An analytical framework to examine power in sustainable energy decision-making in cities

Sumedha Basu*†

Politics and International Studies Department, University of Warwick, Coventry, United Kingdom

Urban areas are emerging as "strategic sites" in the ongoing sustainable energy (SE) transitions. This has rekindled the importance of urban governments in initiating this transition urgently, a departure from the actors managing more mainstream centralized energy governance. However, while there is a growing international and academic interest in urban energy transitions, the political presence of cities in the global clean energy landscape remains largely underwhelming. Scholars studying urban energy transitions or governance have often pointed toward the lack of material and knowledge capacities of the urban governments as the key barrier for their muted actions. I argue that decision-making by urban governments with respect to clean energy adoption needs deeper inspection wherein aspects such as capacity, or the lack of it, are symptoms of underlying power contestations and conflicts that are negotiated in multi-level governance systems. The scholarship of power captures the ideas of contestation, control, and acquiescence, going beyond the ideas of cooperation prevalent in multilevel governance. In this article, I juxtapose these with concepts from multi-level governance and socio-technical studies to offer an analytical framework for understanding energy decision-making by city governments. The framework presented in this article attempts to capture both direct and indirect forms of power, their operationalization, and manifestation in constituting identities, actual decisions (and indecisions) as well as the conditions of decision-making. I also use the framework to understand the role of power in sustainable energy decision-making in three cities in India as an illustration of possible application of the framework.

KEYWORDS

urban, energy transition, multi-level governance, power, decision-making

1 Introduction

City governments across geographies, bolstered by the increasing affordability of decentralized small-scale technologies and the capacity of non-state actors, are setting visions and targets for sustainable energy (SE) deployment (IRENA, 2020). The inflection in the progress of cities as climate arenas was witnessed during the Paris Agreement negotiations when subnational governments were recognized as important climate actors for bridging shortfalls in national commitments and total emissions reduction required (Castán Broto, 2017; Rambelli et al., 2017). Since then, mainstream multilateral energy bodies have acknowledged that urban areas are a "global priority" to achieve a complete energy transition (IEA, 2021a, p. 9). However, this emerging trend is at odds with traditional power structures of the conventional large-scale energy systems that have been the preserve of few state elites or private corporations (Brisbois, 2020b; Goldthau, 2014). Power play between these old and new energy actors—who prevail/(s),

how is that prevalence produced, reproduced, and effectuated—defines SE governance in cities today.

This paper is premised on the now established academic understanding that SE transitions are inherently political—established not only through commands and regulations but also through more obscure mechanisms such as orchestrating consensus, persuasion, and acquiescence. The final energy transition pathway that will emerge from this power play will deliver not just a particular type of energy system configuration but also a particular type of society and, by extension, a particular type of urban (Haarstad, 2016; Rutherford and Jaglin, 2015). Any claim that the current transition trajectory is inevitable, incontestable, or absolute must be questioned, and challenged politically (Stirling, 2014). Questioning how SE transition unfolds in these new arenas, like in urban areas, will deliver critical insights into its nature and politics. However, this inevitably necessitates viewing urban SE transitions as both a complex and contested governing arena where multilevel actors and related elements with differential capacities and competing interests, ideas, and imaginaries of energy futures act and interact to produce or resist change (Haarstad, 2016; Rutherford and Jaglin, 2015).

In this paper, I offer an analytical framework to understand power operationalization within multilevel governing systems as it shapes, enables, and subverts urban energy governance. In developing this approach, I highlight the different debates related to urban energy governance that demand a new framework based on power; draw insights from the power scholarship to elucidate what aspects should be taken into account in developing the framework, thus establishing the scholarly foundations of the framework; and illustrate how it can be operationalized using case studies of three cities in India.[1]

2 Urban sustainable energy governance: a literature review

Urban sustainable energy governance studies are fundamentally interdisciplinary by nature (Castán Broto et al., 2017; Ramamurthy and Devadas, 2013). While some disciplines view cities simply as a scale for accounting for energy demand or carbon footprint or implementation of new energy systems for climate mitigation in a normative manner (Creutzig et al., 2020; Sethi et al., 2020), others have adopted a systems view where energy technologies are contextualized and integrated with local and external social, political, and economic systems (Bai et al., 2016; Basu et al., 2019). Scholars have also used bottom-up social welfare-centric rationalization to rescale energy systems (Castán Broto et al., 2017; Colenbrander et al., 2017; Debnath et al., 2020; UN, 2021).

Cities have exhibited significant heterogeneity in local energy actions as a result of their contextual embeddedness (Castán Broto and Bulkeley, 2013; Creutzig et al., 2015). Several city governments,

particularly in the global north, have not only set ambitious RE targets but are also implementing a wide range of technologies (Castán Broto and Bulkeley, 2013; IRENA, 2020). While some cities have acted mainly intending to reduce emissions, others have approached the issue with a goal to leverage co-benefits—developmental, social, or economic—from the roll-out of SE technologies (Castán Broto, 2017; Sethi, 2018). This has included addressing existing gaps or issues while framing it as climate action. Authors have termed this as "reframing or localizing" (Bulkeley, 2010, p. 245); "translation" (Rutherford and Jaglin, 2015, p. 174); or "policy boosterism" (Fisher, 2014, p. 169). In other words, local authorities are increasingly pooling together multiple objectives and are addressing them through the opportunities offered by the new generations of energy technologies. Castán Broto and Bulkeley (2013), from a survey of over 100 city governments' action on climate change, revealed that cities are taking action across the categories of (1) "Enabling"; (2) "Provision"; (3) "Regulation"; (4) "Self-governing" (see classification in Bulkeley and Kern, 2006).

Despite the optimistic outlook for cities and high ambitions set by city governments, their actual achievements have fallen short of their ambitions, and this has been a consistent issue over the past decade (Bulkeley, 2010; Van der Heijden, 2019). Castán Broto and Westman (2020) argues that this has prompted an era of pragmatism in the urban climate and energy governance studies where cities began to be viewed as "political arenas" rather than just the optimistic notions of strategic arenas (Castán Broto and Westman, 2020, p. 9; Rutherford and Jaglin, 2015, p. 175).

2.1 Urban to multi-level governance of energy in cities

Climate change or sustainability studies are predicated on normative ideas about cities taking action locally and globally. Local conditions impacting governance include political support and leadership, local regulations and incentives, partnerships with local actors, integration with local objectives and projects and organizational context; international and national factors include market dynamics, national context, and direct and indirect pressure from international actors (Castán Broto, 2017; Patterson and Van Der Grijp, 2020; Van der Heijden, 2019). Further, embedded and contingent materiality of energy flow in urban-specific issues like waste, buildings, and transport have opened avenues through which local governments can politically rescale energy (Bulkeley, 2010; Haarstad, 2016; Jasper et al., 2016; Rutherford and Coutard, 2014).

A number of case studies highlight the lack of capacity of local authorities or other actors as a key condition for sustainable energy transitions, often interpreted as a lack of knowledge, skills, and financial and human resources (Bulkeley, 2010; Hughes et al., 2018; Kuzemko and Britton, 2020; Luque-Ayala et al., 2018; Rutherford and Jaglin, 2015). Capacity also may include the authority of local governments to act on local energy, which determines the scope of their action (Azevedo et al., 2013; Eckersley, 2018; Kuzemko, 2019). While it varies with the national context, the authority of cities

---

1   This framework was developed as part of my PhD research that studied three cities in India.

on energy supply and services, in general, is usually constricted in centralized energy political economies where they are increasingly viewed as executive arms of national governments or purveyors of global rules (Kuzemko, 2019, p. 81; Van der Heijden, 2019, p. 4). This relates to the need highlighted by Rutherford and Coutard (2014) for further urbanization of energy studies and energization of urban studies for a more specific analysis of urban energy systems and their transition. Literature emerging from the global south also support these conclusions (Khosla and Bhardwaj, 2019; Sami, 2017). Azevedo et al. (2013, p. 897) claim that lack of capacity and authority have created disincentives for local governments and rationalizations such as "not my business".

Indeed, who, where, or how these actions are forged needs more political enquiry. In line with the traditional understanding of governance literature, multiple actor groups have been analyzed, particularly with respect to their role in fostering SE adoption or transition (Castán Broto and Westman, 2020). While the initial focus was placed on local urban governments (Dowling et al., 2014; Eckersley, 2017; Webb et al., 2016), the role of transnational city networks and non-state local actors who can either act themselves or support local governments has also been studied recently (Castán Broto, 2017; Criqui and Zérah, 2015; Fisher, 2014; Minh et al., 2020). More recently, SE governance studies have urged the return to focus on national governments for their significant influence or control on the urban governments' responses (Castán Broto and Westman, 2020; Johnstone and Newell, 2018). This is particularly true in the energy sector, where energy has been the conventional domain of national governments and state authorities. This has created space to conceptualize potential "political struggle" or contestation that has been discussed in subsequent sections (Castán Broto, 2017, p. 2).

The above discussion clouds the notion of an analytical dead-end where capacity and authority are the only decisive conditions for city governments' actions and inactions. While they are important, the urban governance arena is characterized by a complex set of dynamics that influence urban local government's ability, authority, and capacity to undertake climate and energy actions.

In line with the above, scholars have argued for an analytical turn that will "step beyond the local as a frame of reference" to place cities and city governments in the context of a wider multilevel political economy context (Bulkeley, 2010; Bulkeley and Betsill, 2005, p. 48; Kuzemko, 2019; Webb et al., 2016). Tracing the sector's political economy within which the transitions are unfolding will help understand the structures that give rise to the conditions, such as capacity or authority and the lack thereof. In addition, Bulkeley (2010, p. 231) argues that the multiplicity of pushes and pulls begs a more nuanced conceptualization of the urban arena that considers the "complex interactions of socio, material, economic, technical, and political within and between the spheres of authority". A multilevel political framing of urban climate governance has been suggested to capture these multitudinous dynamics (Haarstad, 2016; Kuzemko and Britton, 2020).

Multilevel Governance (MLG) theory is one such framework that is now increasingly prevalent in broader climate governance and politics (Westman et al., 2019). An inherent assumption underlying MLG is the clear nested hierarchies or concept of subsidiarity where authorities and responsibilities are neatly delineated but horizontal coordination has also gained significant recognition in this framework in urban climate governance scholarship (Brisbois, 2020a; Jaglin, 2014).

2.2 A critical lens on MLG

However, MLG perspectives have often been critiqued for not being critical enough and obscuring the questions of power, conflict, and interests of the powerful (Jaglin, 2014; Marquardt, 2017; Westman et al., 2019). As Jaglin (2014) points out, multilevel governance is much more than a simplified challenge of coordination. Giving evidence from the South African urban areas, Jaglin (2014, p. 1395) demonstrates "multilevel" urban governance arrangements to be a reflection of "unstable patterns of power and resistance rather than stable co-operation processes". Eckersley (2018), Ehnert et al. (2018), and Di Gregorio et al. (2019) all show that national governing frameworks create interdependencies and influence local action, challenging the notion of neatly demarcated authority levels, the autonomy of urban governments, and jumping across authority levels to augment capacity from non-state networks (Westman et al., 2019).

The above view of multi-level climate governance moves the notion of urban governance from a benevolent multilevel actors' coordination exercise to possibilities of not only contestation between the scales but also orchestration to "gain control and establish authority" on another scale (Castán Broto, 2017, p. 8; Castán Broto and Westman, 2020; Jaglin, 2014). Such acts of control and manipulation involve power play between actors consolidating or augmenting their sphere of influence to shape other spheres of governance, constituting urban energy in this case (even if that means muting or allowing specific responses). Castán Broto (2017) argues that scholars studying urban climate governance have begun to shift their focus to derived governance concepts such as orchestration, which captures more centralized forms of steering. Based on this critical outlook, Bulkeley (2015a, p. 3) calls for governance to be viewed as a means to wield power and defines it as "orchestration of distinct modes of power". Dowling et al. (2018) highlight that effective low-carbon governance entails constituting other actors in the governing configuration and shaping their conduct in order to achieve specific ends. This is especially important in governing arenas where traditionally defined power elites are entrenched in the local political economy and have interests in sustaining it. SE transitions embedded in centralized modes of governance form a particularly potent ground for developing a novel understanding of the urban scale. In the section "Situating the urban within the sustainable energy transition politics", I elaborate on why power play in the energy sector needs to be an essential consideration for understanding urban climate governance and throw light on the points of fractures, divisions in interests, and power dynamics.

3 Situating the urban within the sustainable energy transition politics

Two significant changes mark the ongoing phase of the energy transitions. Firstly, new and SE technologies have become imperative and technically and economically feasible. Secondly, this has expanded the scope for governing SE systems at different scales and levels by exhibiting "decentralized dynamics" (Kubli and Ulli-Beer, 2016, p. 71).

3.1 The decentralization vs. centralization debate

Defined by the reprise of decentralized technologies, applications, and actors of energy supply that can potentially be located at the very point of consumption, this new phase of the global sustainable energy transition is marked by the possibilities of governing structures and rationalities that essentially challenge the existing ones (Brisbois, 2020a). Traditional energy systems associated with carbon-intensive fuels are dominated by large-scale infrastructure, controlled by a few powerful actors such as state agencies or big companies (Baker et al., 2021; Kuzemko and Britton, 2020). Incumbents often resort to "no alternative" argument citing the material and institutional path dependence of large energy systems. Brisbois (2020a,b), Webb et al. (2016), and Mohan and Topp (2018) demonstrate through their case studies the tensions between centralized and decentralized energy systems and their political-economic implications, including in the context of a large global south country—India.

Both distribution and concentration of power centers can be possible "pathways" to forge urban energy transition. The pathway finally selected then reflects the politics of how urban energy transitions are being forged (Bridge et al., 2013; Stirling, 2009). Newell and Phillips (2016, p. 39) suggest focusing on social processes of SE governance and "power derived from control over production, finance and technology should assume a central place in accounts of the politics of transition" in energy transitions, particularly in the case of the global south due to their distinct centralized nature that has remained understudied.

3.2 Democratic values or national priorities

Challenges to decentralized governance of energy transitions do not just come from the plurality of actors or multiplicity of scales but also from the ethics and values that they represent (Baker et al., 2021; Becker et al., 2019). As Brisbois (2020a,b) posits, decentralized energy governance is proposed with the hope of embedding associated and possible values of deepening democracy, participatory and deliberative engagement with accountability mechanisms, and ensuring fairness and justice through representation at the lowest levels. Further, more local development, welfare, and need-based energy applications are made possible, but that is not always the case for centralized supply-centric energy systems (Burke and Stephens, 2018; Castán Broto et al., 2017). These potential social gains are often pitched against

concepts of economic efficiency achieved by large-scale systems that are usually then translated to lower retail electricity tariff-based arguments. National energy security is another example, on account of which, first, transitions to sustainable energy were resisted, and now, decentralized technologies are often challenged (Kuzemko, 2019; Lockwood et al., 2017). As most large economies (such as India or Germany) have been powered through traditionally centralized energy systems, incumbent actors like national state-led institutions, often in nexus with large public or private corporations with energy interests, have been structurally empowered to set these rationalities.

3.3 Politics of energy materiality

These above debates, however, have embedded within them an implicit dimension of energy technologies that have only recently been theorized within this stream—the concept of materiality of energy technologies (Luque-Ayala and Silver, 2018; McEwan, 2017; Moss et al., 2016; Rutherford, 2018). Energy technologies bring, along with their material components, specific socio-institutional configurations. Peculiarities of the technologies, related artifacts, and hard infrastructure affect the decision-making space by firstly, legitimizing the participation of selected stakeholders like technocrats, engineers and experts (Sovacool et al., 2020); secondly, justifying decision-making by actors at certain levels only (e.g., national level actor for grid-based supply) and lastly fixate the sector technologically so that other technologies seem either futile or meaningless. Stirling (2014) argues that these material aspects of governing SE and related areas (in areas like agriculture, transport, communications, manufacturing and war) can reproduce the existing power relations and repress any space for innovation in a different direction (Stirling, 2014). The strong support for large-scale electrification of economies, for instance, through grid-based electricity supply, has led to a push for large-scale RE and nuclear energy solutions connected to the grid (Johnstone and Newell, 2018). The phenomenon of infrastructural and institutional lock-in and path-dependency associated with these technologies can vastly modify and even limit the space for urban actors to act on energy. Therefore, the ideation of material power within multilevel governing arrangements of a socio-technical system such as energy is particularly important for sustainability policy choices (Kuzemko et al., 2016).

An important argument to support the devolution of some responsibilities/authority to the municipal level is forwarded in the scholarship on fiscal federalism. Two key thinkers have been Olson and Oates. Oates (1972) proposed that public goods provision related responsibility needs to be devolved to the lowest levels of authority when the costs and the benefits can be internalized. This is a way forward to also raise the revenue-raising potential for municipalities. The European Union also adopted the principle of subsidiarity—the principle that central authorities should perform only those activities that the local authorities cannot perform. Energy in its new decentralized form makes this principle possible today, where localized energy generation from RE or localized EE measures will yield most of the cost and benefits locally. As Rutherford and Jaglin (2015) suggest the need for urban

governments to act is bolstered because energy systems issues are no longer confined to just supply infrastructure but have become more diffused through their embodiment in other infra and practices. This material nature of energy being embedded in the local context, infrastructure, and utilities further adds to the rationale for urban governments to be involved (Kuzemko, 2019). Urban citizens can also potentially both facilitate or constrain by resisting change through participation and representation, a perspective that needs to be addressed even in a normatively framed transition. The idea of cities just as geographical sites and recipient areas of energy infrastructure and institutional systems is outdated in the current context of energy technologies. Cities, then, need to be seen as legitimate political actors in the sustainable transition of energy systems. In the absence of this, there stands a risk, therefore, that decentralization of sustainable energy systems occurs through the rescaling of technologies and material infrastructure and not as decentralization of formal governance in cities.[2] In other words, urban sustainable energy transition is forged without the urban.

The above discussions establish the importance of developing a critical outlook of multilevel governance for studying the politics of urban sustainable energy governance. This is reinforced by the fractures and uneven power distribution in the energy governance domain. In the next section, I turn to power as conceptualized in political science to synthesize the above-identified schisms in the literature.

4 Conceptual foundations of power in political science

Power, a central concept in the social sciences, can serve as a means as well as an end (Arts and Tatenhove, 2004; Haugaard and Clegg, 2009). Scholars have considered any political process to be fundamentally the "shaping, distribution, and exercise of power" (Lasswell and Kaplan, 1950, p. 75). Accordingly, any political arena, as urban energy governance sites have been considered to be, should be subject to analysis through the lens of power. Power, despite being a fundamental concept in the political science discipline, remains an essentially contested concept (Lukes, 2005). Historically, the conceptualization of power has ranged from being coercive to authority-based, a right to leadership abilities, resources to capabilities, and individual power to social power (Cairney, 2019; Haugaard and Clegg, 2009; Hindess, 1996; Lukes, 2005).

The most fundamental debate about power arises from the epistemological differences in the study of power—whether power manifests itself only through measurable and observable outcomes. The focus on understanding power through an observable outcome stems from one of the early foundational definitions of power by Dahl, a pluralist scholar influenced by Weber. Dahl famously defined power as a phenomenon when "A has power over B to the extent that he can get B to do something that B would not otherwise do" (Dahl, 1957, p. 202). Bachrach and Baratz (1962) argued for the need to look at not just decisions but also non-decisions to understand the exercise of power. They suggested

that this could happen simply through the "mobilization of bias" in the constitution and operation of institutions that uphold the interest of certain actor groups while ignoring others; exploiting specific conflicts while suppressing others by strategies like agenda-setting and inclusion in decision-making processes (Bachrach and Baratz, 1962, p. 252). This marks the shift in the literature from a pure individualist methodology to a more institutional-level examination; from questions of actions to the exercise of power in institutional settings that might question inactions.

Lukes (2005), in his seminal book, Power: A Radical View, critiques that both these notions of power depend on the overt manifestation and, therefore, are essentially inadequate (Hindess, 1996). This paves the way for the covert, invisible or unobservable notions of power that came to be identified as the third dimension of power. Lukes (2005) argues that acts of power are not necessarily well-intended acts but "socially structured and culturally patterned behavior of groups and practices of institutions" which may be manifested in individuals" inaction" (Lukes, 2005, p. 26). He puts forth that power can also take an "insidious" form that shapes the thoughts and desires of the subjects without their conscious awareness (Hindess, 1996). There are two major differentiating factors in this "radical" view of power, as put by Lukes himself; firstly, it puts forth the agential nature of the subject, and secondly, power is enacted in a way to change the agency of subjects which was largely missing in the earlier conceptualizations. Despite the methodological challenges, the inclusion of the unobservable, covert and unintentional dimensions of outcomes of societal actions forces governance scholars to not just look at outcomes but also look at the lack of outcomes, rationalization, and prioritization processes behind this presence or absence of outcomes. It not only calls for a more critical assessment of the processes and operations of governance but also for possibly a new ontological and epistemological lens.

Closely linked to the above debate, scholars of power have also been divided on the meaning of power or what constitutes power. Arguments oscillate between conceptualizing power as "power over" and "power to" (see text footnote 2). Hence, literature on "power over" delves into understanding the exercise of power as it explicitly highlights the relation between two agents that leads to the reformation of one agency through the action of another (Hearn, 2014). However, "power to" has resonated with a larger number of scholars and has often been used as power to do something. It is often considered attributional or a capacity that is possessed (Haugaard, 2012b; Morriss, 2002). Hearn (2014) argues that the idea of power to or *power as a capacity* allows space for considering power to be empowering. It can also offer an advantage in the form of locating the source of power, as without having power, one cannot exercise it. This debate also lends itself to the debate on structure and agency in the study of power (Hayward and Lukes, 2008). Theories with an underlying structure-agency dichotomy tend to answer questions of subjectivity and objectivity between structure and agency. Can power be exercised through existing structures so that agency is annihilated? Can the agency be considered a passive player without any action or reactional capabilities? However, more scholars are reconciling with a relational view of structure and agency.

Two approaches have been espoused: Firstly, with structural explanations, the "power over" or power as domination argument

---

2   Notable scholars in the "power over" school are Weber, Dahl, Bachrach and Baratz, Lukes; Power to scholars are Arendt, Barnes, and Parsons.

can demonstrate a consensual or "compliance-based" exercise of agency (Haugaard, 2012a). Lukes (2005) and Foucault (1979) can be considered to be the most important scholars of this understanding, albeit in different ways (Haugaard, 2012a; Hayward and Lukes, 2008). Both have considered disembodiment or disindividualization of power through structural means to be one of the supreme forms of power exercise, especially in the context of government. At the same time, they also theorize agency to operate within the constraints and choices the structures allow (Bevir, 1999; Foucault, 1977; Lukes, 2005). Self-regulation or self-restraint, as posited by Foucault (1979), in response to structural conditions, has been considered to be an agential response (Bevir, 1999; Haugaard, 2012a).

The second approach considers structures to be dynamic and changing, and changes are brought in by human action and by extension, human agency. Giddens' (1984) theory of power unifies the dichotomy of structure and agent that flows from his theory of structuration. He does not attribute intention or interests to the concept of power, instead viewing any action taken by an agent as an exercise of power. The theory holds structure as the source of resource/capacity for all agents in the system. However, this is not neutral; it gives rise to asymmetries of resources, engendering the hierarchical and dominating nature of power when exercised by agents. Therefore, the theory provides for the structure to give rise to both constraining and enabling conditions, and the actions emanating from these conditions give the scope for structures to transform (Giddens, 1984; Haugaard, 2012b). Arts and Tatenhove (2004, p. 350) summarize this recursive relationship between structure and agency as "structures do exist, but they are internal to human action, manifest themselves in human action, and are (re)produced and transformed by human actions, and are changeable in principle".

These two approaches to understanding dynamic interactions between agencies and historically constituted structures provide important theoretical foundations for analyzing power in policymaking and governance ushering change. It offers the potential for deeper structural changes where new actors can emerge (like energy in this case). As Haugaard (2012b, p. 45) posits, structuration practices are embedded in specific "systems of meaning that certain acts appear reasonable and others unreasonable, thus legitimate a particular economy of inclusion and exclusion". Thus, power is operationalized through the actions and inactions of particularly powerful agents that transform or sustain the structures that include or exclude, capacitate and incapacitate specific actors. This structurally mediated power exercise is effectuated when agents (typically weaker) make sense of these practices and shape their self-understanding to take particular actions or exercise inaction. For instance, in the ongoing SE transition dialogues the superiority of the nation-state is considered inescapable (Engberg, 2018). Therefore, the power differential in the case of the other scales or levels is taken for granted, consensual, or even considered prescriptive.

Multiple power frameworks have been offered by scholars of political power and interlinked fields. The analytical framework set out in this study will not only build on but also delineate itself from the existing frameworks in the literature and account for the specificities of urban SE governance. The next section discusses how power scholarship has been translated into MLG and energy studies disciplines.[3]

4.1 Power in multilevel governance approaches

As mentioned earlier, there is a general lack of deep engagement with power in multilevel governance (Barnett and Duvall, 2005; Marquardt, 2017). However, one emerging strand of power conceptualization is particularly pertinent to urban energy governance studies. Apart from conceptualizing governance as the distribution of power, governance is increasingly being understood as operationalizing power through steering instead of commanding (Griffin, 2012). Steering involves aligning multilevel actors and elements to work together toward a single goal or interest. This is premised on the idea of a powerful agent and operalization of the power within a multilevel governing arrangement to bring about "deep and radical changes to existing sociotechnical structures" "legitimizing top-down performance regime by depoliticizing struggles" (Engberg, 2018, p. 146; Voß et al., 2010, p. 198). Related concepts of governmentality, orchestration, and metagovernance have emerged within MLG literature, representing more operational notions of power in governance in which power can be operationalized from a distance without coercive means or direct domination (Gordon and Johnson, 2017; Luque-Ayala et al., 2018). Thus, it brings the focus on the act or processes of governing rather than just outcomes or attributes such as capacity, resources, or authority (Bulkeley, 2015a). The notion is inspired by the concept of governmentality by Foucault, espoused in the phrase "conduct of conduct" (Castán Broto, 2017, p. 9; Foucault, 1982, p. 220). Bues and Gailing (2016, p. 76) suggest, "the concept of governmentality views power not as something actors possess or wield. Instead, it links technologies of the self with technologies of government as well as the constitution of the subject with the formation of society."

Orchestration is an indirect mode of governance "distinguished by an attenuated relationship between the governor and governed" (Abbott, 2018; Gordon and Johnson, 2017, p. 695). Castán Broto (2017, p. 8) highlights, "orchestration which sometimes requires domination, but most times works upon mechanisms of seduction and inducement" to essentially gain "control and authority" working by excluding certain actors, means, and even outcomes related to climate objectives. Gordon and Johnson (2017) give examples of the inter-urban competition for attracting capital investments that espouses a particular type of urban governance. Orchestrating power thus rests on the ability to establish those

---

3   Lukes' (1974) three dimensional/faces of power; Clegg's (1989) circuits of power based on capacity to act; Mann's (1993) sources of power; Haugaard (2012b); and more derived understandings like Arts and Tatenhove's (2004) power in policymaking, and Barnett and Duvall's (2005) typology of power in governance have attempted to address all or some of the three foundational aspects by proposing a cluster of concepts to theorize power.

standards that become widely accepted amongst all actors located within a common domain.

The concept of metagovernance calls attention to the governing mechanisms within state bodies or the government arena in particular (Abbott, 2018). Whitehead (2003, p. 8) posits that metagovernance conceptualizes how "state power become expressed in and through governance structures and the ways in which governance systems are in turn forged in the "persistent shadow of hierarchical authority"". Jessop (2001) argues that indirect methods of governing take precedence over direct domination and command in a governance arena with a proliferation of different types of actors. Whitehead (2003), through his case study of the West Midlands, demonstrates how the national government constricts liberties of local partnerships and controls organizational intelligence through non-coercive mechanisms such as strategic frameworks and monitoring procedures. Therefore, standard views like bounded autonomy and capacities of urban governments (Castán Broto and Westman, 2020) need to be considered interdependent on higher powers and their politics.

These power laden notions of governance emphasize the importance of understanding power and the strategies or mechanisms required to achieve this indirect form of government as a separate unit of analysis rather than just outcomes. Engberg (2018) distills a multitude of mechanisms from the climate change adaptation literature related to these approaches, such as *discursive framing; strategic guidance, direct involvement, enabling self-governance, defining the rules of the game, and using fear* (Engberg, 2018, p. 143; Nederhand et al., 2016; Sehested, 2009).

4.2 Power in socio-technical transitions

The socio-technical transitions literature covers a more complex power conceptualization within multilevel governing systems that studies societal transitions toward sustainability. Grin et al. (2010), Avelino and Rotmans (2009, 2011), Avelino and Wittmayer (2015), and Marquardt (2017) have offered power conceptualizations within the broader discipline ranging from the multi-level arrangement of power to a "horizontal" or individualistic outlook for power with the capacity of actors to change as not is the key starting point (Avelino, 2017). More recently, a more comprehensive and application-oriented conceptualization of power has emerged from the Dutch Research Institute for Transitions (DRIFT) which focusses on a multidimensional heuristic comprising some of the fundamental conceptualizations of power such as "power over"; "power with"; and "power to" (de Geus et al., 2023; Avelino et al., 2023). There is also a focus on operationalization of these conceptual frameworks for applied research (Avelino, 2021).

SE transition studies, more specifically, have applied power as a concept more recently, where the main theme has been conflict, conducts, and technologies of incumbents or power elites (Sovacool and Brisbois, 2019). Path dependence arises from unyielding institutional, structural, and material processes. It perpetuates selection mechanisms and environments via feedback mechanisms such as sunk costs, learning, coordination, and dependencies (Becker et al., 2016a,b; Kuzemko et al., 2016; Sareen, 2020; Wolf,

2020). Brisbois (2019) is one of the few scholars who has explicitly conceptualized power as the ability of actors (energy incumbents) to dominate new energy actors or communities in particular and proposes a framework designed to examine the extent to which power structures are transitioning, the means employed and their outcomes. Brisbois (2019) conceptualizes three types of power for analysis: instrumental, structural, and discursive.

The literature on transitions enables us to adopt a systemic and dynamic perspective on sustainable energy interventions, focusing on structural changes. It is particularly useful in understanding the obstacles that new and emerging actors, such as cities, face when competing against the dominant traditional energy actors. There has also been an effort to re-materialize energy transition studies where the material component of energy is increasingly implicated in the nature, actors, decisions, and pathways for facilitating sustainable energy transition, particularly in terms of the scale and spatiality (Balmaceda et al., 2019; Kuzemko and Britton, 2020; Moss et al., 2016; Stripple and Bulkeley, 2019). Becker et al. (2016a,b) suggest, on the other hand, that energy transition research needs to consider beyond the obdurate aspects of energy institutions, such as historical and discursive elements, to better understand change processes.

In summary, the review of these two literature streams helped generate two additional insights related to (1) governing from a distance in a complex governing landscape emphasizing the relational aspects of power; (2) the tension between incumbents' power play and new players' subjectivation or resistance that shapes the transition to new structures and institutional arrangements.

Given that the theoretical application of power as a concept is only a recent phenomenon in key scholarship enveloping urban energy governance—MLG, SE transition scholarships - there is scope for additional or alternative conceptualizations. Power, as represented in the discussion above, is fundamentally reflected in actions and inactions operating through observable and unobservable, intentional and unintentional means. Different scales of governance, whether national, urban or multilevel, that are intrinsically related to the actor, institutional, and material configurations for addressing social challenges are an embodiment of the complex terrain of underlying power dynamics. The power scholarship, in combination with the complexities of a multilevel governing arena defining the urban scale, demands a framework with the following characteristics:

- *Multidimensionality* of power can generate profound insights into the multilevel multi-actor relationships and how governance of specific problem areas is constituted and shaped.
- Comprising both the *relational* and *processual* nature of power, which allows for an identification of power exercise and how constitutive powers like capacity, resources, or authority, even agency are shaped.
- Comprising a *recursive relationship between structure and agency* where both can become medium as well as the outcome of power.

In the next section, I offer a unifying framework that brings the above discussed aspects together to explore the politics underlying

a fundamentally contested arena such as urban energy governance through the lens of power.

5 Setting out the analytical framework

The analytical framework presented here has been developed with the specific objective of critically understanding the politics of urban SE transitions—action, inactions, ideas, technologies, rationalities—undertaken by the urban local governments. A broader objective is also to characterize the political economy of the energy transitions within which urban SE governance is embedded. The framework offered in this paper illuminates how power, emergent from different points and in a multi-level urban climate governance ensemble, expressed through different interacting media and means, shapes SE actions by cities. The framework could be adapted to answer research questions such as: how does power shape SE decision-making in cities?; Or how can SE transitions in cities be explained through the lens of power?

The framework builds on a typology offered by Barnett and Duvall for political enquiries in the discipline of global governance addressing a "conceptual myopia" on the issue of power (Barnett and Duvall, 2005, p. 67). Barnett and Duvall (2005) adopt an inclusive conceptualization of power as "production, in and through social relations, of effects that shape the capacities of actors to determine their own circumstances and fate". Barnett and Duvall's framework offers a taxonomy along two axes— (a) how is power expressed (interaction or constitution) and (b) its specificity of incidence—whether direct or diffused in nature. The taxonomy generated comprises four types of power— "compulsory" (direct and interactive), "institutional" (indirect and interactive), "structural" (direct and constitutive) and "productive" (indirect and constitutive). Therefore, in addition to evident, direct processes of power such as commands or punitive measures, more subtle covert routes of power operation are considered, wherein not only are the broader conditions of decision-making influenced but also rationality and agency are shaped. The authors have strongly suggested to take an integrated view of the framework, allowing interaction, concurrency, co-existence and overlaps. Integration can signify the relationship between the types of power that may balance each other or reinforce each other. The net effect of the multitudinous power processes fundamentally shapes the (non)outcomes of governing enterprises, such as urban governments' SE decision-making (or no decision-making). This is also in line with the conclusions drawn by Kuindersma et al. (2012, p. 411) in the application of Barnett and Duvall's framework. They conclude, "Each of the four faces of power reveals different aspects of this case, and that only by taking them together can we fully explain the outcome of the case".

The framework offers some benefits, particularly for the global south cities. Firstly, the flexibility and broad scope of the framework hold some clear benefits in power analysis in contexts with little prior knowledge. With its multidimensional typology, the framework allows building an analysis that goes beyond existing straightforward single dimensional explanations such as lack of resources. The focus can be put on more

dynamic and layered notions of power while at the same time allowing exploration of contextual, covert, and more obscure forms of power. The four power categories help provide some structure to the broad conceptualization of power without limiting the analytical potential. The types indicate where and how power should be analyzed in a multi-level governance scenario. The broadness of the power conceptualization in this framework also opens the scope for integration with other conceptualizations or frameworks (cf Avelino, 2021; Avelino et al., 2023).

Secondly, by conceptualizing power as "production of effects", the framework allows a focus on the actual operation of power as against the more prevalent conceptualization of power as a capacity, ability or attributes (cf Avelino and Rotmans, 2011; Marquardt, 2017). It makes it possible to expand the analytical aperture by going beyond the dichotomy of agency or structures as the source of power and other such debates in the scholarship. Within governance studies, the application of the framework can allow focusing on effects that then engender actions (or inactions) and identify the power-laden processes that deliver this type of governance. These processes can sometimes be objectively identified or subjectively crystallized. However, these processes and effects, more often than not, are also nebulous in nature, and a broad definition offered by this framework can be useful for facilitating reflexive and inductive analysis by researchers. This responds to the well-identified gap of a more relational and dynamic understanding of power as articulated in this statement—"the processual and dynamic nature of the state in configuring geometries of power between different actors remains largely unexplored" (Johnstone and Newell, 2018, p. 75; Luque-Ayala and Silver, 2018; Stirling, 2019; Stripple and Bulkeley, 2019). Further, the power definition—"shape the capacities of actors to determine their own circumstances and fate"—allows analysis from the point of view of the affected actors, such as urban governments, as is the focus of this paper. The effects of power production, while left undefined by the authors, can be envisaged to be on the decision-making actors' actions, conditions, and the constitution of their identities and interests. Drawing attention to the conditions of the actors and constitution of urban governments' self-interests can help understand inactions—why some urban governments have not been taking SE actions—contributing to the ambition-achievement disparity knowledge gap.[4] At the same time, the agency is given significant space to operate in dominating, emancipatory, transformative, and structure-shaping roles.

The non-agential conceptualization of power also allowed the adaptation of the framework to include material power as a distinct power type from the socio-technical systems literature. Effects produced by material dimensions of energy systems have been an important line of enquiry in urban climate and energy governance (Stripple and Bulkeley, 2019). It is perceivable that the materiality of energy systems interacts with more structural and institutional forms of power to reinforce or balance each other.

---

4   This is slightly different from the second dimension of power in Lukes' framework that deals with the non-decision by powerful actors.

Having summarized Barnett and Duvall's framework and its advantages, the section below elaborates on its key elements, its adaptation, and operationalization of power for urban energy governance studies. The unit of analysis for this study is the local urban government, or municipal body, as the key democratically elected representative decision-making local state for undertaking SE transitions but embedded within complex multilevel governing structures or interactions.

Power is understood to be the production, in and through social relations, of effects that shape the identities, actions and conditions of actions of other actors. I take a departure from the original definition to adopt a clearer understanding of effects, focusing on the issues that are particularly relevant for decision making in keeping with the objective of the framework. Building on this definition and the taxonomy of four types of power offered by the original framework, I propose to adapt the framework in the following manner.

I propose a heuristic framework comprising three main analytical units: (1) power *types*; (2) power *mechanisms*; (3) *effects*—sharing a recursive relationship. Therefore, within any complex governing arena of interest, the model will analyses how the different power types (identified in the taxonomy later) are operationalized through power *mechanisms* to produce specific (intended or unintended) *effects* on the actions, conditions, and identities of other actors. Additionally, the aggregate effects so produced also have the power to transform either all or any of the power categories including structures, institutions, and direct power. The existing framework already explicitly conceptualizes different power categories. I propose two additional concepts—firstly, in the form of power *mechanisms* as an analytical tool to encapsulate the context-specific processes and strategies under the rubric of each type of power; secondly, I conceptualize power effects to be a field comprising three major units of actions, conditions of actions and identities and subjectivities that combinedly achieve the desired or observed effects. The current framework and definition of power types are broad and have the potential for such specificity and adjustments according to the objectives of this study. I explicate these concepts below:

5.1 Power types

Power types characterize the nature and means of different power mechanisms incident in any governance arena. Barnett and Duvall (2005) identify four types of power generated from the two dimensions of power identified—nature and specificity of social relationships. These four power types offered can, in many ways, be conceptualized as both sources and mediums of power for the actors and elements. Given this conceptual flexibility, I conceptualize a fifth power type—material power—that embodies this dichotomy and reflects the discipline-specific debate of energy socio-technical studies.

- **Compulsory power:** Compulsory power involves the direct exercise of power to control or shape the circumstances of another actor. Barnett and Duvall (2005) qualify that this concept of power has the closest affinity to Dahl's

conceptualization or the first dimension of power as per Lukes' (2005) framework. Conflict of interest, authority and resource differential have been thought to be preconditions for this power type that is employed through direct interactions between actors. In general, compulsory power is the most intuitively understood power, mainly exercised through overt means directly affecting actions (whether instigating, suppressing, or shaping them). Direct compulsory power could work through the promise or sanctioning of resources such as grants, fines, or military coercion, the last, particularly in the case of international politics studies (Barnett and Duvall, 2004). But compulsory power need not be limited to material resources and can also work through authority and regulations-based norms. In terms of actual mechanisms of power, material resources promised by developed countries or corporations to capture the global agenda, shaming tactics by NGOs, and resource supply threats are some of the ways through which this type of power is fructified (Barnett and Duvall, 2004). Direct interaction between actors is the critical identifier for this type of power.

- **Institutional power**: Institutional power, distinct from compulsory power, operates indirectly through established norms, procedures, and rules among actors, both formal and informal. Institutional power is mainly employed in cases where actors to be governed are at a distance, and direct coercive or material inducements are not effective or possible. Within these institutions, the powerful actor "guides, steers, and constrains the actions (or non-actions) and conditions of existence of others, sometimes even unknowingly" (Barnett and Duvall, 2004, p. 15). Institutional power is akin but not limited to the power conceptualization of Bachrach and Baratz (1962), who argued that power could be exercised by distorting the agenda of institutions to keep out select actors and their interests or restrict their participation or representation. Institutions are often a reflection of the structurally ordained or elite actors where institutions embody their *mobilization of bias,* systematically favoring certain actors over others or suppressing certain conflicts indirectly (Bachrach and Baratz, 1962, p.969). Barnett and Duvall (2004) further argue that this mobilization can often be a temporal function and have an associated institutional stickiness. Institutional arrangements, distribution of responsibilities, setting the agenda, and "enduring systems of exchange" can be considered to be some of the mechanisms through which institutional power works (Barnett and Duvall, 2004, p. 52). In the realm of urban energy governance, there are formal and informal institutional connections between higher levels of government and local governments, or among different departments within local government that are closely involved in energy-related institutional setups. Therefore, the scope of exercising direct power is reduced and is instead mediated through the established institutions. For instance, in the energy domain, national governments have been institutionally responsible for creating energy policies and legislation, with urban governments expected to act within these traditional institutional structures. While Barnett and Duvall (2004, 2005) do not mention this explicitly, the

institutional power conceptualization in this study takes the new institutionalism approach that, in addition to the above, also considers the normative and cultural aspects within organizations as potential areas of power production.

- **Structural power:** Structures are fundamentally social relations—"co-constitutive internal relations"—that have the constitutive property of assigning specific positions, "capacities and interests" to actors and essentially establishing actors as specific social beings (Barnett and Duvall, 2005, p. 52). Structural power often merits special discussions as it is indiscernible through material or institutional means and is often considered a pre-given or unalterable attribute of actors or conditions. The key differentiation of structural power is also that it does not necessarily need an actor to actively operationalize power, but power is constituted on account of the structural landscape. A more important feature that the authors add is that structural power also shapes and determines the self-perception and subjective interests of the subjects that prevent them "from having grievances by shaping their perceptions, cognitions and preferences in such a way that they accept their role in the existing order of things" (Barnett and Duvall, 2005; Lukes, 2005, p. 11). This conceptualization of power may be particularly useful in analyzing the self-understandings that local governments assume in energy governance, who may interpret the continued lack of capacity and authority in ways that shape their interests despite local advantages. In essence, structures can produce unobservable effects on the agency of local authorities and consequently impact decision-making. Investigating structural power requires examining the factors, rationalities, and ideological paradigms that produce, reproduce, or alter social relations and assign specific identities and shape the self-understandings of the actors. Barnett and Duvall (2005) held fundamental economic paradigms such as global capitalism, neoliberalism, and world systems of states that produce new social relations and constitute identities as examples of structural power.
- **Productive power:** In contrast to structural power, productive power entails the production of subjects and subjectivities through discourses, creation and sustaining systems of knowledge and rationalities. Productive power operates through less tangible means, such as discourses, frames of reference, and ideas—akin to Foucault's power concept. This form of power creates small fields of influence that define what is considered right or wrong, logical or illogical, normal or abnormal, possible or impossible, and ultimately what is problematic (Barnett and Duvall, 2005). It is with the establishment of these *microfields* that subjects are created and operationalized, which in turn delineate the scope, agency, and fields of action. Zunino (2006) gives the example of urban Chile, where neoliberal logic based knowledge production determined the kind of information and participation considered valid in urban project decision-making. A contemporary example is the transition of national energy landscapes in the context of sustainability. Stirling (2014) argues that imageries and imaginaries of energy transitions are often shaped by the framings and knowledge considered

acceptable by the current incumbents. Consequently, the current transition that we are witnessing may only be "deeper realignments with existing structures" (Stirling, 2014, p. 84). The multilevel governance approach necessitates an analysis of how discourse and knowledge production by higher-level state elites influence the urban government's self-perception and role within the broader governing system. This examination is crucial for understanding the complex interactions between different levels of governance and their impact on urban policy-making and implementation. For the urban, productive power will shed light on the identity in policy domains, role creation of cities in public discourse, position in power hierarchies through the discursive lens, and participation in knowledge production in the energy and climate change policy domains.

- **Material power**: *Material power* as a distinct power type in view of the specific focus on SE technologies in this study. The materiality, or the inanimate aspects related to energy, has been interpreted widely in the STT literature—energy resources, artifacts of the technology, material flows, and the ways spatial processes and landscapes shape technologies and, in turn, are shaped by energy technologies (Becker et al., 2016b; Bridge et al., 2013; McEwan, 2017; Moss et al., 2016). The STT literature broadens energy materiality analysis to include socio-political aspects. Political protests like fracking and NIMBY movements reflect societal reactions to energy materiality (Balmaceda et al., 2019). Decentralized energy technologies' materiality can empower urban governments in energy transitions (Kuzemko and Britton, 2020). Stripple and Bulkeley (2019) propose viewing socio-materiality as assemblages, focusing on generated power. This perspective reveals how material configurations influence governance and subject creation. These insights demonstrate the complex interplay between energy materiality, societal responses, and governance in energy transitions. As SE technologies, both RE and EE, are much more wide-ranging and more sensitive to local conditions than conventional energy, the material aspects of where, how, to what end they are deployed, become a political question. Therefore, beyond the power embodied in the material being of the technologies, studies are looking at how actors have used the materiality of energy technologies to exclude actors and places or to consolidate power in their favor (Moss et al., 2016). As Bulkeley (2015a) posits, in the assemblage of governance, one of the "technologies" of governance is technology itself. Material aspects of SE governance bring with them their own set of governmentalities (Johnstone and Newell, 2018). This subjectivation of and through energy technologies is not just limited to who owns the technology and who benefits and who loses from its implementation (for instance, displacements in the case of hydro) but also extends to more mundane governing implications such as shelf life, appearance, ease of use, financial peculiarities, lock-in period. In this study, I orient the analysis primarily but not limited to these two potential power processes: (1) the direct opportunities and constraints by the materialities, typically technological, spatial, and social in nature, present for realizing low carbon

transitions but also the way the (2) materialities are used by the decision-makers in the multilevel governing set up to rationalize their actions or "(re)production of different forms governmental practice or governmentalities" (Johnstone and Newell, 2018, p. 79).

5.2 Power mechanisms

Mechanisms are envisaged in this framework as an additional analytical tool to articulate the processes of "production of effects". The unit is intended to research and get a handle on how power conspicuously or inconspicuously is operationalized under the different categories of power. They are identified in the form of specific strategies and processes that produce shaping effects to constitute identities or subjectivities or shape the actions and their conditions (of urban governments in this case). In essence, mechanisms act as a bridge between the broader conceptual power types, as presented in the previous paragraphs, and the empirical effects or outcomes. In other words, mechanisms depict power in practice. The use of mechanisms or similar organizing concepts is not new in studies of political power and climate governance (Bulkeley, 2015a; Jagers and Stripple, 2003; Johansen and Chandler, 2015; Patterson and Van Der Grijp, 2020). However, it remains under-conceptualized as a distinct analytical unit. Within governmentality-based studies, mechanisms have been thought of as the practice of the government to accomplish governing and steer societies toward a specific end (Bulkeley, 2015b; Stripple and Bulkeley, 2019). In this stream, scrutinizing calculation, audit, accounting, and participation as possible "technologies of the government" have been conceptualized as mechanisms (Bulkeley, 2015b, p. 12). In other studies, mechanisms are less instrumental or purposive—for instance, "collective organization and protesting"; "unbroken contact with politicians and officials"; "delimiting decision-making arena"; or "creating compulsion"; "threats of sanctions", among others (Ekström and Danermark, 1991).

It may be worth reiterating here that urban has been conceptualized in this paper to be embedded in a complex multilevel governing arena, and power can be operated by and through the myriad actors, elements, and mediums in the backdrop of the political economy they occupy. This inevitably renders the power landscape expansive and possibly cumbersome considering the ubiquitousness attached to the concept of power. Within this complex landscape comprising various power mechanisms in operation, individual mechanisms cannot be causal; they can only influence. Hence, while within particularly realist literature streams or philosophical traditions, mechanisms have been primarily treated as causal links to outcomes, an effort has been made to move away from a causative notion of mechanisms in this framework. Instead, an understanding of the influencing effects of collective mechanisms has been adopted (reflected in Figure 1). Additionally, because mechanisms can make power concepts more granular and perceptible, a collective outlook on the prominent mechanisms across multiple cases can generate insights into the power relationships, the significance of material dimensions, instances of resistance and empowerment, and the effects of often invisible enduring structures.

5.3 Effects

In this approach, the third analytical unit of power analysis is the effects resulting from power operations. Despite not distinguishing "effects" as a distinct dimension, Barnett and Duvall do, in general, identify three categories of effects on (1) the recipient's actions or behavior; (2) the conditions of actions indicating the resources, scope, and other means permitted for the urban governments; and, finally, (3) their identities as social beings arising from constitutive effects.

The last category has significant implications for transitions in any policy area. Constitutive power shapes the self-understandings of actors, influences the actions they are socially empowered to take, and creates a disciplining effect through self-regulation and internalization of constraints (Barnett and Duvall, 2004). For instance, this can potentially result in subjects' rationalizing inaction or limited action despite benefits without necessarily attributing to the underlying source, originating possibly at a different level of governing. However, individual effects do not necessarily relate to specific types of power or mechanisms (structural power is not only linked to identity, for instance). While constitutive relations can influence behavioral change by assigning a particular social identity, interactive power production can, in turn, lead to new subjectivities, contributing to the shaping of the identities. In a complex governing landscape such as urban energy governance like the one being discussed in this study, multiple effects, like mechanisms, are considered to be at play simultaneously. For instance, the decentralization of energy technologies can create opportunities, but can also impose barriers that diminish the scope of action for urban governments. Actions or inactions on SE are the net of these effects.

There are two main advantages that this view extends: Firstly, instead of just a preordained understanding of authority and capacity, the framework allows these variables of urban governments to be considered as an effect of the multiple power mechanisms and, therefore, making the underlying politics more discernible. Secondly, it also raises questions about the differential potency of the different power mechanisms. Could one power mechanism be more influential in a certain context. Further, this framework offers space for the realized net effects to give feedback to the current landscape, resulting in sustenance or disruption of the existing power hierarchies and relationships (see Figure 1). A flowchart of the heuristic model proposed and discussed here has been presented in Figure 1. In Table 1, I operationalize the framework by giving examples of the concepts from the literature (Barnett and Duvall, 2004, 2005; Castán Broto, 2017; Ekström and Danermark, 1991; Lee and Koski, 2015; Marquardt, 2016, 2017; Pasquini and Shearing, 2014; Rhodes, 1986).

In line with Barnett and Duvall's (2004) framework, the above framework brings together power conceptualization from different research traditions and even crosses over different ontological and epistemological foundations. The syncretic ethos of the analytical framework dovetails a multilevel view of urban SE governance and, subsequently, a multidimensional conceptualization of power. Barnett and Duvall (2005) argue that this plurality of concepts and

FIGURE 1
Analytical framework adapted from Barnett and Duvall (2004, 2005); adapted aspects in italics.
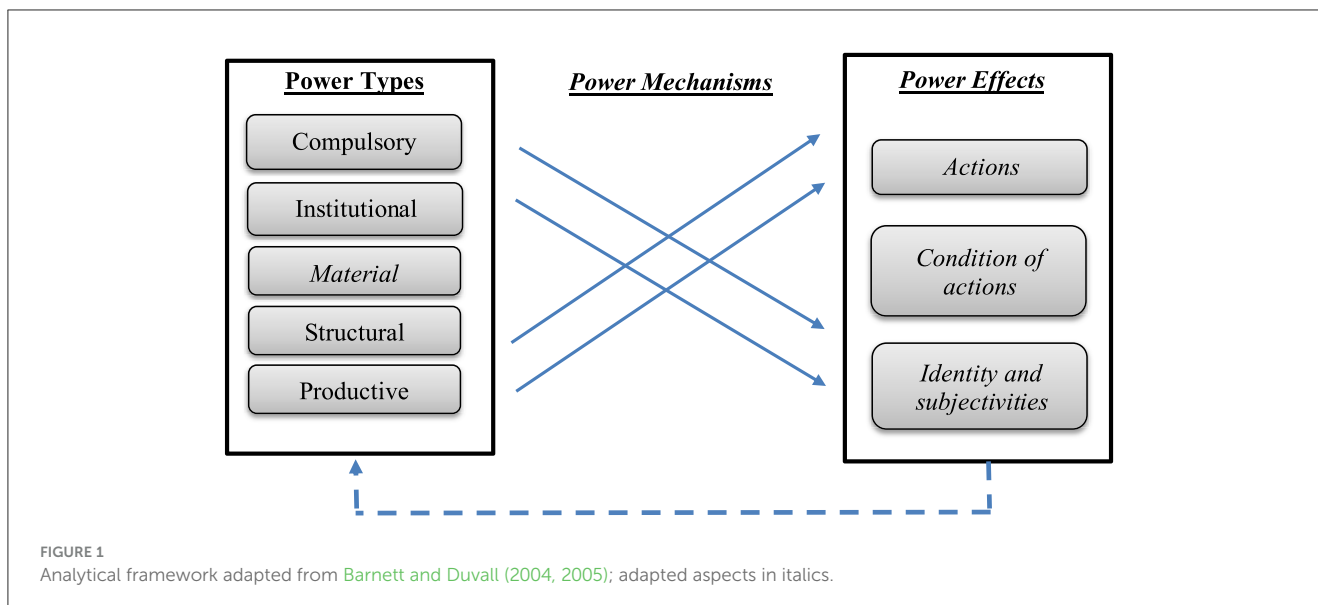
paradigms is a necessity for such a framework that, unlike most other conceptualizations, the power concepts in the framework are not competing with each other but are complementary in any situation (Barnett and Duvall, 2004; Kuindersma et al., 2012). In line with this spirit, this study places itself within the research tradition of "analytical eclecticism" (Sil and Katzenstein, 2010, p. 427). Three aspects specific to this study make this approach particularly relevant as highlighted by the proponents: (1) allows understanding of any complex governance landscape like in this study as emergent from the interaction of multiple mechanisms; (2) helps in generating a more middle-range understanding of the problem area that also has immediate linkage with policy and practice; (3) particularly applicable to research projects with a wide scope, in particular in studies that aim to add complexity to the current understanding of the area of study (Sil and Katzenstein, 2010).

5.4 Application of the framework: politics of urban sustainable energy governance in India

I apply the framework to critically assess how power shapes sustainable energy governance in three cities in India. By understanding the operation of power, as understood through this framework, in these three cities, I not only aim to elucidate the politics of urban sustainable energy governance in India but also throw light on the political character of India's energy transition. I present a summary of the findings as an example of applying this framework.

India's transition to sustainable energy is closely observed due to its large coal dependency and high carbon emissions as the fourth-highest emitter. However, these high-pitched energy transition plans and targets have so far eluded the urban scale.

Despite their global recognition as climate actors and support from national programmes and transnational city networks, urban governments' actions in SE have been largely muted in India.

The urban scale is critical for the success of India's ongoing energy transition. The International Energy Agency (IEA) estimates that most of the built infrastructure required for India's impending urbanization by 2040 is yet to be built (IEA, 2021b). This has implications for national energy demand as the imminent infrastructure stock is likely to lock-in the existing high demand flows for several years to come unless it is sustainably built (Khosla, 2018).[5] Beyond the risks of these energy excesses, the issues of energy access and impacts, such as inaccessibility, air pollution, and the urban heat island phenomenon, are particularly pertinent for India (Khosla et al., 2021; Sethi, 2018). India follows a three-tier governing system—national, state (provincial), and local (constitutionally introduced in 1992). State governments were made responsible for a complete decentralization of local governance as the third-tier of the government. But this was highly contested and largely remains unfinished and state government wield significant control over cities within their administrative regions. On the other hand, electricity is a concurrent subject and controlled largely by national and the state government. Although cities do not have a formal mandate on electricity supply in India, international city networks and national and state (provincial) governments have launched programmes to encourage renewable energy (RE) and energy efficiency (EE) adoption at the urban scale through umbrella programmes. Regardless, cities have not been able to establish themselves as relevant actors within this space (Bhardwaj et al., 2019).

---

5 European building sectors is an example where energy sustainability is one of the difficult challenges due to locked-in nature of the built environment.

TABLE 1 Examples of the concepts in the analytical framework.

Power type	Mechanisms (indicative)	Effects (indicative)		
		Conditions of actions	Actions	Identity and subjectivities
Compulsory	• Command or informal nudges • Direct positive or negative incentives on actions (not through generics state or national policies) • Direct leadership (Mayoral or Bureaucratic) • "Shaming tactics" by civil society	Resources (financial, technical, human) Agenda setting/ mandate/assigned authority/scope of work/area of action "The room for decisional maneuver possessed by a decision-maker"/discretion Access to technology type and related infrastructures Access to updated knowledge about roles and possibilities	Taking actions/ decisions/withdrawing decisions on SE/inactions Technological choices and scale Governing mode such as self-governing, enabling, provision and regulator.	Will to govern/Establishing and sustaining authority in particular policy domain Interests/rationality Normal/probable/necessary Self-regulation/disciplining
Institutional	• Resource and authority distribution rules • Decisional Rules • Formal and informal norms and rules, formalized lines of responsibility, divisions of labor, structures of dependence • "Defining out" • Creation of diffused notions of dependence • Access to policy making circles/policy maker • Enduring systems of exchange and • Interdependence			
Structural	• Multilevel hierarchies (embedded institutions) • Global capitalism • Liberalization of SE sector • Modes of production • State and non-state governing structures • Neoliberalisation			
Material	• Material Benefits (monetary, energy savings, resilience) • Artifacts • Scale of application • Grids and infrastructures • Distinct linked institutional and politico-economic configurations			
Productive	• Defining the "other" and other terminologies in the dominant policy domain • Exclusionary discourse on development • Framing of certain problems • Accessing a particular knowledge domain compared to others			

The analysis is based on 60+ unstructured interviews, document analysis, and process tracing, conducted between 2019 and 2020 at the levels of international, national, states (three) and cities (three). Thematic analysis was carried out to inductively flesh out the themes of effects and power mechanisms guided (not determined) by the five power types. Table 2 gives a condensed picture of the different power mechanisms that were found to shape the SE governance in the three cities in India.[6] The

power mechanisms were multitudinous but also stratified across the different levels of governance and types of power. The structural power was found to be the most significant shaping factor that rendered cities with specific capacities, authority, and resources while assigning particularly national governments with disproportionate powers for establishing the institutions, setting the policy and technological agenda, and exercising political

6 The framework proposed was first developed as part of the PhD thesis (Basu, 2022). The detailed analysis for the three cities can be found in the thesis. This table provides a summary of the major power mechanisms found

in these three case studies and helps understand the politics of urban energy governance in India. The table illustrates the application of the proposed framework that can be used to explore energy transitions in politically contested phenomenon such as urban areas.

TABLE 2 Application of the framework to three cities in India.

Cities	Pune, Maharashtra (PuM)	Surat, Gujarat (SuG)	Kolkata, West Bengal (KoW)
Sustainable actions or inactions	• Sustainable buildings certification and incentive • Carbon footprinting and annual environment status report • SE interventions in city development plans • Green buildings, smart city and other climate plans • Solar water heater (SWH) adoption incentives However, except for relatively successful roll out of SWH and solar rooftop installations in its own facilities, most other reports have not materialized on the ground. Initial momentum on Sustainable buildings has also been lost.	• Establishment of an Energy Efficiency Cell • Power generation from wastewater treatments and energy efficiency • Investments in wind and solar power plants for revenue generation and self consumption • Solar rooftop in public buildings • Solar rooftop programme for city • Reports on solar city plans/smart city plans All initiatives other than RE and EE interventions for SM's own facilities or consumption were discontinued	• Energy efficient and "carbon neutral" street lights for KMC facilities • Solar rooftop mandatory in building by-laws • High-Powered Committee on RE and Climate Change (CRECC) Little action on SE projects and long term planning was largely absent (during the project term)

Power type	Mechanisms		
Structural—rationalities and ideologies that produce and reproduce differential power positions of different actors and assign them different identities	• **Adopting the nation-state regime and pre-eminence of the national and state governments (Na and In)⁻** – *Dominance of national governments in large economic governance as well as global climate and energy governance has reduced the role and position of city governments in these matters. In India, postcolonial emergence and prioritization of energy security and energy access saw national governments assume sticky salience in bringing the country together. Federalism was sacrificed with unsuccessful decentralization attempts.* • **Economic liberalization and ushering in neoliberal governing order in the energy sector (Na)⁻** – *Around the early 1990s, liberalization of the Indian economy, both the electricity and urban sectors were given a particular character that sought to make itself attractive to attract private investments and enroll market facilitation mechanisms. Actors with higher power and capacity became more significant, and cities became attractive sites to facilitate these ambitions in both these sectors.* • **Prioritizing cost efficiency, economies of scale, and profit maximization (over social interests) (Na)⁻** –*Applying the notion of economies of scale, as measured in the classical economic traditions, large-scale RE automatically becomes the obvious choice. This creates barriers for urban governments where decentralized forms of energy are applicable.* • **Centralized energy governance incumbency and path dependence (Na)⁻** –*The structural dominance of incumbent and higher actors, mediated through institutions, resources, knowledge, and discourses, translates into institutional, discursive, and resource-linked powers and a landscape where urban governments are deeply embedded within the political economy pursued by them.*		
Institutional—rules, norms, cultures indirectly shaping conditions of actions and identities	• **Making urban governments "non-entities" in the energy domain (Na, SuG, KoW)⁻** —*SE programmes applicable in urban arenas are governed by national ministries, state governments and parastatal bodies for "consumer-centric"ᵃ programmes. State government influenced distribution utilities being responsible for solar rooftop adoptions in cities is one example of this. The authority and significance of urban governments have been restricted to issues of municipal energy consumption and services (self-consumption) or implementing regulations notified by governments at higher levels.* • **"Directed decentralization"—top-down selective localisation of climate governance (Na, PuM, KoW)⁻** —*refers to the centralized urban reform programmes in India, which aim to improve urban conditions but do not consider contextual urban politics or involve urban actors in programme design. This continues to be reflected in urban programmes with energy sustainability components that subvert the agency or shape the authority of urban government in a particular way through short-term mandates and highly specific asks. Solar city programme or the smart city programme by the national government in India are examples of such tendencies that shaped the agency and actions of all three cities. LED lighting and Green city mission programme of West Bengal government are examples at the state level. The environmental reporting initiated by the state government of Pune city is also another example of this mechanism. However, the programme helped spur local actions on SE.* • **Setting the selective technological agenda (Na, SuG, KoW)⁻** –*Urban governments are dependent on the national and international dynamics of technological supply chains. India's aggressive pursuit of solar, and to a certain extent wind, was not reflected in the case of decentralized SE technologies, once again reducing the conditions of actions. They are also dependent to a large extent on the state government's technological agenda, as was evident in the case of Gujarat's initial reluctance on solar rooftop adoption and West Bengal's reluctance to initiate SE interventions.* • **Policy incoherence and inconsistency(Na, KoW)⁻** –*Siloed and inconsistent policy implementation, such as discontinuation of the solar city programme and withdrawal of the solar rooftop subsidies in the last decade, create impermanent channels of dependence and obscure attention from more long-term visions. This can produce disinterest.* • **Bureaucratisation of city governments (PuM)⁺/⁻** –*State governments have disempowered the political arm considerably of cities while making the executive powerful. Despite day-to-day autonomy, all three cities have witnessed strong executive leadership assigned with close networks to the state government as well as central government.* • **Centralisation through uniformisation (PuM, SuG)⁻/Control of implementation processes (SuG, PuM, KoW)⁻** —*State governments were also found to be centralizing programmes and policies that were originally under the control of urban governments to uniformise them across all cities in the state. This is often at the behest of central government policies of uniform development of Indian cities for ease of doing business. This was particularly seen in case of Pune but also was recently witnessed in case of Surat. This mechanism translates from another key mechanism of state governments exercising complete control over the implementation procedures, and regulations that then impact the capability of the urban governments to implement actions. This was seen in Gujarat, for instance, in the state government's reluctance to issue building energy conservation regulations.* • **Entrepreneurial bureaucratisation (SuG)⁺** - *The state government formally and informally sets rules and norms for their management of the urban governments more in an entrepreneurial spirit focussing on credit worthiness, market forces, and financial independence from the state. The executive is on the lookout for revenue generating activities for ensuring performance.* • **Enabling citizens' activism and institutional participation (PuM)⁺** –*Pune city authorities actively engaged with citizen and advocacy groups on particularly issues of environment and sustainability in the city. Through both coercive and cooperative means, citizens activism influenced Pune's initial and continued focus on SE issues.*		

(Continued)

TABLE 2 (Continued)

Power type	Mechanisms
	• **Convening local expertise for institutional capacity building (KoW)$^+$**–*A High-Powered Committee on RE and Climate Change (CRECC), a consultative committee of local experts housed within the KMC helped KMC in initiating experimental projects like solar 'carbon neutral' park lighting and mandating solar rooftop installations for new private and public buildings across the KMC administrative area (not followed in the state government Building Rules).*
Material—inanimate dimensions of energy systems that have influence	• **Engendering techno-material interdependencies—grid connection interdependence (Na)$^-$:** *There is a path dependence characteristic implicit in the grid infrastructure in that the large amount of capital that has been spent to build it can be recovered only when a wide base of electricity generation technologies (typically large-scale) and consumers are connected to it for the foreseeable future. The material dependence on the electricity grid of RE technologies also serves as an instance where two different types of power interact, i.e., material power influences and reinforces other institutional and structural power mechanisms exercised by other actors.* • **Generating local imperatives, opportunities, and constraints from geographical and socio-economic energy embeddedness(SuG, PuM, KoW)$^{+/-}$**–*Materialities of energy systems—the artifacts, equipment, appliances, input and output resource flows, and wastage all tend to produce effects that can either meet imperatives, offer opportunities, or create very specific constraints. Material aspects of the embodied energy system such as the high energy demand from urban water infrastructure (Surat), local weather or high building growth rates (Pune), or poor structures of old city buildings that cannot support rooftop systems (Kolkata) have directly shaped the actions that local governments were able to take in the city.* • **Conducting politics of visibility (SuG)$^+$/–**–*The visibility of these technologies was also found to be producing effects shaping the identities and conditions for local governments to act. The effect of the decentralized solar energy equipment in inducing public interest was found to be an important rationale for SMC to implement solar rooftop projects locally, ignoring building energy efficiency for the city.*
Compulsory—direct and overt expression of power	• **Informal operational command and control by state government/Imposed financial "autonomy" by the state government (SuG, PuM, KoW)$^-$**–*State governments, in addition, and on account of the institutional powers, also, exercise direct control through informal means. This was seen as a direct command and control method for managing urban matters (including energy) in Kolkata with the urban minister also appointed as the Kolkata mayor and was also witnessed in the case of Pune and Surat through informal directions of financial autonomy for the local bodies.* • **Non-devolution of energy as a governing area (SuG, PuM, KoW)$^-$**—*As state governments can determine the scope of city governments through legislative and institutional means, the non-devolution of energy as a governing subject for cities despite the urban specific applications of the new energy systems needs to be explicitly considered as an exercise of power that works by non-agenda. This was witnessed in all the three cities.* • **Executive leadership by individual officials (SuG, PuM)$^+$**—*In the absence of day-to-day control by the state government, SE actions depended on senior and mid-level executives in Surat and Pune. The motivation for the individual leaderships ranged from legacy, "something new", and financial performance.* • **Instilling technical and financial capacity through international programmes (In, SuG, PuM, KoW)$^+$**- *Through the preparation of multiple local climate studies, plans, and demonstration projects, international networks and institutions have been able to put weight behind the climate action agenda influencing the conditions of SE actions in all three cities. Other technical capacities, financial capacities through demonstration test projects were also advanced.*
Productive—power through narratives and discourses	• **Producing urban as the key site for climate action (Na and In)$^+$**–*Bolstered by new technologies, international networks of cities, and climate agreements, cities have emerged as possible sites for climate action—and by extension SE action—in India as well. More acceptability has emerged around the climate linked actions in cities by policymakers. International policy prescriptions for India have also identified that urban areas need special significance in energy transition policies.* • **Discursive production of "national" technologies (Na)$^-$**- *Climate and SE are being increasingly appropriated for catapulting India as a major climate actor but also individual political gains of the current government (Shidore and Busby, 2019). Symbolically and discursively, SE technologies are being positioned, particularly solar, as artifacts of "future modernity to both elite and mass audiences" ushering a "saffron revolution" (Shidore and Busby, 2019, p. 1184; Arabindoo, 2019, p. 2).*

Na, National; In, International; (+), aids SE actions; (-), inhibits SE actions; (+/-), both aids and inhibits SE actions.
[a]Interviewee at national scale.

control. The three state governments, while legally allowed to determine the scope and strength of city governments, exercised power primarily through executive norms and culture and institutional control. The three cities were able to initiate SE projects because of a combination of local and international factors that included material needs and opportunities as well as individual executive leadership. This clearly indicates the presence of local demand, willingness, and capabilities despite the widely established challenges of lack of mandate and capacity in city governments (see Beermann et al., 2016; Bhardwaj and Khosla, 2020; Khosla and Bhardwaj, 2018; Bhardwaj and Khosla, 2018; Sami, 2017). However, cities cannot sustain or expand these actions due to the power exercised in different forms and means by actors of higher levels. The mechanisms not only give rise to or intensify the challenges of

capacity and mandate, but they also create broader limitations for cities to act.

A key finding from the analysis of the institutional power mechanisms was also that the mechanisms reflected the intersection of both energy transition and urban governance politics in India. Centralization, particularly by state governments, has been a well-known political tactic in urban policy in India due to largely failed or incomplete decentralization efforts. This framework generates two additional insights—(1) new centralization strategies are being forged by both state and national governments which inhibit the capacity, authority and willingness of city governments to act on SE locally. Additionally, energy transition is becoming a new medium for centralization tendencies. (2) A combination of strategic,

institutional and productive power mechanisms has reduced the self-understanding of local governments in India to the role of "municipal consumers"[7], "implementers"[8], and "facilitators"[9]. Therefore, India's energy transition trajectory precludes a key democratic actor—its urban local governments. Consequently, SE governance at the urban level is being co-opted and orchestrated by powerful state actors at the higher levels.

6 Conclusion

The gap between ambitions and execution in the energy sustainability goals of city governments needs a political explanation, given the large number of powerful and incumbent actors in this space. Power and its exercise can help elucidate the politics underlying this multilevel SE governance set-up and how it shapes the decision-making at urban government levels. Power analysis, even in its most fundamental conceptualization, allows critical assessment of the conduct, means and outcome of the most powerful and the weakest, giving insight into the objectives, relationships, strategies, and effective changes in action.[10] While overt political contestations and conflict between actors with differential power dispositions lend naturally to power analysis, a broader multidimensional understanding of power also expands the scope for accounting for conflicts that are evaded or silenced by constraining conditions of actions, manufacturing consensus, excluding contending actors, creating subjects, or other such strategies. A number of these political dimensions have been discussed in the literature circumscribing urban SE governance already. I offer a unifying analytical framework for power in this paper that recognizes the complexities of the different motivations, means, and agencies involved and also aids in exploring the embedded and material nature of urban energy governance. The analytical framework in this paper, adapted from Barnett and Duvall's taxonomy of power, helps in exploring the power mechanisms, distinguished by multiple types of power that affect SE decision-making by city governments by shaping the actions taken or not taken, the conditions and rationalities for taking decisions, and the very agency and self-identity of the local government. The framework allows an expansive conception of power as the production of effects that shape the agency, subjectivities, conditions as well as actions of other actors. The framework locates the analysis beyond the kind of actions being undertaken, which has been the most common objective of enquiry in the urban climate and energy governance literature until now. The framework was applied to examine SE decision-making in three cities in India (Basu, 2022). In this paper, I present a summary of the findings as an example of applying the framework. The analysis shows that structural power mechanisms that organize the constitutive powers, as well as the relational powers, determine the decision-making hierarchy in this space. This hierarchy is influenced by the traditional control over the forces of production

and, related to this, the colonial history of the country. However, institutional power mechanisms put in place by actors with structural powers were found to significantly influence local governments' resources, authority, mandate, and even self-identity. The findings highlight the centralizing character of India's energy transition wherein an urban rescaling of energy transition occurs without the democratic values and safeguards ideally ensured by a local government.

The application of the framework to three cities in a country of the global South responds to a well-established gap in the urban energy governance and climate literature.[11] Within specifically the subset of power studies in this rubric, the framework offers a new approach to power, drawing learning from the global governance literature and the socio-technical studies literature. Barnett and Duvall's framing of power as "production of effects" helps in a more flexible and reflexive approach to analyzing power in a deeply contested setting. The adapted framework helps in understanding the actions, inactions, conditions, and subjectivities of urban governments as symptoms of stratified and yet interconnected categories of power. The framework also offers *power mechanisms* as an analytical tool to untangle this complex terrain.

Application of the framework to other cities in India can deliver policy insights for reforming the sustainable urban energy or urban climate governance landscape. For an enduring and fair SE transition in cities, the international city climate networks and climate aid agencies, in particular, could benefit from the understanding that structural reforms and institutional reforms initiated at the national government levels will be imperative before cities are engaged through *ad-hoc* support and projects. I believe the framework can also be adapted for and applied to other contested governance sites of sustainability, possibly incorporating elements of temporality that the current framework fails to incorporate.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

SB: Conceptualization, Funding acquisition, Visualization, Writing – original draft, Writing – review & editing.

Funding

---

7   City level interviews.

8   City level interviews.

9   City level interviews.

10   Dahl's (1957) classic understanding of power as A has power over B to the extent that he can get B to do something that B would not otherwise do.

---

11   Should be read with the PhD thesis (Basu, 2022).

Acknowledgments

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Abbott, K. W. (2018). "Orchestration," in *Governing Climate Change,* eds. A. Jordan, D. Huitema, H. van Asselt, and J. Forster (Cambridge: Cambridge University Press), 188–209.

Arabindoo, P. (2019). Renewable energy, sustainability paradox and the post-urban question. *Urban Stud.* 57, 2300–2320. doi: 10.1177/0042098019885080

Arts, B., and Tatenhove, J. (2004). Policy and power: a conceptual framework between the 'old' and 'new' policy idioms. *Policy Sci.* 37, 339–356. doi: 10.1007/s11077-005-0156-9

Avelino, F. (2017) Power in sustainability transitions: analysing power and (dis)empowerment in transformative change towards sustainability. *Environ. Pol. Gov.* 27, 505–520. doi: 10.1002/eet.1777

Avelino, F. (2021). Theories of power and social change. Power contestations and their implications for research on social change and innovation. *J. Polit. Power* 14, 425–448. doi: 10.1080/2158379X.2021.1875307

Avelino, F., Hielscher, S., Strumińska-Kutra, M., De Geus, T., Widdel, L., Wittmayer, J., et al. (2023). Power to, over and With: Exploring Power Dynamics in Social Innovations in Energy Transitions across Europe. *Environm. Innovat. Soc. Transit.* 48:100758.. doi: 10.1016/j.eist.2023.100758

Avelino, F., and Rotmans, J. (2009). Power in transition: an interdisciplinary framework to study power in relation to structural change. *Eur. J. Soc. Theor.* 12, 543–569. doi: 10.1177/1368431009349830

Avelino, F., and Rotmans, J. (2011). A dynamic conceptualization of power for sustainability research. *J. Clean. Prod.* 19, 796–804. doi: 10.1016/j.jclepro.2010.11.012

Avelino, F., and Wittmayer, J. M. (2015). Shifting power relations in sustainability transitions: a multi-actor perspective. *J. Environ. Policy Plann.* 18, 628–649. doi: 10.1080/1523908X.2015.1112259

Azevedo, I., Delarue, E., and Meeus, L. (2013). Mobilizing cities towards a low-carbon future: Tambourines, carrots and sticks. *Energy Policy* 61, 894–900. doi: 10.1016/j.enpol.2013.06.065

Bachrach, P., and Baratz, M. S. (1962). Two faces of power. *Am. Polit. Sci. Rev.* 56, 947–952. doi: 10.2307/1952796

Bai, X., Surveyer, A., Elmqvist, T., Gatzweiler, F. W., G.ü, Neralp, B., Parnell, S., et al. (2016). Defining and advancing a systems approach for sustainable cities. *Curr. Opini. Environm. Sustainab.* 23, 69–78. doi: 10.1016/j.cosust.2016.11.010

Baker, L., Hook, A., and Sovacool, B. K. (2021). Power struggles: governing renewable electricity in a time of technological disruption. *Geoforum* 118, 93–105. doi: 10.1016/j.geoforum.2020.12.006

Balmaceda, M., Högselius, P., Johnson, C., Pleines, H., Rogers, D., and Tynkkynen, V. P. (2019). Energy materiality: a conceptual review of multi-disciplinary approaches. *Energy Res. Soc. Sci.* 56:101220. doi: 10.1016/j.erss.2019.101220

Barnett, M., and Duvall, R. (2004). "Power in global governance," in *Power in Global Governance*, eds. M. Barnett & R. Duvall (Cambridge: Cambridge University Press).

Barnett, M., and Duvall, R. (2005). Power in international politics. *Int. Organiz. Found.* 59, 39–75. doi: 10.1017/S0020818305050010

Basu, S. (2022). *Orchestrating the Urban: Politics of Multilevel Sustainable Energy Governance in Urban India* (Thesis, PhD). University of Warwick, Coventry, England. Available at: http://webcat.warwick.ac.uk/record=b3853334 (accessed April 22, 2023).

Basu, S., Bale, C. S. E., Wehnert, T., and Topp, K. (2019). A complexity approach to defining urban energy systems. *Cities* 95, 1–13. doi: 10.1016/j.cities.2019.05.027

Becker, S., Angel, J., and Naumann, M. (2019). Energy democracy as the right to the city: urban energy struggles in Berlin and London: EPA. *Econ. Space* 52, 1093–1111. doi: 10.1177/0308518X19881164

Becker, S., Beveridge, R., and Röhring, A. (2016a). "Energy transitions and institutional change: Between structure and agency," in eds. L. Gailing and T. Moss (London: Palgrave kuzMacmillan), 21–41.

Becker, S., Moss, T., and Naumann, M. (2016b). "The importance of space: Towards a socio- material and political geography of energy transitions," in *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space* (London: Palgrave Macmillan), 93–108.

Beermann, J., Damodaran, A., Jörgensen, K., and Schreurs, M. A. (2016). Climate action in Indian cities: an emerging new research area. *J. Integrat. Environm. Sci.*13, 55–66. doi: 10.1080/1943815X.2015.1130723

Bevir, M. (1999). Foucault and critique: deploying agency against autonomy. *Polit. Theory* 27, 65–84. doi: 10.1177/0090591799027001004

Bhardwaj, A., De Lorenzo, F., and Zérah, M.-H. (2019). *New Powers: How India's Smart Cities Are Governing and Transitioning to Low-Carbon Energy*. Available at: https://cprindia.org/sites/default/files/NewPowers_WorkingPaper_28Aug.pdf

Bhardwaj, A., and Khosla, R. (2018). *Integrating Urban Development and Climate Objectives: Insights from Coimbatore*. Available at: https://www.cprindia.org/system/tdf/policy-briefs/ICEE_CoimbatorePolicyBriefJuly19(3).pdf?file=1&type=node&id=7054&force=1

Bhardwaj, A., and Khosla, R. (2020). Superimposition: how Indian city bureaucracies are responding to climate change. *Environ. Plann. E Nat. Space* 1–32. doi: 10.1177/2514848620949096

Bridge, G., Bouzarovski, S., Bradshaw, M., and Eyre, N. (2013). Geographies of energy transition: space, place and the low-carbon economy. *Energy Policy* 53, 331–340. doi: 10.1016/j.enpol.2012.10.066

Brisbois, M. C. (2019). Powershifts: A framework for assessing the growing impact of decentralized ownership of energy transitions on political decision-making. *Energy Res. Soc. Sci.* 50, 151–161. doi: 10.1016/j.erss.2018.12.003

Brisbois, M. C. (2020a). Decentralised energy, decentralised accountability? Lessons on how to govern decentralised electricity transitions from multi-level natural resource governance. *Global Trans.* 2, 16–25. doi: 10.1016/j.glt.2020.01.001

Brisbois, M. C. (2020b). Shifting political power in an era of electricity decentralization: rescaling, reorganization and battles for influence. *Environm. Innovat. Soc. Trans.* 36, 49–69. doi: 10.1016/j.eist.2020.04.007

Bues, A., and Gailing, L. (2016). "Energy transitions and power: between governmentality and depoliticization," in *Conceptualizing Germany's Energy Transition*, eds. L. Gailing, and T. Moss (London: Palgrave Pivot).

Bulkeley, H. (2010). Cities and the governing of climate change. *Annu. Rev. Environ. Resour.* 35, 229–253. doi: 10.1146/annurev-environ-072809-101747

Bulkeley, H. (2015a). *Accomplishing Climate Governance*. Cambridge: Cambridge University Press.

Bulkeley, H. (2015b). "Climate problematics," in *Accomplishing Climate Governance* (Cambridge: Cambridge University Press), 1–23.

Bulkeley, H., and Betsill, M. (2005). Rethinking sustainable cities: multilevel governance and the "urban" politics of climate change. *Env. Polit.* 14, 42–63. doi: 10.1080/0964401042000310178

Bulkeley, H., and Kern, K. (2006). Local government and the governing of climate change in Germany and the UK. *Urban Stud.* 43, 2237–2259. doi: 10.1080/00420980600936491

Burke, M. J., and Stephens, J. C. (2018). Political power and renewable energy futures: a critical review. *Energy Res. Soc. Sci.* 35, 78–93. doi: 10.1016/j.erss.2017.10.018

Cairney, P. (2019). "Power and public policy," in *Understanding Public Policy: Theories and Issues, 2nd Edn* (Palgrave Macmillan).

Castán Broto, V. (2017). Urban governance and the politics of climate change. *World Dev.* 93, 1–15. doi: 10.1016/j.worlddev.2016.12.031

Castán Broto, V., Stevens, L., Ackom, E., Tomei, J., Parikh, P., Bisaga, I., et al. (2017). A research agenda for a people-centred approach to energy access in the urbanizing global south. *Nat. Energy* 2, 776–779. doi: 10.1038/s41560-017-0007-x

Castán Broto, V., and Westman, L. K. (2020). Ten years after Copenhagen: reimagining climate change governance in urban areas. *Wiley Interdiscipl. Rev.: Clim. Change* 11:4. doi: 10.1002/wcc.643

Castán Broto, V. C., and Bulkeley, H. (2013). A survey of urban climate change experiments in 100 cities. *Global Environm. Change* 23, 92–102. doi: 10.1016/j.gloenvcha.2012.07.005

Clegg, S. (1989). *Frameworks of Power*. Thousand Oaks, CA: SAGE Publications Ltd.

Colenbrander, S., Gouldson, A., Roy, J., Kerr, N., Sarkar, S., Hall, S., et al. (2017). Can low-carbon urban development be pro-poor? The case of Kolkata, India. *Environm. Urbaniz.* 29, 139–158. doi: 10.1177/0956247816677775

Creutzig, F., Bai, X., Khosla, R., Viguie, V., and Yamagata, Y. (2020). Systematizing and upscaling urban climate change mitigation. *Environ. Res. Lett.* 15:100202. doi: 10.1088/1748-9326/abb0b2

Creutzig, F., Baiocchi, G., Bierkandt, R., Pichler, P.-P., and Seto, K. C. (2015). Global typology of urban energy use and potentials for an urbanization mitigation wedge. *PNAS* 112, 6283–6288. doi: 10.1073/pnas.1315545112

Criqui, L., and Zérah, M. H. (2015). Lost in transition? Comparing strategies of electricity companies in Delhi. *Energy Policy* 78, 179–188. doi: 10.1016/j.enpol.2014.11.007

Dahl, R. A. (1957). The concept of power. *Behav. Sci.* 2, 201–215. doi: 10.1002/bs.3830020303

de Geus, T., Avelino, F., Strumińska-Kutra, M., et al. (2023). Making sense of power through transdisciplinary sustainability research: insights from a Transformative Power Lab. *Sustain Sci* 18, 1311–1327 doi: 10.1007/s11625-023-01294-4

Debnath, R., Simoes, G. M. F., Bardhan, R., Leder, S. M., Lamberts, R., and Sunikka-Blank, M. (2020). Energy justice in slum rehabilitation housing: an empirical exploration of built environment effects on socio-cultural energy demand. *Sustainability* 12, 1–27. doi: 10.3390/su12073027

Di Gregorio, M., Fatorelli, L., Paavola, J., Locatelli, B., Pramova, E., Nurrochmat, D. R., et al. (2019). Multi-level governance and power in climate change policy networks. *Global Environm. Change* 54, 64–77. doi: 10.1016/j.gloenvcha.2018.10.003

Dowling, R., Mcguirk, P. M., and Bulkeley, H. (2014). Retrofitting cities: local governance in Sydney, Australia. *Cities* 38, 18–24. doi: 10.1016/j.cities.2013.12.004

Dowling, R., Mcguirk, P. M., and Maalsen, S. (2018). Multiscalar governance of urban energy transitions in Australia: the cases Multiscalar governance of urban energy transitions in Australia: the cases of Sydney and Melbourne of Sydney and Melbourne. *Energy Res. Soc. Sci.* 44, 260–267.

Eckersley, P. (2017). A new framework for understanding subnational policy-making and local choice. *Policy Stud.* 38, 76–90. doi: 10.1080/01442872.2016.1188910

Eckersley, P. (2018). Who shapes local climate policy? Unpicking governance arrangements in English and German cities. *Environm. Polit.* 27, 139–160. doi: 10.1080/09644016.2017.1380963

Ehnert, F., Kern, F., Borgström, S., Gorissen, L., Maschmeyer, S., and Egermann, M. (2018). Urban sustainability transitions in a context of multi-level governance: a comparison of four European states. *Environ. Innovat. Soc. Transit.* 26, 101–116. doi: 10.1016/j.eist.2017.05.002

Ekström, M., and Danermark, B. (1991). The study of power mechanisms - an interactive and generative approach to a case study of Swedish urban renewal. *Scand. Hous. Plann. Res.* 8, 153–170. doi: 10.1080/02815739108730269

Engberg, L. A. (2018). "Climate adaptation and citizens' participation in denmark: experiences from Copenhagen," in *Urban Book Series,* eds. S. Hughes, E. K. Chu, & S. G. Mason (Cham: Springer), 139–161.

Fisher, S. (2014). Exploring nascent climate policies in Indian cities: a role for policy mobilities? *Int. J. Urban Sustain. Dev.* 6, 154–173. doi: 10.1080/19463138.2014.892006

Foucault, M. (1977). *Discipline and Punish: The Birth of the Prison.* New York, NY: Random House.

Foucault, M. (1979). *Discipline and Punish: The Birth of the Prison. (Trans A. Sheridan).* New York, NY: Vintage.

Foucault, M. (1982). The subject and power why study power? the question of the subject. *Criti. Inquiry* 8, 777–795. doi: 10.1086/448181

Giddens, A. (1984). *The Constitution of Society Outline of the Theory of Structuration.* California: University of California Press.

Goldthau, A. (2014). Rethinking the governance of energy infrastructure: Scale, decentralization and polycentrism. *Energy Res. Soc. Sci.* 1, 134–140. doi: 10.1016/j.erss.2014.02.009

Gordon, D. J., and Johnson, C. A. (2017). The orchestration of global urban climate governance: conducting power in the post-Paris climate regime. *Env. Polit.* 26, 694–714. doi: 10.1080/09644016.2017.1320829

Griffin, L. (2012). Where is power in governance? Why geography matters in the theory of governance. *Polit. Stud. Rev.* 10, 208–220. doi: 10.1111/j.1478-9302.2012.00260.x

Grin, J., Rotmans, J., and Schot, J. (2010). *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change (1st ed.).* London: Routledge.

Haarstad, H. (2016). Where are urban energy transitions governed? Conceptualizing the complex governance arrangements for low-carbon mobility in Europe. *Cities* 54, 4–10. doi: 10.1016/j.cities.2015.10.013

Haugaard, M. (2012a). Rethinking the four dimensions of power: domination and empowerment. *J. Polit. Power* 5, 33–54. doi: 10.1080/2158379X.2012.660810

Haugaard, M. (2012b). Editorial: reflections upon power over, power to, power with, and the four dimensions of power. *J. Polit. Power* 5, 353–358. doi: 10.1080/2158379X.2012.735113

Haugaard, M., and Clegg, S. (2009). "Introduction: Why power is the central concept of the social sciences," in *The Sage Handbook on Power* (Thousand Oaks, CA: Sage Publications), 1–24. Available at: https://opus.lib.uts.edu.au/handle/10453/11724

Hayward, C., and Lukes, S. (2008). Nobody to shoot? Power, structure, and agency: A dialogue. *J. Power* 1, 5–20. doi: 10.1080/17540290801943364

Hearn, J. (2014). On the social evolution of power to/over. *J. Polit. Power* 7, 175–191. doi: 10.1080/2158379X.2014.927963

Hindess, B. (1996). *Discourses of Power : From Hobbes to Foucault.* Hoboken, NJ: Blackwell Publishers.

Hughes, S., Chu, E. K., and Mason, S. G. (2018). "Climate change in cities: innovations in multi-level governance," in *The Urban Book Series* (Cham: Springer).

IEA (2021a). *Empowering Cities for a Net Zero Future: Unlocking Resilient, Smart, Sustainable Urban Energy Systems.* Available at: https://iea.blob.core.windows.net/assets/4d5c939d-9c37-490b-bb53-2c0d23f2cf3d/G20EmpoweringCitiesforaNetZeroFuture.pdf (accessed April 8, 2024).

IEA (2021b). *India Energy Outlook 2021 World Energy Outlook Special Report.* Available at: www.iea.org/t&c/ (accessed April 8, 2024).

IRENA (2020). *Rise of Renewables in Cities : Energy Solutions for the Urban Future.* Available at: http://www.irena.org/publicationsrena.org/publications (accessed November 14, 2023).

Jagers, S. C., and Stripple, J. (2003). Climate governance beyond the state. *Global Govern.* 9, 385–399. doi: 10.1163/19426720-00903009

Jaglin, S. (2014). Urban energy policies and the governance of multilevel issues in Cape Town. *Urban Stud.* 51, 1394–1414. doi: 10.1177/0042098013500091

Jasper, R., Deger, S., and Kieffer, G. (2016). *Renewable Energy in Cities.* Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_Energy_in_Cities_2016.pdf (accessed December 21, 2023).

Jessop, B. (2001). "Good governance and the urban question: on managing the contradictions of neo-liberalism," in Mimeograp. (Lancaster: Department of Sociology, University of Lancaster).

Johansen, P. H., and Chandler, T. L. (2015). Mechanisms of power in participatory rural planning. *J. Rural Stud.* 40, 12–20. doi: 10.1016/j.jrurstud.2015.05.006

Johnstone, P., and Newell, P. (2018). Sustainability transitions and the state. *Environm. Innovat. Soc. Transit.* 27, 72–82. doi: 10.1016/j.eist.2017.10.006

Khosla, R. (2018). "Chapter 29: building cities," in *Urban Planet: Knowledge Towards Sustainable Cities*, eds.T. Elmqvist, X. Bai, N. Frantzeskaki, C. Griffith, D. Maddox, T. Mcpherson, S. Parnell, P. Romero-Lankao, D. Simon, and M. Watkins (Cambridge University Press), 388–390.

Khosla, R., Agarwal, A., Sircar, N., and Chatterjee, D. (2021). The what, why, and how of changing cooling energy consumption in India's urban households. *Environ. Res. Lett.* 16:044035. doi: 10.1088/1748-9326/abecbc

Khosla, R., and Bhardwaj, A. (2018). Urbanization in the time of climate change: examining the response of Indian cities. *WIREs Clim. Change* 10:e560. doi: 10.1002/wcc.560

Khosla, R., and Bhardwaj, A. (2019). "Urban India and climate change," in *India in a Warming World: Integrating Climate Change and Development,* ed. N. K. Dubash (Oxford: Oxford University Press), 459–470.

Kubli, M., and Ulli-Beer, S. (2016). Decentralisation dynamics in energy systems: a generic simulation of network effects. *Energy Res. Soc. Sci.* 13, 71–83. doi: 10.1016/j.erss.2015.12.015

Kuindersma, W., Arts, B., and Van Der Zouwen, M. W. (2012). Power faces in regional governance. *J. Politi. Power* 5, 411–429. doi: 10.1080/2158379X.2012.735116

Kuzemko, C. (2019). Re-scaling IPE: local government, sustainable energy and change. *Rev. Int. Politi. Econ.* 26, 80–103. doi: 10.1080/09692290.2018.1527239

Kuzemko, C., and Britton, J. (2020). Policy, politics and materiality across scales: a framework for understanding local government sustainable energy capacity applied in England. *Energy Res. Soc. Sci.* 62:101367. doi: 10.1016/j.erss.2019.101367

Kuzemko, C., Lockwood, M., Mitchell, C., and Hoggett, R. (2016). Governing for sustainable energy system change: Politics, contexts and contingency. *Energy Res. Soc. Sci.* 12, 96–105. doi: 10.1016/j.erss.2015.12.022

Lasswell, H. D., and Kaplan, A. (1950). *Power and Society: A Framework for Political Inquiry*. New Haven: Yale University Press.

Lee, T., and Koski, C. (2015). Multilevel governance and urban climate change mitigation. *Environm. Plann. C: Governm. Policy* 33, 1501–1517. doi: 10.1177/0263774X15614700

Lockwood, M., Kuzemko, C., Mitchell, C., and Hoggett, R. (2017). Historical institutionalism and the politics of sustainable energy transitions: a research agenda. *Polit. Space* 35, 312–333. doi: 10.1177/0263774X16660561

Lukes, S. (1974). *Power: A Radical View, 1st Edn*. Macmillan.

Lukes, S. (2005). *Power: A Radical view, 2nd Edn*. Macmillan Education.

Luque-Ayala, A., Bulkeley, H., and Marvin, S. (2018). "Rethinking urban transitions: an analytical framework," in *Rethinking Urban Transitions: Politics in the Low Carbon City*, eds. S. Andrés Luque-Ayala, H. Marvin, & H. Bulkeley (London: Routledge), 1–275. doi: 10.4324/9781315164779

Luque-Ayala, A., and Silver, J. (2018). "Introduction," in *Energy, Power and Protest on the Urban Grid*, eds. A. Luque-Ayala and J. Silver (London: Routledge), 1–17.

Mann, M. (1993). *The Sources of Social Power, Vol II: The Rise of Classes and Nation-States, 1760-1914*. Cambridge University Press, 830.

Marquardt, J. (2016). *How Power Shapes Energy Transitions in Southeast Asia*. Routledge.

Marquardt, J. (2017). Conceptualizing power in multi-level climate governance. *J. Clean. Prod.* 154, 167–175. doi: 10.1016/j.jclepro.2017.03.176

McEwan, C. (2017). Spatial processes and politics of renewable energy transition: land, zones and frictions in South Africa. *Polit. Geogr.* 56, 1–12. doi: 10.1016/j.polgeo.2016.10.001

Minh, T., Nguyen, P., Davidson, K., and Coenen, L. (2020). Understanding how city networks are leveraging climate action: experimentation through C40. *Urban Transf.* 2:12. doi: 10.1186/s42854-020-00017-7

Mohan, A., and Topp, K. (2018). India's energy future: contested narratives of change. *Energy Res. Soc. Sci.* 44, 75–82. doi: 10.1016/j.erss.2018.04.040

Morriss, P. (2002). Power: a philosophical analysis, 2nd edition. *Contemp. Politi. Theory* 2, 355–357. doi: 10.1057/palgrave.cpt.9300080

Moss, T., Becker, S., and Gailing, L. (2016). "Energy transitions and materiality: between dispositives, assemblages and metabolisms," in *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space*, eds. L. Gailing & T. Moss (London: Palgrave Macmillan).

Nederhand, J., Bekkers, V., and Voorberg, W. (2016). Self-organization and the role of government: how and why does self-organization evolve in the shadow of hierarchy? *Public Manage. Rev.* 18, 1063–1084. doi: 10.1080/14719037.2015.1066417

Newell, P., and Phillips, J. (2016). Neoliberal energy transitions in the South: Kenyan experiences. *Geoforum* 74, 39–48. doi: 10.1016/j.geoforum.2016.05.009

Oates, W. (1972). *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.

Pasquini, L., and Shearing, C. (2014). Municipalities, politics, and climate change: an example of the process of institutionalizing an environmental agenda within local government. *J. Environm. Dev.* 23, 271–296. doi: 10.1177/1070496514525406

Patterson, J. J., and Van Der Grijp, N. (2020). "Empowerment and disempowerment of urban climate governance initiatives an exploratory typology of mechanisms," in *Urban Climate Politics*, eds. J. van der Heijden, H. Bulkeley, and C. Certomà (Cambridge University Press).

Ramamurthy, A., and Devadas, M. D. (2013). Smart sustainable cities : an integrated planning approach towards sustainable urban energy. *Int. J. Soc. Behav. Educ. Econ. Busin.Indust. Eng.* 7, 252–272. doi: 10.5281/zenodo.1075100

Rambelli, G., Donat, L., Ahamer, G., and Radunsky, K. (2017). An overview of regions and cities with-in the global climate change process -a perspective for the future. doi: 10.2863/771632

Rhodes, R. A. W. (1986). "Control and power in central-local government relations (1st ed.)," in *Gower*. Available at:~https://eprints.soton.ac.uk/336572/ (accessed April 5, 2024).

Rutherford, J. (2018). "Seeking effective infrastructures of decarbonization in Paris," in *Rethinking Urban Transitions*, eds. A. Luque-Ayala, S. Marvin, and H. Bulkeley (London: Routledge), 38–54.

Rutherford, J., and Coutard, O. (2014). Urban energy transitions: places, processes and politics of socio-technical change. *Urban Stud.* 51, 1353–1377. doi: 10.1177/0042098013500090

Rutherford, J., and Jaglin, S. (2015). Introduction to the special issue – urban energy governance_ local actions, capacities and politics. *Energy Policy* 78, 173–178. doi: 10.1016/j.enpol.2014.11.033

Sami, N. (2017). "Multi-level climate change planning," in *Local Action on Climate Change - Opportunities and Constraints*, eds. S. Moloney, H. Fünfgeld, and Mikael Granberg (London: Routledge), 92–110.

Sareen, S. (2020). "Reframing energy transitions as resolving accountability crises," in *Enabling Sustainable Energy Transitions Practices of Legitimation and Accountable Governance*, ed. S. Sareen (Springer), 3–11. doi: 10.1007/978-3-030-26891-6

Sehested, K. (2009). Urban planners as network managers and metagovernors. *Plann. Theor. Pract.* 10, 245–263. doi: 10.1080/14649350902884516

Sethi, M. (2018). "Co-benefits of energy sector," in *Exploring Urban Change in South Asia Mainstreaming Climate Co- Benefits in Indian Cities* (Singapore: Springer), 123–144. doi: 10.1007/978-981-10-5816-5

Sethi, M., Lamb, W., Minx, J., and Creutzig, F. (2020). Climate change mitigation in cities: A systematic scoping of case studies. *Environ. Res. Lett.* 15:093008. doi: 10.1088/1748-9326/ab99ff

Shidore, S., and Busby, J. W. (2019). What explains India's embrace of solar? State-led energy transition in a developmental polity. *Energy Policy* 129, 1179–1189. doi: 10.1016/j.enpol.2019.02.032

Sil, R., and Katzenstein, P. J. (2010). Analytic eclecticism in the study of world politics: reconfiguring problems and mechanisms across research traditions. *Persp. Polit.* 8, 411–431. doi: 10.1017/S1537592710001179

Sovacool, B. K., and Brisbois, M. C. (2019). Elite power in low-carbon transitions: A critical and interdisciplinary review. *Energy Res. Soc. Sci.* 57, 1–10. doi: 10.1016/j.erss.2019.101242

Sovacool, B. K., Hess, D. J., Amir, S., Geels, F. W., Hirsh, R., Rodriguez Medina, L., et al. (2020). Sociotechnical agendas: reviewing future directions for energy and climate research. *Energy Res. Soc. Sci.* 70:101617. doi: 10.1016/j.erss.2020.101617

Stirling, A. (2009). *Direction, Distribution and Diversity! Pluralising Progress in Innovation, Sustainability and Development (No. 32; STEPS Working Paper)*. Available at: www.steps-centre.org (accessed April 20, 2024).

Stirling, A. (2014). Transforming power: Social science and the politics of energy choices. *Energy Res. Soc. Sci.* 1, 83–95. doi: 10.1016/j.erss.2014.02.001

Stirling, A. (2019). How deep is incumbency? A 'configuring fields' approach to redistributing and reorienting power in socio-material change. *Energy Res. Soc. Sci.* 58:101239. doi: 10.1016/j.erss.2019.101239

Stripple, J., and Bulkeley, H. (2019). Towards a material politics of socio-technical transitions: Navigating decarbonisation pathways in Malmö. *Polit. Geogr.* 72, 52–63. doi: 10.1016/j.polgeo.2019.04.001

UN (2021). *Enabling SDGs Through Inclusive, Just Energy Transitions*. Available at: https://www.un.org/en/conferences/energy2021/about (accessed April 4, 2024).

Van der Heijden, J. (2019). Studying urban climate governance: Where to begin, what to look for, and how to make a meaningful contribution to scholarship and practice. *Earth Syst. Govern.* 1:100005. doi: 10.1016/j.esg.2019.100005

Voß, J.-P., Newig, J., Kastens, B., Monstadt, J., and Nölting, B. (2010). Steering for sustainable development: a typology of problems and strategies with respect to ambivalence, uncertainty and distributed power. *J. Environm. Policy Plann.* 9, 193–212. doi: 10.1080/15239080701622881

Webb, J., Hawkey, D., and Tingey, M. (2016). Governing cities for sustainable energy: The UK case. *Cities* 54, 28–35. doi: 10.1016/j.cities.2015.10.014

Westman, L. K., Castán Broto, V., and Huang, P. (2019). Revisiting multi-level governance theory: Politics and innovation in the urban climate transition in Rizhao, China. *Political Geogr.* 70, 14–23. doi: 10.1016/j.polgeo.2019.01.002

Whitehead, M. (2003). "In the shadow of hierarchy": meta-governance, policy reform, and urban regeneration in the West Midlands. *Area* 35, 6–14. doi: 10.1111/1475-4762.00105

Wolf, S. (2020). "Accountability and the regulation of legitimacy: biodiversity conservation and energy extraction in the American West," in *Enabling Sustainable Energy Transitions: Practices of Legitimation and Accountable Governance* (Springer), 89–102.

Zunino, H. M. (2006). Power relations in urban decision-making: neo-liberalism, "techno-politicians" and authoritarian redevelopment in Santiago, Chile. *Urban Studies* 43, 1825–1846. doi: 10.1080/00420980600838184