



Review

COPs and ‘robbers?’ Better understanding community energy and toward a Communities of Place then Interest approach

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ABSTRACT

Following its growing popularity in practice, social scientists have turned their attention to a greater understanding of community energy (CE). Beginning with Walker and Devine-Wright's 2008 framework, researchers have consistently been critical about the use of the term – especially when doing so to further powerful, non-local interests. Unpacking what the ‘community’ in CE means has been of particular interest and a few recent studies have shown that different sets of outcomes largely depend on what definition is used. At the same time, many in this literature have pointed to the value of geographic concepts – for example, characterizing communities as either Communities of Place (COPs) or Communities of Interest (COIs). Yet these two characterizations have largely remained in the background, rather than the focus, of CE studies. Here, we attempt to add conceptual clarity to the term CE by tracing the benefits of COP, COI, and hybrid-based (i.e. a combination) projects. We do so through a qualitative content analysis of 133 research articles from more than 30 countries published from 2010 to 2020. The benefits of COP-based CE (i.e. greater social acceptance, creating ‘energy citizens’) are mostly associated with popular descriptions of CE, while the benefits of COI-based CE were cited as those that address the perceived shortcomings of COP-based CE. Finally, it might be the hybrid approach that can effectively marry both COPs and COIs. More specifically, we find that the order of this ‘marriage’ matters and recommend that approaches centered around Communities of Place, then Interest (COPTI) should be prioritized. The paper closes with a discussion of some possible next steps, in terms of social scientific research and the practice of CE.

1. Introduction

All around the world, energy systems are changing quickly. New ways of generating electricity, heating our homes, and moving around are being driven by the interwoven agendas of climate change mitigation, energy security, and the need for a just low-carbon energy transition. To address these issues, electricity in particular is now being produced, managed and used in increasingly decentralized contexts whereby renewable energy technologies like wind turbines and solar panels, are shifting physical and political ‘power’ from international, national, and sub-national scales to the local scale [1–3].

In these moves away from centralized, and often private, control of energy assets, scholars are now writing about how collective ownership of renewable energy projects has the potential to ‘democratize’ energy and help with a just transition [4–6]. It is here where the importance of

local-level actors, like cities and municipal governments, but also citizens themselves, is *potentially* elevated in what can be labeled as decentralized community energy transitions [7,8]. Indeed, both the terms decentralized and especially community energy (CE) are associated with the promise of democratizing energy and giving ‘power to the people’ through a more equitable low-carbon future [1,9,10]. Yet at its extreme, renewable projects with the CE label may simply take place in, or provide energy for, a particular area [11,12], but not actually involve or benefit local individuals or groups in any substantial way [13,14]. This is made even more likely because even as CE gains traction in policy and development practices, the term community remains “unclear and inconsistent” [1; p.1]. This is problematic as it is in this flexibility of the term where CE may be used by national governments and large corporations to suit their own objectives and not those of ‘real’ communities [15]. This only accelerates a real risk that projects branded with the

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well-regarded CE label do not actually deviate much from externally-driven, and top-down ‘business-as-usual’ approaches¹ [17–19]. In such cases, groups are seen to be using the term as a political tool by taking advantage of the positive associations that many people have of CE.

In drawing the boundaries of what is (and what is not) the community in CE, groups showcase their power in determining who is in and who is left out. Indeed, through her work on the politics of community in community development, Shaw [20] has argued that the term has morphed into a way to “distinguish the deserving from the undeserving” [p. 34]. Thus understanding the impacts of the ways in which CE is developed, and how projects might re-order socio-cultural and physical space [11] is critical because we know that CE projects can create new sets of winners and losers.²

The concept of justice – who gets what and why – is important to help us understand CE under models³ centered on ownership by communities of place (COPs), communities of interest (COIs), or a hybrid of the two (i.e. shared ownership⁴). Across all kinds of CE projects, we must carefully consider existing power dynamics and inequalities that may exacerbate existing injustices or introduce new ones [24–27]. Our particular focus on *local* energy justice emphasizes the importance of local-level procedural and distributive justice elements (i.e. benefits and risks) through the planning, development, and operation of CE. While we recognize that addressing climate change including through renewable CE projects has multi-scalar, downstream impacts around the world, those facing the most tangible, visible, immediate and/or perceived risks (i.e. noise, viewscape change, property values, health/well-being) are those that are living closest to wind turbines and solar farms,⁵ for example. Indeed, when comparing COPs and COIs within the context of wind energy, the latter are said to be much less likely to experience negative impacts [29,30]. At the heart of environmental and energy justice [31], these kinds of risks in COPs need to be considered in relation to any kind of local decision-making power and benefits citizens might experience [32,33]. Inspired by recent work set within the context of both Free, Prior and Informed Consent [FPIC; 34,35] and locally unwanted land uses, this study is embedded within Nelson et al.’s [36; p.2] question: “is it possible that local citizen [i.e. COPs] comments possess more input legitimacy than comments from citizens in distant locales [i.e. COIs]?”

It is within this context that we recognize the problem of a continued lack of clarity around the term CE. As a team of authors working in the energy justice space, we address this problem by seeking to understand whether or not there are real differences in the potential benefits⁶ of COP, COIs, and hybrid models. To do so, we present a study that employed qualitative content analysis across more than 130 research articles published from 2010 to 2020. In doing so, we provide a scope of the key potential differences of CE projects that are based within COPs, COIs, and hybrid communities. While both concepts are well-studied [29,37] and CE researchers have consistently argued that the varied outcomes of CE is because individual projects are so context-dependent,

no research can be found that systematically compares what can and does result from COP-based or from COI-based developments. This is consistent with the fact that many of those writing about the idea of CE often ignore important contextual, material, and especially spatial elements⁷ [38–41]. Such thinking tends to ignore the importance of where decision-making ability and benefits lie regarding specific projects. By focusing on understanding the potential benefits of COP and COI-based approaches, we address this lingering weakness in the CE literature while at the same time exploring cases where COPs and COIs may be combined via ‘hybrid’ approaches.

In the sections that follow we briefly outline the literature on CE, including the various ways the term is understood and employed. Here we also outline our study’s framing, as well as its major objectives, and three research questions. Next, we provide details regarding our dataset and analytic considerations. We then present our key findings, implications, and recommendations for future policy and research.

1.1. The meaning of community energy

Spurred by recent scholarly contributions, there is a strong and fast-growing literature devoted to understanding the meaning of community energy, in both theory and practice [1,30,38]. In their seminal and influential piece, Walker and Devine-Wright [43] asked what community renewable energy (CRE) should mean [see also 44]. While acknowledging a diversity of meanings and interpretations, they state that an ‘ideal’ CRE project would be one that is “entirely driven and carried through by a group of local people and which brings collective benefits to the local community (however that might be defined)” [p. 498].⁸ Walker and Devine-Wright [43] based the meaning of the ‘right kind’ of CE within a matrix of process and outcome. In more recent literature, researchers position their arguments within this matrix and, in particular, focus on the conditions of locally-driven processes. For example, Bauwens [45] characterizes CE as “[what happens when] citizens come together to tackle diverse aspects of low carbon energy transitions” [p. 841].

Yet while recognizing the importance of Walker and Devine-Wright’s typology [43], there are many other ways to define CE. As shown through a recent systematic review of 183 definitions from Bauwens et al. [1], there are at least eight ways to investigate the meaning of community in CE: through processes, outcomes, identities, actors, scales, technologies, places, and networks.⁹ Adding further nuance, there are also a range of unique terms that have been developed that are either tangential to, or embedded within, the concept of CE. They include: Renewable Energy Communities [46], renewable energy cooperatives [47], local low carbon energy initiatives [48], grassroots [energy] initiatives [7], community [owned] renewable energy projects [49,50], citizen energy communities [51], community energy enterprises [52], sustainable energy communities [53], local energy generation projects [54], and community renewable energy enterprises [55]. More broadly throughout the CE literature, most authors admit there is a “plurality, and thus ambiguity” of discourses surrounding the term [30; p.2]. Indeed, if there is one thing these sets of papers agree upon, it is that the definition of CE is incredibly diverse, context-dependent, and difficult to place. While some of this is caused by how much community

¹ Purcell [16] writes that CE (or local energy) projects may fall into the ‘local trap’ where a range of positive expectations are made but not met based on a project’s local scale.

² Rydin and Turcu [21] found that in the UK, the large majority of CE projects are being developed within already skilled and middle-class communities.

³ While the focus here is on COPs and COIs, others have written about the typologies of CE models including Walker [22], who write that there are four: cooperatives, charities, development trusts, and shared ownership projects.

⁴ Shared ownership is defined by Goedkoop and Devine-Wright [23] as being between “company and community actors”.

⁵ These areas have been come to be known as ‘green energy sacrifice zones’ [28].

⁶ We situate COP and COI-based CE benefits as being *potential* in nature because we take a constructivist view [42] toward project descriptions and their impacts. That is, any reading of CE benefits needs to be understood as being potentially constructed by project proponents, study participants, and/or the academics who are writing the papers that make up our dataset.

⁷ Creamer and colleagues [38] have noted that while the term CE is dynamic and can involve an entangled collection of actors working across scales, it is “often presented as singular, bounded, and localized” [p.1].

⁸ Hicks and Ison [17] have similarly identified five key attributes that can help us to identify ‘genuine’ CE projects: locally scaled, high levels of community engagement, strong decision-making ability, local actor involvement, and communal distribution of benefits.

⁹ Given that their network dimension relates closely to the concept of COIs, this present study is focused on the latter two, but when relevant, we do note connections to others.

involvement qualifies as ‘enough’ [56,57], the larger issue is related to the multiple meanings and interpretations of the word community [58,59]. Therefore, before we can begin to grasp what CE might be, we must recognize the complexity of the term community itself.

Academic theorists have long been interested in debates surrounding what exactly makes up or should define communities. As outlined by Dalby and Mackenzie [60], the term community had long been associated with physical spaces that you could point to on a map or what they call “geographically specifiable entities” [p. 100]. However, advances in knowledge have increasingly pointed to the idea that communities are much more complex and that each can be differentiated by things that are more difficult to see, including elements connected with particular political and socio-economic context. More recently, Bradshaw’s [61] theory of post-place communities has taken hold. Building on the work above, Bradshaw argues that “[physical] places are not necessarily communities” and provides examples of suburbs, gated developments, and “bedroom communities” [p. 5] that lack social cohesion. Such interpretations of community reject the idea that people living inside certain geographic boundaries automatically belong to a community. It is here where we see a clear distinction between the two key concepts that this study is centered around; communities of place and communities of interest.

Communities of Place, or COPs, are said to be “defined by their geographic location” [62; p. 181]. In line with Walker and Devine-Wright’s [43] ideal form of CE, these kinds of projects are said to be run by locals and bring collective benefits into the local community [63]. They are sometimes closely associated with positive social relations [45], but more commonly are “definable with reference to existing jurisdictions...or linear distance [from a particular landmark]” [30; p. 6]. COPs are often imagined as taking place at the small-scale (i.e. village level) [64,65]; however, they can also take place across a range of remote, rural, and urban contexts. Perhaps because they are often seen as the ideal form of CE, CE projects are usually focused on COPs, starting in a particular place and in some cases working outwards [15,30].

Communities of Interest, or COIs, are said to be made up of people who form a group based on a common interest or bond, but do not live close to one another or a CE project [15,22,63]. Baxter et al. [30] have written that COIs are “spatially amorphous” [p. 6] and form because people with common goals, like to invest in solar or wind energy, decide to form a coalition. A prime example of a COI is a cooperative where people who live in a broadly defined and often large region [i.e. the United Kingdom; see 3; or Oregon, USA; see 30] come together to invest in a RE project. In such instances, and as those living outside of host communities acquire majority ownership, it may be that COIs are seen as playing the role of ‘robbers’ [22,25]. By this we mean that COIs are potentially robbing or stealing decision-making ability and extracting most of the benefits that come from this form of CE. Of course, this kind of opportunity is entirely context-dependent and especially likely to emerge under institutional structures that prioritize non-local COIs [39].

Despite their usefulness, COPs and COIs are not the only terms used to characterize communities within the context of renewable energy development. Others have written about communities of practice [66], communities of learning [62,67], communities of intention [68], communities of affectedness [68] and communities of relevance [69,70]. More closely connected to COPs are communities of identities [71] and especially communities of locality or location [12,22,72]. Though less rarely seen or employed, there can be multiple sets of communities operating within the same CE project [45], including COPs and COIs.

1.2. Study framing and research questions

No matter what definition of community in CE is ultimately used in academia or practice, it is important to understand that the term is constructed and political – often deployed to advance a particular set of interests [70]. Two such interests that have received plenty of attention in the academic literature are government and industry. Both groups use

the term community rhetorically as to increase public acceptance of developments that are otherwise driven by top-down, technocratic practices¹⁰ [58]. As a result, we frame our study using the critical lens of local energy justice [24] – which shares some similarities with landscape justice [74]. The concept of energy justice has recently been applied in studies of whole energy systems [75,76], wind energy [18,19], and community/renewable energy [25,26].

This paper was written in part because there is a lack of research that systematically analyzes the benefits – potential or otherwise – of COP and COI-based approaches to CE. This is often exacerbated by the tendency for many authors failing to address what the community actually is [30,59,77] – including distinguishing between COPs and COIs [29].¹¹ Relatedly, there are also the ever-present critiques from geographers that studies of energy transitions either ignore or neglect the importance of space and place [3,78–80]. This may be because CE projects are consistently assumed to be set within COPs. Especially when compared to research on the initial conditions and implementation of CE projects, there is relatively little on development outcomes and especially social impacts, and benefits [48,81–85]. This may be because authors are “generally positive and uncritical about the real and expected outcomes” under community energy development [86; p. 2]. Additionally, it is seen that there is no one set of benefits that are expected from CE – they are as diverse as the set of motivations, practices of community engagement, and project design that exist in the projects themselves [15,84]. Finally, general calls also include MacArthur’s [87] desire for more macro-level political analysis of the community energy sector.

Based on this understanding of the CE literature, including the gaps in our understanding noted above, we developed three simple and exploratory research questions focused on the potential benefits of COP and COI-based approaches:

1. What are the potential benefits of COP-based approaches to CE?
2. What are the potential benefits of COI-based approaches to CE?
3. What are the potential benefits of hybrid approaches that combine COPs and COIs?

While we considered different sets of research questions focused on the risks and elements of justice, we believe that answers to these three questions around benefits help us to best paint a fundamental and timely picture of what CE looks like under diverse development strategies centered around COPs and/or COIs. That is, with reference to the multiple research gaps identified above, we believe investigating the potential benefits and subsequent tradeoffs of varying approaches provides an important starting-point for different sets of people (i.e. governments, academics, and community energy groups) interested in a greater understanding of CE and its impacts.

2. Methods

To advance our general understanding of CE, and of COPs and COIs in particular, this study employed both grounded theory methodology [88] and qualitative content analysis [QCA, i.e. as a method¹²] to answer the above research questions. Grounded theory methodology was employed because of our overarching desire to generate theory from

¹⁰ Similarly, Tozer [73] has written that the concept of community energy has been co-opted by such groups.

¹¹ Through our scan of the CE literature, we could only find one multiple case-study paper [30] that consistently distinguishes each case by whether or not it was a COP, COI, or some combination.

¹² In this study, we are able to successfully combined grounded theory with QCA as we treat the former as a methodology and the latter as a method [89]. While distinct in several important ways, QCA and grounded theory approaches share similarities, namely that they are a form of naturalistic inquiry, involve identifying themes, and require rigorous coding [90].

data, rather than the other way around [91]. Especially in the absence of research devoted to a full understanding of the differences between COPs and COIs, and the potential need to develop new theory, we decided that an inductive, open methodology was the best way to approach our dataset. As Wolfswinkel et al. [92] write, grounded theory allows for an analysis that “[extracts] the full theoretical value out of a well-chosen set of published studies” [p. 46]. While guided by three research questions, grounded theory methodology also allowed us to explore findings that may lay outside of these questions but are important for our full understanding of CE, COPs, and COIs, which may be written in future publications from our research team. In terms of a specific method, we employ QCA. QCA was chosen as the primary method because we were interested in the classification of qualitative text (i.e. journal articles) into themes and patterns [93]. Especially compared to its quantitative counterpart, QCA is said to be particularly helpful in considering and exposing the tone and context of textual datasets [94].

Our dataset was made up of a total of 133 papers. Of these, 34 were found through a combination of author familiarity ($n = 6$) and targeted Boolean searches ($n = 28$)¹³ focused on terms like “communities of place”, “communities of interest”, and “energy”, performed within Google Scholar in October 2021. Within each set of search terms, publications were sorted by relevance and we full-text reviewed the first 200, in each set of search terms, for inclusion if they had coverage of COP and/or COI-based CE projects. The 28 papers that resulted from this process helped us to widen the theoretical and geographic scope in comparison to the 6 we were already familiar with. In order to even better understand what benefits may be resulting from recent COP and COI-based projects, our sample also includes a selection of 99 journal articles that were published between 2011 and 2020, and used within a recent companion paper [95] focused on government instruments in CE. While there was some overlap between these two datasets, the purpose of the first set ($n = 34$) was to gain a comprehensive overview of the literature specifically devoted to discussions of COPs, COIs, and energy. The purpose of the second set ($n = 99$) was to understand why recent energy projects are based on COPs and/or COIs, and more importantly, what impacts result from these varying approaches. The overall geographic coverage of these papers was vast (see Table 1), covering research set in more than 30 countries across Europe, North America, South America, Asia, Africa, and Oceania. Most were set in the global north, with the highest number in the UK ($n = 30$), Europe (i.e. multi-country EU studies; $n = 23$), across the world (i.e. global review studies; $n = 13$), Canada ($n = 12$), or Germany ($n = 10$).

Especially within the set of 99 journal articles, authors rarely used the direct terminology of COPs and COIs. Therefore full-text reviews were necessary to confidently determine whether CE projects covered in each paper were centered around COPs, COIs, or a combination of the two. This often required reading full project descriptions and including papers when we believed they covered our literature-informed conception of COP and/or COI-based CE. While the lead author led this exercise, others also reviewed papers where the types of approaches were unclear. Subsequent discussions led to agreement regarding the kinds of communities being represented. COPs were generally associated with local citizens, citizen groups, or local governments. We characterized COIs as any non-local entity or group of people (i.e. national governments, spatially disperse cooperatives, non-local private companies). In cases where there was some uncertainty, such papers

¹³ An example of a Boolean search employed is: “community of interest” or “communities of interest” and “community of place” or “communities of place” and “renewable energy” or “clean energy” or “green energy” or “community energy”.

Table 1

Study dataset.

Country/Region	Number of publications reviewed
United Kingdom	30
Europe (multi-country studies)	23
Global (multi-country across three or more continents)	14
Canada	12
Germany	10
United States	6
Netherlands	4
Australia	3
Belgium	3
Denmark	3
France	3
India	2
Italy	2
North American and Europe (multi-country)	1
Europe and South America (multi-country)	1
North America (multi-country)	1
Europe and Asia (multi-country)	1
Other (one each from: Croatia, Indonesia, Hungary, Japan, New Zealand, Poland, Romania, South Africa, South Korea, Spain, Sweden, Switzerland, Greece, Taiwan)	14
TOTAL	133

were excluded. Our analysis involved full-text, line-by-line coding¹⁴ [96] of each paper, identifying themes relevant to both the research questions about the benefits of CE and broader understandings of CE – including the barriers toward each form of CE and implications toward Indigenous energy sovereignty. Altogether, this analysis resulted in more than 80 themes (see Appendix A), with three of the most dominant among the entire dataset presented here.

3. Results

Findings from our QCA are presented below, organized based on the three research questions: potential benefits of COP-based approaches, COI-based approaches, and hybrid approaches to CE. For each, results are summarized in tables that order themes by prevalence, which are expanded upon in the text. These results represent either findings from a paper itself and/or a conclusion taken from a review of the literature therein. We were careful to identify only themes relating to COPs and/or COIs rather than CE generally.

3.1. Potential benefits of COP-based approaches to CE

Authors' discussions of the potential benefits of COP-based approaches to CE was one the most common themes identified in our analysis (Table 2). The set of benefits most cited surrounded how COP-based CE can help to educate local populations about the ‘right’ kind of energy/environmental citizenship. For example, Seyfang et al. [56] write that COP-based CE can be “suitable vehicles for raising awareness of sustainable energy issues” [p. 978]. Also prevalent were a suite of socio-economic benefits – local income, jobs, community facilities, and capacity development. Bere et al. [81] highlight the importance of COP-based development and ownership to ensure that financial benefits “[do not] leak from the locality” [p. 359]. Bomberg and McEwen's [97] research also stresses the importance of localized benefits when they describe how COP-based projects can make communities a better place to live “rather than increasing somebody's balance sheet at the other side of the world” [p. 440]. Other benefits with at least nine references in our dataset include how COP-based projects can: (i) increase support, trust,

¹⁴ We used line-by-line coding as it is said to keep researchers closer to the data and forces the construction of codes that truly reflect experiences shared directly through text [96].

Table 2
Potential benefits of COP-approaches to CE.

Potential benefits	Citations ^a
Helps to educate and promote environmental/ energy citizenship and behaviour (n = 16)	[8,10,21,23,32,49,50,54,56,81,84,97,100–103]
New sources of local income, jobs, facilities, and skill/capacity development (n = 14)	[10,21,32,49,54,59,81,83,97,101,104,105,107]
Higher levels of local support, trust, pride, and/or legitimacy (n = 13)	[7,8,10,23,49,56,59,101,104,106,108–110]
Bringing people together, repairing old divisions, and increasing social capital (n = 9)	[21,23,49,81,86,100,101,111,112]
Allows communities choice, the essence of democracy (n = 8)	[4,59,105,107,109,113–115]
Increased local participation (n = 8)	[4,10,12,49,56,101,109,116]
Embedding energy in daily lives; sense of connection; alignment with local values (n = 8)	[12,48,54,56,86,117–119]
Just benefits for affected communities (n = 7)	[10,81,84,101,108,120,121]
Increases quality of life and sustainable growth especially in rural/poor/isolated communities (n = 6)	[49,54,97,101,106,107]
Encouraging social innovation and challenging the status quo (n = 5)	[7,49,97,109,117]
Empowering local citizens (n = 5)	[54,83,86,101,117]
Signals higher levels of political legitimacy (i.e. to national policy) (n = 4)	[8,21,49,84]
Greater energy autonomy/ sovereignty/ independence (n = 3)	[59,83,112]
Resists forces of peripheralization, outmigration in poor and isolated communities (n = 2)	[49,81]
Greater ability to foster energy justice (i.e. balance of risk and benefit) (n = 2)	[25,115]
May have flexibility to pursue less profitable, early-stage RE technologies (n = 2)	[84,106]
May face lower planning risks and development costs (i.e. by financing locally) (n = 2)	[10,101]
Can counteract forces of populism (n = 1)	[109]
More ethical form of development (i.e. when led by local actors, as compared with top-down approaches) (n = 1)	[10]
Enabling easier access to local natural resources (n = 1)	[33]
Projects can be easier to legitimize because a common identity of heritage (n = 1)	[37]
Native Tribal energy planning (US) can combat isolationism (n = 1)	[98]
Indigenous [economic] independence (n = 1)	[99]

^a For corresponding author details, see [Appendix B](#).

pride, and local legitimacy; (ii) allow communities a choice in deciding their energy future and; (iii) bring people together and build social capital. Less commonly cited benefits include how COP-based CE development can empower local citizens, foster greater energy justice, and even be a more ethical practice in comparison to COI-based approaches.

Although not included in [Table 2](#), some COP-based projects had what may be seen as indirect benefits, what we define as benefits which become present following a direct benefit. One of the clearer examples of this is carbon emission reductions from a more energy literate group of local citizens. Another example is the reduction of [fuel] poverty levels as a result of new sources of local income and/or lower costs of locally-generated and owned energy. There were also two clear mentions of benefits specific to Indigenous communities; how COP-based development can combat isolationism [98] and promote economic independence [99].

3.2. Potential benefits of COI-based approaches to CE

Compared with the number of papers that were set within the context of COPs, there were far fewer which examined COI-based CE ([Table 3](#)). Thus we were able to find much less written on the benefits of COIs. Still, there were several important themes that emerged multiple times in our review – some of which contrast with the benefits of COPs.

Table 3

Potential benefits of COI-based approaches to CE.

Potential benefits	Citations ^a
National or 'beyond-the-local' approaches to help overcome barriers associated with a lack of local capacity or interest (n = 6)	[11,23,48,49,104,122]
Can expand geographic reach of investment/participation which makes it easier to scale-up (n = 4)	[12,23,33,107]
Can increase interest and engagement with energy issues among a larger group of people (n = 2)	[32,123]
More inclusive, since participation is not tied to a particular location or resources therein (n = 2)	[26,51]
More aligned with dominant [renewable] energy and development paradigms (n = 2)	[23,117]
Can (and will) play more major roles in wider system transformation and thus climate change mitigation (n = 1)	[124]
Helping to avoid local volunteer burnout through greater financing and capacity (n = 1)	[83]
When local interest is not there, national approaches can lead to higher levels of local acceptance (n = 1)	[104]
Involvement is driven by a wider range of motivations (n = 1)	[12]
On funding/investment, locals may not be concerned with it coming from outside of COPs (n = 1)	[10]
New developments (i.e. virtual power plants) may be best established over large areas (n = 1)	[51]

^a For corresponding author details, see [Appendix C](#).

Most prevalent of these was this idea that COI-based approaches to CE could help overcome problems related to a lack of local (i.e. COP) capacity or interest. This includes research from Armstrong [11] who cites the financial, political and legal complexity behind renewable energy development as a key reason why smaller COP-led projects can fail to succeed. Relatedly, it was claimed there may be benefits to investment or participation opportunities outside of COPs. Savaresi [33] explicitly criticizes COP-based approaches, writing that there might be “considerable financial opportunities to be seized by expanding the boundaries of project ownership beyond the local level.” [p.498]. Related to this is the idea that projects that focus on COIs are more inclusive, as they seek participation from all those with interest, not just who live close by to particular developments. Magnusson and Palm [123] state that particularly with the assistance of the internet, non-local shareholders can follow and engage with a community wind energy project in the same way – and can be “just as satisfying” [p.16] – as those living in COPs.

The idea that COI-driven projects may be more aligned with status-quo development models and thus are able to scale-up and address climate change much faster was addressed across a few different themes. Nolden [117] acknowledges the many benefits of COP-led projects, but states that they lead to smaller projects that are “unlikely to even scratch the dominant energy policy/infrastructure paradigm” [p. 550]. Other benefits include COIs as a way to avoid COP-based volunteer burnout, that COIs can be formed out of a larger range of participant motivations,

and that new technologies (i.e. those associated with virtual power plants) in fact require more and more non-local engagement with energy systems.

3.3. Potential benefits of hybrid approaches to CE that combine COPs and COIs

To our surprise, relatively few authors seemed to give much explicit thought to the potential benefits that might be seen when combining COP and COI-based approaches to CE. A notable exception was found in a study from Baigorrotegui and Lowitzsch [37], whose exploration of the ways that renewable energy can be co-owned revealed some key insights. This includes that motivations of development can transcend the local (i.e. COP). However, even though the authors produced a Venn diagram showing the intersection of COPs and COIs [“as local identity and common interest...overlap”; p.665], there is relatively little in-depth discussion of the benefits of what may be conceptualized as a hybrid approach.

If we look to papers that do discuss the benefits (Table 4), the most commonly referenced relate to how hybrid approaches can bring together the advantages of COP-based and COI-based approaches. This is perhaps best summarized by Roby and Dibb [107] in the final line of their paper: “Hybrid schemes could offer the best of both worlds, delivering scalability, whilst giving power and control to the communities” [p.9]. Others in this space note that hybrid partnerships can allow CE projects to become more mainstream (i.e. because of better funding and resources provided through COI involvement), while addressing problems like a lack of social acceptance typically avoided under COP-based approaches. Another paper that touches on the combination of COPs and COIs is from Vancea et al. [125] in their study of CE projects across the European Union. Their review of the literature aligns with ours in that the majority of the CE literature is focused on COPs. However they also suggest that this is increasingly being questioned and that new understandings of community are less centered around location or place and more on “interaction, shared goals interests and fears, or a feeling of a sustained connective bond, cooperation, and support” [p.3]. Most notable from this paper though is the authors' identification that two of the three CE projects that began in COPs expanded beyond the local level and into COIs. They write that this shows CE is “no longer tied down by geographical boundaries...[and] scale and scope play an important role in the upscaling of their social ventures” (p. 9). In the end, it seems Vancea et al. [125] suggest that all these projects were able to successfully retain their democratic and participatory ownership structures while adding the benefits of COI investment in part because

Table 4
Potential benefits of hybrid approaches to CE that combine COPs and COIs.

Potential benefits	Citations ^a
Able to mainstream community energy projects while helping with industry concerns like local opposition (n = 8)	[4,84,102,107,112,114,118,126]
Hybrid approaches that prioritize local funding/participation are the most socially acceptable [compared to COP or COI-based CE] (n = 2)	[104,114]
The best roll-out of technical solutions require both community leadership/involvement and outside expertise (n = 2)	[124,127]
Local energy interests are best shared when forming networks at higher (e.g. national) levels (n = 2)	[102,108]
Ability to access partnership-specific funding (n = 2)	[98,102]
Results in both cost reductions and increased community engagement (n = 1)	[101]
Greater variety of expertise (i.e. local and non-local) can provide the best feedback when new innovations are tried out (n = 1)	[128]

^a For corresponding author details, see Appendix D.

all projects began in COPs and decision-making ability was retained therein. Other references to the benefits from hybrid approaches to CE include that the best CE projects contain input and expertise from local and non-local scales, and the ability for hybrid projects to access partnership-specific funding pools.¹⁵

While not explored to any significant degree, there was also some mention of the downside or potential risks of creating hybrid partnerships. This includes that combining actors associated with COPs and COIs “inevitably brings paradoxes” [4; p.226; see also 103] which can create new barriers to CE development. Relatedly, combining such groups can introduce new complexity through blurred and unclear boundaries [129]. Several papers noted that for these partnerships to work and in some cases for communities to overcome a lack of trust in government or private companies, intermediaries are needed [27,32,48,114,130,131]. It is also important to note that not all hybrid models are created equally. In places where shared ownership has been required under certain policy programs (e.g. UK, Denmark, and Germany), it is possible that projects could increase levels of injustice because initiating developers partner with people and community [energy] groups who are already well-off [23].

4. Discussion

4.1. Summary

As a team of authors, our goal in this paper was to provide clarity around the often-used, but rarely dissected, term community energy. Despite the influx of social scientific research with CE at its core, there is still a general ambiguity around its meaning and in particular what these types of developments entail for the ‘communities’ embedded therein [see exceptions including 1]. This is strange given how often researchers either state the outcomes of CE are context-dependent [38,64], or directly acknowledge that a full understanding of the term is lacking [1]. Our critical examination of the potential benefits of CE is made more important given that the term is often used as a political tool to further the interests of national governments and large corporations [70]. While such groups simultaneously claim that their version of CE will bring change and help participating communities, they can continue with business-as-usual approaches and entrench their dominant interests. This trend meant that it was necessary for us to situate the entire paper within a local energy justice perspective [24], one that stresses the importance of procedural and distributive justice elements throughout CE planning, development, and operation.

We decided to frame our study of CE around two of the most common ways that academics conceptualize the community in CE; communities of place (COPs) and communities of interest (COIs). COPs and COIs have long been recognized and well-cited in the CE literature, but we could find no published research that has investigated the meaning and practice of CE through these lenses. Indeed, we found even more specific calls for research that is focused on the development outcomes of CE [48,81–84] and that distinguishes these outcomes between COP and COIs-based approaches. We help to address these calls via the analysis of published research from more than 30 countries. Our methodological approach combined grounded theory and qualitative content analysis to both answer specific research questions and open our minds to the range of other insights than can emerge from such inductive approaches. While only the results from the three research questions are presented in the present paper, we hope to share others – including the unique barriers and enablers to successful COP and COI-based CE projects – in

¹⁵ One such funding opportunity can be seen in the UK, under its Prospering from the Energy Revolution program, whereby they funded 10 design and 3 demonstrator Smart Local Energy System projects that had to prove collaboration between local governments, community groups, universities, and industry [See 3].

upcoming companion pieces.

Our findings focus on the potential benefits of COP-based CE – like helping to create ‘energy citizens’, providing local job opportunities, and increasing local support – were perhaps the least surprising in the sense that they have mostly been long associated with the advantages of CE in general. Still, we found less recognized, less tangible benefits including the increased ability to foster energy justice, and resist the forces of populism. These benefits and many others identified are undoubtedly associated with Walker and Devine-Wright’s [43] description of the ‘ideal’ form of CE, one in which decision-making and benefits are localized.

The list of potential benefits from COI-based CE was highlighted by the idea that bringing in non-local interests would help with the challenges of COP-based development; mainly a lack of resources, skills, and/or investment. Several authors noted that because COI-based projects align better with the ‘status-quo’ in terms of dominant energy paradigms, they would also be more likely to scale-up renewable energy development to the point that emission reductions are certain and immediate. Other cited benefits can be seen as direct contrasts to the benefits of COP-based CE. This includes higher levels of local support, greater (or wider) energy citizenship, and being a more fair or inclusive form of development. If we were to assume all these benefits are truly realized, such contrasts may exist because development outcomes are context-dependent. The advantages of COP-based or COI-based approaches in one place or policy context may not be experienced in another.

We closed our analysis looking at the potential benefits of hybrid approaches or those developments that combine COPs and COIs. While relatively few papers provided content in this respect, those that did often presented arguments why policies and programs should acknowledge the ‘best of both worlds’ with regard to COP and COI-based CE. Most of these stated that hybrid approaches could assist in the mainstreaming of CE while bringing with it the well-established and regarded benefits of COP-based CE like increasing local support. There were also mentions of how the best CE projects balance local and outsider or technical knowledge, and how these kinds of partnerships can enable access to specific funding pools. Related to the latter, as governments realize the range of benefits of hybrid approaches, there may be even more funding programs dedicated to energy projects that bring together COPs and COIs. One such program is the UK-based Prospering From the Energy Revolution (PFER), which has brought together local citizens, councils and community groups with businesses, academics, and national utilities to “accelerate innovation in smart local energy systems” [132; see also 3].

4.2. Theoretical development and key messages

Several important takeaways emerge from this research. The first is that if we are to advance truly sustainable CE – what we see as projects that are equitable, just, democratic, and socially accepted – then we must begin to prioritize COP-based approaches. While shaped by the greater number of studies centered within COPs, our analysis suggests that there is a greater range of potential benefits, and the potential to address a greater range, of environmental, socio-economic, and cultural problems, in this form of CE. Indeed, it is clear to us that the so-called ideal form of CE is, for the most part, COP-based CE. Yet this potential can only be fully realized if CE projects are built to align with local sovereignty and a desire for benefits to stay close to where energy is generated. It may not be surprising that we wish to advocate for more COP-based approaches given that we set our research in a *local* energy justice context. Within the realm of CE projects, we answer ‘yes’ to Nelson et al.’s [36] question about whether local citizen (COP) concerns “possess more input legitimacy” [p. 2] than those living further away or in COIs. This answer of ‘yes’ is only reinforced within Indigenous contexts, where communities may rightfully demand Free, Prior and Informed Consent regarding any kind of energy development on their

traditional land [35]. While the worst of climate change will often be felt far away from CE projects (in the global north in particular), we do not see how these effects are impacted by local communities having more decision-making ability (procedural justice) or financial benefits (distributive justice). In fact, some have recently argued that when local energy injustice leads to high levels of opposition to specific projects,¹⁶ entire policy programs and developments therein may be threatened [133,134], which reduces our ability to fight climate change and leaves many of the most vulnerable at the mercy of an increasingly warming planet. Just because projects may represent a renewable or clean energy transition, does not mean we should turn a blind eye to issues of autonomy and environmental justice [35].

While this study helped us to recognize how important COP-based approaches are, we must also be clear that there are also real, if not still potential, benefits of COI-based CE. As researchers who work in partnership with communities considering or going through low-carbon energy transitions, our natural predisposition was to see COI developments as ‘robbers’ in a sense that they can steal value from local communities playing host. Like other authors in our dataset, it is easy to see COIs not as ‘real’ communities, but rather meta-individual experiences [135; p.90]. Yet governments are rightfully concerned about the need for a rapid scale-up of low-carbon energy projects. If we are to build such projects at the speed at which they are needed to address climate change, involving industry, governments and otherwise non-local actors is clearly essential [39,136]. This is especially the case under current-day capitalist economic and political structures. As MacArthur [87] writes, “local empowerment, environmental justice and liberalized markets are not easy bedfellows” [p.16]. That is, as long as policies and programs are set up in a way that privileges non-local power, there will be a tension that makes it extremely difficult for COPs to realize anywhere near their full potential in a just clean energy future. Change in the form of an energy system paradigm shift which “better reflects broad human welfare and wellbeing” [137; p.62] would help, and arguably is required. Indeed, drawing on the work of Elinor Ostrom, Bauwens and colleagues [108] write that ‘true’ (i.e. COP-based) CE initiatives will be able to achieve much more if “accompanied by deeper changes in rules to the game” [p. 146].

At the same time, a choice between COP-based versus COI-based CE is clearly a false dichotomy and this study provided support for the benefits of hybrid approaches that combine them. To advance these kinds of projects, there are many legal structures that can assist [38]. These include community benefit societies, and other types of co-operatives long outlined in the literature [e.g. 10,138]. Our findings on hybrid projects connect well with innovative research from Bauwens and colleagues which looks at renewable energy cooperatives [139] and broader community enterprises [140] that lay outside of our study’s dataset. In both studies, it is suggested that the apparent paradoxes and conflicts created when bringing together different sets of groups (i.e. those associated with COPs and COIs) can be managed through pairing institutional logics – finding common ground or shared goals – to maintain a project’s true hybrid status and avoiding ‘mission drift’. Perhaps most importantly of all, and like Bauwens et al. [140] begins to suggest, our work highlights that the order of involvement and associated decision-making ability embedded within each community may also be important. Such models that begin by COPs holding majority ownership and thus retaining the ability to democratically decide which COIs join their project is likely to be very important. Projects that begin with COI-based ownership and subsequently invite a COP to join in a secondary role ‘after the fact’ may not experience the same range of local benefits, including energy autonomy. Thus, and as assisted through our grounded theory approach, we recommend that development centered

¹⁶ More broadly, Bauwens et al. [108] write that when “an elite or a dominant group establishes rules without the consent of local communities, they are unlikely to serve the common good” (p. 146).

around Communities of Place, then Interest (COPTI) should be prioritized moving forward in order to maximize a range of benefits.

While not focused within Canada and/or Indigenous communities, our findings may have special relevance to such contexts, where partnership efforts within the renewable energy sector are being presented as a viable pathway toward Indigenous-settler reconciliation. Complicated through settler-colonialism whereby the term place can mean traditional land, treaty land, and/or reserves and other government-legislated settlements [72], many Indigenous communities still have a distinct connection and inherent right to place. It is here where COP-based or hybrid approaches to CE may hold the most promise in terms of economic reconciliation. Many Indigenous communities suffer from a lack of capital, skills, and resources to build CE projects on their own. However, as exemplified by Tobique First Nation's Wocaswson wind energy project, with the right kind of COI-based partner, hybrid projects may allow communities to “feed those [social funding] gaps...and allow [them] to flourish” [141]. We agree with Bradshaw [61] that “physical places are not necessarily communities” [p. 5], however COPs are where the greatest negative impacts lie and with special relevance to Indigenous and northern communities, that is where autonomy and decision-making ability should be.

4.3. Limitations and future research

There are some obvious and not-so-obvious limitations of our research and some of these provide avenues for future research. First, though we focused on two of the most common ways academics characterize the community in CE (COPs and COIs), there are several others that could have been used. Framing future research questions around communities of learning [67] or communities of practice [66] for example, may uncover new insights. Still, further questions framed around COPs and COIs should be investigated as well, including by researchers focused more squarely on Indigenous communities and their important role in CE development. Others could frame their study around Bauwens et al.'s [1] eight ways to investigate the meaning of CE.

A second limitation concerns our characterization of the CE projects within each paper we reviewed. After full-text reviews, we would label each as a COP, COI, or hybrid CE project. While we were confident in the majority of these assessments, it would be interesting for future researchers to reach out to the authors of each paper or even the project owners themselves and have them characterize the project. Though this may also introduce a new source of research bias.

Third, and like the work of Lai [64], our work was embedded within a [local] energy justice perspective. It might therefore be fair to say that we were always going to favour approaches that centre on the interests of COPs and it is easy to imagine how this penchant may shift if our study was centered around non-local, national or international policy perspectives. At the same time, we echo Sebi and Vernay's [50] call for research that dives deeper into elements of energy justice and what the concept means for those most involved in CE projects. This may require a sharper focus on a smaller number of projects than was done here.

Fourth, it is likely that our chosen sampling framework missed some important papers, including those focused on hybrid approaches or co-ownership of CE. It also could have missed papers (and thus projects) that used a range of terms that are tangential to or embedded within CE

including local low carbon energy initiatives [48] or grassroots/citizen [energy] initiatives [7,47].

Finally, we recognize that our research was aimed at an understanding of CE at particular snapshots in time. Projects and communities are often more dynamic than published research would suggest, but this is a shortcoming of the CE literature in general. This creates an even greater need for CE-focused research to be set within longitudinal contexts whereby we can trace changes to, for example, COP and COI-based involvement in CE projects over years or even decades. Based on the potential of hybrid or partnership projects, there also should be future research fully committed to understanding the best ways to ensure these projects are successful across multiple local and non-local criteria.

5. Conclusion

Finally, it is plain to see that the ‘community’ in CE can be any number of groups, from governments and private developers, to local citizens, municipal councils, and community groups. For the best possible CE outcomes, it should be the latter groups of people – here known as COPs – that have the power to define what is, and what is not, CE. This first step is an important one. From there, COPs can determine what kind of structure their CE project should have, including whether or not they want to partner with COIs. For all the potential benefits this study found related to COP-based CE, we cannot ignore the benefits of involving COIs. They may not only help to upscale CE initiatives and therefore make more significant progress toward climate change mitigation, but it can also introduce more equitable opportunities for those living outside sometimes resource-rich areas to participate. It is here where we see great potential in the bringing together of COPs and COIs into what we call hybrid approaches to CE. Though as suggested above, the order of this hybrid approach matters, and we recommend a Communities of Place then Interest (COPTI) approach to CE. Especially within current economic and political structures, our hope lies in seeking this carefully designed combination that can build the right kind of community energy projects that act quickly to address climate change, and local residents' right to be in charge and benefit from a low-carbon transition.

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 are unable or have chosen not to specify which data has been used.

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Appendix A. All themes found during data analysis

A focus on geography	Cooperatives being the best form of COP projects	Extending boundaries	Prosumers in COI
Barriers to collaboration Barriers to COP	COP example COP motivations	Gender empowerment Grassroots development	Prosumers in COPs Range of Definitions of Community Energy Projects
Barriers to local government involvement Benefits of COIs	COP projects are best in public areas; more inclusive COP projects need to share learnings	Hybrid model is the best Hybrid solutions are the same as multi-level governance	Renewable Energy Communities (RECs) defined Renewable Energy Sources Cooperatives (REScoops) definition
Benefits of COPs	COP projects needed for true decentralized energy	Importance of local or COP governments	Rich COPs only for development
Benefits of local energy generation	COPs and COIs - Indigenous communities	Importance of this paper	Sustainable Energy - Important role of Local champions
Benefits of a flexible definition of CE	COPs defined	Indigenous sovereignty	Sustainable Energy Communities (SECs) defined
s1	COPs are more than physical spaces	Local Energy Generation projects	Snowball effect in COPs
Building back better references	COPs needed to help resist peripheralization	Local Energy Generation projects defined	Social acceptance means should be Local COPs
Calls for future research Community Energy playing a small role right now	COPs starting from the local Community-Owned Renewable Energy (CORE) defined	Local Energy Initiatives Limitations re: the outcome of social acceptance	Temporal aspects of CE Those with interest are not part of the community
Community Energy to Local Energy	Community Renewable Energy Enterprises (CREEs) defined	Literature has focused on processes behind CE	Three ways of defining community
Citizen Energy Communities can be COIs	Community Renewable Energy Projects (CREPs) defined	Local Low-Carbon Energy Initiatives (LLCEIs) defined	Walker framework - process and outcome
Citizen Energy Communities defined	Denmark's Community energy right	'Local' placed in front of Community in CE	Sustainable Energy Communities (SECs) defined
CEEs defined	Disadvantages of COIs	Local Renewable Energy Organizations (LREOs) defined	Snowball effect in COPs
Community Initiatives defined	Disadvantages of Co-ops	More difficult to measure benefits in COPs	Social acceptance means should be Local COPs
COI motivations COIs defined	Disadvantages of COPs Disadvantages of flexible definitions	Policy is moving away from COP projects Need for intermediary	Temporal aspects of CE Those with interest are not part of the community
COIs are more inclusive	Disadvantages to local government involvement	Novel methods in CE	Three ways of defining community
Collaboration needed among COPs and others	Distributive Justice	Projects do not need a COP origin	Walker framework - process and outcome
Community label being used strategically	Enablers to collaboration	Projects need a COP origin	
Concern re: COPs on their own Cooperatives and COIs	Enablers to COP	Prosumers	

Appendix B. Benefits of COP-approaches to CE (with author details)

Benefits	Citations
Helps to educate and promote environmental/ energy citizenship and behaviour (n = 16)	Adams and Bell, 2015; Allen et al., 2012; Bere et al., 2017; Berka et al., 2017; Berka et al., 2020; Berry, 2013; Bomberg and McEwen, 2012; Cebotari, 2019; Devine-Wright and Wiersma, 2013; Fudge et al., 2016; Goedkoop and Devine-Wright, 2016; Parag et al., 2013; Ruggiero et al., 2014; Rydin and Turcu, 2019; Sebi and Vernay, 2020; Seyfang et al., 2013
New sources of local income, jobs, facilities, and skill/capacity development (n = 14)	Adams and Bell, 2015; Apostolopoulos et al., 2020; Bere et al., 2017; Berka et al., 2017; Berlo et al., 2016; Bomberg and McEwen, 2012; Busch and McCormick, 2014; Cebotari, 2019; Devine-Wright and Wiersma, 2013; Rezaei and Dowlatabadi, 2016; Roby and Dibb, 2019; Ruggiero et al., 2021; Rydin and Turcu, 2019; van Veelen, 2017
Higher levels of local support, trust, pride, and/or legitimacy (n = 13)	Apostolopoulos et al., 2020; Bauwens et al., 2016; Berka et al., 2017; Blanchet, 2015; Busch and McCormick, 2014; Cebotari, 2019; Devine-Wright and Wiersma, 2013; Parag et al., 2013; Rezaei and Dowlatabadi, 2016; Seyfang et al., 2013; Tews, 2018; Goedkoop and Devine-Wright, 2016; Hager and Hamagami, 2020
Bringing people together, repairing old divisions, and increasing social capital (n = 9)	Allen et al., 2012; Bere et al., 2017; Berka et al., 2017; Cebotari, 2019; Goedkoop and Devine-Wright, 2016; Kim, 2017; Madriz-Vargas et al., 2018; Rydin and Turcu, 2019; van der Waal, 2020
Allows communities choice, the essence of democracy (n = 8)	Sokolowski, 2020; Roby and Dibb, 2019; Berlo et al., 2016; Capellan-Perez et al., 2018; Mey and Dissendorf, 2018; Rezaei and Dowlatabadi, 2016; Schmid et al., 2020; Tews, 2018
Increased local participation (n = 8)	Tarhan, 2015; Berka et al., 2017; Capellan-Perez et al., 2018; Cebotari, 2019; Devine-Wright and Wiersma, 2013; Markantoni, 2016; Seyfang et al., 2013; Tews, 2018
Embedding energy in daily lives; sense of connection; alignment with local values (n = 8)	Nolden, 2013; Tarhan, 2015; Adams and Bell, 2015; Berka et al., 2017; De Boer, 2018; Seyfang et al., 2013; van der Waal, 2020; Warbroek et al., 2019; Maleki-Dizaji et al., 2020
Just benefits for affected communities (n = 7)	Süsser and Kannen, 2017; Bauwens et al., 2016; Bere et al., 2017; Berka et al., 2017; Berka et al., 2020; Devine-Wright and Wiersma, 2013; Holstenkamp and Kahla, 2016
Increases quality of life and sustainable growth especially in rural/ poor/isolated communities (n = 6)	Cebotari, 2019; Adams and Bell, 2015; Berka et al., 2017; Bomberg and McEwen, 2012; Busch and McCormick, 2014; Roby, 2019
Encouraging social innovation and challenging the status quo (n = 5)	Nolden, 2013; Blanchet, 2015; Bomberg and McEwen, 2012; Cebotari, 2019; Tews, 2018
Empowering local citizens (n = 5)	Nolden, 2013; Adams and Bell, 2015; Berka et al., 2017; van der Waal, 2020; van Veelen, 2017 Berka et al., 2020; Cebotari, 2019; Parag et al., 2013; Rydin and Turcu, 2019

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Benefits	Citations
Signals higher levels of political legitimacy (i.e. to national policy) (n = 4)	
Greater energy autonomy/ sovereignty/ independence (n = 3)	Madriz-Vargas et al., 2018; Rezaei and Dowlatabadi, 2016; van Veelen, 2017
Resists forces of peripheralization, outmigration in poor and isolated communities (n = 2)	Bere et al., 2017; Cebotari, 2019
Greater ability to foster energy justice (i.e. balance of risk and benefit) (n = 2)	Forman, 2017; Schmid et al., 2020
May have flexibility to pursue less profitable, early-stage RE technologies (n = 2)	Berka et al., 2020; Busch and McCormick, 2014
May face lower planning risks and development costs (i.e. by financing locally) (n = 2)	Berka et al., 2017; Devine-Wright and Wiersma, 2013
Can counteract forces of populism (n = 1)	Tews, 2018
More ethical form of development (i.e. when led by local actors, as compared with top-down approaches) (n = 1)	Devine-Wright and Wiersma, 2013
Enabling easier access to local natural resources (n = 1)	Savaresi, 2019
Projects can be easier to legitimize because a common identity of heritage (n = 1)	Baigorrotegui and Lowitzsch, 2019
Native Tribal energy planning (US) can combat isolationism (n = 1)	Brookshire and Kaza, 2013
Indigenous [economic] independence (n = 1)	Gonzalez et al., 2019

Appendix C. Benefits of COI-based approaches to CE (with author details)

Benefits	Citations
National or 'beyond-the-local' approaches to help overcome barriers associated with a lack of local capacity or interest (n = 6)	Apostolopoulos et al., 2020; Armstrong and Bulkeley, 2014; Cebotari, 2019; Goedkoop and Devine-Wright, 2016; Palit et al., 2013; Warbroek et al., 2019
Can expand geographic reach of investment/participation which makes it easier to scale-up (n = 4)	Tarhan, 2015; Savaresi, 2019; Roby and Dibb, 2019; Goedkoop and Devine-Wright, 2016
Can increase interest and engagement with energy issues among a larger group of people (n = 2)	Magnusson and Palm, 2019; Savaresi, 2019
More inclusive, since participation is not tied to a particular location or resources therein (n = 2)	Inês et al., 2020; Lowitzsch et al., 2020
More aligned with dominant [renewable] energy and development paradigms (n = 2)	Nolden, 2013; Goedkoop and Devine-Wright, 2016
Can (and will) play more major roles in wider system transformation and thus climate change mitigation (n = 1)	Strachan et al., 2015
Helping to avoid local volunteer burnout through greater financing and capacity (n = 1)	van Veelen, 2017
When local interest is not there, national approaches can lead to higher levels of local acceptance (n = 1)	Apostolopoulos et al., 2020
Involvement is driven by a wider range of motivations (n = 1)	Tarhan, 2015
On funding/investment, locals may not be concerned with it coming from outside of COPs (n = 1)	Devine-Wright and Wiersma, 2013
New developments (i.e. virtual power plants) may be best established over large areas (n = 1)	Inês et al., 2020

Appendix D. Benefits of hybrid approaches to CE that combine COPs and COIs (with author details)

Benefits	Citations
Able to mainstream community energy projects while helping with industry concerns like local opposition (n = 8)	Berka et al., 2020; Berry, 2013; De Boer et al., 2018; Capellan-Perez et al., 2018; Comodi et al., 2012; Madriz-Vargas et al., 2018; Roby and Dibb, 2019; Mey and Diesendorf, 2018
Hybrid approaches that prioritize local funding/participation are the most socially acceptable [compared to COP or COI-based CE] (n = 2)	Apostolopoulos et al., 2020; Mey and Diesendorf, 2018
The best roll-out of technical solutions require both community leadership/ involvement and outside expertise (n = 2)	Arriaga et al., 2017; Strachan et al., 2015
Local energy interests are best shared when forming networks at higher (e.g. national) levels (n = 2)	Bauwens et al., 2016; Berry, 2013
Ability to access partnership-specific funding (n = 2)	Berry, 2013; Brookshire and Kaza, 2013
Results in both cost reductions and increased community engagement (n = 1)	Berka et al., 2017
Greater variety of expertise (i.e. local and non-local) can provide the best feedback when new innovations are tried out (n = 1)	Izutsu et al., 2012

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