Geoforum 166 (2025) 104411

Contents lists available at ScienceDirect

Geoforum

journal homepage: www.elsevier.com/locate/geoforum

Twisting like a cabbage worm: The politics of enacting sustainable futures through energy communities

Fredrik Envall [a,b], J. Daniel Andersson [a,b,*], Johanna Liljenfeldt [c]

[a] The Department of Thematic Studies – Environmental Change, Linköping University, Sweden
[b] Centre for Climate Science and Policy Research (CSPR), Linköping University, Sweden
[c] The Department of Earth Sciences, Uppsala University, Sweden

ARTICLE INFO

Keywords:
Community energy
Energy democracy
Future-making
Sociotechnical configurations
Sustainability transitions

ABSTRACT

In 2019, the European Union launched a set of eight legislative acts called the Clean Energy Package, which introduced energy communities as a formal actor in its regulatory framework. Often defined as the cooperative production and management of energy through civic engagement, high hopes have been pinned on energy communities to serve as instruments for realizing fundamental ideals of energy democracy. Although it has been recognized that energy communities are fraught enterprises that involve multiple actors and cut across geographic scales and vertical levels of policy and politics, surprisingly little attention has been paid to the processes through which they take shape. In this paper, we approach energy community initiatives as sociotechnical configurations, examining how actors, technologies, and institutions are assembled, drawn into relation, and held together in collective efforts to shape the future. Our locus is two energy communities under configuration in the Swedish energy landscape: one part of a climate-smart urban planning project in the city of Örebro, and one in the sparsely populated rural countryside on the island of Gotland. By treating the configuration of energy communities as place-based enactments of sustainable futures, we illustrate how the prospects of community energy are shaped in practice and illuminate the composition of power that permeates the politics of future-making.

1. Facilitating community energy to forge a more democratic energy system

That is a tricky question: what would be the gain for a grid operator, how can you identify that? […] Regarding system services, when the grid is congested, currently there is no price tag for that. Or rather, we can see that there is no substantial gain there. The actual gain would be to shave our peak demand towards our transmission grid, and there is not a lot of money in reducing 100 kW, there is no gain with 100 households.

Thus spoke an employee at Gotlands Energi AB (GEAB) – the distribution system operator (DSO) on the Swedish island of Gotland in the Baltic Sea – about the potential contribution of energy communities (ECs) to Sweden's energy transition. ECs are often defined as the cooperative production and management of energy through civic engagement, emphasizing justice-oriented values connected to citizen participation and local empowerment (Szulecki, 2018; Van Bommel & Höffken, 2021). Judging by the above quote, however, such values are far removed from a grid operator's day-to-day concerns. A similar attitude to that expressed by the employee at GEAB prematurely ended a pilot project in the city of Uppsala, located on the Swedish mainland. As on Gotland, central actors ultimately deemed the establishment of the EC not worthwhile, judging that the economic benefits would not justify the effort required to launch the initiative. In both cases, the potential value of community energy was dismissed, as uncertainties remained about whether, when, and how actors might be remunerated for providing system services to an otherwise reluctant grid operator. What those examples underline is how ECs in the Swedish context have come to be entangled with imaginaries of a renewable energy future molded to fit the current large-scale grid configuration. Although there is substantial interest among local and regional organizations in the potential of ECs to contribute to social and ecological sustainability, grid operators and governmental agencies remain skeptical of their public utility (Palm, 2021; Envall & Rohracher, 2024; Envall et al., 2023a).

In the European context, this framing of ECs is unusual. Launched by the European Commission in 2019, a substantial policy package called

* Corresponding author at: The Department of Thematic Studies – Environmental Change, Linköping University, Sweden.
E-mail address: daniel.j.andersson@liu.se (J.D. Andersson).

https://doi.org/10.1016/j.geoforum.2025.104411
Received 15 November 2024; Received in revised form 5 September 2025; Accepted 10 September 2025
Available online 19 September 2025
0016-7185/© 2025 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

Clean Energy for all Europeans – also known as the Clean Energy Package (CEP) – introduced ECs as a formal actor in its regulatory framework. Comprising eight new laws, of which the Renewable Energy Directive (EU) 2018/2001 (REDII) and the Common Rules for the Internal Market for Electricity Directive (EU) 2019/944 (IEM) are of particular relevance, the CEP emphasizes the potential of ECs to contribute to the European Union's (EU) just transition agenda, focusing on the alleviation of energy poverty and the inclusion of marginalized groups in the energy transition (EU 2018/2001: L328/89, L328/91-L328/92; Gâju, 2019). Two new types of community actors are distinguished in the CEP framework: "renewable energy communities" (RECs) and "citizen energy communities" (CECs). Although they differ in terms of activities and eligibility criteria, both are defined as cooperative forms for producing economic, social, and ecological benefits beyond that of economic profit or even values narrowly related to the provision of energy services (DG Environment, n.d). As opposed to traditional market actors, their purpose is specified as non-commercial, to serve as a cornerstone of stimulating local ownership of energy resources. Similarly, academic scholarship has highlighted the potential of ECs to serve as instruments for realizing fundamental ideals of energy democracy (Stephens, 2019; Wahlund & Palm, 2022), such as by shifting ownership and control of energy resources and infrastructures to grassroots constellations (Van Der Schoor et al., 2016), with hopes of far-reaching redistributive change as a result (Burke, 2018; Dall-Orsoletta et al., 2022). While there are competing interpretations about the potential values that ECs might contribute (Walker & Devine-Wright, 2008; Chmutina & Goodier, 2014; Van Veelen, 2018; Creamer et al., 2018), European policymakers and scholars have pinned high hopes on them to promote social sustainability, empower citizens, and increase social acceptance of the energy transition (Wustenhagen et al., 2007).

Whether such expectations are realized when the CEP is implemented in the member states, though, is an empirical question (Emelianoff & Taylor Aiken, 2021). As indicated above, they are a far cry from the concerns with energy system services that dominate how the value of ECs has been framed in Sweden (Envall et al., 2023b). There is a wide gap between the CEP's vision of ECs as instruments for forging a more democratic energy system, and how their potential to contribute to the energy transition have been envisioned by key actors in the Swedish energy landscape (Envall & Rohracher, 2024). Previous scholarship has shown that community initiatives challenging established regimes must twist and turn, often adopting artefacts and practices that conflict with their own values to gain momentum within hostile institutional settings (Laforge et al., 2017; Taylor Aiken, 2016). Moreover, the CEP's regulatory framework takes the form of directives that are not directly applicable but must be interpreted and implemented – or "transposed" – into national legislation by each member state. To monitor this process, the civil society organization Rescoop has launched a transposition tracker that follows how the CEP directives are being implemented across the EU. According to the tracker, Sweden has yet to formally transpose any of the provisions on RECs or CECs.

This discrepancy between the values ascribed to ECs in the CEP and those emphasized in the Swedish context calls for research that closely examines the performative dimensions of sustainable futures (Hajer & Pelzer, 2018). Although it has been recognized that ECs are fraught enterprises that involve multiple actors and cut across geographic scales and vertical levels of policy and politics (Gui & MacGill, 2018; Blasch et al., 2021), surprisingly little attention has been paid to the processes through which they take shape. Those processes – in the research literature frequently referred to as "configurations" (McGuirk et al., 2016) – largely remain underspecified. In this paper, we approach EC-initiatives as sociotechnical configurations, excavating how their diverse elements – actors, technologies, and institutions (Melnyk et al., 2023) – are assembled, drawn into relation, and held together in collective efforts to shape the future (Chilvers & Pallett, 2018). To guide or analysis, we ask two overarching research questions:

(i) what values are made legible to facilitate agreement on the configuration of the EC;
(ii) and what, as a result, is the prospect of community energy demonstrated to be?

Our locus is two ECs under configuration in the Swedish energy landscape: one part of a climate-smart urban planning project in the city of Örebro, and one in the sparsely populated rural countryside on the island of Gotland. By treating the configuration of ECs as place-based enactments of sustainable futures, our aim is to illuminate how power operates immanently within the sociomaterial relations that underpin the politics of future-making (Burke & Stephens, 2018). In doing so, we respond to calls for deeper engagement with the configurations that produce the emergent potentials of energy democracy and influence how it takes form (Bulkeley, 2016; Droubi et al., 2022; van Veelen & Eadson, 2020).

The paper proceeds as follows. In the next section, we situate our study in the scholarly literature on future-making and assemblage theory. In section three, we explain our action-oriented approach to the Swedish energy transition and reflect upon our position as "critical companions" to the two EC-initiatives we have studied. Section four is where we present our empirical analysis. After a brief contextual background, the analysis is structured along three types of practices through which sustainable futures are enacted – legibilization, demonstration, and agreement. Finally, in the concluding section we clarify our analytical contributions and relate our empirical findings to the literature discussed in section two.

2. Conceptualizing the enactment of sustainable futures

In the social sciences, there is a growing awareness of the need to better understand the role of foresight in sustainability transitions (Vervoort & Gupta, 2018; Bornemann & Strassheim, 2019). To manage the uncertainty of sustainability transitions, climate governance relies to a significant degree upon assembling shared convictions about the future (Muiderman et al., 2020; Brodén Gyberg & Lövbrand, 2022). Drawing upon the sociology of expectations in science and technology (Borup et al., 2006), our theoretical starting point is that ECs are neither exclusively a set of legal entities nor technological artefacts for collectively producing and sharing energy; they are also sites for governing expectations around the prospective role of community energy in a renewable energy system (cf. Parkhill et al., 2015; Smith & Tidwell, 2016; Burnham et al., 2017; Longhurst & Chilvers, 2019; Marquardt & Delina, 2019). Borrowing from the conceptual toolbox of Jasanoff (2015), we understand the democratizing promises of community energy as imagined forms of social order that center on the expected development and fulfillment of particular ways of organizing energy systems, connecting the potential realization of certain values to visions about the kind of communal life we want to foster (Jasanoff & Kim, 2009, 2013). In this sense, ECs are sociotechnical configurations with which to solidify collective beliefs about the prospects of community energy. In the practices of setting up and establishing ECs, negotiations unfold between the future visions entangled with such initiatives and the present conditions within which they are always situated (Edwards & Bulkeley, 2017). One fruitful approach for examining its prospects as collectively held, institutionally stabilized, and publicly performed is thus to focus on ECs and the context of associated practices through which they take shape (Chilvers & Longhurst, 2016).

Taking inspiration from the research literature on the politics of future-making in sustainability transitions (Knappe et al., 2019), we concur with Longhurst and Chilvers (2019) that to understand how sustainable futures are enacted, it is necessary to follow concrete initiatives – such as ECs under configuration – longitudinally. We believe that this sets the stage for a deeper understanding of the politics of future-making that emerges in and through such initiatives, attending to how participation is formatted around sociotechnical configurations

(Groves, 2017), and to how sustainable futures are enacted in processes of stabilizing assemblages for coordinated action (Chilvers et al., 2018). Indeed, to shed light on how sustainability transitions unfold, scholars have turned to assemblage theory to study systems of energy and transport as "collection[s] of heterogeneous elements" (Wise, 2005: 77) in "a multiplicity of processes of becoming, affixing sociotechnical networks, hybrid collectives, and alternative topologies." (Farías, 2009: 2). To date, it has motivated and informed studies ranging from energy infrastructure and policy to public transportation to the democratization of access to energy resources (Ureta, 2015; Moss, 2020; Eadson & Van Veelen, 2021). Applying a variety of relational approaches to the study of energy transitions, there is a burgeoning literature on how practices of energy production and use intersect with large-scale grids and government policy to shape the possibility space and the congealing of agency in multilinear ensembles of solar panels, feed-in tariffs, electricity meters, building codes, batteries and the like (Bouzarovski, 2009; Bridge et al., 2013; Haarstad & Wanvik, 2017; Castán Broto, 2019).

In their analysis of processes of urban decarbonization, for instance, Stripple and Bulkeley (2019: 54) contend that "governing a 'decarbonisation pathway' is less about 'control' [and] more about how they are assembled and congealed through particular arrangements." They propose three types of practices – legibilization, demonstration, and agreement – through which decarbonization pathways are enacted. With the help of the three types, they then analyze "the kinds of realignments that these afford, and the forms of politics to which this gives rise" (Stripple & Bulkeley, 2019: 56). Referring to specific junctures in the energy transition where its meaning and value is particularly unstable and open for negotiation, Stripple and Bulkeley (2019: 54) define the three types of practices as follows:

First, rendering legible is a calculative or aesthetic way of coding, representing, and knowing a domain, thus making it possible for government to operate. Second, demonstration is about arranging particular sociomaterial relations (e.g., housing, mobility, energy provision, shopping) within the narrative of a low carbon-transition. Bringing into agreement is about piecing together a bricolage of diverse entities – thereby enabling sociomaterial relations to reconfigure.

Following Van Der Schoor et al. (2016), we hold that community energy is one such juncture in the Swedish energy transition, and that ECs constitute sites for studying how the material-semiotic arrangement of Sweden's renewable energy system is negotiated (cf. Eames et al., 2006). Building on Stripple and Bulkeley's (2019) typology of practices, we provide empirical insights into how the prospects of community energy are enacted through processes of sociotechnical configuration that go into shaping ECs. Our analytical approach homes in on the composition of power as energy communities are assembled, aligning with scholarship that uses assemblage theory to interrogate emergent relations and dynamics (McFarlane, 2009; Anderson & McFarlane, 2011; Featherstone & Korf, 2012; Jones et al., 2013). We pay particular attention to how path dependencies and regime resistance shape – and at times constrain – the democratizing potential of community energy (Eadson & van Veelen, 2021; van Veelen & Eadson, 2020; cf. Geels, 2014).

There is research that has studied other kinds of community initiatives in a similar fashion. Examples include how community food providers reluctantly interact with dominant neoliberal systems of food production, adopting various modes of engagement by both drawing upon and resisting features of large-scale industrial systems (Laforge et al., 2017); or how the impact of practices of quantification for governing sustainability transitions motivate local activists to adopt numerical targets for their own ends (Taylor Aiken, 2016). We seek to bring much the same concern to the field of energy studies, with an emphasis on agency as relationally produced and contingent upon the interactions and entanglements that constitute assemblages. Drawing upon the analytical sensibilities of assemblage theory, our contribution lies in elaborating upon a relational understanding of the politics of future-making in the energy transition. Whereas Stripple and Bulkeley (2019) detail practices for the enactment of sustainable futures, we seek to illuminate how power is composed to and facilitate or restrict the capacity for their actualization (Ruggiero et al., 2021). Shifting analytical focus away from discrete actors and structures, assemblage theory directs attention instead to the evolving practices through which ECs are configured and reconfigured, which enables us to move beyond dominant models of energy transitions that rely on prototypical hierarchies, bounded systems, and fixed scalar levels, such as the multi-level perspective (Geels, 2011; Genus and Coles, 2008). In contrast, assemblage theory offers a lens to empirically engage with the power dynamics that play out as community energy is enacted. It foregrounds a processual view that emphasizes the ongoing work of assembling over ready-made configurations; highlights emergence and contingency rather than linear pathways of change; acknowledges the multiplicity of co-existing assemblages; and reconceives agency as a relational property, not an attribute that actors inherently possess, thus treating their capacity to act as derived from the way in which elements are assembled in configuring their ECs (Bouzarovski & Haarstad, 2019; Kok et al., 2021; López Cifuentes & Sonnino, 2024; Fressoz, 2024).

Focusing on the concrete and situated politics of future-making, our ambition is also to contribute empirically grounded insights to the conceptual literature on energy democracy (Szulecki, 2018; Van Veelen & Van Der Horst, 2018; Stephens, 2019; Szulecki & Overland, 2020). By attending to the topological implications of how community energy is practically accomplished (Allen & Cochrane, 2010; Allen, 2011), and with what democratizing effects (if any) (Van Veelen, 2018; Gürtler et al., 2021), we critically examine the potential for "democratization assemblages" (Eadson & Van Veelen, 2021) to take shape in practice. Note that we engage the concept of energy democracy in a delimited sense, focusing specifically on the values that ECs make legible. Rather than treating energy democracy as a stable normative framework or an evaluative checklist of procedural and redistributive principles, we approach it as an emergent property of sociotechnical configurations (Van Veelen & Eadson, 2020). By tracking how certain elements are drawn into agreement in the EC-initiatives, while others may be sidelined or transformed, our assemblage-theoretical lens allows us to examine how relations between the assembled elements are configured, and what prospects of community energy the arrangements demonstrate. Our intent is thus not to evaluate the empirical presence of energy democracy against an ideal, but to make visible how the enactment of sustainable futures through practices of community energy may both open up and foreclose different pathways for democratizing energy transition processes.

3. Action-oriented research on the enactment of sustainable futures through energy community initiatives

We have followed two EC-initiatives under configuration for a duration of two years (cf. Derrington, 2019). One of the initiatives, Austerland Energi, is situated in the countryside on the island of Gotland, whereas the other, Tamarinden, is a new city district under construction in the city of Örebro. The two cases were chosen due to their contrasting settings: whereas Austerland is situated in a rural context with strong local ties, Tamarinden is part of a 'climate-smart' urban development project. Empirical material has been collected through semi-structured interviews, observations, on-site fieldwork, written correspondence, as well as through participant observation in the Austerland initiative. One of us recurrently returned to the two EC-initiatives throughout the duration of the study whereas another was steadily involved in Austerland as part of its advisory board. In both cases, our study was guided by the two overarching research questions outlined in the introduction. To make them more methodologically precise, we further developed four analytical questions to guide our post-fieldwork interpretation:

)i) what elements become important to the EC in efforts to make its value legible;
)ii) what elements are marginalized in the resulting agreement;
)iii) how are relations between the assembled elements configured;
)iv) and what prospect of community energy does the arrangement of these relations demonstrate?

These analytical questions offered a flexible yet structured framework for comparing how sociomaterial relations were configured in the two ECs and for assessing their effects on the potential for a democratization of the Swedish energy system.

Based on interview transcripts, field notes, meeting minutes, project reports, and policy documents, our empirical material is exclusively qualitative. Field notes taken over the two-year duration of this study, and interview transcripts based on a total of forty-four interviews with an average duration of thirty minutes, dominate the material. Our interviewees comprise representatives from: the project groups of each EC-initiative; the Swedish Energy Markets Inspectorate; two energy utility companies; two Swedish municipalities, including both local politicians, civil servants, and special advisers; a municipal property developer in Örebro; a commercial property developer; the regional energy office on Gotland; a local development company on Gotland; an energy consultancy firm; an innovation platform for climate-smart urban development; a Swedish state-owned research institute on sustainable growth; two interest organizations for economic associations and cooperatives. During our participant observations and ethnographic field work, we have also had the opportunity to interact with representatives from: the advisory boards of each EC-initiative; three commercial property developers; a regional business incubator; a study association for adult education; as well as residents and businesses in the EC area on Gotland. Occasions for our participant observation grew to encompass formal project demonstrations, informal project visits, project meetings, symposia, and conferences.

To thematize and code the material, we conducted our analysis through an iterative and reflexive process alternating between individual and shared efforts at interpretation (cf. Charmaz, 2014, 2017). At the stage of systematization and categorization, we began familiarizing ourselves independently with the material, looking for both surface and underlying patterns of meaning. We then collectively explored similarities and differences in our coding, moving on to deliberate and distill our codes into a shared set of candidate themes. We began the analytical stage about mid-way through the study and what followed from thereon were three phases of revising and redefining our candidate themes. During the first two phases, we gradually shifted attention from data collection to analysis as we reached saturation, all the while controlling that our themes were consistent against the entirety of the dataset. Working iteratively like this allowed for a reflexive approach in our research design, such that our thematic analysis could inform and shape our interview guides and the objectives for our participant observation, and our interviews and observations in the field, in turn, could illuminate our interpretation and coding of meeting minutes and project reports.

3.1. *Critical companionship with energy community practitioners*

Our methodological approach can best be described as action-oriented. The idea that knowledge should be mobilized to actively help transform the world, rather than merely understand it, is a cornerstone of the scholarship on sustainability transitions (Markard et al., 2012). Our methodological choice is deeply informed by the ambition to empower ECs in Sweden to successfully produce and share renewable energy in ways that contribute to social sustainability and deepened energy democracy (Coy et al., 2021). As solution-oriented foresight becomes more and more important, Geels et al. (2016) have argued that practice-based action research is an important complement to the traditional modeling approaches of government bureaucracies (see also Turnheim et al., 2015; Hajer et al., 2015). To ensure that sustainability transitions do not become technocratic endeavors, it is necessary to politicize practices for enacting the future by opening them up to public participation and contestation (Lövbrand et al., 2015; Granjou et al., 2017). While there is a wide spectrum of action-oriented research (see, e.g., Santoro Lamelas, 2020; Minkler & Freudenberg, 2010), we have aligned our approach with a critical research ethos (Cavanagh & Benjaminsen, 2017; Haarstad et al., 2018; Machen, 2019), which means that we have sought to support envisioned alternatives to dominant political economic practices in the Swedish energy landscape, nurture reflexivity in the project groups around questions of procedural justice, and connect grassroot initiatives with each other to share knowledge, making us "critical companions" (Ziewitz & Singh, 2021) of our informants in the process.

Following Ziewitz and Singh (2021: 3–4), we understand critical companionship as an effort to engage with the interlocking learning journeys of researcher and informant. While our informants navigate the Swedish energy landscape in configuring their ECs, we as researchers seek to understand how they experience this process, including the obstacles they encounter and the internal frictions it generates. By critically accompanying ECs over time, we have sought to render these frictions analytically productive, treating them not as disruptions to be smoothed over, but as openings through which the politics of future-making can be examined. We begin from the premise that "community" is not a given, territorially bounded entity, but rather something that is produced through relational processes, and therefore permeated by the sociomaterial circumstances of its configuration, reflecting longstanding asymmetries of power in the energy landscape. In this context, our action-oriented approach is both an ethical choice and an epistemological necessity: to critically engage with the topological production of community, our presence as participant observers is already entangled in the very processes we seek to understand, making critical companionship a mode of inquiry that is both situated and inseparable from the configuration of the ECs themselves; both empirically informative and normatively committed.

On a practical level, this companionship took several forms: we established an online forum where EC-initiatives and other community energy actors in Sweden could regularly interact; assisted in designing a household survey for Austerland Energi; raised concerns about social sustainability during project group meetings; organized seminars bringing together Swedish actors and representatives from the European Federation of Energy Communities (REScoop); and provided advice – and arguably a degree of legitimacy – to the Austerland initiative. While we initially approached both ECs with an open attitude and discussed various forms of collaboration, our roles evolved differently in each context. In Austerland, the project group actively sought to enroll our perceived expertise to help demonstrate their EC. In Tamarinden, by contrast, our involvement remained limited to observation. As we will show, this divergence reflects key differences in how the initiatives were configured: Tamarinden is characterized by a professional project set-up, led by a project group that saw little need for more active involvement of us as researchers, while Austerland, lacking in legal and technical expertise, was more open to, and arguably dependent on, close collaboration with participant observers like us.

Undeniably, one of the authors' position on the advisory board of Austerland has been a key site of engagement. This role provided unique access to configuration of this EC, and helped foster trust among informants. At the same time, it required careful reflexivity to balance the responsibilities of providing support with the demands of critical scholarly inquiry, such as resisting the urge to take the stated objectives of the EC at face value, and fostering deliberation around what values should underpin social sustainability and democratization without imposing any prefabricated ideal in the process. Rather than compromising integrity as researchers, though, we view this embedded position as consistent with an action-oriented approach undertaken from an assemblage-theoretical point of view – one that acknowledges how

knowledge is co-produced through critical companionship and aims to support transformative capacities from within. Our strategy, then, is to be transparent about our normative commitments – commitments that are not unique to us as researchers, but are clearly articulated in the EU's policy goals – while remaining attentive to the tensions and disagreements that emerge in the field.

4. Comparing the configuration of two energy community-initiatives

Community energy in Sweden has long been associated with the environmentalist movement and has constituted a historical site of struggle for sustainable futures (Anshelm, 2000; Hultman, 2015; Kall, 2011). In the 1970 s, it played a central role in the utopian discourse of a low-energy society and associated efforts through, among other things, practices for producing and using energy, to realize a future substantially different from the dominant norms of mainstream culture, with envisioned values connected to processes of decentralization, local decision-making, and small-scale economies. Due to the centralized design of the Swedish energy system, however, and because electricity production comes mainly from large-scale hydropower and nuclear power, with municipalities being key suppliers of gas, electricity, and district heating (Palm, 2006), community energy has remained a marginalized enterprise in Sweden. But while community energy has so far developed according to local and national sociopolitical, infrastructural, and legal contexts, the CEP has now put responsibility on EU's Member States – including Sweden – to actively facilitate and incentivize their emergence as an important actor in the European energy landscape, and it is this process of transposition that will test the legal strength of the new rules and decide the future of community energy in Europe (Roberts, 2020).

In 2022, the Swedish government opened the door for local sharing of energy in a way that was previously, with few exceptions, prohibited for actors without a grid concession. Although this could prove significant for practitioners of community energy in Sweden, the Swedish Energy Markets Inspectorate (Ei) – which is the authority commissioned to investigate the measures required to translate and implement the CEP into national legislation – has been criticized for failing to incentivize EC-initiatives, and to have prioritized pragmatism to the detriment of envisioning alternative futures (Palm, 2021). In its report on the implementation of the CEP, for instance, Ei states that:

An [energy] community shall also [i.e., just like any other actor] be subject to cost-related network charges and taxes, to ensure that it contributes in an appropriate, fair, and balanced way to the overall distribution of costs in the system, in line with a transparent cost-benefit analysis of distributed energy sources as it is developed by national authorities. This requirement does not necessitate any action based on the proposed regulation. The community and its members have the same rights and obligations as other actors and customers (Husblad et al., 2020: 349. Our translation).

Since bureaucratic, administrative, and legislative burdens have been identified as significant barriers to ECs (Brummer, 2018; Wagemans et al., 2019; Horstink et al., 2020), Ei has proposed that they be incorporated under the already existing law on economic associations, which is described as the most suitable organizational form because it is convenient, requires little administration, and is not surrounded by as many regulations as is, for instance, a limited company. Ei has further recommended that ECs should not be allowed to own electricity grids themselves nor to transmit electricity on behalf of others (Husblad et al., 2020: 351–352). One reason is that existing regulations prohibit this. The electricity grid is a monopoly, and an actor needs a permit – a grid concession – to operate a grid. An option for ECs would be to use an exemption to the law and establish community-owned grids as non-concession grids, but as soon as an EC consists of several separate residential buildings, such as single-family houses, those rules are inapplicable. To avoid the administrative burdens that separate grid concessions would create for ECs, Ei stresses that the primary purpose of an EC must be to share electricity between its members and points out that this does not require ownership of a grid.

The fact that "Ei stated that it could see only limited EC influence on the Swedish market" (Palm, 2021: 12) sums up what can be described as a reluctant attitude to proactively shape the Swedish grid infrastructures, grid ownership structures, and institutional frameworks in ways that would make them more conducive to community energy. It is also what makes Sweden a compelling setting for elucidating how entrenched relations of power shape the enactment of sustainable futures through ECs (Kooij et al., 2018; Magnusson & Palm, 2019). Without state funding, subsidy mechanisms, or a dedicated support program, responsibility has been put on the initiatives themselves to demonstrate and make legible the value of their ECs (Envall & Andersson, 2024), potentially to the detriment of vulnerable energy users with limited capacity to do so (Campos et al., 2020; Hanke & Lowitzsch, 2020).

This brief contextual background is instructive to understand the contemporary landscape for EC-initiatives in Sweden. Now, we turn to the two cases and the practices of legibilization, demonstration, and agreement through which they enact community energy, focusing on the composition of power in each configuration.

4.1. Demonstrating the prospect of community energy through climate-smart urban planning

A good case to shed light on the significant effort that goes into enacting sustainable futures through ECs in Sweden is the urban development project Tamarinden in Örebro. Tamarinden is a residential area under construction in the city of Örebro. Located approximately 2.5 km from the city center on a municipally owned area of 5 ha, a total of 700 homes – distributed over apartment buildings and townhouses – are to be built along with commercial premises and preschools. Central to the project is the establishment of a local EC for producing, storing, and sharing renewable energy – both electricity and heat – across buildings and real estates. The initiative includes rooftop solar electricity production, battery storage, electric vehicles, a low-temperature district heating grid, a local DC power grid, and a digital automation platform to optimize energy use, storage, and sharing across the new district. Five developers in total were involved in Tamarinden during our fieldwork: Örebrobostäder (ÖBO), Friendly Building, Magnolia, Serneke, and Tornet. Together with Örebro municipality and the energy utility company E.ON, ÖBO is one of the original parties to the project; the others are commercial developers who gained the right to build in the area through a land allocation competition. At the time of closing our fieldwork, the actor coalition was in the process of filing an application to establish a joint property unit between the developers, with the intentions of then making the DC-grid, the district heating grid, and the digital automation platform into a community facility. In practice, this would give the actors formal control over the local physical and digital infrastructure.

Crucial to rendering community energy legible in the case of Tamarinden is the proactive role played by ÖBO. With 470 employees, just over 22,000 homes, and 1,000 commercial premises, ÖBO is a relatively large municipal property developer. Originally set up as a foundation in 1946, it was transformed into a limited company in 1989 and is since fully owned by Örebro municipality. One of its subsidiaries, Västerporten AB, uses premises in western Örebro to run social sustainability projects through so-called socially smart lease contracts. "We have worked with sustainability since our inception," ÖBO proudly declares, "long before other companies started talking about social, ecological, and economic sustainability. Contributing to a sustainable Örebro is an essential part of the mission from our owner, the municipality." It is at the same time obvious how Tamarinden fits into ÖBO's history of promoting public utility values, because one offshoot of its multifaceted work with sustainability is to experiment with energy

efficient solutions. Even though Tamarinden is demonstrated through five overarching sustainability themes – connecting local community building together with mobility, greening, and automated information systems – that are supposed to inform the entire process from land allocation to post-construction in equal measure, it is above all the work-package entitled "smart city" that is described at a strikingly detailed and technical level by project members and in the marketing material. Compared to the other sustainability themes, whose implementation is described in vague terms – such as "providing space for spontaneous play and meetings in a green and lively environment" – agreement among the actors involved in Tamarinden hinges on how the intended sharing of energy between properties has "never before been done in an urban residential area," and that "as a property developer involved in this project, one is therefore offered the opportunity to participate and develop a completely unique energy solution at the cutting edge of innovation.".

Indeed, it is thanks to ÖBO's considerable experience with pilot-scale electricity production, storage, and sharing in their other properties that they have been awarded a direct allocation of land by the municipality. In collaboration with the other four commercial property developers in the project, the role of ÖBO is clear: they will support the actor coalition with advice about technological procurement and legal forms for sharing energy across properties, to expand its experimental ambitions "from property level to system level," and thereby "realize the energy efficient solutions of community energy on a residential scale." Representatives of ÖBO recurrently describe Tamarinden with reference to their previous experiments with "innovative energy configurations," depicting the new partnership as the next progressive stage in a gradual upscaling of their energy infrastructure, with hopes of eventually being able to aggregate energy services from an entire portfolio of properties. What we might call the institutional memory of ÖBO thus constitutes a crucial place-based network of relations assembled in Tamarinden to operate in an energy landscape that otherwise lacks supportive regulative frameworks for ECs (Envall & Rohracher, 2024). "We have all the knowledge locally," a municipal official confides, "and we have the will both from our civil servants and also from the political organization to test this project. […] In this case, we have had ÖBO, who has been very driven in the matter, and who has come to us with a vision [for Tamarinden]." Unlike most other Swedish municipalities, Örebro has already cultivated a professionalized network of collaboration between civil servants and local politicians around urban planning in the region, against the background of which the prospect of community energy can now be demonstrated.

4.2. *Making the value of energy communities legible through energy efficiency and grid benefits*

If ÖBO's experiments in community energy is demonstrated by the municipality in the context of climate-smart urban planning, then it is through its provision of auxiliary services to the regional grid that the value is made legible. With the help of energy system models, the project group estimates that congestion in the grid could be alleviated by producing, storing, and sharing energy in new ways. One strategy for peak load shaving is to reconfigure the role of developers and property owners by turning them into active parts of the energy system, optimizing electricity and heating from household up to neighborhood- and eventually regional grid level, consequently making energy use "vastly more efficient." In several project demonstrations, representatives of ÖBO emphasize their expected delivery of frequency regulation to the TSO's market, describing how the actors involved in Tamarinden "want to be responsible end consumers." Although one of the stated aims of Tamarinden, according to the municipality, is to "include the residents in shaping ideals of energy efficiency through their everyday practices," it is not so much the tenants themselves that will be involved, other than via digital applications that make their energy consumption visible. Rather, practices of legibilization suggest that it is the property owners that are imagined as the decisive parties to the EC. For one thing, the problem to which community energy is envisioned as a solution is first and foremost represented as a lack of coordination in the interface between properties and local and regional energy systems, gearing the configuration towards optimizing the energy performance of buildings and providing auxiliary services for grid operators, such as through aggregation and load shifting. While citizen engagement is emphasized in project documents, the sociotechnical configuration is less set up to facilitate community-led renewable energy than to promote energy efficiency and grid benefits.

One reason for this rather narrow approach can be found in the central role played by calculative devices as tools for legibilization (see, e.g., Niskanen & Rohracher, 2022), with which the expectations put upon Tamarinden are legitimized and made credible. Energy optimization models to examine its contribution under different assumptions, and virtual interfaces for the tenants to regulate their energy consumption, are the techniques and technologies with which initiatives like Tamarinden can access the discursive landscape that constitutes how ECs are spoken of, and reasoned about (cf. Rosenbloom, 2018), by grid operators such as E.ON, whose interests need to be piqued by the other actors if any hope of a commercial partnership is to be fulfilled and access to the grid granted. By participating in the frequency regulation market and alleviating grid capacity strains through flexibility measures like decreased power demand from the distribution grid, the guiding vision is for Tamarinden to not only become a highly energy-efficient neighborhood, but an innovative model of a smart city district. Of course, the municipality emphasizes that it is mandated to run Tamarinden as an urban planning project, not an energy system development project. But while importance is placed on the fact that every property developer in the partnership is contractually obligated to promote all of the five sustainability themes, it is acknowledged that energy efficient solutions is core to the vision with Tamarinden as a climate-smart model, not least because producing, storing, and sharing renewable energy is deemed to be "the most unique sustainability experiment pursued by ÖBO, with the most potential for innovation." Such an emphasis on innovation hints at broader power relations within which Tamarinden's configuration is entangled. For one thing, follow-up and evaluation with the aim of contributing to knowledge transfer is recurrently mentioned as fundamental to the municipality's ambition with Tamarinden to scale up experimental energy efficient solutions (cf. Pfotenhauer et al., 2022). As a result, Tamarinden is part of a strategic innovation program on climate-neutral cities. In 2021, a consortium was granted funding by the Swedish Energy Agency for a large project to aid the development of local ECs in Tamarinden together with another city district in Stockholm called Hammarby Sjöstad. On several occasions, the project members refer to both Tamarinden and Hammarby Sjöstad as "EC-testbeds," emphasizing the importance of experimenting with technologies and business models for how microgrids can be developed to produce, store, and share renewable electricity.

This careful alignment of the innovation-oriented mission to experiment with and optimize the energy system in urban interfaces, spearheaded by ÖBO, with the sustainable urban planning agenda of the municipality, plays nicely into national ambitions to stimulate innovation to develop green technology (Hallonsten, 2023). By treating city districts as experimental testbeds that can contribute to national interests, all the while alleviating a strained regional grid capacity, Tamarinden has been strategically embedded in a nation-wide project of ecological modernization (Hajer, 1995), stressing the opportunities of environmental policy to stimulate technological innovation and create new markets for green growth. A project partner explains that their aims are to contribute to make Sweden into an international leader for innovative energy services, simultaneously enabling energy transitions in new and already existing built environments. Such ambitions are represented in terms of an "innovation deficit" (Pfotenhauer, Juhl & Aarden, 2019), suggesting that to transform the energy system all the while ensuring economic competitiveness requires further gearing

Swedish society, institutions, and individual predispositions toward social entrepreneurship. One of the project members involved in the funding application to the Swedish Energy Agency details strong institutional connections between the board of Hammarby Sjöstad and the Swedish research institute RISE, and how this connection sparked a business interest. "Hammarby Sjöstad has a board, and on this board, there was a member who is employed by RISE," the project member recounts, "[s]o it was probably the case that [s/he] picked up on this and saw it as a business opportunity for RISE." Commercial partnerships like these, stirred by promises of attracting private investment, have been crucial in the case of Tamarinden to get the ball rolling:

[W]e heard, I think it was about a year ago, that this issue [i.e., the policy uncertainty surrounding Swedish ECs] would be brought up on the government's table in September. But by then we had already had, first, a separate meeting with the Energy Markets Inspectorate, then a separate meeting with the Energy Agency, and then yet another one with representatives of the Ministry of Rural Affairs and Infrastructure. Then, lastly, we had gotten all three together to have a joint meeting.

Another interviewee, also part to the funding application, speaks warmly about the so-called "Örebro model" and expresses admiration over how the municipality has embraced an entrepreneurial attitude to urban development that has proved successful in "getting stuff done.".

The institutionalized role of civil servants in the project, with significant political backing from the municipal level, remains integral to Tamarinden's configuration. While ÖBO is responsible for the guiding vision for Tamarinden, along with the technical expertise required to put the vision into practice, Örebro municipality has been far from a passive onlooker. Due to uncertainties regarding how Swedish legislation will approach ECs, the municipality has worked tirelessly to detach Tamarinden from such contingencies. To hedge the risks involved in spearheading residential-scale community energy in Sweden, it has balanced an extensive planning horizon with significant flexibility in the near term. On the one hand, the municipality has already identified an existing legal form for Tamarinden's energy infrastructure as a second-best alternative – namely, a community facility jointly owned by a community association – to ensure effective control over their physical and digital infrastructures. On the other hand, its efforts to guard against unforeseen eventualities has not rendered it overly cautious. Like its experimental approach to various energy solutions, ÖBO has procured an adeptness in navigating policy uncertainty and setting statutory precedent, attributing its accomplishments to its close collaboration with the municipality, which is praised as having "a brave urban planning office" that has proactively contributed to the resilience of its projects against government indecision. Previous success stories, including the battle over the Swedish Public Procurement Act that ÖBO took to the Court of Appeal in 2007 and won, have strengthened its self-confidence. Now, with the land instructions for Tamarinden, the planning office has disregarded the Swedish prohibition on placing special technical requirements on new constructions, which means that demands have been put on all four commercial property developers in the partnership to comply with ÖBO's recommended technological procurement.

Forging these networks over a long period of time has also emboldened actors in Tamarinden to take on a more hardline – occasionally confrontative – position in relation to E.ON. While E.ON is formally part of the coalition through various signed declarations and agreements, civil servants recount how the relationship has not been frictionless, and how local politicians in Örebro have pressured E.ON on more than one occasion "to play ball." Even though Swedish grid operators have a lot to say about who is allowed to access the regional grids, the project group has negotiated permission with relative ease. Its success is arguably because Tamarinden's assemblage comprises actors – in particular ÖBO and various facets of Örebro municipality – with valuable experience from having already collaborated across several urban development projects, out of which has grown a professionalized organization. By aligning the economic interests of the actor coalition with national export ambitions, Tamarinden has attracted the interest of government officials and brought on board E.ON, who, although still a reluctant collaborator, would rather be involved in the project than not.

4.3. Local development projects as configurations for forging bottom-up agreement

Similar to Tamarinden, the configuration of Austerland Energi is entirely dependent on the institutional memory of one of its most central actors, Nygarn Utveckling Ltd. However, the place-based circumstances of this initiative – located, as it is, on the island of Gotland in the Baltic Sea – means that the practices through which it is legibilized and demonstrated look very different (cf. Kim et al., 2019). More specifically, the initiative is located on the sparsely populated eastern side of the island, in an area called Östergarnslandet, which is made up of five rural parishes consisting of some 3700 households, with one-third permanent residents and two-thirds second-home owners. Nygarn is a locally owned development company and the project leader of Austerland, whose business is to initiate projects and dialogues to develop Östergarnslandet into a vibrant place to live. As a result, Austerland is managed primarily through voluntary work by a group of five local residents. Through a small grant from the Swedish Energy Agency, they have in turn hired an energy project consultant, set up a project group together with additional local stakeholders, such as residents and small-scale farmers, along with a reference group consisting of academic researchers, regional politicians, and transport and agricultural companies. With its focus on "engaging the entire community in the energy transition" and "giving the community a voice," the prospects of community energy is demonstrated by Austerland in terms of local development. Unlike Tamarinden's efforts to make the value of its EC legible as a feasibility study of energy efficiency, the legibilization of Austerland hinges on its success in shifting engagement, knowhow, and infrastructures for sustainable generation, storage, sharing, and use of energy to the residents themselves. Encompassing around 200 households and businesses, the EC is supposed to supply members with renewable energy and enable fossil-free transport. On a technical level, the project is investigating potentials for wind and solar electricity production, hydrogen and battery storage, smart technology, electricity sharing through virtual and DC-grids, car charging stations, carpools, and supply of trucks and agricultural machines using renewable fuels.

Previous community initiatives carried out by Nygarn, such as investments into a water and sewage system, a fiber network, and a community and business center, are used to demonstrate its capability to realize the envisioned prospects, and thus remain central to forging agreement among the actors involved. As there is a clear overlap in management between Austerland and Nygarn's previous initiatives, residents on the island praise the technical knowhow, managerial experience, and leadership skills of the project group. Locals refer to them as "driving sprits" (in Swedish: "eldsjälar"), namely, visionaries that are proactive in developing the community and put a lot of time and effort into realizing various projects, often on a voluntary basis. Similarly, stakeholders mention confidence in and inspiration from those driving spirits as important for their own engagement and belief in the initiative. In contrast to Tamarinden then, the demonstration of Austerland is strongly oriented around the capacities of a small group of enthusiasts, and eventual agreement around its EC-initiative is much more dependent upon their personal time and skills. Besides the curiosity of a few interest groups, Austerland is therefore reliant on the informal network of its project managers, which, although it is small and brittle compared to Tamarinden, is certainly more impressive than that of the average person's. After long careers within the renewable energy industry and the building and planning sector, two of the project managers have developed personal relationships with experts on energy technologies. Three of the project managers also have managerial experience from working with projects related to energy and sustainable development in the Global South, mostly across Africa. At the same time,

however, it is Austerland's lack of a professionalized set-up that has made the initiative agreeable to the residents of Östergarnslandet. It is thanks to the significant amount of social capital invested in Nygarn over time that the project managers can convincingly demonstrate the communitarian aspect of decentralized energy production, through the same practices of small-scale, local development that they have been engaged in for decades.

4.4. Relational obstacles to making procedural values legible in an innovation-oriented energy landscape

Nygarn's social capital has been completely decisive for the configuration of Austerland, not least since the EC-initiative seeks to enact an imaginary that is relatively foreign to the innovation-discourse that Tamariden has aligned its initiative with. "We are creating a community among the neighbors and people who live here," one project manager proudly declares. Critical reflection among the project managers appeals to the significance of place, with Östergarnlandet's ecological characteristics in focus. Inspired by the permaculture movement, the aspiration with Austerland is to build community resilience for humans and non-humans alike, focusing on the uniqueness of the land, where people, animals, and plants form the basis of the energy system to be constructed. As the project group is keen to point out, the energy future envisioned is one in which the infrastructures have been adapted to the socioecological conditions of the local environment, which is rhetorically opposed to that of adapting the place-based surroundings to the large-scale energy system. An important part of that aspiration is that the local residents on Östergarnslandet are ready to invest their own personal time and effort into shaping Austerland according to their wants and needs. Consequently, the network of importance for the success of Austerland's previous projects, as well as its current EC-initiative, is the administrative unit of the parish, which functions as a structure of community life and social cohesion in this particular place. "People have gotten used to doing things together," explains one of the project managers, "like our water and sewage system. Even if there might be a few of us that have been more active in getting the system established, all people who have joined […] have also contributed with some degree of participation to it all." Although it is more or less forgotten on the mainland, the parish is still an important part of the social fabric on Gotland. Within the parish, there is a proud history of joining together in developing the area, and people often express a sense of belonging and responsibility in relation to their parishes. In forming Austerland then, the already cultivated social relations on Östergarnslandet are central both for mobilizing some actors around the initiative and to exclude others from it.

By functioning as an important gatekeeper to the parish structure on Östergarnslandet, Nygarn has managed to enroll another important actor to this coalition: the island's regional energy office, Energicentrum. This organization was formed as part of a now defunct government mission, where Gotland would function as a pilot area for the Swedish energy transition. Much like ÖBO, Energicentrum's identity is based on an experimental modality, closely linked to the same innovation-discourse within which Tamarinden has actively sought to position itself. Today, Energicentrum has been incorporated into the structure of Sweden's regional energy offices, with the distinctive mission of creating legitimacy for the energy transition on the island. But the history of the organization is still reflected in its language and strategies, such as its ambition to enable business models for community energy that will then be able to be replicated and scaled up. Energicentrum therefore wants to mobilize the unique parish structure on Gotland: it is imagined that ECs, once anchored in the existing community network on the island, can make civic engagement "take off." In practical terms, it means that Energicentrum has assisted Austerland with technical support and expertise, as well as mediated contact with consultants for energy system modeling, cost-benefit analyses, and technical procurement. Despite having no formal connections to Austerland then, Energicentrum has devoted significant time and effort to facilitate the development of its EC. On Gotland, the parish structure constitutes a place-based network for agreement, and insofar as it is Energicentrum's mission to facilitate the energy transition on the island, they want to access this network too. At the same time, striking up a collaboration with Energicentrum is an important step for Austerland's project group to make the value of its EC more widely legible, not the least for convincing the regional grid owner GEAB for permission to access the island's grid.

Indeed, the social capital of Nygarn matters only within a very narrow set of relations, namely, among the stakeholders on Östergarnslandet, and so to navigate the broader energy landscape, enrolling actors like Energicentrum is paramount. Because of the lack of governmental support functions in the Swedish energy landscape, initiatives like Austerland are characterized by a significant pressure toward professionalization, which, regardless of Nygarn's social capital, creates difficulties for the project group to enact its permacultural vision. An important type of actor that has emerged in this landscape to support initiatives whose assemblages are not as financially, politically, and institutionally robust as Tamarinden (Isaksson & Hagbert, 2020), is the so-called intermediary (Hargreaves et al., 2013; Bird & Barnes, 2014; Warbroek et al., 2018). In fact, the project group has had to seek the help of, and hire, a number of companies, researchers, and interest organizations to assist with technical, legal, and organizational expertise. Apart from Energicentrum, Austerland has also had to employ an energy consultancy firm, a software developer working with optimization-modeling of decentralized energy systems, a law firm specializing in electricity market regulations, and a cleantech company developing smart energy solutions. First and foremost, the project group has had to appeal to GEAB with energy system simulations and public surveys to obtain, as they put it, "the hard facts" regarding the needs and interests of the stakeholders involved. By utilizing such artefacts the project group could begin to make its value legible to stakeholders beyond the local context on the Gotland countryside, but only at the expense of estimating its value exclusively in terms of the system services it could contribute to the regional grid. The use of energy system simulations was further necessitated through the funding granted by the Swedish Energy Agency. Such funding, the project group complains, "comes with strings attached." Instead of formatting Austerland to the place-based needs and desires of the peoples and place of Östergarnslandet, the project group has had to, as one of the managers describe it, "twist like a cabbage worm" to conform to external pressures and demands.

Its dependence on intermediaries has in effect driven Austerland in the direction of primarily offering flexibility services through smart control – not at all unlike the ambitions of Tamarinden. Over time, Austerland has had its practices for enacting community energy shifted towards a repertoire that is much more aligned with grid operators' definition of its value. Once nudges like these to the EC-initiative begin to compound, they eventually prove problematic for the project group: it turns out that permaculture rhymes badly with the repertoires of practices that drive the majority of the other actors that have gradually become involved, and to whom the project group is increasingly forced to relate. It means that the permacultural imaginary risks slowly being outmaneuvered by practices that are more in line with a business-as-usual scenario. On the one hand, to align the manner in which they seek to practice community energy with the prevailing Swedish energy system regime is to reduce the value of their EC to a limited conception of its potential grid benefits. On the other hand, if the project managers do not at least adapt to the other actors enrolled, their EC-initiative is unlikely to get off the ground at all. And adapted they have. Lately, Austerland has allied itself with the regional business incubator Science Park Gotland, with whose help it has become a participant in a large, EU-funded research project on energy efficient solutions, much like that of which Tamarinden is part. Intermediaries of various kinds – energy offices, technical consultants, and interest organizations – exert significant

influence over Austerland, and these do not possess the same interpersonal trust in the project group as the local stakeholders do (cf. Walker et al., 2010). The fact is that the competence of one of the project managers, his status in the parish notwithstanding, has already been questioned. As the envisioned permacultural future of Austerland fades, it remains to be seen whether that manager will be further marginalized.

5. Entrenched relations of power in the Swedish energy landscape

Approaching ECs as sociotechnical configurations produced through situated practices of legibilization, demonstration, and agreement, we have compared two cases in which the prospective role of community energy in Sweden's renewable energy system is currently being enacted. Our analysis of Tamarinden and Austerland reveals the provisional accomplishment of community energy, while also illustrating how the composition of power in their respective assemblages impact its democratizing potential. In Tamarinden, the prospect of community energy is demonstrated through climate-smart urban planning. Here, the value of its EC is made legible primarily through energy efficiency and grid benefits. As a result, participation is channeled toward optimizing the regional grid, and agreement is forged through pilot-scale experiments embedded in professionalized, bureaucratic networks. In contrast, Austerland is held together due to strong social capital in the parish structure on Östergarnslandet and is enacted through long-standing local development practices to demonstrate the communitarian prospect of decentralized energy production.

Despite these striking differences, our findings point to two central insights. First, the topological production of community energy is a material-semiotic and power-saturated process. What matters in these assemblages is not spatial proximity but relational connectivity (Allen & Cochrane, 2010; Allen, 2011). In Austerland, the project managers may live five kilometers from their neighbors in the next village, yet their configuration brings them into closer association with stakeholders 250 km away on the Swedish mainland. Although situated in an energy landscape, "community" thus cannot be equated with locality. Admittedly, Austerland has strong local ties. Compared to Tamarinden, agreement is informally brokered and reliant upon personal trust. However, because of the need to forge an agreement that extends beyond this place-based network of relations, Austerland's permacultural imaginary faces relational obstacles: the assemblage becomes increasingly reliant on intermediaries with the right competence to translate their vision into values legible to grid operators and project funders. In doing so, though, the configuration adopts artefacts and techniques that fail to register the procedural value of local development. Following Stripple and Bulkeley (2019), our analysis thus provides insights into how the enactment of sustainable futures through practices of community energy opens up and forecloses pathways for democratizing the energy transition

Secondly, the democratizing potential of community energy is contingent upon how the value of ECs is rendered legible. For instance, Tamarinden's comparatively successful formation of its EC rests on its embeddedness within an already established network of urban planning, where actors at the municipal, regional, and national levels are configured into agreement around the investment opportunities that may be attracted through pilot-scale energy experiments, with expectations of future upscaling potential. Indeed, we find that associated values like grid benefits and energy efficiency align neatly with longstanding national ambitions for green innovation, and that, as a result, the assemblage in Tamarinden has acquired an impressive degree of robustness – so much so that even a hesitant grid operator, initially reluctant to engage, ultimately found it difficult to resist the momentum that had built up around the initiative. By examining three practices in detail, our study thus offers empirically grounded insights into the kinds of power at work in forming connections between elements – insights that respond directly to Van Veelen and Eadson's (2020: 248) call for "conceptualization and analysis of the specific forms of power being exercised in the creation of ties between elements, [with the] potential to take further [the] existing understanding of […] assemblage-democracy.".

Looking at the Swedish energy landscape in particular, we find that entrenched relations of power enable the capacity of those EC-initiatives that extrapolate the marketized political economy of the energy system in its present state (and restrict the capacity of those that do not). The relations of power through which such an extrapolation of the present is enacted are embedded in the large-scale energy system infrastructure (Künneke et al., 2015), such as in the legal and technical configuration of the regional distribution grids, access to which constitutes an "obligatory passage point" (Callon, 1986; Latour, 1988: 43 et passim) that grid operators are well-positioned to modulate due to their embedded roles in development projects of different kinds. For EC-initiatives to pass through this point, they not only require technical and legal expertise to make the value of their ECs legible, the passage point also shapes the agency of actors to reproduce a very particular kind of value, namely, a narrow conception of public utility in terms of auxiliary grid services. Even though grid optimization and stabilization have no place in Austerland's permacultural imaginary, its project managers must nevertheless turn to consultants to procure assistance with energy modeling to make its value legible in those terms, when attempting to appeal to an otherwise reluctant and disinterested incumbent in the form of GEAB. It suggests that the Swedish transposition of the CEP has placed energy utility companies in a favorable negotiating position, as the repertoire of practices with which the value of ECs must be made legible seemingly plays straight into their interests. Forced to conform to this favorable positioning of incumbent actors in the Swedish energy landscape, ECs become less about fostering citizen participation and shifting ownership over the means of energy production, and instead realizing a prospective vision of community energy that is defined by the same centralized system as today, and which, working within the framework of current electricity market structures, and dominated by commercial large-scale renewable energy, envisions the Swedish energy transition as an innovation-oriented project of ecological modernization. Imagined alternatives to the current energy system, like that of Austerland's permacultural decentralization of energy production and use, run the risk of being transformed to the point of alignment with business-as-usual.

By making residents into co-producers in the configuration, it seems clear that Austerland nonetheless harbors potential for democratizing the energy system. Its approach is rooted in practices of local development that draws upon the parish structure to instigate collective action and that seeks to shift ownership and operation of energy resources to citizens. Such ambitions seem to correspond with values envisioned in the CEP. To make the value of its EC-initiative more widely legible, however, Austerland has been nudged in the direction too of becoming an aggregator for the regional grid operator. Only time will tell whether the permacultural imaginary embodying those values has been configured into a network resilient enough to withstand external pressure. Judging from our study, though, it certainly looks like Austerland has gone through – and continues to go through – an internal transformation to its configuration. Even if the initiative is unlikely to entirely fall apart at this stage, the process through which the EC has taken shape has gradually foregrounded grid optimization and stabilization as its central values, steadily aligning its envisioned future with the present state of the large-scale energy system infrastructure.

To some degree, alignment can serve to enable configurations that promote at least some of the values ascribed to ECs in the CEP. However, assemblages forged around coordinating roles held by large commercial energy utility companies and property developers risk displacing principles of energy democracy. Let us take Tamarinden again as an example. With a strong actor coalition, and working within highly professionalized and institutionalized structures, it is reasonable to think that the initiative could serve to normalize ECs as an actor in the

Swedish energy landscape. Furthermore, one could argue that its configuration does facilitate the agency of citizens to contribute more actively to increase the energy efficiency of the regional grid – simply being a member of a tenant-owned housing association is enough. On the other hand, its configuration constitutes a barrier to more deep-seated ambitions of energy democracy: firstly, since it is primarily upper-middle-class citizens that can afford to move into this new city district, access to participation is conditioned by financial circumstances; and secondly, the digital interface facilitates no agency to those citizens beyond that of becoming self-disciplined end-users. A cynical interpretation would thus characterize Tamarinden as a marketing-oriented attempt at "citizen washing" (Hoffman & High-Pippert, 2010). It could equally well be interpreted as the realpolitik of a municipality operating in a neoliberal context, where social entrepreneurship is promoted and actors encouraged to pursue innovative solutions to community problems in a business-like manner (cf. Laforge et al., 2017; Taylor Aiken, 2016).

In sum, grid benefits has become the value that EC-initiatives in the Swedish energy landscape have been forced to relate to: either in the role of aggregators of household electricity and heat loads to bid on the electricity exchange; or by providing market-oriented system services, such as frequency regulation for the administrator of the Swedish transmission grid, Svenska Kraftnät; or flexibility on local or regional flexibility markets. The enactment of sustainable futures through ECs is funneled through a passage point that restricts those initiatives to reproduce the Swedish energy system in its present state, neutering them of their potential to democratize participation and ownership in a more radical fashion.

CRediT authorship contribution statement

Fredrik Envall: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **J. Daniel Andersson:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Johanna Liljenfeldt:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis.

Funding

This research was supported by a grant from the Swedish Energy Agency for the project "Local solar energy communities: a way towards strengthened energy democracy?", grant number 50969–1.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

References

Allen, J., 2011. Topological twists: Power's shifting geographies. Dialogues in Human Geography 1 (3), 283–298.
Allen, J., Cochrane, A., 2010. Assemblages of state power: Topological shifts in the organization of government and politics. Antipode 42 (5), 1071–1089.
Anderson, B., McFarlane, C., 2011. Assemblage and Geography. Area 43 (2), 124–127.
Anshelm, J., 2000. *Mellan frälsning och domedag: Om kärnkraftens politiska idéhistoria i Sverige, 1945-1999*. Eslöv: B. Östlings förlag.
Bird, C., Barnes, J., 2014. Scaling up community activism: the role of intermediaries in collective approaches to community energy. People, Place, and Policy 8 (3), 208–221.
Blasch, J., Van Der Grijp, N.M., Petrovics, D., Palm, J., Bocken, N., Darby, S.J., Barnes, J., et al., 2021. New clean energy communities in polycentric settings: Four avenues for future research. Energy Res. Soc. Sci. 82, 1–7.
Bornemann, B., Strassheim, H., 2019. Governing time for sustainability: Analyzing the temporal implications of sustainability governance. Sustain. Sci. 14, 1001–1013.
Borup, M., Brown, N., Konrad, K., Van Lente, H., 2006. The sociology of expectations in science and technology. Tech. Anal. Strat. Manag. 18 (3–4), 285–298.
Bouzarovski, S., 2009. East-central Europe's changing energy landscapes: a place for geography. Area 41 (4), 451–463.
Bouzarovski, S., Haarstad, H., 2019. Rescaling low-carbon transformations: Towards a relational ontology. Trans. Inst. Br. Geogr. 44 (2), 256–269.
Bridge, G., Bouzarovski, S., Bradshaw, M., Eyre, N., 2013. Geographies of energy transition: Space, place, and the low-carbon economy. Energy Policy 53, 331–340.
Brodén Gyberg, V., Lövbrand, E., 2022. Catalyzing industrial decarbonization: the promissory legitimacy of fossil-free Sweden. Oxford Open Clim. Change 2 (1), 1–10.
Brummer, V., 2018. Community energy – benefits and barriers: a comparative literature review of community energy in the UK, Germany, and the USA, the benefits it provides for society, and the barriers it faces. Renew. Sustain. Energy Rev. 94, 187–196.
Bulkeley, H., 2016. *Accomplishing climate governance*. Cambridge University Press, Cambridge.
Burke, M.J., 2018. Shared yet contested: Energy democracy counter-narratives. Front. Commun. 3 (22), 1–15.
Burnham, M., Eaton, W., Selfa, T., Hinrichs, C., Feldpausch-Parker, A., 2017. The politics of imaginaries and bioenergy sub-niches in the emerging Northeast U.S. bioenergy economy. Geoforum 82, 66–76.
Burke, M.J., Stephens, J.C., 2018. Political power and renewable energy futures: a critical review. Energy Res. Soc. Sci. 35, 78–93.
Callon, M., 1986. Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay. In: Law, J. (Ed.), *Power, Action, and Belief: A New Sociology of Knowledge?* Routledge, London, pp. 196–223.
Campos, I., Pontes Luz, G., Marín-González, E., Gährs, S., Hall, S., Holstenkamp, L., 2020. Regulatory challenges and opportunities for collective renewable energy prosumers in the EU. Energy Policy 138, 1–11.
Castán Broto, V., 2019. *Urban energy landscapes*. Cambridge University Press, Cambridge.
Cavanagh, C., Benjaminsen, T., 2017. Political ecology, variegated green economies, and the foreclosure of alternative sustainabilities. Journal of Political Ecology 24 (1), 200–216.
Charmaz, K., 2014. *Constructing grounded theory*. Sage, London.
Charmaz, K., 2017. The power of constructivist grounded theory for critical inquiry. Qual. Inq. 23 (1), 34–45.
Chilvers, J., Longhurst, N., 2016. Participation in transition(s): Reconceiving public engagements in energy transitions as co-produced, emergent and diverse. J. Environ. Policy Plan. 18 (5), 585–607.
Chilvers, J., Pallett, H., 2018. Energy democracies and publics in the making: a relational agenda for research and practice. Frontiers in Communications 3, 1–16.
Chilvers, J., Pallett, H., Hargreaves, T., 2018. Ecologies of participation in socio-technical change: the case of energy system transitions. Energy Res. Soc. Sci. 42, 199–210.
Chmutina, K., Goodier, C.I., 2014. Alternative future energy pathways: Assessment of the potential of innovative decentralised energy systems in the UK. Energy Policy 66, 62–72.
Coy, D., Malekpour, S., Saeri, A.K., Dargaville, R., 2021. Rethinking community empowerment in the energy transformation: a critical review of the definitions, drivers, and outcomes. Energy Res. Soc. Sci. 72, 1–13.
Creamer, E., Eadson, W., Van Veelen, B., Pinker, A., Tingey, M., Braunholtz-Speight, T., Markantoni, M., Foden, M., Lacey-Barnacle, M., 2018. Community energy: Entanglements of community, state, and private sector. Geogr. Compass 12 (7), 1–16.
Dall-Orsoletta, A., Cunha, J., Araújo, M., Ferreira, P., 2022. A systematic review of social innovation and community energy transitions. Energy Res. Soc. Sci. 88, 1–18.
Derrington, M., 2019. *Qualitative longitudinal methods: Researching implementation and change*. Sage, London.
Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources. *Official Journal of the European Union* 61: L328/82-L328/209.
DG Environment, n.d. *Energy communities repository: Energy communities*. [Online] https://energy-communities-repository.ec.europa.eu/energy-communities_en [accessed: 2023-03-29].
Droubi, S., Heffron, R., McCauley, D., 2022. A critical review of energy democracy: a failure to deliver justice? Energy Res. Soc. Sci. 86, 1–15.
Eadson, W., Van Veelen, B., 2021. Assemblage-democracy: Reconceptualising democracy through material resource governance. Polit. Geogr. 88, 1–11.
Eames, M., McDowall, W., Hodson, M., Marvin, S., 2006. Negotiating contested visions and place-specific expectations of the hydrogen economy. Tech. Anal. Strat. Manag. 18 (3–4), 361–374.
Edwards, G.A.S., Bulkeley, H., 2017. Heterotopia and the urban politics of climate change experimentation. Environ. Plann. D: Soc. Space 36 (2), 350–369.
Emelianoff, C., Taylor Aiken, G., 2021. The (in)justice of community-based initiatives. Spatial Justice 16, 1–19.
Envall, F., Andersson, J.D., 2024. *Vägar till rättvis omställning: Energigemenskaper i skärningspunkten mellan systemoptimering och demokratiskt deltagande*. Linköping University Electronic Press, Linköping University.
Envall, F., Rohracher, H., 2024. Technopolitics of future-making: the ambiguous role of energy communities in shaping energy system change. Environ. Plann. E: Nat. Space 7 (2), 765–787.
Envall, F., Andersson, J.D., Rohracher, H., 2023a. Att energigemenskapa: Energigemenskaper som arena för klimatomställningens praktiker och politik. Sociologisk Forskning 60 (3–4), 299–325.

Envall, F., Andersson, J.D., Wangel, J., 2023b. Gridlocked: Sociomaterial configurations of sustainable energy transitions in swedish solar energy communities. Energy Rsearch & Social Science 102, 1–10.
Farías, I., 2009. Introduction: Decentring the object of urban studies. In: Farías, I., Bender, T. (Eds.), *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*. Routledge, London, pp. 1–24.
Featherstone, D., Korf, B., 2012. Introduction: Space, contestation, and the political. Geoforum 43 (4), 663–668.
Fressoz, J.B., 2024. *More and more and more: an all-consuming history of energy*. Allen Lane, London.
Gâju, M., 2019. Opinion of the European Committee of the Regions on "Models of local energy ownership and the role of local energy communities in energy transition in Europe. Off. J. Eur. Union 62, C86/36–C86/40.
Geels, F.W., 2011. The multi-level perspective on sustainability transitions: Responses to seven criticisms. Environ. Innov. Soc. Transit. 1 (1), 24–40.
Geels, F.W., 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. Theory, Culture & Society 31 (5), 21–40.
Geels, F.W., Berkhout, F., Van Vuuren, D.P., 2016. Bridging analytical approaches for low-carbon transitions. Nat. Clim. Chang. 6, 576–583.
Genus, A., Coles, A.-M., 2008. Rethinking the multi-level perspective of technological transitions. Res. Policy 37 (9), 1436–1445.
Granjou, C., Walker, J., Salazar, J.F., 2017. The politics of anticipation: on knowing and governing environmental futures. Futures 92, 5–11.
Groves, C., 2017. Emptying the future: on the environmental politics of anticipation. Futures 92, 29–38.
Gui, E.M., MacGill, I., 2018. Typology of future clean energy communities: an exploratory structure, opportunities, and challenges. Energy Res. Soc. Sci. 35, 94–107.
Gürtler, K., Löw Beer, D., Herberg, J., 2021. Scaling just transitions: Legitimation strategies in coal phase-out commissions in Canada and Germany. Polit. Geogr. 88, 1–13.
Haarstad, H., Sareen, S., Wanvik, T.I., Grandin, J., Kjærås, K., Oseland, S.E., Kvamsås, H., et al., 2018. Transformative social science? Modes of engagement in climate and energy solutions. Energy Res. Soc. Sci. 42, 193–197.
Haarstad, H., Wanvik, T., 2017. Carbonscapes and beyond: Conceptualizing the instability of oil landscapes. Prog. Hum. Geogr. 41 (4), 432–450.
Hajer, M.A., 1995. *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford University Press, Oxford.
Hajer, M.A., Nilsson, M., Raworth, K., Bakker, P., Berkhout, F., De Boer, Y., Rockström, J., et al., 2015. Beyond cockpit-ism: four insights to enhance the transformative potential of the Sustainable Development Goals. Sustainability 7 (2), 1651–1660.
Hajer, M.A., Pelzer, P., 2018. 2050 – an energetic odyssey: Understanding "techniques of futuring" in the transition towards renewable energy. Energy Res. Soc. Sci. 44, 222–231.
Hallonsten, O., 2023. *Empty innovation: Causes and consequences of society's obsession with entrepreneurship and growth*. Palgrave Macmillan, London.
Hanke, F., Lowitzsch, J., 2020. Empowering vulnerable consumers to join renewable energy communities: Towards an inclusive design of the Clean Energy Package. Energies 13 (7), 1–27.
Hargreaves, T., Hielscher, S., Seyfang, G., Smith, A., 2013. Grassroots innovations in community energy: the role of intermediaries in niche development. Glob. Environ. Chang. 23, 868–880.
Hoffman, S.M., High-Pippert, A., 2010. From private lives to collective action: Recruitment and participation incentives for a community energy program. Energy Policy 38 (12), 7567–7574.
Horstink, L., Wittmayer, J.M., Ng, K., Luz, G.P., Marín-González, E., Gährs, S., Campos, I., et al., 2020. Collective renewable energy prosumers and the promises of the Energy Union: taking stock. Energies 13 (2), 1–30.
Hultman, M., 2015. Den inställda omställningen: Svensk energi och miljöpolitik i möjligheternas tid, 1980-1991. Möklinta: Gidlunds.
Husblad, R., Morén, G., Nordström, J., Vendel Nylander, C., Tedebrand, L., Wahlberg, S., S., 2020. *Ei R2020:02. Ren energi inom EU: Ett genomförande av fem rättsakter*. Energimarknadsinspektionen, Eskilstuna.
Isaksson, K., Hagbert, P., 2020. Institutional capacity to integrate "radical" perspectives on sustainability in small municipalities: Experiences from Sweden. Environ. Innov. Soc. Trans. 36, 83–93.
Jasanoff, S., 2015. Future imperfect: Science, technology, and the imaginations of modernity. In: Jasanoff, S., Kim, S.-.-H. (Eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. University of Chicago Press, Chicago, pp. 1–33.
Jasanoff, S., Kim, S.-H., 2009. Containing the atom: Sociotechnical imaginaries and nuclear power in the United States and South Korea. Minerva 47 (2), 119–146.
Jasanoff, S., Kim, S.-H., 2013. Sociotechnical imaginaries and national energy policies. Sci. Cult. 22 (2), 189–196.
Jones, L., Mann, R., Heley, J., 2013. Doing space relationally: Exploring the meaningful geographies of local government in Wales. Geoforum 45, 190–200.
Kall, A.-S., 2011. Förnyelse med förhinder: Den riksdagspolitiska debatten om omställningen av energisystemet, 1980-2010. In: Linköping Studies in Arts and Sciences 524 (Dissertation). Linköping University Press, Linköping.
Kim, H., Cho, S.H., Song, S., 2019. Wind, power, and the situatedness of community engagement. Public Underst. Sci. 28 (1), 38–52.
Knappe, H., Holfelder, A.-K., Beer, D.L., Nanz, P., 2019. The politics of making and unmaking (sustainable) futures: Introduction to the special feature. Sustain. Sci. 14, 891–898.
Kok, K.P.W., Loeber, A.M.C., Grin, J., 2021. Politics of complexity: Conceptualizing agency, power, and powering in the transitional dynamics of complex adaptive systems. Res. Policy 50 (3), 1–11.
Kooij, H.-J., Oteman, M., Veenman, S., Sperling, K., Magnusson, D., Palm, J., Hvelplund, F., 2018. Between grassroots and treetops: Community power and institutional dependence in the renewable energy sector in Denmark, Sweden, and the Netherlands. Energy Res. Soc. Sci. 37, 52–64.
Künneke, R., Mehos, D.C., Hillerbrand, R., Hemmes, K., 2015. Understanding values embedded in offshore wind energy systems: Toward a purposeful institutional and technological design. Environ. Sci. Policy 53B, 118–129.
Laforge, J.M.L., Anderson, C.R., McLachlan, S.M., 2017. Governments, grassroots, and the struggle for local food systems: Containing, coopting, contesting, and collaborating. Agric. Hum. Values 34 (3), 663–681.
Latour, B., 1988. *The Pasteurization of France*. Harvard University Press, Cambridge.
Longhurst, N., Chilvers, J., 2019. Mapping diverse visions of energy transitions: co-producing sociotechnical imaginaries. Sustain. Sci. 14, 973–990.
López Cifuentes, M., Sonnino, R., 2024. Transforming the food environment: an assemblage-based research approach. Environ. Innov. Soc. Trans. 52, 1–11.
Lövbrand, E., Beck, S., Chilvers, J., Forsyth, T., Hedrén, J., Hulme, M., Lidskog, R., et al., 2015. Who speaks for the future of Earth? how critical social science can extend the conversation on the Anthropocene. Glob. Environ. Chang. 32, 211–218.
Machen, R., 2019. Critical research impact: on making space for alternatives. Area 52 (2), 329–341.
Magnusson, D., Palm, J., 2019. Come together: the development of swedish energy communities. Sustainability 11 (4), 1–19.
Markard, J., Raven, R., Truffer, B., 2012. Sustainability transitions: an emerging field of research and its prospects. Res. Policy 41 (6), 955–967.
Marquardt, J., Delina, L.L., 2019. Reimagining energy futures: Contributions from community sustainable energy transitions in Thailand and the Philippines. Energy Res. Soc. Sci. 49, 91–102.
McFarlane, C., 2009. Translocal assemblages: Space, power, and social movements. Geoforum 40 (4), 561–567.
McGuirk, P.M., Bulkeley, H., Dowling, R., 2016. Configuring urban carbon governance: Insights from Sydney, Australia. Ann. Am. Assoc. Geogr. 106 (1), 145–166.
Melnyk, A., Cox, H., Ghorbani, A., Hoppe, T., 2023. Value dynamics in energy democracy: an exploration of community energy initiatives. Energy Res. Soc. Sci. 102, 1–14.
M. Minkler N. Freudenberg From community-based participatory research to policy change H.E. Fitzgerald C. Burack S. Seifer Handbook of Engaged Scholarship: the Contemporary Landscape Community-Campus Partnerships vol. 2 2010 Michigan State University Press East Lansing 275 294.
Moss, T., 2020. *Remaking Berlin: a history of the city through infrastructure, 1920–2020*. MIT Press, Cambridge.
Muiderman, K., Gupta, A., Vervoort, J.M., Biermann, F., 2020. Four approaches to anticipatory climate governance: different conceptions of the future and implications for the present. WIREs Clim. Change 11 (6), 1–20.
Niskanen, J., Rohracher, H., 2022. A politics of calculation: Negotiating pathways to zero-energy buildings in Sweden. Technological Forecasting & Social Change 179, 1–8.
Palm, J., 2006. Development of sustainable energy systems in swedish municipalities: a matter of path dependency and power relations. Local Environ. 11 (4), 445–457.
Palm, J., 2021. The transposition of energy communities into swedish regulations: Overview and critique of emerging regulations. Energies 14 (16), 1–15.
Parkhill, K.A., Shirani, F., Butler, C., Henwood, K.L., Groves, C., Pidgeon, N.F., 2015. "We are a community [but] that takes a certain amount of energy": Exploring shared visions, social action, and resilience in place-based community-led energy initiatives. Environ. Sci. Policy 53A, 60–69.
Pfotenhauer, S., Juhl, J., Aarden, E., 2019. Challenging the "deficit model" of innovation: Framing policy issues under the innovation imperative. Res. Policy 48 (4), 895–904.
Pfotenhauer, S., Laurent, B., Papageorgiou, K., Stilgoe, J., 2022. The politics of scaling. Soc. Stud. Sci. 52 (1), 3–34.
Roberts, J., 2020. Power to the people? Implications of the Clean Energy Package for the role of community ownership in Europe's energy transition. Rev. Eur. Comp. Int. Environ. Law 29 (2), 232–244.
Rosenbloom, D., 2018. Framing low-carbon pathways: a discursive analysis of contending storylines surrounding the phase-out of coal-fired power in Ontario. Environ. Innov. Soc. Trans. 27, 129–145.
Ruggiero, S., Busch, H., Hansen, T., Isakovic, A., 2021. Context and agency in urban community energy initiatives: an analysis of six case studies from the Baltic Sea Region. Energy Policy 148A, 1–11.
Santoro Lamelas, V., 2020. The practice of action research on health in Latin America: a systematic review. Educational Action Research 28 (2), 293–309.
Smith, J.M., Tidwell, A.S.D., 2016. The everyday lives of energy transitions: Contested sociotechnical imaginaries in the American West. Soc. Stud. Sci. 46 (3), 327–350.
Stephens, J.C., 2019. Energy democracy: Redistributing power to the people through renewable transformation. Environ. Sci. Policy Sustain. Dev. 61 (2), 4–13.
Stripple, J., Bulkeley, H., 2019. Towards a material politics of socio-technical transitions: Navigating decarbonisation pathways in Malmö. Polit. Geogr. 72, 52–63.
Szulecki, K., 2018. Conceptualizing energy democracy. Environmental Politics 27 (1), 21–41.
Szulecki, K., Overland, I., 2020. Energy democracy as a process, an outcome, and a goal: a conceptual review. Energy Res. Soc. Sci. 69, 1–14.
Taylor Aiken, G., 2016. Prosaic state governance of community low carbon transitions. Polit. Geogr. 55, 20–29.
Turnheim, B., Berkhout, F., Geels, F.W., Hof, A., McMeekin, A., Nykvist, B., Van Vuuren, D.P., 2015. Evaluating sustainability transitions pathways: Bridging

analytical approaches to address governance challenges. Glob. Environ. Chang. 35, 239–253.
Ureta, S., 2015. *Assembling policy: Transantiago, human devices, and the dream of a world-class society*. MIT Press, Cambridge.
Van Bommel, N., Höffken, J.I., 2021. Energy justice within, between and beyond European community energy initiatives: a review. Energy Res. Soc. Sci. 79, 1–12.
Van Der Schoor, T., Van Lente, H., Scholtens, B., Peine, A., 2016. Challenging obduracy: how local communities transform the energy system. Energy Res. Soc. Sci. 13, 94–105.
Van Veelen, B., 2018. Negotiating energy democracy in practice: Governance processes in community energy projects. Environmental Politics 27 (4), 644–665.
Van Veelen, B., Eadson, W., 2020. Assembling community energy democracies. Voluntary Sector Review 11 (2), 231–249.
Van Veelen, B., Van Der Horst, D., 2018. What is energy democracy? Connecting social science energy research and political theory. Energy Res. Soc. Sci. 46, 19–28.
Vervoort, J.M., Gupta, A., 2018. Anticipating climate futures in a 1.5 °C era: the link between foresight and governance. Curr. Opin. Environ. Sustain. 31, 104–111.
Wagemans, D., Scholl, C., Vasseur, V., 2019. Facilitating the energy transition: the governance role of local renewable energy cooperatives. Energies 12 (21), 1–20.
Wahlund, M., Palm, J., 2022. The role of energy democracy and energy citizenship for participatory energy transitions: a comprehensive review. Energy Res. Soc. Sci. 87, 1–19.
Walker, G., Devine-Wright, P., 2008. Community renewable energy: what should it mean? Energy Policy 36 (2), 497–500.
Walker, G., Devine-Wright, P., Hunter, S., High, H., Evans, B., 2010. Trust and community: Exploring the meanings, contexts, and dynamics of community renewable energy. Energy Policy 38, 2655–2663.
Warbroek, B., Hoppe, T., Coenen, F., Bressers, H., 2018. The role of intermediaries in supporting local low-carbon energy initiatives. Sustainability 10 (7), 1–28.
Wise, J.M., 2005. Assemblage. In: Stivale, C. (Ed.), *Gilles Deleuze: Key Concepts*. McGill-Queen's University Press, Montreal, pp. 77–87.
Wustenhagen, R., Wolsink, M., Burer, M.J., 2007. Social acceptance of renewable energy innovation: an introduction to the concept. Energy Policy 35 (5), 2683–2691.
Ziewitz, M., Singh, R., 2021. Critical companionship: some sensibilities for studying the lived experience of data subjects. Big Data & Society July-November 1–13.