



Energy justice from the bottom up: A capability approach to community acceptance of wind energy in Mexico

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ABSTRACT

This paper aims to extend the energy justice framework by using the capability approach to understand factors affecting community acceptance of energy technologies. The capability approach is a normative framework for assessing people's well-being and devising interventions for social justice. Whilst recognising that opposition to energy technologies is fundamentally a problem of distributive, recognition and procedural injustices, the paper operationalises the capability approach to unveil what these justice tenets mean to indigenous people living in three communities neighbouring wind installations located in Southern Mexico. Findings conclude that building a bottom-up approach to understand complex conceptions of energy justice within a community can lead to an improved awareness of justice implications relevant to community acceptance of energy technologies. In the Mexican case, these factors relate to inclusive community engagement that pays particular attention to valued ways of being and doing of the local population, such as equal access to employment, higher education and professional training, diversified sources of income, and recognition of the local indigenous everyday life and communal identity. The results also highlight a nested structure of justice concerns, with the three tenets being embedded into one another and presenting different levels of visibility.

1. Introduction

Promoting common interest in climate change mitigation would be more effective if solutions resulted in all stakeholders being better off. However, this is rarely the case since strategies to reduce greenhouse gas emissions usually result in winners and losers [1], and the development of renewable energy technologies (RETs) are no exception. The adoption of ambitious renewable energy targets has had profound social, economic and environmental implications at scales ranging from local to global and has raised questions about social justice in capitalist societies [2]. Therefore, identifying key social justice issues affecting social acceptance of RETs has become hugely important in advancing the diffusion of clean energy. Wind farms offer an emblematic example of such issues, as their development has generated considerable opposition in many parts of the world [3].

Energy justice research seeks to identify the ways in which benefits and ills related to energy issues are distributed, remediated and victims are recognised (e.g. [4–8]). However, this literature and, in particular, the so-called triumvirate conception of energy justice [9], does not specify who is responsible for defining justice concerns, potentially contributing to a top-down approach to energy justice that does not

explicitly include the values of people on the ground. In addition to this central gap, the present paper seeks to address three additional under-researched issues: 1) there is limited research on the links between the social acceptance of RETs and energy justice; 2) even though the capability approach (CA) has been proposed to theoretically extend the concept of energy justice as a way to bridge ideal and abstract notions of justice [10] and to capture tensions between well-being and climate change mitigation [11], it has only been empirically applied within an energy justice framing linked to energy usage and energy poverty [12,13], and not applied to large-scale energy production; 3) hardly any attempts have been made to look at how the three tenets of energy justice can inform social acceptance of RETs in the context of emerging economies and to engage in how indigenous communities interpret energy production related issues, and what kind of improvements and strategies they would propose and endorse.

To contribute to bridging these gaps, this paper aims to extend the energy justice literature and, in particular, the triumvirate conception of energy justice [9], with the CA [14–19] to demonstrate how this extension can contribute to a bottom-up approach to identify injustices. Furthermore, it aims to understand factors affecting social acceptance of energy technologies. In this regard, the paper thus focuses on

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community acceptance (captured through attitudes toward locally installed technologies) rather than socio-political acceptance (captured through general attitudes toward RETs) or market acceptance (captured through the market penetration of a technology) [20].

The research questions addressed are therefore the following: 1) *How can the CA contribute to a bottom-up approach to energy justice?* 2) *To what extent can this enhance understandings of social acceptance of energy technologies?* The CA is a normative framework for assessing people's well-being [21] that offers a deeper context-sensitive analysis of justice issues by allowing individuals to define what justice ought to be [22,23]. Whilst recognising that opposition to energy technologies and infrastructures is fundamentally a problem of distributive, recognition and procedural injustices [24], we argue that operationalising the CA unveils what these justice tenets mean to people on the ground, with the aim of building a bottom-up approach to energy justice. Our main contribution here is to elaborate the connection between the three tenets of energy justice and show how they are not only interrelated [23], but also nested into one another: distributive justice is underpinned by procedural justice, while these two are embedded within issues associated with recognition justice. By defining this structure, the study demonstrates how an increased understanding of the complex conceptions of justice within a community led to an improved awareness of justice implications related to the acceptance of energy technologies.

To do so, we use the case of a wind energy siting to detail how the distributive, recognition and process elements of energy justice link to well-being perceptions related to wind energy, proposing a characterisation of this concept for this research. This is done by operationalising the CA to identify well-being-related concerns of indigenous people living in three communities neighbouring wind installations located in Southern Mexico that have low, medium and high levels of social acceptance, thus providing a useful comparative stance. Data was drawn from 103 semi-structured interviews and a medium-size questionnaire-based survey (N = 382) conducted between September 2017 and June 2018.

The remainder of this paper presents the theoretical framework of this study (Section 2), the methods adopted to address the above-mentioned research question (Section 3), the empirical results and their discussion (Section 4) and some concluding remarks (Section 5).

2. Conceptual framework: Linking energy justice, community acceptance and capabilities

2.1. Energy justice

A central research endeavour within the field of energy justice has been the development of a range of frameworks to identify energy injustice(s) and guide energy decision-making. Three particular approaches have gained traction: 1) the conception set out by McCauley et al. [4,9], referred to as the triumvirate conception of energy justice, which repackages the classic trivalent approach of environmental justice in terms of distributional, procedural, and recognition justice [22,25,26], 2) an eight-principled conception of energy justice framed as an analytical and decision-making tool for facilitating decision-making in energy dilemmas [27,28], 3) an Energy Justice Metric seeking to quantitatively analyse energy justice in order to translate more effectively justice principles into policy formulation [29]. The triumvirate energy justice framework is the conceptualisation adopted in this study, because it is easier to operationalise and to combine with the CA than the principled conception of energy justice, which draws on an extensive range of moral theories and perspectives. As for the Energy Justice Metric, its quantitative nature and essentially top-down construction makes it less suited for the analysis of the capabilities of local communities.

Within the triumvirate of tenets of energy justice, distributive justice can be considered as the 'chief topic' of environmental concerns [30] or the 'substantive justice' that matters in a material sense in terms

of allocated costs and benefits [31]. This element of justice draws attention to where energy injustices are located [4]. It includes both the physically unequal allocation of environmental benefits and burdens, and the uneven allocation of their associated responsibilities [32], for instance exposure to risk. This concept raises awareness about the link between the desirability of energy technologies and its relation to their location [33,34], calling for the fair distribution of burdens and benefits between all members of society regardless of income, race, gender, etc. [5]

Despite its centrality, distributive justice needs to be complemented by other concepts of justice to understand the underlying reasons for maldistribution. Accordingly, the concept of recognition justice sheds light on under-recognised sections of society such as indigenous peoples, raising the relevance of this framework for the proposed case study. The tenet may present itself not only as a failure to recognise, but also mis-recognise [22]. At the core of misrecognition, there are cultural and institutional processes of disrespect which devalue some people in comparison to others. For instance, social norms, languages and mores can be fundamental to the failure to recognise and respect group differences and can ultimately constitute practices of cultural domination and oppression that are rendered invisible through non-recognition [35]. Many indigenous activists and organisations have expressed concern about their cultural processes and cultural identity not being recognised or valued in negotiations about the environment.¹ Thus, recognition justice includes calls to acknowledge the divergent perspectives of RETs rooted in social, cultural, ethnic, racial and gender differences [22,36].

Recognition, however, can only go so far; energy justice requires converting that recognition into exercises of political participation. The third tenet of energy justice, procedural justice, is the political. Distribution and recognition are themselves political in the sense that they are power-loaded. However, the political in the procedural sense provides a stage on which struggles over distribution and recognition are played out, establishing criteria such as who can make claims and how [37]. For instance, literature on RET siting has explored how exclusive and closed decision-making processes generate conflict in evaluations of observed environmental threats [38], with opposition activity focused on perceived injustices in procedure and the lack of chances of being heard [39]. Thus, procedural justice presents a call for equitable procedures and to engage all stakeholders in non-discriminatory decision-making [25].²

While the triumvirate conception of energy justice is a useful approach to frame ethical issues arising in relation to energy systems, it also suffers from some limitations. First, Wood and Roelich [40] point to a lack of clarity about what can be defined as justice or injustice. Without drawing on a particular account of what makes an event or situation unjust, it proves difficult to identify which aspects of these situations needs ameliorating [11,40]. Second, there is a lack of a detailed description and valuation of different conceptions of justice by the communities themselves. Indeed, the triumvirate conception of energy justice has favoured a top-down approach to energy justice to enable contributions to mainstream policy-making. For instance, as stated by Jenkins [41], "Energy justice does so by overcoming what may be identified as the 'naïve' approaches of environmental and climate justice—the presumption that society would support their ideals—focusing instead on embedding justice in policy. This 'top-down' methodology offers the potential for a refined 'practice'".

¹ See, e.g., "The Anchorage Declaration" of the Indigenous Peoples' Global Summit on Climate Change.

² It is important to observe that distribution, recognition and procedural justice are connected between them, and will have a degree of overlap between justice concepts and questions of process [23]. They are distinct forms of justice in their own right and can also explain the existence of injustice in the others [26].

However, Wood and Roelich [40] raise the concern that this approach may not be able to include the values of activist-led community-driven movements, which constitutes one of the main goals of environmental justice [22,26]. Justice definitions determined by developers, governments, academia, development agencies or economic elites may lead to the misrepresentation of regular people's everyday concerns.

2.2. Energy justice and social acceptance

Social acceptance has been a long-standing topic in relation to industries such as nuclear power infrastructure, waste facilities, and hydro-electric schemes. It is only in 1984 that Carlman [42] defined social acceptance in relation to wind power. She pointed out that siting turbines was also a political matter, carrying a study on acceptance among policy-makers. As stated in the introduction, this research focuses on community acceptance, that is, that element of social acceptance dealing with local opposition to specific projects, particularly by residents and local government. Because local approval for a proposed wind project is required before construction can begin, community acceptance is a fundamental aspect of the social acceptance of wind energy.

Community acceptance has become a significant point of discussion in the social sciences [43], particularly its links to fairness as an important explanatory factor that superseded former, more simplistic 'backyard motives' [39]. Perceptions of fairness have been shown to influence how people perceive the legitimacy of energy infrastructure siting outcomes; a fairer process that increased the legitimacy of the outcome will in turn advance the acceptance of new developments [44]. Similarly, characteristics of community-based ownership, which address procedural and distributive concerns, have proven to be crucial for community acceptance of wind farms [3,45,46]. The importance of more inclusive citizen participation from the beginning through deliberative decision-making has also been emphasised (e.g. [39,44,45,47–49]).

However, limited attention has been drawn to how the three tenets of energy justice can inform social acceptance. For instance, Roddis et al. [50] consider the relationship between public acceptance and energy justice by analysing variables found in the public acceptance and environmental planning literature of inshore wind and solar farms. Nonetheless, this study is limited to planning applications in Great Britain, adding to the existing literature on social acceptance found in Western European contexts, but widening the existing gap between high income and middle and low-income countries. Furthermore, the study uses existing variables in the literature that often do not engage local communities in defining valuable definitions of justice, perpetuating a normative, top-down perspective on people's relation to energy infrastructure which characterises part of the social acceptance literature [51,52].

Furthermore, the energy justice framework's lack of clarity about what can be defined as justice or injustice and its top-down approach identified in the previous section are especially problematic when trying to understand factors for social acceptance. Indeed, reasons for a community lack of acceptance might be rooted to aspects of a situation or event that is contributing to local people's experiences of injustice. These experiences may vary from individual to individual depending on factors that can be related to age, gender, age, race, class and place. Aside from high-level concerns over electrification rate impacts, justice-related concerns are most immediate for individuals living in the communities adjacent to wind energy facilities. A bottom-up analysis is thus especially suited to examine how the lives of the poor and marginalised are shaped by the introduction and expansion of energy technologies in areas where indigenous populations have lived for more than a thousand years.

2.3. A capability approach to energy justice

We propose using the capability approach (CA) to recognise perceptions of justice and injustice of individuals neighbouring wind farms. First developed by Amartya Sen and Martha Nussbaum [15–19], the CA is a theory to conceptualise the purpose and aims of economic development. Venturing to go beyond development schemes that focused on resource-based normative theories (e.g. [6,7]), happiness or desire-fulfilment [8], Sen and Nussbaum proposed an approach that turned to people's perspectives about what they can do and be, and on removing barriers in their lives so that they have more freedom to live the kind of life that they have reason to value. While the CA attempts to encompass all dimensions of human well-being, it recognizes human diversity, acknowledging that different people need different amounts and different kinds of goods to reach the same levels of well-being [21]. Thus, the CA can serve as a more comprehensive and integrated component for a theory of justice. By paying attention to links between material, mental and social well-being, as well as to the economic, social, political and cultural dimensions of life, it can be useful in specifying an evaluative space of injustices that might ultimately result into a lack of social acceptance. For instance, the perception of justice of a community neighbouring a wind farm might not only include the importance of increasing their income or social modernisation, but also by guarantees that ensure that wildlife will not be harmed.

Central to this approach are the concepts of functionings and capabilities. While functionings are 'beings and doings' ([53]: 40), which can include activities (reading or dancing) or states of existence (being in good health or not being ashamed) that people value and actually achieve, capabilities reflect the various functioning bundles an individual has the freedom to choose from, to achieve the life they have reason to value [53]. For Sen and Nussbaum, capabilities, rather than functionings, are the object of concern. Focusing only on functionings – what people living near RETs do in their day-to-day life – would dictate a particular way of living that may or not may be aligned to their aspirations. Recognising their capabilities – their actual opportunities to live the life that they value – can be key to understanding varying responses to these installations. For instance, someone's opposition to wind farms might not relate to the amount of income received as part of a land tenure for hosting a wind turbine, which is an achieved functioning, but due to the lack of real opportunities of engaging in paid work or having access to decision-making spaces about how these projects may enhance their livelihoods.

What these actual capabilities should be is an on-going debate between Nussbaum and Sen. Nussbaum [18,19] proposes a list of central capabilities that are core to human dignity and should be guaranteed by all democracies, although they can be debated and tailored to differing contexts. In contrast, Sen avoids proposing a list and calls on societies to decide, through deliberative processes, what the capabilities to be enhanced are in a given context. To contribute to a bottom-up perspective which includes the conceptions of a good life of the people affected by wind energy developments themselves, this research aligns with Sen's approach. This ensures that necessary value judgements are made explicitly and openly by communities themselves [15,54,55], as opposed to being decided by corporations, governments, academics or development agencies. Moreover, the deliberation process advocated by Sen embodies aspects of recognition and procedure central to the energy justice framework.

The CA has influenced a number of studies looking at the relationship between energy, well-being, and development. A first stream of research uses the CA to conceptualise and operationalise the relationship between well-being, energy services and energy poverty, both in Southern and Northern contexts [12,13,56,57]. A second stream focuses more specifically on the development impacts of electrification in different Southern countries [58–61]. In a recent contribution, Wood and Roelich [11] also drew from Day et al.'s framework to capture tensions between well-being and climate change mitigation.

Table 1
Energy justice and community acceptance gaps that can be addressed with the capability approach.

Gaps in the Triumvirate conception of Energy Justice	How the CA helps to address these gaps
Limited description of how to define justice and injustice, which is key to understand factors for community acceptance	The CA contributes to conceptualise energy justice in specific cases and understand (the lack of) community acceptance of RETs based on whether these technologies are contributing to enhance the lives that people have reason to value.
No precision of who is responsible for defining justice concerns, which may contribute to a top-down approach that does not explicitly include the values of people on the ground	The bottom-up nature of the CA, which requires local communities to define capabilities through deliberative processes, can contribute to avoiding misrepresentation of people's concerns by "outsiders" (e.g. developers, governments, academia or development agencies).
Limited research on how the three tenets of energy justice can inform community acceptance of RETs in developing contexts	The CA allows a contextual definition of injustices and ways to address them that does not imply a one-size-fits-all approach to community acceptance.

Source: constructed by the authors.

Furthermore, notable work has linked the CA with the energy justice framework. For instance, Schlosberg [10] use the CA to theoretically extend the concept of energy justice as a way to bridge ideal and abstract notions of justice, while Wood and Roelich [41:15] use Nussbaum's central capabilities to propose a pluralistic appeal to the three tenets to integrate a "broader range of moral approaches and concepts".

While the relationships between the concept of capabilities, energy justice and community acceptance have so far remained untapped, we argue that the CA is a particularly useful framework to assess the extent to which RETs, such as wind energy, are enhancing (or constraining) the individual capabilities of people living in local communities. Indeed, levels of acceptance of wind farms may be explained by the impacts of wind energy siting and its outcomes on people's valued lives. Moreover, while there are many different ways in which one can try to make sense of a fair distribution, significant recognition, and due process linked to human well-being when siting RETs, the CA, particularly in Sen's approach, allows diverse justice concerns from different people to be brought into view, moving beyond assumptions of what is just or unjust in any particular place [62]. At the same time, the CA enables partial comparisons [63] across developed and developing contexts, allowing situations and claims in one context to be placed within another [12]. Based on this evaluative capacity, the CA can offer insights about aspects of acceptance related to justice that have been neglected or overlooked by other approaches that perpetuate a normative top-down perspective on people's relation to energy infrastructure (Table 1).

3. Methods

3.1. Case study

The Isthmus of Tehuantepec in Mexico was selected as a suitable place to conduct an inquiry about how the lives of poor and marginalised indigenous populations are shaped by the introduction and expansion of wind power. Indeed, this region has been identified as one of the best areas in the world to establish wind farms [64]. Following a major energy reform in 2008 that facilitated international private capital investments [65], large international utility companies started to operate in the region, installing wind energy turbines that accounted for up to 3,527 MW in 2016 [66]. Furthermore, Tehuantepec crosses the state of Oaxaca, a region shaped by an indigenous identity in the legacy of colonialism, high levels of marginalisation and inequalities. It is one of three states with the highest indigenous population percentage in Mexico: 43.7% of its population self-classify as indigenous [67]. It is also one of the poorest. 84% of the municipalities in the Isthmus of Tehuantepec face a moderate, high or very high grade of marginalisation, according to the National Population Council's [68] marginalisation index.³ Mexico generally has high levels of income inequality,

³ This index considers deficiencies in basic education and housing, residence in small, dispersed and isolated localities, and low monetary income [68].

marked by a 43.4 coefficient in the GINI 2016 Index [69]. This greatly affects Oaxaca specifically, given the legacy of colonisation and discrimination against indigenous and non-whites [70].

The introduction of the wind energy industry was not originally an issue in the region. Developers approached indigenous landowners, who initially agreed to have their lands leased to build wind farms without much hesitation. Nevertheless, while the process of price negotiation progressed and turbines were erected on the ground, opposition emerged. These negotiations took place without a clear legislative framework and resulted in political conflict, economic loss, and social disruption within a region historically marked by poverty and ethnic struggles. For instance, in 2012, a 396 MW development that was planned to be the largest in Latin America [71] was cancelled due to conflicts linked to land speculation and ethnic tensions between Zapotecs and Huaves (e.g. [72]), causing an approximate loss for the main investors of seven million dollars [73]. While in theory the establishment of wind farms was a good opportunity for the region, lack of community acceptance and negative social impacts are putting further investments at risk, in addition to risking the well-being of the local population.

Three communities located in the region of the Isthmus of Tehuantepec were selected based on their citizens' general position on wind farms (see Fig. 1). These communities have similar characteristics that allow comparability (see Table 2). All three communities have had wind farms installed between 2009 and 2017 and new developments have been planned in all three. Moreover, all three communities have an indigenous population and comparable levels of deprivation [74]. Unión Hidalgo was selected based on their opposition-based history, and El Espinal due to its acceptance-based context. Santo Domingo Ingenio was selected because of its acceptance-opposition mixed history: although wind energy has been accepted to some extent, conflicts between landowners, government, and wind energy companies are pervasive.⁴

3.2. Data collection

Conceptions of well-being among people living near wind farms were explored through an evolving research design combining qualitative and quantitative data to triangulate and validate research findings. More specifically, the research involved a 'methodological integration' [76] following a qual-quant-qual approach in which the output of one method was used for the design of another (Fig. 2). Employing a mixed-methods approach enabled us to compensate for the weaknesses of one method with the strengths of the others. Indeed, the

⁴ Levels of acceptance were determined based on the number of projects that have been stopped or blocked for more than two weeks between 2009 and 2017. In El Espinal no projects of the four existing wind farms have been discontinued, in Santo Domingo Ingenio three out of nine projects have been halted, and in Unión Hidalgo all five existing projects have been stopped or delayed at least for two weeks in the period given.

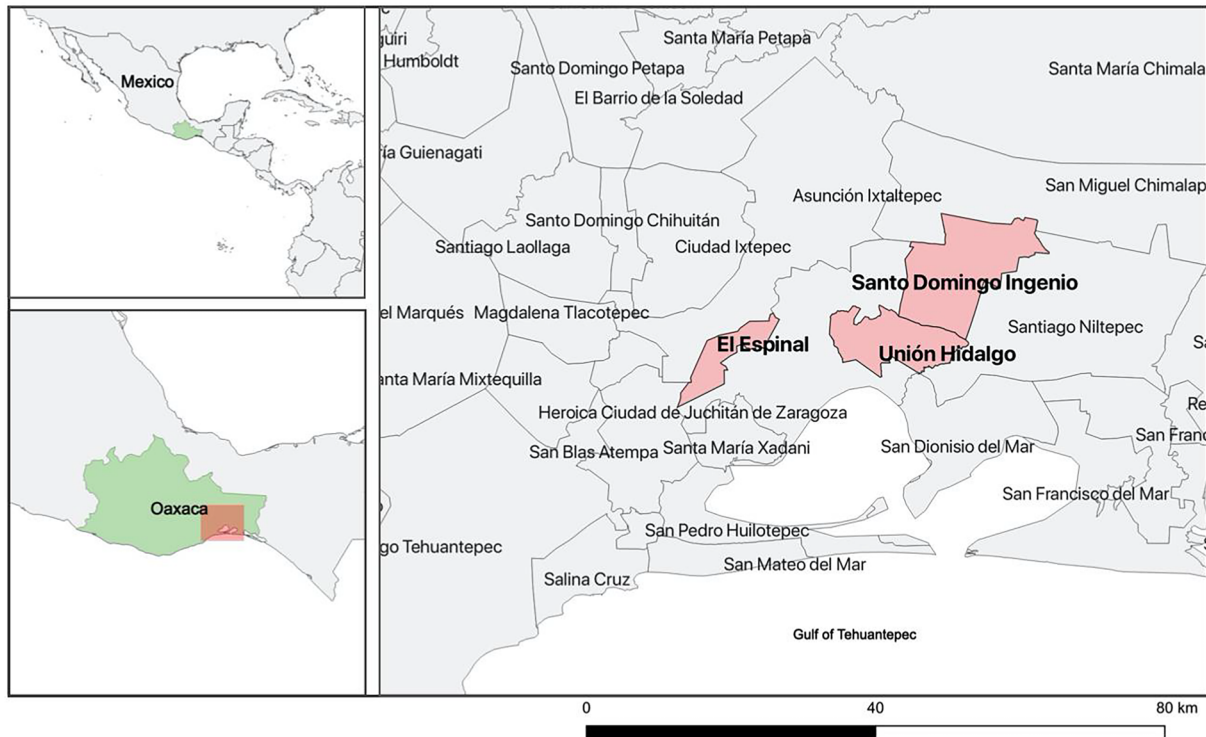


Fig. 1. Three case studies in the Isthmus of Tehuantepec, Mexico Source: Map by Alejandro Guizar Coutiño.

Table 2
Community demographics and relevant variables.

	El Espinal	Santo Domingo Ingenio	Unión Hidalgo
Level of community acceptance of wind energy projects	High	Medium	Low
Population (2015)	8,824	8,208	14,704
% women	51	50	52
% unemployment	3.3	8.3	5.3
Average duration of education (years) (2015)	9.9	7.5	8.5
% education lag	17.8	28.2	15.7
% indigenous population	36.7	5.4	53.6
% of people living in poverty (2015)	34.2	63.3	57.6
Human Development Index ¹ (2015)	0.776	0.678	0.743
Distance to the closest turbine (mts)	2,000	500	500

Source: INEGI [74].

¹ The Human Development Index (HDI) [75] is a statistic composite index of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development (0.800–1.000 very high, 0.700–0.799 high, 0.550–0.699 medium, 0.350–0.549 low).

first qualitative stage helped the study to reflect local understandings and context and offered participants the opportunity to discuss the issues under scrutiny more openly, while the quantitative stage enhanced the internal validity of the findings of this first stage and attended to any interviewer bias [77]. Finally, workshops offered a more in-depth explanation of why people value one capability more than others.

The first stage of the methodology involved semi-structured individual interviews in the three communities to explore (1) understandings of a good life (used as a simplified definition of capabilities), (2) how these conceptions are associated with everyday interactions with wind farms, and (3) how they drive wind energy acceptance (Table 3). During this stage, two participatory workshops with ten local students were also introduced to generate a list of basic capabilities using data collected during the interviews. Findings were used as focal

points of analysis to jointly design the second methodological stage of the research.

The second stage turned these diverse community perceptions into a relevant set of questions in the form of an in-person survey informed by previous studies on capabilities (e.g. [78–80]). The questionnaire sought to reveal the capabilities people aspire to. It did so through asking an open question about respondents’ perceptions of a good life, followed by closed questions that assessed the extent to which they valued the list of basic capabilities defined in stage 1 and the reasons for valuing them. It also investigated their achieved functionings by asking about the aspirations that people succeeded in being and doing following the instalment of wind farms in their community. More precisely, respondents were asked whether or not they considered that wind farms had contributed to the enhancement of these basic capabilities and their general individual and community well-being. This second stage resulted in 382 questionnaires across the three communities, paying special attention to achieve a representative sample in terms of age, gender, ethnicity and socioeconomic status. The sample was composed of 54.7% of women; with the average age of 33 years, almost 10 years of education and 34% of people having a relationship with the wind farm industry. Ten local students contributed to the design and administration of the questionnaire.

Lastly, the third stage involved participatory workshops with members of the three communities to further triangulate, complement and collectively analyse data collected during the two first stages. This methodology helped clarify quantitative results, such as understanding the reasons why respondents do not participate in decision-making in relation to wind farms even though they find this of value. The participation of the local population in the design, administration and analysis of information during stage 2 and 3 contributed to ensure a bottom-up approach of the research design and findings. Participatory efforts facilitated the recognition and validation of indigenous voices and knowledge [81–83]. This was essential to question ‘Western’ norms [84] and identify conceptions of well-being that are very different from the ones held by wind energy developers, governments, and the research authors. It also guaranteed that the language of the questions

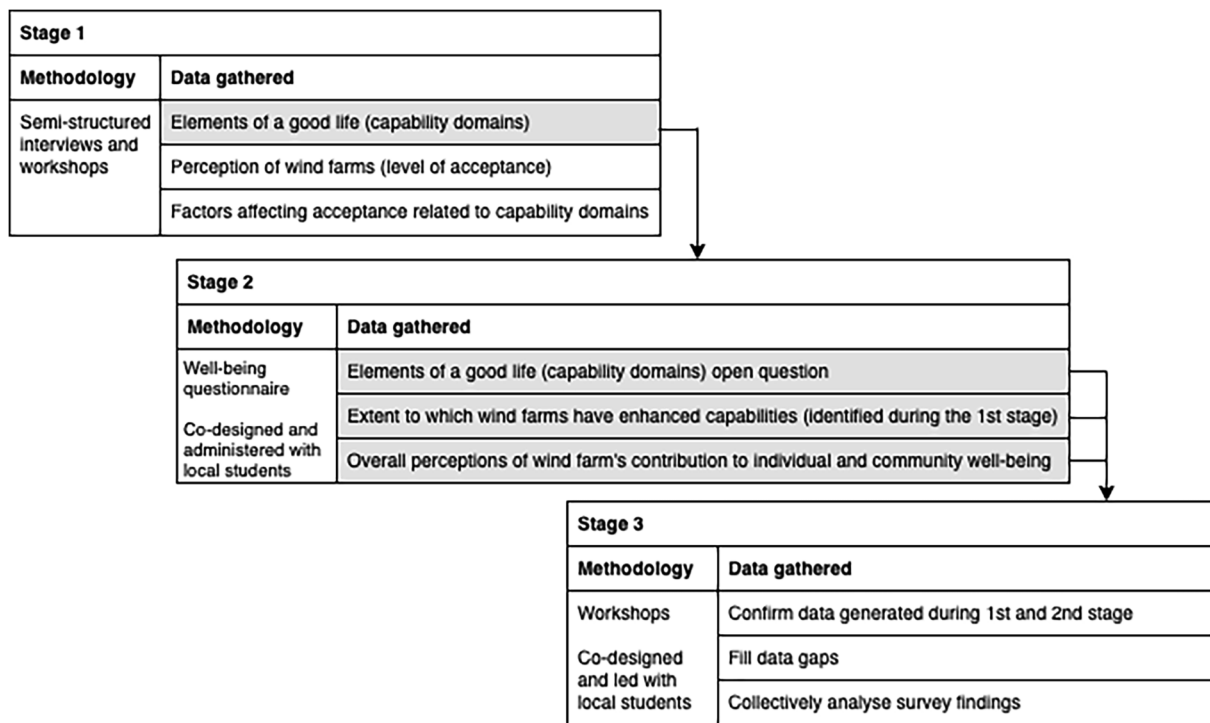


Fig. 2. Research methodology Source: constructed by the authors.

were clear and adapted to the local context while improving trust and learning, which are key to improving the quality of knowledge [85]. For instance, income is a foreign concept in the region. The idea had to be defined in the local language to relate to the western definition and the data collection methods were adapted to delve into local conceptions of money.

3.3. Data analysis

The data was analysed through three main steps. First, the qualitative data collected during the first stage was broken down using the NVivo software to code valued capabilities and factors affecting acceptance of wind energy according to central topics. This data was then collectively analysed, synthesized, and confirmed through the workshops using participatory tools such as matrix scoring and ranking [86]. Second, quantitative data was analysed by conducting chi square tests to compare the values of the variables of interest across the three communities. Third, data collected from Stage 1 and 2 was then paired

and jointly analysed using the Gioia Methodology [87]. This led to the theoretical framework (see Fig. 3).

To build our theoretical framework, a bottom-up compendium of nineteen first-order concepts emerged from the systematic coding procedure of the raw data, which correspond to people’s concerns about wind energy siting in the region and which thus affect community acceptance of wind energy. These were organised into second-order, theory-centric energy injustices. These injustices were then assigned to their corresponding tenet of energy justice. Note that some energy injustices may connect to various tenets, as represented in Fig. 3 by the overlap between the tenets. For instance, insufficient access to information can also be viewed as unequal distribution of information. In parallel, people’s valued capabilities identified through all three data collection stages were matched with the energy injustices, unveiling capabilities that have been constrained by the establishment of wind energy projects.

Indeed, these energy injustices can also be viewed as capability deprivation, and its relationship is reciprocal (hence the two-way

Table 3
Semi-structured interview respondents.

Actor	Type of participant	No. of interviews
Community	People who live near wind farms (three communities)	25
	Land tenants (three communities)	14
	Agrarian authorities	3
	NGO's and collectives (three communities)	5
	Wind energy developers	Local representatives (eight companies)
Wind energy developers	National representatives (eight companies)	13
	State and National Government	Local government (three communities)
State and National Government	Government of the state of Oaxaca	5
	Ministry of Energy	1
	National Commission for the Development of Indigenous People	1
Academia		6
NGO's (National)		4
Total of participants in semi-structured interviews		103

Source: constructed by the authors

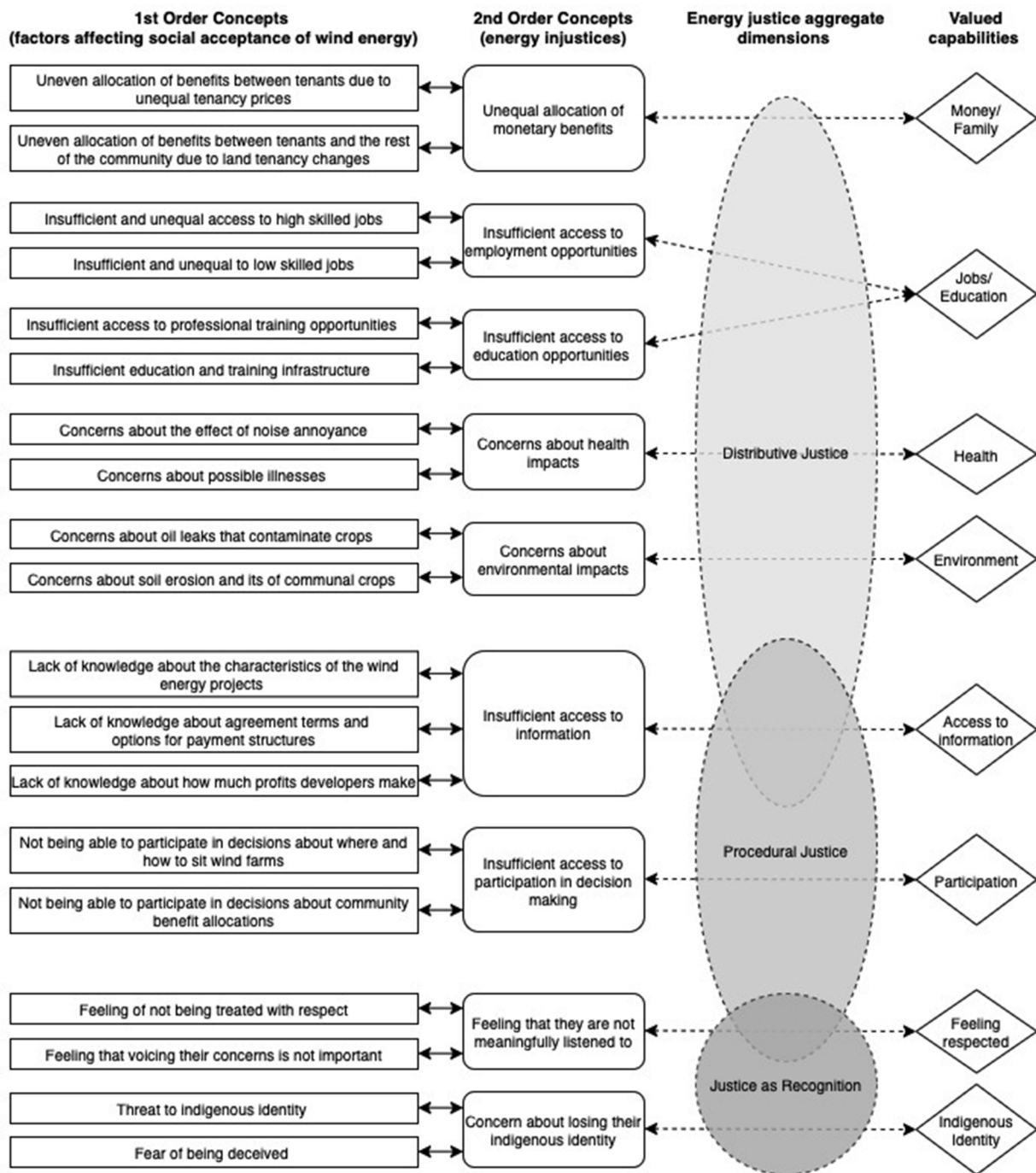


Fig. 3. Local people’s concerns about wind energy siting, and their relationship with energy justice tenets and capabilities. Source: constructed by the authors.

arrows). Understanding the process through which capabilities are constrained by the establishment of wind energy developments enables policy-makers to assess the points at which wind farms may conflict with means for well-being attainment, and thus provide a more in-depth, bottom-up explanation for reasons for opposition. Following this reasoning, enabling capabilities can be a way to eliminate injustices [16], possibly enhancing community acceptance. For example, the uneven allocation of benefits between tenants and the rest of the community affects community acceptance. Using an energy justice approach, this can be related to the energy injustice of “unequal allocation of monetary benefits”, which is linked to the tenet of distributive justice. This injustice constrains local people’s valued capability of diversifying their access to money. Thus, enabling a more equitable distribution of monetary benefits may enhance important capabilities

affecting community acceptance. In parallel to this coding, a cross-case analysis was conducted to highlight the major differences between the communities in terms of the theoretical dimensions previously highlighted. Finally, additional consultations of the literature were done to refine the articulation of emerging concepts and relationships.

4. Results

This section first presents findings from all three stages of data collection in order to have an overview of the capabilities valued by the communities and their perceptions of the impact of wind farms on these capabilities. It then shows how the discussion of people’s capabilities within the framework of the three tenets of energy justice can lead to an improved awareness of justice implications related to the acceptance of

energy technologies in indigenous communities, paying particular attention to differences across communities.

4.1. Capabilities in the Isthmus of Tehuantepec and concerns about wind farms

Survey participants in the three communities reported similar responses when asked which capabilities they perceived as most valuable, although our interviews and our participatory workshops highlighted notable differences across communities in the reasons why these capabilities were valued (see Table 4). Health was considered as an important capability in all three localities, and across methodologies, due to its instrumental value to enhance other capabilities. Family, the second most important capability in the survey, was intrinsically valued for its contribution to well-being and harmony, according to our interviews. Having a job was mentioned as the third most important capability in the survey but was seen differently in the three communities. Work in El Espinal and Unión Hidalgo was mentioned in reference to effort and avoiding “taking the easy path of corruption” [88], whereas people in Santo Domingo Ingenio regarded having a job as a stable source of income but was not linked to effort or honesty.

Although education was ranked only fifth in our survey, several interviewees mentioned it as an important instrumental capability, for reasons that differed across communities. People in El Espinal considered higher education important in order to get a job. In Santo Domingo Ingenio, education was seen as a form of status, a sign of success, and as an instrument to “avoid being fooled by the government” [89], whereas in Unión Hidalgo, it was mentioned as a capability in reference to children’s access to basic schooling. Similarly, money, the fourth most valued capability in our survey, was seen in El Espinal as a way to afford “luxuries” such as eating at a restaurant, going to the movies, or travelling. In Santo Domingo Ingenio, money had two connotations: to provide food and basic goods for the family, and “to live the good life” which is linked to “alcohol and women”. People in Unión Hidalgo mentioned the importance of money to live a dignified life which includes good food and basic education, but that is not necessarily a source of happiness.

Fig. 4 confirms discrepancies between communities about the perceived impact of wind farms on well-being and the resulting negative attitudes towards the industry. Residents in Unión Hidalgo, the locality with the highest opposition level, perceive lower positive impacts associated with the introduction of the wind energy industry than

Table 4
Results from the open survey question: What is the most important element of a good life?

	Unión Hidalgo%	Santo Domingo Ingenio %	El Espinal %	Total %
Health*	36 ^b	55 ^a	35 ^{ab}	41
Family	23	24	35	28
Jobs	17	4	6	9
Money	5	5	4	5
Non-recognition	5	3	7	5
Life itself	4	2	3	3
Education	2	4	1	2
A good environment	4	1	1	2
Religion	0	1	4	2
Well-being	2	0	1	1
Housing	2	1	0	1
Eating	0	1	1	1
Happiness	0	0	2	1
Safety	0	0	0	0

Source: constructed by the authors. N = 358. Surveys with responses that were unable to be ranked were excluded. * indicates significant differences across the three communities using a chi-square test. Values within rows with different lowercase superscripts are significantly different according to Bonferroni multiple comparisons test with a significance level of p-value < 0.01.

residents in the other two localities across all valued capability dimensions. The observed differences between El Espinal and Santo Domingo Ingenio are not statistically significant. The perceived positive impact of wind farms on individual well-being does not significantly differ across communities, whereas the perceived positive impact on collective well-being is statistically much lower in Unión Hidalgo. This finding suggests that the impact of wind farms on communities is primarily experienced collectively and can also be related to the conflicts between the collective traits of local traditions (communal ownership of land, consensus-seeking decision-making) and the more individualised approaches promoted by the wind energy industry (see Sections 4.2.1 and 4.4.3). Perceptions of the positive impact of wind farms on local culture are also much lower in Unión Hidalgo. Given that the percentage of indigenous population is larger in this locality, this result suggests that the perception of wind farms as a threat to indigenous culture is particularly strong within this community. It can also be related to the different ways in which the three communities have been colonized (see Section 4.4.4.).

4.2. Distributive justice

The most explicit concern voiced by the three communities in this study is the uneven distribution of benefits and ills arising from the wind energy industry. Wind farms brought numerous benefits to the local economy. However, these were not equally distributed among local people affected by these developments. In contrast, ills were felt by the wind farm neighbouring population as a whole. This situation resulted in growing inequalities between beneficiaries and non-beneficiaries that have often generated negative attitudes towards wind farms, as these interviewees explained: “The issue is not about whether people want or not wind farms, it is about the distribution of their benefits... Before everyone was equal in poverty.” [1]. “Benefits should be given to all the local population and not only to landowners since ills derived from the wind energy industry affects us all” [90].

4.2.1. Concerns about the distribution of benefits

Money and family. The land tenure situation in the Isthmus of Tehuantepec is not clear. Most of the land designated for the development of wind farms was historically communal. Indeed, collective access and ownership to land is considered an aftermath of the Mexican Revolution [91]. However, in 1994 agrarian reforms enabled individual farmers to sell and buy land [92], which in turn allowed wind energy companies to propose individual land leasing contracts. These contracts resulted in only some farmers becoming tenants, thereby receiving additional income from renewable energy companies. Yet, part of the population still considers land as communal and thus do not recognise tenancy agreements stipulating sole ownership. This situation has caused unrest among other farmers and the local population who have raised concerns about who has claims over these benefits, resulting in hostility towards future wind farm construction. Inhabitants of Unión Hidalgo are particularly concerned with the land tenancy allocation since it is the community that has the largest proportion of communal land of all three communities. To regain their claim over the communal land, they have strengthened the figure of the representative of communal property and re-established monthly communal meetings. These spaces are now used to articulate actions against the development of new wind farms.

The most important effect of the unequal monetary benefit allocation has been the weakening of the social fabric, particularly in the form of family ties. For instance, there have been growing tensions over land inheritance among household members, and at times, one or several family members do not agree in signing a contract with a wind energy company, thus causing internal divisions. This is particularly significant in this region given the importance that local residents confer to family and social networks, which was the second most important capability dimension raised in the survey. Alfonso, a master’s student in Unión

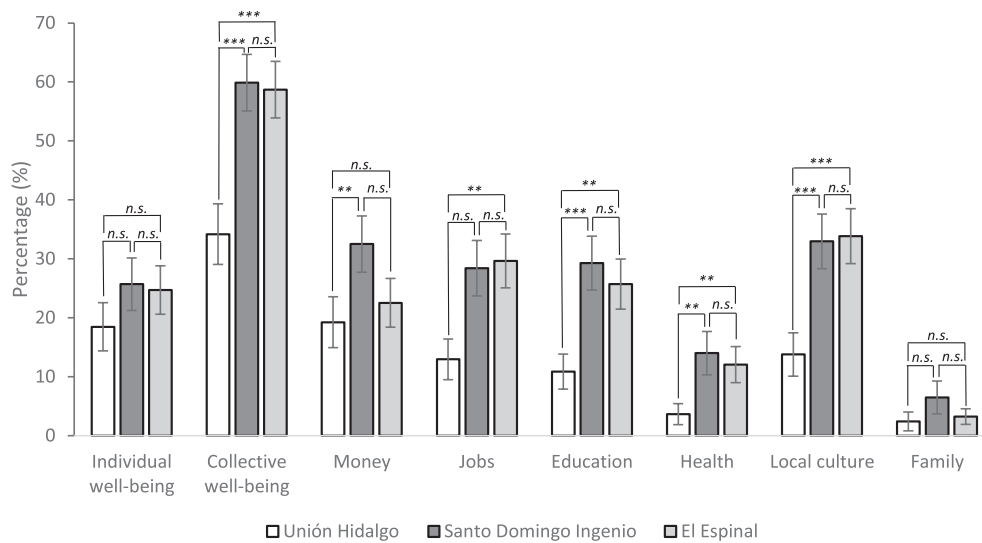


Fig. 4. Perceptions of positive impacts of wind farms on valued capability dimensions. Source: constructed by the authors. N = 382. n.s. = not significant. *** p-value < 0.01. ** p-value < 0.05. * p-value < 0.1.

Hidalgo described this situation using the following words: “If there is no cordiality in a family, how can there be a community?” [93].

Jobs and education. When wind energy developers first arrived in the Isthmus of Tehuantepec, jobs were offered as one of the most important trade-offs due to the prominence of employment as a valuable capability in all three localities. The state of Oaxaca has the highest informal sector employment rate in Mexico, accounting for 81.6 percent of the working population [74]. Residents in the Isthmus of Tehuantepec were thus eager to access more formal and better-paid work. However, while employment was widely available during the construction phase of wind farms, this lasted for approximately two years, and only left an average of 1.6 percent of all temporary workers permanently employed.⁵

Employment in the region generally grew by 64.31% between 2010 and 2015, when nearly all wind farms were built, linked to manufacturing, commerce, and non-financial services.⁶ However, jobs did not grow at the rate of residents’ expectations. This led to concerns about unequal and insufficient access to employment opportunities. For instance, highly skilled jobs are usually only entrusted to foreign workforces brought in by wind energy developers. Firms argue that local workers do not have the required skills to perform essential duties such as training for working at height. However, local residents regard this decision as unreasonable given the need for local employment and the possibility of local people acquiring expertise through training. Furthermore, developers offer the few available low-skilled jobs to tenants or their relatives as currency to avoid farmers blockading roads to wind developments. The uneven distribution of jobs affects community acceptance of further developments, since non-beneficiaries no longer see employment as a widely accessible benefit of the wind energy industry. Moreover, this further widens the economic gap between land tenants and the rest of the community.

Education was also categorised as a valuable capability in all three communities due to its instrumentality to increase access to formal employment. And, at the same time, 14 per cent of respondents considered education as one of the most important unfulfilled capabilities in their life due to the lack of access to education in the region. The state of Oaxaca has an average schooling of 7.5 years, a rate significantly lower than the national average of 9.2 years. Furthermore, 13

per cent of the population is illiterate [74]. People in the Isthmus of Tehuantepec believed the wind energy industry would be an opportunity to access skills training that young people would not otherwise have, and which would enable them to access qualified jobs in the industry. Interview participants recounted people that have been trained locally and are now employed in the industry in other countries.

In El Espinal, average access to education is higher, and this municipality thus secured more jobs in the wind energy industry compared to Unión Hidalgo and Santo Domingo Ingenio. Moreover, developers in El Espinal have engaged in several initiatives for children with a focus on environmental education, such as producing books for basic education level on renewable technologies and promoting engineering programmes such as robotics competitions. These initiatives have become popular among local schools since they are a way of training future generations for participation in the industry’s qualified workforce. Conversely, school directors in Unión Hidalgo indicated that these kinds of initiatives have not been promoted in their municipality.

4.2.2. Concerns about the distribution of ills

Health. According to our survey, health was the most important capability dimension in all three communities. Furthermore, qualitative data revealed that assumed negative impacts on health now and in the future constituted one of the main factors affecting the acceptance of wind turbines. Only 10% of survey respondents reported a positive impact of wind farms on access to health information or services. This may signal a lack of investment by the wind energy industry in health, which, if rectified, might increase the social acceptability of wind energy. Yet, perspectives about health concerns vary among the three localities. Concerns about noise annoyance were mainly raised in Unión Hidalgo, while Santo Domingo Ingenio residents were mainly worried about oil leaks that could pollute edible crops, and possible effects of electromagnetic fields that they fear could cause cancer. By contrast, residents in El Espinal did not raise major concerns, but wanted further research done to assess the extent of wind energy impacts. These differences in the three communities’ reactions may be explained by the short distance of the first turbine to both towns (500 m) as opposed to the distance of the closest wind farm to El Espinal (2 km).

Environment. Oil leaks from wind turbines can pollute soil and water where crops are grown. Furthermore, water currents need to be channelled to avoid the infiltration of turbine foundations, which can reach six metres in depth. The resulting scraping and concrete filling

⁵ Survey results in file with the authors.

⁶ while in the state of Oaxaca grew 53.7% in the same period [108].

can produce accelerated soil erosion [94]. Local residents believe that channelling water has affected water availability in the region and contend that the amount of concrete that has been injected into the soil has had an impact on the land humidity needed for soil fertility. This specifically may explain the higher opposition to wind farms in Unión Hidalgo, known for producing crafts made of palm taken from a natural palm forest of 829 ha, growing 3 km from the municipality. Inhabitants have engaged in palm weaving for more than a hundred years and the occupation constitutes the livelihood of at least 50 households, especially elderly people [95]. Nevertheless, palm productivity has decreased in the last ten years and residents in Unión Hidalgo blame the lack of humidity due to wind farms as the main cause of this decline. Given the perceived and actual effects of wind farms on livelihoods, wind energy opponents argue that turbines should not be installed near sites that constitute people's livelihoods, such as agricultural land, forests and lagoons, or fishing coasts.

4.3. Procedural justice

4.3.1. Access to information

Inhabitants in all three municipalities asserted that access to relevant information is a key factor affecting attitudes to wind energy. Specifically, respondents mentioned the need to have access to data about the characteristics of the wind energy project itself (size and location of turbines), details about payments and contract options, the exact earnings of developers in case lease payments are done based on a percentage of profits, health and environment impacts, and the types of available remediation measures. Nevertheless, developers have failed to provide access to this information effectively. Respondents concurred that companies have resorted to a strategy that entailed limited access to data to ensure that tenancy prices and other benefits remained low, and to avoid further negotiations on remediation measures. Developers representatives believed that the less interaction with the affected population would result in less disagreements. Instead, this lack of access to information channels has resulted in the creation and reinforcement of myths about negative impacts of wind energy developments (e.g. electromagnetic fields that could cause cancer⁷). These resulting misconstructions have gone both ways since by concealing informational spaces, developers hindered the chance of acquiring more information about the local population.

All three communities have had different levels of access to information that have triggered contrasting degrees of community acceptance. People in El Espinal have resorted to more information channels due to their higher levels of education and knowledge of legal instruments to make information requests. Though Santo Domingo Ingenio does not have the same level of education as El Espinal does, their proficiency in Spanish allowed better comprehension of technical terms and the possibility of expressing doubts more readily. In contrast, people living in Unión Hidalgo feel unsure about making formal information requests since tenants have only finished primary school and, for the most part, Zapotec is their first language.

4.3.2. Access to meaningful participation

Though residents in all three communities have expressed their interest in participating in decision-making related to how and where wind farms are installed, our survey results show that 85% of all respondents have partaken in these processes (a comparable rate for all three communities). Even though local culture among the three communities holds higher regard for collective decision-making, the few existing participation processes have unfolded in the three communities differently. In El Espinal local government intervention in decision-

making has allowed a more democratic process which have in turn favoured community acceptance. In contrast, public deliberation processes in Santo Domingo Ingenio and Unión Hidalgo conducted by national and local governments about how wind farms are installed and benefits shared are lacking or have been conducted in ways that has caused public apathy or even active opposition.

For instance, since the arrival of the wind energy industry government, El Espinal appointed a "social committee" integrated by main business owners in the town and cultural associations as well as representatives of wind energy developers to define a "list of priorities" that would guide the development of the township. By contrast, in Santo Domingo Ingenio and Unión Hidalgo, solely the mayor has been responsible for making decisions on when to use resources received by wind energy firms and how. This unilateral decision-making practice clashes with the tradition of making relevant decisions about the community by seeking consensus in general assemblies held in public spaces. Yet, governments, developers and residents themselves have failed to generate spaces and procedures that would enable forms for enabling communal agreements. As a result, residents and tenants have grown resentful. In Unión Hidalgo residents have organised protests calling for a more inclusive decision-making process, and in Santo Domingo Ingenio, tenants have blocked the entrance to a wind farm for 60 days given that most of them did not have a say in how community benefits provided by the company to the local government were going to be shared.

4.4. Recognition justice

4.4.1. Recognising an indigenous identity

Being indigenous is an evolving identity that has fluctuated from pride to shame over different years and contexts. Wind energy developers' everyday practices have reproduced colonial based discrimination, which further contributed to the perspective of being indigenous as shameful. Given the history of foreign intervention in the region⁸, these practices have become a significant factor affecting acceptance, since people in the Isthmus of Tehuantepec have progressively regarded the arrival of wind energy companies as a threat to their indigenous identity and culture. Eight respondents consider the new wind energy industry promoted by Spanish and French companies as a third conquest attempt: similar to the former colonial domination, they see developers as part of an extractive industry that benefits only foreign particulars and not the local population, while also favouring divergence to developer cultural traits (Fig. 5). They argue that this conquest is possible given the lack of information and situation of poverty that indigenous people experience in this region. Thus, regardless of their social and economic hardships wind energy opponents have resorted to earlier anti-conquest strategies of resistance to retain their indigenous identity.

Zapotec culture shows its richness in the everyday through the language, regional clothing, food and festivities. Though both El Espinal and Unión Hidalgo have a high percentage of indigenous population, different levels of acceptance can be explained due to their divergent colonial histories and resulting attitudes towards wind farms. Although El Espinal has a rich indigenous background, its historical relationship to the Spanish and French crowns has eased a favourable attitude towards foreigners. The town was first established as a Hacienda⁹ built and owned by the Spanish crown in 1690 [96]. Respondents explain that residents of the El Espinal have progressively ceased to call themselves indigenous and speak Zapotec because of the negative connotation that it entailed during colonial times and still signifies today.

⁷ Respondents also mentioned other effects such as the birth of cattle with two heads and children born without arms (Interview transcripts on file with the authors).

⁸ Spaniard army arrived in 1523 and French in 1866 [109].

⁹ In Spanish-speaking countries or regions, a large estate or plantation with a dwelling house [110].



Fig. 5. “La nueva conquista” (The new conquest) Photo credit: José Arenas López.

On the other hand, Unión Hidalgo was formed of scattered indigenous rancherías¹⁰ that were gathered together by force by the State government of Oaxaca shortly after the war of Independence. Yet, they were never formally colonised or lived under a colonial rule, and thus see developers as a new external threat to their land ownership and the enforcement of indigenous rights. Santo Domingo is formed of people that recently migrated from different municipalities. Their indigenous population only accounts for 5%. Thus, recognition of indigenous culture has not been a key factor for acceptance. Yet, being treated with respect and as equals plays an important trait as it does in the other two remaining communities.

4.4.2. Listening intently

Learning how to listen is crucial when trying to understand people of an indigenous culture that may not only feel uncomfortable speaking another language, but also have another perspective on how ideas are communicated given semantic differences, in this case between Zapotec and Spanish.¹¹ Respondents asserted that developers have often approached local people in ways that made them feel disrespected particularly by not listening to their concerns at satisfaction. A group of opponents explained that this situation has been one of the main reasons for negative reactions against wind farms, and the resulting radicalisation of some of its actions and “unreasonably excessive” requests. Local residents feel that developers dismiss their claims and concerns by cutting meetings short before everyone has had the chance to voice their thoughts, and not informing them about activities that may affect them, such as blocking a road or opening a cattle gate. This echoes the literature showing that the right of being heard and included is a particular focus of people most affected by decision-making processes [97,98]. This, in turn, has a relationship with meaningful participation as an opportunity to be listened to. Study respondents maintain that if they had a space of voicing their concerns about environmental and health impacts, or even to understand payment rates and benefits, they would have a more positive stance towards the industry. “Developers could understand that people in the region can seem difficult at the beginning. Yet, once we are listened to, we become more at ease.” [99]

Opponents in Unión Hidalgo particularly do not feel listened to. When they have attended meetings, supporters of wind energy projects have told them publicly to stop speaking and leave, exacerbating their anger against the wind energy industry. By contrast, in El Espinal all staff working at a wind farm is now required to stop any operations if a farmer has a concern and address it before maintenance work

continues. Though this has meant that operations have to be discontinued during hours or sometimes days, this has proved key for avoiding more significant conflicts that affect negatively community acceptance. This approach requires planning time to listen, has been replicated in sites outside the Isthmus, such as the north of Mexico. Even if concerns are not raised, developers still hold meetings with tenants to make sure that they in agreement with the project.

5. Discussion: The nested structure of justice concerns

The findings also demonstrate the significance of the bottom-up approach that the Sen’s CA can offer to energy justice. The proposed theoretical framework specifies that people on the ground are the ones responsible for defining justice concerns related to RET siting. By extending the three-tenet approach with the CA, energy justice need not be a top-down approach that deviates from the main goals of environmental justice, as the one presented by Jenkins [41]. Rather, operationalising the CA brings back voices from non-academics into scientific debates and decision-making, a key step to redistribute expertise by opening science to participation and make science more accountable to publics [100,101], while also embedding justice into policy. This does not mean that there is no role for top-down institutions. These are notably important to establish “capability ceilings”, for instance when tensions arise between basic liberties and environmental protection [102]. That is, top-down institutions can set the boundaries, which can also be subject to democratic deliberation, within which individual capabilities can flourish. They can also help create the conditions conducive to meaningful bottom-up participation. Indeed, some contextual factors may obstruct people’s meaningful participation to deliberative processes. For example, wider socio-economic and power disparities may undermine participation of the less affluent groups in society [103].

In addition, findings also revealed that the CA does not only enable a more context-specific approach to energy justice, but also allows a better understanding of the relationship between the three tenets: each justice tenet corresponds to a different layer of concerns related to RETs, distributive justice being the most visible tenet and recognition justice the least observable. Further, these layers are interrelated to one another in a nested structure. Indeed, our data showed that concerns about distributive justice are more openly and frequently expressed than those of the other two tenets. When asked about their position towards wind farms, respondents first described how only certain groups were being benefited by the new industry. Subsequently, participants would mention health or environment related risks for all the adjacent population. When asked to elaborate on these concerns about the way in which these benefits and ills were distributed, reasons often revealed underlying procedural concerns affecting wind energy acceptance. For instance, interview respondents explained that prevailing

¹⁰ Native village or settlement [111]

¹¹ For instance, Zapotec has four different ways of referring to the wind, depending whether it comes from the south, the north, or if it is new or old. Conversely, Spanish has only the word *viento* (wind).

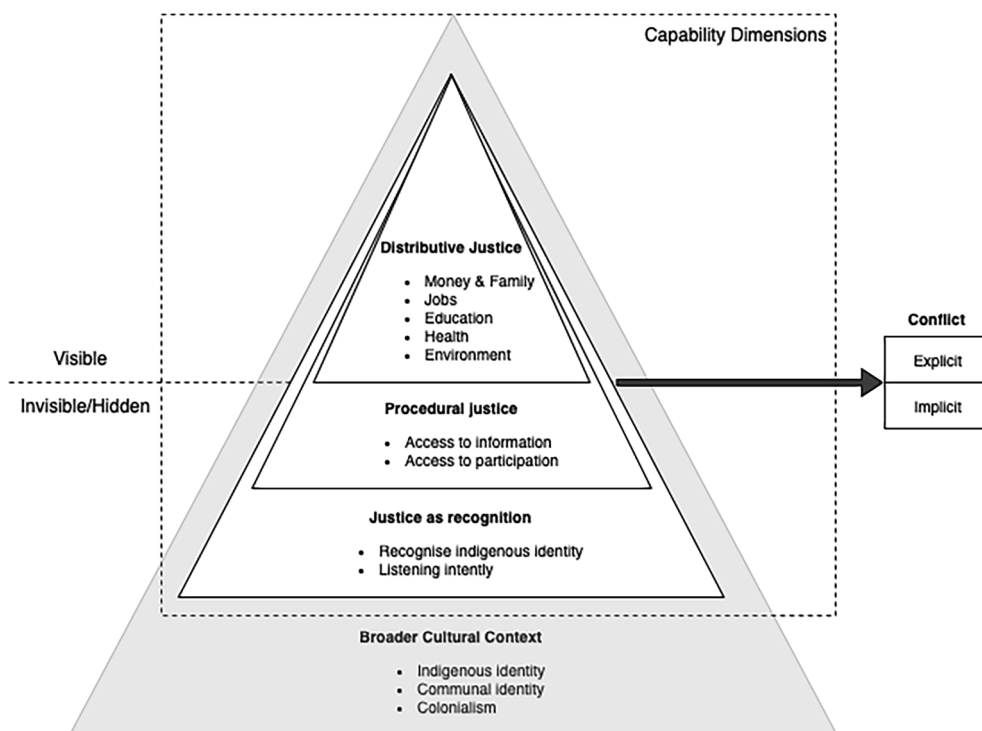


Fig. 6. Capability dimensions of people in the Isthmus of Tehuantepec analysed through an energy justice framework. Source: constructed by the authors.

catastrophic perspectives about negative environmental and health impacts such as soil erosion at grand scale and cancer were a way to legitimise more fundamental needs such as being able to access relevant information, be listened to, and engage in decision-making about their territory.

Findings also showed that concerns about procedural and distribution were embedded within issues associated with recognition justice, suggesting that human dignity precedes other capabilities such as material resources and the way these are distributed. This echoes justice theorists, such as Young [104], Fraser [35,105] and Honneth [106], who argue that the mis-, or mal recognition of people, communities, and conditions is often the core of injustice and that its identification is key to understanding the underlying reasons for maldistribution. Having money, a job, education, and access to relevant information and decision making have all been described by respondents as capabilities needed for the ultimate purpose of having a more dignified life. Findings also concluded that justice concerns were rooted in a wider cultural context. This context is shaped by negotiations about indigenous and communal identity, which are influenced by a resistance legacy to colonialization. For instance, communal ownership of land conflicts with the idea of a new agrarian order of private ownership introduced by the wind energy industry. The tension between the tradition of consensus-seeking through general assemblies and the individualised, top-down decision-making favoured by wind energy developers constitutes another example. Still, only those contextual elements linked to valued capability dimensions affect attitudes towards wind farms.

All these concerns have resulted in conflicts in the Isthmus of Tehuantepec that have a negative effect on the way people perceive wind farms. These conflicts have been often explicit such as road blockages to the access to wind farms, legal battles to reverse leasing contracts or building permits, and media wars between wind energy opponents in the community and developers. At the same time, the analysis unveiled that each of these explicit forms of disagreement preceded a broader spectrum of more implicit forms of conflict, such as the lack of attendance of community members to consultations for the construction of new wind farms summoned by the federal government

and developers, or suggested everyday frictions within family members who are opposed or in favour of wind farms. This is shown in Fig. 6, which represents the three tenets of energy justice in an iceberg-like diagram to reflect the different levels of visibility of the concerns affecting acceptance of wind energy, with distributive justice being positioned at the tip of the iceberg.

In relation to the literature on social acceptance, our results resonate with the critical approaches to social acceptance, which “highlight the importance of always examining what is being said, how, by whom and for whom, within research on people’s responses to RET” [107: 3] and illustrate the need to go beyond the simplistic, utility-maximising visions of opponents or the top-down approaches peoples’ relations with energy infrastructure. They also confirm the urgent need for using a context-sensitive framework such as the CA rather than one size fit all generalisations. For instance, while our results echo Roddis et al.’s [50] finding that costs and benefits of onshore wind farm deployment in Great Britain are not evenly distributed across social groups, higher deployment in the more affluent town of El Espinal counters Roddis et al.’s finding that RET developments are mostly concentrated in deprived areas.

6. Conclusions

This paper sought to build a bottom-up approach to energy justice by operationalising the CA to understand what distributive, recognition and procedural justice mean to people on the ground. Furthermore, the study aimed at illuminating how these justice implications relate to acceptance of energy technologies. Findings confirm the importance of distributive, procedural and justice as recognition, but also show that the CA offers a deeper context-specific analysis of justice issues related to community acceptance of RETs, by enabling individuals neighbouring wind farms to define what justice ought to be. For instance, this approach was instrumental in characterising what kind of informational channels and participation processes people on the ground have reason to value, given their history and culture, and in highlighting the importance of acknowledging and valuing local indigenous everyday life

and communal identity. As our results highlight, who defines justice and how it is defined can have significant consequences on the choices that are made. The bottom-up, subjective and deliberative nature of the CA is thus particularly relevant for building more inclusive definitions of energy justice, ensuring that people on the ground are the ones defining justice concerns, as opposed to developers, NGOs and government officials.

Furthermore, findings empirically recognise how justice concerns linked to valued capabilities are embedded into one another: distributive concerns are rooted in disagreement about the process in which benefits and ills derived from RETs are allocated. In turn, procedural concerns are explained by understanding underlying reasons linked to misrecognition of people's identities and rights to their lands, which are shaped by the cultural context. As a result, the three tenets showed different levels of visibility of concerns affecting acceptance to wind energy on the ground, distributive concerns being the most observable, while procedural and recognition concerns being more implicit or hidden approach.

Admittedly, this research has also some limitations. First, despite the benefits of participatory methods, bottom-up participation in the first stage of the research was limited to young people, due to racial and age relations of power [107]. Only when trust was established through other methods (interviews and questionnaire), other groups in the community resolved to participate in the third stage. Second, our cross-sectional data remains silent about the temporal relationship between capabilities and community response to RETs development. Third, findings are context-specific and cannot be generalised to another setting. These limitations represent various viable avenues for future research on this topic. This future work could replicate our methodology in other geographical contexts or for other types of technologies. It may also operationalise the dynamic nature of the CA to observe changes in capabilities over a period of time and analyse their influence on the social acceptance of RETs. Furthermore, the collective and individual tensions disclosed in the findings could be analysed using a political economy approach. And above all, understating meanings of justice can be complemented by looking at power relations between developers-governments and communities, since solutions related to social justice questions need to address power inequalities.

In terms of policy implications, this study shows that undertaking policies that aim at improving valued capability dimensions may increase acceptability of wind energy. Thus, resulting bottom-up perceptions of justice and injustice of individuals neighbouring wind farms can be key for decision-makers to learn what makes a fair distribution, significant recognition, and due process linked to human well-being when siting RETs, and adapt energy policy to achieve just outcomes for local populations. Accordingly, policy-makers and wind energy developers should also modify their approach by changing their perspectives about wind farm opposition from attitudes that must be overcome, to an empathetic stance that owns people's concerns to address them accordingly. This could be done by creating, early on in the development process of RETs, genuine spaces for participation to provide affected people with opportunities to express the capabilities they value and integrate them in the decision-making processes, for instance through community-led modes of governance, in harmony with local culture and traditions. Though this process may be time- and resource-consuming in the short run, it may be necessary for ensuring long-term sustainability (in its broadest sense) of the transition towards renewables.

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.

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