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RESEARCH ARTICLE

Recommendations for initiating and engaging local energy communities in alignment with justice principles – evidence from seven European citizen engagement processes

[version 1; peer review: 2 approved with reservations]

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Abstract

Background

The promotion of local energy communities is highlighted as a solution to accelerate the transition towards a more decentralised, decarbonised and just energy system. EU policies are actively trying to strengthen the role of local energy communities as vital actors in the energy system. These developments open up a space for energy communities across Europe that are initiated, supported and/or strengthened from actors outside of the community. Such approaches have received limited attention by academic literature. The perspective of energy justice can serve as a normative framework to assess how the engagement of local residents and stakeholders in energy communities *should* take place.

This paper points out injustices in seven different community engagement trajectories that took place as part of the Horizon project Lightness.

Methods

Relevant data was collected over the course of more than two years of field work, including interviews with residents and engagement leaders, workshops and site visits. A framework based on justice principles called The Voicer model was applied to analyse the data and pinpoint injustices.

Results

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Based on these findings it provides ten recommendations for engaging residents and other local stakeholders in a just manner in local energy communities (LECs). These recommendations address among others the competences required for engaging residents in community-building, the importance of accessible communication and how to deal with the complexity of multi-stakeholder involvement.

Conclusions

The pathways for just engagement shown in this paper are limited in scope and would benefit from application in contexts with different legal, economic and governance configurations. Doing so can provide engagement practitioners with tangible tools to let diverse groups of residents enjoy the benefits that a just energy transition has in offer.

Keywords
Energy justice, environmental justice, energy communities, citizen engagement

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Introduction

The promotion of local energy communities is highlighted as a solution to accelerate the transition towards a more decentralised, decarbonised and just energy system (Bauwens, 2016; Brummer, 2018; Lowitzsch *et al.*, 2023). Long-term policy packages at the level of the European Union (EU) such as the Clean energy for all Europeans package actively try to strengthen the role of local energy communities as vital actors in the energy system (European Commission, 2019). Currently, 3931 energy communities are active in the European Union and the United Kingdom according to an estimate of Koltunov *et al.* (2023). In addition, the concept of energy justice, and its predecessor environmental justice, have found increasing application to the matter of community energy (Heldeweg & Saintier, 2020). Among others, justice can serve as an analytical point of departure to recognise that energy communities are heterogenous across a range of characteristics (Bauwens, 2016) and that energy communities can play a decisive role in addressing distributive issues such as energy poverty (Hanke *et al.*, 2021).

The momentum of the cooperative movement has attracted the interest of public bodies, research and consultancy agencies in initiating energy communities, sometimes in cooperation with local residents and stakeholders (De Vidovich *et al.*, 2021). In contrast, the body of scientific literature mainly focusses on communities that arise in a bottom-up matter (Dudka *et al.*, 2023). Much less is known about cases in which the efforts from actors outside of the community contribute to forming an energy community[1]. The initiation of communities through the intervention by external actors poses particular challenges. External actors have relatively less knowledge about the target group, there are little existing relationships to build upon and the goals of people who are targeted to be part of community and of the initiators might be misaligned. The academic literature lacks empirical evidence of the challenges outside actors face when aiming to engage local residents and stakeholders in an energy community.

This paper investigates which injustices are present in engagement trajectories related to energy communities and how these can be resolved. The focus is on communities initiated through external interventions. Relevant findings are based on experiences from the Horizon project Lightness[2] and are analysed through a conceptual framework for assessing issues of environmental and energy justice called The Voicer (see Breukers *et al.*, 2016). The Voicer conceptualises justice along six dimensions: recognition, participation, distribution, responsibilities, capabilities and learning. The analysis of the engagement trajectories in Lightness from the perspective of The Voicer allows to formulate recommendations on how to engage citizens and businesses in a just manner in local energy community initiatives. These recommendations account for differing characteristics of local communities in order to increase applicability across various local contexts. Recommendations are primarily directed at practitioners that have a decision-making and/or facilitating function with regards to the community.

The remainder of this paper is built up as follows: Section 2 elaborates on the concepts of energy justice and energy communities as core of the theoretical and analytical framework. Section 3 introduces the methodology of data collection and derivation of recommendations for just citizen engagement. It also provides the framework for characterising different energy communities. Findings are presented and interpreted from the perspective of energy/environmental justice in section 4. Section 5 provides ten recommendations for just citizen engagement in energy communities based on the findings. Conclusions and suggestions for further research are given in section 6.

Theoretical framework: Energy justice and energy communities

Two core concepts treated in this paper are energy justice, further conceptualised through The Voicer model, and energy communities. In this section these concepts are further scrutinised from a theoretical point of view.

Energy justice

Since its emergence in the early 2010s, energy justice has found increasing use for assessing the normative dimension of changes in energy systems on the local, regional, national and global level (Sovacool & Dworkin, 2015). Coming forth from the idea of environmental justice (see Schlosberg, 2013), energy justice consists of three pillars: justice through recognition, procedural justice and distributional justice (Jenkins *et al.*, 2016).

Justice through recognition asks the question, whose voice is heard. Justice through recognition is given, when actors who have a stake in a matter are being acknowledged and respected (Young, 1990). It includes the recognition of beliefs and opinions held by people in a given local context. Jenkins *et al.* (2016) give the example of a local community on the Isle of Lewis, Scotland who successfully protested against a planned wind park on the island. Commercial developers accounted the resistance to the NIMBY phenomenon[3]. In truth the resistance stirred from a culture of distrust towards external parties, in turn rooted in historic experiences of unjust land claims. This case illustrates that beliefs and values held by local residents can play a significant role for citizen engagement, and that these values can stem from past experiences and events.

Procedural justice or justice through participation is concerned with the representativeness, transparency and depth of engagement

[1] De Vidovich *et al.* (2021) use the terms 'public lead' and the 'community energy builders' model to refer to communities initiated by public bodies and research agencies respectively. The Lightness project falls into the second category.

[2] For more information visit www.lightness-project.eu/.

[3] NIMBY ('Not in my backyard') represents the resistance of local residents to changes in their physical surroundings caused by (renewable) energy infrastructure due to fear of losing quality of life and from the preconception and unacceptance that they should not be the ones who bear the costs of the energy transition, while others are not affected.

in an engagement process. In practice it often refers to the degree of involvement of citizens into matters that affect them. Procedural justice builds on transparent communication and processes that grant actors the capacity to influence decision making that suits the degree that they are affected by the process and its outcome (Sovacool & Dworkin, 2015). Whereas justice through recognition asks *who* is recognised, for procedural justice it matters *how* decisions are being made and under which conditions.

Distributional justice revolves around the allocation of impacts, positive and negative, among different actors. With regard to energy, negative impacts often refer to monetary costs of one's energy supply, perceived loss of landscape serenity and health risks for residents' health through renewable energy installations. Benefits on the other most frequently relate to revenues from renewable energy generation (Jenkins *et al.*, 2016). Distributional injustices are characterised by allocations of costs and benefits that are perceived as unfair. In the context of energy communities, the distributive pillar of justice often relates to energy poverty (Walker & Day, 2012).

The Voicer

Breukers *et al.* (2016) have expanded on these three pillars by adding three dimensions to the energy justice concept: *capabilities, responsibilities* and *learning*. All elements combined constitute *The Voicer* framework that allows for a more nuanced assessment of justice aspects in the context of energy communities (Breukers *et al.*, 2016).

The *capabilities* approach was developed by Sen (2009) and Nussbaum (2011) as a counterargument towards utilitarian and Rawlsian theories of justice. Contrary to those two, the capabilities approach does not treat the allocation of goods and services as the analytical point of focus. Instead, it revolves around the potential of human beings to convert certain goods into so-called *functionings* that fulfil the needs, wishes and ambitions of a given person, such as "being employed, expressing oneself, breathing clean air [and] engaging with nature" (Davoudi & Brooks, 2014, p.2689). The capabilities approach has been applied in a variety of energy-related studies, e.g. regarding demand response in the flexibility market (Powells & Fell, 2019), energy poverty (Day *et al.*, 2016; Middlemiss *et al.*, 2019), local neighbourhood sustainability upgrades (Breukers *et al.*, 2016) and energy communities (Slingerland *et al.*, 2021).

Another novelty to the three-tenant energy justice framework is the element of *responsibility.* Justice through responsibility is concerned with the question whether each person engaged in the process carries responsibilities that comply with its willingness to contribute and to its capabilities (Davoudi & Brooks, 2014). Injustices can occur if a person is burdened with a number of responsibilities that exceed what they are willing and able to carry. Conversely, it can be interpreted as injustice when the desire of a person to contribute to an engagement trajectory remains unaddressed, i.e. when it is not enabled to fulfil its responsibility due to regulative, psychological or material constraints (Davoudi & Brooks, 2014). The dimension of responsibilities is relevant because norm-driven members of energy communities tend to take up several tasks on a volunteering basis (Bauwens, 2016; Stürmer & Kampmeier, 2003). Furthermore, smart grid technology increases the amount of responsibilities of energy communities as they often demand certain technical knowledge from energy community members (Kloppenburg & Boekelo, 2019).

The sixth element added to The Voicer is *learning*. Energy communities are hubs of innovation and creativity (Bauwens, 2017). Innovative bottom-up solutions require factual information to be gathered, trust between actors to be established as well as norms and perspectives of actors involved to be aligned (McFadgen, 2019). These types of learning are all part of the collective learning process within innovative energy communities (Mlinaric *et al.*, 2019). The failure to adopt these learning procedures can lead to injustices e.g. because norms and values held dear by residents are not considered.

Figure 1 illustrates the Voicer model and the aspects used to assess issues of justice in the Lightness communities' engagement trajectories. The following section discusses energy communities, and the local energy community is a specific analytical type of community.

Local energy communities

An energy community can be understood as a collective initiative made up of citizens and/or local businesses that engages in a set of activities related to the energy system (Caramizaru & Uihlein, 2020). The main aim of these initiatives is to create public value for the local community (Seyfang *et al.*, 2013; Van Veelen, 2017). Since the early 2000s, the concept has received increasing attention from national policy-makers as a solution to the double challenge posed by climate change and energy security (Seyfang *et al.*, 2013; Walker & Devine-Wright, 2008). As of 2023, Ireland, France, Germany, Belgium, Denmark and Italy have adopted legislative definitions of energy communities (REScoop.eu, 2023).

LEC characteristics. This paper uses the term *local energy community* (LEC)[4] to refer to local energy initiatives. The choice in terminology has been made because *local* emphasises that the pilot sites of the Lightness project were chosen mainly due to their geographical and infrastructural configuration. A number of key characteristics of an LEC can be derived from the body of scientific literature on community energy and energy justice as discussed above: Geographical and infrastructural scope, organisational form and governance, activity and use case, regulatory framework, social fabric, past events and experiences and capabilities. These seven characteristics are described in more detail below.

[4] The authors are aware that there are many, sometimes overlapping definitions of energy communities. While acknowledging that each definition and concept holds merit in its own right, developing a clear-cut definition of what community energy should mean is outside of the scope of this paper.

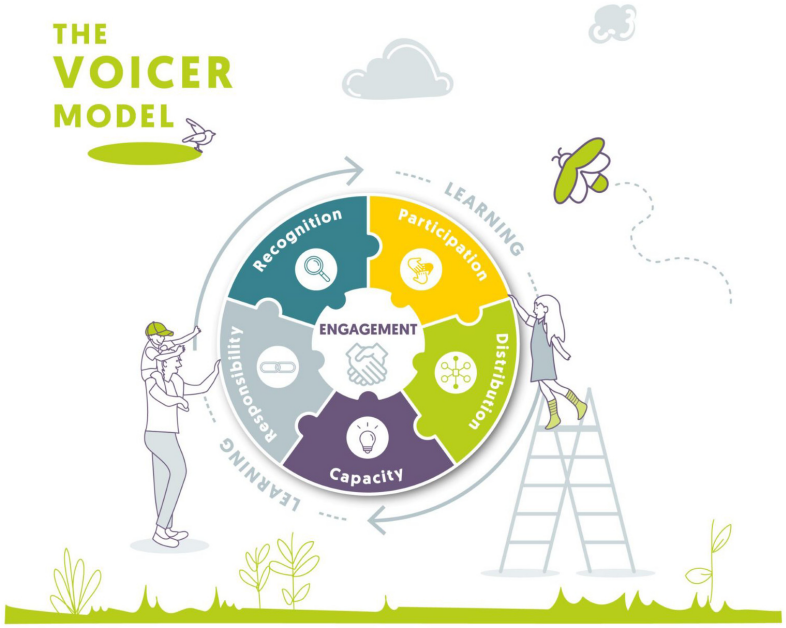

Figure 1. The Voicer model (Traza Territorio, 2021). Retrieved from https://www.lightness-project.eu/wp-content/uploads/2021/08/The-Voicer-model-b-1536x1290.jpg.

1. Geographical and infrastructural scope

An energy community can surface around a place-based and/or an interested-based logic (Walker & Devine-Wright, 2008). The place-based aspect is particularly relevant in the case of Lightness. All case study sites of Lightness have been selected because of their local scope. The EU's definition of a REC also emphasizes the place-based aspect. It describes a community that is settled within close proximity of an energy project (EU, 2018). The geographical and infrastructural scope of a community can be summarised most aptly by the type and scale of housing vested in the given area. Examples are apartments accommodating multiple households, blocks of apartments, several dwellings located in one or more neighbourhoods and entirevillages or cities.

2. Governance

Energy communities vary in the way they organise themselves (Bauwens, 2016). The governance structure of the LECs in Lightness is predetermined by the project team, at least in the early stages of the project. Variety of governance and organisations then occurs depending on two main factors: Firstly, whether local intermediary organisation are involved or not and secondly, whether there are other dependencies on actors outside of the community which are not actively involved in its day-to-day operations but that have substantial decision-making capacity. The responsibilities actors involved in a LEC can have are the provision of energy services, initiation and facilitation aswell as active membership and consumption (De Vidovich*et al.*, 2021).

3. Activities

Energy communities are not determined to perform a specific set of activities (Roberts *et al.*, 2019). According to EU legislation the possible activities LECs can engage in include but are not limited to the "generation, distribution, supply, aggregation, consumption, sharing, storage of energy and provision of energy-related services" (Caramizaru & Uihlein, 2020, p.8). The exact activities that are eligible for deployment are in part determined by the technical and infrastructural configuration as well as thelegislative framework.

4. Regulatory framework

Regulations regarding the energy market, and energy communities in particular, differ strongly across EU member states (Caramizaru & Uihlein, 2020). The regulatory framework can be of influence on the opportunities LECs have to financially exploit from renewable energy generation. In the Dutch context, where there is no formal definition of energy community, local initiatives can make use of subsidies aimed at fostering a decentralised and renewable energy system (Caramizaru & Uihlein, 2020). Meanwhile Spanish legislation officially recognises the concept of local energy communities and the regulatory framework allows for sharing energy among peers (Frieden *et al.*, 2019). The possibilities a regulatory framework offers can also be a determinant of what motivates people to be part of a local energy initiative (Bauwens, 2016; Oteman *et al.*, 2014). On the other hand regulator barriers can be obstructive to the formation of energy communities as argued by Brummer (2018). An overview of the regulatory frameworks

in the respective pilot countries can be found in Deliverable 2.2 "Regulatory Impact Analysis for CECs and Flexibility Services" (downloadable here) and Deliverable D2.6 "Policy recommendations for CECs and Flexibility uptake" (downloadable here) of the Lightness project.

5. Social fabric
Social fabric is understood as the web of interactions and relationships that collectively form a society or a subset of society, such as a community (Hayden, 1982). The denser the social fabric the more frequent, trusted, intimate and rigid social interactions are. On the other hand, a loose social fabric indicates that a relatively weak sense of social cohesion among a given social group.

Apart from these five characteristics derived from the literature about energy communities, an additional two characteristics for understanding LECs in more depth and nuance are proposed based on the principles of energy justice outlined above.

6. Past events and experiences
Recognition through justice builds in part on a thorough acknowledgement and respect for the history a given local context has. Above the example of community energy on the Isle of Lewis was given (see Jenkins *et al.*, 2016). The recognition of past events that shaped a community in a way that impacts engagement enables to develop engagement approaches that are more tailored to the local context. The sections "Energy justice & The Voicer" and "Insightfulness of field research" provide more details about role of past events and experiences in just engagement.

7. Capabilities
The Voicer model additionally points towards the relevance of certain capabilities being present among a given group of members (see Sen, 2009; Nussbaum, 2011). As mentioned above, capabilities play an explanatory role in relation to phenomena such as energy poverty, consumer behaviour using smart grid technology and local sustainabilisation measures. See sections "Energy justice & The Voicer" and "Energy literacy, digital literacy and immobility" for more details about the role of capabilities in just engagement.

The following section elaborates, among others, how this framework of seven LEC characteristics is used to derive recommendations tailored to specific community contexts.

Methods
This section describes the broader context of the Lightness project, the case studies, the action research approach to data collection, and the method of data analysis.

Case study: Engagement in Lightness
The engagement experiences reported on in this paper are based on the engagement trajectories that took place in seven pilot sites as part of the Lightness project. The Horizon project Lightness (2019–2023) aims to unlock demand flexibility of residential users and increase the share of renewable energy in the energy mix. For that purpose, LECs were aimed to be developed in seven pilot sites in five countries. The pilot communities involved in Lightness differ in one key aspect from the kind of energy community typically treated in the literature: Most often, energy communities emerge in a bottom-up manner through the motivation of a group of local residents. Bauwens (2016) calls these "communities of interest". In such a case the beneficiary of the energy services provided by the LEC is also the initiator (Gjorgievski *et al.*, 2021). In the case of the pilot communities discussed in this paper however, the initiation was external and the motivation not necessarily bound to the communities' members' aims and aspirations. Instead, the deployment of technical use cases and the implementation of a citizen engagement strategy based on justice principles were two major interventions to develop LECs in the respective pilot sites. The authors were involved in the Lightness project as leaders of the citizen engagement work package and actively contributed to the design and execution of the engagement activities.

Another important characteristic of all pilot communities participating in Lightness is that they were not yet energy communities at the start of the project. When we use the term LEC, we refer to a community which has developed so far that its members collectively engage in energy-related activities such as energy generation or storage. By *pilot community* or *pilot site* on the other hand we refer to one of the seven communities that participated in Lightness. In order to offer engagement recommendations that are sensitive to different local conditions, a characterisation of the seven pilot sites is proposed in the following.

Characterisation of communities in Lightness. Seven pilot sites participated in the Lightness project, each with a unique social, technical, organisational and legal configurations. Table 1 provides some key information about these communities.

A more formal characterisation of LECs consists of the seven aspects presented above: *geographical and infrastructural scope, governance, activities, regulatory framework*, *social fabric, capabilities* and *past experiences and events.* A characterisation the pilot communities using this set of characteristics can be found in Table 2.

The characterisation of the pilot communities according to this method is aimed to increase the validity of engagement recommendations for differing local and national contexts. The following section outlines how experiences on the engagement process were monitored and how meaningful findings were derived from the data.

Data collection
Relevant data was collected among potential participants and stakeholders in the Lightness project. See Table 3 for an overview of all data collection activities. Due to the need to get in-depth knowledge of the local context and establish trusted relationships, qualitative methods were the most suitable mode of data collection (see Boeije, 2009).

Table 1. Description of pilot communities in the Lightness project.

Country	Location/title	Type & scope	Group size targeted for engagement
Spain	Alginet	Village	~13.000 inhabitants
	Manzanares	Village	~18.475 inhabitants
France	Technolac	Business park	20 businesses
Italy	Cagliari	Condominium	8 households
Netherlands	Woerden	Residential neighbourhood	130 households
	Quatrebras	Residential neighbourhood	~200 households
Poland	Wroclaw	Blocks of multi-family apartments	260 households

Table 2. Characterisation of pilot communities in Lightness according to seven key criteria.

Pilot community	Scope	Governance	Activities	Capabilities	Social fabric	Past experiences
ES – Alginet	Village	Community facilitation through cooperative ESCo	Energy community building; P2P energy trading	Mixed	Various	Establishment of cooperative energy distributive operator in 1930s
ES- Manzanares	Village	Regular communal meetings; based on neighbourhood association	Energy awareness raising campaign; energy community building; energy advisory shop	Divided between affluent members and vulnerable households	Various	Experiences with Manzanares 50-50 programme
FR - Technolac	Business park	Decision-making through board of directors	P2P energy trading	Understanding of added value of energy community, limited energy awareness	Medium	Previous collaboration between local businesses
IT – Cagliari	Condominium	Regular communal meetings	Energy community building; housing energy efficient upgrade; energy monitoring P2P energy trading	Mixed	High	n.a.
NL – Woerden	Residential neighbourhood	Decision-making through housing cooperative	Energy community building; energy monitoring; virtual P2P energy trading	Low digital literacy; high energy awareness	Medium	Unfair distribution of benefits from energy renovation; Placement and decommission of communal battery
NL - Quatrebras	Residential neighbourhood	None – homeowners decide for themselves	Energy community building; energy monitoring; virtual P2P energy trading	High technical knowledge of renewable energy systems	Low	Social isolation due to covid-19
PL - Wroclaw	Blocks of multi-family apartments	Decision-making through housing association direction	Energy community building; energy monitoring (virtual) P2P energy trading	Unknown	Unknown	n.a.

Table 3. Data collection activities in respective LECs and overview of validation activities with LEC stakeholders.

Country	Pilot community	Activity	Respondent(s)	Performed by	Data file title	Reference in text
France	Technolac	Interview	Engagement leader	Authors	22 07 28 Interview France_ano.pdf	Engagement leader in Technolac
Italy	Cagliari	Interview	Engagement leader	Authors	22 07 13 Interview Cagliari - Italy_ano.pdf	Engagement leader in Cagliari
Spain	Alginet	Interview	Engagement leader	Authors	22 07 12 Interview Alginet_ano.pdf	Engagement leader in Alginet
Spain	Manzanares	Interview	Engagement leader	Authors	22 07 13 Interview Manzanares_ano.pdf	Engagement leader in Manzanares
Poland	Wroclaw	Interview	Engagement leader	Authors	22 07 14 Interview Poland_ano.pdf	Engagement leader in Wroclaw
Netherlands	Woerden	Interview	Pensioner in Woerden	Authors	NL_WO_INT1_ 220510_interview transcript Schilderskwartier.pdf	Interview resident NL#1
Netherlands	Woerden	Interview	Elderly couple in Woerden	Authors	NL_WO_INT2_220524_interview transcript Schilderskwartier_ruw.pdf	Interview resident NL#2
Netherlands	Quatrebras	Interview	Resident of Quatrebras	Authors	NL_QB_INT1_Interview guide Quatrebras aug '22.pdf	Interview resident NL#3
Netherlands	Woerden	Interview	Resident of Woerden	Authors	NL_WO_INT#3_220510_interview transcript Schilderskwartier.pdf	Interview resident NL#4
Italy	Cagliari	Interview	Condominium residents	Lightness partners	IT_INT1_WP5 Engagement Exercise - 1st interview.pdf	Interview resident IT#1
Italy	Cagliari	Interview	Condominium residents	Lightness partners	IT_INT2_WP5 Engagement Exercise - 2nd Interview.pdf	Interview resident IT#2
Netherlands	Woerden, Quatrebras	Interview	Innovation manager at energy service provider	Authors	NL_SH#1_230523 notules interview.pdf	Stakeholder NL#1
Netherlands	Woerden, Quatrebras	Interview	Academic researcher	Authors	NL_SH#2_Validation interview 17-05-2023.pdf	Stakeholder NL#2
Spain	Manzanares	Interview	Municipal councilman	Lightness partners	ES_MA_INT1_Interview-Councilman.pdf	Stakeholder ES#1
Spain	Alginet	Interview	LEC member	Lightness partners	ES_AL_INT1_Interview Active member of the community.pdf	Stakeholder ES#2
Spain	Manzanares	Interview	School Teacher	Lightness partners	ES_MA_INT2_Interview-teacher.pdf	Stakeholder ES#3
Spain	Alginet	Workshop	Workshop attendees (n=6)	Lightness partners	ES_AL_WS2_Monitoring Guide Workshop 03.05.2022 ALGINET.pdf	Workshop Alginet #1
Spain	Woerden	Workshop	Workshop attendees (n=7)	Authors	NL_WO_WS1_Verslag Workshop Woerden 24 februari '22_final.pdf	Workshop Woerden #1

Participants. Residents were sampled through targeting each household within the predetermined scope of the pilot area (see Table 1). Respondents were purposively recruited from the pool of residents and stakeholders in each of the pilot sites. These households were addressed via phone, e-mail, flyers, street interviews and/or door-to-door visits. The establishment of the initial contact led to inviting interested residents in signing a participation form, thereby agreeing that their anonymised responses can be used for analytical and dissemination purposes in the Lightness project and scientific papers. Additional respondents were purposively sampled from the network of stakeholders involved in the local pilot site, and directly invited to participate in an interview. Sampling of respondents involved a snowball element in that interviewees were asked

whether they knew of other residents that might be willing to be interviewed. The most common reason for people not participating in the data collection activities were lack of time, unfamiliarity with the topic of smart energy, distrust towards external parties (including researchers) and low expected benefit. All data collection activities took place between September 2021 and May 2023. All parties performing the data collection were representatives of professional organisations in the renewable energy field. They were prepared through a series of workshops involving ethical considerations, practical tools and tips of data collection. Below the setting and location, the methods of data collection and tools used, and the structure and format of each data collection method are presented.

Interviews. In total 16 interviews with residents and relevant stakeholders were performed (see section Data availability for more details). Interviews were semi-structured, and varied in duration from 30 to 60 minutes. Dependent on the availability of respondents, interviews were either performed on location, via phone call or via videochat. Locations for face-to-face interviews include the residents' homes, public facilities such as a town hall and rooms made available through project partners. Interviews with either performed by the authors themselves or a key partner active in the respective pilot community. Partners were briefed and supplied with a pilot-tested interview guide including instructions and tips prior to performing the interviews. At the start of the interview, the interviewer introduced him- or herself and explained the aim of the Lightness project. The interviews were either recorded and transcribed using transcription software. Transcripts were not shared with participants for insight to prevent overburdening participants with extra tasks beyond contributing to Lightness. In case audio recording was not possible, e.g. because of unwillingness of the respondent, (co-)interviewers took notes and summarised the findings in an interview report.

Workshops. Workshops were a vital part of building local communities, informing residents about ongoing activities and collecting input and opinions of participants within the Lightness project. In total 14 workshops were held by project partners, of which two are cited in this paper. Workshops took place in facilities owned or rented by project partners, including office rooms, conference rooms, community centres and schools. The duration of workshops was 60 to 120 minutes. The programme of the individual workshops varied depending on agenda points relevant to the local context. An observation protocol based on the seven justice aspects mentioned above and including explicit instructions to project partners on how to recognise and assess verbal and non-verbal feedback from residents allowed for consistent and systematic data collection during workshops.

Field research. In addition to the interviews and workshops six rounds of street interviews and door-to-door visits were performed, alongside various informal conversations with residents on the pilot sites or via the phone. Although these activities did not yield concrete data they were an essential building block for recruiting participants and getting a grasp of the local context, thereby paving the way for subsequent data collection activities.

Ethical approval. Responses obtained through this study contain personal information, e.g. about financial problems, political opinions and personal behaviour at home. The analysis of these responses and the dissemination of relevant fragments of data such as quotes necessitated informed consent on the part of respondents. All activities related to this research, including the collection of data from respondents, the processing of this data and the publication of findings based on the data is approved under the Grant Agreement No 953020 and have received consent by the respective respondents either in written or recorded verbal form. Respondents gave written consent to use their response for research purposes and publishing anonymised statements through signing a participation form for the Lightness project or, if monitored as part of a workshop, through signing a consent form allowing the above mentioned activities in addition to having anonymised photos taken and used for communication purposes. Interviewees gave verbal consent through stating their full name and an agreement to record the interview and use the findings coming forth from it for research and dissemination purposes.

Data analysis. The Voicer model provided the analytical framework for interpreting the data. Guided by the seven justice elements mentioned in Section 2, issues of justice were identified in the interview transcripts and workshop reports. Following this selection of potential injustices, the authors performed a cross-comparison between issues of justice among all LECs. Specifically, similarities of occurrences of injustices were sought out, and the way in which they relate to the characteristics of the respective pilot sites. The comparison led to an inventory of justice issues which were known to be relevant because they were shared by multiple LECs. The relevance of these issues was validated through a series of interviews with stakeholders associated with energy communities. The analysis was performed without the use of additional coding software for transcripts with less than five pages. Coding software atlas.ti was used for transcripts exceeding five pages. The outcomes of the data collection and analysis process are described in the following section.

Findings: Experiences and lessons from engagement in Lightness

This section presents the engagement experiences that were made in the pilot communities of Lightness.

The findings are presented in linkage with issues that arose in relation to justice through recognition, procedures, distribution, responsibilities, capabilities and learning.

Recognition

Insightfulness of field research. Partners of the Lightness project deployed various engagement and recruitment activities in the pilot communities by being physically present. In the social housing neighbourhood in Woerden the field visits

exposed that residents' feel scepticism towards governmental institutions and large companies. The low efforts of institutions in addressing environmental issues made residents feel as though they themselves should not feel responsible for engaging in collective, climate change mitigating energy activities. Furthermore, a previous renovation project which provided about half the neighbourhood with an extensive deep-core energy efficiency upgrade while the other half was left with gas heating and lesser insulation measures was perceived as highly unjust by many residents, aggravating the distrust towards outside interventions. As one resident states: "When you look at what the renovation [on the other side of the street] had cost you would think: What did the people get in return? Only misery. Because they are still using gas." (Resident NL#1).

A field visit in Quatrebras confirmed that the target group almost exclusively consisted of households with kids, two working parents and a tight time budget. Social ties were found to be weak, in part because Covid-19-induced lockdowns were in force at the time many residents had moved to the area. In Cagliari an interview with the condominium inhabitants confirmed that the residents are close to each other and that regular informal events such as dinners take place (Resident IT#1). In the course of the engagement process, the close social ties were a crucial pillar of engagement in the Italian pilot. In Alginet it appeared that there is a generational difference between older cooperative members who hold on to the social core of the cooperative, while younger members are less active in the cooperative and are more interested in the financial aspect (Workshop Alginet #1). In the French business park of Technolac field research revealed the rather absent connection of employees with the energy status of their work environments (Engagement leader in Technolac).

These findings speak of the importance of recognizing past events, experiences and broader circumstances in a given local context and their impact on engagement. Furthermore, the field research activities shed light on the existing social ties in each of the local contexts. Across all seven engagement trajectories, the importance of getting to know the field through field research was acknowledged. In particular such field visits allow for recognising which aspects of the local context are most important to the residents and for the engagement trajectory. An increased understanding of the wishes, aspirations, worries and values residents carry strengthen justice through recognition.

Dependency on intermediaries. Some engagement processes featured a prominent role for an intermediary actor or organisation. In Poland, it is required by law that apartment buildings are managed by a private company. The building manager of the apartment complex in Wroclaw had existing connections and relations with the residents which were important for spreading information to residents about the project to the residents. He also held control over all communication towards residents, whether it be flyers, interviews, community events or door-to-door visits. Upon his replacement however, recruitment activities in Wroclaw came to a halt. The manager who followed him up was not as enthusiastic about renewable energy installations as his predecessor (Engagement leader in Wroclaw). In Manzanares the support of the municipality was an essential asset in the early engagement phase, i.e. the recruitment. The municipal departments granted engagement leaders access to households which were in a situation of energy vulnerability or energy poverty. The municipal support largely depended on a municipal councilman was very favourable towards collective renewable energy action (Engagement leader in Manzanares; Stakeholder ES#1). The French case was characterised by the involvement of political actors who saw an opportunity for economic growth in a business park organised as an energy community (Engagement leader in Technolac).

Overall the recognition of intermediary actors and organisations is a matter of justice because they are entitled to have a seat at the table. Beyond that, they need to be recognized for practical reasons: Assistance in communication matters and sometimes substantial decision-making power make them a much-needed asset for effective citizen engagement. The Polish example might be the most illustrative one of how important it is to assess the importance of local stakeholders. Without anticipating the power and commitment of key stakeholders, the initiation of an energy community can come to an abrupt halt.

A business does not only consist of its management. In an energy community settled in the residential sector, households are equally decision-makers and members. The French case study displayed that in a business park circumstances are different. Instead of households and individuals residents, companies make up the member base of the community. Strategic decision-making power is vested in business directors, e.g. the decision whether to join a community and, if so, under which circumstances. Managers have the capacity to monitor and adapt energy-related issues such as regulating in-door temperatures. As such the decision-making capacity is distributed between different levels and individuals of a company. Employees are often the ones who are affected by managerial decisions and also carry the responsibility to act upon these decisions, for instance through adopting their energy consumption behaviour at work (e.g. switching off stand-by devices, regulating spatial heating, saving hot water etc.). Employees however commonly do not get a say in the question whether to join an energy community or not.

The motivations of directional company boards are instead often related to building a green image and saving costs as reflected by this statement: "In the business park, all motivation was directed at climate action and the image of the company. We consume local, is the image wish" (Engagement leader in Technolac). The disconnectedness between the directional and operational layer led to a situation in which the role of employees for strategic decision-making remained unacknowledged. From an energy justice perspective this indicates injustice through non-recognition.

On top of that an increased understanding of energy consumption may be beneficial to form an LEC in a business park.

As the engagement leader of Technolac commented: "I went door-to-door, want to speak to you about creating an EC in this building. They said: Yes, very interesting. I asked: Do you know how your energy consumption is, what you are paying now? They did not know at all."

Procedures

Language and communication channels. Two aspects of communication were paramount for engagement: The language that was being used and the communication channels through which information was shared. Residents in Woerden were alienated by some of the terminology used by project staff during the engagement process. Among those were the terms "smart grid", "energy community" and "energy service", as expressed by one Dutch resident: "'Delivered back to the grid', 'own consumption or energy community' … So, yeah, I don't know what that means" (Resident NL#4). The abbreviations "kWh" and "CO2" were also frequently misunderstood or misinterpreted (Resident NL#1). In Manzanares there was a discrepancy between the language used by people who were financially relatively affluent and energy vulnerable households. The differences were discussed during a workshop of the Lightness project which ultimately led to both groups understanding each otherbetter (Engagement leader in Manzanares).

The appropriate communication channel differed vastly across the pilot communities. In Alginet and Quatrebras WhatsApp groups proved an efficient and reliable way to disseminate community-related information, based on feedback from engagement leaders. Face-to-face interaction during interviews, workshops and field visits was beneficial in all engagement trajectories because it allowed for disseminating information while almost simultaneously gathering information from potential members. Overall, procedurally just engagement builds on a mixture of face-to-face, personal interaction and efficient low-threshold remote communication. In both cases the language being used can determine whether certain groups of people feel excluded from participating.

Social ties differ across communities. Although all participating pilot sites accommodated a "pilot community" the degree to which these bundles of households (or businesses) can be considered a community with close social ties differs. The residents of the condominium in Cagliari were already a community in the sense of a group with informal and frequent social interactions before the beginning of the Lightness project. People share a staircase, the amount of households is relatively small, decisions about the communal area were taken together and matters are discussed during communal dinners. Close community ties and the small size of the community helped to disperse motivation and information among residents, and thereby boosted engagement (Engagement leader in Cagliari). The residents living in Woerden who participated in Lightness appreciated informal conversations and sharing their opinions. The workshops were staged to be informal and easily accessible through offering drinks and snacks, and through leaving the hired space open for people to chat after the official workshop programme had finished. The technical issues related to the project were generally considered a nice-to-have, but not core of the programme. This became evident through the fact the community gatherings were used by residents to raise issues not related to the project, but which related to their worries about energy and their neighbourhood more broadly (Workshop Woerden #1). Overall, the development of community ties was found to be an important driver for energy community-related activities.

According to one interviewee employed at a large energy service provider it is disputable whether citizen engagement will at all play a role for forming energy communities in the future. She argued that in the future automatised peer-to-peer energy trading and standardised value propositions can develop energy communities without having to personally engage with residents. In such a scenario engagement takes place via digital interfaces and less through personal interactions (Stakeholder NL#1). An opposing view is offered by another stakeholder who advocates that engagement will always be an important pillar for a just energy transition because it allows to adaptively create measures which are sensitive to the local context (Stakeholder NL#2). Both interviewees agreed that at this moment, community ties and actively trying to contribute to building a community is vital for just and effective citizen engagement. Along these lines a stakeholder in the Alginet pilot stated: "Activities outside the energy field bring members of a community closer together. It is necessary to stand together in pursuit of the interests of all." (Stakeholder ES#2)

Experience with engaging young people. In Manzanares, pupils of the local public school were engaged with the topic of energy through the so-called *Manza 50-50 programme*. This programme seeks to achieve energy efficiency in the school through the promotion of energy awareness and changes in the energy behaviour of children and the educational community in general. The economic savings resulting from the reduction of energy consumption in the school are dedicated for 50% to the maintenance of the school and for 50% to a purpose the children decide through a democratic process. Energy awareness is promoted among children with different activities such as critical walks through the school buildings to identify and understand how much energy is consumed where, and why. A teacher comments on the success of involving the pupils: "Kids from the fourth grade are very capable of coming up with ideas and getting involved, they also have a lot of spontaneity and grace. Let's see how the next year goes when we'll involve kids from the fifth grade, who may be more serious and reflexive" (Stakeholder ES#3). The programme has led to raising awareness not only among children and other members of the schools' network but also among the children's parents, as the newly gained energy knowledge spread to the homes. A municipal councilman involved in the pilot community of Manzanares stated: "There is only one public school in Manzanares, so it is a node through which many families can be reached. Also, the children [students] are very enthusiastic about this programme and are a very powerful propagation vector of their enthusiasm" (Stakeholder ES#1). This is considered

a success since parents can be a challenging target group to reach, due to their limited time budget (also seen in Quatrebras). The experience in Manzanares showed that engaging younger people can be a promising avenue for creating a collective awareness about energy which can ultimately result in an increased number and diversity of members, and increased capacities for engaging with the topic of energy.

Distribution

Worries about maldistributed costs and benefits. In Woerden and Quatrebras participants expressed worries about the distribution of the benefits from using locally produced energy. An elderly couple in Woerden said: "Heating costs energy, there is nothing to do about that. So we're very considerate of that. We use as little energy as possible. But then again, we sacrifice it, maybe for the person next door who's like: One-two, let's go!" (Resident NL#2). Similarly, a resident in Quatrebras stated that he has a strong preference for consuming the energy that is produced on his rooftop instead of supplying it to the neighbourhood: "I want to use one on one what I have produced. If it works that way, fine." (Resident NL#3). Similar concerns were expressed in the Italian pilot. Residents were worried that the usage of a communal battery might lead to energy supply shortages during peak consumption hours, that energy sharing might require residents to cover the bill of neighbours who consume higher quantities of energy (Resident IT#1) and that the revenue of the PV panels are distributed unfairly (Resident IT#2).

On several occasions it was explained to residents that they enjoy absolute priority for consuming their own self-generated energy before supplying it to others. As became apparent during engagement process, people nonetheless feared that they would supply wasteful neighbours who would then reap the benefits of green local energy without having to do anything. Questions about distributions have a functional role for residents to ensure themselves what they are getting involved with. This makes such inquiries part of a healthy engagement process. However, the experiences in Lightness show that ever so critical questions and remarks may indicate an underlying fear or concern of being treated unfairly.

Responsibilities

Confusion of multi-stakeholder involvement. Externally initiated engagement processes can involve a large number of actors including project partners, energy service providers and local stakeholders. The involvement of too many parties makes the process prone to confusion and resistance. In the case of Cagliari, the involvement of two departments of the same energy service providing company in the pilot formed a challenge to engagement. One department handled the energy efficiency renovation of the condominium. The other department engaged citizens in the Lightness project. Communication took place via one representative who belonged to the second department. The unintended consequence was that residents expected the representative to be able to answer questions about the renovation project (which he could not). When residents discovered that he was not the dedicated person to address their questions, confusion and disappointment about the process had already set in and ultimately stalled the engagement process (Engagement leaders in Cagliari).

In Alginet, a cooperative energy distributor was present before the start of the Lightness project. Because it mainly fulfils the role of a DSO, it cannot be considered an energy community. Part of the challenge of the process in Alginet was that residents wanted to know from the beginning what the role of the cooperative and what their own role in the energy community was (Engagement leader in Alginet). A community member in Alginet elaborates that "at the beginning the role of the cooperative in the creation of the Local Energy Community was not clear, which made the members upset, […] uncertainty makes people not to commit with the community" (Stakeholder ES#2).

All examples show that an engagement process becomes more just and more accessible if the roles of the actors involved are made clear. This includes the role that citizens want to play or what is expected from them because the clearer the responsibilities of participating actors are, the clearer becomes what is expected from members of the community.

Capabilities

Energy literacy, digital literacy and immobility. Certain capabilities were found to be crucial for residents when wanting to be engaged in an energy community. Among the residents in Wroclaw were people with impaired mobility and a lack of digital proficiency. Engaging people in such situations proved difficult because they cannot stay updated on engagement activities via the e-mail or cannot attend physical meetings for residents or both (Engagement leader in Wroclaw). In Woerden, the deployment of analogue engagement tools, e.g. a paper manual instead of a digital one, proved beneficial for engaging pensioners with relatively lower digital proficiency.

In two pilots the inequality in initial competences was particularly decisive for engagement decisions. In Alginet, attendees of a workshop had mixed levels of energy literacy. This caused the challenge of keeping the engagement workshops broad and general enough to attract more residents to join the project and build up their energy literacy, while making sure that more experienced participants do not lose interest. One way to address this challenge was to facilitate workshops where more proficient residents help less experienced residents in a process of shared learning. The shared learning was a successful measure as evident from observation during workshops in the Dutch pilots. The particular challenge of involving households in a situation of energy poverty became clear in Manzanares. A municipal official stated: "Many of them find it difficult to participate in collective meetings as they feel exposed, have difficulties to dedicate time to it, also may feel shame and guilt for their situation, etc." (Stakeholder ES#1). In this case engagement benefitted from residents engaging in open and respectful conversations with each other under the supervision of an experienced and competent facilitator. Altogether these results indicate that the investment of resources in

capacity-building among residents can increase the inclusiveness of the engagement process.

Learning

Engagement leadership requires competences. The importance of learning and acquiring competences for leading engagement become apparent through the negative experience in Wroclaw and the positive experiences in the Dutch and Spanish pilots. In Wroclaw, the partner tasked with the engagement of residents had a technical background and did not have a partner with experience in engagement matters. She felt unprepared, unexperienced and therefore uncomfortable to carry out engagement activities. In addition no resources were explicitly earmarked for citizen engagement activities by the project administration, depriving the engagement leaders of financial budget vital for planning and executing engagement activities (Engagement leader in Wroclaw). As a result, it was difficult to get the recruitment process tailored to the needs and motivations of the residents.

In the Dutch and the Spanish cases partners with a complementary set of competences collaborated. Technical partners were able to confidently provide information and pinpoint uncertainties which created trust. Partners with a social-science based background and experience in citizen engagement on the other hand were able to tailor communication and engagement activities to the needs of different target groups. It was found that a combined set of competences is required to successfully recruit a diverse group of participants. The single most effective measure deployed by the authors to increase capacities among engagement leaders in Lightness was to organise collaborative sessions for discussing engagement issues, reflecting on them from a justice perspective and formulating solutions in a workshop-like setting. This paper itself may be seen as such a capacity-building measure since its aim is to provide recommendations for just citizen engagement. These are presented in the following section.

Ten recommendations for just engagement

From each of the key findings presented above a recommendation for just engagement of citizens in energy communities is derived. These are presented in this section. The process of validation and LEC characterisation highlighted the relevance of certain recommendation with respect to certain LEC characteristics. The most relevant LEC characteristic is indicated for each recommendation. The distinction of different LEC characteristics allows practitioners to determine therecommendations that are most applicable to their respective engagement process.

1) Do field research to know what is important

Field research in the form of street interviews, interviews, door-to-door visits and information events is essential to get to know the local area. Such physical activities can create trust among residents, increase the project's visibility and, most importantly, allows one to get a rich understanding of the context. If there is access to any intermediary organisations or residents, they should be made part of the field research activities because they tend to be more trusted by residents and can therefore raise interest and awareness. If no such parties are present the dependency on field research measures increases because engagement cannot be based on an existing body of knowledge about the local context. Because of the positive experiences for increasing recognition in Lightness, field research measures are considered a prerequisite of just engagement in all engagement trajectories.

2) Recognise benefits and risks of intermediaries

Intermediary actors and organisations can be very supportive when wanting to engage with residents. But their responsibilities, decision-making authority and personal interests also have the power to obstruct the engagement process. This is especially the case when the governance structure is rigid and recognised and respected by community members. It is therefore important to recognise which decision-making power, interests and benefits for engagement intermediaries have. Experiences from Lightness show that the involvement of stakeholders in a community engagement process can be volatile in that it is of temporary nature. Municipal elections or personnel changes in enterprises are common reasons for intermediaries to be removed from the project and be replaced by others. Recognising the role of intermediaries is essential if intermediary organisations or persons have significant power, e.g. in social housing or associations of home owners. These recommendations are related to the *Governance* of a local community.

3) Engage work floor staff, managers and directors of a business

Launching an energy community in a business park requires to first identify the functions which carry the decision-making capacity. It is essential to safeguard their commitment and goodwill before proceeding to recruitment and engagement activities. Once engagement has commenced employees need to be recognised as stakeholders in energy-related matters of a business. It is advisable to make sure that the engagement does not only address the managers but also people working in the building. The process might benefit from the input of work floor staff because they are the ones who are conscious of how energy is being used and can contribute ideas of how to make it more efficient. This recommendation specifically refers to engagement trajectories in business parks. This recommendations is related to the *Geographical and infrastructural scope* of a local community.

4) Learn the local language

Project language is a different language than the one used by households. Next to engagement activities, the communication within and about an engagement process is essential to run a just engagement procedure. Communication can be tailored by choosing the appropriate language. Language must be chosen that is understandable and relatable for the target group. This relates to the complexity of terms (smart grid, kWh, EU Directive), the ambiguity of terms (energy community, co-creative) and the complexity of concepts (layered energy system, energy monitoring dashboard). In a fruitful engagement process it is essential that all actors, including residents as key

stakeholders, have a shared understanding of the terms and concepts. Attention for language can close the discrepancy in the language different groups of residents are using (*Capabilities*) or when a digital use case is involved (*Activities*). This recommendations is related to the *Capabilities* and *Activities* of a local community. We therefore recommend to address the target group(s) with terms and concepts they can relate to and to build on existing communication channels before trying to deploy new ones.

5) Focus first on "community", then on "energy"

Communities are most likely to develop around shared values which may or may not relate to energy, such as the safety, access to recreational green or in-house comfort. Energy may or may not be part of interest to the community. A focus on community is crucial when there are little or no social ties, especially in larger target areas such as whole neighbourhoods and villages (*Social ties)*. A scenario is imaginable where a highly advanced technologically-oriented business case decreases the importance of face-to-face engagement (*Activities*). Even then community-building can be useful because the input of households helps to pinpoint implementation problems and develop sharper value propositions. This recommendations is related to the *Social ties* and *Activities* of a local community.

6) Engage the younger generation

Engaging people of younger age such as school students can increase the outreach of engagement activities. In cases where a local institution related to young people is present, e.g. a school or a local sports club, such activities can be particularly advantageous (*Governance*). Even in local contexts without such institutions the engagement of young people offers a way to increase the representativeness of community members. Doing so means to give a voice of say to the generations that are most impacted by the decisions being made today. This recommendationsis related to the *Governance* of a local community.

7) Clarify potential costs and benefits

Transparency about the costs and benefits that energy-related activities have to offer is a prerequisite for recruiting members for LEC. From the perspective of justice it is crucial to identify issues that could lead to some residents feeling as though they are being treated unequally, e.g. because they incur higher costs relative to other residents or stakeholders or through foregoing benefits that others have access to. Special attention should be given to clarifying costs and benefits when there are concerns about maldistributions which stem from past experiences in the community (*Past experiences and events*). The experiences in the Dutch pilot communities furthermore show that the absence of a legal framework that facilitates financial revenue from collective energy generation and trade calls for an extra effort to clarify the benefits of a community membership (*Regulatory framework*). In case worries about the risks, costs benefits and opportunities are insufficiently addressed engagement is likely to be obstructed by resistance and decreasing enthusiasm. This recommendations is related to the *Past experiences and events* and *Regulatory framework* of a local community.

8) Create clarity about who does what in the process

It can be challenging for residents to keep track of the work package, aim and responsibilities of all the parties involved in an engagement trajectory that is initiated from outside of the community. Community facilitators and engagement professionals are advised to be clear about who is involved in the process and what their role and responsibilities are. International research projects such as Lightness involve anything in the range of five to 50 different organisations, each represented by a varying number of staff members (*Governance*). In such settings explanations as to which actor is in charge of what are simply overwhelming. Instead residents should be provided with an increasingly clear picture about who does what in the engagement process and, more importantly, whom they can rely on for placing questions, feedback and concerns. Clarity about all parties' roles in the process benefits from creating consistency. If possible, residents should be able to recognise certain faces and names through designating one person per organisation for resident engagement. This recommendations is related to the *Governance* of a local community.

9) Empower the willing and unable

People who are willing but unable to contribute to and benefit from the engagement process need to be empowered to do so. The first step towards providing measures that empower participants who lack certain capabilities is to get to know their situation and their interest in the engagement. Performing field research in the respective context can help with doing so (see recommendation one). A promising way for building capacities and developing a community is to engage residents with different competences in cross-learning activities. This can for example be helpful to endorse energy literacy or digital literacy among community members. Other capabilities such as financial resources, physical mobility or motivation for communal activities are much more challenging to build throughout an engagement trajectory. In such cases empowerment can be realised through letting people who are somehow impaired by a lack of a capability express what they would require to meaningfully engage. From the experience in Lightness, empowerment through capacity-building is necessary when (energy) poverty is a problem, when there are many elderly people involved (*Capabilities*) and when digital use case such as an energy trading platform is involved (*Activities*). This recommendations is related to the *Capabilities* and *Activities* of a local community.

10) Cultivate skills, confidence and reflexivity in engagement leadership

The degree of justice of an engagement trajectory strongly depends on the party that leads the engagement process. The expertise, motivation and competences of those in charge of engagement will always affect the way that a process contributes to justice. A just engagement procedure needs to build on key competences for facilitating a LEC. Engagement of various kinds of residents in complex subjects such as demand response management, smart grid technology and peer-to-peer energy exchange requires engagement leaders to have considerable knowledge and experience in process facilitation. This includes communicating effectively, empathising, managing

expectations, identifying stakeholders, planning and executing meetings, workshops and interviews. In addition technical, legal and organisational expertise is required to address residents' questions. A *just* engagement approach additionally requires engagement leaders to be open to adapt the process to the wants and needs of users and, to a certain extent, to of serviceto the community. This clashes with the traditional profit-maximising, market-based paradigm often underlying engagement processes that revolve around technological use cases orenergy service-based business models.

In order to cultivate these competences, it is vital to regularly exchange experiences with other engagement leaders who have a similar goal setting, i.e. facilitating a local energy community in a just manner. Collaborative sessions are recommended that provide a safe space to engagement leaders to share difficulties, insecurities and mistakes. Exchange can help engagement leaders to prevent and anticipate difficulties in their own process. Searching for solutions by reflecting on these issues with The Voicer model as a guiding framework should be a core part of these sessions. The desired outcome is an engagement leadership that is more aptly equipped to deal with the uncertainties, complications and requirements faced when facilitating the development of a LEC.

Discussion and conclusion

The aim of analysing the engagement trajectories in five countries from the perspective of justice was to extract recommendations for engaging citizens in Local Energy Communities (LECs) in a just manner. Ten recommendations were derived based on two years of field research and validated through a series of stakeholder engagements. In the first instance the lessons and recommendations presented in this paper are found to be valid for LECs that are initiated through an intervention from outside of the community, e.g. through a research project or a governmental body. This is seen as a much-needed addition to the vast body of literature on bottom-up energy initiatives.

Three limitations of this study stand out and point towards avenues for further research. While the focus of this paper on communities facilitated through external interventions is a novelty, it might pose restrictions to the applicability of the recommendations. It is unclear in how far this knowledge is valuable to shaping local energy initiatives that evolve in a bottom-up fashion thanks to the intrinsic motivation and effort of their members. Further research on the topic of community engagement is required to explore in how far these recommendations are applicable to communities already existent before external intervention measures.

The differentiation between seven characteristics of LECs can assist engagement practitioners to assess in how far the recommendations are applicable to the project they are involved with. This research has set the scope in a way that certain characteristics are excluded from the analysis because they are less relevant to the pilot communities of Lightness. Examples are the values community members hold, the business model a community makes use of and the initiative's legal status. Future research efforts should shed light on the role of aspects which have not been discussed in this paper and understand what those mean for engagement.

Thirdly, this paper argues that the outside facilitation of a LEC demands specific competences from the party in charge of engagement. While this notion in itself is a novel perspective on citizen engagement it needs further scrutinisation. Facilitatory and moderating skills for instance, which were mentioned above as a key set of competences, may be especially important when a community has suffered from disputes and conflicts in the past that flame up as a result of the engagement process. Technical competences may be particularly beneficial when deploying complex use cases or when the digital proficiency of the target group is high. By linking respective LECcharacteristics to the importance of specific competences of the engagement leader such claims could be verified. This knowledge would allow for cultivating the appropriate competences in engagement leadership in order to boost just engagement in the most effective way.

On a concluding note, the consideration of justice in citizen and business engagement does not take place for its own sake. It forms a starting point for further activities deployed in the community, ranging from the distribution of responsibilities and the capabilities present among members to the way in which costs and benefits are allocated. In that way just engagement is the cornerstone for LECs that operate in a manner coherent with justice principles. Our experience shows that the placement of this cornerstone requires attention to detail and, above all, an open ear towards the wants and needs of community members.

Data availability

Underlying data

DANS: "Workshop observations and interview reports of just engagement in Lightness project", https://doi.org/10.17026/SS/A4NU3S (Young, 2023).

This project contains the following underlying data:

- 22 07 12 Interview Alginet_ano.pdf
- 22 07 13 Interview Cagliari - Italy_ano.pdf
- 22 07 13 Interview Manzanares_ano.pdf
- 22 07 14 Interview Poland_ano.pdf
- 22 07 28 Interview France_ano.pdf
- 23 03 07Manzanares interview_ano.pdf
- ES_AL_INT1_Interview Active member of the community.pdf
- ES_AL_WS2_Monitoring Guide Workshop 03.05.2022 ALGINET.pdf

- ES_MA_INT1_Interview-Councilman.pdf
- ES_MA_INT2_Interview-teacher.pdf
- NL_WO_INT1_ 220510_interview transcript Schilderskwartier.pdf
- NL_WO_INT2_220524_interview transcript Schilderskwartier_ruw.pdf
- NL_WO_INT3_220510_interview transcript Schilderskwartier.pdf
- NL_WO_WS1_Verslag Workshop Woerden 24 februari '22_final.pdf

Extended data

This project contains the following extended data:

- IT_INT1_WP5 Engagement Exercise - 1st interview.pdf
- IT_INT2_WP5 Engagement Exercise - 2nd Interview.pdf
- NL_QB_INT1_Interview guide Quatrebras aug '22.pdf
- NL_SH1_230523 notules interview.pdf
- NL_SH2_Validation interview 17-05-2023.pdf

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

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Neil Simcock
Liverpool John Moores University, Liverpool, England, UK

This is an interesting and useful paper. It examines energy justice issues that arose during the (attempted) establishment of 7 local energy communities as part of the H2020 'Lightness' project. The paper reflects on the challenges and successes encountered during the establishment of these energy communities, and categorises these challenges based on a particular energy justice framework. From this, it makes recommendations for "justice" in the engagement process when developing LECs.

Overall, I think this is a useful paper and is not far from being able to be published. However, I do have some recommendations for improvements. These especially relate to the methods section of the paper, which still requires further work.

BACKGROUND AND CONCEPTUAL FRAMEWORK
The topic the paper addresses is pertinent and likely to be useful to a policy and practitioner audience. The theoretical framework used is interesting. However, there are challenges when rigidly "retrofitting" an existing theoretical framework onto novel empirical results, as you attempt to here. The categories of "Learning" and "Capabilities" are that distinct from one another - capabilities seems to refer to the capabilities of the local residents, and learning to the capabilities of the project members. Likewise, whilst the empirical material in these sections is interesting and relevant, it feels like it could have been included in sections on "Procedures" and "Responsibilities" (and even "recognition"), because ultimately they both relate to barriers to local stakeholders being included and being able to participate. So I guess my recommendation/question is: do you really need to use the Voicer model? Would it be possible (and more simple) to explain your results using only the other four dimensions?

As an aside, for me recognition does not relate to "whose voice in heard" - this is procedural justice. Recognition is rather about "who is respected".

One area that could be improved is in the description of what was actually done during the Lightness project. We are only told its aims in very broad terms at the beginning of the Methods,

and Table 2 gives a broad overview of the 7 case studies. Aside from this, when I read the paper I did not really understand what the project did and what happened in each of the case studies. E.g. what work was involved, what was the role of the project members, what actually happened in each case study in terms of what was being set up, what community residents did in each case etc.? Without these details, when I was reading the Results it was quite difficult to understand, contextualise and interpret them. Therefore, I recommend including, in the Methods section, (i) more detail on the work of the Lightness project, and what setting up the ECs involved (linking to a full project report if there is one available); (ii) more detail on the case studies, in terms of the types of projects that were being set up.

Could be clearer on what actually makes ECs distinctive. Even with different governance structures, are there common features? Are LECs with strong social fabric better? What binds the seven case studies together and makes them an EC?

METHODS
The qualitative methods used are appropriate, and the case studies have very good variety in terms of context and form. This is useful for seeing commonalities and differences across the cases, allowing overarching lessons to be drawn out. However, it is in the methods aspect that I have some concerns regarding this paper, and feel that more details are required on the approach adopted.

The paper is limited by a somewhat small dataset. Only 16 interviews were conducted across the 7 cases, with some case studies only having a single interviewee. This does limit the generalisability/transferability of the findings, and means that it is arguably difficult to make very in-depth assertions about particular cases. I recommend including some reflection on the sample size in the methods section, including a statement on why you believe the results to still be sufficiently rich and useful given the small number of interviewees. For example, I note some interviewees were "engagement leaders" - could it therefore be argued that they garnered a detailed understanding of the communities and cases during there work, and so could speak with some authority about their particular case study (thus reducing the need for multiple interviewees)?

Related to the above, I would also like to see more justification and explanation of the sampling for interviewees. For example, why are engagement leaders interviewed in some case studies, whereas in other cases it is local residents, innovation managers, academic researchers etc? You state that sampling was a combination of purposive and convenience sampling, but what was the criteria by which people were able to be included? For example, were you seeking maximum difference in terms of residents experience and perspectives?

Finally, given the seemingly quite extensive recruitment process that is described in "Participants" section, it is even more surprising that only 16 interviewees were recruited. Could you explain this?

It is mentioned that 14 workshops took place, but only two were used as data in this paper. Why is this? Surely the paper would be stronger if all workshops were included in the data that is analysed. Doing this would also go a long way to offset the limitations created by the small interview dataset.

It's mentioned that "field research" took place, involving door-to-door visits, street interviews,

information conversations etc. Essentially, this sounds like a type of ethnographic data collection, which is great. However, you state that this didn't yield "concrete data". I wasn't quite sure what's meant by this, especially as there seems to be a couple of times in the results section when field visits are referred to. My recommendation would be to make more of the field visits, and to promote these as a valid and important data collection method rather than trying to downplay them. If you did this, alongside incorporating data from the 12 other workshops that are mentioned but not included in the paper, the limitations arising from the small interview sample could be overcome.

RESULTS
The results are necessarily brief and give only an overview of the key points, with selected examples from the case studies. Given the number of case studies and the need to remain within the word limit this is done quite well.

Before going into the "Ten recommendations for just engagement" section, it would be useful to have a summary of the key results. This could be a short paragraph explaining the key issues, alongside a Table. This would make the key findings arising from the research much clearer.

RECOMMENDATIONS
These are good! Could you state which of the justice dimensions (recognition, procedure, distribution etc.) these recommendations relate to?

Some of the recommendations are quite general and apply to all case studies or any energy community project - for example "learn the local language". But some are very specific and only relevant to specific types of energy communities - for example, "engage work floor staff, managers and directors of a business". In my opinion, it would be better to include only the general types of principles, rather than the very specific ones. Perhaps the specific ones could be reworded to extract the broader lessons.

Is the work clearly and accurately presented and does it engage with the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

Are all the source data and materials underlying the results available?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Energy justice, fuel poverty, community energy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 09 November 2023

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Ana Stojilovska
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Thank you for the opportunity to review the manuscript.

It applies the energy justice-inspired conceptual model Voicer to the results of local energy communities studied through the Lightness project in regard to external actors initiating energy communities.

It is a very novel and topical issue, well studied and written.

I have the following suggestions:

In the introduction, the use of the key terms ‘actors outside of the community’ and their ‘contribution to forming an energy community’ sound a bit unclear. I would suggest using external or non-community actors, and instead of contributing to forming – motivating, raising awareness, or initiating the idea of citizens in the community to form an energy community.

While the assumption that external initiation of energy communities is a challenge is justified, there is a need to explain more why this specific aim of exploring external initiation of energy communities. Is it because they are not developing fast enough on their own, or do we need to speed up the energy transition? And also, why should an external actor start such an initiation?

There is a need for more justification of why injustices are explored in this context of how external (non-community) actors initiate an energy community.
The conceptual part starts with a review of energy justice and then the developed concept of Voicer. It would make more sense to merge both sections and elaborate on the development of Voicer. How the traditional 3 justice tenet contributed to Voicer, and how the other parts developed.

The energy justice literature mentions only a few key articles, but this literature is now much more developed, and the literature review can be enriched, for instance, please consider:
https://doi.org/10.1080/13549839.2023.2238747
https://doi.org/10.1016/j.erss.2017.05.012
https://doi.org/10.1016/j.erss.2020.101718
https://doi.org/10.1016/j.erss.2022.102654
https://doi.org/10.1080/1523908X.2021.1940895
https://doi.org/10.1080/13549839.2022.2077713
http://dx.doi.org/10.1016/j.apenergy.2015.01.002

In Table 1 there is a big difference between the representation of community members in each of the cases with Italy being very poorly represented. Please provide elaboration.

When describing the methods, the topic of the interviews was not elaborated. Were the interviews and other methods done to inform, engage, and persuade community members to form an energy community?

One of the methods – field research seems to partly overlap with interviews, but its goal was to disseminate knowledge, and not collect data. If so, it's not necessary to be mentioned in the manuscript.

In the methodology, the representation and role of the different case studies should be mentioned – are they just an illustration of the project, or do you aim to compare them?

The findings section should start with a table with the codes per Voicer categories to facilitate the readability of the findings.

Some of the sub-codes are not clearly and obviously linked to the Voicer codes. Each sub-code should start with how it's linked to the Voicer code and then provide the evidence and explanation.

In some instances, there were some examples that might fit two codes – such as competences and literacy. And some examples didn't well fit the overall code – the mention of the lack of trust as part of recognition. In this regard, I wonder whether it makes sense to make overlap codes and new codes which would also expand the initial Voicer framework.

In the table to present the code – sub-code matching the illustration of cases per case study can be mentioned. It can better support the recommendations and the validity of the findings for future replicability studies.

It is not clear who the recommendations are targeting. I read it as they target potential external actors who would want to motivate community members to create an energy community. Having a clear target group is relevant for the replicability of the approach and findings.

Some of the recommendations can benefit from better formulation. For instance, doing field research would better sound as learning/understanding the local context and gaining the trust of the local community. Learn the local language – just by reading the subtitle one might think learn the actual language and not use simple non-technical language as intended.

It seems that some recommendations fit only a certain case study – such as the example of the business park. This should be clearly marked that this refers to this specific context of involving businesses.

The discussion can be supported by some literature on energy communities and energy justice, such as those mentioned above and these, for instance:
https://journals.sagepub.com/doi/abs/10.1177/0306312718770286
https://doi.org/10.1016/j.erss.2023.102959
https://doi.org/10.1016/j.apenergy.2018.05.079
https://doi.org/10.1016/j.enpol.2016.03.019
https://doi.org/10.1016/j.erss.2023.103163

I wish the authors good luck in revising the manuscript!

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Is the work clearly and accurately presented and does it engage with the current literature?
Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

Are all the source data and materials underlying the results available?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Energy poverty, energy justice, just transition

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.