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Original research article

Participation as a pathway to procedural justice: A review of energy initiatives across eight European countries

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ABSTRACT

The engagement of citizens in the energy transition through a variety of energy initiatives is an important component of a just energy transition. Through analyses of 378 energy initiatives, along with 81 interviews with energy professionals across eight European countries, including Austria, Bulgaria, Greece, Germany, Italy, Norway, Switzerland, and Türkiye, we examine how and in what ways these initiatives address justice outcomes. Specifically, we look at citizen participation as an avenue to procedural justice, which may enable forms or distributional and recognitional justice as well. We critically examine the different forms of citizen engagement put forward by such initiatives, classifying such initiatives into three types: i) demand side action, ii) supply side action and iii) political action. While all forms of engagement are instrumental, the latter two attach greater importance to collective actions and the political agency of individuals. For demand side actions, we find that people tend to be reduced to economic actors subject to top-down directives, given agency in the privacy of their homes through atomized, individual action. Supply side initiatives, like energy communities, may encourage increased citizen involvement, yet they may not fully reflect the ideals of collective political action. Direct participation in shaping energy policies is found to be an avenue towards procedural justice. Yet, it can also exclude female, non-white, lower-income populations unless processes are put into place for fairer representation. Finally, our analysis points to the potential of initiatives that move towards more political and collective actions to deliver energy justice.

1. Introduction

In order to stay within the 1.5 degree celsius threshold, there is increasing consensus on the need to reach carbon neutrality, and even net negative emissions, by the second half of this century [1]. 'Energy transitions' are an integral part of the global efforts towards mitigating climate change. The decarbonization of energy sources and absolute reductions in energy usage, as stipulated in the IPCC 6th assessment report of working group III [2], will require major changes to systems of production and consumption while recognizing system interconnections, interdependencies, and functions [3,4]. The social implications of such transitions require special attention, as they invariably engender various complex and mixed consequences [5,6] related to employment, education, poverty, land ownership and displacement, and health, to name but a few. Since the European Commission's 2019 report, *Clean Energy for All Europeans*, the need for *just* energy transitions has been made explicit in the policy arena. The *European Green Deal* [7] also outlines the need for a 'just and inclusive' transition.

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While different actors have a role to play in promoting a just energy transition, from the public to the private sectors and non-governmental organizations, at different spatial scales, the role of everyday people is a growing field of research and practice. The participation of people, as individuals and as collectives, across systems is often captured under the notion of 'energy citizenship' [8–12]. Here, citizenship is not merely a status awarded by the state that confers a collection of rights; it is defined by active participation. Among the different forces driving a just transition, energy initiatives are particularly important for cultivating and deepening energy citizenship (i.e., strengthening active citizen participation). Broadly construed as projects and activities that directly engage with citizens in the energy transition, energy initiatives work with citizens in activities that aim at reducing energy use, producing renewable energies among others. In recent years, energy initiatives have proliferated across Europe (e.g., [13,14]), but how and in what way different forms of energy citizenship embodied in various energy initiatives might help achieve a just energy transition as a normative aim, is understudied.

The purpose of this article is to examine how energy initiatives across eight European countries (Austria, Bulgaria, Greece, Germany, Italy, Norway, Switzerland, and Türkiye) account for a just energy transition. Specifically, we use procedural justice and its interrelations with recognitional and distributional justice [4,15] to examine how and in what ways these initiatives recognize and address the needs of different social groups and the unequal distribution of environmental benefits and disadvantages, and uncover ways in which underrepresented groups can be further engaged. To answer these questions, we analyze the aims and activities of initiatives in a database of 378 energy initiatives, as well as in-depth interviews with 81 energy professionals in these eight countries.

The following section reviews key theoretical and empirical studies of energy justice. We then detail our methodology, followed by a presentation of the results, which shows how a just transition has consensus in theory, but also plays out in practice in at least three different ways. Finally, we discuss enablers and deterrents for energy citizenship in a just transition before concluding with policy implications.

2. Approaching procedural justice: Conceptual and empirical review

Building on extensive works in the fields of environmental and social justice [16–21], energy justice is now an established field of research that draws attention to aspects of unfairness and inequalities in energy systems and transitions within society [4,15,22]. The 'triumvirate of tenets' of energy justice, encompassing distributional, recognitional and procedural justice, is now a well-established theoretical framework in energy research. Starting with the three tenet approach as a framework to identify and classify energy initiatives under examination, we focus on procedural justice as a facilitator of other forms of justice [23].[1] Instead of evaluating outcomes in substantive justice, we build on theories of procedural justice to look at how just the institutional processes and procedures of decision making are. Thus, issues of representation, recognition, and structural conditions of inequity come to the fore [27,28]. In this way, procedural justice can be thought to enable substantive justice through offering possible avenues and procedures for including historically marginalized communities and constructing solutions to counter structural inequity [25].

In the following sections, we unpack the different facets of procedural justice, to then summarize our approach alongside a discussion on its interrelations with distributional and recognitional justice.

2.1. Procedural justice

Procedural justice generally concerns public participation, due process, and representation [29]. Procedural justice's normative aim is to ensure all groups are able to participate in decision making, and that their decisions carry weight. To achieve this goal, it is first crucial to establish robust legal and regulatory frameworks that guarantee participatory rights of all people to contribute to decision-making which affect their everyday lives (e.g., access to energy services, energy transition, energy infrastructures [30]). Furthermore, the adoption of principles across decision-making spaces that ensure the integrity, transparency and accountability of participatory processes is also key [4]. Here, the robustness of legal frameworks that protect citizens' participatory rights also become significant [21].

While procedural rights are codified and guaranteed in legal and regulatory frameworks, and participatory principles are put in place to encourage citizen participation in the energy transition, much empirical research has identified a multitude of challenges to achieve energy justice in reality. Studies have shown that energy policies are usually deliberated and decided upon in governmental and industrial elite circles. Those outside of fossil fuel networks and policy-making spaces tend to be excluded or misrepresented in participatory processes and might not benefit equally from an energy transition [31]. Lack of technological literacy and capacity building, and cultural norms can also limit participation of individuals and groups [21]. Particular attention has been paid to women in energy policies, where social and gender norms have limited their representation in bodies of energy decision-making as well as in energy research [32–35]. The conditions for procedural justice are therefore manifold, including rights and regulations, capacity building, technological literacy, and accountability to different social groups, to name but a few.

At the community level, Renewable Energy Communities (RECs) continue to be dominated by men with high incomes and education levels, with women, minorities and younger people highly underrepresented in membership [36,37]. In some cases, this may be due to a blind spot in terms of recruitment (such as not accounting for including under-privileged and under-represented groups); in others, RECs intentionally seek the more affluent, professional class in their membership and leadership to maximize their 'practical capacity' (e.g. time, money and expertise) [38]. Compounded and structural barriers exist for the highly-deprived and marginalized to actively engage in the RECs. For instance factors such as having a low income, unemployment, disability, insecure housing often exacerbates each other and lead to cumulative vulnerability that disengages these households from participating in any initiative, unless intentionally incentivised [39].

In addition to inclusive energy decision making (and due process), procedural justice also concerns the quality and degree of participation, and the extent to which the inclusion of citizens actually translates into decision-making power. Arnstein's ladder of citizen participation warns against the danger of simply being included and represented, which can amount to 'manipulation' and 'tokenism' [40]. The degree and quality of participation often play out through the different 'domains' of citizen participation. Energy initiatives can enable, facilitate or channel citizens' participation in three different 'domains': i) participation through demand side actions, such as information campaigns to incentivize energy-saving behaviors and the uptake of energy efficiency technologies; ii) participation through supply side actions, such as RECs that generate, produce, distribute or invest in renewable energy; iii) participation in energy politics, such as the organisation of citizen assemblies or social movements for just transition. Involving citizens through consultation and information campaigns – as opposed to engaging citizens in the co-design and production of local energy policies – entail varying degrees of participation and imply varying decision-making power, which will likely produce different participatory outcomes.

[1] The three-tenet approach is one of many to examine energy justice. Sovacool and Dworkin's [22] eight principles for energy justice, or Jones's [24] prohibitive and affirmative principles are other notable frameworks to conceptualize energy justice. Others have used the capabilities approach to think about energy justice [25,26].

To illustrate the above point, empirical research shows that in the absence of quality participation, legitimate concerns of local communities about energy development have been consistently brushed aside as NIMBYism (Not In My Back Yard) and ignored across different countries [4,41–43], while coherent procedural mechanisms that allow adequate public expression and participation lag behind "rational" or "efficient" planning considerations driven by market interests [44–46]. Accordingly, our analysis distinguishes between energy initiatives that focus exclusively on information and consultation and those that facilitate and enable citizens' participation in collective decision making that affects the policies that shape *systems* of energy consumption and production (often through supply-side and political action). This analytical approach is also congruent with the concept of energy democracy, which centers the rights and responsibilities of citizens to shape energy systems [47,48]. It could be said that procedural justice at the level of energy initiatives embodies energy democracy (as a process), and contributes to energy democracy as a goal [49].

2.2. Approaching energy justice: Interconnections

Closely linked with procedural justice, is distributional justice and recognitional justice. Distributional justice calls for equitable allocation of 'goods and ills' concerning energy production, distribution, and usage. Energy – such as clean, renewable energy – can be considered a primary good to which each citizen should be provided sufficient and equal access, as the services provided by energy are central to human well-being [15,50]. Further, social goods – such as employment, training and other opportunities – and economic goods – such as subsidies and credits related to energy – are also key. Empirical studies have already observed the unequal distribution of goods: for instance, new employment in the renewable energy sector is minimal for underprivileged communities due to a lack of technical know-how and information asymmetry, and there are many cases in which higher-income households seize access to low-carbon and energy-efficient technologies [41,51,52]. When it comes to the 'ills' or negative externalities of energy transitions, it has been well documented they are disproportionately borne by disadvantaged groups and individuals: indigenous peoples, communities of color, and low-income communities are those who experience the most injustice in the deployment of renewable energy, in terms of access, land dispossession, among others [46].

Recognitional justice concerns the identification of sections of society or social groups that have historically experienced denial of equal respect, rights, and opportunities and continue to be sidelined or misrepresented. In the context of an energy transition, recognitional justice emphasizes efforts to understand the different and specific needs of certain social groups (such as the elderly, the chronically ill, ethnic minorities, women, and sexual and gender minorities) and to ensure their fair representation decision-making processes [4]. It also entails identifying vulnerable groups whose vulnerabilities may be worsened due to energy policies [29]. For instance, there is a gender dimension to energy poverty and questions of recognitional justice: more women than men are struggling to afford the energy services they need in Europe, and elderly female-headed households are most affected by rising energy costs [54].

The three tenets of energy justice are also indissolubly interlinked. Recognitional justice is the foundation for distributional and procedural justice, for the reason that non-recognition of injustices and marginalization invites the potential for procedural and distributional injustice [42]. On the other hand, distributional justice cannot be achieved through recognition alone – it must be enacted through just procedures, whereby historically marginalized and diverse communities are guaranteed equal rights and empowered to participate fully in decision-making processes. The directionality of the interrelations between the three tenets is contested in the literature [53] - one form of justice often engenders and/or is predicated upon others for its achievement.

We identify procedural justice as central to other forms of justice, as can be seen in our analytical framework (Fig. 1). Being critical of how environmental goods and ills are distributed would help identify which groups need to be represented in decision making processes. In a similar vein, looking at which groups are under- or overrepresented in decision making processes can help illustrate how inclusive these spaces are [21]. Refusal to participate in participatory procedure, as a form of protest by vulnerable communities, for example, can also be a way to highlight historical recognitional injustice [54].

Our analytical framework (Fig. 1) is adapted to our data focusing on energy initiatives – broadly construed – with the intertwined and compounding sources of vulnerabilities treated as cross-cutting variables across the analyses of justice. We mainly analyze procedural justice and its distributional outcomes. With such an analytical approach, we can also gauge recognitional justice (or its lack thereof) as it is often implicit or implied in initiatives' activities. Such forms of justice also have more observable outcomes.

For *procedural justice*, we analyze: i) dynamics of inclusion and exclusion in energy initiatives for different social groups; ii) the domain and degree of participation promoted by the initiatives; iii) the representation of underprivileged groups in the initiatives' own governance structures. For *distributional justice*, we pay attention to activities in the following three areas: i) access to energy services and products (e.g. locally-produced renewable energy, energy-efficient technologies and renovations); ii) access to social goods, such as employment, training and other opportunities; iii) access to economic goods (e.g., reduced fees, subsidies and credits related to energy); iv) distribution of various negative externalities (e.g., energy poverty, the siting of energy projects). Our approach could be seen as identifying procedural justice within and beyond energy initiatives [55]. We rely on procedural justice to examine the complex and varied ways energy initiatives embody different tenets of energy justice in Europe. Our approach is congruent with the conceptual tools developed in existing studies that empirically examine energy justice in the cases of RECs [56,57] and national green transition policies [29].

3. Methods and procedures

In order to assess how energy initiatives across eight European countries contribute to a just energy transition, this study considers countries that were represented in the H2020 (Anonymized) project, which aimed to represent different parts of Europe (northern, central, southern and eastern). Our analysis draws from three sources of data: first, semi-structured in-depth interviews ($N = 81$) with individuals working in a professional capacity on the energy transition in eight European countries (Austria, Bulgaria, Greece, Germany, Italy, Norway, Switzerland, and Türkiye) ('energy initiative professionals'); second, comprehensive country reports ($N = 8$) summarizing these interviews generated by research partners; and third, the analysis of a database of energy initiatives ($N = 378$) in the same countries. This qualitative study required streamlining data collection across the eight countries; for the purpose of this article, it is not possible to provide much depth to the different energy contexts in each of these countries; nevertheless, the analysis of this triangulated data provides some insights on national differences in how energy justice is being put forward through energy initiatives.

Before we detail the different data sources and our procedures, we explain what we mean by the term 'energy initiatives'. Following the definition developed by [14], energy initiatives are broadly construed as ongoing or recently concluded projects, programs and activities that *directly engage with ordinary citizens* in the energy transition with the aim to lower energy-related carbon emissions where households are concerned. In some instances, these initiatives can be self-organized by citizens or collectives of citizens, for instance, RECs; in other instances, they can be designed, funded or implemented by 'professionals' who might involve citizens with different degrees of participation, for instance, a campaign launched by a utility company for energy

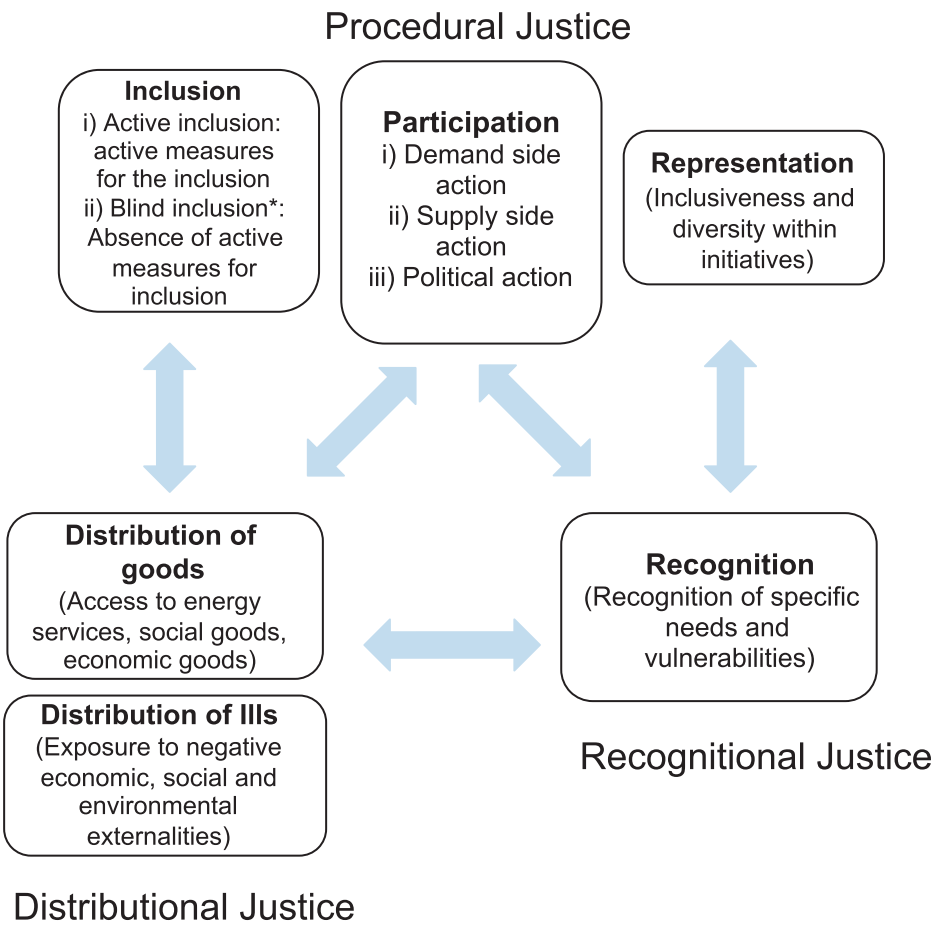

Fig. 1. Analytical framework - Using procedural justice to examine justice outcomes in energy initiatives.
Source: Authors.
*Blind inclusion is considered as a form of procedural injustice.

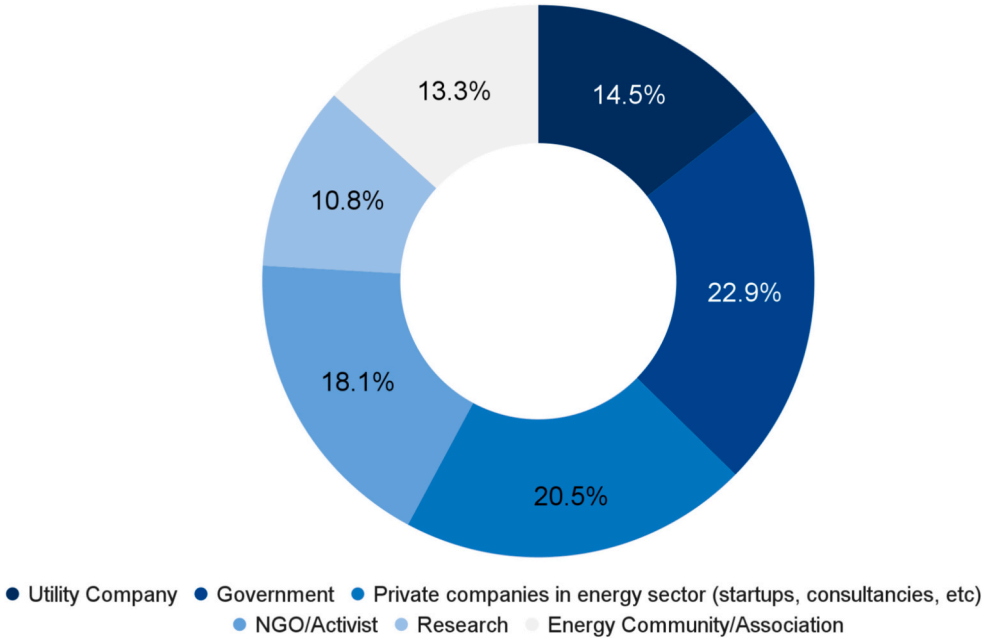

Fig. 2. Sectoral background of energy initiative professionals interviewed.
(Source: Authors)

conservation, or a project implemented by a local association to address energy poverty. Energy initiatives can be implemented at different scales (local, regional, national), for different objectives, with different target groups and durations.

Following a common operational guideline for recruitment, purposeful sampling was used to identify people working either directly or indirectly with energy initiatives. Interviewees were selected on the basis of relevant expertise, institutional diversity (public authorities, private companies, NGOs, associations), engagement with citizens, and accounting for gender balance. The sectoral distribution of the interviewees can be seen in Fig. 2, based on a tally of their professional background (see the appendix for a full list). There was a focus on recruiting an equal number of women, to fully represent their perspective, as they have been historically underrepresented in the energy sector [34,58,59]. Interviewees were contacted by the respective research team in each country, and snowball sampling was used to reach out to additional participants.

All interviews followed a common methodology and operational protocol, starting with questions about the professional's occupation and moving towards more reflexive comments on energy justice. For example, the interviewees were asked to reflect on diversity and inclusiveness in their own organizations, in the energy sector, and in how they understand the energy transition. Each interview complied with the EU's General Data Protection Regulation (GDPR, 2016/679) and national legislation; when necessary, research teams also obtained approvals from ethical committees within their respective organizations. All 'professional' interviews were conducted in the language(s) of the country, then fully transcribed and translated into English based on recordings gained through informed consent. The collected data have been anonymized and de-identified.

Research partners in all the involved countries also delivered a *Country Analysis Report* following a unified reporting template. These reports detail the recruitment process and the professional profiles, provide a rich landscape level analysis of the country's energy transition, and above all, provide testimonies from the energy professionals on a range of important issues related to energy justice (with original quotes). Our analysis relied on both the country analysis reports and interview transcripts, following a codebook developed based on the analytical framework; we also identified enablers and deterrents – from the more personal to the more structural – to a just transition. The first two co-authors independently coded the data using both deductive code (to map justice outcomes) and inductive codes (to identify barriers to inclusion) in ATLAS.ti for researcher triangulation. Then, thematic analysis was used to arrive at the results.

Turning now to the database of energy initiatives, the authors were permitted to use a database created by the European research project ENERGISE between 2016 and 2019, which includes more than 1000 energy initiatives across 30 European countries (EU27, Norway, Switzerland and the United Kingdom). As such, the database covered all countries involved in this research except for Türkiye. From 2021 to 2022, the authors of this research updated the existing database with at least ten more initiatives identified per each of the eight countries considered following the same sampling strategy, with additional ones for Türkiye (for more details on the database, see [14]). A total of 378 energy initiatives, encompassing existing and newly added initiatives in all countries involved in this research project, were analyzed for the purpose of this paper. The database includes a variety of initiatives with diverse scopes, scales, objectives, and activities. We primarily focused on the following categories of information: 'short description', 'objectives', 'target groups', 'target areas', 'scale of the initiative', 'type of participation' and 'outputs'. We followed the same codebook used for the analysis of interviews; for both data sources, researcher triangulation was used: the first two authors of this article participated in data coding to enhance the validity of the analyses. Cross-national initiatives, i.e., the same initiative implemented in multiple countries, were counted for each instance they were mentioned as we assume that their implementation may differ across the countries and hence are counted as unique instances in the database.

In keeping with the ethos of using the intersectional lens, we attempt to incorporate "feminist, anti-racist, indigenous and postcolonial perspectives" [60], during the data collection and analysis. We use purposeful sampling to ensure the interviews with professionals show a gender balance in the respondent, and highlight gender responsive energy initiatives. Based on our literature review [3,5,20,34,50,58,61], we identified the following intersecting sources of vulnerabilities that are particularly important to a just energy transition: socio-economic status (rurality and employment), ethnicity and migration status, gender and age. We also highlight initiatives that account for multiple axes of inclusion. That being said, our methodology focuses on foregrounding inclusion along the categories mentioned above, and does not examine the relationships between them. Moreover categories such as more-than-human, and indigeneity [62], while important, do not feature in the data and thus are not included in the analysis. Thus, it is a limited claim to intersectionality.

We acknowledge that the database has several limitations. First, information in the database is based on available online information; the research team could not ascertain whether the information was correctly represented, save for instances where the 'professional' interviews allowed us to ask specific questions about initiatives that directly involved our contacts. Interviews with all initiators are beyond the scope of this article; however, the 'professional' interviews often gave us valuable insights into the actualities of initiatives. Second, the database is not comprehensive - it does not cover all the initiatives in a given country, but a purposeful sample based on our aim of capturing diversity in energy initiatives. The sample for Türkiye was very low, as this country was not included in the ENERGISE database: we have included insights from this country as relevant. Initiatives *against* large-scale renewable energy projects are also, in principle, energy initiatives, but they are not explicitly included in the database. We recognize the normative bias of the research team in considering projects that support energy efficiency, renewable energy production or sufficiency, as stipulated in the IPCC's 6th assessment report. Third, much of the database was populated between 2016 and 2019, and then updated in 2022; many newer initiatives might have been left out, even with the latest update.

4. Results

There are a myriad ways in which energy justice is currently being taken up by various energy initiatives the eight European countries under study.

4.1. Summary of energy justice posture reflected in energy initiatives: A general focus on distributional justice and procedural justice as recognition

Energy professionals in different countries have identified various sources of injustices in the energy transition in their own countries and at a global scale, with a focus in first instances on distributional justice. Such injustices are eloquently summarized by an energy initiative professional in Norway (male, manager at an organisation for energy-efficient buildings), who pointed out that there is a gap between the 'haves' and 'have-nots' in the energy transition: on the one hand, there is overconsumption of energy and other natural resources, combined with the resources and opportunities to adapt to, and benefit from, the energy transition; on the other, there is underconsumption, with people suffering from unequal access to energy and the burden of having to adapt to climate change, without the necessary resources, financial or otherwise. The professionals across our sample recognize the entrenched challenges towards a just transition, given the highly unequal distribution in power.

To challenge current power imbalances, a professional in Germany (female, leader of an enterprise supporting energy citizenship projects) held that citizens must be able to organize to "create impact in the energy system, on the individual level – in relation to one's own needs, and on the political level – by reorganizing markets and power". Thus, citizen action is envisioned as necessarily political to be influential. This is also in line with procedural justice's normative aim of inclusion in decision making processes [30]. There is an overwhelming trend among energy professionals

that a just transition can only be achieved through active citizen participation. In the words of a Swiss professional, a just transition is one "in which everyone can participate to the extent possible," and initiatives "have to find a way to include everyone" (female, representative from an energy community network, Switzerland). For many professionals, citizen participation becomes a key indicator of the possible success of the energy transition. Citizen participation often influences how local plans and/or policies might be better developed or how such municipal, regional, or national plans might be interpreted into local contexts and in relation to community needs. As an energy professional from Italy puts it,

"The right energy transition for me is one that starts from the bottom up, the energy community must respond to local needs and must be tailor-made, a whole network of local stakeholders must be involved during the feasibility phase, which must not only be technical but also, and above all, social. You are not just putting up panels or wind turbines, you are building a type of community that could then carry out many other initiatives." (Female, representative from an energy cooperative, Italy).

Professionals also identify injustices for specific groups, such as women or low-income populations, who frequently get overlooked or left out in current endeavors. The inclusion of these groups is brought up as necessary for a just transition. For instance, a representative working at an NGO in Bulgaria mentions how the members of the Roma minority face obstacles to participating as energy citizens due to economic deprivation, marginalization, low level of education, and legal barriers, while also suffering from energy poverty. An interviewee from Türkiye highlights that women and younger people still face challenges when they try to assert their roles in the energy transition, a male-dominated field.

However, we observe that while such recognition is explicitly mentioned in discourses – recognition both in distributional and procedural injustices – actual initiatives and practices may not always translate these values into action. In the database, only about a third (126 out of 378) of initiatives specifically seek to involve underrepresented populations in their activities, which have the potential to contribute to outcomes that further procedural and distributional justice. Out of these, we find that 92.2 % energy initiatives seek to address the distribution of goods. In terms of initiatives that contribute to the just distribution of ills, we find only 10 such initiatives in the database – which might be the result of a sampling bias. Most such identified initiatives are cross national European projects that seek to find and target vulnerable populations and reduce the economic and/or social impact of disadvantageous energy systems. An example of such an initiative is *Empowering All*, which seeks to integrate gender perspective in energy policy. Vulnerable groups explicitly targeted by such energy initiatives are low income populations, women, rural populations, migrants, youth, and other hard to reach populations such as the elderly, unemployed, faith based groups, etc. (see Fig. 3). The rich have also been identified as a hard to reach group, as a target for reduction of overconsumption, in an effort towards more equitable distribution of energy resources. What's more, and following our analytical framework, there is very little attention given to the degree of participation, beyond questions related to inclusivity.

Fig. 3 shows the distribution of initiatives across countries. Here, we count initiatives that explicitly seek to include one or many vulnerable groups in their aims and activities ($N = 126$). The total number of such initiatives for each country is mentioned at the end of each horizontal bar. Of these initiatives, only a small percentage (5 %) seek to include multiple groups, and lean towards a more intersectional approach in their activities; we account for these initiatives in the category 'Multiple'. An example of such an initiative is *Energieberatung für ALG II-Haushalte* in Germany, which trains long-term unemployed people to act as energy coaches for low-income households, offering advice on energy-saving and energy-efficient practices.

In the following sections, we discuss how different groups of people are included/excluded in these domains of participation and its implications for energy justice. Through our analysis, we have found that energy initiatives can enable, facilitate or channel citizens' participation in three distinct ways – through i) demand side actions, ii) supply side actions and iii) political action. This is in line with Wahlund and Palm's [47] systematic review of energy democracy and energy citizenship literature, which found common types of citizen participation fell along the spectrum of consumer forums of participation, direct forms of participation, and representative forms of participation. This is conceptualized in Fig. 4. The size of the bubble represents the prevalence of that type of citizen participation in the initiatives sampled, and is indicative. The percentage of each type of action is shown in Table 1 below. While the type of action was coded as mutually exclusive (based on the predominant activities carried out by said initiative), we want to acknowledge instances where the different types of participation overlap in a single initiative. In our database, we find 35 (9.3 %) of such initiatives facilitate multiple types of

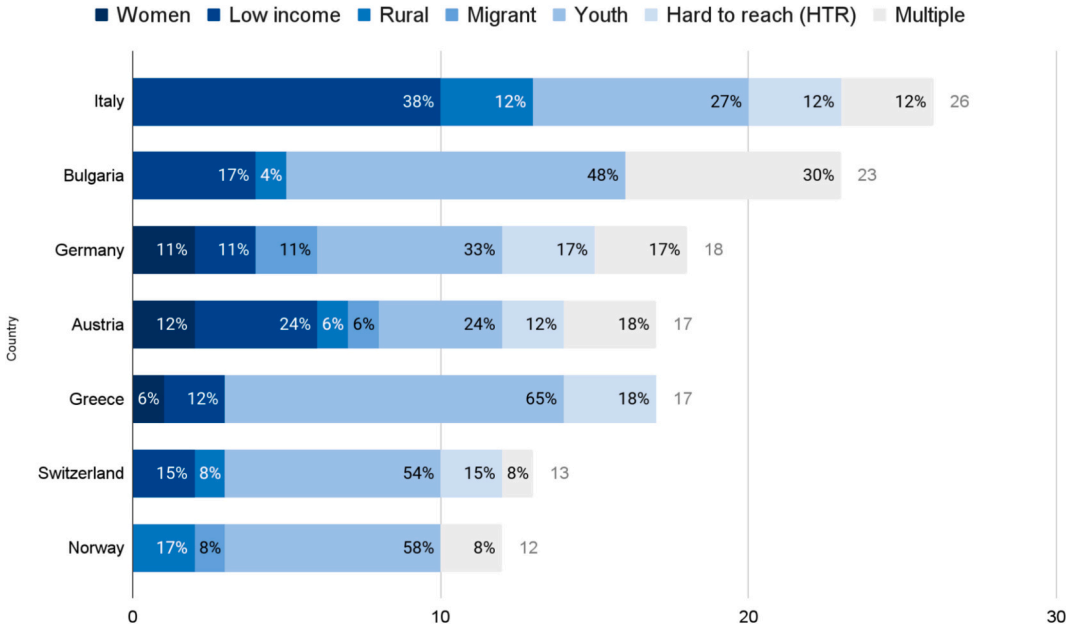

Fig. 3. Population groups targeted by energy initiatives across countries; Note that Türkiye has been excluded from the figure, due to a limited sample size for energy initiatives.
(Source: Authors)

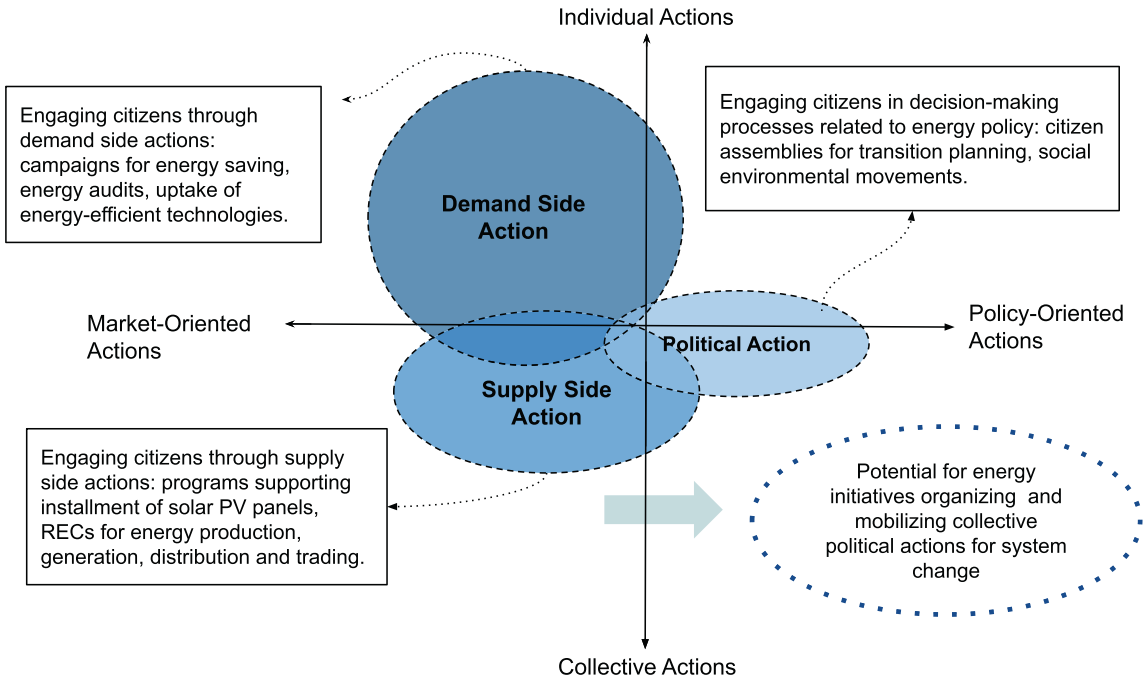

Fig. 4. Types and prevalence of citizen participation as a form of procedural justice, in the energy transition. (Source: Authors.)

citizen participation. The most common form is the renewable energy cooperative, which tends to bring people together to produce their own energy, but which also encourages the adoption of energy efficient technologies and usages. Similarly, some energy cooperatives and associations also organize their members to lobby for a more direct participation in energy governance. Finally, the same energy initiatives seek to understand and influence citizens' consumption patterns through stakeholder engagement with local authorities and utility companies, and hence facilitate demand side action, as well as forms of political action, such as participating in deliberative climate assemblies.

In the following sections, we discuss how different groups of people are included/excluded in these domains of participation and its implications for energy justice.

4.2. *Three forms of (overlapping) participation in energy initiatives: Demand side, supply side, and political action*

Focusing now on participation as a subset of procedural justice, we detail the three, overlapping ways in which energy initiatives engage with energy citizenship. A summary is provided in Table 1.

Table 1
Types of citizen action in energy initiatives, examples, and opportunities for inclusion; Source: Authors.

Type of citizen action	Role of Citizens	Example of action	Percentage of initiatives (N = 378)	Barriers to inclusion	Examples of inclusive practice in selected energy initiatives
Demand Side Action	As consumers	- Being the target of informational campaigns, awareness drives - Purchasing energy efficient technologies, conducting energy audits - Adopting behavioral changes to individual consumption	76.5 %	- Limited ways to participate - Individual and collective agency of citizen-consumers not fully recognized - Certain initiatives privileges those with money, property, time, access to networks	- *Kostenloser Stromsparcheck der Caritas* (Austria): Offers free energy audits for the energy poor - *Klimaschutz in unserer Hand* (Germany): Includes migrants through collaborating with NGOs, linking religious activities with climate awareness
Supply Side Action	As producers, prosumers	- Engaging in individual prosumerism - Participation in energy cooperatives - Participation in community energy projects	17.2 %	- Information asymmetry - Economic barriers to entry - Lack of social integration in community	- Anonymous REC (Italy): Gives all cohabiting household members REC membership (as opposed to the electricity bill holder - usually male), adjustment of meeting timings to be more convenient for women with care duties - *WenCoop* (Greece): Develops and promotes women's entrepreneurship in the energy sector
Political Action	As direct stakeholders	- Contributing to knowledge/ competencies related to energy policies - Co-creating solutions with governments though deliberative processes - Participating in RECs - Participating in social and environmental movements for energy policies and system change	6.3 %	- Energy seen as a technical subject, rather than also social and political - Limited effect on actual policy - Lack of legislative frameworks and policies to facilitate bottom up citizen participation	- *Genève en transition* (Switzerland): Hosted citizen forms to engage the public in the energy transition in the canton of Geneva - A municipal urban development initiative (Norway): Targeted minority and underrepresented groups

4.2.1. Participation as energy consumers: The pitfalls of demand side actions

The first domain of citizen participation in the energy transition promotes demand side actions, which concerns the majority of initiatives in the database. This may reflect a general tendency to see people in their role as consumers rather than citizens [63]. The range of activities these initiatives conduct all seek to influence energy consumption in some way, either through information campaigns and behavioral nudges to render usage more efficient or efforts to incite the uptake of more energy-efficient technologies and retrofits. This domain of participation is where underrepresented groups are most considered. In the database, 102 (79 %) of the 129 initiatives that actively include at least one underrepresented group relate to demand side actions.

Demand side interventions are deemed highly favorable and useful for energy-poor groups by professionals. A professional in Germany discusses ways to enable them to become active citizens in the energy transition: by offering free energy advice for people who cannot pay their energy bills and providing guidance on proper energy consumption behaviors through unemployment programs. In terms of initiatives, they often take the form of free energy audits for the energy poor (e.g., *Kostenloser Stromsparcheck der Caritas* in Austria), information campaigns for energy conservation (e.g., *Eco Citoyen* in Switzerland), social housing retrofitting (e.g., *EnerSHIFT* in Italy), etc. In Switzerland, underprivileged groups were the focus of a utility company campaign to help reduce energy usage in the home, involving home visits to low-income households and the deployment of energy-saving devices (see [64]). In Germany, the initiative *Klimaschutz in unserer Hand* aims to include people with a migrant background through various activities, such as collaborating with NGOs working with migrants and combining religious activities with climate protection. Thus, these initiatives become examples of addressing both procedural justice (by the engagement of marginalized populations in the energy transition process) and distributional justice (by potentially leading to a just distribution of economic and social goods and ills through such engagement).

Youth and students are among the underrepresented groups that figure prominently (41 %) in the database of initiatives and are overwhelmingly engaged through demand side activities. This focus on engaging young populations has the potential to address intergenerational justice. These initiatives include educational courses or certifications on energy saving (e.g., *Energie-Fuehrerschein* in Austria), awareness drives for children and families (e.g., Green *Children's City* in Norway), or competitions (e.g., *Our islands, lighthouses of sustainable development* in Greece). In our interviews with professionals, we see that youth are viewed as critical actors in the energy transition - as future citizens and mediators in communicating with their parents and peers. Initiatives carried out in school settings are seen as particularly effective for many energy professionals, as students are expected to have an impact on their parents' energy usage, creating a positive spillover effect from school to home.[2] Most of the initiatives engage young people in activities related to energy consumption. Still, one initiative also includes activities on the energy supply: Switzerland's *SolarSupport*, which brings together regional power plants in the country by informing and training individuals in installing and maintaining various renewable energy technologies, including solar camps for young people.

On the flip side, certain initiatives, such as those inciting the uptake of more energy-efficient technologies and retrofit, are predicated on the assumption of ownership – of apartments and houses – leaving out lower-income households and renters. In Norway, for instance, a public agency funded 500–600 'early adopter' households in implementing (often pricey) projects such as home energy upgrades. This initiative has been criticized in the media for mainly supporting already wealthy people and technology enthusiasts, mostly men. Overtly technical communications might also exclude people not well-versed in energy issues. It is also important to note that the degree of inclusion of marginalized populations in demand side activities also varies, and such inclusion may remain limited and not translate to more substantive or continuous engagement, such as that in supply side or energy politics. Thus, procedural justice outcomes can be limited in demand side action.

4.2.2. Participation in energy supply: RECs' ambiguous relationships with energy justice

We now focus on RECs as a subset of energy initiatives and as the most prominent example of supply side actions. A total of 65 initiatives (17.2 % of the total) fall under this category. Members of such communities tend to have a direct stake in the initiative. They might also have the ability to influence energy policy and regulation, depending on the scale of the community, which is why this 'bubble' crosses over into more political forms of actions in our conceptualisation of participation in energy citizenship initiatives (see Fig. 4). The general consensus among professionals is that RECs foster participation and allow for a strong commitment to and direct interaction with the energy transition. As an executive of an energy cooperative in Italy puts it, RECs allow citizens to "become protagonists in the energy transition".

RECs appear to be more prominent in some countries than others. For instance, in Germany, citizens are seen as crucial to the energy transition and there are policies to enable local, decentralized energy production and consumption [65,66]. This can be seen in the relatively large number of both demand and supply-side energy initiatives present here. Similarly, Italy, through recent implementation of the EU RED II Directive [67] and post-Covid National Recovery and Resilience Plan (PNRR) [68], and Switzerland, through its highly decentralized energy system and direct democracy enabling more citizen participation [69], also see many energy initiatives in these countries with supply side and political participation. A high level of decentralization is present in the Austrian case too, where a large number of initiatives focus on regional and municipal levels, rather than the national level.

On the other hand, Bulgaria's highly centralized energy system, lack of legal framework for energy communities, and delayed implementation of the EU RED II Directive [70,71] may limit the scope for supply side and political participation. Norway's installed capacity is mostly hydropower resources, also centralized (though now expanding to include more decentralized hydropower plants) - with limited scope for supply-side action due to high initial capital investment [72]. The electricity generation mix of the country and the energy transition strategy also play a role. In the case of Türkiye, for instance, electricity production from renewable sources is limited in comparison to other countries in the region, and a conducive policy framework for citizen participation is in its early stages [73,74]. Greece has one mainland electrical system and then autonomous systems in non-interconnected islands. The islands' topography and non-interconnectedness make technical interventions harder to implement [75,76]. Thus, the prevalence and the degree of citizen participation in different countries vary, depending on various factors such as the development of national energy policies, (de)centralization of energy systems, and conducive geography and regulations. We can see the distribution of different domains of citizen participation in Fig. 5 below.

In some instances, the future potential of energy communities is given prominence in discourse:

"The most useful tool will be the energy communities, and we need to understand how to integrate them effectively into the territory, but they would certainly give concrete and immediate benefits. We need to create a balanced system…this has a cost, part of which can be absorbed by the structural funds that relieve citizens of a direct investment, but it must be done proportionally, i.e., so that the lowest strata do not pay the cost of the transition. The poorest should be the first to have access to renewables, spreading the costs to the

[2] Some other initiatives include Bambini, a cross-national initiative in Bulgaria and Greece that targets children aged 0–6 and their parents to change their mobility behavior; and Pattern of Energy Efficiency in the Schools (PEES) in Greece and Bulgaria that targets secondary school children for behavioral changes and energy savings at home.

better-off." (Male, small enterprise specializing in energy efficiency, Italy).

The interviewee's point about the distribution of the costs of the transition is relevant. Casting a light on the demographic makeup of RECs, professionals we interviewed who work in RECs in countries such as Germany, Norway and Italy reveal that members are often older men with higher incomes. In the words of a board member of a German REC, members are "predominantly green-oriented academics who are motivated by cultivated idealism." These individuals are also targeted as 'early adopters' of energy-efficient and/or new renewable technologies and services. The professionals' observations are aligned with survey results that show low levels of diversity among participants of community energy projects, reaffirming the need to enhance engagement of citizens across age, gender, income and education levels [36].

It is important to point out that most initiatives have an open-door policy and make information publicly available without distinguishing diverging needs between different groups. In terms of procedural justice, this often does not translate into actual inclusion of underprivileged and underrepresented groups – such as young people, students, migrants and women, who face compounded barriers to participation. Membership fees – which may amount to €1000 in some German cases – are the first barrier. For migrants, language and assimilation into the host country become additional barriers. In the interviews, several professionals admit that they do not have any migrants in the REC they are involved in. In the database, only 4 RECs actively seek to include migrants in their activities. A professional from Germany, who works with Turkish migrants on energy-related issues, explains that while there is a focus on prosumerism (the production and consumption of energy) and RECs in the country, these concepts are unfamiliar to most in the Turkish community. A professional working with RECs in Austria explains the challenges of engaging with migrants this way:

"In many cases, the groups you mentioned [migrants] do not feel addressed by the energy transition…There is often a communication deficit. And these groups often don't feel they belong in general." (Male, government official and expert of energy communities, Austria).

In some cases, the emphasis on RECs as 'local' entities, often construed narrowly as involving people in the same community or place, might imply that people with similar socio-demographic profiles and cultural capital are brought together. Such an emphasis on the 'local' might also justify the homogeneity of certain RECs and legitimize the exclusion of migrants and ethnic minorities. A board member of a REC from Germany expresses that a homogenous group may lead to a feeling of 'togetherness', causing less friction and better sustaining participation. Such groups tend to be more oriented towards bonding among themselves than bridging out to people of different backgrounds.

When it comes to including women in RECs, the use of technical language in recruitment, the requirement of a relevant degree, care responsibilities, lack of time and financial stability, and prior knowledge of energy systems are identified as barriers. The lack of gender parity in STEM (science, technology, engineering and math) fields and the energy sector specifically feeds into fewer women's participation in energy communities [58,59,77,78]. A good example of an effort to promote inclusivity in RECs is explained by an interviewee in Italy, where the REC took several steps to increase women's participation. The first step was to adjust the timings of the meetings, to be more convenient for women with care duties. Furthermore, earlier, only holders of electricity bills (generally a man who acts as head of the household) were given membership to the REC. The regulation was changed so that cohabiting members of the family (women and young adults, for instance) were also considered part of the REC and thus could participate more actively. In a

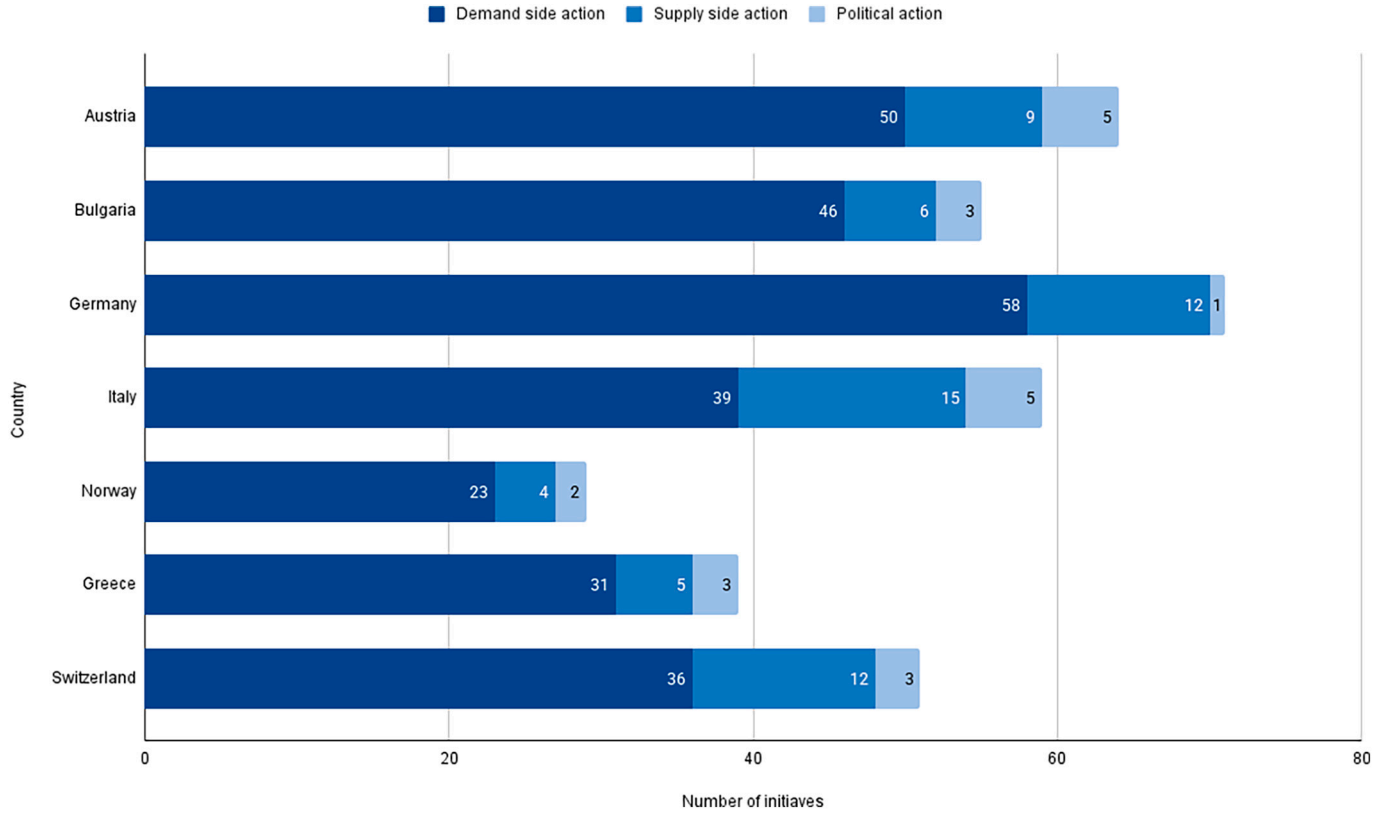

Fig. 5. Prevalence of different types of energy initiatives across countries.
Here we consider the dominant feature of the initiative for our analysis. As mentioned in Fig. 4 above, some initiatives in the sample also facilitate additional forms of citizen participation in a 'secondary capacity', but we do not make such a distinction in Fig. 5. Note that Türkiye has been excluded from the figure, due to a limited sample size for energy initiatives.
(Source: Authors)

case in Germany, after observing the lack of gender parity in their REC, a professional described efforts to approach women directly and offer training in solar panel installations in the community. Another example is *WenCoop* in Greece, a grassroots energy community that aims to develop and promote women's entrepreneurship in the energy sector.[3]

To summarize this section, RECs play a critical role in promoting a just energy transition in many countries, but current efforts are insufficient to include underrepresented groups in their activities and achieve procedural and distributional justice. Participating in RECs, while leading to a greater role and representation of citizens in having a say in energy systems, certain barriers to inclusion of underrepresented groups limits their procedural justice outcomes. Energy communities need to make concerted efforts of inclusion to avoid invariably reproducing the same injustices apparent in the fossil fuel industries, such as lack of gender parity and unequal distribution of environmental ills [6].

4.2.3. Participation in political action: A promising and under-explored terrain

Another domain identified for citizen participation in the energy transition is through direct engagement in decision-making processes of energy-related policies. This can take many forms, such as providing direct feedback and co-creating solutions with government authorities through deliberative processes [79–82]. One channel for this is again through RECs, where citizens participate as a collective, although many communities are now a-political and more oriented towards prosumption, thus the overlapping forms of participation in Fig. 4. One point of disagreement between energy professionals is the approach to energy policy in relation to citizenship. While some advocate for decentralization and bottom-up approaches based on RECs and the active engagement of citizens, others argue for a top-down, regulation-heavy approach as necessary to bring citizens on board. For the latter, citizens vote for elected officials who implement policies as a more individual approach to change. Differences between countries may relate to socio-historical factors in how citizenship plays out, as well as different energy provisioning systems, such as the more decentralized energy provisioning in some countries compared to others.

Professionals extensively discuss citizen participation in policy processes in the energy transition as a desirable way forward, but we find little evidence of initiatives that would engage people in this capacity when interviewees are solicited to give examples. In the database, only 6.3 % of initiatives also involve citizens in institutionalized energy politics related to energy issues. One example of such an initiative is the *Genève en transition* program in Switzerland to engage with citizens in the ecological transition of the Canton of Geneva. The program initiates, plans, supports, and coordinates numerous participatory initiatives and events to provide citizens with opportunities to regularly debate, exchange and come up with constructive proposals that could contribute to the ecological transition in Geneva, albeit managed in a top-down manner. These 'citizen forums' are in their infancy and, in some instances, seek to represent the population of the Canton through lot-by-lot sampling based on attributes of age, education and gender [82]. Whether such forums engage solely in consultation and deliberation, or whether their outcomes actually influence policies remains to be ascertained. How to further engage citizens in political processes is a growing field of research and practice, moving beyond the capacity to vote or not. Demoscan Association, for instance, explores different avenues, such as representative citizen forums or assemblies, and how these might be applied to the energy transition [83].

In Germany, an energy professional describes co-founding an overarching network for energy citizenship in the country to facilitate information dissemination and knowledge development and collectivize the voices of the network members. While such initiatives no doubt facilitate participation in policy processes, we observe a similar problem as that in RECs – a blind approach to inclusion, which inadvertently resulted in the amplification of voices of citizens already well versed in energy and climate issues. Including only these citizens does not consider the unique experiences and needs of various underrepresented groups, thus delivering the benefits of the energy transition to an already privileged group. A good example of including multiple axes of intersectionality is found in a local government in Norway. In this project, different minority and underrepresented groups were targeted and involved in a sustainable urban development project, with energy being one of the focus areas. According to the professional, different groups set their own parameters for how and in what way to be involved, and workshops were organized by putting citizen participation at the forefront. Lectures, exhibitions, and events for families with small children, immigrants, businesses, and so on were conducted.

To enable direct citizen participation, it is necessary to have the 'right' rules, policies and regulations in place. For example, bureaucratic hurdles created by current legislation, often due to the lack of commitment to the energy transition at the national level and lobbying by the fossil fuel industry, among other reasons, hamper citizen participation in energy communities. In Bulgaria, for instance, inadequate legislative frameworks, complex administrative procedures for setting up RECs, and low trust in public institutions and collective endeavors hinder energy citizenship efforts. Similarly, in Austria, a professional explains,

> *"…there are so many bureaucratic hurdles that many people don't even want to do it [engage with energy citizenship efforts]. I think it needs to be simplified and you need the staff to do the whole thing."* (Female, representative from an NGO, Austria)

Our analysis points to the potential of initiatives that move towards more political and collective actions for system change to deliver energy justice.

5. Policy implications

Based on the results above, we detail here some factors that *might deter or enable a more just energy transition*, with policy recommendations:

First, the role of people as consumers responsible for 'demand', rather than citizens, has been amply criticized in the sustainable consumption literature for shifting responsibility to individual decision-makers rather than addressing broader power dynamics and responsibilities at a systemic level [84]. More specifically, in relation to energy, researchers also find that people tend to be reduced to mere economic actors subject to top-down directives, given agency in the privacy of their homes through atomized, individual action [63,85]. Certain popular forms of consumption initiatives give more agency to citizens with the purchasing power (or time, another precious resource] to act upon their energy provisioning [64]. While some energy professionals believe those with more resources should bear the initial costs of the transitions and try out new technologies, others critique this by arguing that it excludes energy-poor populations. Thus, a more just energy transition that engages with citizens-as-consumers could envision forms of redistribution, whereby wealthier households contribute to subsidizing the involvement of underprivileged households in the energy transition. In general, wealthier households are not usually considered as a 'hard to reach group', despite their high levels of over-

[3] We highlight a few more examples of inclusion of women and gendered minorities here. The C3E International Initiative, a cross national initiative in Austria, aims to increase the advancement of women in the energy industry and energy research, through policies, institutional support and networks and informational exchange. Turkish Women in Renewable Energy and Energy Sector is another similar organisation in Türkiye. The assumption here is that if more energy professionals are women, then a more gender sensitive approach to the energy transition might be imagined – although this would need to be substantiated in practice.

consumption. Apart from such redistribution, inclusion of more diverse voices in democratic processes could also offset privileged perspectives from overpowering the rest. Thus, the due processes of inclusion are important for procedural justice outcomes that go beyond distributional justice. RECs and more collective and political action in the energy transition could be more open to the participation of diverse groups, thus creating a promising ground for a just energy transition. The dominance of more consumerist understandings of energy citizenship must be counteracted through political and collective forms of engagement rooted in an active and engaged citizenry, developing at the local level new skills and competencies for collective action [86]. Whether through supporting training in school programs, or the engagement of citizens in diverse forms of association (sports, arts, etc.), organizational skills can be developed, as well as a better understanding of how to be active and make one's voice heard in the public sphere.

Second, direct participation in shaping energy policies leads to procedural justice. Yet, it can also exclude female, non-white, lower-income populations unless processes are put into place for fairer representation. A conducive regulatory framework, including clear goals and objectives for inclusive citizen participation and transparency in policy processes, is necessary for broad-based citizen participation. The use of arbitrage in selecting participants for citizen forums is a promising way forward towards involving a representative group of people in discussions and debates on energy issues. Attention should also be paid to policies that are not directly related to energy but nonetheless relevant [87]; for example, work-time reduction policies that encourage part-time work might allow people to engage in community-level work as energy citizens [88]; the allocation of paid time for such activities is also a promising proposal. In some instances, local governments' own lack of capacity may prove to be a barrier to implementing inclusive energy initiatives, and according to energy professionals, there need to be policy frameworks that allocate resources for technical and financial support to local authorities.

Third, energy communities are, in principle, about engaging citizens in a collective. From the interviews, energy professionals agree that such communities should foster greater engagement in the energy transition. Yet, energy communities do not necessarily embody principles of collective *political* action and might be unduly focused on consumerist principles such as coming together in a group to invest in renewable energies or renovations. While these are laudable missions, such communities do not necessarily seek to affect broader systems that underpin current patterns of energy consumption and production. As discussed above, there are positive and negative sides to having homogenous groups as energy communities: on the one hand, bonding with similar people may create relations of trust towards supporting energy initiatives; on the other hand, leaving energy communities to people with more available resources – including financial and time – means less justice in terms of recognition in the energy transition. Thus, the engagement offered by energy communities also varies for different populations. Emphasis on 'local' community and group homogeneity may exclude women, migrant populations, low-income groups, etc. Finding strategies and incentivizing such communities to be more inclusive is a central concern. In an example of the inclusion of low-income populations, a professional from Germany describes a project she worked on where the energy poor could successfully participate via micro-credits –– which could be supported by public-private partnerships.

Fourth, there is no contesting that the energy sector is currently male-dominated – as our professionals all testify, across the eight countries involved in this study. There is no guarantee that gender mainstreaming in this sector would result in a more gender-responsive energy transition. Besides, as stated above, the energy transition relies on a host of non-energy-related sectors and policies, such as urban development or mobility, which would also need to be more representative of gender differences. And yet, a more diverse workplace – in the energy sector and beyond – is certainly a worthy aim in and of itself. This could be tackled with various public initiatives, starting from promoting gender parity in STEM fields.

6. Conclusions

Through analyses of 378 energy initiatives and interviews with 81 energy professionals across eight countries, we examined citizen action as a proxy for procedural justice, and how they lead to different energy justice outcomes.

We found that the importance of citizen engagement is generally acknowledged by professionals and within initiatives, with some groups more widely recognized as underrepresented, such as low-income populations and young people; subsequently, many initiatives take measures to include these populations in their activities. We also observed the trend of recognizing gender as an important category for inclusion, with targeted initiatives for women, for instance. Other groups, such as ethnic minorities, migrant populations, but also wealthy individuals, are still under-acknowledged in relation to inclusion in the energy transition, with only a few initiatives actively working towards their inclusion. It is important to note that inclusion rarely accounts for intersectionality; for instance, energy initiatives may be proactive in including more women but not consider how gender relates to income or migration status.

Apart from investigating which populations are included and excluded, we also examined the forms of citizen engagement – from demand side participation (e.g., behavioral change campaigns, projects for the uptake of energy-efficient technologies etc.), supply side production (e.g., energy communities and cooperatives) to political participation (e.g., lobbying through citizen collectives, social movements). While all forms of engagement are instrumental, the latter two attach greater importance to collective actions and the political agency of individuals. These two forms of engagement also tend to include high-income, male, non-migrant, and often technocratic individuals who allegedly have the knowledge and resources to participate in this way. For instance, energy cooperatives usually come with a membership fee, the first barrier preventing low-income populations from participating. Young people, students, migrants and female-headed households, who are more likely to be in precarious situations, thus tend to be excluded. Language and assimilation into the host country also become additional barriers to migrants' participation. Thus, the procedural justice, and thereby, the distributional justice outcomes become limited due to these groups' non-recognition and non-inclusion, regardless of whether they are included or not as recipients of informational and awareness campaigns and energy-saving initiatives. Admittedly, such activities might deliver energy and cost-saving benefits. Still, these groups are thus only considered for their capacity to act as consumers with a limited political agency, and their role in shaping a just energy transition becomes highly constrained.

A way of enabling inclusive and just energy citizenship might be to render more visible and provide more support for the initiatives that 'walk the talk' (such as the exceptional initiatives highlighted previously), who move beyond the prevailing discourses and practices to implementing initiatives that tackle different forms of injustice and exclusion, towards deep and inclusive participation for all in the energy transition.

CRediT authorship contribution statement

Sharayu Shejale: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Mallory Xinyu Zhan:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Marlyne Sahakian:** Writing – review & editing, Supervision, Formal analysis, Conceptualization. **Remina Aleksieva:** Writing – review & editing, Investigation. **Mehmet Efe Biresselioglu:** Writing – review & editing, Investigation. **Victoria Bogdanova:** Writing – review & editing,

Investigation. **Barbara Cardone:** Writing – review & editing, Investigation. **Julia Epp:** Writing – review & editing, Investigation. **Benjamin Kirchler:** Writing – review & editing, Investigation. **Andrea Kollmann:** Writing – review & editing, Investigation. **Lucia Liste:** Writing – review & editing, Investigation. **Chiara Massullo:** Writing – review & editing, Investigation. **Karl-Ludwig Schibel:** Writing – review & editing, Investigation.

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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Appendix A. List of energy initiative professionals interviewed

COUNTRY	ROLE	GENDER
Austria	Head of Innovation Department of Austrian Energy Utility	Male
	Senior Expert for end-consumer affairs at Austrian Regulation Agency	Male
	CEO of Austrian Energy Consulting Company	Female
	Senior Expert for Energy Communities in the Federal Government	Male
	Senior Expert in Austrian Energy Cooperation Start-up	Male
	Senior Expert for Gender/Inclusivity in an non-profit research organisation	Female
	Senior Expert for Technology Acceptance at an Austrian University	Female
	Senior Expert at Austrian research center for energy efficient construction	Female
	Senior Expert for Energy Communities in Federal Government	Female
	Professor at an Austrian University for research on the energy transition	Female
Bulgaria	Senior expert at a local municipality	Male
	Academic (expert on energy topics) at a leading Bulgarian university	Female
	Expert at the local municipality	Female
	Expert at a national CSO that campaigns for energy sustainability	Male
	Expert at an energy agency providing renewable energy solutions	Female
	Two experts at an NGO campaigning for sustainability	F & M
	Senior expert on environmental issues at a national utility company	Female
	Entrepreneur, member of an association of entreprises interested in RES	Female
	Senior expert on energy topics at a local municipality	Male
	Representative of a local municipality	Male
Germany	Project Manager of German Sustainability Consulting Company	Male
	CEO of a digital platform for energy citizenship projects	Female
	CEO of a network for energy citizenship	Female
	Board of a renewable energy cooperative and political activist	Male
	Head of the political representation of an energy enterprise	Male
	Member of the German parliament (Green party)	Male
	Former member of the German parliament (Socialist party)	Male
	Board member of an energy cooperative and activist for fridays for future	Male
	CEO of a NGO supporting intercultural ecological work	Female
	Project leader for energy citizenship initiatives	Female
	Board of a renewable energy cooperative	Female
Greece	University Professor	Male
	University Professor	Male
	High level energy consultant in Ministry of Environment and Energy	Male
	High level representative in RES Association	Female
	Founder of an Energy Cooperative	Male
	High level officer in Ministry of Environment and Energy	Female
	High level officer in the Electricity Distribution Network Operator	Female
	High level officer in Energy Communities Federation	Female
	Mayor of a small island	Male
	Vise Mayor of a big island municipality	Female
Italy	High level representative of environment NGO	Male
	SME energy efficiency	Male
	High level representative of energy cooperative	Female
	High level representative of environment NGO	Male
	High level representative of energy agency	Female
	President of energy cooperative	Male
	Architect, high level consultant for regional energy plan in Italy	Female
	High level representative of energy cooperative	Female
	Foundation president	Male
Norway	Representative of governmental energy enterprise	Male
	Senior Manager at an organisation for energy efficient buildings	Male
	Professor with gender expertise	Male
	Representative of environmental Interest Organisation	Male
	Participatory method expert	Female

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(*continued*)

COUNTRY	ROLE	GENDER
	Climate coordinator in regional government	Female
	Project leader (participatory project)	Male
	Leader of environmental interest organisation	Male
	Co-founder of a power supply company	Male
	CEO Energy Company	Male
	Representative of an energy company	Female
Switzerland	Consultant in an environmental NGO	Male
	Elected representative (Green party) and NGO director	Male
	Two representatives from private utility company	F & M
	Representative from private utility company	Female
	Head of an energy community network	Female
	Representative of the cantonal energy department	Male
	Researcher in social science, expert in sustainable practices	Female
	Energy consultant for public authorities	Female
	High level representative of the federal energy department	Female
	Climate activist	Male
Türkiye	High level representative from the Ministry of Energy and Natural Resources	Male
	High level representative from Metropolitan Municipality	Male
	Director of research oriented environmental NGO	Female
	Journalist/Activist	Male
	High level representative from a private utility company	Female
	Consultant to local governments on climate change and Sustainability	Male
	High level representative from a state-owned power generation company	Female
	Representative from a national committee of women in the energy sector	Female
	Representative of a network for women in the energy sector	Female
	Coordinator of the Turkish section of an international NGO Coalition	Female

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2025.103982.

Data availability

The data that has been used is confidential.

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