



Legitimacy and accountability in the governance of sustainable energy transitions

A B S T R A C T

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How can we enable equitable decarbonisation? There is a wide gap between power to make transformative decisions, on the one hand, and agency on the part of those affected by climate change, on the other. We converge scholarly strands to understand and address the causes for insufficient action towards equitable decarbonisation – the crisis of accountability – despite global recognition of the urgent need for such action. Just as we study the socio-materiality of energy systems to understand the ephemeral flows of energy, we must also unpick the making of socio-political arrangements to comprehend what practices determine the elusive governance of energy transitions. To unite the twin concerns of energy and accountability, we probe the relationship between accountability and legitimacy on the one hand, and the governance of sustainable energy transitions on the other. This synthesis offers three key insights. First, accountability and legitimacy are deeply conflictual issues where various actors negotiate and struggle for control in energy transitions. Second, the negotiations around accountability and legitimacy have outcomes that are often inequitable. Third, it is crucial that reforms and policies that aim to stimulate sustainable energy transitions address power imbalances as well as carbon emissions. Overall, building equity into processes of systemic change requires instituting *strong mechanisms that generate public benefits* while legitimating new socio-material infrastructure and practices.

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1. Energy transitions are hampered by a crisis of accountability

Scholarship has established beyond doubt that there is an urgent need to address climate change and persistent inequity [1]. Responses to both concerns have been insufficient, as evident from the increasingly frequent devastating effects of anthropogenic climate change on populations worldwide and in the growing level of atmospheric carbon concentration. This is well known. In this special issue, we frame this as a crisis of accountability: that globally dispersed failures of governance to push for rapid and equitable decarbonisation are driving catastrophic impacts like wildfires, floods, drought and storms on scattered sub-populations who cannot exercise agency to hold to account the actors whose decisions drive greenhouse gas emissions. This crisis persists despite the many rapid, massive changes – positive seen from a sustainability standpoint – that are underway in the energy sector [2,3]. Energy transitions are fuelled by drastic cost reductions in renewable energy, especially solar photovoltaic technologies, and by actions based on recognition that the high-carbon emission fossil fuel era is untenable. Nevertheless, there seems to be a wide gap between power to make transformative decisions, on the one hand, and agency on the part of those affected by climate change, on the other.

Research on sustainable energy transitions has struggled to keep pace with these recent changes, even as the literature has

burgeoned [4–6]. Techno-economic analyses of the energy sector are increasingly accompanied by socio-political perspectives (e.g., Refs. [7,8]). It seems widely agreed by scholars in the field that the necessary transition involves material, institutional and social aspects, and that attention to social equity is a critical concern in any pathway towards the rapid decarbonisation required [9,10]. Without equity, this historic opportunity for systemic transformation risks being coopted by entrenched powerful actors, privileging their own interests rather than generating essential public benefits under transition [11,12].

The question that becomes important in light of this consensus is *how* to enable equitable decarbonisation. Mindful of the limits and positionality of scholars as actors within energy transitions ourselves [13,14], we argue that our contribution should be to advance empirically informed accounts of how energy transitions are being governed in practice. This special issue seeks to converge the promising scholarly strands signified above towards understanding and addressing the causes for insufficient action towards equitable decarbonisation – the crisis of accountability – despite global recognition of the urgent need for such action.

2. Legitimacy and accountability at the heart of equitable decarbonisation

'Just because you can't see it doesn't mean it isn't there' – this maxim is as true for energy as it is for accountability. *Energy is*

what powers action: from the act of plugging a cord into a socket to the electrical force that powers a lamp through it, energy is embodied in the socio-materialities around us – everywhere and yet invisible. *Accountability is what power enacts through legitimation*: one actor holds another to account by virtue of a common understanding, a tacit or explicit relationship of power that validates a given act. Validation bestows legitimacy and formalises a particular relationship of power; its practice strengthens an accountability mechanism. This holds true at any scale – a village chief choosing which households should receive a limited number of electricity connections typically relies on the villagers' recognition of his basis for decision-making as legitimate, and a national regulator fixing an electricity tariff for households depends on citizens accepting its rate as fair based on an exercise of justification.

This special issue unites these twin concerns – energy and accountability. It probes the relationship between accountability and legitimacy on the one hand, and the governance of sustainable energy transitions on the other. Following Sareen [15], we define a sustainable energy transition as a matter of equitable decarbonisation, where 'equitable' refers to enhancing equity by creating public benefits, and 'decarbonisation' is shorthand for reductions in greenhouse gas emissions, of which we chiefly focus on energy sector carbon emissions. This builds on earlier work to apply environmental governance insights on accountability and legitimacy (e.g. Refs. [15–19], within energy transitions research.

Questions of accountability and legitimacy are, we argue, critical to understanding how energy transitions are governed and whether they contribute to equitable decarbonisation. Any energy transition involves an assemblage of actors in a changing configuration. Energy is so intrinsic to society that these configurations cover a broad field, often spanning not only the energy sector but also cognate sectors such as housing, construction, land use and finance. While energy technologies compete, these actors push for their self-interest even as their concrete actions evolve – for instance, a major oil company looking to grow its renewable energy portfolio, or a household keen to invest in increasingly affordable solar panels to lower its electricity bill. An accountability lens examines the relationships between these actors, and highlights how changes in the actor configurations, technologies and interests are interrelated with changing practices of legitimation at multiple scales.

So why is it important to examine accountability and legitimacy in the context of energy transitions? Actors are rarely forthright about their interests, and often stand to gain by cloaking their actions in the garb of the fashion of the day: a utility may advertise its new investments in gas as being low-carbon compared to coal, but may simultaneously lobby governments to subsidise their gas investments, a high-carbon source compared to wind or solar energy. Moreover, relatively established and large-scale actors, such as electric utilities, are typically more networked with administrative and regulatory actors and better equipped to negotiate rules than emerging, small-scale actors such as renewable energy cooperatives [20]. Hence, public discourse may be dominated by the claims of incumbent actors, compounded by a sense of inertia in social imaginaries of how energy systems work. These power differentials and tendencies towards biased representation make the study of accountability flows, or practices of legitimation [15], both difficult and necessary. Without an incisive understanding of practices in different spheres and at different spatial scales, we risk achieving only energy transitions that cater primarily to the interests of those with the greatest power [21], who control both the material and data infrastructure as well as the socio-cultural understanding of what energy transitions should look like via prominent media platforms.

For an evidence-based appreciation of how energy transitions are being governed and whether they contribute to equitable

decarbonisation, it is thus essential to attend to what practices are being legitimated as actors reconfigure relations of accountability within an energy transition. To the extent that these practices are able to reconfigure the field [22], they constitute accountability mechanisms – the particular institutionalised constraints and enablements that structure agency and the modalities of an energy transition [9]. Just as we study the socio-materiality of energy systems to understand the ephemeral flows of energy, so must we unpick the making of socio-political arrangements to comprehend what practices determine the elusive governance of energy transitions.

Analysing practices of legitimation – social relations that use accountability as a premise and relationally produce it – foregrounds our understanding of how accountability relations evolve during energy transitions, and can inform strategies to institutionalise strong accountability and challenge unaccountable structures and processes (cf [23]). In this time of 'fake news' and political lobbying by entrenched fossil fuel interests, this can provide a much-needed fillip for deliberative assessment to drive sanctions in favour of sustainability on specific issues that are tautly contested during sectoral transition – whether to build a new gas pipeline or not, whether to expand infrastructure in support of carbon-intensive practices or not. Developing an evidence-based approach that directs attention to power relations and their legitimation can thus help institute decarbonisation strategies that simultaneously mitigate climate change and target inequity. It can produce arguments to support choices on discrete issues contested between actors at multiple scales, by showing which actors' actions enable equitable decarbonisation and which run counter to it. Such relational, processual analyses can yield situated insights into what accountability mechanisms to institutionalise and how, in order to advance equitable decarbonisation.

3. Analysing legitimacy and accountability in sustainable energy transitions

The papers in this special issue examine the interplay between questions of legitimacy, governance and power relations during energy transitions. We have invited and pulled together a diverse set of contributions that advance socio-politically informed studies across various scales and geographical contexts. When inviting contributions, we asked scholars to employ environmental governance concepts to analyse the production and maintenance of institutional authority and accountability relations in the energy sector. In doing so, they were encouraged to shed light on what the new configurations of authority and infrastructure imply for decarbonisation (climate change mitigation) and resource allocation (equity).

The resultant collection of articles provides rich insights into important aspects of legitimacy and accountability in sustainable energy transitions, divided into three sections.

The first section, *Integrative analyses of transitions*, addresses accountability and legitimacy in ongoing processes of transitions. The paper by Hargroves, Qandeel and Sommer [24] provides a cross-national longitudinal analysis that tests how 24 multilateral environmental treaties impact CO₂ emissions. In this manner, it examines how the legitimacy of global contracts may impact actual decreases in CO₂ emissions. They also find that emission reductions are higher in countries with higher levels of state-led governance, and that this is especially the case with control of corruption and government effectiveness. Underlining the importance of accountability, they argue that countries with stronger state-led governance have greater capacity and oversight to implement multilateral treaties and follow through on their promises.

What can insights from good governance in the water sector

teach us about accountability in a decentralising energy sector? The paper by Brisbois [25] applies principles from multi-level governance to energy, in order to provide guidance for effective and legitimate governance regimes. ‘Good governance’ is intended to help meet a number of criteria with both instrumental and normative implications that are viewed as desirable with respect to resource governance. On this basis, the author presents some concrete steps that central authorities that are accountable for electricity governance should address in a decentralisation process.

Blondeel’s paper [26] offers an innovative perspective on legitimacy, by focusing on efforts to delegitimize fossil fuel assets as objects of investment. It examines the international fossil fuel divestment norm, which formulates a standard of appropriate behavior to withdraw investments from fossil fuel assets and reinvest them into climate-friendly solutions. The author traces the origins of the campaign and analyses it through a norm diffusion perspective. While this movement has diffused quite effectively, Blondeel is cautious with regard to prospects of a wide-scale transformation, since the norms of divestment must resonate with a conventional finance audience and feed into dominant normative underpinnings of the liberal economic order.

The second section, *National energy transitions cases*, consists of selected country case framings to understand how accountability and legitimacy play out. Wu’s paper [27] on market reform in the electric power sector of China examines how the restructuring of energy markets has depended on adjusting accountability relations between central and provincial authorities. Contrary to the widespread view that changes in China’s energy governance are driven by the central government, Wu shows that they are instead a result of bargaining between national and sub-national actors. In other words, accountability relations in the Chinese context are much more flexible and adaptive than what is typically assumed.

The relationship between national authorities and regional-local actors is also a key theme in Bedi’s paper [28] on solar energy and questions of justice in Kerala, India. The country has large-scale national ambitions in the development of solar energy, as a way of meeting twin objectives of generating clean energy and alleviating energy poverty. However, achieving these goals hinges on local consent for land acquisitions. The paper shows how energy transitions involve a convergence around numerous types of interests and objectives at different scales – global climate change goals, national development, poverty, land rights and more. It poses important questions about what injustices might be legitimated by the state-led push for renewable energy development.

In the German case study by Fuchs [29], the emergence of renewable energy has co-evolved with new strategies of legitimation. The paper traces the different phases of how legitimation of energy sector policies has developed over time, from the 1990s until recent times. This illustrates a significant transition, from the dominance of the idea that electricity generation has to be based on fossil fuels and nuclear sources, through the growth of technological niches and competing legitimations of energy sources, and to the breakdown of hegemonic forms of legitimation and the construction of new market frameworks. In the current phase, Fuchs argues that electricity generation based on renewable energy has become the new norm.

The third section, *Multi-sectoral infrastructural change cases*, comprises papers that examine accountability and legitimacy in relationships between energy transitions and developments in related sectors. Grossmann’s paper [30] takes a conflict perspective on the negotiation of norms for energy transitions – here in the case of retrofitting of housing stock to accommodate new energy efficiency standards in Germany. These new standards have been challenged by protesters because they have become a means of real estate speculation and have displaced low-income residents.

The paper illustrates clearly how the legitimation of energy transitions depends on the perceived justice of the outcomes generated by the transitions.

Likewise, the paper by Bartiaux, Maretti, Cartone, Biermann and Krasteva [31] also shows the importance of assessing energy transition policies and initiatives on the basis of their social effects. Aiming to improve the focus on correlates of energy policies on equity, the paper uses a capabilities-based approach to monitor social correlates of the governance of energy transitions in Austria, Belgium, and Bulgaria. Measures related to different capabilities are calculated for different categories of households, according to their access to energy. Their results underline numerous inequalities in each country studied, not only between energy poor households and energy richer ones, but also between energy poor households and other households that perceive themselves as poor.

The third paper in this section, authored by Jordan and Bleischwitz [32], discusses what it would take to achieve legitimation of governance measures that account for ‘embodied emissions’ – emissions that result from the production and distribution of a product. This is also referred to as product carbon footprinting. The paper distinguishes between the different common modes of evaluation, such as market, civic, and green. It then discusses recent and potential developments in the legitimation of product carbon footprinting in relation to these evaluation modes. The authors argue that to advance legitimation of carbon footprinting, it needs to be perceived as accurate and ready for scaling up in the market, affordable for the industry and trustworthy for the public.

The final paper in this section focuses on the evolving metrics of energy poverty as a multidimensional phenomenon that interlaces with energy sector decarbonisation. Sareen, Thomson, Tirado Herero, Gouveia, Lippert and Lis [33] articulate five dimensions of energy poverty metrology to guide the measurement of energy poverty in ways that are attentive to path dependency, new energy infrastructure, power dynamics and the challenge of retaining contextual nuance in scalable data. They use a variety of empirical cases from Portugal, Spain and the United Kingdom to demonstrate the need for accountable roll-out of new metrics and data infrastructures that can represent the social effects of infrastructural changes during energy transitions.

4. Conclusion: towards strong mechanisms that generate public benefits

The three sections – integrative analyses of transitions, national energy transitions cases, and multi-sectoral infrastructural change cases – leverage the analytical lens of accountability and apply it to a diverse set of problems of how energy transitions are governed. The papers make it clear that questions of accountability and legitimacy are critical issues in energy transitions governance across a diversity of contexts and sectors. Here in this final section we outline some common implications from the research gathered in the papers of this special issue.

First, accountability and legitimacy are deeply conflictual issues where various actors negotiate and struggle for control. The papers based on national energy transitions (Wu; Bedi; Fuchs), for example, highlight the negotiations for legitimation between government institutions, national and sub-national actors, and private interests and stakeholders. Powerful actors are able to gain legitimation by appealing to and aligning their agendas with the prevailing economic order (Blondeel). At the same time, the distribution of legitimacy cannot be completely explained simply by pointing to the most powerful actors – there is room for social movements and skilled norm entrepreneurs to shape legitimation in their own favour (Grossmann; Blondeel). And there is also a role for contractual agreements and multilateral agreements in achieving

greater legitimacy for sustainability governance (Hargroves et al.).

Second, the negotiations around accountability and legitimacy have outcomes that are often inequitable. The papers illustrate these effects in many different sectors, for example in the building sector (Grossmann), household energy consumption (Bartiaux et al.), and land distribution (Bedi). In her reflections on the political economy of India's energy transition, Bedi writes about how renewable energy developments, while probably positive from a climate perspective, "can replicate land mistakes of the past, with social and development implications". This acutely captures what several of the papers illustrate – if accountability relations of the past are replicated with the new emerging energy regime, historical structures of injustice and misdistribution may simply be reproduced.

This brings us to the final point that we want to conclude the special issue on. Building on the insights from these papers, we would argue that it is of critical importance that reforms and policies aimed to stimulate sustainable energy transitions address power imbalances as well as CO₂ emissions. The papers illustrate this, from a variety of different angles, by discussing the way accountable governance is constructed. Accountable governance is underpinned, among other things, by norms considered legitimate by a wide range of actors (Blondeel; Jordan et al.); by metrics and data that, if used for public benefit, provide knowledge about distribution of goods and services (Sareen et al.); by spaces for negotiations between different levels of authority (Wu); and by coordination between levels of governance to uphold good governance principles (Brisbois). As the authors emphasise, in all these areas it is critical to articulate reforms in ways that make benefits public.

Therefore, a key takeaway for decision-making centred on accountability relations is to adopt this rule of thumb: building equity into processes of systemic change requires instituting *strong mechanisms that generate public benefits* while legitimating new socio-material infrastructure and practices.

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Siddharth Sareen*, Håvard Haarstad

Department of Geography, Centre for Climate and Energy Transformation, University of Bergen, Fosswinckels gate 6, 5007 Bergen, Norway

* Corresponding author.

E-mail address: Siddharth.Sareen@uib.no (S. Sareen).

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