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particularly Perspective

Equity, diversity and inclusion promises, exclusive practices? How to move towards effective and just energy transitions

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ABSTRACT

Equitable, diverse and inclusive action in a climate emergency is not optional – it is an imperative. Despite the growing rhetoric for inclusive energy systems transformations, many such promises are often empty signifiers and lack substantive action. For energy transitions to be effective and sustainable, they must include, prioritize, and benefit diverse groups, encompassing marginalized communities, underrepresented stakeholders and those disproportionately burdened by current energy systems – a wider range of groups than at present. In this perspective, we argue why and how it is necessary to embed concrete practices that center equity, diversity and inclusion for meaningful energy systems transformation. As researchers and practitioners, we can influence and support the larger energy community to move from pledges to practice by supporting locally led energy systems transitions, by building participatory energy governance, addressing intersectional inequalities in energy systems and centering equity diversity and inclusion as metrics for successful energy systems.

1. Introduction

Energy systems encompass an extensive range of actors, networks, institutions and technologies that use and govern the earth's resources for energy (1). Consequently, energy systems transitions are far more than a technical shift from fossil fuels to renewable sources of energy. These systems are “intimately intertwined with the expansion of the social, economic and political relations of which [they are] a part” (2,3). These dynamics have led to widespread environmental degradation and socio-ecological injustices (4). Transforming energy systems, therefore, requires addressing the entrenched power-laden and social inequities

that underpin them. Effective energy transitions demand an overhaul – one that disrupts the patterns of unjust environmental harm and socio-ecological destruction that define our current reality (4,5).

One way of centering justice in energy systems transitions is to focus on aspects of equity, diversity and inclusion.¹ Equity involves creating systems that ensure fair treatment and access to opportunities for all. Diversity refers to practices that include and serve the variety of identities and backgrounds in a given environment, including along the lines of class, gender, race, Indigeneity, age, ability and geography. Inclusion is the practice of creating environments where different individuals and groups, particularly those that have been historically marginalized, feel

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¹ We use equity, diversity and inclusion here, though we note that other frameworks (often used in workplaces and organizations) foreground diversity or, in settler colonial contexts, include decolonization or Indigenization.

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valued and can fully participate. While equity, diversity and inclusion are broad concepts that can be defined in many ways, we highlight two cross-cutting themes relevant across multiple aspects of energy systems transformations. First, the whole of society must work to reduce intersectional socio-ecological inequalities and negative outcomes from energy system transformation. Second, and relatedly, private and public sectors, researchers, decision-makers in policy, and civil society actors need to ensure that more heterogeneous actors and groups are integrated and can meaningfully benefit socially, politically, economically and environmentally from energy systems transitions at local, national and transnational scales. Simply put, in order to be effective and sustainable, energy transitions must prioritize, include and materially benefit a wider range of groups than at present. Notably, enhancing forms of equity, diversity and inclusion needs to reach beyond, for instance, a focus on adding women or racialized minorities to energy industry boardrooms. Crucially, those who do not necessarily lead but who form and participate in energy systems stand to either benefit or suffer the most in energy transitions.

The basic principles of equity, diversity and inclusion have, to this point, become more openly supported by public and private decision-makers leading energy transitions; however, we sit at a critical juncture.² On the one hand, the costly ramifications of climate change and ecological degradation are increasing and more intensely apparent. Global climate agendas led by multilateral institutions and countries have championed principles of equity, diversity and inclusion in energy transition governance (7). Nevertheless, the overwhelming reality is that energy transitions are maintaining business-as-usual practices, which sanitize and limit transformative agendas seeking structural changes.

On the other hand, worrying forms of backlash against both climate action and forms of equity, diversity and inclusion have grown in recent years. The result of this backlash is most apparent in the rise of right-wing nationalist political figures, parties and governments that threaten both ambitious climate action and what is denigrated as “wokeism” (8). This is especially important in the context of an incumbent Trump administration in the United States.

To some degree, advancing ambitious and just climate action can appear to be stuck between a rock – empty rhetoric of advancing just and sustainable transitions – and a hard place – outwardly hostile responses – obstructing difficult conversations on how to transform the socio-ecological status quo. Where does this leave us?

In this perspective piece, we highlight concrete experiences and approaches that highlight both the need for enhanced meaningful forms of equity, diversity and inclusion in energy systems and principles that can guide more effective and just transitions. The messages in this piece draw from a set of year-long linked public symposia events convened by WISER (Women & Inclusivity in Sustainable Energy Research), a global network of women and non-binary academics in the field of clean, low-carbon, or sustainable energy research, of which we are all affiliated. The symposia series created the space to hold these necessary yet difficult conversations, and in so doing showcased the perspectives and approaches of diverse women and non-binary academics, practitioners and activists working on energy systems transformations.

There is substantial work documenting how to better advance principles of equity, diversity and inclusion in academic research (9). Our contribution speaks to how to better understand and embed meaningful forms of equity, diversity and inclusion in the practice of energy systems transformations. The piece speaks to both researchers and practitioners working to transition energy systems, including academics,

policy-makers, energy companies, energy communities, and energy modelers. It does so at an important strategic time in current affairs where energy transitions, climate policy and forms of social equality are threatened. We are motivated to productively contribute to conversations on how to insulate progress on equity, diversity and inclusion in energy transitions to be able to weather times of uncertainty and political claw back, particularly for communities facing the brunt of socio-ecological exclusion. As a group of researchers affiliated with WISER, we are keenly driven to address how researchers can better approach energy transition scholarship that both “address[es] past injustices and mitigates future inequities” to develop strategic windows for pushback in the midst of system change (10).

In what follows, we discuss how avoiding “diversity-washing,” building participatory energy governance, centering energy democracy and shifting the metrics of success for energy transitions are key to effectively facilitating more effective and just energy transitions.

2. Diversity-washing: the good, the bad and the exclusionary

The feminist perspective we put forward takes the well-established starting point that energy systems are deeply uneven – including along the lines of class, gender, race, Indigeneity, age, ability and geography – in terms of which actors profit from energy, have access to energy, are best represented in policy and energy sector decision-making positions and face disproportionate harms from both the local grounded effects of energy development and broader systemic climate impacts resulting from greenhouse gas emissions.³ An intersectional feminist approach recognizes that uneven benefits and outcomes of energy systems are contextually specific and widely varied according to how individuals and communities experience the world and its structures of power and exclusion (11). In our year-long symposia series, WISER showcased female and non-binary academic and practitioner perspectives in order to develop pluralistic understandings of the successes, challenges and opportunities in energy systems transformation; these perspectives varied widely, however, according to both the identity of the presenter and their area of work, considering what social factors were most influential.

The findings from the WISER symposia series demonstrated that despite widespread promises of equity, diversity and inclusion in energy systems transformation, there has not been a substantive shift in which groups control and benefit from energy transitions. While we expand on the following points in the sections below, in brief, the expert knowledge delivered in our symposia demonstrated that Indigenous sovereignty over resources continues to be violated, communities and citizens are distanced from the means to which they access energy, private utility companies benefit while energy poverty persists and vulnerable groups are not becoming less vulnerable through energy systems transitions.

In this context, it is clear that the grounded practices of energy systems transformation sit in stark contrast with the promises of liberal institutions and many corporations on their energy systems transitions. If energy transitions do not radically address the socio-ecological relations of power that inform both unsustainability and injustice, rhetorical commitments to just transitions will preach inclusive action while practicing exclusive conduct, serving as a form of ‘diversity-washing’ over meaningful change (12).

Diversity-washing refers to a gap between advertised equity, diversity and inclusion promises and actual transformation in practice, providing a misleading view of action progress being made. Its conceptual cousin, greenwashing, is more well-known, reflecting highly

² Through we note some resistance to gender-diverse leadership; for example, the 2023 United Nations Gender Social Norms Index indicates that “half of people worldwide still believe men make better political leaders than women, and more than 40 % believe men make better business executives than women” (6).

³ For a thorough literature review of the gendered nature of the energy system, see (4), as well as (3) for a broad discussion of power in energy systems.

publicized green commitments that fail to engender meaningful environmental action. Diversity-washing exists on a spectrum, whereby the language of diversity and commitments to diversity in policy may be ineffective for reasons related to lack of commitment and/or implementation challenges. Diversity-washing can include employing symbolic language while going about “business as usual”; it can also be a product of good intentions that fail to secure transformative change by, for instance, being too narrowly construed or ineffective in terms of implementation; it can also be employed as a political tool, when pointing to equity, diversity and inclusion outcomes is used to deflect negative attention and to extend influence and legitimacy.⁴ Diversity-washing is powerful because while equity, diversity and inclusion initiatives have considerable visibility, commitments and investment, it engages in acts of deflection that deny forms of justice that are required for effective energy transitions.

Alongside the marked dangers of diversity washing, there is a growing backlash against ‘woke’ politics and policies that recognize and support just transitions. Problematically, this may upend equity, diversity and inclusion efforts. Backlashes against equity, diversity and inclusion programs in universities in the United States have led to cut-backs and defunding (14,15)⁵, the new European Parliament elected in June 2024 reflects a crack in an established consensus in the European Union to energy systems transitions have been referred to as “green-lashing” (17), and the climate-denialist Trump administration is expected to overhaul the entire American approach to environmental policy, including by pulling out of the Paris agreement, repealing pollution limits, removing references to “climate change” and “environmental justice” from government websites and empowering oil and gas companies to expand resource extraction on federal lands (18). We advocate for institutions and practitioners to insulate against this backlash against both equity, diversity and inclusion and sustainable energy systems transitions, which leads to poorly distributed rents from energy sector activities and large gaps in representations of the lived experiences of energy users (19).

At present, a central focus of equity, diversity and inclusion initiatives in energy transitions is through the diversification of the energy industry itself. One of the most wide-ranging of these is the Equal by 30 campaign that operates as part of the Clean Energy Ministerial *Equality in Energy Transitions Initiative*.⁶ It currently has 14 national and two subnational government signatories as well as 30 corporate and non-profit signatories. These initiatives seek to ‘close the gender gap’ in energy employment, as the share of women employed in energy industries continues to lag far beyond most other industries globally (ranging from 20 to 26 % across fossil fuel and electricity industries globally), and wages for female employees are almost 20 % lower than for male employees, even when controlling for skills, education and experience (20,21). A independent survey of diversity outcomes at the corporate level led by McKinsey that tracked more than 1000 large firms found that gender and ethnic diversity on executive teams improved in one-third of the cases and either stalled or eroded in two-thirds, despite the fact that both elements of diversity are strongly associated with improved firm performance (22). The successes, of equity, diversity and inclusion initiatives are contentious. Employment-oriented equity, diversity and inclusion initiatives run the risk of placing a narrow set of equity-seeking groups in positions of power without doing the actual and complex work of transforming socio-economic relations that power energy systems driven by wealth-generating activities (23). Diversifying energy industry boardrooms and workforces does not necessarily ensure

just energy transitions and may even falsely essentialize certain equity-seeking groups as natural stewards of sustainability (24). For those working in climate and energy spaces, the reality of the deeply inequitable ways in which energy transitions are taking place is jarring, undermining confidence in the commitments to equity, diversity and inclusion that are being put forward. Extensive research in the field of energy transitions scholarship points to the structural and cultural changes required to address sexism, racism, and class-based forms of exclusion in energy systems (19).

While there is no silver bullet solution to enhancing equity, diversity, and inclusion, in the remainder of this piece, we highlight alternative approaches that can foster more just and, thus, effective energy transformations. These approaches seek to improve material conditions for equity-seeking groups, avoid harm and undermine forms of power that foster unsustainable and inequitable socio-ecological conditions (25). We highlight three areas, noting that they are necessary but not sufficient components of energy transitions: 1) building participatory energy governance, 2) addressing intersectional inequalities, and 3) shifting the metrics of success around equity, diversity and inclusion.

3. How should we engage with justice in energy transitions?

3.1. Building participatory energy governance

To encourage distributional shifts in what groups control and benefit from in energy transitions, there are growing calls for enhanced participatory energy governance (26). Enhanced participation in energy systems involves engaging diverse actors and ideas in multiple sectors of the energy system and at multiple levels of governance, from local to global. The concepts of energy democracy (27), energy citizenship (28), energy justice (29) and Indigenous energy sovereignty (30) are central to this governance transformation.

3.1.1. Energy democracy and energy citizenship

Energy democracy is an umbrella term for a diverse set of ideals, goals, and aligned practices that seek to re-embed citizens in energy provision and governance (27,31). The principles behind energy democracy encourage moving away from a narrow understanding of citizens as consumers to collective co-creators of the energy system. In other words, energy democracy advocates offer alternate visions for energy systems through reconfiguring social relations (32). Practices can range from community-owned renewable energy projects to remunicipalization and participatory policy designs (28) (Fig. 1).

The People Power Solar Cooperative⁷ exemplifies the principles of Energy Democracy as a collaboration of 40 racially and geographically diverse organizations in the United States working to democratize the energy sector. For example, to implement community solar in the state of California, the Cooperative developed an innovative model using the California Corporations Code (34). The Cooperative invests in community-led projects that create alternatives to private utilities by “decentralizing, democratizing, distributing, and diversifying” the energy system (35). Crystal Huang – Co-founder and CEO of the People Power Solar Collective – reflects that, “we learned firsthand that our politicians [are] not acting out of malice, but they do not understand that communities can come together and solve problems, they still look at everything as individuals, as consumers and potentially as prosumers” (33). In this way, enhanced energy democracy can foster forms of energy citizenship, where citizens see themselves as rights-holders of and active

⁴ This last example of diversity washing is influenced by Sophie Harman’s definition of “healthwashing” (13).

⁵ We also note the more insidious forms of resistance to institutional change in universities (16).

⁶ For more information see https://www.cleanenergyministerial.org/initiatives-campaigns/equality_initiative/

⁷ See more at <https://www.peoplepowersolar.org>

Energy democracy “is about active participation and citizenship, of coming together [...] we're talking about a paradigm shift – not just the economy, we're talking about what energy means to people, we're really engaging with people in a way that is so different” (33).

- Crystal Huang, Co-Founder and CEO of People Power Solar Collective and National Coordinator of the [Energy Democracy Project](#)

Fig. 1. “What is energy democracy?” Quotes from panelist, Symposium “Policy Change, Energy Democracy & Inclusive Energy Policies,” November 2022, WISER.

participants in energy systems rather than consumers and passive recipients of top-down policy change.

3.1.2. Energy justice and indigenous energy sovereignty

Energy justice focuses on four dimensions of inequality: distributive injustice (i.e., who benefits and who loses?), procedural injustice (i.e., who drives decision-making?), cosmopolitan justice (i.e., what are the global ‘externalities?’) and recognition justice (i.e., how are vulnerable groups represented?) (36). Researchers highlight how these various aspects of energy justice lead to both consumption-related inequality, referring to energy poverty, and production-related inequality, manifested through the location of energy infrastructure (37). Those interested in increasing energy justice ask questions such as: who is presently valued as an energy citizen? Which communities are most likely to benefit from energy transition policies? Why have injustices been established, and what is to be done to address them? Employing a justice lens in energy transitions work centers issues of representation, distribution and power.

The concept of Indigenous energy sovereignty exemplifies how complex matters of justice in energy transitions can be addressed. Judith Sayers – president of the Nuuchahnulth Tribal Council, representing fourteen Nuuchahnulth First Nations with approximately 10,000 members on Vancouver Island, Canada⁸ – defines Indigenous energy sovereignty as “being able to control your own energy production for yourselves [as a society or nation], and to continue to alleviate climate change impacts” (38). Sayers illustrates the barriers to Indigenous energy sovereignty in British Columbia, Canada, in describing challenges associated with developing clean energy for First Nations.⁹ In 2017, British Columbia’s provincial government pledged to support clean energy for First Nations (40). Sayers articulates how government action has undermined this commitment with continued support for a contentious hydroelectric mega-dam project,¹⁰ which the provincial government has framed as a clean energy project. As Sayers and others argue, the energy produced by this mega-dam project will directly power fossil fuel production (specifically liquified natural gas [LNG] facilities), cause ecological damage, worsen food insecurity, and detrimentally affect the rights and responsibilities of Indigenous Nations and communities (41,42). Furthermore, the project has diverted the development of Indigenous-owned utilities and partnerships between energy producers and First Nations (43–45). Subsequently, in August 2023, the main contractor responsible for constructing the dam was fined CAD \$1.1 million for polluting the Peace River, where the dam is located,

with contaminated drainage water with a high concentration of metals in fish-bearing waters (46). While Indigenous renewable energy ownership is growing (47), it is held back by these ongoing violations of Indigenous energy sovereignty (25,48).¹¹

Despite these challenges, First Nations in British Columbia and across Canada are building clean energy projects, including “solar, run-of-the-river, wind, and geothermal power generation” (48).¹² Indigenous-led renewable energy ownership is about far more than just energy choices but also social relations that centre Indigenous sovereignty and challenge settler colonialism and extractivist paradigms (50). This work offers pathways towards a just transition that are grounded in self-determination and upholds Indigenous “rights, knowledges, sovereignty, and leadership” (51).

Energy transitions do not automatically guarantee forms of equity, justice or inclusion. Building enhanced participation in energy governance requires a shift regarding deeply embedded inequitable cultures and practices.

3.2. Addressing intersectional inequalities

A key challenge of transitioning to a more sustainable energy future is that to be just and equitable, transformations must address structural and systemic intersectional inequalities in societies. Though intersectionality has become politically polarized (52), we stress that a first step in addressing injustices in society requires an understanding that people experience unequal conditions due to personal experiences of varied and overlapping forms of oppression such as race, class, gender, age, marital status and ability (53).¹³ To address intersectional injustices in energy transitions, multiple sectors, practitioners and stakeholders must work together in new ways that seek to address these inequalities. Here, we briefly illuminate the issue of energy poverty to illustrate the intersectional approach needed to address just and equitable energy transitions.

Energy poverty refers to the “inability to attain a socially and materially necessitated level of domestic energy services,” such as heating, cooling, and cooking (55). Fig. 2 captures the realities of energy poverty, detailing selected lived experiences of energy poverty.

Major drivers of energy poverty include low income, high energy costs and energy inefficiency, resulting in insufficient or inadequate access to energy services. Lived experiences demonstrate that these drivers have intersectional and uneven outcomes for those facing energy

⁸ For more information see <https://nuuchahnulth.org/about-ntc>

⁹ First Nations refers to Indigenous peoples officially called “Indian” under the colonial Indian Act (39).

¹⁰ This project is referred to as the Site C mega-dam project. Construction of the dam is ongoing at the time of writing. See information here: <https://www.sitecproject.com/>

¹¹ Though we note a new recent commitment by the BC government to support Indigenous-led ‘clean energy’, at the time of writing details have not been released (49).

¹² See also Indigenous Clean Energy, *Indigenous-led Clean Energy Project Map*, <https://indigenoucleanenergy.com/connect-learn/indigenous-led-clean-energy-project-map/>.

¹³ On integrating intersectionality in energy justice research, see (54).

How does energy poverty present itself?
“It’s about dwellings that are poorly insulated, that are old, that have problems with mould, with water infiltration” – Mylène Riva, McGill University
“It’s walking into somebody’s house and seeing that they haven’t had water or heat for 10 years, that are using their basement as a bathroom” – Yasmin Abraham, Kambo Energy Group
“[Energy poverty is] where there’s not enough energy access for illumination, studying becomes quite difficult. If you don’t have internet access, this is a real problem” – Lina Brand-Correa, York University

Fig. 2. “How does energy poverty present itself,” quotes from panelists, Symposium “New Developments in Energy Modeling, Urban Transitions, and Energy Poverty,” 15 September 2022, WISER.

poverty (56). The risk of energy poverty can be significantly higher for “one-person, lone-parent, and older households, and for households with someone living with a long-term illness or disability” (57,58). Women often face greater risks of energy poverty, in part driven by gendered household practices and lower participation in the economy (57), which intersects with other dynamics including class, race, Indigeneity, age, ability and geography (59). Geography is of particular importance, as more rural and remote regions experience relatively higher energy poverty rates in comparison to urban spaces (60). To effectively address energy poverty, it is necessary to understand how these intersecting socio-economic and identity factors as well as housing conditions contribute to how affected groups experience hardship and inequity.

Working directly with affected groups is essential to effectively tackle many of these intersecting challenges. Yasmin Abraham, the co-founder of Kambo Energy Group and visionary behind the organization Empower Me,¹⁴ has created Canada’s only energy and climate-focused program designed for, and delivered by, members of underserved communities. Empower Me has assembled an employee roster representative of the communities they serve. Most of Empower Me’s employees are female and over 80 % identify as a visible minority, immigrant or multilingual. Due to its diverse workforce, Empower Me is better able to understand and address the complex intersectional challenges faced by newcomers, immigrants, single mothers, seniors, and others experiencing energy poverty. For example, low-income households may face language barriers, time constraints and limited access to financial resources; Empower Me provides the necessary support and guidance for its stakeholders to effectively engage with services and address specific barriers, bridging the gap between policy and implementation.

The above example highlights one potential pathway to address the intersectional and multidimensional aspects of energy poverty. It also highlights the importance of shining a light on communities that have been overlooked in energy transitions. These communities must not be left behind in transitions that promote the business-as-usual benefits of energy economies. The challenges of addressing energy poverty are complex, but grappling with these is possible if researchers and practitioners consistently center the intersectional experiences of vulnerable communities.

3.3. Centering equity, diversity and inclusion metrics for success

In this final section, we stress the need to shift the metrics for success in the energy transition: simply put, we must re-orient metrics towards more egalitarian socio-economic and socio-ecological conditions. The business-as-usual model of energy systems governance prioritizes market imperatives and economic incentives of profitability as a non-negotiable value (61). To truly transform energy systems, current non-negotiables need to be questioned and there must be a shift in thinking about what new values should be centred. Larissa Crawford of Future Ancestors Services¹⁵ notes that acknowledging the injustices embedded in energy systems can reveal unique and context-specific opportunities to address the root causes of socio-economic and socio-ecological harm (62). We call for metrics of success that make equity, diversity and inclusion non-negotiables in energy transitions and their governance, rejecting forms of diversity-washing. We acknowledge that this is complicated work. While energy transitions are not a monolithic process, there are many opportunities to connect various geographies and sectors, engaging multiple scales of public and private actors as well as communities and citizens.

We highlight three examples of paths forward that were raised during the symposia series:

1) Make energy modeling more inclusive:

Energy models are used to inform policy and regulations in developing decarbonization and energy transition pathways. For models to be responsive to the complexities of energy transition in a just and fair manner, they need to be inclusive of the diverse voices and realities that policies and regulations ultimately impact. Energy modelers should bring together multiple disciplinary perspectives, such as from engineers, economists, social scientists and behavioral scientists, in modeling processes. Models also need to have a trans-disciplinary orientation by including diverse stakeholders like policymakers, practitioners and end users. As users of these models, it will be most effective and applicable to real-world needs if policymakers, practitioners, and end users can speak with one another during the modeling and policy-making processes. In addition to being inclusive, models should also be transparent and openly accessible to facilitate inclusivity over time (33). This approach shifts energy modeling from being purely technical to a tool for social inclusion and equity, aligning with broader DEI goals of

¹⁴ For more information see <https://www.empowerme.ca>

¹⁵ For more information see <https://www.futureancestors.ca>

making energy systems work for a wider array of participants.

2) Work beyond carbon tunnel vision:

Emily Ghosh – a scientist at Stockholm Environment Institute – highlights a challenge inherent to transitioning energy systems amidst global inequality in production and consumption habits, which are deeply tied to energy use (33). She underscores that

while we focus so much on decarbonization, this is only one type of solution that we need to focus on. We need to move beyond just looking, having this **carbon tunnel vision** and look holistically... as to not reinforce existing inequalities and environmental problems. Or worse, create new ones.

While emphasizing the urgency of emissions reductions, Ghosh notes that the wealthiest 1 % disproportionately causes twice the carbon emissions of the poorest half of the global population combined, a figure which is motivated by material demands and is set to only increase by 2030 (63). Conversely, the most vulnerable and climate-affected groups – who are largely located in the global South and who bear the brunt of negative environmental outcomes from uneven consumption patterns such as biodiversity loss, waste and pollution – must be able to increase their consumption to meet their basic needs. Energy transitions should target the activities of the wealthy, taking into account the need to support the most disadvantaged communities and to tackle consumption-driven forms of economic growth (64,65). By including a wider set of criteria in deciding who should reduce their emissions and where carbon reductions should happen, a more differentiated energy policy can be developed at the international as well as national scale.

3) More groups should access and benefit from energy transitions

We advocate for policymakers to continue broadening coalitions that can have the opportunity to capitalize on transitioning energy systems, particularly focusing on population groups that do not benefit from the status quo. This moves focus beyond that of green energy jobs, to putting the focus on ensuring affordability and access to housing as well as the transportation and infrastructure sectors. At present, in OECD countries, green initiatives and incentives such as subsidizing electric vehicles and the electrification of household heating and cooling primarily apply to wealthy segments of the population (66–68). There is a vital need to keep affordability in mind and target population segments in rental housing and informal forms of housing, particularly given that perceptions and experiences of economic precarity and inequality deeply shape political landscapes and buy in to climate policies. There is also a need to continue to focus on transportation networks that benefit and are attractive to broader populations. Thinking through access and affordability challenges requires a recognition, as Emily Eaton highlights, that “justice [does not] materialize out of thin air when fossil fuels are ... swapped out for green energy or green energy infrastructure” (62). Widening the coalitions who benefit from energy transitions centers inclusive thinking opening new pathways for decarbonization.

4. Conclusion

While inclusive language is increasingly standard in energy system transitions, actual practices are not yet commensurate: fossil fuels are not being displaced, the energy needs of vulnerable populations continue to go unmet, and Indigenous rights continue to be violated. We urgently need meaningful progress on equity, diversity and inclusion in times of uncertainty, polarization and backlash. Pursuing and focusing on equitable, diverse and inclusive transformative change whilst in a climate emergency is not an option but an imperative (69). Keeping with the trajectory of business as usual will perpetuate exclusionary transitions for a few at the cost of many, following the patterns that currently

exist in the climate crisis (19). While inclusive language has become ubiquitous, it often remains an empty signifier.

As a group of researchers within the WISER network, we call for substantive attention to be paid to equity, diversity and inclusion. However we recognize that the true task of transformation is a challenging one. As Tameka Samuel Jones of York University reminds us, “justice means different things to different people,” meaning that inclusivity can very well mean different or conflicting things to different stakeholders and groups of people depending on context (62). This challenge calls for even more, not less, attention to discussions of equity, diversity and inclusion in energy transitions. The above areas of focus are suggested windows of opportunity, and do not reflect a full spectrum of experiences or paths forward. In acknowledging the complexity of transitioning energy systems in a more just and equitable manner, there is an opportunity to move beyond myopic and shallow energy transition solutions to those that directly grapple with the relations of power and lived realities that encompass systems-level change.

CRedit authorship contribution statement

Sarah E. Sharma: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Runa R. Das:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Amy Janzwood:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Investigation, Formal analysis, Data curation, Conceptualization. **Neelakshi Joshi:** Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Julie L. MacArthur:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Georgia Savvidou:** Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

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Data availability

Data will be made available on request.

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