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Review

Intersectionality and energy transitions: A review of gender, social equity and low-carbon energy

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ABSTRACT

Transitions to low-carbon energy systems are essential to meeting global commitments to climate change mitigation. Yet "greening" energy systems may not make them any fairer, inclusive or just. In this paper, we review the academic literature to understand the state of knowledge on how diffusion of low-carbon technologies impacts gender and social equity in intersectional ways. Our findings indicate that renewable energy projects alone cannot achieve gender and social equity, as energy interventions do not automatically tackle the structural dynamics embedded within socio-cultural and socio-economic contexts. If existing power asymmetries related to access and resource distribution are not addressed early on, the same structural inequalities will simply be replicated and transferred over into new energy regimes.

1. Introduction

The science and policy discourse around climate change has firmly shifted from *whether* humankind needs to confront climate change to *how* societies can best mitigate and adapt to a changing climate. Transitioning energy systems to support a sustainable, low-carbon future is a central pillar of such climate action [1]. Energy transitions occur as state and non-state actors seek to reduce their reliance on finite fossil fuels for energy, electricity and transport, expand their use of renewable energy and diversify their energy mixes to ensure universal energy access, longer-term energy security and enhanced climate resilience [2,3]. In this sense, energy transitions sit at the intersection between many of the UN's Sustainable Development Goals (SDGs), not least SDG7 (ensure access to affordable, reliable, sustainable and modern energy for all) and SDG11 (take urgent action to combat climate change and its impacts).[1]

In recent years, energy transitions research has proliferated and diverged into multiple but complementary intellectual streams. Some of these streams explore the socio-technical challenge of transitioning whole energy systems towards sustainability [4,5] by confronting incumbent energy policies [6,7], diffusing new low-carbon – or renewable – energy technologies [8,9], establishing new value chains and business models [10,11], and changing user behaviour [12–14].

Yet energy transitions are not only socio-technical, but deeply socio-political [15–17]. A key aspect of the socio-political nature of energy transitions is the embedded gender and social inequalities in energy systems. Inequalities can constitute and persist in low-carbon energy systems; they may not be any fairer, inclusive or just than the conventional systems they displace [18,19]. One way of viewing the gender and social dimensions of energy systems is through the lens of disaggregated employment trends. Evidence from the US and Canada suggests the renewable energy sector is already more gender diverse than the fossil fuel industry, but still less diverse than other areas of the economy that require commensurate levels of training and experience [20]. Diversity of employment, however, is only one factor leading to inequity throughout the energy sector.

Political economy analyses of energy transitions have highlighted that decision-making power, as manifested by the interests of large actors and global elites, often overlooks the energy needs and climate vulnerabilities of the world's poorest and most marginalized people [21–23]. For example, much of the energy transitions literature frames energy security in terms of ensuring reliability of energy supply to meet

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[1] https://sustainabledevelopment.un.org.

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energy demands within politically and economically strategic sectors and locations – such as transport, industry and commercial sectors, capital cities and industrial hubs. Less strategic sectors and locations are typically expected to benefit from the trickle-down effects of a more reliable centralized electricity supply [24,25]. Overall, a transition to a low-carbon future, while desirable from a climate change perspective, does not guarantee that pre-existing inequalities in energy systems will be reduced, or even addressed.

Questions of context are of fundamental importance when tackling gender and social inequalities in energy transitions [26]: Who are the energy users? What are their social positions and aspirations? Who is consulted during the process of implementation, and how is the energy supply organized? This is often represented in the concept of "just transitions", whereby energy transition processes must ensure fairness via equal distribution, full recognition of rights and labour contributions, equal participation in decision-making procedures, and equal capabilities in renewable energy outcomes [26,27]. Indeed, the 2015 Paris Agreement notes:

> "Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights…. as well as gender equality, empowerment of women and intergenerational equity" [28].

Gender is a form of socially constructed difference that translates into different inequalities and hierarchies traditionally between women and men. More recent conceptualizations in the scientific literature fundamentally integrate the wider notion of social equity, which captures the intersectional nature of gender [29]. An intersectional approach to gender is to analyse social inequalities and systems of power with the awareness of their interconnected character, such as how gender inequality interacts with other inequalities of ethnicity, race, class and age [30]. Thus, a gender and social equity intersectional perspective on energy transitions brings issues of overlapping inequities to the fore in the analysis of efforts to mitigate climate change through introducing low-carbon energy technologies.

Over the last three decades, there has been a wealth of research into the gender and social equity aspects of energy systems [e.g. 31–35], such as that supported by ENERGIA, a pioneering international network on gender and sustainable energy [36–38]. Initial interest in this domain was primarily triggered by the recognition that in the least developed countries in Africa and Asia, as much as 90% of total energy consumption was attributed to households and consisted of traditional biomass fuels mostly managed and collected by rural women [39]. A body of research in this area focuses on the reproductive role and labour of women as users of energy for household food provision [40], showing that both production and consumption of energy is highly gendered [41–44]. Advocacy groups argue that the shift to clean and renewable energy resources and technologies – such as advanced smoke-free cookstoves burning sustainably-harvested biomass or solar home systems connected to efficient lightbulbs and electric appliances – should also herald equal employment and decent work policies for women, as well as a stronger recognition of women's reproductive work [50].

Research has also shown that gender and social norms limit women's ability to express their energy needs and participate in decision-making at every level of the energy system [45,46]. In particular, gender considerations are rarely explored in analyses around energy use within business enterprises [47]. Only recently have energy companies started embracing the idea that gender equality and diversity make good business sense: studies show that more gender-diverse energy firms experience better business performance in tandem with promoting women's economic empowerment [45,48,49].

Addressing gender and energy issues in tandem is gaining traction in view of the development of alternative energy sources and the creation of carbon markets to mitigate climate change and reduce fossil fuel dependency [51–53]. Yet, despite the growing discourse around just transitions and the wealth of research on gender, social equity and energy, dedicated research and knowledge on the gender and social equity implications of low-carbon energy transitions is only slowly emerging [54–56]. This paper contributes to addressing this existing gap by undertaking a review of academic literature on how the impacts and benefits of low-carbon energy transitions are distributed along gender and social lines. To examine this, we respond to the following question: What are the gender and social equity implications of introducing low-carbon energy technologies into traditional or conventional energy systems?

This paper is structured as follows: Section 2 describes the method used to review the academic literature on gender and social equity implications of energy transitions. Section 3 sets out the results and findings from our review. Section 4 discusses the results and Section 5 concludes with policy recommendations and areas for future research.

2. Methods

Following calls for more rigour in social science energy research [57], we conducted our exploratory literature review by adopting some principles from systematic review and mapping [58]. Systematic reviews originate from the field of medical science and public health to evaluate information and adapt responses based on this evidence [59], and are widely seen as the most rigorous approach to synthesis of qualitative and quantitative evidence [60]. They have been used in energy studies to look at how an energy justice lens can shed light on gender dimensions of energy policy [61], the role of actors, processes, and networks of local societies in low-carbon energy systems [62], barriers and enablers to adoption of clean fuels [63,64], who adopts improved fuels and cookstoves [65] and health impacts of traditional fuels and stoves [66].

By following strict guidelines aimed at minimizing bias, the systematic review approach is a powerful and effective method for conducting literature reviews in a comprehensive and transparent manner [67]. Given constraints on time and resources, we were unable to conduct a full systematic review. However, we used lessons learned from systematic reviews set out in Haddaway et al. [58] to develop a simplified review process, which comprised the following steps: searches, screening, data extraction and coding.

2.1. Searches

2.1.1. Databases

The reviewing team consisted of three researchers at the Stockholm Environment Institute. A search of the literature was conducted during June and July 2019. Due to time and resource constraints, we chose to narrow our search to two academic databases: Scopus and Web of Science Core Collection. A brief search of the thesis repositories ProQuest and Ethos came up with few results, so these repositories were not included.

2.1.2. Search string

In order to search the literature in Scopus and Web of Science, we developed a search string using a combination of search terms related to (a) low-carbon energy, (b) transitions and (c) gender and social equity impacts (see Table 1). We aimed for specificity in our search terms, but included some search refinements to exclude very unrelated fields of study and to limit our results to English language papers. For example, we linked "solar" with "power", "photovoltaics", "PV", "concentrated" (as in concentrated solar power), "home system", and "industry"; this ensured that our search was less likely to pick up results related to topics outside our scope of inquiry, such as solar flares or solar eclipses. Additionally, we added a range of qualifiers – such as "group", "people" and "community" – to issues around gender and social equity to make our search more targeted. When adding descriptive terms to group, people and community, we used positive and

Table 1
Search string.

Database	Date	Search string
Scopus (Title, keywords, abstract Web of Science core collection(Topic search)	9 Jul 2019 30 Jun 2019	((((“sustainable?energy” OR ((“low?carbon” OR renewable*) AND (development OR energy OR power OR electricity OR generation OR industry))) OR (solar* AND (power OR photovoltaics OR PV OR concentrated OR “home?system*” OR industry)) OR (wind* AND (power OR electricity OR turbine* OR industry)) OR hydropower* OR (geothermal AND (power OR electricity OR industry)) OR (biomass AND energy) OR bioenergy OR biofuel* OR agrofuel* OR “mini?grid*”) AND (transit* OR transform* OR change* OR shift* OR pathway* OR polic* OR strateg*)) AND ((“social?impact*” OR “social?outcome*”OR “socioeconomic*”) OR gender* OR wom?n* OR m?n OR girl* OR boy* OR child* OR youth* OR “young?people” OR elder* OR “old?people” OR (disable* AND (group* OR people* OR communit*)) OR (poor AND (people* OR communit*)) OR (rich AND (people* OR communit*)) OR (wealthy AND (group* OR people* OR communit*)) OR (“low?income” AND (group* OR people* OR communit*)) OR (vulnerab* AND (group* OR people* OR communit*)) OR (marginal* AND (group* OR people* OR communit*)) OR (ethnic* AND (group* OR people* OR communit*)) OR (indigenous* AND (group* OR people* OR communit*))))

Table 2
Eligibility/inclusion criteria.

Relevant populations	Relevant exposure[a]	Relevant outcomes
Households, communities, towns/cities and countries consisting of people relying on traditional or conventional energy systems.	Real cases of adoption/use/management of low-carbon technologies Hypothetical cases (i.e. simulations/modelling exercises) were not considered	Empirical data on social impacts on people, communities or social groups. Reference made to issues related to class, displacement, education, employment, energy supply, food security, gender, health, human rights, indigenous/race, land ownership, or poverty. Environmental impacts and hypothetical outcomes of possible exposure were not considered. Willingness to pay and attitudes to low-carbon technology not considered Technical studies focusing on system performance were not considered

Notes:
[a] Following Sola et al. [68], we use the term ‘exposure’ rather than ‘intervention’, which is more commonly used in systematic reviews. Exposure more accurately reflects contact with and contingent nature of low-carbon technologies.

negative terminology. For example: [“poor” AND (…)] and [rich AND (…)]. Searches were performed on 9 July 2019 (Scopus) and 30 June 2019 (Web of Science) and have not been updated during the conduct of the review. Full details of our search can be found in Additional file 1.

2.1.3. Additional search

In our initial search, we did not include “household” in our search string, which was an oversight on the part of the research team. In order to rectify this, we undertook an additional search of Scopus and Web of Science in which we replaced the search terms (group* OR people* OR communit*) and (people* OR communit*) in the original search string with the search term (household*). In order to avoid capturing articles we had already screened, we explicitly excluded results from the original search string by using the “NOT” operator. The additional search was undertaken on 26 May 2020. Further details can be found in Additional file 1.

2.2. Screening process and eligibility criteria

All articles gathered during the search were screened for eligibility at title, abstract and then full text levels using predefined inclusion criteria set out in Table 2. Three researchers took part in the screening process, and items were not double-screened. A consistency check was performed in order to reduce risks of bias and inconsistency across the team. This check involved all researchers screening the same 100 titles. Any discrepancies were then discussed among the team to resolve differences before broader screening began. This was also done for 50 abstracts. Title and abstract screening was undertaken using Rayyan[2], a web-based review tool. Following abstract screening, potentially relevant articles were retrieved in full text and screened.

Articles screened on title and abstract are listed in Additional file 2. Unobtainable articles are listed in Additional file 3. All screened full texts that were excluded from the review are listed in Additional file 4. During screening, we excluded non-English language articles due to resource constraints.

[2] https://rayyan.qcri.org/welcome.

2.3. Data extraction and coding framework

In order to analyse the articles that were included after full-text screening, data were extracted from each article and put into a coding framework. Data extraction was undertaken by two researchers, who coded data in an Excel file. The Excel file was designed to document and characterise details of the studies in each paper, including geographical location, energy resource, and type of impact. Table 3 sets out the coding framework.

3. Results

3.1. Review of descriptive statistics

3.1.1. Selected studies

A diagram of the screening and selection process from initial searches to articles put forward for data extraction and coding is provided in Fig. 1. A total of 12,176 articles were identified in Scopus and Web of Science (see Additional file 1), with 7,164 remaining after removal of non-English language articles and duplicates. 6,172 articles were excluded after title screening and 748 were excluded after abstract screening, leaving 244 articles to be retrieved for full-text screening (see Additional file 2). The full text of 19 articles could not be retrieved for various reasons (see Additional file 3). Full text screening resulted in

Table 3
Coding framework.

Nature of the literature	
Bibliographic Info	Author(s), Title, Date, Journal
Nature of case	
Research methods	Qualitative, quantitative or mixed methods
Geographical Location	City, region, country (include multiple locations if relevant)
Urban/Rural	Urban, rural
Energy Source	Low-carbon energy sources studied (e.g. hydro, solar, etc.)
Energy Use	Energy service studied (e.g. lighting, heating, etc.)
Scale of energy use	Household, local/community, national
Gender and social equity issues	Class
	Displacement
	Education
	Employment
	Energy supply
	Food security
	Gender
	Health
	Human rights
	Indigenous/race
	Land ownership
	Poverty
Impacts of transition	
Outcome of transition	Positive/negative
Gender and social equity benefits	Social mobility
	Eco-tourism
	Education
	Cost-effective
	Health benefits
	Improving gender equality
	Job creation
	Energy self sufficiency
	Poverty alleviation
	None stated
Who benefits?	Description of people/groups that benefited
Location of benefits	Local, regional, national
Negative gender and social equity impacts	Resource dependency
	Outward migration
	Not cost-effective
	Adverse health impacts
	Human rights violations
	Widened wealth gaps
	Food security
	Worsening gender equality
	Job/livelihood loss
	Increased poverty
	Loss of social capital
	Loss of land / displacement
	None stated
Who is adversely impacted?	Description of people/groups that were adversely impacted
Resistance/opposition to negative impacts?	Yes/no (if possible, give details)
Long-term impacts discussed?	Yes/no (if possible, give details)
Details of the transition process	
How did the transition process occur?	Description
Who implemented transition process?	Description of people/groups that implemented process
Formal impact assessment study before transition	Yes/no (if possible, give details)
Stakeholder consultation before transition	Yes/no (if possible, give details)

the inclusion of 90 articles that explicitly contained empirical studies of gender and social equity impacts of renewable energy transitions (see Additional file 4).

3.1.2. Countries studied in the literature

The 90 articles in our analysis described 105 case studies in 44 different countries, with the country count not including repeats and multi-country analyses. As shown in Fig. 2, the vast majority of the 105 cases were located in countries in Asia (45%) and Africa (27%). Cases in Europe, North America, Australia and New Zealand represented 23% of the total sample, and a smaller number of cases are located in Latin America (6%). Almost all of the case studies from the literature are based in rural settings, with the exception of nine cases looking across the national scale (covering both urban and rural areas) and two cases exclusively in an urban setting.

3.1.3. Energy sources covered and causes of transitions

As shown in Fig. 3, the energy source that receives the most attention is solar energy, with coverage in 26% of the reviewed literature. Biofuel and biodiesel are examined in 20% of the literature, with hydropower being addressed in another 14%. While most articles do not explicitly state the cause of a transition, many provide context; they often cite policy pronouncements (such as national targets to reduce greenhouse gas emissions), and the private sector is often involved in the implementation of such policies, sometimes with state endorsement [15,69–84].

Since almost all of the cases in the literature reviewed are based in rural areas, decentralized energy systems are commonly mentioned – particularly decentralized electrification powered by solar energy. In these cases, various non-government actors promote and invest in these renewable energy sources and decentralized systems. Actors mentioned include non-profit organizations [15,70,82,85], local social enterprises [86], private enterprises or developers [69,80], and even church organizations [15].

Within the reviewed literature, private companies are behind most cases of biofuel and biodiesel production and consumption; most of these companies are endorsed by the government. For example, both Montefrio and Sonnenfeld [87] and Schoneveld et al. [88] outline the joint role of the private sector and the local government in establishing jatropha plantations in rural Philippines and Ghana, respectively.[3] Similarly, Santika et al. [84] noted the rapid expansion of oil palm cultivation in Indonesia, predominantly in Sumatra and Kalimantan (Indonesia Borneo), under the continuous promotion of the Indonesian government. In addition, Vermeulen and Cotula [90] examine the ways that land-use changes – due to land deals for biofuels – shape social vulnerabilities in various African countries. Interestingly, as opposed to fitting under a wider narrative of environmental sustainability, the discourse around biofuel initiatives tend to have a heavier focus on stimulating economic growth [70,87,88,90–97]. This aligns with the fact that most of the case studies on biofuel plantations are located in impoverished and rural areas.

3.1.4. Social impacts of transitions: key themes

The review examined the impacts of energy transitions on aspects broadly related to gender and social equity, including employment, education, poverty, land ownership, food security and health. Figs. 4 and 5 show the percentage of publications that mention various types of positive and negative impacts across these dimensions.

The most documented positive and negative impacts are broadly related to economics. This includes impacts on poverty, energy cost-effectiveness, and labour (such as a gain or loss in jobs). Poverty alleviation and energy self-sufficiency are dominant positive impacts, with 44% and 42% of the literature, respectively, discussing these outcomes. Issues of land loss and displacement appears to be a dominant negative impact, with 24% of the literature mentioning it as a negative outcome of the transition. Various impacts are interrelated; for example, poverty alleviation is largely influenced by energy self-sufficiency and job creation, which are mentioned in 44% and 27% of the literature,

[3] The *Jatropha curcas* is a species of plant that has been popularized as a promising renewable energy source due to its relative ease of cultivation [89].

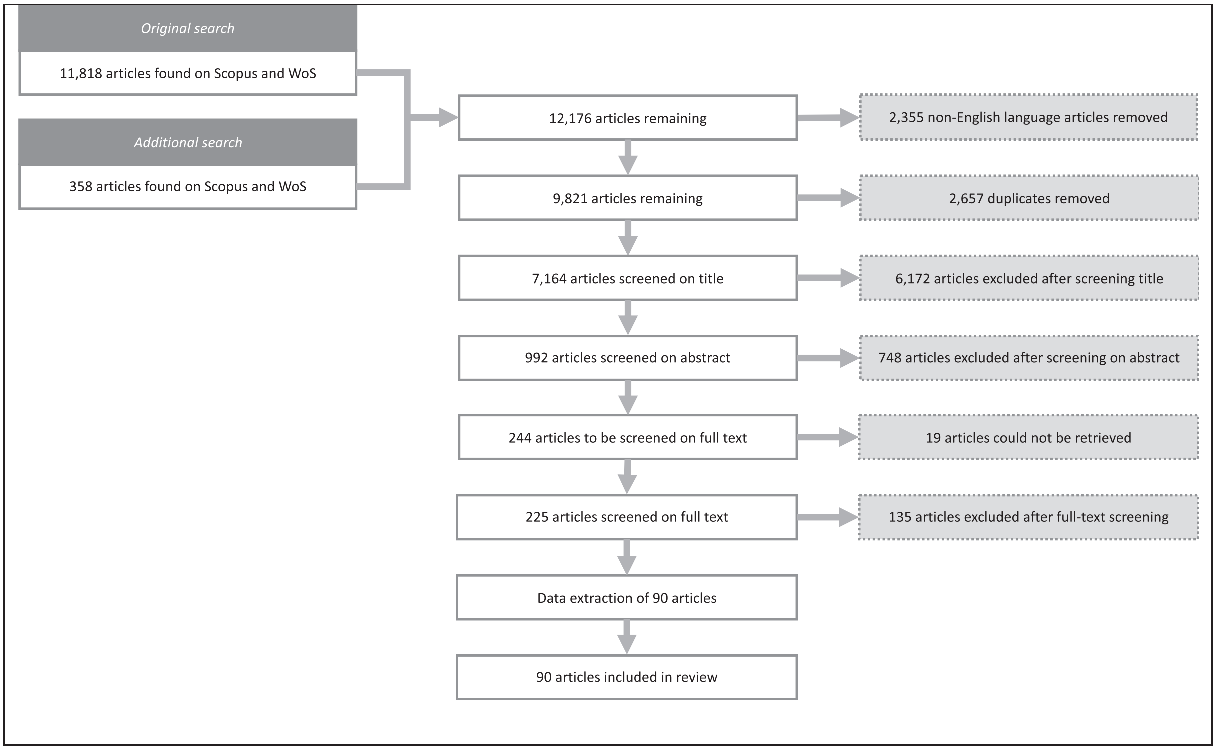


Fig. 1. Flowchart of screening and selection process.

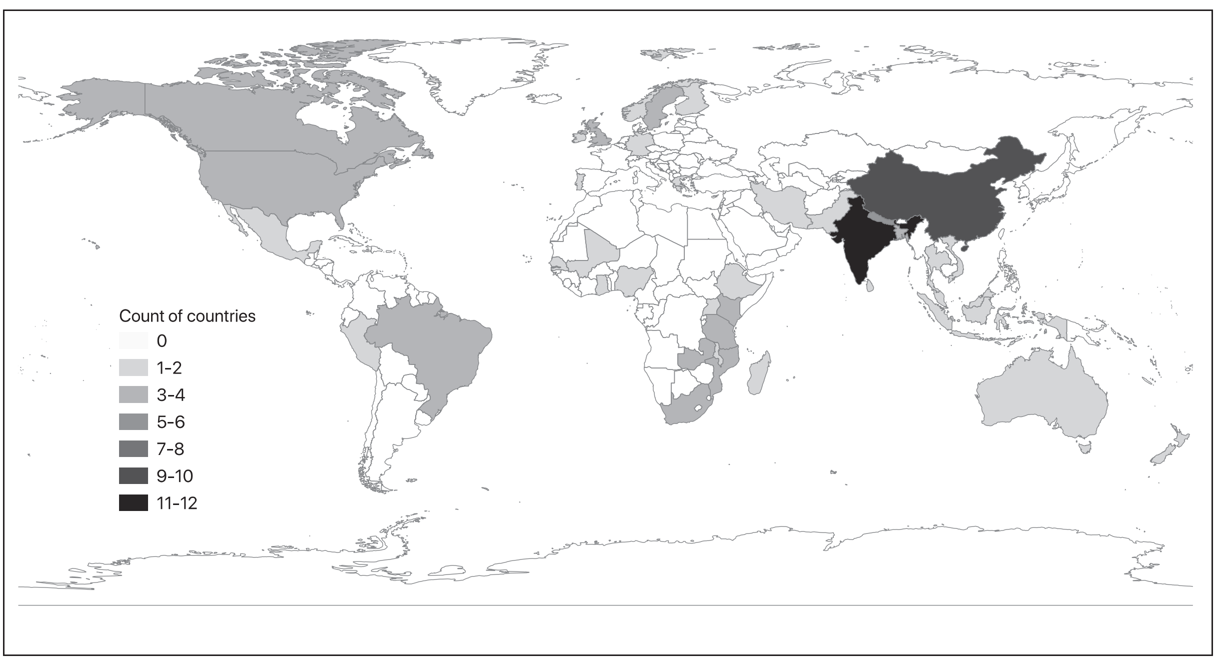
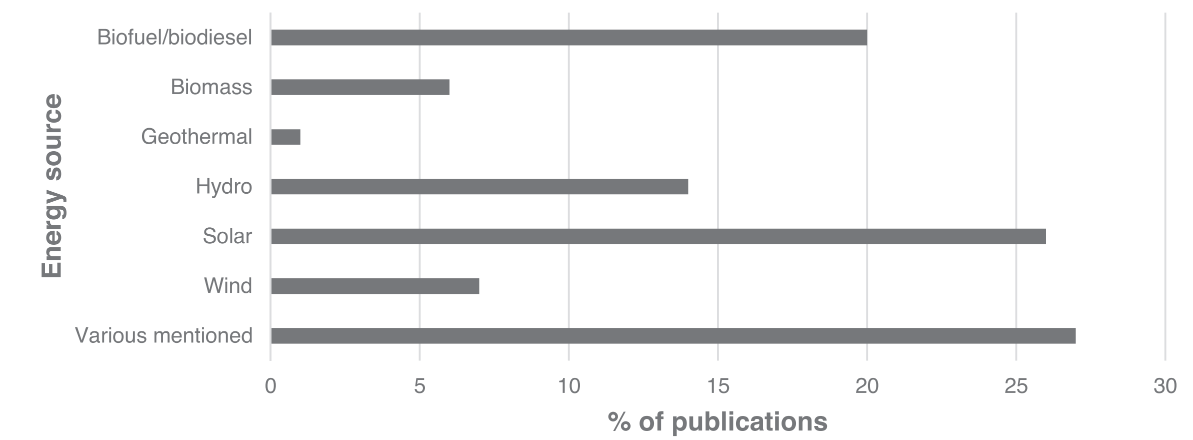


Fig. 2. Geographical concentration of case studies.

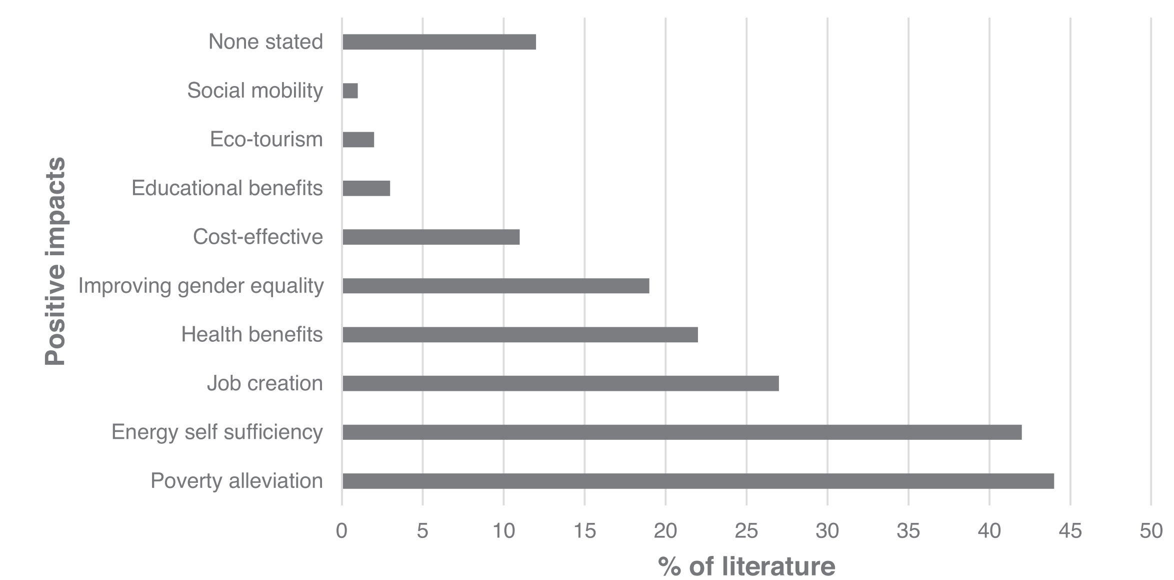
respectively. Likewise, loss of land and displacement influence other negative impacts, such as increased poverty and job/livelihood loss, which are both mentioned in 16% of the literature, respectively. Similarly, these impacts have gendered outcomes. For example, shifts in traditional forms of livelihoods induced by land-loss may prompt an increase of outmigration that traps women in further poverty [98]. For example, women may have difficulty finding jobs in their new locations, or they may face an increased burden of physical labour as their husbands flock to urban areas in search of work [99].

When coding articles according to case study impacts, we found that positive and negative impacts are also commonly mentioned in conjunction with one another (see Fig. 6). For example, in some cases, the introduction of a solar energy source decreased an area's overall poverty, but its limited accessibility and higher cost meant that the benefits were not equally distributed, thus leading to energy poverty and/or widened wealth gaps [82,100–106]. In another case, the development of a hydropower project increased jobs initially, yet the change in land use negatively affected local livelihood systems, eventually resulting in food insecurity [107]. Similarly, while the positives outcomes of wind energy have been attributed to energy self-sufficiency and job creation



Note: "Various mentioned" include counts of solar, wind, biofuel, and biomass energy source. "Hydro" includes both large and small hydropower plants.

Fig. 3. Percentage of publications that examine each energy source.



Note: The percentages are mutually exclusive as one piece of literature can have multiple counts of impacts.

Fig. 4. Percentage of literature mentioning positive impacts of transition.

[108–110], its negative impacts are related to issues of land loss which, in the long run, may threaten livelihood options [74,79,111]. Additionally, aesthetic issues and noise disturbances have also been mentioned as adverse impacts of wind energy [112]. Thus, energy transitions bring about complex consequences that are seldom discrete: 47% of the examined literature explicitly addresses mixed consequences of a particular transition. This ambiguity underscores how there are not necessarily clear winners and losers of energy transitions. Impacts of different energy supply and technologies vary and those impacts are intersectional and difficult to disaggregate in clean-cut ways. Social differences including gender, ethnicity, race, class, and age are intertwined, which leads to complex forms of disadvantages and privileges related to energy use.

The cases from the literature illustrate that low-carbon energy

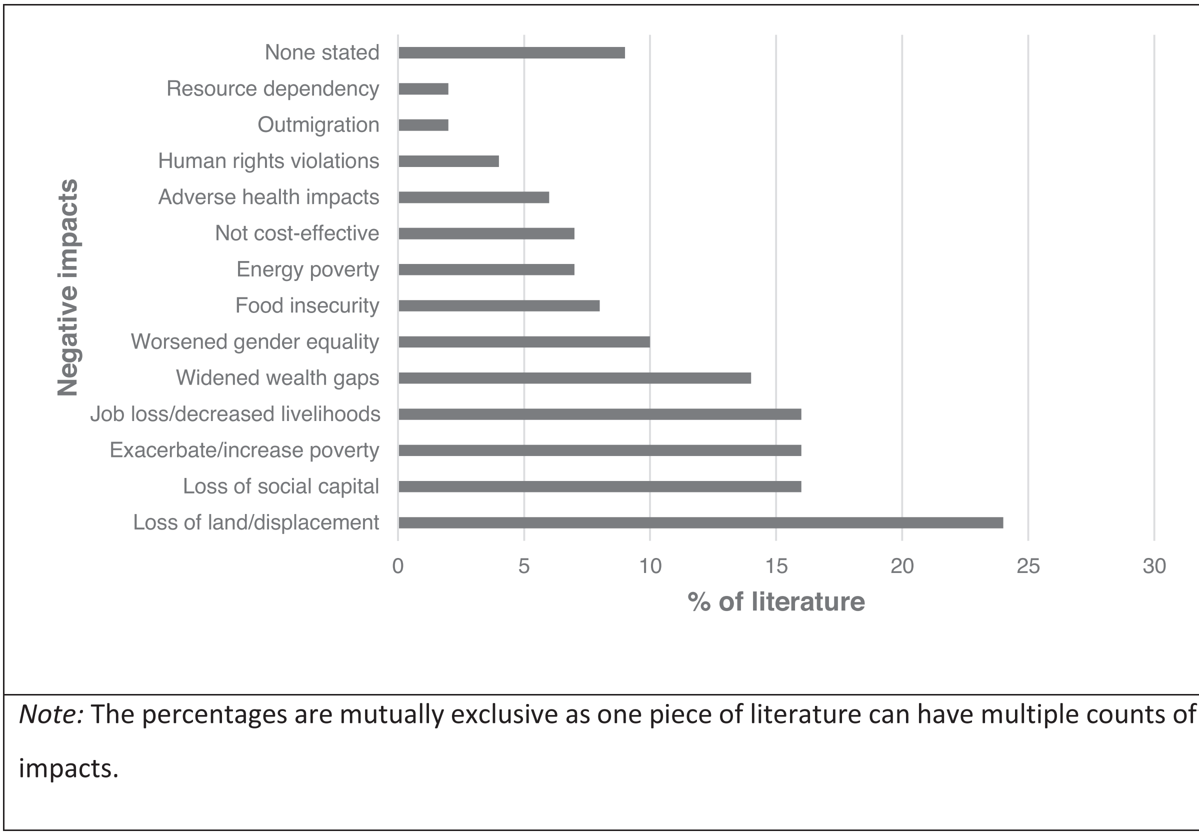


Fig. 5. Percentage of literature mentioning negative impacts of transition.

systems may not be more inclusive or empowering than traditional energy systems. While energy transitions are indeed shaped by technical and economic aspects (e.g., technological innovations, investments, and costs), they are also crucially mediated by political dimensions (e.g., enabling or constraining policy environments and bureaucratic power structures) and socio-cultural dynamics (e.g., prevailing gender norms, power relations and social stratifications, and community structures) [113]. Consequently, different technologies will have differential outcomes depending on the context in which it lands. Indeed, it is not the technology itself that determines the outcome of a transition per se, but rather the ways in which the technology interplays with the existing socio-cultural, socio-economic and institutional contexts that determines its design, purpose, adoption and consequential effects. In this vein, the following sections outline key themes related to gender and social equity that emerged from the reviewed literature.

3.2. Key themes emerging from the literature

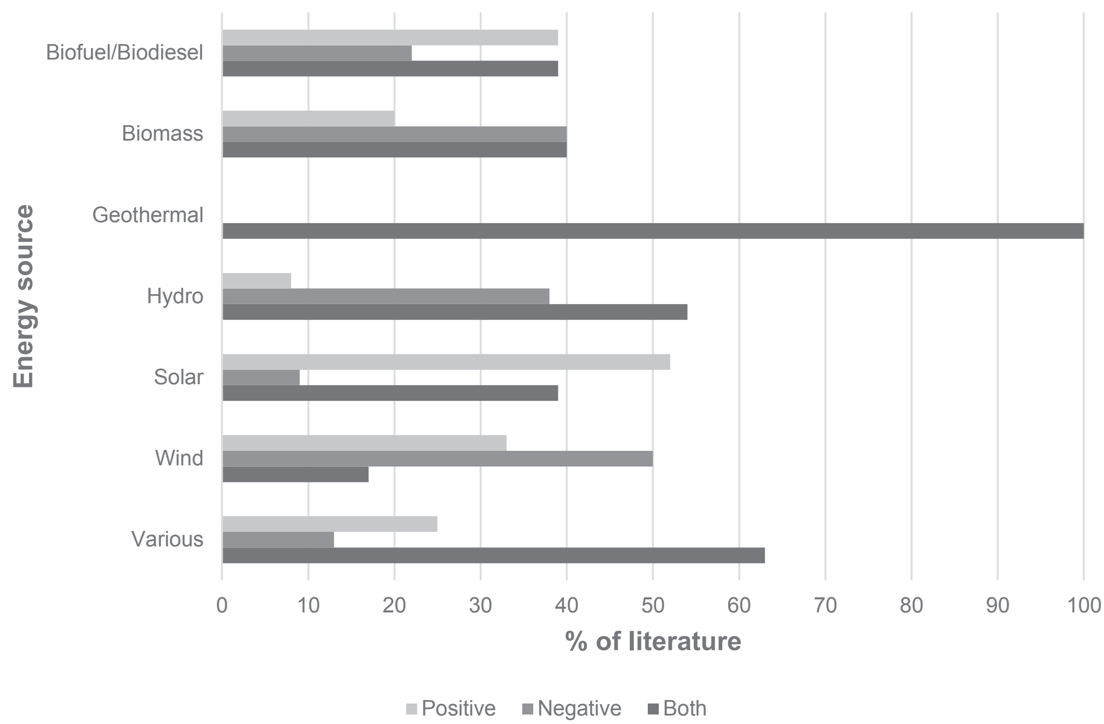
3.2.1. Double-edged consequences on women's labour

The type of energy use that is frequently credited with having a positive impact on gender equality in rural contexts is modern household electricity and heat (such as modern cookstoves and lighting) [75,76,78,80,86,114–119]. Small-scale household solar systems, such as solar lanterns, can be particularly beneficial to children, women and poor rural households; the increased availability of light extends studying and working hours, allowing for better educational, health and livelihood outcomes [76,86,114–116,120–122].

However, a pattern observed in the literature is that despite the obvious benefits, energy transitions sometimes merely shift inequalities, rather than eliminate them. This is most evident in the ways in which energy sources affect women's workloads. Several studies state that solar and biofuel energy has had a positive effect on women's empowerment in rural villages; it significantly decreases women's workloads (such as cooking and collecting firewood), allowing them to use the daylight hours on other activities, such as engaging with local communities and even pursuing other forms of employment [70,75,78,116,123]. However, other studies have shown that women's labour simply transferred from one domain (such as cooking) to another (such as taking care of livestock) [78,80,99,123–125]. A few pieces of literature highlight the ways in which men and women reap the benefits of new energy sources differently. For example, Fernandez-Baldor et al.'s [124] case in rural Peru demonstrates that while men are likely to have more options to extend their leisurely activities with the time they saved on labour due to the introduction of renewable electrification, women tend to sacrifice their leisurely time to increase the family's income or complete domestic tasks. In this sense, social norms and gendered divisions of labour remain entrenched despite the introduction of new energy sources. Similarly, while renewable energy sources may provide the potential for women to expand livelihood options, their entry into other domains of labour is affected by existing social norms and contextual factors. For example, when more shops are owned by men – because of gendered norms around business – then men are able to use the introduction of electricity to enhance their businesses; women, however, have significantly fewer options to capture the advantage of electricity to increase their income [125]. Besides gendered norms, the intersecting relationship of gender and class also plays an important role in determining which parts of the population benefits from renewable energy services [15]. Thus, contextual and systematic factors play a crucial role in determining the extent to which the benefits of renewable energy sources can be reaped.

3.2.2. Poverty, employment, and precarity

The introduction of renewable energy in poor communities does not guarantee a decrease in poverty. While 44% of literature recorded poverty alleviation as a positive impact of transitions (which includes aspects of job creation, energy self-sufficiency and improved education



Note: "Various" include counts of solar, wind, biofuel, and biomass energy sources.

Fig. 6. Impact of energy source.

opportunities), many of these outcomes are two-sided upon closer examination, as ambitions for poverty alleviation can be intertwined with bureaucratic interests [126], and issues around precarious employment persists [95,97,101,107,127,128]. Much of the literature that cites job creation as a beneficial outcome attributes that creation to jobs on biofuel plantations. However, in many cases, this holds double-edged consequences. Several of the articles note that while private sector-led biofuel plantations can initially bring about employment opportunities, many of the jobs are precarious; this is due to the plantation structures, where smallholders under private sector holdings tend to receive unequal shares and are subject to unfair land allocation processes. Santika et al.'s [84] study on the impacts of oil palm plantations in Indonesia revealed that the existing baseline socio-economic conditions and biophysical features of communities played a large role in determining the outcome of plantation developments. For example, for communities that are already largely relying on market-oriented livelihoods, the development of oil palm plantations, in various ways, contributed positively to substantiating these livelihoods. However, for communities that originally relied on subsistence-based livelihoods, the introduction of oil palm and its plantation structures have actually eroded existing livelihoods and instead increased poverty.

In addition, the benefits of employment also may be overshadowed by the long-term consequences of land loss, which significantly constrains livelihood options [84,87,88,90–92,95]. In their study of jatropha production systems in the Philippines, Montefrio and Sonnenfeld [87] examine the contract farming arrangements of indigenous smallholder farmers with parastatal and private firms. The study finds that biofuel contracts compel smallholder farmers to adopt agro-industrial practices as opposed to traditional crop management; this priority of "efficiency" over sustainability may fundamentally affect local livelihood options and capacity in the long run, due to resource scarcity induced by land-use change. In addition, contract farming relations can also perpetuate ongoing social and economic inequalities, including increasing women's labour burdens due to existing gendered divisions of labour. Thus, while communities have accepted plantations due to a narrative that promises poverty alleviation and job creation, the industry's irresponsible practices have instead led to the long-term disenfranchisement of local communities (which are disproportionately indigenous).

Within this discourse, the literature pays some attention to the gendered aspects of worsening poverty and shifts in labour. In certain contexts, existing norms surrounding access and divisions of labour means that land loss further constrains women's access to vital livelihood resources [88]. Arndt et al. [91] point out that while women make up between 60% and 80% of the agricultural workforce in Africa, they are typically involved in food crop production; men, however, tend to control cash crops and monetary proceeds. Interestingly, according to the case study, the increase of women in biofuel production in Mozambique has led to increases in food prices, as women shift away from food production without replacement.

Besides incidents of private-sector led initiatives that exacerbated local inequalities, state-led, top-down energy projects can also prescribe unified energy projects without sufficiently considering local needs and poverty context, leading to undesirable outcomes. Geall et al.'s [126] case study looked at the efficacy of state-led push for solar photovoltaic (PV) infrastructure in rural Guinan county, China. One intention of the programme is to enhance nomadic household's living standards by allowing nomadic households to sell electricity via grid connected solar systems. However, most of the targeted nomadic households of the region did not reap the intended benefits of the programme due to livelihoods and mobility patterns tied to seasonal movement. In addition, no monitoring system has been implemented to ensure that energy benefits are equally distributed to poor households, making it easy for local bureaucratic actors to take advantage of the bulk of profits generated by the project. This case demonstrates that when transitions are enforced as a top-down mode of governance, local communities' role in decision-making may be excluded or constrained, causing energy deployment and poverty alleviation goals to be misaligned with local socio-cultural and political realities.

3.2.3. Land loss and echoes of colonial rationalities through market interests

The discourse surrounding renewable energy can be used against indigenous, rural, or marginalized communities, with an underlying narrative that implies community interests must concede to broader environmental concerns. Land loss is a dominant topic among the literature on renewable energy transitions, with 24% of the reviewed literature addressing this impact. Within those, biofuel plantations and large hydropower projects dominate, with cases illustrating stark conflicts of interest between private developers, investors, and local communities. The majority of the literature dealing with the impacts of land loss are related to the loss of livelihood and food security, as discussed in the previous section. This echoes existing literature on the consequences of land grabbing, as the privatization of common land alienates vulnerable communities from their sources of livelihood, thus increasing their precarity [88].

The yielding of local community rights is reflected in cases of hydropower developments [73,129–131], mega solar energy projects [83,126], biofuel plantations [84,87,88,90,92,95], and wind power developments [79,111]. The topic of land ownership is particularly linked to indigenous causes; 50% of the literature that addresses indigenous issues concerns land loss and/or issues of food security related to land loss. Both McCauley et al. [111] and Ossbo and Lantto [132] refer to cases of declined reindeer husbandry among Swedish Sámi communities to illustrate the ways in which renewable energy developments have threatened forms of livelihood specific to indigenous communities. Industrial encroachments on indigenous territories thus echo colonial rationalities. Indigenous interests are not only excluded from the market gains of renewable projects; those gains are also accumulated at the expense of indigenous communities.

The consequences of land loss and resettlement can fundamentally – and negatively – transform the social fabric of a community, including its power relations and gender norms. Several pieces of literature describe different repercussions for men and women when hydropower projects cause them to lose access to land and traditional forms of livelihoods [107,133,134]. Hill et al.'s [133] study on Laos and Vietnam notes that communities displaced by hydropower developments are often resettled on lands that are unsuitable for cultivation, forcing much of the population into informal wage labour or illegal work, such as timber harvesting. Many of the articles discussing this outcome describe men as having an easier time finding work than women during such a transition to a market economy, which consequentially increases women's dependency on men after hydropower development. Adding to previous reflections on top-down modes of energy developments (see Section 3.2.2), Hill et al.'s [133] case demonstrates that such developmental trajectories can fundamentally destabilize existing social orders in a way that further constrains women's roles and positions in society.

3.2.4. (Unequal) access

Several pieces of literature assert that the presence of certain renewable energy projects has deepened social and wealth divides due to unequal access [15,71,72,80,82,100,101,135,136]. While many cases have pointed to the positive outcomes that solar energy sources have brought to rural communities, especially with regards to improving energy self-sufficiency, educational outcomes, and the alleviation of women's labour burdens [69,76,80–82,86,115,116,120–122,124,125,127,137,138], questions of equitable access have also been particularly common within cases of solar energy deployment. Examining renewable energy consumption in Sub-Saharan Africa, Mohammed et al. [101] find that the high start-up cost of household renewable technology blocks the poorest families from accessing technologies such as rooftop solar systems. In certain cases, poor families are even trapped in debt cycles after borrowing money to pay for renewable energy technologies. In their study of solar electricity use in rural Kenya, Winther et al. [80] point to the gendered dimension of financial barriers to access. The study highlights how fixed connections and subscription fees of solar energy give rural women less agency regarding access and appliances, as opposed to men, who in general are homeowners and have a higher income. As a response to this, the paper discusses two examples of successful decentralized systems of supply initiated by women-led community projects in the studied villages, pointing to the importance of community-based and participatory initiatives. As a result, the women's 'hands-on' involvement in energy system implementation and supply management has not only led to a socio-technological shift in energy use, but also to changes in village norms and the increased status of women in the eyes of their communities and families.

Several cases in South Asia have reflected on the role of financing strategies in disseminating solar energy in rural contexts, especially with regards to solar home systems (SHS) [69,82,100,116,120,121]. Despite the common presence of subsidy programmes and the generally positive outcomes of solar energy systems across the region, affordability remains an issue despite the help of subsidy, with common challenges including the inability of poor households to pay the heavy down payments and subscription fees [69,82,100,120,121]. In addition, Wong's [82] comparative study on off-grid solar lighting projects in rural Bangladesh and India points to the ways that insufficient subsidy policies may inadvertently create unfair outcomes that only benefits the non-poor. In the Bangladeshi case study, the ownership model (rather than a rental model) of SHS has led to very high operation and maintenance costs, and the subsidy provided for each installation is only able to cover 65–70% of the total related expenses. This means that customer contributions are required, on top of the heavy down-payment and high subscription fees, to fill in the financial gaps. As such, not only has the subsidy policy exerted a heavy financial burden on the donors, it has also only encouraged the better-off customers to adopt the technology. Wong [82] further outlines the social and psychological impacts of this unequal access, stating that solar electrification has deepened a middle-class divide: households that can afford SHS have improved educational opportunities (children can study more easily at home), health conditions, and means of communication (through access to reliable recharging of mobile phones), while the poor lag behind on these aspects [82]. In response to divided access and insufficient subsidy programmes, studies have suggested measures such as developing socially differentiated subsidies or loans, through the consultations of the needs and knowledge of local users [82,100,121].

Several studies on solar PV in the Global North have reflected on the ways that the expansion of residential solar PV has led to differentiated electricity cost burdens [102–106]. In Germany, the rapid expansion of renewable energy capacity in the past decades, especially due to large increases in solar PV, has had mixed consequences. On one hand, the share of renewable energy consumption increased by approximately 18% between 2000 and 2013 [106]; on the other hand, this increase has led to a significant rise in electricity prices, leading to "regressive distributional effects" placing uneven electricity cost burdens on poorer households. In the U.S, Sunter [136] has pointed to the racial aspect of solar PV use: across the country, Black and Hispanic-majority communities show significantly less rooftop PV installed on average. The study observes that the disparity is correlated to racial divides in both household income and ownership, and argues that delayed participation by a community in energy source use may exacerbate existing socio-economic gaps.

While the cases have demonstrated the ways in which top-down implementation of renewable energy projects may overlook the interests of those who are already in a marginalized position, Winther et al.'s [80] study contends that gender-neutral and generic interventions to involving communities can result in benefiting the groups that are already in a more privileged position (e.g., men are more often recruited in the system of energy supply), thus perpetuating the structures of inequality (e.g., male dominated energy systems).

3.3. Responses to negative impacts

The literature documents several cases of organized resistance against negative impacts of energy transitions [73,77,79,111,127–129,132,139,140]. Almost all of these cases concern land loss and displacement, with the majority of the resistance consisting of local protests against the government. There are few records of resistance that occurred on a more institutional level, with the exception of one study that mentions indigenous Sámi representation in the Swedish government [132]. The Sámi representation has called for social impact assessments on any renewable energy projects in Sámi territories, as well as veto rights over projects.

4. Discussion

4.1. Reflections on the evidence base

The evidence base reviewed in our study points to four important insights. First, *lack of engagement* with local communities is often a major factor leading to negative impacts of low-carbon development. This suggests there is a crucial need for participatory frameworks that prioritize the needs and concerns of local residents, particularly vulnerable stakeholders. To avoid the pitfalls highlighted from articles in our review, engagement should focus on feedback from local people on the suitability of certain project developments, as well as establish an inclusive and just supply chain process.

Second, with the exception of one paper [133], there appears to be *little evidence of formal gender assessments* being undertaken to assess how low-carbon energy solutions might consider existing gender injustices. For example, women could be provided with access to certain resources that help ease their transition; officials could develop more holistic compensation plans; or land can be jointly titled in the case of resettlement. This suggests there is a need to conduct gender impact assessments alongside environmental and social impact assessments when developing low-carbon energy projects. Effective participation of multiple stakeholders (e.g., government, civil society actors, affected community members, etc.) is crucial in order for any gender impact assessment to be suitably designed and implemented. This process can begin with an analysis of the political economy through identifying stakeholders and recognising their interests as well as positions in the energy transition process. Such an analysis can reveal actors who may be opposed to a transition, as well as those who are supportive.

Third, the review highlights that potential barriers to access, especially the cost of renewable technologies, is a key consideration that is particularly critical when promoting low-carbon technologies in poor households. Strong cross-sectoral initiatives between the energy sector and other departments (such as the public sector) can be a way to develop inclusive energy policies, programmes, or subsidy schemes to address this issue. Such collaborations may also be a way to address complex socio-economic topics, such as women's social security and land ownership. This topic points to a broader issue of democratizing ownership and control of energy systems and technologies.

Fourth, development projects that promised new jobs – and then failed – raises the question of whether a "job increase" is a sufficient indicator in assessing long-term economic improvement. Renewable energy projects typically focus first and foremost on contributing to affordable and clean energy (SDG7), whose indicators relate to the proportion of people with access to modern energy services, the share of renewables in national energy mix, and the energy intensity of the national economy. Benefits associated with other SDGs are often expected too – such as job creation linked (SDG8) and gender equality (SDG5). But the links between energy, economy and society are complex. Moreover, project implementers rarely conduct follow-up evaluations beyond the length of the project, meaning evidence of sustained positive change is often weak [141]. Instead of assuming renewable energy is a solution to social problems and creating policies around popular discourses, policy-makers might wish to look at a renewable energy project as *one* of the *many* aspects that need to be considered when addressing issues of gender and social equity.

4.2. Gaps in the research literature

Our review reveals a number of gaps in the academic literature that will benefit from future attention. Only three papers [80,86,114] explicitly discuss the gendered dimensions of renewable energy leadership and how that may influence implementations and transitions related to social equity. As demonstrated in the review, poor women from rural regions often hold central roles in energy-related work. However, this perspective is severely lacking in the current "gender-blind" decision-making processes of renewable energy projects. The discussion on barriers or opportunities for women's *active role* in shaping transitions is also limited, including in the implementation of gender concerns within renewable energy decision-making structures, the designs of alternative energy technologies, and the value chain of renewable energy technologies. Thus, further research is required to explore the various gendered dimensions of employment and representation in the overall trajectory of renewable energy industries and transitions.

Additionally, there was little evidence on whether the resource extraction needed to build low-carbon technologies poses the same, or potentially worse, environmental outcomes than fossil fuel extraction. The literature analysed in this paper largely focused on the gender and social equity dimensions of use and access, but an examination of the equity impacts of the production of low-carbon technology deserves further exploration.

None of the reviewed literature specifically looks at the role of disabilities within renewable energy transitions, although we are aware of energy projects and initiatives targeting disabled communities: for example, a partnership between Fundación Paraguaya and Barefoot College in India to train women with disabilities to become solar engineers, and a partnership between Siemens Gamesa Renewable Energy and Pathway Plus in the UK to provide disabled students with work placements in a wind turbine blade factory. The limited research on impacts of energy transitions on disabled communities and an overall gap in knowledge on the wider employment opportunities from renewable energy transitions raises a number of important questions: To whom are these opportunities available? Are they inherently exclusive to those with certain disabilities? Will those with disabilities be further left behind as certain communities transition from one form of labour to another, with the arrival of renewable technologies? Whether renewable energy can pose unique contributions or limitations to those living with disabilities is a question largely overlooked.

We note that most of the reviewed literature focuses on exploring the gender and social equity impacts on local communities that are physically near the development site of renewable energy projects. While proximity correlates to level of impact, it is relevant to explore the larger regional, national, and even global effects of certain renewable energy developments. This may paint a broader picture of how transnational actors influence and impact energy regimes.

Finally, there appears to be a paucity of literature from the Global North on gender implications of energy transitions. Indeed, there is potentially a lot to learn from research on gender and energy in the Global South that could be applied to analyse experiences in the Global North. We note that our search terminology may have limited the literature we found focusing on the Global North, where researchers and policy makers often use the terms 'fuel poverty' and 'vulnerable consumers', which we did not search for. In addition, both of these terms are gender-neutral, so any data collected on them does not easily lend itself to analysis of intersectionality.

4.3. Limitations of the review

Here we identify a number of important limitations to our review. First, systematic review methods from which we derived our review process are best suited to answering a narrow question using quantitative data, such as effects of an intervention or prevalence of a condition within a population [142]. As such, these methodologies are arguably less appropriate for synthesizing the qualitative evidence gathered from the articles in our study. Nonetheless, systematic approaches are powerful for providing a meta-analysis to combine the results of multiple studies in a robust and transparent manner [142,143]. Systematic maps in particular are designed to collect existing evidence on a topic and identify gaps in knowledge [144]. Our study of gender and social equity implications of energy transitions is itself a form of systematic map, intended to synthesize relevant literature on intersections between gender, social equity and energy transitions.

Second, time constraints meant we could only focus on peer-reviewed academic publications. This means our study does not include insights from the grey literature, despite considerable work on the topic reported by NGOs, civil society organizations, consultancy groups and international organizations. However, we believe the focus on peer-reviewed academic publications is a useful and important starting point for this study. Indeed, there is some value in interrogating the academic literature if only to see how important real-world issues around gender, social equity and energy transitions are being conceptualized and theorized in academic studies. Moreover, inclusion of grey literature requires time consuming manual searching of individual web sites as no comprehensive database exists for this literature [145].

Third, we expect that some literature on the topic will not have been picked up by our precise search string. Hence, we may have missed some important findings from the literature. For example, including only the papers that explicitly addressed gender and social equity aspects of low-carbon energy systems means we will have missed out on papers that explored other facets of the same low-carbon energy systems, which may be contextually relevant. In further research, refinement of the search string, combined with more initial testing and validation, and augmenting the search with a targeted selective search of key academic journals – either during testing and validation or as an additional, parallel search – would help to avoid this limitation to some extent.

Fourth, our search did not distinguish between literature that featured small hydropower projects from those that featured large ones. Small or micro-hydropower (plants that produce less than 10 megawatts) are typically considered renewable; however, large hydropower is sometimes not considered a renewable resource, due to its potentially large environmental and controversial social impacts. We have tried to bear this in mind when drawing insights from any analysis of hydropower cases.

5. Conclusions and recommendations

In this study we asked the question: What are the gender and social implications of introducing low-carbon energy technologies into traditional or conventional energy systems? Drawing on a systematic review approach, we reviewed 90 peer-reviewed academic papers relevant to our question. Our analysis generated two main findings relevant to researchers, policy-makers and practitioners active in low-carbon energy transition processes.

First, technology on its own does not determine whether the outcomes of an energy transition will be inclusive and beneficial. Our results showed that no low-carbon energy option led to solely positive or solely negative impacts. Technologies do not stand outside the social and political contexts within which they have been created and are being applied. There may be different outcomes and dynamics depending on the prevailing power relations, spatial and social contexts. Shaping energy transition processes is a complex process in which technology plays a part. Social, political, economic and cultural dynamics contribute significantly and manifest themselves in multiple ways, not just in the distribution of benefits and impacts, but also in decision-making and implementation (including within labour regimes and in technology design).

Second, when decision-making around transitions does not adequately include the voices of rural, poor, indigenous or other marginalized communities, their roles and sense of ownership of the transition and their control over technologies that affect their lives is often severely limited. This is demonstrated in the incidents of land-loss, livelihood change, and precarious employment arrangements discussed in Sections 3.2.2 and 3.2.3. However, as mentioned in Section 3.2.4, generic and gender-neutral approaches to 'community engagement' in energy transitions will not automatically lead to fairer outcomes, and in many cases, can perpetuate existing structures of inequalities. For example, such interventions often involve and benefit groups that are already in a privileged position. Thus, there is a need to develop energy projects and interventions with the explicit purpose of including marginalized groups in the planning and implementation of energy transition programmes.

The global climate crisis demands a transition away from fossil-fuel-based energy and toward cleaner energy alternatives. Yet, as this review has shown, low-carbon energy systems do not guarantee more equitable and inclusive outcomes. It is crucial to recognise that energy processes and sources are implicitly shaped by existing power structures and social norms, and that different renewable energy technologies have different impacts and contributions to social costs and benefits. While renewable energy technologies are an important means to wider social equity, a "just transition" cannot be achieved without inclusive institutional arrangements that ensure just processes. With this in mind, we encourage the energy transitions research community to place greater emphasis on gender and social equity considerations in their work.

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.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2020.101774.

References

[1] IPCC, Summary for Policymakers: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty, World Meteorological Organization, Geneva, 2018.
[2] G. Bridge, S. Bouzarovski, M. Bradshaw, N. Eyre, Geographies of energy transition: space, place and the low-carbon economy, Energy Policy 53 (2013) 331–340, https://doi.org/10.1016/j.enpol.2012.10.066.
[3] B.K. Sovacool, How long will it take? Conceptualizing the temporal dynamics of energy transitions, Energy Res. Soc. Sci. 13 (2016) 202–215, https://doi.org/10.1016/j.erss.2015.12.020.
[4] F.W. Geels, B.K. Sovacool, T. Schwanen, S. Sorrell, Sociotechnical transitions for deep decarbonization, Science 357 (2017) 1242–1244, https://doi.org/10.1126/science.aao3760.
[5] F.G.N. Li, E. Trutnevyte, N. Strachan, A review of socio-technical energy transition

(STET) models, Technol. Forecast. Soc. Change. 100 (2015) 290–305, https://doi.org/10.1016/j.techfore.2015.07.017.
[6] C. Strambo, A.C. González Espinosa, A.J. Puertas Velasco, L.M. Mateus Molano, Contention strikes back? The discursive, instrumental and institutional tactics implemented by coal sector incumbents in Colombia, Energy Res. Soc. Sci. 59 (2020) 101280, , https://doi.org/10.1016/j.erss.2019.101280.
[7] G.C. Unruh, Escaping carbon lock-in, Energy Policy 30 (2002) 317–325, https://doi.org/10.1016/S0301-4215(01)00098-2.
[8] G. Iyer, N. Hultman, J. Eom, H. McJeon, P. Patel, L. Clarke, Diffusion of low-carbon technologies and the feasibility of long-term climate targets, Technol. Forecast. Soc. Change. 90 (2015) 103–118, https://doi.org/10.1016/j.techfore.2013.08.025.
[9] R. Raven, F. Kern, B. Verhees, A. Smith, Niche construction and empowerment through socio-political work. A meta-analysis of six low-carbon technology cases, Environ. Innov. Societal Transitions 18 (2016) 164–180, https://doi.org/10.1016/j.eist.2015.02.002.
[10] R. Hoggett, Technology scale and supply chains in a secure, affordable and low carbon energy transition, Appl. Energy 123 (2014) 296–306, https://doi.org/10.1016/j.apenergy.2013.12.006.
[11] M. Richter, Utilities' business models for renewable energy: a review, Renewable Sustainable Energy Rev. 16 (2012) 2483–2493, https://doi.org/10.1016/j.rser.2012.01.072.
[12] C. Muhoza, O.W. Johnson, Exploring household energy transitions in rural Zambia from the user perspective, Energy Policy 121 (2018) 25–34, https://doi.org/10.1016/j.enpol.2018.06.005.
[13] J. Schot, L. Kanger, G. Verbong, The roles of users in shaping transitions to new energy systems, Nat. Energy 1 (2016) 16054, https://doi.org/10.1038/nenergy.2016.54.
[14] J. Stephenson, B. Barton, G. Carrington, A. Doering, R. Ford, D. Hopkins, R. Lawson, A. McCarthy, D. Rees, M. Scott, P. Thorsnes, S. Walton, J. Williams, B. Wooliscroft, The energy cultures framework: exploring the role of norms, practices and material culture in shaping energy behaviour in New Zealand, Energy Res. Social Sci. 7 (2015) 117–123, https://doi.org/10.1016/j.erss.2015.03.005.
[15] H. Ahlborg, Towards a conceptualization of power in energy transitions, Environ. Innov. Societal Transitions 25 (2017) 122–141, https://doi.org/10.1016/j.eist.2017.01.004.
[16] M. Lawhon, J.T. Murphy, Socio-technical regimes and sustainability transitions: insights from political ecology, Prog. Hum. Geogr. 36 (2012) 354–378, https://doi.org/10.1177/0309132511427960.
[17] J. Meadowcroft, What about the politics? Sustainable development, transition management, and long term energy transitions, Policy Sci. 42 (2009) 323–340, https://doi.org/10.1007/s11077-009-9097-z.
[18] C.A. Miller, A. Iles, C.F. Jones, The social dimensions of energy transitions, Sci. Cult. 22 (2013) 135–148, https://doi.org/10.1080/09505431.2013.786989.
[19] G. Ottinger, The winds of change: environmental justice in energy transitions, Sci. Cult. 22 (2013) 222–229, https://doi.org/10.1080/09505431.2013.786996.
[20] J. Emmons Allison, K. McCrory, I. Oxnevad, Closing the renewable energy gender gap in the United States and Canada: the role of women's professional networking, Energy Res. Soc. Sci. 55 (2019) 35–45.
[21] I. Scoones, M. Leach, P. Newell (Eds.), The Politics of Green Transformations, Routledge, London, New York, 2015.
[22] F. Avelino, J.M. Wittmayer, Shifting power relations in sustainability transitions: a multi-actor perspective, J. Environ. Plann. Policy Manage. 18 (2016) 628–649, https://doi.org/10.1080/1523908X.2015.1112259.
[23] V. Castán Broto, Innovation territories and energy transitions: energy, water and modernity in Spain, 1939–1975, J. Environ. Policy Plann. 18 (2016) 712–729, https://doi.org/10.1080/1523908X.2015.1075195.
[24] B.K. Sovacool, I. Mukherjee, Conceptualizing and measuring energy security: a synthesized approach, Energy 36 (2011) 5343–5355, https://doi.org/10.1016/j.energy.2011.06.043.
[25] A. Månsson, B. Johansson, L.J. Nilsson, Assessing energy security: an overview of commonly used methodologies, Energy 73 (2014) 1–14, https://doi.org/10.1016/j.energy.2014.06.073.
[26] P. Newell, D. Mulvaney, The political economy of the 'just transition', Geogr. J. 179 (2013) 132–140, https://doi.org/10.1111/geoj.12008.
[27] N. Healy, J. Barry, Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition", Energy Policy 108 (2017) 451–459, https://doi.org/10.1016/j.enpol.2017.06.014.
[28] UNFCCC, Paris Agreement, United Nations Framework Convention on Climate Change, 2015. < https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement > .
[29] A. Kaijser, A. Kronsell, Climate change through the lens of intersectionality, Environ. Politics 23 (2014) 417–433, https://doi.org/10.1080/09644016.2013.835203.
[30] M.J. Azocar, M.M. Ferree, Engendering the sociology of expertise, Soc. Compass 10 (2016) 1079–1089, https://doi.org/10.1111/soc4.12438.
[31] J. Clancy, U. Roehr, Gender and energy: is there a Northern perspective? Energy Sustainable Dev. 7 (2003) 44–49, https://doi.org/10.1016/S0973-0826(08)60364-6.
[32] S. Oparaocha, S. Dutta, Gender and energy for sustainable development, Curr. Opin. Environ. Sustainability 3 (2011) 265–271, https://doi.org/10.1016/j.cosust.2011.07.003.
[33] S.E. Ryan, Rethinking gender and identity in energy studies, Energy Res. Social Sci. 1 (2014) 96–105, https://doi.org/10.1016/j.erss.2014.02.008.
[34] E. Cecelski, Energy and rural women's work: crisis, response and policy alternatives, Int. Labour Rev. 126 (1987) 41–64.
[35] K.R. Smith, Women, energy, and health: a perspective from where the people are, Bull. Sci. Technol. Soc. 16 (1996) 107–115.
[36] E. Cecelski, Re-thinking gender and energy: Old and new directions, Energia/Ease (2004).
[37] J. Clancy, S. Dutta, Gender in the transition to sustainable energy for all: From evidence to inclusivepolicies, ENERGIA International Network on Gender and Sustainable Energy, The Hague, Netherlands, 2019.
[38] E. Cecelski, From the Millennium Development Goals Towards a Gender-Sensitive Energy Policy Research and Practice: Empirical Evidence and Case Studies, ENERGIA International Network on Gender and Sustainable Energy, London, 2006.
[39] E. Cecelski, S. Dutta, Mainstreaming Gender in Energy Projects: A Practical Handbook: Resource Pack, ENERGIA, 2011. < http://genderandenvironment.org/resource/mainstreaming-gender-in-energy-projects-a-practical-handbook-resource-pack/ > (accessed March 27, 2018).
[40] G. Kelkar, D. Nathan, Gender Relations and the Energy Transition in Rural Asia, Collaborative Research Group on Gender and Energy (CRGGE), 2005. < https://assets.publishing.service.gov.uk/media/57a08ca440f0b652dd001464/R8346_finrep_kelkar.pdf > .
[41] J.S. Clancy, M. Skutsch, S. Batchelor, The gender-energy-poverty nexus: finding the energy to address gender concerns in development, DFID, 2002. < https://research.utwente.nl/en/publications/the-gender-energy-poverty-nexus-finding-the-energy-to-address-gen > (accessed April 1, 2018).
[42] E. Cecelski, The role of women in sustainable energy development, National Renewable Energy Laboratory, Golden, Colorado, 2000. < http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.508.3364&rep=rep1&type=pdf > (accessed April 3, 2017).
[43] Y. Lambrou, G. Piana, Energy and Gender Issues in Rural Sustainable Development, FAO, Rome, 2006.
[44] G. Köhlin, E.O. Sills, S.K. Pattanayak, C. Wilfong, Energy, Gender and Development: What are the Linkages? Where is the Evidence? World Bank, Washington, D.C., 2011.
[45] R. Pearl-Martinez, J.C. Stephens, Toward a gender diverse workforce in the renewable energy transition, Sustainability: Sci., Pract., Policy 12 (2016).
[46] F. Rabia, K. Arslan, A. López-Peña, M. Renner, Renewable Energy and Jobs: Annual Review 2016, International Renewable Energy Agency (IRENA), Masdar City, 2016.
[47] A. Pueyo, M. Maestre, Linking energy access, gender and poverty: a review of the literature on productive uses of energy, Energy Res. Soc. Sci. 53 (2019) 170–181, https://doi.org/10.1016/j.erss.2019.02.019.
[48] IFC, Investing in Women's Employment Good for Business, Good for Development, International Finance Corporation, Washington, D.C., 2013.
[49] K. O'Dell, S. Peters, K. Wharton, Women, energy, and economic empowerment: Applying a gender lensto amplify the impact of energy access, Deloitte University Press, New York, 2014 (accessed April 1, 2018).
[50] APWLD, A Feminist Interpretation of Just and Equitable Transitions in the Context of Climate Change, Asia Pacific Forum on Women, Law and Development (APWLD),, Chiang Mai, Thailand, 2017.
[51] A.V. Rojas, F.M. Schmitt, L. Aguilar, Guidelines on renewable energy technologies for women in rural and informal urban areas, IUCN and ENERGIA, 2014. < http://genderandenvironment.org/resource/guidelines-on-renewable-energy-technologies-for-women-in-rural-and-informal-urban-areas/ > (accessed March 27, 2018).
[52] S. Nelson, A.T. Kuriakose, Gender and renewable energy: entry points for women's livelihoods and employment, Clim. Invest. Funds (2017).
[53] M. Gay-Antaki, "Now We Have Equality": A Feminist Political Ecology Analysis of Carbon Markets in Oaxaca, Mexico, J. Latin Am. Geogr. 15 (2016) 49–66.
[54] ENERGIA, Gender in the Transition to Sustainable Energy for All: From Evidence to Inclusive Policies, ENERGIA, The Hague, Netherlands, 2019.
[55] S. Pachauri, N.D. Rao, Gender impacts and determinants of energy poverty: are we asking the right questions? Curr. Opin. Environ. Sustainability 5 (2013) 205–215, https://doi.org/10.1016/j.cosust.2013.04.006.
[56] J. Clancy, In the light of what we know: Gender and energy transformations, (2016). < http://epdoc.utsp.utwente.nl/102396/ > .
[57] B.K. Sovacool, J. Axsen, S. Sorrell, Promoting novelty, rigor, and style in energy social science: towards codes of practice for appropriate methods and research design, Energy Res. Social Sci. 45 (2018) 12–42, https://doi.org/10.1016/j.erss.2018.07.007.
[58] N.R. Haddaway, P. Woodcock, B. Macura, A. Collins, Making literature reviews more reliable through application of lessons from systematic reviews: making literature reviews more reliable, Conserv. Biol. 29 (2015) 1596–1605, https://doi.org/10.1111/cobi.12541.
[59] A.S. Pullin, T.M. Knight, Support for decision making in conservation practice: an evidence-based approach, J. Nat. Conserv. 11 (2003) 83–90, https://doi.org/10.1078/1617-1381-00040.
[60] J.J. Walker, Systematic Reviews in the Social Sciences: a Practical Guide – by Petticrew, M. and Roberts, H. Soc. Health Illness 29 (2007) 318–319, https://doi.org/10.1111/j.1467-9566.2007.498_4.x.
[61] M. Feenstra, G. Özerol, Using energy justice as a search light for gender and energy policy research: A systematic review, in: Panel Sesson on Between You and the State: Discussing the Emerging Energy Justice Regimes, Hamburg, Germany, 2018.
[62] J. Balest, E. Pisani, D. Vettorato, L. Secco, Local reflections on low-carbon energy systems: a systematic review of actors, processes, and networks of local societies, Energy Res. Social Sci. 42 (2018) 170–181, https://doi.org/10.1016/j.erss.2018.

03.006.
[63] E. Puzzolo, D. Pope, D. Stanistreet, E.A. Rehfuess, N.G. Bruce, Clean fuels for resource-poor settings: a systematic review of barriers and enablers to adoption and sustained use, Environ. Res. 146 (2016) 218–234, https://doi.org/10.1016/j.envres.2016.01.002.
[64] E.A. Rehfuess, E. Puzzolo, D. Stanistreet, D. Pope, N.G. Bruce, Enablers and barriers to large-scale uptake of improved solid fuel stoves: a systematic review, Environ. Health Perspect. 122 (2014) 120–130, https://doi.org/10.1289/ehp.1306639.
[65] J.J. Lewis, S.K. Pattanayak, Who Adopts Improved Fuels and Cookstoves? A Systematic Review, Environ. Health Perspect. 120 (2012) 637–645, https://doi.org/10.1289/ehp.1104194.
[66] J.Y.T. Po, J.M. FitzGerald, C. Carlsten, Respiratory disease associated with solid biomass fuel exposure in rural women and children: systematic review and meta-analysis, Thorax 66 (2011) 232–239, https://doi.org/10.1136/thx.2010.147884.
[67] Collaboration for Environmental Evidence, Guidelines for Systematic Review and Evidence Synthesis in Environmental Management, Environmental Evidence, 2013. < www.environmentalevidence.org/Documents/Guidelines/Guidelines4.2.pdf > .
[68] P. Sola, P.O. Cerutti, W. Zhou, D. Gautier, M. Iiyama, J. Schure, A. Chenevoy, J. Yila, V. Dufe, R. Nasi, G. Petrokofsky, G. Shepherd, The environmental, socio-economic, and health impacts of woodfuel value chains in Sub-Saharan Africa: a systematic map, Environ Evid. 6 (2017) 4, https://doi.org/10.1186/s13750-017-0082-2.
[69] N. Amin, R. Langendoen, Grameen shakti: A renewable energy social business model for global replication, in: 2012: pp. 324–327. https://doi.org/10.1109/GHTC.2012.50.
[70] S.S. Amjid, M.Q. Bilal, M.S. Nazir, A. Hussain, Biogas, renewable energy resource for Pakistan, Renewable Sustainable Energy Rev. 15 (2011) 2833–2837.
[71] S.H. Baker, Anti-resilience: a roadmap for transformational justice within the energy system, Harvard Civil Rights-Civil Liberties Law Rev. 54 (2019) 1–48.
[72] A.C. Brent, D.E. Rogers, Renewable rural electrification: sustainability assessment of mini-hybrid off-grid technological systems in the African context, Renewable Energy 35 (2010) 257–265.
[73] F.M. Cooke, J. Nordensvard, G.B. Saat, F. Urban, G. Siciliano, The limits of social protection: the case of hydropower dams and indigenous peoples' land, Asia Pacific Policy Stud. 4 (2017) 437–450.
[74] A.J. De Andrade Meireles, A. Gorayeb, D.R.F. Da Silva, G.S. De Lima, Socio-environmental impacts of wind farms on the traditional communities of the western coast of Ceará, in the Brazilian Northeast, J. Coastal Res. (2013) 81–86.
[75] J.U. Devkota, C. Prajapati, S. Singh, B. Hada, Statistical analysis of benefits of renewable energy - examples from biogas consumers of Nepal, Int. J. Renewable Energy Res. 4 (2014) 477–483.
[76] M. Gustavsson, A. Ellegård, The impact of solar home systems on rural livelihoods. Experiences from the Nyimba Energy Service Company in Zambia, Renewable Energy 29 (2004) 1059–1072.
[77] S. Jackson, A. Sleigh, Resettlement for China's Three Gorges Dam: socio-economic impact and institutional tensions, Communist Post-Communist Stud. 33 (2000) 223–241.
[78] H. Katuwal, A.K. Bohara, Biogas: a promising renewable technology and its impact on rural households in Nepal, Renewable Sustainable Energy Rev. 13 (2009) 2668–2674.
[79] R. Lawrence, Internal colonisation and indigenous resource sovereignty: wind power developments on traditional Saami lands, Environ. Plann D: Soc Space 32 (2014) 1036–1053.
[80] T. Winther, K. Ulsrud, A. Saini, Solar powered electricity access: implications for women's empowerment in rural Kenya, Energy Res. Social Sci. 44 (2018) 61–74.
[81] H.L. Wlokas, What contribution does the installation of solar water heaters make towards the alleviation of energy poverty in South Africa? J. Energy Southern Afr. 22 (2011) 27–39.
[82] S. Wong, Overcoming obstacles against effective solar lighting interventions in South Asia, Energy Policy 40 (2012) 110–120.
[83] K. Yenneti, R. Day, O. Golubchikov, Spatial justice and the land politics of renewables: dispossessing vulnerable communities through solar energy mega-projects, Geoforum 76 (2016) 90–99.
[84] T. Santika, K.A. Wilson, S. Budiharta, E.A. Law, T.M. Poh, M. Ancrenaz, M.J. Struebig, E. Meijaard, Does oil palm agriculture help alleviate poverty? A multidimensional counterfactual assessment of oil palm development in Indonesia, World Dev. 120 (2019) 105–117, https://doi.org/10.1016/j.worlddev.2019.04.012.
[85] R. Kattumuri, T. Kruse, Renewable technologies in Karnataka, India: jobs potential and co-benefits, Clim. Dev. 11 (2019) 124–137.
[86] L. Gray, A. Boyle, E. Francks, V. Yu, L. Gray, A. Boyle, E. Francks, V. Yu, The power of small-scale solar: gender, energy poverty, and entrepreneurship in Tanzania, Dev. Pract. 29 (2019) 26–39.
[87] M.J.F. Montefrio, D.A. Sonnenfeld, Global-local tensions in contract farming of biofuel crops involving indigenous communities in the Philippines, Soc. Nat. Resour. 26 (2013) 239–253.
[88] G.C. Schoneveld, L.A. German, E. Nutako, Land-based investments for rural development? A grounded analysis of the local impacts of biofuel feedstock plantations in Ghana, Ecol. Soc. 16 (2011), https://doi.org/10.5751/ES-04424-160410.
[89] V.C. Pandey, K. Singh, J.S. Singh, A. Kumar, B. Singh, R.P. Singh, Jatropha curcas: a potential biofuel plant for sustainable environmental development, Renewable Sustainable Energy Rev. 16 (2012) 2870–2883, https://doi.org/10.1016/j.rser.2012.02.004.
[90] S. Vermeulen, L. Cotula, Over the heads of local people: consultation, consent, and recompense in large-scale land deals for biofuels projects in Africa, J. Peasant Stud. 37 (2010) 899–916.
[91] C. Arndt, R. Benfica, J. Thurlow, Gender implications of biofuels expansion in Africa: the case of mozambique, World Dev. 39 (2011) 1649–1662.
[92] M.J.F. Montefrio, D.A. Sonnenfeld, Forests, fuel, or food? Competing coalitions and biofuels policy making in the Philippines, J. Environ. Dev. 20 (2011) 27–49.
[93] P. Ariza-Montobbio, S. Lele, Jatropha plantations for biodiesel in Tamil Nadu, India: viability, livelihood trade-offs, and latent conflict, Ecol. Econ. 70 (2010) 189–195, https://doi.org/10.1016/j.ecolecon.2010.05.011.
[94] N. Favretto, L.C. Stringer, A.J. Dougill, Unpacking livelihood challenges and opportunities in energy crop cultivation: perspectives on *Jatropha curcas* projects in Mali: Perspectives on Jatropha curcas projects in Mali, Geogr. J.. 180 (2014) 365–376, https://doi.org/10.1111/geoj.12053.
[95] N. Mintz-Habib, Malaysian biofuels industry experience: a socio-political analysis of the commercial environment, Energy Policy 56 (2013) 88–100, https://doi.org/10.1016/j.enpol.2012.08.069.
[96] O. Riera, J. Swinnen, Household level spillover effects from biofuels: evidence from castor in Ethiopia, Food Policy 59 (2016) 55–65, https://doi.org/10.1016/j.foodpol.2015.12.011.
[97] G. von Maltitz, A. Gasparatos, C. Fabricius, The Rise Fall and Potential Resilience Benefits of Jatropha in Southern Africa, Sustainability 6 (2014) 3615–3643, https://doi.org/10.3390/su6063615.
[98] N. Weeratunge, O. Joffre, S. Senaratna Sellamuttu, B. Bouahom, A. Keophoxay, Gender and household decision-making in a Lao Village: implications for livelihoods in hydropower development, Gender, Place Cult. 23 (2016) 1599–1614.
[99] W. Ding, L. He, D. Zewudie, H. Zhang, T.B. Zafar, X. Liu, Gender and renewable energy study in Tibetan pastoral areas of China, Renewable Energy 133 (2019) 901–913.
[100] I. Mahat, Implementation of alternative energy technologies in Nepal: towards the achievement of sustainable livelihoods, Energy Sustainable Dev. 8 (2004) 9–16.
[101] Y.S. Mohammed, M.W. Mustafa, N. Bashir, Status of renewable energy consumption and developmental challenges in Sub-Sahara Africa, Renewable Sustainable Energy Rev. 27 (2013) 453–463.
[102] M. Andor, M. Frondel, C. Vance, Installing Photovoltaics in Germany: a license to print money? Econ. Anal. Policy 48 (2015) 106–116, https://doi.org/10.1016/j.eap.2015.09.003.
[103] A.J. Chapman, B. McLellan, T. Tezuka, Residential solar PV policy: an analysis of impacts, successes and failures in the Australian case, Renewable Energy 86 (2016) 1265–1279, https://doi.org/10.1016/j.renene.2015.09.061.
[104] W. Strielkowski, D. Štreimikienė, Y. Bilan, Network charging and residential tariffs: a case of household photovoltaics in the United Kingdom, Renewable Sustainable Energy Rev. 77 (2017) 461–473, https://doi.org/10.1016/j.rser.2017.04.029.
[105] N. Farrell, S. Lyons, Who should pay for renewable energy? Comparing the household impacts of different policy mechanisms in Ireland, Energy Res. Soc. Sci. 7 (2015) 31–42, https://doi.org/10.1016/j.erss.2015.02.006.
[106] M. Frondel, S. Sommer, C. Vance, The burden of Germany's energy transition: an empirical analysis of distributional effects, Econ. Anal. Policy 45 (2015) 89–99, https://doi.org/10.1016/j.eap.2015.01.004.
[107] T. Chandy, R.J. Keenan, R.J. Petheram, P. Shepherd, Impacts of hydropower development on rural livelihood sustainability in Sikkim, India: community perceptions, Mt. Res. Dev. 32 (2012) 117–125.
[108] P. Devine-Wright, Local aspects of UK renewable energy development: exploring public beliefs and policy implications, Local Environ. 10 (2005) 57–69.
[109] Y. Du, K. Takeuchi, Can climate mitigation help the poor? Measuring impacts of the CDM in rural China, J. Environ. Econ. Manage. 95 (2019) 178–197.
[110] J.S. Greene, M. Geisken, Socioeconomic impacts of wind farm development: a case study of Weatherford, Oklahoma, Energy, Sustainability Soc. 3 (2013) 1–9.
[111] D. McCauley, R. Heffron, M. Pavlenko, R. Rehner, R. Holmes, Energy justice in the Arctic: implications for energy infrastructural development in the Arctic, Energy Res. Soc. Sci. 16 (2016) 141–146.
[112] A. Delicado, E. Figueiredo, L. Silva, Community perceptions of renewable energies in Portugal: impacts on environment, landscape and local development, Energy Res. Soc. Sci. 13 (2016) 84–93.
[113] J. Marquardt, L.L. Delina, Reimagining energy futures: Contributions from community sustainable energy transitions in Thailand and the Philippines, Energy Res. Soc. Sci. 49 (2019) 91–102, https://doi.org/10.1016/j.erss.2018.10.028.
[114] B. Baruah, Creating opportunities for women in the renewable energy sector: findings from India, Feminist Econ. 21 (2015) 53–76.
[115] M. Gustavsson, Educational benefits from solar technology — access to solar electric services and changes in children's study routines, experiences from eastern province Zambia, Energy Policy 35 (2007) 1292–1299.
[116] M. Millinger, T. Mårlind, E.O. Ahlgren, Evaluation of Indian rural solar electrification: a case study in Chhattisgarh, Energy Sustainable Dev. 16 (2012) 486–492.
[117] R. Mohideen, The implications of clean and renewable energy development for gender equality in poor communities in South Asia, in: 2012. < https://doi.org/10.1109/TSAsia.2012.6397976 > .
[118] T. Sesan, Navigating the limitations of energy poverty: lessons from the promotion of improved cooking technologies in Kenya, Energy Policy 47 (2012) 202–210.
[119] S.L. Fischer, C.P. Koshland, J.A. Young, Social, economic, and environmental impacts assessment of a village-scale modern biomass energy project in Jilin province, China: local outcomes and lessons learned, Energy Sustainable Dev. 9 (2005) 50–59, https://doi.org/10.1016/S0973-0826(08)60499-8.
[120] E. Kabir, K.-H. Kim, J. Szulejko, Social impacts of solar home systems in rural

areas: a case study in Bangladesh, Energies 10 (2017) 1615, https://doi.org/10.3390/en10101615.
[121] D. Laufer, M. Schäfer, The implementation of Solar Home Systems as a poverty reduction strategy—a case study in Sri Lanka, Energy Sustainable Dev. 15 (2011) 330–336, https://doi.org/10.1016/j.esd.2011.07.002.
[122] R. Murali, S. Malhotra, D. Palit, K. Sasmal, 1 TERI University, Institutional Area, Vasant Kunj, New Delhi-110070, India; Socio-technical assessment of solar photovoltaic systems implemented for rural electrification in selected villages of Sundarbans region of India, AIMS, Energy. 3 (2015) 612–634, https://doi.org/10.3934/energy.2015.4.612.
[123] W. Ding, L. Wang, B. Chen, L. Xu, H. Li, Impacts of renewable energy on gender in rural communities of north-west China, Renewable Energy 69 (2014) 180–189.
[124] A. Fernández-Baldor, P. Lillo, A. Boni, Gender, energy, and inequalities: a capabilities approach analysis of renewable electrification projects in Peru, Sustainable Access to Energy in the Global South: Essential Technologies and Implementation Approaches, Springer International Publishing, Universitat Politècnica de València, València, Spain, 2015, pp. 193–204.
[125] O.W. Johnson, V. Gerber, C. Muhoza, Gender, culture and energy transitions in rural Africa, Energy Res. Soc. Sci. 49 (2019).
[126] S. Geall, W. Shen, Gongbuzeren, Solar energy for poverty alleviation in China: State ambitions, bureaucratic interests, and local realities, Energy Res. Soc. Sci. 41 (2018) 238–248, https://doi.org/10.1016/j.erss.2018.04.035.
[127] E.M. Nkoana, Community acceptance challenges of renewable energy transition: a tale of two solar parks in Limpopo, South Africa, J. Energy n Southern Afr. 29 (2018) 34–40.
[128] Z.A. Zommers, P.J. Johnson, D.W. Macdonald, Biofuels bonanza? Sugarcane production and poverty in villages surrounding Budongo Forest, Uganda, J. Eastern Afr. Stud. 6 (2012) 177–195, https://doi.org/10.1080/17531055.2012.669569.
[129] S. Baruah, Whose river is it anyway? Political economy of hydropower in the eastern Himalayas, Econ. Polit. Weekly 47 (2012) 41–52.
[130] M. Finley-Brook, C. Thomas, Renewable energy and human rights violations: illustrative cases from indigenous territories in Panama, Ann. Assoc. Am. Geogr. 101 (2011) 863–872.
[131] B.A. Galipeau, M. Ingman, B. Tilt, Dam-induced displacement and agricultural livelihoods in China's Mekong Basin, Hum Ecol. 41 (2013) 437–446, https://doi.org/10.1007/s10745-013-9575-y.
[132] Å. Ossbo, P. Lantto, Colonial tutelage and industrial colonialism: Reindeer husbandry and early 20th-century hydroelectric development in Sweden, Scand. J. Hist. 36 (2011) 324–348.
[133] C. Hill, P.T.N. Thuy, J. Storey, S. Vongphosy, Lessons learnt from gender impact assessments of hydropower projects in Laos and Vietnam, Gender Dev. 25 (2017) 455–470.
[134] L. Lebel, P. Lebel, K. Manorom, Z. Yishu, Gender in development discourses of civil society organisations and Mekong hydropower dams, Water Altern. 12 (2019) 192–220.
[135] V.R. Reddy, J.I. Uitto, D.R. Frans, N. Matin, Achieving global environmental benefits through local development of clean energy? The case of small hilly hydel in India, Energy Policy 34 (2006) 4069–4080.
[136] D.A. Sunter, S. Castellanos, D.M. Kammen, Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity, Nat. Sustainability 2 (2019) 71–76.
[137] D.R. Thiam, Renewable energy, poverty alleviation and developing nations: evidence from Senegal, J. Energy Southern Afr. 22 (2011) 23–34.
[138] P.D.C. Wijayatunga, R.A. Attalage, Socio-economic impact of solar home systems in rural Sri Lanka: a case-study, Energy Sustainable Dev. 9 (2005) 5–9.
[139] A. Curley, A failed green future: Navajo Green Jobs and energy "transition" in the Navajo Nation, Geoforum 88 (2018) 57–65.
[140] J. MacArthur, S. Matthewman, Populist resistance and alternative transitions: indigenous ownership of energy infrastructure in Aotearoa New Zealand, Energy Res. Social Sci. 43 (2018) 16–24.
[141] J. Clancy, N. Mohlakoana, Y. Diagne Gueye, L. Muchiri, I. Shakya, Mainstreaming Gender In Energy Sector Practice And Policy – Lessons from the ENERGIA international network, ENERGIA International Network on Gender and Sustainable Energy, The Hague, Netherlands, 2016.
[142] K.L. James, N.P. Randall, N.R. Haddaway, A methodology for systematic mapping in environmental sciences, Environ Evid. 5 (2016) 7, https://doi.org/10.1186/s13750-016-0059-6.
[143] E. Nye, G.J. Melendez-Torres, C. Bonell, Origins, methods and advances in qualitative meta-synthesis, Rev Educ. 4 (2016) 57–79, https://doi.org/10.1002/rev3.3065.
[144] N.R. Haddaway, G.S. Bilotta, Systematic reviews: separating fact from fiction, Environ. Int. 92–93 (2016) 578–584, https://doi.org/10.1016/j.envint.2015.07.011.
[145] N.R. Haddaway, The Use of Web-scraping Software in Searching for Grey Literature, Grey J. 11 (2015) 186–190.