CHAPTER 2

Simplify the Uptake of Community Energy by Leveraging Intermediaries and the Use of Digital Planning Tools

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Policy Highlights To achieve the recommendation stated in the chapter title, we propose the following:

- Ensure the follow-up and implementation of EU policy measures, including by conducting quality assessments and introducing national community energy targets.
- Foster institutional allies at local and regional levels.

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- Provide access to and capacities for using digital planning tools.
- Nurture knowledge and method integration across STEM and SSH disciplines to develop practices and tools to effectively implement community-led initiatives.

Keywords Energy transition · Citizen participation · Local governance

2.1 Introduction

There is growing consensus that community-led renewable energy initiatives play a crucial role for energy transitions delivering on both net-zero and just transition objectives (Bauwens et al., 2022; Standal et al., 2023). While moving away from fossil fuels demands collective efforts from a diverse array of stakeholders at different technology scales, these decentralised and bottom-up social innovations are commonly cited for ensuring greater citizen participation (Bielig et al., 2022; Creamer et al.,

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2019). This is not only crucial for ensuring public support and acceptance of renewable energy projects, it also helps to promote sustainable energy intentions and behaviours, creating social norms that accelerate the energy transition locally (Sloot et al., 2018). Indeed, the last decade has seen a growing number of communities and citizen initiatives taking a more active role in the decarbonisation of the energy system, in terms of generation, consumption, and distribution, across both rural and urban regions of Europe. Currently, the European Federation of Citizen Energy Cooperatives has a network of 2250 initiatives operating across Europe, jointly representing over 1.5 million citizens (REScoop, 2024).

Community-driven solutions have a great appeal as they can add further renewable generation capacity into the energy mix, with this increasing the flexibility of the energy system, and diversifying the actor base and decision-making authority beyond the traditional centralised incumbents. In fact, non-technical benefits dominate the current narrative, which outlines the positive impacts and abilities of such initiates to integrate citizens' needs and opinions, mitigate resistance against transition measures, provide fairer models of prosumership, and strengthen democratic control and energy justice.

The narratives of the social impact have particularly shaped the conceptualisation of community-led energy initiatives and their perception for instigating a new relationship between society and its energy system. Hence policymakers from the European Union (EU) have acknowledged the importance of providing a legal framework with two variants of community energy actions—'Citizen Energy Communities' (CEC) and 'Renewable Energy Communities' (REC)—as further explained in Table 2.1, which details the broader understanding of the concept in the literature across purpose, governance, and activity types (European Union, 2023).

Although these acknowledgements are notable, and researchers, as well as policymakers, are increasingly well-versed in what community energy should mean (Creamer et al., 2019), challenges do persist when it comes to implementation, practice, and impact. In fact, the accelerated pace of the energy transition increases the risk of perpetuating existing structural inequalities and falling short on achieving a democratic just transition. Consequently, much still needs to be done to catalyse growth in the community energy sector and to leverage positive social benefits. Yet, we acknowledge that the transition to a decentralised renewable energy supply does not inherently guarantee a fairer, more gender-equitable,

Table 2.1 Definitions of community-led energy initiatives by the European Commission (Inspired by European Union, 2023)

Terms	*Citizen Energy Community (CEC)*	*Renewable Energy Community (REC)*
Governance and members	A legal entity that is based on voluntary and open participation, effectively controlled by shareholders or members who are natural persons, local authorities, including municipalities, or small enterprises, and micro-enterprises	A legal entity that, in accordance with the applicable national law, is based on open and voluntary participation, autonomous, effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; the shareholders or members of which are natural persons, SMEs, or local authorities, including municipalities
Purpose	Both share the purpose to provide environmental, economic, or social community benefits for its shareholders, members or the local areas where they operate, rather than financial profit	

or more inclusive system. Socio-demographic and structural inequalities (including those related to income, education, and health) will persist, even in greener and more ecological systems, unless politics, business, and society actively address these disparities and prioritise the needs and preferences of the public. We posit that community-led initiatives offer the potential to address these issues.

In this chapter, we draw upon interdisciplinary insights across Geographic Science, Political Science, Psychology, and Economics, and incorporate valuable feedback from practitioners and advocates. We therefore bridge across the Social Sciences and Humanities (SSH) and Science, Technology, Engineering, and Mathematics (STEM) disciplines to emphasise the political contexts, governance factors, and spatial analytical techniques necessary to foster community-led initiatives. The insights were gathered in an expert workshop in late-2023 (Mey et al., 2024a), which served to align our understanding of the subject, as well as brainstorm and prioritise recommendations, while building on data and knowledge gained across a broad range of research projects, including:

- Studies analysing the socio-economic dimensions of community energy projects, in particular their motivation, participatory practices, governance structures, and impacts (Holstenkamp & Kahla, 2016; Mey et al., 2022; Radtke, 2014).
- Research projects to understand the role of individual community energy actors as prosumers in the energy transition (EU Horizon 2020 project, PROSEU).
- Analysis of regional added value and financial benefits of community-led initiatives to support structural change processes (Energy Communities: Structural Policy & Participation [BE:ST]).
- Research linking to the spatial dimensions of the energy transition and the emphasis of participatory arrangements as crucial for establishing landscape democracy (CIVIC Renewables).
- Geographic Information Systems (GIS) technology-based research, highlighting an actor-centred approaches in spatial optimisation and energy modelling.
- Global initiatives like the Colouring Cities Research Programme and the Colouring Cities open data platforms (Hecht et al., 2023), gaining insights how to utilise web-based tools in a citizen's science approach for energy data gathering.

The initial and revised versions of this chapter were circulated among practitioners, as part of an open feedback process in early 2024, with their input used to refine the subsequent text.

Our aim is to offer energy policy recommendations to the EU and its Member States, to enhance the resilience of community-led energy initiatives, and to provide suggestions on: how to fully unlock their potential by leveraging various instruments at different governmental levels; and, access to information resources.

2.2 Strengthen Community-Led Renewable Energy Initiatives

2.2.1 Ensure Follow-Up and Implementation of EU Policy Measures

Community energy policies need diligent follow-through, including instruments for quality assessment. Since the introduction of energy communities into EU law with the adoption of the 'Clean energy for all Europeans' legislative package in 2019 (European Commission, 2019),

the EU has started several initiatives to strengthen collective initiatives in the energy sector. These include policy proposals as part of the Solar Energy Strategy (European Commission, 2022), as well as research and technical assistance in the context of the Energy Communities Repository and the Rural Energy Communities Advisory Hub (European Commission, 2023, 2024). Yet, implementation requires genuine follow-through; the EU must hold Member States accountable for assessing the status of EU policies for community energy and the evaluation of measures taken. Here, the introduction of a national target for energy communities could contribute clear direction, show commitment, and guide decision-making at various governmental levels.

According to the recast Renewable Energy Directive (RED II) (European Union, 2018), Member States shall take out assessments of the community energy sector in their countries, specifically of barriers and potentials (RED II, Art. 22 Para. 3). These assessments should then build the basis of an enabling framework (RED II, Art. 22 Para. 4), which Member States should set up. In addition to this, Member States could also use regular assessments to monitor the efficiency and effectiveness of policy measures. Although the EU legislator has not (yet) defined any standards nor provided any template for such an assessment, there are already proposals that exist (Holstenkamp & Kriel, 2022).

An assessment needs to build on data about the current state and the development of energy communities, ideally disaggregated for different types of energy communities. In this regard, Member States can partly build on data provided by national umbrella organisations, through the Energy Community Repository and/or by European research consortia. Moreover, as is well known from the evaluation literature, an assessment should build on an impact model or a theory of change (Weiss, 1995). As known from the Management literature (Drucker, 1973), *sensible* measurement that provides feedback into the management process is important—meaning that the process needs to involve the build-up of relationships (from participation in the energy community sector) to make sense of the data and manage them in a correct way.

According to the EU Solar Energy Strategy (which is part of the REPowerEU plan), EU Member States shall ensure to set up at least one renewables-based energy community in every municipality with a population above 10,000 by 2025 (European Commission, 2022). However, almost all Member States are yet to implement any concrete national targets for energy communities. Such targets make it easier to follow-up

and report on developments in the sector, e.g. in the National Energy and Climate Plans (NECPs). This is why the European Commission stresses the lack of quantitative targets for energy communities in nearly all its assessments of NECPs. The structure and format of NECPs laid out in the Implementing Regulation foresees targets for energy communities.

Clear targets or goals are supposed to create a management tool that "help[…] to ensure the accountability of all stakeholders" (SDSN, 2015, p. 2). They could direct (political) attention towards energy communities. What needs to be considered, though, is that indicators also have political dimensions—again highlighting the importance of embedding the selection and use of targets into a participatory process.

2.2.2 Foster Institutional Allies at Local and Regional Levels

Since community-led energy initiatives originate at the grassroots-level, distinct from commercial entities, they often lack the knowledge as well as the capacity to plan and implement energy projects. Hence studies have shown that community-led renewable energy initiatives can: greatly benefit from intermediary organisations enabling learning, skills, and knowledge transfers; provide capacities and resources; and aggregate impact for stronger local energy activities (Arler et al., 2023; Mey et al., 2016). This rationale gave impetus for the establishment of one-stop shops at EU (e.g. Energy Communities Repository) and National levels (e.g. Spain, Netherlands, France, Belgium, Croatia). An example is the Coordination Office for Energy Communities in Austria, with the role to provide practical advice, knowledge, materials, and resources for new and operating energy communities (Österreichische Koordinationsstelle für Energiegemeinschaften, 2024). In addition, this institution has also created regional and local subsidiaries offering personal consultation sessions.

While we acknowledge positive strides are being made in some countries, greater action is necessary to support communities at regional and local levels across most countries in the EU. The last decade has seen an increasing engagement of particularly local governments in the fledgling community energy sector, with many local climate and energy initiatives emerging across the EU. However, these institutional partnerships are often underfunded and have lower capacities to navigate the complexity of the energy-related legal frameworks, regulatory instruments, and procedures. We found that these limitations may increase a reluctance to act

and hinder the brokering role of local government to engage in partnerships and collaborations, which in turn may hamper communication, community cohesion, and trust.

Hence, we argue that while local governments already play a significant role in climate action, they often lack the capacities and resources to take on additional tasks or fulfil their existing responsibilities to a satisfactory extent. Policies—such as the amendment of the German Renewable Energy Act 2023 (Section 6 of the Act), which allows wind energy and open-space photovoltaic projects to financially involve affected local municipalities in the profits generated—are important developments and may give these institutions greater scope for action. Consequently, strengthening local governments and other intermediaries to better facilitate community participation in energy planning and energy project implementation is a crucial step to foster a decentralised, community accepted, and co-owned energy transition.

2.2.3 Provide Access and Increase Capacities for Using New Planning Tools

A growing field of conflict is the selection of sites for renewable energy projects because legitimate concerns from affected communities are often neglected in the national legal framings (Borch et al., 2023). These unmet concerns may spin siting disagreements out-of-control as they often travel (overflow) to other settings (e.g. social media), escalating into entrenched conflicts (Borch et al., 2020). Here, it is crucial to optimise communication processes, providing comprehensive knowledge about the techno-economic and socio-ecological conditions of selected sites, and creating transparency regarding regulatory factors to communities.

In the last decade, innovative, user-oriented, web-based planning, and visualisation tools like GIS have received increasing recognition in planning and implementing renewable energy projects at local level (Bosch & Schwarz, 2018). These tools can enable participatory mapping of sites, political prioritisation of land use, and empower local communities to navigate competing land use interests.

We argue that community-led initiatives could benefit from utilising these tools to further strengthen their abilities for an inclusive and locally informed decision-making process for site selection. However, we find that these initiatives often face challenges due to limited resources, capacities, and information for accessing these tools.

In Germany, a growing movement is advocating for greater transparency and participation in local energy planning. An interesting example of this is the *Bavarian Energy Atlas*, which is provided by the *Bavarian Ministry of Economic Affairs, Regional Development and Energy*. While the digital atlas does not allow for complex spatio-temporal analyses of the implementation of renewable technologies, it does nevertheless provide valuable insights into the site potential and planning basis for renewable energies in the state of Bavaria. In order to get in touch with local actors and facilitate communication with local experts, important contacts are also mapped in the atlas. Moreover, users can select individual municipalities and calculate local energy potentials. Other participatory planning tools are also linked to the *Energy Atlas*, such as the 3D-analyser, which can be used to place wind or photovoltaic plants in the landscape and thus provide a visual-aesthetic impression of the specific spatial impact of renewable energies.

Since these tools make it possible to simulate social, ecological, and economic environments, we argue that they can highlight trade-offs and help to make informed decisions at community level. GIS tools assist in simplifying the complexity of local planning processes and empowering local actors to actively engage in dialogue aimed at transforming the energy system. This is particularly achieved through the identification and prioritisation of suitable locations, and ideally enables a democratic dialogue, coordination, and balancing of the needs and preferences of the local population and stakeholders (Mey et al., 2024b).

However, to contribute to the acceleration of a local energy transition, a coordinated development of geodata infrastructures and a better access of geodata is necessary. Only then will it be possible to establish participatory and collaborative digital planning approaches, in contrast to the top-down mechanisms that still dominate energy planning processes at present. As some countries have already advanced in their transition, they can provide insights in appropriate geodata usage. For example, GIS and energy system analyses have been used to provide technical and socio-economic knowledge regarding the potential role of photovoltaic in an urban system, including the societal perspective in Denmark (Mathiesen et al., 2017).

Hence, optimising the use and accessibility of these tools can help accelerate the development of energy community projects. EU policy should encourage Member States to prioritise collaboration, adaptation, capacity building, and community engagement, to ensure that

existing tools become an integral part of communities' journey towards sustainable energy practices.

2.3 Achieving Our Recommendation

We recognise the increasing importance of community-led energy initiatives in achieving both net-zero and just transition objectives. Although, in the recent decades, community-led initiatives have enjoyed the support of various policy measures, we find that continuous efforts from EU and Member State level are needed to facilitate and simplify their implementation.

As per the title of this chapter, our core recommendation is that policy should: *simplify the uptake of community energy by leveraging intermediaries and the use of digital planning tools*. We argue that this can be achieved through the following sub-recommendations: firstly, it is important to strengthen overall community energy policies in the Member States. To this purpose, it is necessary to ensure a follow-up and implementation of EU RED II and its CEC and REC provisions, further enhanced by quality assessments of national policy measures and the introduction of a national community energy target to evaluate the progress in the sector. Secondly, institutional allies at multiple levels are important factors for the success of local energy initiatives, yet still often lack resources and capacities to do so. Hence, empowering local governments and intermediaries to enhance community involvement in energy planning and project implementation is essential for promoting a decentralised and co-owned energy transition. In particular, we consider the new digital planning tools as great opportunities to simplify processes, empower local actors, and speed up energy community project development. Therefore, our third recommendation is to enhance tool accessibility and user capacity at the local level. Finally, we conclude that integrating insights, tools, and methods from both SSH and STEM disciplines is essential to leverage on social-political and technical opportunities for an effective implementation of community-led initiatives.

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