking activities have also opened the door to new collaborations with several municipalities. These include advisory work with the city of Ajka on a citizen-led renovation initiative, and with Budapest's 11th district on participatory planning for a district heating project and an energy efficiency program for condominium buildings. A new partnership has also begun with the municipality of Kóspallag, where discussions are underway about establishing a community energy yard that would provide affordable firewood while helping to reduce local air pollution. New collaborations were launched in 2026. SEC will participate in the EUCF project initiated by Nemesnádudvar and, within this, in the creation of an energy community, which brings together municipalities from the county. According to the plans, the DVCS Energy Community to be established will be named after the Danube Valley Canal, which connects these settlements. Also, a joint research project has been launched with the town of Budaörs, located in the suburbs of Budapest, to explore the possibilities of energy communities.

Workshops have also played an important role in strengthening these partnerships. For example, one session brought together representatives of local governments to discuss energy-related challenges affecting municipal economic activities.

Another community-focused workshop was organised with the municipality of Pilisborosjenő as part of the preparation of its local climate and energy action plan. Residents participated in a community-based SWOT analysis, the results of which will help shape the municipality's future strategy.

The insights of the research and the field experiences gathered during this process have been organised around key themes, creating a strong foundation for strengthening the advisory and support work in the future. We separated the problems into national and local challenges. At the national level, issues related to the energy system and existing utility price

policies continue to shape the environment in which community initiatives operate, highlighting the importance of stronger advocacy efforts. Another major obstacle is the absence of adaptable business models that could support the development of community-based energy projects.

3.2. Innovative Character

A key innovation was the establishment of the federation of registered energy communities in Hungary, which created new institutional infrastructure for the sector. The founding members include nine initiatives based in municipalities and NGOs. Membership is open to officially registered energy communities, while those not yet registered may apply for supporting membership.

The federation provides more favourable conditions for effective advocacy and supports the development of a national network of Hungarian energy communities. It also serves as a platform for knowledge exchange and coordination among emerging initiatives. An important milestone was the organisation of a joint event that brought together a wide range of stakeholders, demonstrating growing interest and engagement within the sector.

The federation’s role is expected to become even more relevant in the context of the new Hungarian government, as this institutionalised form of collaboration and representation can strengthen advocacy efforts and provide a more unified voice for community energy actors.

4. What We Achieved

In Hungary, one of the main achievements was the strengthening of the network. In line with defined goals, this activity successfully expanded the circle of stakeholders who are familiar with Transzformátor's activities and, thus, with energy communities. And what is even more important, this network is no longer closely tied to the capital city, which is a great success for the organisation.

It is also worth mentioning that the work of recent years has not only focused on municipal partners; some progress has also been made in terms of professional cooperation. SEC established a community energy coalition where 10 NGOs active in the field of energy work together, with a particular focus on social aspects (linked to the LIFE-COMET project). In recent months, SEC has played an increasingly active role in coordinating with the other NGOs, including joint work on consultation responses with fellow energy organisations.

And last but not least, in the second half of 2025, SEC took the first steps towards establishing an independent federation of registered energy communities in Hungary. The federation was officially founded in 2026. The essence of the organisation is to provide a dedicated platform for energy communities to represent their interests, cooperate, and share knowledge. The association was founded by ten energy communities, with two more in the process of joining, which is the majority of the energy communities registered in Hungary. In this process, SEC itself became a registered energy community as well.

It may not seem like a remarkable achievement, but it is still very important to us that SEC’s communication skills have improved significantly in recent times. Colleagues participated in several training courses, and an external expert guided them through the process of developing a strategy, which contributed to more structured and efficient processes. Self-training continued with an expert in community development, as a way to broaden SEC's collective knowledge about participation. In fact, this process continued, and internal training

within the organisation was strengthened, contributing to professional issues not only being well-founded and clear to everyone, but also becoming genuine organisational knowledge.

In Germany, the project achieved significant progress in strengthening the capacities, visibility, and support structures of the citizen energy sector. A key success was the further professionalisation of advisory and coaching services provided by BBEn, which were not only conceptualised but also tested and refined through concrete pilot activities. In addition, the development and dissemination of targeted guidelines and the organisation of workshops and webinars contributed to a broader and more structured knowledge transfer within the sector. The project also helped to position BBEn more clearly as a central point of contact for citizen energy communities, municipalities, and international partners seeking expertise and practical guidance. Furthermore, the increased focus on cooperation with municipalities and the exploration of new business models—particularly in areas such as photovoltaics and heat—provided important impulses for the future development of citizen energy in Germany. Overall, the project laid a strong foundation for scaling support services, strengthening networks, and enabling citizen energy actors to operate more effectively in an increasingly complex regulatory and market environment.

5. What We Learned

At the beginning of the project, it was already clear that energy communities in Hungary are still at an early stage of development. Although fully functional, democratically operated initiatives were not expected, the research (mapping local government initiatives on community energy) hoped to find local governments that had already taken the first innovative steps in the field of energy and were ready to seek community-based solutions as soon as the regulatory and financial environment became more favourable. As a result, no fully developed examples were found that could clearly serve as best practices. More often, initiatives that were strong in one area — such as renewable energy development — faced challenges in others, including community participation and engagement. This field research helped to understand better where the real gaps and opportunities lie. By systematising the identified challenges and possible solutions, it was possible to identify the local entry points where SEC can provide support.

In Hungary, it is particularly interesting how the most active local governments are often the ones that face significant structural obstacles. The current local government system leaves little room for entrepreneurial or experimental approaches, making it difficult for pioneering settlements to move forward. The research also revealed several recurring local challenges. Many municipalities struggle with energy efficiency improvements due to limited financial resources and technical expertise, affecting both public institutions and municipally owned housing, which is often home to vulnerable residents. Participation among residents and municipal staff remains relatively low. And many local strategies tend to focus on grant opportunities rather than long-term planning. Even when strategies exist, they often lack the resources needed for implementation. To validate and evaluate these experiences more broadly, these findings were shared at SEC's annual Community Energy Conference in October, titled "Business models, regulation, participation." The event brought together more than sixty participants, including policymakers, experts, and community actors. After several opening presentations, participants continued the discussions in smaller groups using a world café format, focusing on the key themes identified during the project. The insights

gained here were also incorporated into the informational brochure that served as a summary of the research.

In Germany, the insights gained from the project highlight that the further development and scaling of community energy in Germany depend on a combination of enabling policy frameworks and targeted support structures. It became particularly clear that, alongside political advocacy, practical advisory, coaching, and knowledge-sharing services play a crucial role in stabilising existing initiatives and enabling new projects. At the same time, it can be observed that a subset of citizen energy communities - particularly larger and more established actors - are facing the challenge of further professionalising their structures and developing new business models. This development path requires additional competencies, reliable financing options, and appropriate support mechanisms. Furthermore, cooperation with municipalities has proven to be a key success factor for the implementation of larger and more system-relevant projects. Overall, the project experiences underline the need to further reduce regulatory barriers, strengthen incentives for community energy, and systematically expand support services in order to establish citizen energy as a key pillar of a socially just and participatory energy transition in Germany.

6. Transferable Insights

Cross-border exchange works when it is practical and experience-based. The study trip to Germany organised as part of the project was not only an unforgettable experience for the Hungarian team, but also provided extremely valuable insights. Sites visited and various models studied continue to serve as examples in everyday work. Not only did the team understand how the system works there, but it can often be referred to in the consulting process as an example of a model that already exists elsewhere. Moreover, since personal connections were formed, these locations could even emerge as potential partners for Hungarian energy communities.

Direct exposure (study visits, real cases) is more effective than abstract learning. Surveying the current situation in one's own country provides a realistic, practical picture. Many things come to light that don’t surface during desktop research. In fact, deeper collaborations can begin, and personal connections help foster networking. The actors who became known during the research process have remained regular participants in the project ever since. They take part in events, serve as good examples, and some have even joined the new advocacy organisation.

Advisory services and structured support tools are critical. Local initiatives often do not have access to comprehensive information (such as international calls for proposals, legal options, or ideal business models). A nationally operating advisory network can help them take the first steps towards becoming an energy community. Advice should also be provided at multiple levels, as an established organisation often cannot overcome certain obstacles on its own. This is precisely why a one-stop shop (OSS) with a holistic approach is a good solution, where all related topics can be addressed.

7. Looking Ahead

In Hungary, the goal is to systematise the knowledge gathered to date and communicate it in creative and accessible ways. Further important goals are to strengthen advisory activities,

operate effectively as a one-stop shop (OSS), and to establish long-term partnerships with communities.

In addition, a key objective is to advocate for a supportive regulatory environment - through the federation, for example - to enable viable business models. This also fosters networking among members and supports the further development of the energy community ecosystem.

In Germany, further development depends on reducing regulatory barriers, strengthening incentives, and expanding support services in a more systematic and long - term manner. In particular, the effective implementation of new regulatory frameworks - such as energy sharing will be crucial to unlock the full potential of citizen-led energy initiatives. At the same time, there is a growing need to further professionalise support structures, enabling citizen energy communities to scale their activities, develop more complex business models, and participate in larger projects across sectors such as wind, photovoltaics, and heat. A key priority will be to deepen cooperation between municipalities and citizen energy actors, as these partnerships have proven essential for implementing projects that are both economically viable and socially accepted. Strengthening these collaborations can help align local development goals with energy transition objectives, while ensuring that value creation remains within the region.

Looking ahead, the continued expansion of advisory and coaching services will play a central role. Building on the experiences of this project, BBEn aims to further develop its role as a national knowledge and support hub, while also contributing to European exchange and capacity building. In this context, international cooperation such as the ongoing collaboration with Hungary - will remain highly relevant, as many structural challenges are shared across countries and can be addressed more effectively through joint learning and the exchange of practical solutions. Ultimately, the future of community energy in Germany will depend on its ability to combine strong local engagement with professional structures and enabling policy frameworks, positioning it as a key pillar of a resilient, democratic, and climate-neutral energy system.

VII. Latvia: Rural Energy Communities[LV] - Catalysing and Building Capacities for Renewable Energy Communities in Rural Latvia

Authors: Michael Krug (Heinrich Böll Foundation Schleswig-Holstein), Ilvija Ašmane (Latvian Rural Forum)

Project Snapshot

Core Idea	-	The project accelerated the emergence of renewable energy communities in rural Latvia by transferring German know-how (from the pioneering region of Schleswig-Holstein), building multi-level capacities, and enabling policy dialogue while hands on supporting country's first registered rural energy community despite regulatory and financial barriers.
Organisation	-	Heinrich Böll Foundation Schleswig-Holstein (Germany Project lead) and Latvian Rural Forum (Latvia)
Country	-	Latvia and Germany
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	January 2024 to October 2025
Scale	-	Across multiple scales - linking cross-border and national policy dialogue, capacity-building in all four rural planning regions of Latvia, and support for local pilot communities - while being strengthened through close international collaboration with Germany.



Image 14: Study Visit Community Wind Farm Wiemersdorf (Germany) in 2024. Photo credit: Marie Halbach

1. Why This Project

Until 2023, energy communities, including renewable energy communities (RECs) as defined by the European Renewable Energy Directive (EU) 2018/2001, were virtually non-existent in Latvia. This was particularly true in rural areas outside the capital, Riga. On the other hand, there was and is growing interest among rural municipalities, local communities, NGOs,

small and medium enterprises (SMEs), and other stakeholders in establishing such entities. In Germany, energy cooperatives in particular, but also other collective forms of citizen energy, have a long tradition. The federal state of Schleswig-Holstein can be regarded as one of the pioneers in citizen energy in Germany and Europe, especially in the field of wind energy, but also in the photovoltaic (PV) and heating/cooling sub-sectors. There are numerous energy communities here that are active in various markets. In 2018, the Schleswig-Holstein state government established a citizen energy fund (*Bürgerenergiefonds*) that provides start-up financing for citizen energy initiatives and serves as a model for several other federal states and the federal government, which also have set up similar funds.
This innovative financing mechanism may also serve as a showcase for other countries, including Latvia. Policymakers in both countries faced the common challenge of fully transposing and implementing the provisions of the Renewable Energy Directive, the Internal Electricity Market Directive (EU) 2019/944 and the Electricity Market Design Directive (EU) 2024/1711 and creating a supportive regulatory framework for RECs. Neither country had a legal framework for energy sharing in place, i.e. the possibility for members of a specific community energy to jointly use and share energy (e.g., electricity) generated within that community. The project *"Catalysing and Building Capacities for Renewable Energy Communities in Rural Latvia"* aimed to promote the development of RECs, with a particular focus on rural regions in Latvia. It also intended to facilitate a dialogue between two countries and regions on the transposition of pertinent European directives, regulatory frameworks and support schemes. The project was able to build directly on the findings of two preparatory studies conducted by the project partners individually and funded by DBU in 2022 and 2023, thereby ensuring continuity, evidence-based design, and a strong analytical foundation for the project activities.

2. What We Wanted to Achieve

The overall objective of the project was to promote the development of RECs in Latvia, with a particular focus on rural regions. It aimed to facilitate structured dialogue, mutual knowledge exchange, and cooperation between policy makers and other relevant actors and stakeholders in Schleswig-Holstein and Latvia. In addition, the project sought to strengthen capacity development and foster network formation within rural regions of Latvia.

3. What We Did: Methods, Tools and Innovative Character

3.1. Methods and Tools

The project took an integrated, multi-level approach. At the macro level, it helped drive a German–Latvian policy dialogue on how to transpose and implement relevant European rules and create the enabling regulatory conditions for RECs, on energy sharing, on support schemes and financing options. Two virtual policy dialogues, a study visit to Schleswig - Holstein for Latvian policy makers and community energy experts, and ongoing exchanges with ministries and regulators fed directly into policy processes in both countries. Two policy factsheets (Krug, 2024a, Kudreņickis, 2025) and a synopsis of energy sharing regulations in both countries (Krug & Kudreņickis, 2026) strengthened cooperation and made it easier to share knowledge across institutions.

At the meso level, the project significantly boosted skills and know-how related to energy communities across Latvia's four rural planning regions. An interregional task force was set up which supported regular information exchange, while a wide range of regional seminars, good practice fiches, communication activities, and train the trainer workshops reached hundreds of people. Together, they helped build a growing network of informed multipliers and "REC ambassadors."

At the local level, the project supported the early development of three potential pilot communities and ultimately enabled the creation of Latvia's first rural energy community in the village of Kalniena. Despite difficult regulatory and financial conditions, the initiative successfully registered as an energy community in October 2025 - a major milestone for Latvia's energy transition. A pre-feasibility study showed that community-driven energy sharing is possible in principle, but requires targeted support, enabling policies, and continued capacity building. These elements will be taken forward in a follow-up project funded by DBU from December 2025.

Both partners stayed active in public outreach throughout the project. Each kept a dedicated project page on its website[6] and regularly shared updates through newsletters. They also brought the project into a wide range of events and discussions. Michael Krug (Heinrich Böll Foundation SH) showcased the work during an exchange with a Polish expert delegation visiting Schleswig-Holstein in May 2024, during the Böll Covenant conference in January 2025, and later that year in a school exchange engaging German and Latvian teachers and pupils. Ilvija Ašmane (Latvian Rural Forum) was equally visible, joining national and international events, including a community-energy discussion hosted by the Latvian Wind Energy Association in May 2024 and an expert interview for the POWERyouth project. Ilvija also took part in a radio interview on 3 January 2025 alongside representatives from the Latvian Ministry of Climate and Energy and other experts (Jansons & Bērziņa, 2025). The project reached high-level international audiences as well. On 4 June 2024, Michael Krug joined a panel discussion on citizen energy organised by the Technical University of Berlin at the DBU "Grüne Woche / Week of the Environment" at Schloss Bellevue in Berlin, where five experts from Germany, the Baltics, and the Western Balkans discussed the role of energy communities. Ilvija Ašmane contributed to the 6th European Rural Parliament in Scotland, moderating a workshop on support systems for energy communities. Both partners participated in the DBU online status workshop together with other sister projects in the DBU citizen energy cluster in November 2024 and contributed to the TU Berlin & DBU Citizen Energy in Central and Eastern Europe (CEE) Conference in Budapest in May 2025 with a dialogue session on what makes community energy projects successful.

3.2. Innovative Character

- Energy communities can be regarded as social innovations themselves. In a country which has inherited a highly centralised energy system built around large-scale.
- electricity generation, transmission, and distribution facilities, the concept of community energy-decentralised, citizen driven, and locally governed - is inherently innovative. Any initiative that advances community energy models can therefore be regarded as a meaningful innovation in its own right.
- Although Latvia has a new regulatory framework for energy communities in place that transposes relevant provisions of the Renewable Energy and the Electricity Market Directives, there is still a lack of 'real life' examples. Any type of collective citizen engagement in the energy sector can be regarded as highly innovative, particularly in rural regions.
- To our knowledge, this collaboration can be regarded as the first bilateral German - Latvian cooperation project dedicated to community energy.
- The multi-level implementation model, which connects policy dialogue at the macro level with regional capacity building (meso level) and local pilot development (micro level), represents an innovative and promising approach. It enables an integrated, systemic perspective that strengthens coherence across governance levels.

[6] See https://www.boell-sh.de/en/rural-energy-communities-lv and https://laukuforums.lv/project/energokopienu-stiprinasana-latvijas-lauku-teritorijas/

- The establishment of direct policy-practice feedback loops - where continuous exchanges with ministries and regulators informed real policy processes - proved to be a particularly effective and impactful instrument.

4. What We Achieved



Image 15: Return study visit of German experts in Lapmežciems, Latvia. Photo credit: Michael Krug

Strengthening the German–Latvian collaboration in the renewable energy sector
During their official meeting in May 2022, the Minister President of Schleswig-Holstein and the President of Latvia committed to strengthening cooperation, with renewable energy, medical technology, education and research identified as shared priorities (dpa Hamburg/Schleswig-Holstein & Die Zeit 2022). The project *Rural Energy Communities*[LV] demonstrated how decentralised energy solutions can connect regional policy goals with meaningful cross-border cooperation. As project coordinator Michael Krug (Heinrich Böll Foundation SH) noted: *"Our project is one small step to bring the political ambition to life, showing how high-level commitments can turn into practical collaboration*. *It proves that when regions work together on concrete challenges, they can accelerate innovation, build trust, and create models that others can follow.*" The study visit to Schleswig-Holstein in October 2024 gave Latvian policy makers and community energy experts hands-on insights into regulatory frameworks, support schemes, financing models and citizen-led energy projects, while also building long-term bilateral ties. This exchange continued in June 2025, when three German experts who were actively engaged in the previous study visit in Schleswig-Holstein travelled to Latvia to meet emerging rural citizen-energy groups in Vārme and Lapmežciems/Ragaciems. Together they explored opportunities and challenges, from building local support for wind and solar projects to cooperative models, citizen mobilisation, financing options and plug-in PV systems use.

Latvia's first rural energy community established
Despite challenges in the initially envisioned pilot area, the Latvian partners quickly identified new potential pilot communities through an open call in 2024, which also increased project visibility. In the village of Kalniena, Latvia's first rural energy community was founded and officially registered in October 2025 - an important milestone demonstrating local commitment to join forces to stabilise energy costs and foster energy independence. A pre-feasibility study accompanied the process, showing that in principle community-driven energy sharing is possible, but requires enabling policies, and continued capacity building. These elements will be taken forward in a follow-up project funded by DBU. Ilvija Ašmane, project manager at the Latvian Rural Forum, is highly satisfied with the outcome: *"The registration of the first rural energy community in Latvia is undoubtedly the most significant achievement of our project. The next step is to bring it to life through practical implementation. Now the real work begins - turning this formal milestone into a functioning, community-driven energy initiative that others across Latvia can learn from."*

Policymakers informed and engaged
Virtual policy dialogues, study visits, and workshops significantly strengthened relationships with and among national, regional, and local policymakers in both countries. The Latvian Rural Forum successfully engaged the Ministry of Climate and Energy as an active supporter. High-level representatives—including the State Secretary of Schleswig-Holstein's

Ministry of Energy Transition and the Latvian Minister of Climate and Energy—participated in key events. Instead of preparing formalised policy input/position papers, the partners decided to convey policy related project findings and lessons directly to the ministerial officers concerned. This was facilitated by the close and fruitful collaboration between the Latvian Rural Forum and the Latvian Ministry of Climate and Energy throughout the entire project lifetime. Policy related project lessons were also included in a resolution which was adopted by the Latvian Rural Communities Parliament in June 2025 (Latvijas Lauku Kopienu Parliaments, 2025). In August 2025, the Heinrich Böll Foundation SH organised an informal policy dialogue dedicated to energy sharing, engaging the State Secretary in the Ministry of Energy Transition and energy cooperatives from Schleswig-Holstein. In this meeting, the foundation also provided insights from ongoing policy and regulatory developments in Latvia.

The Latvian Rural Forum recognised as a competence centre for rural energy communities
Through its active role, the Latvian Rural Forum strengthened its position as Latvia's central competence centre for rural energy communities. It expanded its advisory capacity, facilitated knowledge exchange, and became a trusted contact point for regulatory, financial, and organisational guidance. The Forum also enhanced its international standing by joining the European Association for Energy Communities REScoop.eu and securing Latvia as the host of the European Energy Communities Forum 2026. This growing visibility not only elevates Latvia's profile in the European energy transition but also positions the Forum as a key driver of community-based innovation in the years ahead. In 2025, project manager Ilvija Ašmane became the national expert for Latvia in the European Energy Communities Facility (ENERCOM) of the European Commission.

Knowledge and capacities of multiple stakeholders expanded
The project adopted a holistic, multi-level approach that activated policymakers, public authorities, Latvian rural planning regions, regional energy agencies, local communities, NGOs, and SMEs. Through policy dialogue, training, and exchange formats, it fostered mutual learning and durable professional networks. The project empowered particularly emerging communities and initiatives by providing them with access to inspiring and replicable showcases (Krug 2024b), structured and practical guidance and model statutes/templates to start operation (Latvijas Lauku Forums, 2025). The four rural planning regions in Latvia gained access to information, replicable models and guidance, enabling them also to integrate collective energy solutions into broader development strategies. Local authorities benefit from enhanced knowledge and capacity to support community energy initiatives, and foster citizen participation. SMEs profit from new opportunities in energy sharing, renewable energy services, technology deployment, and community-based business models. Policy makers and concerned public authorities gain insight into the transposition and implementation of relevant EU legislation in the partner countries and beyond, the respective policy and regulatory frameworks, support schemes and funding mechanisms.

German–Latvian dialogue in the LEADER context created
The study visit for policy makers and experts from Latvia in Schleswig-Holstein carried out in 2024 facilitated an exchange between Local Action Groups in both countries on how LEADER can support energy communities. A dedicated workshop with experts from regional LEADER coordination units and the German National Network for Rural Areas laid the foundation for continued dialogue. The compilation of good practice showcases prepared by the Heinrich Böll Foundation Schleswig-Holstein included also exemplary promotional measures for energy communities identified in the Integrated Development Strategies of selected Local Action Groups in Schleswig-Holstein[7] (Krug, 2024b).

[7] In Schleswig-Holstein the Local Action Groups are called *'Aktivregionen'.*

5. What We Learned

- The project demonstrates that favourable economic framework conditions, together with a supportive legal and regulatory environment, are crucial for the uptake and long-term viability of energy communities.
- Energy communities depend fundamentally on the capacity of local citizens to cooperate, plan collectively, and assume responsibility for the future development of their communities. In this context, social cohesion, trust, and local organisational capacity emerged as key enabling factors alongside regulatory, technical and financial considerations.
- Clear rules, legal certainty, and appropriate incentives significantly reduce barriers for citizen participation and investment. At the same time, targeted support structures and advisory services are needed to translate regulatory opportunities into concrete local action.
- Overall, the project marks a meaningful contribution towards a greener, more sustainable, and economically viable Latvian countryside. It provides valuable insights and practical lessons that can inform future policy development, replication efforts, and capacity-building initiatives.
- Community energy projects have the potential to generate a wide range of economic, social and environmental benefits, including the reduction or stabilisation of energy costs, income generation, increased tax revenues, added local value and job creation, rural development, strengthened social cohesion, and higher levels of community support and acceptance for energy projects. Under certain conditions, energy sharing can also help alleviate grid bottlenecks and reduce strain on electricity networks. At the same time, energy communities face structural disadvantages
- compared to traditional market actors, such as more cumbersome decision-making processes, less favourable financing conditions, and limited opportunities to benefit from economies of scale. These factors justify targeted incentives to support the development of collective approaches. In our view, the Latvian government should therefore not only establish the legal foundations for energy communities, but also actively develop an effective enabling framework, as required under European law. The provision of investment grants through the Modernisation Fund in 2026 is a promising step in this direction.
- The project demonstrated that local actors are willing and able to engage in collective energy initiatives when the right conditions are in place. However, successful implementation requires targeted support, enabling policies, and ongoing capacity building. Without these elements, even highly motivated communities struggle to navigate technical, legal, and organisational complexities.
- Capacity building across all governance levels is indispensable. The project confirmed that knowledge and skills must be strengthened not only at the community level but also among regional intermediaries, policymakers and relevant market actors, particularly distribution system operators (DSO), and energy traders). The government should hold DSOs and energy traders accountable and make sure that these actors cooperate with energy communities.
- Structured exchange formats and cross - border cooperation can accelerate mutual learning and development. Peer-to-peer exchanges, study visits, and international cooperation proved to be powerful tools for knowledge transfer. They helped communities and institutions learn from practical experiences elsewhere, avoid common pitfalls, and adapt proven solutions to local contexts.

6. Transferable insights

- Ensure supportive economic and regulatory conditions
  Clear rules, predictable incentives, and the removal of administrative barriers are essential for motivating citizen participation and investment.
- Strengthen local cooperation and organisational capacity
  Trust, social cohesion, and local leadership are as important as technical or financial factors. Communities need support to plan collectively and take responsibility.
- Provide practical support and advisory services
  Guidance including standardised templates, good practices, and regional intermediaries can help communities turn regulatory opportunities into real projects.
- Address structural disadvantages of community initiatives
  Energy communities face higher transaction costs and weaker financing conditions than traditional market actors. Targeted incentives are justified to level the playing field.
- Build capacity at all governance levels
  Knowledge must be strengthened not only locally but also among regional and national actors as well as market actors to ensure coherent, long-term support. The government should hold DSOs and energy traders accountable and make sure that these actors cooperate with energy communities.
- Use peer learning and cross-border exchange
  Study visits, peer to peer formats, and cross-border cooperation accelerate learning and help adapt proven solutions to local contexts.
- Highlight broader co-benefits
  Community energy can reduce import dependency, strengthen energy security, stabilise energy costs, create local value, support rural development - important arguments for political and public support.

7. Looking Ahead

The two project partners have successfully secured DBU funding for a follow-up initiative. The new project, “Setting up a Rural Lighthouse Energy Community in Latvia - Process Support, Mentoring for Follower Communities and Cross - border Knowledge Exchange”, was launched in December 2025 and builds directly on the achievements of Rural Energy CommunitiesLV. Its main goal is to support the practical implementation of Latvia’s first rural lighthouse energy sharing community in the village of Kalniena, working closely with the newly established energy community, local inhabitants, SMEs, and municipal authorities. A key priority of the project is the meaningful inclusion of vulnerable households, including low-income families, in line with the ambitions of the EU Electricity Market Design Directive.

VIII. **North Macedonia**: Skopje Climate Assembly. Citizens Deliberating Clean Air in a Politically Divided City

Authors: Agim Selami, (ZIP Institute), Layla Weiss (Peace Corps Volunteer - ZIP Institute)

Project Snapshot

Core Idea	-	The Skopje Climate Assembly brought together randomly selected citizens to develop concrete, citizen-led recommendations on air pollution, which resulted in the first unanimous, cross-party adoption of citizen recommendations by the Skopje City Council.
Organisation	-	ZIP Institute (North Macedonia), Nexus Institute (Germany)
Country	-	North Macedonia
Funding	-	Deutsche Bundesstiftung Umwelt, DBU
Timeline	-	February – May 2024 (Assembly), June–December 2024 (handover and follow-up)
Scale	-	Regional scale, Skopje city



Image 16: Skopje Citizens Climate Assembly Closing Session. Photo credit: Zip Institute

1. Why This Project

Air pollution is one of the most persistent and visible challenges facing citizens in Skopje. During winter months, particulate matter levels regularly exceed European safety thresholds, affecting public health, productivity, and trust in public institutions (Jakimova, 2025). The causes are well known-household heating with firewood, traffic congestion, and outdated infrastructure - yet solutions have remained politically contested, fragmented across institutions, or stalled by jurisdictional disputes between the City of Skopje and its municipalities.

At the same time, North Macedonia's EU accession process and alignment with the European Green Deal place increasing pressure on national and local authorities to act on climate and energy issues. However, many citizens, particularly those affected by energy poverty, remain excluded from decision-making processes that directly affect their daily lives.

The Skopje Climate Assembly was designed as a response to this gap: a structured, inclusive process through which ordinary citizens could learn about air pollution, deliberate together, and propose solutions grounded in lived experience and evidence (Smith, 2023; Pakhuis de Zwijger & Bureau Burgerberaad, 2021).

2. What We Wanted to Achieve

The project aimed to test whether a citizen climate assembly could:

1. Create legitimate, inclusive space for citizens to engage in a complex and politically sensitive issue.
2. Generate practical, actionable recommendations aligned with local decision-making powers.
3. Rebuild trust between citizens and institutions in a polarised political environment.
4. Demonstrate that citizen-led processes can unlock political consensus where traditional politics struggle.

Rather than addressing “climate change” broadly, the Assembly focused on air pollution in Skopje, structured around three thematic areas:

- Energy production and consumption
- Mobility and transport
- Public health

3. What We Did: Method, Tools and Innovative Character

3.1 Method and Tools

Table 6. Method used and activities

Phase	Main activities
Preparation	Problem definition workshops, stakeholder mapping, expert Delphi
Inclusion	Focus groups with energy-poor firewood users and women from a rural municipality
Deliberation	Six Climate Assembly sessions with around 60 randomly selected citizens
Decision-making	Drafting, refining, and voting on recommendations
Follow-up	Formal handover, municipal meetings, monitoring, toolkit development

Inclusion before Deliberation

Before the Assembly itself, two focus groups were held with groups often excluded from climate discussions: Albanian-speaking firewood users and women from a rural community within Skopje. These conversations helped surface the realities of energy poverty and informed both agenda-setting and expert selection.

In parallel, a Group Delphi with civil society and academic experts identified areas of controversy and policy deadlock that would benefit from citizen deliberation.

Citizen Selection and Assembly Design

Participants were selected through random stratified selection (sortition) to reflect Skopje's demographics across age, gender, ethnicity, education, and employment status. Invitations were hand-delivered to approximately 10,000 addresses across all municipalities.

The Assembly met across six sessions over three months, combining:

- Accessible expert input
- Facilitated small-group deliberation
- Plenary discussion and synthesis
- Structured drafting and voting on recommendations

Participants were supported through travel reimbursement, facilitation, translation where needed, and clear communication to ensure equal participation.

After the Assembly concluded, participants finalised 19 recommendations addressing air pollution across the three thematic areas. These were compiled into a citizens' report and formally handed over to decision-makers.

On 11 June 2024, a citizen representative presented the recommendations at the Macedonian Energy Forum, where they were received by senior national officials.

Initial reactions were mixed. At a City Council session later in June, political divisions led to the recommendations being rejected. Rather than stopping there, citizens supported by ZIP Institute - contacted council members directly, requested meetings, and re-engaged municipalities individually.

3.2. Innovative Character (Story from the field)

***S*kopje City Council Unanimously Backs Citizen Climate Recommendations**

On 16 July 2024, this effort culminated in a historic outcome:

"For the first time, the Skopje City Council voted unanimously across party lines on citizen-led climate recommendations."



Image 17: Skopje City Council unanimously voting on the recommendations. Photo credit: Zip Institute

All 19 recommendations were ultimately adopted, demonstrating that a citizen-led process can achieve consensus where party politics often cannot.

The path to approval, however, was not immediate. Initial scepticism from City Councilors centered on whether the Climate Assembly's outcomes were truly independent and free from external influence, leading to early resistance.

To address this, Assembly participants directly engaged councilors through personal letters, explaining the deliberative process and its nonpartisan, citizen-led foundation. This outreach helped build trust and clarify the legitimacy of the recommendations.

By the time the proposals were reintroduced, scepticism had largely subsided, and they were adopted unanimously, marking a strong endorsement of both the outcomes and the process behind them.

4. What We Achieved

Tangible Outcomes

Table 7. Recommendations and their significance

Outcome	Significance
19 recommendations adopted	Formal political recognition of citizen deliberation
Cross-party unanimity	Rare consensus in a polarised political context
Municipal engagement	Shift from abstract debate to local implementation
Increased visibility	Air pollution reframed as a shared civic issue

Less Visible but Equally Important Shifts

- Citizens reported increased confidence in engaging with institutions.
- Decision-makers acknowledged the legitimacy of citizen input.
- Media coverage shifted from blame narratives to solution-oriented discussion.

As one participant reflected:
"I never imagined people like us could sit together, learn, disagree, and still reach something everyone could stand behind and then see it taken seriously. "Following the Vote: Monitoring and Local Follow-up

Adoption was not treated as the end of the process. From September to October 2024, citizens and ZIP Institute representatives met with municipalities across Skopje to discuss implementation realities.

Common challenges emerged:

- Overlapping jurisdiction between municipalities and the city.
- Limited financial and human resources.
- Uneven political cooperation.

At the same time, promising practices were identified, such as investments in photovoltaic systems on public buildings and energy-efficient street lighting.

Monitoring efforts continue through:

- Regular engagement with municipal authorities
- Public updates on implementation progress
- Continued citizen involvement where feasible

Meeting with Center Municipality: Center Municipality has implemented most of the Assembly's recommendations and continues to pursue further improvements. Progress has been constrained, however, by limited coordination with the City of Skopje and persistent shortages of human resources in key environmental and urban planning roles. Municipal representatives also highlighted citizen behavior and low compliance with environmental regulations as an ongoing challenge.



Image 18. Meeting with Center Municipality. Photo credit: Zip Institute

5. What We Learned

Table 8. Lessons learned

What worked well	What was difficult
Random selection-built legitimacy	Sustaining citizen engagement after the Assembly
Clear facilitation enabled trust	Slow administrative implementation
Narrow topic focus improved quality	Resource constraints at local level
Public handover increased accountability	Lack of formal mandate early on

Key reflections

The Citizens' Climate Assembly showed us something important: deliberation creates legitimacy, but not speed. Bringing together 65 diverse citizens to develop 19 recommendations on air pollution was a major achievement and the unanimous adoption of all 19 by the City Council of Skopje was a historic moment. It proved that when citizens are given time, information, and space to deliberate, they can produce serious, politically viable solutions.

But adoption is not the same as implementation. While the Council voted unanimously, many of the recommendations are now moving slowly or remain stuck. Bureaucratic delays, limited budgets, institutional coordination challenges, and shifting political priorities have made follow-through harder than expected. This has been one of our biggest lessons: follow-up mechanisms need to be built in from the very beginning. Without clear timelines, ownership, and resources, momentum can fade.

We also learned that citizen pressure matters. The unanimous vote only came after citizens re-engaged decision-makers directly. At the same time, sustaining that engagement has been challenging participants understandably returned to their daily responsibilities after an intensive three-month process.

Overall, the grant objective was achieved. Public awareness increased, citizens were meaningfully involved in policymaking, and air pollution became a shared civic issue rather than just a governmental one. The experience confirms that assemblies can shift debate and unlock consensus - but turning recommendations into lasting change requires continued political will, resources, and structured accountability.

6. Transferable Insights

Table 9. Transferable insights

Key element	Practical takeaway
Mandate	Secure at least a commitment to respond publicly to recommendations
Recruitment	Use random selection; avoid open calls
Facilitation	Invest in neutral, skilled facilitators
Follow-up	Plan monitoring mechanisms from the start
Visibility	Make handovers and responses public

Citizen assemblies are not a shortcut, but they are a powerful tool for tackling contested energy and climate issues, especially where trust is low and politics are polarised.

7. Looking Ahead

The Skopje Climate Assembly has already informed the development of a regional Climate Assembly Toolkit, aimed at supporting similar processes across the Western Balkans. Future steps include training workshops, knowledge exchange between cities, and exploration of assemblies on related topics such as energy poverty and sustainable mobility.

In Skopje, the real test lies ahead: translating unanimous votes into measurable improvements in air quality. What the Assembly has shown, however, is that citizens are ready and capable of shaping that journey.

IX. Synthesis

9.1. Key Learnings across all Project Experiences

Citizen energy in Central and Eastern Europe (CEE) is emerging in the right direction, but it is still at a premature and at an early and uneven stage of advancement when comparing different countries of the region among each other (Bukovszki & Haliza, 2024). Across the projects presented here, ranging from Latvia and Greece to Czechia and Bulgaria, it is clear that citizen energy initiatives operate within fragmented regulatory environments, limited financial support structures, and varying levels of institutional capacity (Rescoop.eu, 2026). In many contexts, legal recognition exists on paper, but practical implementation remains constrained.

In this reality, research and development citizen energy projects play a critical role. They do not simply test technologies; they test whether citizen energy works under real and challenging institutional, social, and economic conditions. The project experiences presented in this publication demonstrate clearly that progress often happens despite not fully enabling frameworks and a lack of finances due to social engagement, advocacy work and awareness raising actions. Projects like these act as strategic entry points, translating abstract policy concepts into tangible practices and trying to change the status quo in the energy sector. This is done in real life through the establishment of Latvia's first rural energy community, deliberative participatory models in North Macedonia and Bulgaria, setting up of umbrella organisations in Czechia and Hungary, establishing concrete pilots in Greece and North Macedonia or inclusive capacity-building approaches for marginalised groups in Albania. Taken together, these experiences signal an emerging momentum in the region. Citizen energy is moving from a niche concept towards a more recognised part of the energy transition in the CEE region, thus, forming a binomial of technological and social innovation. This momentum is supported by increasing EU-level attention, growing networks of practitioners, and a gradual accumulation of practical knowledge serving as a base for more initiatives. However, the topic of citizen energy remains fragile and highly dependent on continued support, institutional alignment, and the ability to scale what works well beyond isolated pilot cases.

As mentioned, countries of the CEE region are not at the same stage of citizen energy growth. Some are still focused on first pilot projects and awareness raising, while others are already working on secondary legislation advocacy work, umbrella organisations, and scaling models - this is seen when comparing for example citizen energy developments in Albania or Latvia with developments in Czechia or Hungary. As a result, support measures should be adapted to different levels of maturity rather than follow a one-size-fits-all approach.

Cross-cutting Insights

Another layer of evidence from this publication comes from taking a cross-cutting look at these practical experiences. By identifying common elements across challenges, emerging tools, and lessons learned from different countries and projects, this approach highlights recurring issues in different realities, the most effective approaches, and transferable insights. It also offers self-reflections for the project implementers themselves. While each

chapter contains rich project-specific detail, another valuable piece of information is this overview that reveals patterns of what works (and what does not) across contexts, giving interested stakeholders a clearer picture of similarities, differences, innovative tools, and solutions that can be applied more widely.

Structural barriers are persistent and multi-dimensional

When it comes to structural barriers across all project cases from different countries, they are not isolated but interconnected - sharing similar challenges in their work. Below is a list of barriers mentioned often from different chapter contributors. It should be noted that not all the structural barriers below necessarily apply to all projects the same; rather, they are clearly shown in which contexts they apply - while the list of barriers below is not exhaustive.

- **Regulatory and administrative complexity** remains a key barrier for CEE countries: for instance, Albania has unclear permitting and lack of guidance, Bulgaria is faced with legal and technical constraints for energy sharing or policy reversal, Greece/North Macedonia has regulatory ambiguity and incomplete legal frameworks, and Czechia deals with ongoing implementation gaps despite legal recognition of CE.
- **Limited or unclear financial mechanisms** is a topic elaborated and consistently mentioned problem across all chapters as a systemic barrier. One concrete example comes from the Greek/North Macedonian project when anticipated co-funding for the North Macedonia side was affected by external geopolitical events, leading to project delays.
- **Technical and infrastructure gaps** are present especially around grid access and energy sharing issues everywhere in the CEE region but are mentioned specifically in the case of Bulgarian, Czech and Hungarian projects.
- **Institutional fragmentation and limited coordination** are noted when responsibilities are spread across multiple actors such as municipalities, national authorities, and grid operators without effective coordination mechanisms, leading to unclear roles (who does what) and delays in citizen energy initiative implementation. This is reflected in North Macedonia through overlapping municipal responsibilities, in Latvia through still-developing multi-level coordination structures, and in Bulgaria or in Albania through weak cooperation between municipalities and distribution system operators (DSOs).
- **Socio-cultural factors**: Mistrust towards institutions, collective models, and the fairness of energy projects emerges as a cross-cutting barrier, shaped by both historical experiences with centralised cooperative structures as in the case of Albania but also due to more recent policy failures and political fragmentation or the market developments taking place in Bulgaria, North Macedonia or elsewhere in CEE region.

Structural barriers across all project cases are persistent, multi-dimensional, and unfortunately mutually reinforcing challenges. For example, unclear regulation increases financial risk, which in turn discourages participation of interested actors. More concretely, this is seen in Czechia where energy sharing is possible but grid access is still a bottleneck or in the case of Latvia, where the first rural energy communities was registered only in 2025 due to the lack of enabling policies.

Citizen energy, a technological and social innovation instrument

Citizen energy is not only a technological undertaking but also a social process, constituting an important socio-technical dimension of the energy transition. Success across the projects depended far more on building trust, early stakeholder engagement, and co-creation rather than on technology choices alone. Initiatives that started by mapping local actors, fostering genuine participation, and creating transparent governance such as in Bulgaria, Bansko project, and the Greek-North Macedonian agrivoltaics projects, generated strong ownership and more durable outcomes. The BBEn coaching for the emerging Hnutí DUHA community energy in Czechia reinforced a key pragmatic lesson: focus on forming a small, motivated core team and delivering a first tangible pilot project rather than building a complex theoretical business model first - aiming at "*progress over perfection*" as crucial for building momentum and credibility.

Design inclusion from the start to deliver for low-income groups

Social cohesion is reached when all groups of society have access to energy matters, since everyone is affected - especially those in disadvantaged circumstances. Tested models come from Albania with targeted PV training and the gender-just roadmap for women, youth and energy-poor families. For the North Macedonia Skopje Climate Assembly, the focus groups with firewood households show how early involvement, beginning with them in mind and later expanding to a broader cross-section of citizens, can lead to practical solutions aimed at lowering energy costs while strengthening social cohesion and acceptance.

Municipalities are key, including local champions

Municipalities matter a lot in citizen energy projects. They lend legitimacy, help with coordination and day-to-day implementation, and often serve as the practical link between citizens and larger institutions. This is clear in Gabrovo, Bulgaria, where municipal involvement was central to getting the project off the ground. Similar patterns show up in Latvia, with local authorities supporting emerging rural energy communities, and in Hungary, where municipalities regularly act as key partners. But relying too heavily on them could create its own difficulties. Capacity is frequently limited, political support can shift, and commitment varies widely from one region to another. In North Macedonia, for example, recommendations from the Climate Assembly have moved slowly because of administrative bottlenecks and weak coordination. Even in Hungary, where some municipalities are genuinely proactive but with structural limits that leave little room for real experimentation.

This is why local champions become so important. Most of the successful initiatives depend on a few dedicated people - coordinators, facilitators or trusted intermediaries - who keep pushing things forward and anchor the work inside the municipality or partner organisations. Without them, coordination gets harder, transaction costs rise, and projects easily lose momentum. Supportive proactive mayors and municipal structures are necessary, but they rarely manage on their own. Strong civil society actors and intermediaries are needed alongside them if the work is going to last.

Knowledge and technical gaps need targeted solutions

Knowledge gaps among key actors involved in citizen energy such as citizens, municipalities, and active organisations remain a central bottleneck. Across many project experiences, there is a clear gap between policy ambition and the practical understanding needed to implement

projects. This includes limited technical know-how, weak understanding of viable business models, and uncertainty about legal procedures. For example, in Albania, citizens lacked guidance on how to navigate installation processes; in the Bansko project in Bulgaria, local actors needed support to move from abstract ideas to concrete investment models; and in Czechia, practical understanding on how energy sharing works was missing. Projects that addressed these gaps through hands-on training, guidance tools, and advisory support such as roadmaps, manuals, and coaching proved to be effective in translating interest into action.

Policy recognition is not enough without clear guidelines

One of the most consistent conclusions of all chapter contributions is that policy recognition alone is not enough. While legal frameworks like RECs and CECs are important, they are often difficult to use without clear secondary appropriate rules. Their impact is also limited without proper infrastructure, such as smart meters, and without supportive incentives, many citizen energy business models remain weak.

Public consultation periods on legislative change are crucial windows of opportunity

Successful policy influence through advocacy work, as shown in Czechia, depends on monitoring upcoming transposition or amendment processes (e.g., Lex RES II and III) and having ready positions backed with evidence and coalition statements well before formal consultations open. This proactive preparation turned UKEN as an umbrella organisation into a trusted partner for ministries and regulators and helped secure energy-sharing rules despite resistance from traditional energy actors. The same logic applies across CEE where citizen energy related rules are still being shaped.

Stability and scaling of citizen energy projects require institutional anchoring

Stability and scaling citizen energy initiatives require more than successful pilot projects. It depends on strong institutional anchoring. A valuable lesson comes from the Greek/North Macedonia project where they found it relevant to connect with municipal climate plans and strategies and connect their project to them. While pilots can demonstrate what is possible, broader expansion relies on stable policy frameworks, dedicated support structures and access to finance. Without these conditions in place, many initiatives remain isolated successes rather than becoming widely adopted models.

Source locally the needed supporting experts

Bringing local specialists on board such as engineers, technicians, gardeners, suppliers, does more than just cut costs and avoid delays. It also builds skills in the community itself and helps keep the project genuinely community-driven, something that came through clearly in the Greek–North Macedonian project.

Network actively for valuable connections

Participating in dedicated European, national or regional events such as the European Energy Communities Forum and other more regional initiatives allows small projects to showcase their work, build credibility, shape wider discussions, and create valuable connections with other practitioners, academics and funders. These platforms often lead to new collaborations and opportunities, and this is precisely what most of the projects used for meaningful multilateral exchange.

9.2. Emerging Methods and Tools

Across the chapters, several emerging methods and tools stand out as particularly relevant to the projects themselves but also relevant to be transferable elsewhere - some of them are highlighted here.

Participatory design and co-creation approaches

Turning initial interest into genuine commitment requires a structured participatory process. Across the project experiences in this publication, this was achieved through methods that combine iterative engagement, local knowledge, and transparent decision-making. In Bulgaria (Bansko), service-design and iterative workshops gradually transformed early interest into real commitment. In the Greek-North Macedonian agrivoltaics pilots, the process began with mapping the needs and knowledge of local actors (citizens and municipalities), followed by technical discussion rounds with energy experts. The Skopje Climate Assembly applied random citizen selection together with targeted focus groups on energy-poor firewood users, supported by transparent information on roles, risks and benefits, and clear decision-making rules, an approach that produced adopted policy recommendations and deliberately included vulnerable households. Similar co-creation methods in Albania, where targeted training strengthened the energy knowledge and technical skills of marginalised groups, further demonstrate how structured participatory approaches reduce implementation risks, build ownership, and lead to more durable outcomes.

Adaptive management: turning barriers into multi-benefit opportunities

Through flexible decisions, continuous learning, and community-driven problem-solving, adaptive management often turns barriers into opportunities in unpredictable situations. When municipal land in Ioannina in the Greek/North Macedonian project proved unavailable due to unclear rules on solar use in public spaces, the project adapted by relocating the agrivoltaic plot to an alternative site where agreements with the social property holders allowed it to move forward. This multi-benefit and adaptive approach show how citizen energy initiatives can simultaneously advance clean energy and local food production while promoting meaningful social inclusion. By adding a solar PV system to the garden of a mental health facility and opening the space for educational activities with local citizens, the project can also contribute to awareness-raising around mental illness as a positive side impact not foreseen at the start of the project.

Practical guidance and capacity-building tools

Capacity-building tools are essential to bridge the gap between concept and implementation. Step-by-step manuals and roadmaps, as developed in the projects in Albania, Czechia, Germany and North Macedonia, together with training programmes, workshops, and advisory or coaching services, support actors in moving from ideas to practical action.

Innovative organisational development

Internal development and embracing innovation emerge as key enablers. Examples include the creation of umbrella organisations such as UKEN in Czechia, which benefited from strategic support by a cross-national advisory board with umbrella organisations (e.g., REScoop.EU or the Czech Solar Association) and mentoring from the German partner, BBEn. In parallel, BBEn in itself developed a structured consultancy and coaching

workstream that delivers practical support for citizen energy actors (e.g. emerging initiatives, municipalities) implementing concrete projects - an innovative move for an organisation focused on policy and networking up to that point. The establishment of a national federation of energy communities in Hungary was initiated by the Hungarian project partner after long - term efforts dedicated to organisational self-development. Additionally, the establishment of the interregional task force from the Latvian Rural Forum demonstrates efficiency in growing a network of informed multipliers and citizen energy ambassadors “REC ambassadors” and recognition of the Latvian partner as a competence centre for rural community energy. The formal registration of the first rural community energy in 2025 in Latvia was a major milestone for the Latvian project partners.

Cross-border knowledge exchange

Cross-border knowledge exchange plays an important role in the DBU funded projects, with study visits, mentoring, and partnerships. Particularly between German and different CEE partner organisations or as in the case of the Greek and North Macedonian neighbouring Balkan countries implementing a joint project. This continued engagement has facilitated the transfer of experience, often on both sides. At the same time, these experiences have shown that transferability is not automatic and requires adaptation to local settings as experienced between all project partners.

9.3. Top-Down Policy Acceleration and Bottom-Up Realities in Citizen Energy

Building on the previous chapters outlined above, a broader reflection emerges on how citizen energy is currently developing in the CEE region. The development of citizen energy in CEE is increasingly shaped by an accelerated, mainly top-down approach as a result of accelerated European Union policies feeding into national ones. On the one hand, this development has some clear advantages as it creates momentum, aligns national frameworks with European objectives, and brings the topic quickly into the policy arena. On the other hand, this acceleration without depth can create weak systems. Depth determines whether citizens actually fully understand, own, shape, and benefit from the transition in a meaningful way. When policies are introduced faster than local capacities, societal understanding, and institutional structures can absorb them, the result can often be partial implementation, unclear rules, and citizen energy initiatives that exist more on paper than in practice. This dynamic can also lead to policy fatigue that overwhelms the public. The EU has frequently promised that citizens would sit “at the heart” of the energy transition (Energy Union, 2015; Clean Energy Package, 2019; Green Deal, REPowerEU, and Citizens Energy Package, 2026). Yet independent assessments show energy communities still lag far behind targets, definitions remain ambiguous in practice, transposition is incomplete in many Member States, and practical barriers (e.g., grid connections, legal uncertainty, administrative complexity) persist (European Court of Auditors, 2026). Frequent changes, high expectations, and complex requirements risk overwhelming municipalities, civil society actors, and emerging initiatives. Over time, this can erode trust, slow down engagement, and create hesitation among those who are expected to implement and participate in citizen energy projects (Ibrahim et al., 2026; Sokolowski, 2020).

In this context, small-scale grassroots citizen energy initiatives play a critical role: they can supply the depth that accelerated, top-down EU and national policies often lack, even as

spatially blind frameworks at those levels can undercut them (Liljenfeldt et al., 2025). While policies may be designed at a high level, these bottom-up efforts test what actually works on the ground. They translate abstract frameworks into real-life applications, reveal practical barriers, and build local knowledge and trust step by step. Beyond testing, they also generate valuable feedback that can inform and improve future policy design, helping to make upcoming frameworks more realistic, targeted, and effective. Simultaneously, these early initiatives often act as critical feedback mechanisms. By working directly with communities and institutions, they are able to identify gaps, unintended consequences, and implementation challenges early on, and often provide valuable feedback for policy improvements based on their experience. In doing so, they help surface weaknesses in emerging systems and contribute to safeguarding public interest, ensuring that citizen energy development remains aligned with its social and environmental objectives.

The interaction between top-down and bottom-up approaches is therefore essential. Accelerated policy development can open doors and create opportunities, but it needs to be matched with sufficient time and space for local experimentation, learning, and adaptation. Grassroots initiatives help to bring depth into the system, ensuring that progress is not only fast but also stable, democratic and meaningful. Without this balance, there is a risk that rapid advancement leads to fragile outcomes, whereas combining both approaches can support a more resilient and well-rooted development of citizen energy in the region.

9.4. Scope of the Synthesis and Reflections on Critical Mass in Citizen Energy

This synthesis is based on a selected but diverse group of citizen energy projects from several CEE countries. It brings together rich qualitative insights and honest self-reflections from the project implementers themselves. These experiences provide practical, hands-on knowledge drawn from a variety of approaches, from local pilot installations and participatory models to the creation of umbrella organisations and policy advocacy work.

As with any qualitative synthesis of this nature, certain limitations apply. While the projects do not represent every grassroots effort in the region, they span several countries and highlight tools and methods that have already proven effective in their specific contexts with real-world lessons. Many of the initiatives are still in their early stages, and the analysis relies mainly on the perspectives of those directly involved in the projects.

Drawing on threshold models of collective behaviour (Granovetter, 1978) and research on social tipping dynamics in energy transitions (Milkoreit et al., 2018; Alkemade et al., 2024), critical mass in citizen energy is best understood not as a fixed number of projects, but as a qualitative shift in which initiatives, institutions and citizens begin to reinforce one another through shared learning, more consistent institutional responses and the normalisation of participation. Empirical work on the scaling of energy communities further shows that multiple conditions, including capacity support, intermediary structures and mechanisms that connect initiatives, are necessary for such self-reinforcing dynamics to emerge (Petrovics et al., 2024). In the CEE context, where many initiatives still function in relative isolation, the still limited presence of these self-reinforcing loops helps explain why growth often remains fragile and highly dependent on temporary project funding or individual champions, even as first steps towards greater interconnection and institutional learning are beginning to emerge. These interactions and connections have been facilitated by intermediary networks and project-focused events, including the REScoop yearly forum, the DBU citizen energy funding

cluster, the Citizen Energy in Central and Eastern Europe (CEE) Conference held in Budapest on 8 and 9 May 2025, and the newly established, regionally important Wider Balkan Working Group. Academia also plays a crucial role in this emerging ecosystem: by systematically researching community energy initiatives, it both generates knowledge that can inform policy and practice and functions as an intermediary that connects practitioners, researchers, funders and public authorities. While no precise quantitative thresholds can yet be established, progress towards this self-sustaining stage becomes visible when multiple initiatives start to interact, intermediary structures emerge, and policy frameworks begin drawing systematically on practical experience rather than remaining fragmented and case-by-case. It is also important to recognise the considerable differences in national maturity levels and regulatory environments across CEE countries. For this reason, the synthesis is best viewed as an informative snapshot that offers practical guidance and inspiration. The approaches presented here show good potential for transfer, provided they are carefully adapted to local conditions. In this way, they can help strengthen the ongoing development of citizen energy across the CEE region.

9.5. Future outlook

The project experiences in this publication show that citizen energy can become an important part of the energy transition in Central and Eastern European countries. This positive development is clearly reflected in the inspiring words of the authors of the Greek and North Macedonian chapters: "*Our countries have the social capital, the sunlight, and the civic motivation to make citizen energy a real force*". Citizen-led energy can support decentralisation and democratisation of the energy sector, create local value, and strengthen active participation. At the same time, this potential depends on the availability of key enabling conditions. Important elements such as regulatory frameworks need to be clearer, more transparent and easier to use and benefit from, especially from practical secondary rules (Ibrahim et al., 2026; Bankwatch, 2025; Krug et al., 2023). Secondly, EU, national and other financing mechanisms need to become more accessible and better tailored, particularly for early-stage and small initiatives that face difficulties in securing upfront capital and particularly just for the inclusion of marginalised groups (Bankwatch, 2025; REScoop.eu & partners, 2025). Capacity building is needed for municipalities, intermediaries, and local practitioners in order to build capacities from the design to the operation phase (Energy Cities, LIFE LOOP, COMANAGE, Tandems, & ConnectHeat, 2025). It is important to recover the lost trust in distrustful societies with past socio-political shocks (Kupiec et al., 2025, 2024; Bankwatch, 2025). Social inclusion also remains essential, especially for vulnerable groups that require additional attention, tailored backing and inclusive approaches for societal coherence (Koukoufikis et al., 2023). Simultaneously, infrastructure such as digital systems and smart energy solutions must advance fast. In many parts of Central and Eastern Europe, these enabling conditions are harder to secure than in more established Western European citizen energy contexts, due to fragmented governance systems, slower regulatory implementation, and weaker administrative capacity. Financial ecosystems and trust in collective ownership models are often less developed, making citizen-led initiatives more dependent on targeted support and strong intermediary actors (Geißler & Lleshi, 2024; Spasova & Braungardt, 2021).

Looking ahead, there is already a solid base of acquired knowledge, built by the on-the-ground project actors featured in this publication and by many others working beyond it. Continuous DBU and other funding instruments support have been important in this regard:

rather than treating each grant as an isolated intervention, the approach has helped create conditions that go beyond the simple sum of individual projects or events. By connecting practitioners, intermediaries and institutions over time, it has generated new realities of exchange and policy visibility in which citizen energy attracts far more attention, individual initiatives become relevant to country-level energy policy, and the field is increasingly treated as work that should become an integral part of the energy transition in the countries of CEE. Projects have gained valuable experience in three areas: better participation processes using local tools, practical support services for citizen energy and research initiatives, and strong advocacy work to influence policy and funding. This experience should be turned into a simple service model that can be easily copied and scaled by other initiatives, regions and countries. Additionally, both research and practice-oriented projects would be essential to focus even more on developing viable business models beyond photovoltaics, integrating citizen energy with other sectors such as heating, mobility, and food, thus also strengthening governance and organisational models. Greater attention is also needed to ensure the self-sustainability of citizen energy initiatives in the long run, as this is becoming a crucial part of the energy transition domain.

Moreover, collaboration among all stakeholders remains vital. Stronger and more structured interaction between top-down policies and bottom-up initiatives is needed. Policy development can provide direction and momentum, but it must remain closely linked to local realities. This requires creating space for local projects to test approaches, learn from practice, and adapt over time. At the same time, grassroots initiatives should not only implement projects in silos but also systematically feed their experience back into policy design and exchange among each other. This exchange helps make rules and frameworks more realistic, practical, and effective. If all active stakeholders are better connected, citizen energy can develop in a way that is both faster and more stable over time. At the project level, the cases presented here show that cross-border exchange, interdisciplinary cooperation, and engagement across different governance levels are essential for advancing citizen energy in complex and changing environments.

Lastly, a key underlying principle across all initiatives is that citizens must remain at the centre of the process, as these are fundamentally citizen-centred energy initiatives. This requires early, continuous and meaningful communication with all groups of citizens, not only as end users but as active participants in shaping, implementing, and evaluating projects. Networking among implementing organisations, researchers, and funders across Europe plays an important role, as it enables learning from different experiences and often leads to new fruitful collaborations.

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