A Thesis Submitted for the Degree of PhD at the University of Warwick

Permanent WRAP URL:

http://wrap.warwick.ac.uk/170993

Orchestrating the urban:
politics of multilevel sustainable energy governance in urban India

by

Sumedha Basu

Thesis submitted for the degree of

Doctor of Philosophy in Politics & International Studies

University of Warwick

January 2022

Table of contents

List of tables and figures

5

Acknowledgements

The covid pandemic struck in the middle of writing this thesis. Large parts of this thesis were written away from my partner, family, and friends during one of the worst phases of the pandemic. I start this acknowledgement with immense gratitude for the good health of my immediate family members and friends and for keeping in thought those who passed.

If it takes a village to raise a child, it took an army of people to make this thesis possible. My supervisors, Prof Caroline Kuzemko and Prof Edward Page have to be on top of that list. Getting back to academia after ten years of professional life, literally and figuratively very far from your comfort zone, was daunting. But standing at the rather uncharacteristically empty Coventry station, when I saw a white electric car drive in with a lady wearing the brightest smile and later who gave me the warmest hug, I knew I was home, albeit a second one. Since then, Prof Kuzemko has been the most competent guide, a mentor, and a friend when I was going through my worst, often switching roles seamlessly, even during a single meeting. Prof Kuzemko struck the perfect balance between handholding, giving me the space to develop my own ideas and critiquing my work. She also understood my weaknesses and the challenges the pandemic brought and worked around them to support me in every which way. I will always be grateful to her for everything and will try to borrow a lot of her qualities when I get the opportunity to mentor someone else in my professional or personal life.

Prof Page opened a completely different world for me. I will treasure the long meetings he allowed where I could bounce off some of the weirdest ideas about the project without apprehension. These interactions were one of the most fulfilling experiences for me in this journey. He was always there to listen, challenge, and give that little extra push whenever I slowed down. As a supervisor, he knew when he had to step in or step back and precisely offer the support I needed at that point. Immense patience and sincerity are some things that I will take away from him as life lessons. I will always be indebted to both of them.

This thesis would be incomplete if I did not thank Prof Mukul Sharma, who first sowed the seeds of academia and an inevitable PhD in my head. Since then, he has stood steadfastly with me throughout this journey as a guide, philosopher, no-you-can't-quit-at-this-stage voice in my head. Despite his busy schedule, he took the time to read multiple drafts of this thesis, even when I finished writing in the middle of the night. He has been a father figure in my first

steps into academia, but he has been an even better friend and a cheerleader that every PhD student needs. I dedicate this thesis to him.

Thanking my partner would be simply inadequate as 'thank you' cannot convey what he has done for me in the last four but particularly in the last two years. I could stay in the UK during the lockdown with two sets of ageing parents in the middle of a deadly pandemic in India because I knew he was there. He never once questioned my decision to quit a stable job and join a PhD away from him. He took complete charge of me, my family, and our home whenever I needed him. But most of all, I will forever be thankful to him for bearing with my obnoxious mood swings whenever I was late on a deadline or in a crunch.

I also have to mention my family, who never quite understood my research or why I decided to take the plunge but decided to give me the space to make my own decisions. It feels good that they are finally at peace that I submitted, and I can now engage with them like before.

I am grateful to my friends and colleagues at the University, who made me feel welcome and wanted in an unknown place. I do not take for granted the kindness of my office mates-turned-friends Elmira, Wai Hong, and Kai li, without whom I would have spent most of my first year like a headless chicken; Clementina, for letting me into her world and making me feel part of a family and home; my PhD cohort who were so very friendly and fun, and especially the few who continued to keep in touch. A special mention to Théo, who calmed my nerves during the submission by sharing his experiences with me. I also want to thank my friends in my shared accommodation, who always tolerated my endless chai-making sessions in the kitchen and fed me whenever I was on a deadline. They made my journey fun and enjoyable.

I also take this opportunity to thank the academic and the administrative staff at PAIS, who extended help and support whenever I needed it. They were prompt in their emails and helped me settle down in my first year. It is for them that, even in remote working conditions, most of the administrative process was smooth and efficient.

Lastly, I want to appreciate and thank all the interviewees and participants in my study who decided to help out an absolute stranger - their extended time, willingness to share information, going out of their way to get some documents, their hospitality for visiting their city for the first time, and checking on my progress when I went back. Their kindness makes this thesis possible. It is a pity that I cannot name all the people who helped me in this journey. For their kindness and generosity, I will forever be grateful.

Declaration

I, Sumedha Basu, confirm that the work presented in this thesis is my own and has not been submitted for examination for a degree at another university. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

Urban governments are emerging as 'strategic sites' for responding to global calls for sustainable energy transitions - not just in decentralised ways but also in more democratic ways. However, beyond ambitions, actual actions by urban governments have been underwhelming, including in India. In India, there is an emerging interest in understanding cities' responses to climate change, including sustainable energy. However, the multilevel politics of urban and energy governance has been less critically explored.

Responding to these under-explored avenues, this thesis explores the politics of sustainable energy governance in urban India as manifested in the power operationalisation within multilevel governing structures to shape the responses of urban governments. I adapt Barnett and Duvall's multidimensional power conceptualisation and taxonomy to develop a framework for power analysis in the three cities of Surat, Pune, and Kolkata. The thesis bases its analytical framework on a processual notion of power, defined as the 'production of effects' to understand the ways different types of power are operationalised concurrently to orchestrate the actions of other actors in a multilevel governance system. The analysis is presented as a complex web of power mechanisms identified inductively in each of the case studies that are then generalised to unpack the larger politics of urban sustainable energy governance and understand the diversity of responses between different Indian cities.

The study finds that evolving and path-dependent structures underlying India's energy transition trajectory are privileging higher-level actors with more control over institutional and discursive realms. These actors utilise this control to centralise more power and relegate urban governments as non-entities or energy consumers. However, the study also highlights the mechanisms that can be cautiously considered to be green shoots and can potentially challenge this elite policy capture to some extent.

Glossary of terms

ADB – Asian Development Bank

BEE – Bureau of Energy Efficiency

CAA – Constitutional Amendment Act

CESC – Calcutta Electricity Supply Company

DISCOM – Distribution Companies

ECBC – Energy Conservation Building Code EE – Energy Efficiency

EESL – Energy Efficiency Services Limited

ESCO – Energy Service Company

GCM – Green City Mission

GEDA – Gujarat Energy Development

GUVNL – Gujarat Urja Vidyut Nigam Limited

IAS – Indian Administrative Service

IPCC – Intergovernmental Panel for Climate Change

KEIIP – Kolkata Environmental Improvement Investment Program

KMC – Kolkata Municipal Corporation

LED – Light Emitting Diode

MDB – Multilateral Development Banks

MEDA – Maharashtra Energy Development Agency

MNRE – Ministry of New and Renewable Energy

MLG – Multilevel Governance

MOEFCC – Ministry of Environment Forest and Climate Change

MoP – Ministry of Power

MoHUA – Ministry of Housing and Urban Affairs (formerly MoUD)

MoUD – Ministry of Urban Development

MSEDCL – Maharashtra State Electricity Distribution Company Limited

NMEEE – National Mission for Enhanced Energy Efficiency

NRDC – Natural Resources Defense Council

NRI - Non Resident Indians

PACE-D - Partnership to Advance Clean Energy – Deployment

PCEF - Pune Citizen's Environmental Forum

PMC – Pune Municipal Corporation

RE – Renewable Energy

RESCO – Renewable Energy Service Company

SCM – Smart City Mission

SE – Sustainable Energy

SEB – State Electricity Board

SMC – Surat Municipal Corporation

UNDP – United Nations Development Programme

USAID – U.S. Agency for International Development

WB – World Bank

WeB – West Bengal

WBEDCL – West Bengal Electricity Distribution Company Limited

WBREDA – West Bengal Renewable Energy Development Authority

Chapter 1: Introduction

'We can't solve problems by using the same kind of thinking we used when we created them'.

Albert Einstein

'Power is necessary for transformation, but this may be subverted if power itself is not transformed'.

Andy Stirling (2014)

1.1. Introduction

A complete transition to sustainable energy systems to address climate change demands a society-wide transformation (IRENA, 2021; Kuzemko et al., 2016). Calls for wider energy sustainability and social justice that include universal energy access, resilience and security, and mitigating externalities, such as air pollution, water scarcity, and environmental degradation, further strengthen this demand. Evidently, governance of a complex socio-technical policy domain such as sustainable energy transitions is predicated upon the inclusive participation of multiple actors, geographies, and scales (Goldthau, 2014).

Urban areas that have been both at the contributing end (high energy demand), as well as the receiving end of energy challenges (air pollution, urban heating, energy poverty), are emerging as important sites for sustainable energy transitions (Bulkeley, 2010; Bulkeley & Castán Broto, 2013; IEA, 2021a; Jaglin, 2014; Jasper et al., 2016).[1] Several urban governments across geographies are setting goals for sustainable energy deployment, facilitated by the increasing availability and affordability of decentralised small-scale technologies and non-state actor networks (IRENA, 2020). Such plurality challenges the 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). Politics in the governance of urban

---

[1] Sustainable energy technologies in urban areas include RE (solar rooftop PV, solar water heaters, small wind) and EE (efficient appliances, smart meters, building EE, urban greening technologies) and practices (energy conservation practices, time of day usage, taking control of energy consumption and production) – in direct and embedded energy usage. Waste and electric vehicles (EV) have not been included in this as the technology linked to waste to energy are linked to other environmental issues given the low segregation rates in India. EV policy domain is just evolving and may have been too premature for inclusion in this study.

sustainable energy transitions is reflected in the power play between these old and new energy actors, who prevail/(s), and finally, how is that prevalence produced and effectuated. This is premised on the explicit understanding that sustainable energy transitions are necessarily a political project – established through commands and regulations as well as through orchestrating consensus, persuasion, and acquiescence – to deliver not just a particular type of energy system configuration but also a particular type of urban (Haarstad, 2016; Rutherford & Jaglin, 2015). Therefore, any claim that a particular type of transition is inevitable, incontestable, or absolute needs to be questioned (Stirling, 2014). Paying attention to if and how sustainable energy transition unfolds in these new arenas, like urban in this study, will deliver critical insights into its nature and politics. However, this inexorably renders a growing phenomenon such as urban sustainable energy 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 & Jaglin, 2015).

This thesis aims to understand the politics of urban sustainable energy governance as reflected in the responses of urban local governments in India. In doing so, it recognises the authority and democratic legitimacy of urban governments to lead this transition at the urban scale while placing them within the complex, contested, interconnected, and interdependent governing arena described above. India's sustainable energy transition is one of the most closely observed transitions, given India's status as one of the largest coal-dependent developing economies and the fourth-highest carbon emitter. India's high-pitched energy transition plans and targets have so far eluded the urban scale. On the other hand, despite their global recognition as climate actors and support from national programmes and transnational city networks, urban governments' actions in sustainable energy have been largely muted in India. Taking actions and inactions, both as responses and part of urban sustainable energy governance, I analyse the politics by exploring the underlying processes that engender and shape these responses.

Given the limited literature in the area of urban sustainable energy governance in India, this study draws from and contributes to the emerging scholarship of urban climate governance, where understanding of cities' sustainable energy actions is mainly limited to their lack of mandate and capacity. A more comprehensive and layered understanding of this issue is offered by exploring political power and its operationalisation within the complex multilevel

governing setup of the energy and urban domains. Setting out an analytical framework informed by the relational conceptualisation of power in governance and socio-technical transitions literature, I unpack how urban sustainable energy responses of three urban governments (Surat, Pune, and Kolkata) in India are being affected and shaped by multidimensional power mechanisms. I generalise the findings from the three cities to develop insights for the broader urban sustainable energy governance in India and reflect on the political undertones of India's sustainable energy transition.

1.2.   Study rationale and importance

1.2.1. Linking urban energy, climate change, and social welfare

It has been three decades since the publication of the Brundtland report in 1987 that identified cities as the centre of the sustainable development agenda in view of the rapid urbanisation anticipated globally (Betsill & Bulkeley, 2006). Today, cities account for two-thirds of the world's energy and emit 70% of carbon emissions while accommodating just 55% of the global population (REN21, 2019). More recently, in 2021, the Intergovernmental Panel on Climate Change (IPCC) issued stark warnings on the impacts of climate change in cities where climate-linked disasters will be intensified because of unplanned built environment development and unprecedented increases in population in urban areas (IPCC, 2021). The latest IPCC sixth assessment report estimates that urban areas may triple between 2015 and 2050, which will have significant implications for how urban governance can avoid long term carbon lock-in (IPCC, 2022). The UNFCCC Paris Agreement helped cement the significance of cities and city governments as climate actors in formal global climate change governance circles (Khosla & Bhardwaj, 2018). Two-thirds of the Agreement's signatories have submitted NDCs that have linked urban energy to climate change mitigation and adaptation goals (REN21, 2019). Sustainable Development Goals (SDGs) (2015) and the New Urban Agenda (2016), negotiated around the same time, highlighted the interlinkages of cities' climate and energy actions with development and welfare objectives such as energy access, air pollution, urban heating and other vulnerabilities, and standards of living. Therefore, the global sustainable energy transition efforts have clearly identified urban areas as one of the critical pillars for their success.

From the perspective of governing this transition and realising broader social welfare, the idea of sustainable energy action in cities has widened from being considered just 'critical' to

also being 'strategic'. Because of their spatial as well as compact socio-economic characteristics, cities are increasingly being viewed as sites of opportunity where experimentation and policy innovation can be fostered, given the concentrated local financial and knowledge capacities (Bulkeley & Castán Broto, 2013; Evans & Karvonen, 2011). This view has been further bolstered by the increasing affordability of the decentralised sustainable energy technologies that find relevance in their application in urban areas. Citizens are increasingly expected and incentivised to participate in energy transition through localised energy generation or conservation. Consequently, urban sustainable energy technologies and strategies are also framed as potential ingresses for a systemic transformation in order to achieve multiple objectives of climate mitigation and adaptation, integrated infrastructure, and social welfare interventions (Kuzemko, 2019; Rutherford & Coutard, 2014; Sareen & Rommetveit, 2019).

The urban scale as a discreet yet interconnected scale for governing sustainable energy transitions deserves this special attention not only because of its multifaceted relevance in the global climate response but also for the politics it can potentially engender. With the increasing participation of urban citizens, their size and direct relationships with citizens make cities nimbler than the behemoth of national governments or multilateral bodies (Van der Heijden, 2019). These same advantages also allow contextualisation and bottom-up approaches to socio-technical system transitions, accounting for local material realities, socio-economic landscape, and welfare and equity needs (Schreurs, 2008).

The last point is particularly important for the global south, marked by both intra-urban and inter-urban heterogeneity, in contrast to the global north influenced prescriptions of a 'modern infrastructure ideal' (Graham, 2002:108; Koepke et al., 2021; Lawhon et al., 2018). Here, cities embody the paradox of the highest human progress and development and social inequalities, inaccessibility and environmental decay at the same time. In India, for instance, cities are of distinct importance, as they experience not only rapid rural-urban migration but also infrastructure deficits, environmental degradation, inequality, and informality (Debnath et al., 2020; Puppim de Oliveira & Doll, 2016; Sethi, 2018). The International Energy Agency (IEA) estimates that most of the built infrastructure required for India's impending urbanisation by 2040 is yet to be built (IEA, 2021c). 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).[2] 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). Scholars have called for greater attention to energy linked inequities or developmental avenues that have energy justice implications within urban areas of the global south in general. Evidently then, a just and fair urban energy transition will have to necessarily consider these welfare implications championed typically by local political actors and institutions, along with climate mitigation and national security concerns. Broto et al. (2022), for instance, argue, 'there is great hope embedded in the idea that cities can look at climate policy from their citizens' practical perspectives and align climate objectives with locally relevant co-benefits.'

Thus, while the transition of energy systems, traditionally under the control of large national and international players, are being designed to advance global climate efforts, their interlinkages, spillover effects, externalities, tradeoffs, and opportunities at the urban scale cannot be ignored, as they had been in the past. Implementing systemic energy transformations in this scalar context then additionally demands a normative dimension to the evolving understanding of governing urban energy transitions in order to ensure a just, equitable, and inclusive approach. In other words, not only should the urban scale be a distinct component of sustainable energy transitions that is currently underway globally, but the above discussions also support the argument that the urban governments should serve as the locus for governing these energy transitions while taking along the other state and non-state actors.

1.2.2. Cities as climate actors - strategic or rhetoric?

In addition to academic analysis, the significance of urban RE generation and energy management through planning and efficient technologies to mainstream energy policy is evident from the increasing number of international policy reports that invoke their significance (IEA, 2021b; Jasper et al., 2016; REN21, 2021). Although increasingly contested, urban governments have been the main entry point for assessing climate or sustainable energy action on the ground. Despite the ambitious targets announced by urban

---

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

governments, the performance of urban governments in the adoption and scaling up of sustainable energy has been underwhelming (Brooks, 2017; Bulkeley, 2010; Castán Broto & Westman, 2020; Van der Heijden, 2019). This realisation has prompted a more recent trend in urban climate governance studies to view urban pragmatically within the national and international context of sectoral politics (Castán Broto & Westman, 2020). Van der Heijden (2019:6) posits, 'it is essential to remain critical of the gap between policy rhetoric and action on the ground, to open our research lenses to understudied areas in urban climate governance.'

The Indian landscape on sustainable energy actions at the urban scale has been no different. 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 and energy efficiency adoption at the urban scale through umbrella programmes. Regardless, cities have not been able to establish themselves as relevant actors within the sustainable energy transition that is currently underway in India (Bhardwaj et al., 2019). While some urban governments did launch ambitious plans, targets, and programmes, they have been realised only partially or not at all. As such, the complex multilevel landscape of urban sustainable energy governance in India requires further research within the context of evolving global and national environmental imperatives and the critical role of cities.

1.2.3. Urban sustainable energy governance in India

As can be seen in more detail in Chapter 3, India's sustainable energy landscape is transitioning. The national energy sector in India has been historically organised around the political economy of conventional energy-based sources, with coal comprising 70% of the current electricity capacity (D'Souza, 2019).[3] The embeddedness of the sector has been characterised as including a 'historically entrenched set of institutional forms, such as distribution companies, which also have considerable inertia' (Dubash et al., 2019:2). India's aggressive national RE targets and international clean energy grandstanding are the linchpin of its climate policy; its achievement is also significant for the global climate response (Pillai & Dubash, 2021b). Despite India's timely progress towards RE targets (MNRE & Government of India, 2021), critical scholars have characterised the trajectory as top-down, techno-

---

[3] It is also the source of 65% of its carbon dioxide emissions (Roy & Schaffartzik, 2021:2).

centric, and 'hyped' (Arabindoo, 2019; Roy & Schaffartzik, 2021). Further, whether this can be called an energy system transition can be debatable and may be premature, as coal remains the mainstay of India's energy plans with the second-largest coal pipeline in the world (Montrone et al., 2021). It is broadly within this paradox that sustainable energy governance at the urban scale is situated.

Academic as well as policy inquiry into the understanding of the muted sustainable energy actions of Indian cities has occurred largely within the rubric of urban climate governance (Bhardwaj & Khosla, 2017; Khosla & Bhardwaj, 2019; Sami, 2017; WWF, 2020). Building their insights primarily from climate and urban politics in India, the analyses have considered their lack of mandate and capacity to be the primary constraining factors for city sustainable energy governance. Interestingly, recent academic studies also show that some city governments have been planning and implementing sustainable energy actions locally, despite these constraints. The scale and the nature of these actions vary widely between cities (Bhardwaj & Khosla, 2017; Bhardwaj et al., 2019; Bhardwaj & Khosla, 2018; Khosla & Bhardwaj, 2018). Focusing on the actions and proposed plans, these studies bring important insights into the nature of city governments' actions. Key insights include 1) cities are framing local developmental issues as climate change actions ('Superimposition' (Bhardwaj & Khosla, 2020)); 2) project-based or short-term approaches; 3) an increasing interest (as reflected in plans) in local, sustainable energy production and distribution grids in urban areas, particularly through the use of solar energy; 4) most proposed or implemented actions are to manage municipal expenses and electricity costs rather than city-wide energy management (ibid.).

While the attempt here is not to present an over-optimistic notion of sustainable energy actions in Indian cities, it merits further study into the factors and actors that produce and shape these responses. Further, the varied responses by the cities – not just why some cities are taking actions, and some are not, but also the diversity of responses between the cities taking action – are striking. This problematises the generalised notions of lack of capacity and mandate as the key explanatory variables wherein the political context is taken to be static and these variables as a given. Further, this foregoes a critical view of the origin of these variables, limiting the scope of analyses and confining these variables largely to the local level. When capacity and mandate are not taken as mere extant conditions but are problematised as expressions of deeper fractures within the sector's multilevel structures, the analysis can

shift our gaze towards more complex stratified explanations. These variables are then not taken to be explanations themselves but as necessary conditions generated to elicit a certain kind of response. In this view, governance can be a generative, relational, and power-laden process for producing particular conditions rather than just a reactionary process to pre-existing or set conditions. The responses of urban local governments, then, can include both actions and inactions based on the conditions produced for them. Therefore, questions of chronic incapacity or lack of mandate become as important as questions of the mechanisms and actors that produce and sustain (and also benefit from) such conditions. By linking the two, it will be possible to take into account the dynamic, overlapping, and conflict-ridden nature of India's multilevel energy transition governance; also to situate urban sustainable energy governance into the broader politics of energy transition.

Having outlined the policy, political, and normative need for a more nuanced understanding of sustainable energy governance at the urban scale in India, I turn to introduce some of the emerging political debates in the multidisciplinary literature streams that underpin the approach taken in this study.

1.3.   Debates that define the approach to this study

1.3.1. Multilevel governance of urban energy: co-operation or contestation?

As I discussed earlier, with the emergence of large multilateral bodies and a turn to 'pragmatism' in urban climate studies, there is a wide consensus that studies of urban governance will be incomplete when limited to one scale (Castán Broto & Westman, 2020:2). Urban areas instead are open governing areas that are highly interconnected and interdependent on multiple levels of governance, spanning international and domestic state bodies to local and national non-state actor networks (Kuzemko, 2019). Haarstaad (2016) argues that local material and infrastructural processes also need to be taken into account.

While coordination across these levels can be viewed almost as a normative exercise for delivering timely and cost-efficient energy transition, a recent analytical turn in the area of urban climate governance demands a more critical lens to look at mechanisms of purposive steering, i.e. 'who, why, and with what consequences urban governance is accomplished' (Castán Broto, 2017:8; IEA, 2021a; Jasper et al., 2016). Understanding governance, particularly in multilevel arrangements, as a political process to gain control over the practices

of other actors and institutions has been explored in the form of concepts such as meta governance, governmentality, and orchestration (Betsill & Bulkeley, 2006; Gordon & Johnson, 2017; Kokx & Van Kempen, 2010). Assimilating these critical views in climate governance, Bulkeley (2015) offered an alternative definition of governance as the 'orchestration of distinct modes of power' (Bulkeley, 2015a:3; Castán Broto, 2017). Governance within a multilevel governing arena then becomes necessarily convoluted with wide-ranging power orchestration by multiple actors and elements of the socio-technical configuration. This thesis embraces the inherent complexity of power within a multilevel governing area and tries to highlight the multivarious, wide-ranging power orchestration instead of opting for a more simplified approach.

Despite its significance in multilevel governing arrangements, explorations of power and its mediation amongst multiple actors and networks are only evolving within the urban climate and energy multilevel governance literature (Castán Broto, 2017; Jaglin, 2014; Van der Heijden, 2019). Existing power conceptualisations have focused on considering power in relatively straightforward terms, i.e. as the capacity of actors. Additionally, the literature collectively voices the need for more evidence from the global south context, where power imbalances are more pronounced (Van der Heijden, 2019).

1.3.2. Politics of sustainable energy systems transitions

Scholars studying the politics of socio-technical systems, such as energy systems, contend that systemic transitions necessitate a relational and dynamic study of political power (Sovacool et al., 2020). As energy systems across geographies and scales transition and multitudes of actors emerge, orchestration of different types of power will be exercised where specific configurations of actors, technologies, and economics will be preferred to deliver a particular type of transition, sometimes at the cost of others (Brisbois, 2020b; Siddharth, 2020; Stirling, 2014). Critical scholars have further called for considering the past rescaling and reterritorialising of energy systems as outrightly political projects (Bridge et al., 2013; Kuzemko, 2019) - from 'islands of power' that cities once were owned and managed by local municipal bodies to centralised grids that automatically extended controlling powers to national or more powerful actors. Therefore, the new phase of energy transition should be seen in this light, where entrenched centralised centres of production are being challenged by decentralised systems of energy and emerging possibilities of new societal configurations

(Baker et al., 2021; Brisbois, 2019). Kuzemko et al. (2016:98) further argue that this phase is also distinct in the 'purposive' nature of its governance compared to earlier phases.[4] Therefore, the broader political context, including power struggles between the involved actors and institutions, shapes final outcomes.

This line of thinking also makes it imperative to conceptualise the role and behaviour of the state, a collective of disparate but connected elements, explicitly as the main structurally authorised force behind the 'purposive' transition. Bulkeley (2015:9), quoting Jessop (2002) and McGuirk (2004), visualises the state as a system of 'strategic selectivity' facilitated through an 'institutional ensemble' working towards the 'conduct of conduct' of less powerful actors. The source of this 'strategic selectivity', and hence governance techniques, can be traced to underlying social, political, and economic (historical and contemporary) frameworks (Johnstone and Newell, 2018).

The above discussions highlight some important points that underscore the broader relevance and approach of this study. Firstly, cities, sustainable energy, climate change, and social welfare are critically interlinked. Secondly, politics involving urban sustainable energy governance need to be considered in a bigger multilevel context where attention needs to span across the processes of collaboration, contestation, and capture. Thirdly, given the highly unequal power distribution amongst the actors and institutions in a transitioning socio-technical arena, the illumination of power in its myriad forms and ways in which it shapes the responses at the urban scale will be critical to understanding the politics of any arena. Lastly, the emphasis on national context and contingencies implicates the role of the state. Recent thinking around this problematises the notion of the state as a neutral and unitary body (Castán Broto & Westman, 2020; Johnstone & Newell, 2018a). It acknowledges that the state can be fragmented, multilevel, and embody competing visions and interests. This opens space for strategies of steering or orchestration of sub-state actors and elements by powerful actors for the realisation of specific objectives. Burke and Stephens (2018) give a particularly relevant example of one such strategy of reproducing power structures by sustaining weak energy democracy. They posit,

> Both concentrated energy politics and weak energy democracy may delay RE transitions
> or facilitate a shift to more concentrated energy development strategies. Such strategies

---

[4] This transition is not driven by the organic evolution of better technology or political requirements but is largely being imposed to resolve temporally sensitive climate and sustainability problems.

work to re-organise distributed energy flows into aggregated and concentrated stocks of energy, investment instruments, technological research, ownership patterns, etc. (Burke & Stephens, 2018).

This view is particularly illuminating for assessing the incapacities of local democratic institutions such as weak urban governments and the persistent reproduction of their condition under the shadow of national energy transitions.

1.4. Research question and approach

Informed by these debates, the broad research aim of this study is to critically understand the politics of urban sustainable energy governance, including the way it is being orchestrated within India's broader multilevel energy governance domains. The action, inactions, ideas and overall approach to sustainable energy governance taken by the urban governments are considered to be a feature of not just direct commands but their broader conditions, related perceptions, and assumed self-interests. These conditions and self-interests are in turn constituted or shaped by the actions and interactions of the multivarious co-operating and competing actors and material elements that occupy this multisectoral arena.

As these actions and interactions are undertaken by political actors with uneven resources, capacities, and authority to realise different objectives and interests, it becomes necessary to view this landscape through the lens of political power. These actions and interactions can then be conceptualised as the operationalisation of power or mechanisms of power employed by these actors for their specific objectives. This view is also in line with the apertures of power contestations presented by the politics of socio-technical transitions and multilevel governance literature. Accordingly, the main research question (RQ) that guides this study is:

How does power shape sustainable energy governance in Indian cities within the multilevel energy and urban governing structures?

Here, governance is understood more broadly as involving multiple actors undertaking intersecting intentional or unintentional actions through a multilevel political economy to address an interconnected, or even competing, societal problem.[5] This conceptualisation of governance is hardly devoid of state, with the state and its apparatuses being key to the arrangement. Urban government is conceptualised as a local state or the third-tier of the

---

[5] Adapted from definitions offered by Broto (2017:2) and Webb et al., (2016:29).

government. Urban sustainable energy governance then comprises the actions, inactions, and the general approach to implementing sustainable energy transition at the city level as undertaken by the local democratically elected urban government, with or without support from other related actors.

This study assumes a more relational and processual conceptualisation of power, as also suggested by scholars in this area (Luque-Ayala et al., 2018). Based on Barnett and Duvall's (2005) aligned approach, power is understood as *'production, in and through social relations, of effects that shape the capacities of actors to determine their circumstances and fate'* (Barnett & Duvall, 2004:39). Barnett and Duvall (2004/05) also offer a taxonomy of four power types (Compulsory, Institutional, Productive, and Structural) differentiated on the basis of the relationship type (direct or diffused) and medium of power operation (interaction or constitution). Grounding the power conceptualisation in Barnett and Duvall's framework and drawing from socio-technical transitions scholarship, an adapted analytical framework is developed in Chapter 3. The analytical framework helps view the figurative area of study through three broad analytical blocks: 1) Power types; 2) Power mechanisms; 3) Effects. Therefore, the framework allows any complex governing arena to be analysed through multidimensional *types* of power *operationalised* through context-specific *mechanisms* that produce specific *effects* in the form of actions, their conditions, and/or identities. It is suggested, in this framework, that mechanisms are not causal pathways but more influencing strategies that are only part of a larger set of interacting and effective strategies. Two adaptations to the Barnett and Duvall's (2004/05) original framework are proposed: 1) the addition of *Material Power* as the fifth power type in the existing taxonomy, in line with the current positions in political STT literature; 2) Further, adding *power mechanisms* as a distinct analytical unit to offer a heuristic model of power operationalisation (power types – multiple mechanisms – effects). Mechanisms primarily represent the strategies and/or processes of operationalising power employed by the multiple actors and elements and help make the broad conceptualisation of the five power types more perceptible. Given that power hierarchies are already well known within the federal system of India, mechanisms help in crystalising the multivalent processes of domination, shaping, and empowerment (and resistance) that are not only influencing actions, shaping arenas or conditions of actions for

urban actors but also potentially reconfiguring a new urban – *orchestrating* a new urban.[6]
Using these concepts, I approach the main research question above through two sub-questions.

o *RQ1: How are multidimensional types of power operationalised to shape the sustainable energy actions of, and conditions of actions for, urban governments?*

I answer this question by delving into the sustainable energy governance undertaken by Surat, Pune, and Kolkata. Wide-ranging power mechanisms employed by the multivarious actors and elements in the multilevel governing configurations of each city are identified inductively from the data collected for each city. The conceptualisation of the mechanisms was guided by the taxonomy adapted from Barnett and Duvall (2005). I consciously take an expansive view of power and its operationalisation to illustrate the complexity of the urban governing arena in each city. I contend that power operationalisation is not just the preserve of higher levels of government but can emanate from multiple other avenues - entrenched institutions, underlying structures, inanimate elements or even weaker actors. The wide conceptualisation of power in this study also accommodates this expanse, accounting for not just visible and direct types of power but also more covert and less perceptible types of power. The governance emerging is the net effect of these interactions. This was felt particularly necessary for this area where existing literature and thus understanding is limited.

o *RQ2: How do power mechanisms elucidate the heterogeneous nature of sustainable energy responses by the urban governments of India?*

Based on the power mechanisms identified within the three individual cases, a more generalised analysis is carried out to offer a general theory of the varied sustainable energy responses by city governments as described in section 1.2.3. The research questions are expected to yield findings that will add critical depth to the enabling as well as constraining conditions shaping sustainable energy responses by urban local governments. Subsequently, a more incisive discussion is presented to understand these conditions as part of the larger orchestration of urban sustainable energy governance in India, either intentionally or unintentionally, thus throwing light on the politics encompassed in the configuration.

---

[6] See a more elaborate understanding of *orchestration* in critical governance literature in Bulkeley, (2015b)

The discussion also incorporates reflections on the nature and politics of the sustainable energy transition pathway that has been adopted by India. Sustainable energy transitions are often considered to be an opportunity to configure energy governance in ways that are more democratic, accountable, and societal need-driven. This is particularly relevant for India as the country frequently positions itself as not just a climate leader but also an international advocate for global climate equity (Dubash, 2013; Mohan & Topp, 2018). The pathway that India chooses to tread on in this phase of the energy transition will set the foundations of future climate and energy politics in India. Lastly, the study's findings also present a discussion on how India's sustainable energy transition is shaping urban and urban governance for posterity and, in turn, is being shaped by it.

1.5.   Main contributions

The contributions of the study have been described in detail at the end of the thesis. I introduce the main contributions here briefly. At a very fundamental level, this study's findings contribute to the emerging analyses of subnational sustainable energy governance in India within the broader rubric of the urban climate governance literature. The discipline has witnessed few city-specific sustainable energy governance analyses. The three cases of Surat, Pune, and Kolkata, which include primary data analyses of cities' actions on sustainable energy, are an attempt to enrich this discipline empirically.

This study also presents an alternative understanding of urban sustainable energy action in India. It demonstrates that the current disciplinary understanding of capacity and authority deficits are only two of the many effects (conditions of actions) of the underlying power dynamics within the urban sustainable energy governance arena. Therefore, these variables need more in-depth analysis informed by the multilevel political economy of the energy as well as urban domains in India. This aligns with Eckersley's (2017, 2018) findings that the capacity of local governments in a multilevel setting is conditioned by historical-political events that, in turn, influence how actions are recognised. Continued reproduction of these conditions, thereby impeding a more democratic adoption of sustainable energy, reflects its own politics and needs to be acknowledged explicitly. Secondly, power within this arena is operationalised through multitudinous, multidimensional, and multi-layered mechanisms. The presence and interactions of multiple mechanisms also indicate the extent of the interdependence of each condition. For instance, in a hypothetical scenario, even if urban

local governments were accorded energy mandates or capacity, their agency over local energy would still have been significantly eroded as a result of the neoliberal modes of governance that characterises sustainable energy transition in India today (cf.(Rumbach, 2016).

Further, the study takes an interdisciplinary route wherein it contributes by combining insights from India's sectoral politics of both energy and urban governance. Existing studies mainly limit themselves to situating the analysis of urban climate governance within India's urban or environmental politics, even when including sustainable energy interventions (cf.(Bhardwaj & Khosla, 2020; Sami, 2017)). Focusing on the politics of both sectors and their interactions has brought additional insights on whether they counteract or intensify the net effects on urban governments' responses. For instance, I find that India's sustainable energy politics and urban governance politics interact symbiotically to intensify the net effect of centralisation and to further weaken urban governments institutionally.

At a broader level, this study contributes to the global urban climate and sustainable energy governance scholarship, where there is only a preliminary recognition of the importance of multilevel, multidimensional power processes (Castán Broto, 2017; Castán Broto & Westman, 2020; Sovacool & Brisbois, 2019). The taxonomy of power by Barnett & Duvall (2004/2005), which was originally proposed in response to the lack of power considerations within global governance, has not received adequate attention within the emerging power theorisation studies in this scholarship. This study adds an alternative conceptualisation of power as being relational as well as processual while allowing space for both intentional and unintentional effects of power. The conceptualisation allows political analysis beyond direct power to include covert, relational power strategies such as inducements, subversion, orchestration, and acquiescence. I further contribute by adapting the original framework to study power in the governance of socio-technical systems by including material power as an additional power type. I also suggest a heuristic model for power operationalisation that theorises non-linear interactions between three major analytical units of power (types), mechanisms and the effects. Within this model, an initial but enhanced conceptualisation of power mechanism has been proposed to bridge the concepts of power types and effects available in the original framework of Barnett and Duvall (2004). The empirical significance of power mechanisms is demonstrated through the case studies as it provides insight into how higher governments can orchestrate exclusionary conditions for urban governments to weaken the political

participation of urban citizens in the local energy transition. It further shows how a new urban is being constituted through the ongoing sustainable energy transition by establishing a centrally controlled market economy for sustainable energy.

The study places urban governments as part of the larger fragmented statal arena where multitudinous power mechanisms interact concurrently. Sustainable energy responses at the urban government level are thus a net effect of the interaction of these mechanisms. The broad framework is expected to be particularly useful for studying complex governing arenas where little scholarship exists to understand power influences. Through the above discussions, this thesis is an attempt to respond to scholarly calls for studying contestation and conflicts in multilevel policymaking, particularly in the global south, forefronting situated analyses or bottom-up analyses of energy governance in urban areas, and theorisation of urban and urban politics on account of energy transitions (Castán Broto et al., 2017; Castán Broto & Westman, 2020; Jaglin, 2014; Rutherford & Coutard, 2014; Sovacool et al., 2020). A multilevel power-laden view of urban sustainable energy governance can also contribute towards understanding the gap between 'policy rhetoric' and actual action by city governments (Van der Heijden, 2019:1).

1.6.   Thesis overview

This thesis has been designed to answer the main research question articulated in the above section, supported by two sub research questions. A detailed literature review and an analytical framework set the background for the analysis and outline the methodology adopted. In keeping with the multilevel approach of this study, the empirical analysis based on both within-case and cross-case analyses is organised in three sections. At the first level, power dynamics that shape the urban energy governance in India, in general, are analysed. This takes into account the national and international policy landscape as well as the underlying structures that organise these larger umbrella avenues and constitute specific conditions and identities for all urban governments in India (Chapter 4). At the second level, the analysis shifts from general to specific contextual power mechanisms anchoring in the effects and conditions witnessed in the three case study cities (Chapter 5,6,7) individually. The combined analysis at both these levels attempts to respond to the first sub-research question (RQ1); subsequently, specific findings and analysis of the three cases studies are compared and synthesised to draw generalised power-based insights for understanding the

diversity in sustainable energy responses of the urban governments in India, addressing the second sub-research question (RQ2).

The study takes a fundamentally multidisciplinary research approach and embraces the complexity of the study arena. The literature on the application of political power scholarship with respect to urban climate or sustainable energy transition governance has been limited in the context of the global south. At the same time, empirical evidence on sustainable energy governance and its politics in the Indian context is also very limited. Given this, the chapterisation in the thesis extends equal weightage to both the theoretical framing and the empirical analysis.

Chapter 2: Literature review

Chapter 2 presents the literature review and reflects the interdisciplinary approach that defines this study. The objective of the review is to inform the reader of the current status of learnings in the different disciplines that lend insights to this thesis. It is also guided by this study's aim to contribute to the newly emerging Indian scholarship of urban climate governance, where much of the Indian urban sustainable energy governance scholarship is subsumed. Broadly, the following scheme has been followed: Firstly, the review details the kind of actions cities globally are taking on climate change and particularly sustainable energy, and the conditions that shape these actions. It then traces the evolution in the theorisation of urban areas within the rubric of broader climate governance and related ideas of contestation. Application of power, a classical lens to study conflict in governance scenarios, is a recent venture in studies exploring multilevel approaches to urban climate or energy governance. Accordingly, a review and summary of the formative debates on power generated within the political science scholarship, their application to multilevel governance in general and socio-technical systems transitions are discussed.

Chapter 3: Analysing power operationalisation in urban sustainable energy governance: a framework

The literature review generates the understanding that political power can be a useful lens to develop a critical understanding of urban sustainable energy governance in the Indian context. The review also suggests that a processual or dynamic understanding of power will be particularly relevant for a context already known to be centralised and top-down in its functioning. Chapter 3 is dedicated to developing the analytical framework for the empirical analysis, building on the insights summarised in Chapter 2. It justifies the approach taken and

describes the concepts that form part of the framework in detail. The chapter also provides the details of the methodology followed in the study, providing an approach as well as a description of each step of the methodology. This section also elaborates on the data types and sources used for the analysis, challenges faced during the fieldwork and data collection, not least because of the pandemic, and finally, how alternative strategies were opted to mitigate these challenges.

Chapter 4: Analysing power in sustainable energy governance in urban India

The first level of the empirical analysis for the study commences with Chapter 4. At the outset, the context of the study is set. The context plays an important role not just in informing the reader but also used as a reference, contributing to the analysis that ensues. This first level of analysis focuses on identifying the common power mechanisms affecting all cities in India uniformly as a result of the national and international landscape within which they are embedded. Four out of the five power types allowed by the framework have been identified: Structural, Institutional, Material, and Productive. Compulsory power emanating from the direct interaction of actors was found to be absent at this general level, where the distant relationship with urban governments ensures that only diffused, indirect forms of power can be operationalised. Structural power is an exception here. Conceptualised as the underlying rationalities, logical frames, and socio-economic paradigms that structure our societal relations constitute identities and conditions of all actors directly. However, structural power applies to society at large, eliminating the need to contextualise it in the three cities. Accordingly, it has not been discussed in the case-specific chapters (5-7). The insights drawn in this chapter are to be read along with the discussions organised in the case-specific empirical chapters.

Chapter 5, 6, 7: Analysing power in sustainable energy governance in Surat, Pune, Kolkata

The three case-specific empirical chapters form the second level of the analysis. The three cities located in different states of India represent the spectrum of the scale of sustainable energy actions and plans by urban governments in India. Each empirical chapter provides the background of the city and presents the sustainable energy response and the broader approach by the local urban governments in detail. The description uses primary data to highlight the kind of technological and institutional actions that the urban governments have undertaken. It also highlights the interventions that were not taken despite their potential or were removed from the agenda. The urban governments' actions, inactions, and broader

conditions formed the gateway for the power analysis as *effects* of power operationalisation and power mechanisms were identified from the data, as informed by the power taxonomy in the framework. Each of the three empirical chapters showcases a complex mesh of interacting power operationalisation, highlighting that urban sustainable energy governance cannot be understood by a parsimonious approach and a more open-ended bottom-up analysis is imperative.

Chapter 8: Discussion

Chapter 8 is the third level of the empirical analysis, where a cross-case comparative analysis is presented to analyse the power mechanisms that influence heterogeneous sustainable energy responses of city governments (RQ2). Additionally, the chapter synthesises the specific findings of the earlier analyses to generalise key insights for urban sustainable energy governance politics in India.

Chapter 9: Conclusion

Chapter 9 summarises the earlier analyses and discussions to respond to the main research question that guided the study. Key contributions of the thesis in the literature streams of urban climate governance (Indian context and general) and political power are detailed. The chapter ends by highlighting future research avenues that emanate from this research.

India's urban energy sustainability governance cannot be dismissed as a predetermined narrative but should be considered as a more evolving site with multivarious political possibilities constantly emerging, being created, and closing. How these political dynamics can be understood through the lens of power is the core area of interest in this study. This resonates with Stirling's (2014:23) argument, 'one way or another, it is through various kinds of power dynamics, that any social transformation comes to be realised or suppressed.'

Through this study, I find that urban governments are not only being pushed to the margins but also their authority in the local energy transition is actively being subverted and co-opted. With the multilevel energy transition in India, urban is being governed sans its government, and urban citizens are being transformed into new energy market subjects.

Chapter 2: Literature review

2.1.   Introduction

This chapter presents a review of the literature streams that contribute to the understanding of this study. The review aims to cover what is already known, how that shapes this study, and how it can potentially contribute to these disciplines. Two key themes of the urban climate and sustainable energy governance literature framed through actions and conditions become the entry point for this review. The discussion then traces the evolution of this literature to include multilevel approaches and return to a national sector-specific political economy. Accordingly, key insights from the scholarship on sustainable energy transition politics are discussed to establish the need for a power-based framework for understanding urban sustainable energy governance in India. A review of the foundational debates within the scholarships of political power is presented after this. It includes a summary of the emerging applications of political power in the urban climate and sustainable energy transitions literature. The chapter concludes with a description of the insights that anchor this study and how this study will address some of the gaps in the literature.

2.2.   Conceptualising urban energy and climate governance

The latest political fillip to cities as climate actors was witnessed during the Paris Agreement negotiations when subnational governments were recognised as climate actors for bridging shortfalls in national commitments/performance 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 complete energy transition (IEA, 2021a:9).

Studies on sustainable energy governance are fundamentally interdisciplinary by nature (Castán Broto et al., 2017; Ramamurthy & Devadas, 2013). Due to the varied areas of application of sustainable energy technologies, several interlinked disciplines tend to study the interactions between energy systems and society. While some disciplines have viewed urban 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 taken a systems view where energy

technologies are complex systems contextualised and integrated with local and external social, political, economic systems (Bai et al., 2016; Basu et al., 2019). Still others, have used bottom-up social welfare centric rationalisation to conceptualise urban energy (Castán Broto et al., 2017; Colenbrander et al., 2017; Debnath et al., 2020; UN, 2021). In their compact nature, cities have been viewed as ready grounds for innovation and experimentation through enhanced research and financial capacities (Rutherford and Coutard, 2014). Cities as 'living laboratories' for innovation projects that target behaviour change, scaled adoption, and socio-cultural acceptability are currently an ongoing exercise in multiple countries (Evans & Karvonen, 2011; Voytenko et al., 2016).

However, Rutherford and Coutard (2014) highlight the need for further urbanisation of energy studies and energisation of urban studies for a more specific analysis of urban energy systems and their transition. This gives a sense of the multidisciplinary space that urban energy studies occupy in social sciences. However, they acknowledge that urban sustainable energy governing challenges have been a significant focus of climate change governance literature, though not without its shortcomings (Rutherford & Coutard, 2014). Heeding this, the study situates itself within the urban climate governance literature while also drawing from the socio-technical studies of energy transition politics. Locating the study within urban climate governance is also relevant as Indian academic analysis on urban sustainable energy governance has been limited to the ambit of climate change studies. Therefore, this study has attempted to contribute primarily to these two literature streams.

Urban areas have also exhibited significant heterogeneity in local energy actions as a result of their contextual embeddedness (Broto & Bulkeley, 2013; Creutzig et al., 2015). Several cities, particularly in the global north, have not only set ambitious RE targets but are also implementing a wide range of technologies (Broto & Bulkeley, 2013; IRENA, 2020). While some cities have acted mainly with an aim to reduce emissions, others have approached the issue with a co-benefit objective – where clean energy technologies also become the means to attain other development or economic objectives locally (Castán Broto, 2017; Sethi, 2018). 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). Many local governments are adopting a leadership role in addressing the local socio-economic or infrastructural issues through sustainable energy while framing it as climate

action – a dynamic that Bulkeley (2010:245) calls 'reframing or localising'; Rutherford and Jaglin (2015:174) call 'translation'; Fisher (2014:169) suggests this can be 'policy boosterism'. In other words, most local authorities have displayed tact in bringing together multiple objectives and meeting them through the opportunities offered by the new generations of technologies.

Who governs (/should govern) this space? Unfortunately, the answer is not as obvious as one may have hoped. In line with the traditional understanding of governance literature, multiple actor groups have been analysed, particularly with respect to their role in fostering sustainable energy adoption or transition (Castán Broto & 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 have also been studied recently (Castán Broto, 2017; Criqui & Zérah, 2015; Fisher, 2014; Minh et al., 2020). More recently, sustainable energy governance studies have returned to focus on national governments for their significant influence or control on the urban governments' responses (Castán Broto & Westman, 2020; Johnstone & Newell, 2018a). This is particularly the case in the energy sector, where energy has been the conventional domain of national governments and state authorities. This gives rise to a potential 'political struggle' and has been discussed further later (Castán Broto, 2017:2).

2.3. Conditions of urban energy and climate governance

Despite the optimism around cities, the gap between their ambitions and actual achievement has been a constant concern and has remained unchanged over the last decade (Bulkeley, 2010; Van der Heijden, 2019). Broto (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 the optimistic notions of strategic arenas (Castán Broto & Westman, 2020:9; Rutherford & Jaglin, 2015:175).

One source of this realisation was through studies on the conditions and interests of actors that influence climate and sustainable energy actions in cities. These studies typically build on the normative ideas of cities to take actions on climate change or sustainability for both local and global redressal. The capacity of local authorities or other actors emerges as one of the key conditions across different case studies and is often translated in terms of lack of

knowledge or skills and lack of financial and human resources (Bulkeley, 2010; Hughes et al., 2018; Kuzemko & Britton, 2020; Luque-Ayala & Silver, 2018; Rutherford & Jaglin, 2015). Often subsumed within the broader idea of capacity is the authority of local governments to act on local energy that, in turn, determines the scope of their action – what they are responsible for or what they are not (Azevedo et al., 2013; Eckersley, 2018; Kuzemko, 2019). Azevedo et al. (2013:897) argue that a combination of lack of capacity and authority has led to disincentives for local governments and for rationalisations such as 'not my business'. While it varies with national context, the authority of cities on energy supply and services, in general, is usually constricted in centralised energy political economies. In these polities, cities are increasingly viewed as executive arms of national governments or purveyors of global rules (Kuzemko, 2019:81; Van der Heijden, 2019:4). Indian literature also points to similar conclusions (Khosla & Bhardwaj, 2019; Sami, 2017).

Eckersley (2018:6) posits a counterargument that the lack of formal authority and independence from the national government's resources can boost local governments' autonomy by reaching out to non-state actors or reframing existing projects. However, this can risk the capture of the local energy agenda by non-state actors (Haarstad, 2016:7). Irrespective, reviews of the urban climate studies throw interesting light on the enabling conditions beyond capacity and authority. This includes local factors such as political support and leadership, local regulations and incentives, partnership with local actors, integration with local objectives and projects (see above section), organisational context; national and international factors such as market dynamics, national context, and direct and indirect pressure from international actors (Castán Broto, 2017; Patterson & Van Der Grijp, 2020; Van der Heijden, 2019). Within these factors, a prominent theme increasingly highlighted within the literature, including in energy transitions politics scholarship, is the condition produced by the infrastructure and materialities of energy systems. 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 & Coutard, 2014).

The above discussion clouds the notion of an analytical dead-end where capacity and authority are the decisive conditions for the actions and inactions of city governments. While they are important, the urban governance arena is marked by a complex set of dynamics at play influencing local climate and energy actions. As Kuzemko (2019) points out, some cities

are taking action despite capacity and authority challenges. Contrastingly, it has also been demonstrated that capacitating a local body does not guarantee successful action, underscoring an alternative, more complex understanding of urban sustainable energy governance (Broto, 2021).

2.4. Multilevel approach to urban governance

In this vein, scholars argue for an analytical turn that will 'step beyond the local as a frame of reference' to place cities and city government in the context of a wider multilevel political economy context with which it is taking place (Bulkeley, 2010; Bulkeley & Betsill, 2005:48; Kuzemko, 2019; Webb et al., 2016). Tracing the sector's political economy where the transitions and its governance is taking place will help understand the antecedents of the conditions, such as capacity or authority and the lack thereof. In addition, Bulkeley (2010:231) argues that the multiplicity of pushes and pulls begs a more nuanced conceptualisation 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 approach to urban climate governance serves these discussions well (Haarstad, 2016; Kuzemko & Britton, 2020).

Multilevel Governance (MLG) theory is one of the more commonly adopted frameworks in climate governance and politics (Westman et al., 2019). It highlights that in a complex polity, decision-making can happen at multiple levels, by multiple actors where the s*tate* is one of the actors but not absent or 'hollowed out' (Andersen, 2008; Hooghe & Marks, 2001:5). The framework helps structure the multiple actors and their relationships in two ways, 1) vertical (Type 1) – the hierarchical relationship of international and regional intergovernmental, national and local government actors; and 2) horizontal (Type 2)– the collaborative relationship between networks, civil society, private players, among others (Westman et al., 2019).

An inherent assumption to the MLG is the clear nested hierarchies or concept of subsidiarity where authorities and responsibilities are neatly delineated (Brisbois, 2020a; Jaglin, 2014). However, it is the interventions by actors at 'horizontal levels' (like international and national city networks and local non-state actors) that have gained significant recognition in this framework (Alber & Kern, 2009; Bulkeley & Betsill, 2013; Stehle et al., 2020). This led to compensating or, in some cases, challenging the lack of capacity narrative at urban

government levels as one of the key barriers to urban governance (Marquardt, 2017; Ramamurthy and Devadas, 2013; Bulkeley et al., 2011). Jaglin (2014:1396) draws on the empirical evidence to state that several cities are taking energy actions 'decoupled from national frameworks and policies'. Given the large number of actors within the MLG framework, studies have also identified the critical need for coordination - both vertically and horizontally- amongst the 'multiple challenges, multiple actors and multiple levels' (Castán Broto, 2017; Hodson & Marvin, 2010:477). An interesting aspect is the coordination challenges even between different departments of a particular urban local body, highlighting inter-departmental dynamics (Aylett, 2011; Gabillet, 2015).

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). Through international and regional networks, horizontal collaboration has also not been able to explain the climate ambition-achievement gaps in cities (Castán Broto & Westman, 2020). Viewed critically, even coordination as an exercise to align the divergent visions of different actors is invariably a question of power needed for influencing powerful actors. 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 (2014:1395) rightly calls this 'multilevel' urban governance arrangement a complex one that reflects 'unstable patterns of power and resistance rather than stable co-operation processes'. Therefore, in the naïve recommendation of strategies of coordination and steering, there are underlying preconceived assumptions about the alignment of objectives, motivations, and vision amongst the different actors (Castán Broto, 2017).

More recently, a view has emerged of urban being beyond bounded yet conditioned by its geography, materiality, and relational politics (Broto, 2020). It is in this view that urban governance of sustainable energy or other climate actions is thought to be part of a complex multilevel governing configuration, and therefore, successful adoption, scaling, or society-wide transition are dependent on a large set of actors and factors, more prominently the local and national politics (Castán Broto, 2017; Hughes et al., 2018; Kuzemko, 2019). As a corollary, there has been recent recognition of the importance of the national political context. Eckersely (2016), Ehnert (2018), and 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). Further, Koepke et al. (2021), Broto and Sudhira (2019), and Sovacool et al. (2020) also lend further support to this argument by showcasing highly heterogeneous local conditions that deliver very contextual energy transitions, particularly in the global south. Webb et al. (2016:29) forward a helpful rounded notion of governing that encompasses the evolved political dimension of this scholarship

> In liberal democracies, governing is orchestrated through a multilevel political-economic arena, where the urban scale is constituted through intersecting local, national and transnational actors, with potentially competing definitions of societal problems and their solutions, as in the case of climate change and energy.

The above conceptualisation deftly moves the notion of urban governance from a benevolent multilevel actors' coordination exercise to initiate local action, particularly in the absence of capacity and mandate, to possibilities of not only contestation between the scales but also orchestration in order to 'gain control and establish authority' on another scale (Castán Broto, 2017:8; Castán Broto & Westman, 2020; Jaglin, 2014). This involves power play of powerful 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). Broto contends that urban climate governance scholars have returned to governance techniques like orchestration that exemplify centralised forms of steering due to the limits of the 'horizontal coordination' notions and acknowledgement of the inevitable influence of national elites. Based on this critical outlook, Bulkeley (2015:3) calls for governance to be viewed as a means to wield power and defines it as 'orchestration of distinct modes of power'. Dowling, Mc-Guirk and Bulkeley (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 particularly relevant for governing arenas where power elites are clearly defined and entrenched in the local political economy. Sustainable energy transitions traditionally embedded in centralised modes of governance form a particularly potent ground for developing novel understanding based on this view of governance. This resonates with the argument within the scholarship for more contextual and sector-specific yet interconnected analyses of urban energy governance to encompass the sector-specific multilevel politics and their interactions (Rutherford & Coutard, 2014).

Following this, we engage with energy politics in the next section.

In essence, this emerging sub-strand of critical multilevel governance approaches underscores not just the need to look at the power and power operationalisation within the MLG governing structures but also highlights the need to return our focus on the national and subnational level state institutions and the political economy that they represent (Castán Broto, 2017; Castán Broto & Westman, 2020; Di Gregorio et al., 2019; Marquardt, 2017; Miao & Li, 2017; Westman et al., 2019).[7]

2.5.   Sustainable energy transition politics and urban

Two major changes mark this phase of the energy transitions. Firstly, new and sustainable energy technologies have become both imperative and economically feasible. Secondly, this has necessitated and opened the scope for governing sustainable energy systems at different scales and levels with 'decentralised dynamics' (Kubli and Ulli-Beer, 2016:71). Both distribution and concentration of power centres are active possibilities here, literally and figuratively. The ensuing politics implicates both energy and urban governance and needs a nuanced understanding of how urban energy transitions are being forged. The urban scale has been considered to be inevitable for delivering global energy transition, but energy transition is also considered the new conduit to govern and reconfigure urban areas (Rutherford & Coutard, 2014; Rutherford & Jaglin, 2015). As discussed in the earlier section, this review sets the political context of sustainable energy transitions that is established in the scholarship to highlight the points of fractures, divisions in interests, and power dynamics.

Decentralisation versus centralisation: Defined by the reprise of decentralised 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). Existing energy systems associated with conventional carbon-intensive fuels are characterised by supply-centric, large/ utility-scale systems and infrastructure networks, allowing only a few power actors such as central state agencies or big companies as part of the governing configuration (Baker et al., 2021; Kuzemko & Britton, 2020). Brisbois (2020), Webb et al. (2016), and Mohan and Topp (2018) demonstrate through their case

---

[7] The influence of national governing structures on local sustainability actions has been established in the global north as well. (Ehnert et al., 2018), (Lee and Koski, 2015).

studies the tensions between centralised and decentralised energy systems and their political-economic implications, including in India. Newell and Phillips (2016:39) suggest focusing on social processes of sustainable energy 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 centralised nature that has remained understudied.

STT scholars engaging with social change also view these different socio-technological approaches as 'pathways' (Bridge et al., 2013; Stirling, 2009). The pathway that is given precedence and how that precedence is established in a multi-actor governing arrangement is politically contingent on the geography, time, and domain. It also problematises the often forwarded 'no alternatives' narrative (Stirling, 2009:5). In a similar vein, the literature offers the concepts of *path dependency* and *lock-in,* particularly in the infrastructure-heavy sector such as energy systems (but also reflects very much in institutions and ideas) that tend to privilege existing structures and power hierarchies by maintaining the status-quo (Becker et al., 2016; Moss, 2014b; Stirling, 2009; Unruh, 2000).

Deepening democracy versus national priorities: Challenges to decentralised governance of energy transitions do not just come from the plurality of actors or multiplicity of scales but also from the ethics and beliefs that they represent (Baker et al., 2021; Becker et al., 2019). As Brisbois (2020) posits, decentralised energy governance needs a different kind of governing mechanism managing a large number of actors with different capacities and privileges but also can become a conduit for embedding associated and possible values of deepening democracy, participatory and deliberative engagement with accountability mechanisms, ensuring fairness and justice through representation at the lowest levels. Further, more local development and welfare need-based energy applications are made possible, but that is not always the case for centralised supply centric energy systems (Burke & Stephens, 2018; Castán Broto et al., 2017). These potential social gains are often pitched against economic efficiency achieved by large scale systems that are often then translated to lower retail electricity tariff based arguments. The argument of sunk public investments made into grid infrastructure or other such obdurate infrastructure or institutions is the other commercial argument that is frequently offered against decentralised technologies that may not always need to be connected to the grid (Verbong & Geels, 2007). National energy security is another example, on account of which, first, transitions to sustainable energy were

resisted, and now, decentralised technologies are often challenged (Kuzemko, 2019; Lockwood et al., 2017). Scholars of energy transition and governance are increasingly presenting evidence that the nature, pace, and form of energy transitions in any geography are definitively shaped by the national political economy of energy that encompasses the above traditional political narratives (Jaglin, 2014; McGuirk et al., 2014; Sareen & Rommetveit, 2019). As most large economies (including India) have been powered through traditionally centralised energy systems, incumbent actors like national state-led institutions, often in nexus with large public or private corporate with energy interests, have been structurally empowered to set these rationalities.

Governance of sustainable energy transition: Given the significance of urban areas in sustainable energy, who and how should the transition to sustainable energy be governed in urban areas has been a contentious and geographically contingent issue (Brisbois, 2020a; Haarstad, 2016). The relevance of urban is no more limited to the idea of urban areas being a site for climate interventions but simultaneously arises from the imminent decentralisation (even if partial) of energy systems applicable widely in urban areas (electric vehicles, heating, solar prosumers), implicating urban societies and politics for the long term (Brisbois, 2020a). However, neoliberal and corporatisation based governing approaches that define today's energy sustainability programmes are redefining the state-market relations as well as state-citizen relations at the urban scale. This implicates the subnational state actors like urban governments and their actions (Kuzemko, 2019). A number of decentralised energy applications are now designated to be implemented by private technology or service providers as part of the larger energy products or services market (LED bulbs, Energy service companies ESCO), diminishing the need for urban local governments or other local states. Peter & Hughes (2017), Cauvain et al. (2018), and Bulkeley et al. (2014) show how neoliberal strategies designed at a different level tend to shape urban government's responses or capacities. Dowling et al. (2014), on the other hand, illustrate how by framing citizens as consumers through market mechanisms, the role or conduct of urban governments is reduced to educators or awareness generators. Webb et al. (2016:36) provide evidence of the effects of the neoliberal modes of energy and urban governance in the UK. They conclude,

Urban energy governing is hence rendered susceptible to co-optation for green branding, which risks treating climate change as a new opportunity for capital accumulation and

normalising the continuing mass consumption of resources, rather than building long-term

foundations for low energy, low carbon municipalities. (Webb et al., 2016)

This resonates with the recent climate urbanism scholarship that focuses on how urban is being reshaped because of climate actions (Castán Broto et al., 2020; While, 2020). Long and Rice (2019:992) argue,

Certainly, cities are appropriate sites for addressing climate change, but in the current neoliberal context, the transition from policy rhetoric to climate action presents a potentially problematic landscape of inequality and injustice.

These debates, however, have embedded within them an implicit dimension of energy technologies that have only recently been theorised within this stream – the concept of materiality of energy technologies (Luque-Ayala & Silver, 2018; McEwan, 2017; Moss et al., 2016; Rutherford, 2018). The perspective of material power brings within the purview of the governance of socio-technical configurations, the hardware, infrastructure, resource inputs and outputs, and other inanimate components associated with energy technologies around which governance is usually designed and delivered.[8] This includes not just the technological needs and the artefacts linked to the technology but also the energy flows and physical environment wrought by geographical and socio-economic features that shape it and, in turn, are shaped by it (Becker et al., 2016; Moss et al., 2016). Finally, Balmaceda et al. (2019) highlight the number of ways in which materiality of energy has come to be analysed in the literature: as a condition/ constraint, both independent or dependent variables, and also materials as actors themselves. Energy technologies bring, along with their material components, specific socio-institutional configurations. Peculiarities of the technologies, related artefacts, and hard infrastructure affects the decision-making space by firstly legitimising 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 sustainable energy and related areas (in areas like agriculture, transport, communications, manufacturing and war) have the ability to reproduce the existing power relations and repress any space for innovation in a different direction (Stirling, 2014).

---

[8] Materiality as understood in socio-technical systems is distinct from the material resources or flows often commonly used in political economy or global governance studies.

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 that are connected to the grid (Johnstone & Newell, 2018). Phenomena 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 the sustainability policy choices (Kuzemko et al., 2016). In the case of this study, whether urban governments and local urban energy are made part of the national sustainable energy transitions is one of those policy choices that are implicated in politics.

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 internalised. This is a way forward to also raise the revenue-raising potential for municipalities. The European Union also adopted the principle of subsidiarity to adopt the principle that central authorities should be performing only those activities that the local authorities cannot perform. Energy in its new decentralised form makes this principle possible today, where localised energy generation from RE or localised EE measures will yield most of the cost and benefits locally. Beyond the more economic argument, Brisbois (2020) also argues for the normative case for local body led decentralised energy systems governance that incorporates accountability and democratic social imperatives. As Jaglin and Rutherford (2015) suggest, the need for urban governments is reinforced because energy is no more confined to just supply issues but has become more diffused through their embodiment in other infra and practices. This material nature of energy being embedded further adds rationale for urban governments to be involved in increasing their capacity (Kuzemko, 2019). Further, Jaglin and Rutherford (2015) showcase examples where urban citizens can potentially both facilitate or constrain by resisting change, a perspective that needs to be addressed even in a normatively framed transition and local representation. The idea of cities just as geographical sites and recipient areas of energy infrastructure and institutional systems have been prevalent and justified since long in centralised types of energy governance. This shuns the idea that cities are political actors on their own. There stands a

risk; therefore, that decentralisation of sustainable energy systems occurs through rescaling of technologies and material infrastructure and not as decentralisation of formal urban governance.[9] In other words, urban governance of sustainable energy takes place somewhere else and not in the urban.

With the help of a literature review, the above discussions establish the importance of developing a critical outlook of multilevel governance for studying the politics of local, sustainable energy governance. This is bolstered by the fractures and uneven power distribution in the energy governance domain. I turn to power as conceptualised in political science and applied in the two relevant fields of climate multilevel governance and sustainable energy transitions to crystallise the foundations of this study.

2.6.   Conceptual foundations of power in political science

At its core, the central concept in social sciences, power, can be a means as well as an end (Arts & Tatenhove, 2005; Haugaard & Clegg, 2009). Scholars have considered any political process to be fundamentally the 'shaping, distribution, and exercise of power' (Lasswell & Kaplan, 1950:75). Accordingly, any political arena, as urban sites have been claimed to be, should be explained through the lens of power.

 Within the scholarship of power, if there is one area of unanimity in the literature on power, it is that social or political power is one of the most complex concepts to define. Like many other concepts in the discipline of political science, power is called an essentially contested concept (Lukes, 2005). Historically, the conceptualisation of power has ranged from being coercive to authority, a right to leadership abilities, resources to capabilities, and individual power to social power (Cairney, 2019; Haugaard & Clegg, 2009; Hindess, 1996; Lukes, 2005). An alternative to the idea of a 'contested concept' that aims to establish one single definition of power is the family resemblance concept. A number of power scholars, in consonance with its proponent Wittgenstein, consider power to be a 'family resemblance' concept (Haugaard, 2010; Morriss, 2002b; Smith, 2009). The family resemblance approach to conceptualising power justifies two important trends in power scholarship: 1) power can be understood on the basis of the task at hand or, in other words, as per the problem that is to be understood. This is in line with Lukes' understanding, 'when we try to understand power, how we think about it relates in a number of ways to what we are trying to understand' (Lukes, 2005:62).

---

[9] A counterview can be found in McGuirk et al. (2014).

This gives the researchers the space to develop a framework that is suited to their context of study; 2) different definitions and dimensions of power can co-exist and interact in any one specific arena of study (Haugaard, 2010). This second avenue has led to the development of multidimensional power conceptualisation that is both compatible and interacting and produces a net effect (Haugaard, 2010). Given the contested nature of power, a review is presented of the key debates in the power scholarship that inform the theoretical positions taken in this study.

2.6.1. Power in outcome - observable and non-observable

The most fundamental debate about power arises from the epistemological differences in the study of power – whether power manifests itself only through measurable, observable outcomes. Two of the key theoretical approaches in the observable power school of thought are the rational choice method and the early pluralist method. The focus on understanding power through an outcome that is observable stems from one of the early foundational definitions of power by Dahl, a pluralist scholar and influenced by Weber: 'A has power over B to the extent that he can get B to do something that B would not otherwise do' (Dahl, 1961). Critiquing the stand taken by Dahl and other pluralist scholars, Bachrach and Baratz (1962) argued the need to look at not just decisions but also non-decisions in order to understand power exercise. Bachrach and Baratz (1962) suggested that this could happen simply through 'mobilisation of bias' in the constitution and operation of an organisation or institutions that uphold the interest of certain actors groups while ignoring others and exploit certain conflicts while suppressing others by strategies like agenda setting, participation in decision-making processes (Bachrach & Baratz, 1962:252). This shifts the focus of analysis 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 (1974), in his seminal book, Power: A Radical View, highlights the key limitation of these two concepts. He mentions that both the notions of power depend on the overt manifestation and therefore are essentially inadequate – something he identifies as the first and second dimensions of power (Hindess, 1996). This criticism by Lukes 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 behaviour of groups and practices of institutions'

which may be manifested in individuals' inaction' (Lukes, 2005:26).

In this, Lukes puts forth that power takes an 'insidious' form that shapes the thoughts and desires of the subjects without their conscious awareness (Hindess, 1996). A major differentiating factor of the 'radical' view of power, as put by Lukes himself, in addition to bringing out the unobservable power, is to firstly put forth the agent nature of the subject and secondly, power being enacted in a way to change the agency of subjects which was largely missing in the earlier conceptualisations. At the same time, Hindess also highlights that while Lukes' third dimension of power is considered a seminal work for the unobservable power paradigm, a number of scholars and thinkers like Marx, Gramsci, Giddens, Arendt and Foucault can be considered to make up the spectrum that occupies this paradigm (Hindess, 1996). [10] The difference between observable and non-observable types of power raises important questions on the methods of analysing the outcomes - especially in the latter case. In addition to other approaches (see discussion in Lukes (2005:48-58) on assuming to act differently), Arts and Tatenhove (2005) have argued that empirical discussions on the multi-dimensional understanding of power need to be normative in nature. Despite the methodological challenges, the inclusion of the unobservable, covert and unintentional dimensions of outcomes of societal actions can be of high relevance for the field of governance, where change produced by these actions is an area of concern. It allows a more critical assessment of any governing arrangements by focusing on the process and operations of governance.

2.6.2. Power 'over' or 'power to' - power as exercise or capacity?

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 conceptualising power as 'power over' and 'power to'.[11] 'Power over' is the more traditional form of conceptualising power and has been considered synonymous with domination or subordination. Hence, literature on 'power over' delves into understanding the exercise of power. It has also been considered a 'relational' form 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

---

[10] Digeser 1992 and Haugaard 2012 also suggest a fourth dimension of power.
[11] Notable scholars in the 'power over' school are Weber, Dahl, Bachrach and Baratz, Lukes; Power to scholars are Arendt, Barnes, and Parsons.

scholars and has often been used as power to do something and is often considered attributional or something 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 and helps in locating the source of power as without having power, one cannot exercise it.

Both these understandings of power then give rise to the next level of a binary understanding of power as an attribute 'capacity' or 'ability' or 'resource' and power as 'exercise' (Cairney, 2019; Mann, 1986). Morris (2002), although, differentiates between power as 'resource' and 'capacity' and agrees to the latter for his conceptualisation of power. While defending the argument of power as 'capacity' avidly, Morris (2002) gives the example of why people, in general, are aware of the powers of a lion while visiting a zoo. He acknowledges that there is a matter of perception or 'senses' but insists that power as a capacity goes beyond just senses. On the other hand, the arguments for power as an 'exercise' stem from the conclusion that power relations necessarily give rise to an object and a subject. Therefore, power does not make sense unless it has been unleashed or operationalised on the subject. Until then, it is simply a resource or a capacity or 'latent power' as per Dahl (1961). If power is required to achieve the desired outcome, then not exercising available capabilities does not result in achieving any outcomes. There have been recent attempts to reconcile this schism by accepting the duality in the conceptualisation of power. Hearn (2014:177), for instance, argues, 'So, we also need to make this distinction for reasons of processual analysis. To understand how power relations change and develop over time, it is useful to be able both to distinguish power as capacity versus as hierarchy and also to be able to argue why and how these aspects interact in a dynamic way.'

Another stream of studies, following Parsons (1967) and Morris (2002) in sustainability governance, have also attempted to bridge this gap of capacity and exercise by conceptualising power as the ability or capacity to mobilise resources for realising the desired outcome (Arts & Tatenhove, 2005; Avelino & Rotmans, 2011; Marquardt, 2016). While I consider the merits of this conceptualisation for this study towards the end of this section, these developments reflect that a dual conceptualisation of power in the same study context can add further depth to the analysis. As these studies also demonstrate, in complex governing arrangements that all three studies aim to study, a singular, deterministic conceptualisation of power as just exercise or just capacity can be limiting and

instead, an understanding that allows a more dynamic interplay between exercise and capacity is desirable.

2.6.3. Source of power - structure-agency debate

The age-old debate on structure and agency in political science also takes centre stage in the study of power (Hayward & Lukes, 2008). The nature of contestation is a little different in that the arguments amongst different camps are on what is the source of power – is it purely structural or is it agential? Structures embodied in day-to-day life in the form of institutions, discourses, and actors are considered to give little space for an agency to operate. 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? The structure and agency binary find a home in both 'power to' and 'power over' arguments. While 'power to' advocates find it helpful to use structural explanations for resource or capacity allocations to agents, the 'power over' school prioritises agential interactions to shape outcomes (Lukes, 2005). However, more scholars are reconciling with a relational view of structure and agency.

Two approaches have been described: Firstly, with structural explanations, the 'power over' or power as domination argument 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 & Lukes, 2008). While both have considered disembodiment or disindividualisation of power as one of the supreme forms of power exercise – especially in the context of Government, they also theorise agency to operate within the constraints and choices allowed by the structures (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). On the other hand, Lukes (2005) argues that human agency operates and consents to power when it chooses from the choices placed by the structures in place of resisting (Lukes, 2005). Elias (1994) referred to this as the internalisation of structuration practices in tacit knowledge.

The second approach considers structures to be dynamic and changing, and changes are brought in by human action. Giddens' (1984) theory of power exemplifies this approach by

linking the dichotomy of structure and agent that flows from his theory of structuration. He does not assign intention or interests to the concept of power and considers any action undertaken by an agent to be 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 but 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 giving 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 (2005) articulate 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' (Arts & Tatenhove, 2005:350). These two approaches to understanding the dynamic interactions between agency and historically constituted structures provide important theoretical foundations for analysing policy domains that are in the process of transitioning and hold the potential for deeper structural changes where new actors can emerge (like energy in this case). As Haugaard (2012:45) 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 becomes operational when actions and inactions of particularly powerful agents transform or sustain the structures that include or exclude and 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 action or inaction.

Power, as conceptualised in political science and represented through the discussion above, is fundamentally reflected in actions and inactions operating through observable and unobservable, intentional and unintentional means. Realms of governance, whether national, urban or multilevel, that are intrinsically related to the actor, institutional, and material configuration to act on social challenges is an embodiment of the complex terrain of underlying power dynamics. The above discussion, in combination with the complexities of a multilevel governing arena, underlines the need for a framework that reflects the following:

- Multidimensionality as multilevel urban governance takes place in a complex political arena, as reflected in the governance definitions assumed for this study (see the introduction to this chapter). Multidimensionality of power exercise has the potential to

generate more profound insights into the multilevel multi-actor relationships and how governance of specific problem areas is constituted and shaped.

- Comprising both relational and processual nature of power that allows for an identification of power exercise and how constitutive powers like capacity, resources, or authority are shaped.

- An interactional and recursive relationship between structure and agency where both can become medium as well as the outcome of power. In other words, while structure shapes agency by attributing certain capacities to actors, actors, in turn, are capable of reconfiguring the structural practices through actions and ushering in new systems of meaning.

The above positions form the cornerstone for conceptualising power in this study. Multiple power frameworks offered by scholars of political power and interlinked fields such as Lukes' three dimensional/ faces of power (1974); Clegg's circuits of power based on capacity to act (1989); Maan's sources of power (1993); Haugaard (1997); and more derived understandings like Arts and Van Tatenhove's power in policymaking (2004), 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 theorise power. These frameworks, though diverse, were created with specific objectives in mind. In the same vein, the analytical framework set out in this study will not only build on these frameworks but also account for the study's specific objectives.

2.7.   Power in multilevel governance approaches

Governance as a subject has been critiqued for not considering power more comprehensively (Arts & Tatenhove, 2005). Griffin (2012) has argued that though governance theories implicitly assume power relations and interdependence, the theories lack the flexibility to allow a more dynamic conceptualisation of power. The lack of an explicit engagement with the wide-ranging conceptualisation of power is also apparent in the subdisciplines like multilevel governance and global governance (Barnett & Duvall, 2005; Marquardt, 2017). Marquardt (2017:163) further critiques the MLG theory saying, ´lack of a clearly defined or universally accepted theoretical foundation, concepts and theories from other fields like power theory are desperately needed to advance multilevel governance research.' This is in line with Smith's (2007) argument that MLG adds little analytical value, although useful. He,

too, contends that change in the power relationships and distribution of power between the levels of MLG can be a useful area and needs further conceptualisation.

One possible explanation or defence against the above arguments could be that a theory such as MLG's foundation lies in the understandings of power, albeit in a limited way. The main focus of MLG, especially Type 1, has been to understand the division of power amongst the different levels that are closely linked to the preordained division of authority and jurisdiction (Hooghe & Marks, 2001; Stein & Turkewitsch, 2009). By focusing on the policy competencies and financing powers divided as per the neatly stacked jurisdictions, MLG ignores the multivarious analytical potentials of the power literature. Further, basing their theoretical framework on EU centric empirical evidence, Hooghe and Marks (2001) essentially position the two MLG arrangements in neutral political terms of efficiency and coordination. The contested or the political nature of these arrangements or the interactions within these arrangements for specific ends desired by the powerful, as seen particularly in the global south, has been largely ignored (Jaglin, 2014). Thus, at best, MLG serves as a precursor to the understanding of power in complex, particularly hierarchical policy-making environments like that of energy, where both Type 1 and Type 2 overlap.

Further, MLG allows the consideration of other non-state actors and their linkages to this policy and decision-making process. Political ideas and interests are likely to osmose into each decision-making level creating a situation ripe for contestations and persuasion. For instance, nation-states in developing countries are known to increasingly design neoliberal energy policies influenced by international multilateral financing or advisory bodies or international consultancies (Newell & Phillips, 2016); On the other hand, cities are known to be influenced by international cities networks that propagate peer to peer learning (Chu, 2016).

While the governance literature has not been able to take advantage of the vast expanse of power concepts, one emerging strand of power conceptualisation is particularly pertinent for this study. Apart from conceptualising governance as the distribution of power, governance is increasingly being understood as operationalising power through steering as opposed to commanding (Griffin, 2012). Steering is the act of bringing the multilevel and disparate actors and elements in alignment and working together for a single interest. This assumes the presence of a powerful agent and operalisation of the power within a multilevel governing arrangement to bring about 'deep and radical changes to existing sociotechnical structures' 'legitimising top-down performance regime by depoliticizing struggles' (Engberg, 2018:146;

Voß et al., 2010:198).

Related to this, concepts of governmentality, orchestration and metagovernance have also emerged within multilevel climate governance literature as more operational notions of governance that ground themselves in the understanding of how power can be operationalised from a distance without necessarily coercive or direct domination (Gordon & Johnson, 2017; Hughes et al., 2018; 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, 2017:9; Foucault, 1982:220). Bues and Gailing (2016:76) suggest,

> In summary, 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. Through this conceptualization it helps to develop a critical perspective on the role of power in societal transformations – or a turn towards an operational notion of power within governance.

In the increased adoption of sustainable energy technologies, the superiority of the nation-state is considered inescapable (Enberg, 2018). In particularly climate governance studies, national approaches to governance are taken as a necessity given the 'purposive' and time-bound nature of climate-linked energy transition (Eckersley, 2017). Therefore, a consensus for the power differential and hence underlying structures are taken for granted or even considered prescriptive.

Orchestration is an indirect mode of governance 'distinguished by an attenuated relationship between governor and governed' (Abbott, 2018; Gordon & Johnson, 2017:695). Broto (2017) highlights, 'orchestration which sometimes requires domination, but most times works upon mechanisms of seduction and inducement' to essentially gain 'control and authority' that can also exclude certain actors, means, and even outcomes related to climate objectives (Castán Broto, 2017:8). Giving an example from their typology of what orchestration entails, Gordon and Johnson (2017) opine,

> Emergent orchestration operates on a logic of interurban competition for economic standing and capital investment and abstains from positioning cities as participants in, or alternatives to, the global climate regime complex. Orchestrating power thus rests on the ability to establish those standards that become widely accepted amongst all actors

51

located within a common domain. In a manner similar to Barnett and Duval's (2005) characterization of structural and productive forms of power, emergent orchestration is located in the process through which such standards are developed, diffused and rendered dominant (Broome and Quirk 2015:705).

The concept of metagovernance is consistent with orchestration but calls attention to the governing mechanisms within state bodies or the government arena in particular (Abbott, 2018). Whitehead (2003:8) defines metagovernance to conceptualise 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 the proliferation of different types of actors in a governance arena has meant that indirect methods of governing take precedence over direct domination and control, and command. Contrary to the common notion of 'hollowing out of state', this only concentrates the powers in the hands of the incumbent or structurally powerful actors as they hold control over these institutional and discursive processes.   Whitehead (2003) argues that metagovernance allows for a non-deterministic view of hierarchical power. Therefore, standard views like bounded autonomy and capacities of urban governments (Castán Broto & Westman, 2020) need to be considered as interdependent on higher powers and their politics. Whitehead (2003), through his case study of the West Midlands, demonstrates how through non-coercive mechanisms such as strategic frameworks and monitoring procedures, the national government constricts liberties of local partnerships and controls organisational intelligence.

Aligned with the above, Li (2007) conceptualises governing from a distance in the form of 'will to improve' by Li (2007), inspired by the Foucault's governmentality that assigns three dimensions to governing by different actors: 1) strategic ideas/ rationalities to order or improve something or someone; 2) the actual technologies/mechanism/act to improve; 3) recruiting or conducting the conduct of the relevant actors 'who would deploy those calculative rationalities over themselves and the world' (Castán Broto, 2020:249).

The above indirect forms of governance highlight the need for embracing the complexities of power as a concept. Significantly, they force attention on the question of the strategies or mechanisms to achieve this indirect form of government as a discreet unit of analysis. Engberg (2018) distils a multitude of mechanisms from the 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, 2018:143; Nederhand et al., 2016; Sehested, 2009); Terming mechanisms as 'technologies of the government', Bues and Gailing (2016:73) identify 'energy legislation, the organizational structure of the energy system, strategies and discourses related to energy, energy infrastructures and their ways of inducing human behaviour or mechanisms of energy pricing' as some of the power mechanisms to induce 'technologies of self'. Mechanisms have been theoretically fleshed out further for this study in the next section.

Recent studies in multilevel climate governance have also engaged with a more traditional scholarship of power as well as conceptualise power in a multidimensional way. Eckersley (2018), Ehnert et al. (2018), and Gregorio et al. (2019) conceptualise power largely in the sense of attributes and capacities to highlight the resource interdependencies and power concentration and differentials that shape climate action in a multilevel setting. In doing so, all three studies underline the importance of local as well as the national context in understanding the effects of power.

2.8.   Power in socio-technical transitions

A more complex power conceptualisation within multilevel governing systems is covered in the socio-technical transitions literature that studies societal transitions towards sustainable technologies. There is a growing scholarship within the transitions literature that is trying to understand the explanatory prowess of politics and power. The basic premise for the sustainable transitions literature is to make sustainability interventions mainstream through broader socio-political change. Grin (2010), Avelino and Rotman (2009, 2011), and Marquardt (2018) have offered some of the power interpretations within the broader discipline. Given the limited exploration of explicit power conceptualisation in MLG, it may be worth turning to sustainable transitions literature that has recently attempted to look at sustainable energy governance through a political-economy approach (Kuzemko et al., 2016). Unlike urban climate governance scholarship, where sustainable energy governance is often clubbed under the broader rubric of climate governance, transitions have paid distinct attention to energy sustainability in terms of socio-technical systems. Thus, insights from the socio-technical transition studies can serve as a valuable layer to the MLG framework to gain a nuanced political perspective of the sustainable energy sector.

The transitions literature makes it possible to take a systemic as well as a more dynamic view

of the domain of sustainable energy interventions due to their significant focus on structural change. It especially helps in putting into context the challenges faced by new emerging actors like cities in the face of the dominant powers of traditional energy actors. As a result, the sustainable energy transition has emerged as a subdiscipline in its own right, with contributions from scholars across disciplines (Brisbois, 2019, 2020a; Kuzemko & Britton, 2020; Moss et al., 2016; Sovacool & Brisbois, 2019; Stirling, 2014). As the earlier chapters highlight, the scholarship widely argues that this phase of energy transitions hinges on the systemic transformation of the sector – not just in terms of the technological configuration but also in terms of actors' configuration. A key preoccupation within the literature is with the structurally powerful actors who control the mode of conventional energy production and consumption, their relationship with the state, and the rules and norms changes that will facilitate an increasing share of cleaner energy technologies and actors (Brisbois, 2020b; Sovacool & Brisbois, 2019). Much of this depends on the transitions that are facilitated or inhibited within the institutional and structural realms, often used interchangeably in the literature (Becker et al., 2015; Fuchs & Hinderer, 2014; Sovacool & Brisbois, 2019). Power analysis to throw light on the issues of incumbency and path dependency has been a common concern across a number of studies. Issues of path dependence, for instance, emerge from the obduracy of the current institutional, structural, and material processes and are visible in the 'reproduction of selection mechanism/environments' and take place through feedback mechanisms such as sunk costs; learning and coordination dependency (Becker et al., 2015; Kuzemko et al., 2016a; Sareen Siddharth, 2020; Wolf, 2020) (Becker, Beveridge, et al., 2016; Kuzemko et al., 2016b; Wolf, 2020:92). Ideas of 'elite power', 'incumbency', and 'power-play' can embody and manifest structural path dependence and tilt the transition in favour of the powerful and exclude new actors such as cities or cooperatives (Sareen, 2020; Sovacool & Brisbois, 2019; Stirling, 2014). Stirling (2019) links the concept of pathways with incumbency and posits that incumbency can prevent perfectly feasible alternative pathways from being part of the transition. Becker et al. (2016) argue that energy transitions studies have primarily focussed on the stabilising and obdurate aspects of institutions and can vastly benefit from a deeper engagement with historical and discursive elements to look at processes of change. They further argue for the consideration of structures, separate from the above elements that are interpreted by agents to shape their actions. Capturing some of these aspects, Brisbois (2019) has conceptualised 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) identifies instrumental, structural, and discursive types of power for the analysis while focussing on the exercise of power, contrary to most other conceptualisation in this field that has viewed power as a capacity (Stripple & Bulkeley, 2019). There has also been an effort to re-materialise energy transition studies where the material component of energy is increasingly implicated in the nature, decisions, and pathways liked to the sustainable energy transition, particularly in terms of the scale and spatiality (Balmaceda et al., 2019; Kuzemko & Britton, 2020; Moss et al., 2016; Stripple & Bulkeley, 2019).

In summary, both sub-disciplines of multilevel climate governance and energy transitions have only recently begun exploring explicit, multidimensional, and more derived conceptualisation of power. The review of these two literature streams was helpful in generating insights related to 1) governing from a distance in a complex governing landscape emphasising the relational aspects of power and 2) the tension between incumbents' power play and new players' subjectivation or resistance that shapes the transition to new structures and institutional arrangements. Lastly, given the relatively recent foray into the traditional power conceptualisation in the scholarship, there is space for additional or alternative conceptualisations of power that considers the operationalisation of power in dynamic multilevel governing contexts.

2.9.   Power in socio-technical transitions

The literature review in this chapter covers a range of literature streams related to the study. At the outset, it summarises the evidence presented by urban climate governance scholarship on the kind of actions that urban governments are undertaking and a critical review of the enabling or the constraining conditions that shape these actions. The discussion highlights the scholarly calls to view urban arenas as complex multilevel governing arrangements and engage with the national political economy of the context they represent for understanding the origin of the earlier discussed conditions. Accordingly, disciplinary understanding of multilevel approaches to urban climate governance and emerging politics of sustainable energy transitions are discussed. The insights of contestation with multilevel governing structures of urban governance and entrenchment of incumbent fossil-based governing

structures in the energy sector build the case for a power-based assessment of urban sustainable energy governance in the three cases. Such an approach is an attempt to deepen the extant understanding of urban climate governance that is limited to discussions of lack of capacity and authority. Further, as direct conflict and coercion are not commonly witnessed in formal governing realms, the analysis aperture begs an approach where non-coercive, non-descript processes of governing by the powerful actors are taken into account. A turn to the political science scholarship of power was made, and a brief literature review of the key debates in power scholarship was presented. The review discussed the scholarly understanding of power that is beyond the notions of coercion, dynamic and allowed agency-structure interaction. A review of the emergent applications of these concepts in the concerned disciplines of MLG and sustainable energy transitions revealed frameworks that illuminated power in 'governing from a distance' and the dominance of sector elites. The review, in its entirety, established the need for a new power-based analytical framework for urban sustainable energy transition governance drawing from the existing frameworks and insights discussed in this chapter.

Chapter 3: Analysing power in urban sustainable energy governance - a framework

3.1. Introduction

The literature review in the earlier chapter outlines the complex multidisciplinary terrain within which urban sustainable energy governance is situated. This study builds on two important insights generated by the review. Firstly, urban sustainable energy governance needs to be comprehended by placing it within the complex multilevel governance set up within which it is embedded. Secondly, politics underlying multilevel governance of the area of concern – urban sustainable energy transition here - is central to understanding the actions and inactions of the urban governments. As I posited earlier, these two insights in urban sustainable energy governance make an academic enquiry through the lens of power particularly relevant. Power analysis, even in its most fundamental conceptualisation, allows critical assessment of the conduct of the most powerful as well as the weakest, giving insight into the objectives, relationships, strategies, and change in action.[12] 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.

In this chapter, I present an analytical framework to understand power operationalisation within multilevel governing systems as it shapes, enables, and subverts urban climate governance. In developing this approach, I draw insights from the power literature discussed in the earlier chapter to elucidate why power as an analytical lens will be useful for this study and urban climate governance in general; what aspects should be taken into account in developing the framework, thus establishing the scholarly foundations of the framework. In

---

[12] Dahl's 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. (Dahl, 1957).

the second half of the chapter, I describe the methodology used for the application of this framework.

3.2.   Setting out the analytical framework

The analytical framework presented here has been developed with specific research questions in mind. With the objective of analysing how power operations, emergent from different points of this governing ensemble, interact to shape sustainable energy actions by cities, I develop this framework to focus on the operational manifestation of power. This attempt is a departure from the more capacity oriented understanding of the established power frameworks in this field and more in line with Brisbois's (2020) conceptualisation within the POWERSHIFT framework. This also attempts to respond to the need highlighted in the literature for 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 & Newell, 2018a:75; Luque-Ayala & Silver, 2018; Stirling, 2019; Stripple & Bulkeley, 2019).

Keeping the above in consideration, I propose a framework that builds on a framework offered by Barnett and Duvall (2005:8). Barnett and Duvall (2005) adopt an inclusive conceptualisation of power as 'production, in and through social relations, of effects that shape the capacities of actors to determine their own circumstances and fate'. The framework was proposed as a response to what the authors call 'conceptual myopia' in global governance scholarship in considering a singular view of power, i.e., resource-based power (Barnett & Duvall, 2004:67). Barnett and Duvall's framework offers a taxonomy along two axes, i.e., 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). While I elaborate on how these powers have been defined and adapted for the analytical framework of this study in the paragraphs below, Barnett and Duvall (2004) have strongly suggested viewing the four types of power in a co-existing as well as integrated manner while also allowing overlaps. Integration can signify the relationship between the types of power that may balance each other or reinforce each other. In a complex and multilevel governing landscape, not only will these types of power interact but can potentially originate from more

than one nodal point (agents or entities) concurrently. The outcomes realised from the governing enterprise, such as the sustainable energy actions (or inactions) by urban governments, would be fundamentally shaped by the net effect of these multitudinous power processes. This is also in line with the conclusions drawn by Kuinsderma et al. (2012:411) 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.' This has defined the approach taken to apply the framework in this study. It will then be imperative to at least attempt to identify the expanse of the major power processes or strategies within the multilevel urban sustainable energy governing arena to analyse cities' actions (or inactions) adequately.

The framework, yet to be applied in climate or energy governance studies, also fits the objectives of this study better than some of the other existing frameworks for the following reasons: Firstly, the framework's key advantage is the flexibility and broad scope it offers (as also articulated by the authors themselves). The Indian urban climate scholarship already characterises cities as embedded within powerful vertical hierarchies while having little capacity and mandate to act on sustainable energy (Khosla & Bhardwaj, 2018, 2019; Sami, 2017). With its multidimensional typology, the framework allows building an analysis that goes beyond these existing straightforward explanations. Instead, the main focus can be put on more dynamic notions of power while at the same time allowing exploration of contextual, covert, and more obscure forms of power. The second dimension in the framework where power is operated through different *specificity of the social relations* accommodates the observable and unobservable forms of power debates (Barnett & Duvall, 2005). Therefore, in addition to evident, direct processes of power such as commands or punitive measures, more subtle covert routes of power operation are considered. The broad conceptualisation of the individual power types provides analytical flexibility in capturing context-specific power operationalisation compared to most other existing frameworks where the effects or type of interaction are predetermined or limited in scope. Further, the power taxonomy proposed by Barnett and Duvall (2004) offers the scope to adapt the power categorisation in discipline-specific ways for the specific governing area under research (cf. (Moon, 2019)).

Secondly, by conceptualising power as 'production of effects', the framework allows a focus on the actual operation of power as against the more prevalent conceptualisation of power as a capacity or attributes (cf Avelino & 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. Within governance studies, the application of the framework can allow focus on the process of governance as a power–laden activity. Stripple and Bulkeley (2019:53), for instance, based on Barnett and Duvall's conceptualisation, have conceptualised power as 'a social process constituting actors as social beings, that is, their capacities and identities'. This has allowed them to visualise decarbonisation 'as a set of politics, social and material relations that are invoked and pursued through a complex array of interventions with multiple intentions and (unintended) consequences'. 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 without necessarily being deterministic and allowing the agency to interpret the incidence of power. Barnett and Duvall (2004/05) envisage the effects of power production primarily on the actors' actions but also on their conditions and the constitution of their identities and interests. Again, as the focus of this study is how decisions and actions of city governments are shaped within India's sustainable energy governance, this conceptualisation provides a suitable ground for a more streamlined analysis concerning urban governments, unlike most other frameworks that privilege the power wielder. Drawing attention to conditions of the actors and constitution of urban governments' self-interests can help understand inactions – why some urban governments have not been taking sustainable energy actions.[13]

Lastly, the framework also helps transcend some of the other intrinsic power debates (highlighted in section 2.6), allowing a more comprehensive theoretical foundation for the analysis. *Production*, here, is considered a joint operationalisation of both exercise and capacity where actors with preordained attributes exercise power to shape the actions or capacity of other actors to take actions (conditions of actions) using multiple strategies, processes, or mechanisms. Additionally, while the framework seems to tilt towards the structural explanation, agency is allowed significant space to operate as dominating, emancipatory as well as structure shaping roles. Explaining how the structure and agency debate has been addressed, Barnett and Duvall (2005:49) posit, 'We want to stress, though, that because each type of power has at least an implicit view of both agency and structure, none simply reflects an entirely agentic or structural perspective (to the neglect of the other)'.

---

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

The understanding is in line with the agency-structure dynamic co-constitutive relationship highlighted by Sovacool and Brisbois (2020).[14] This is also reflected in the distinction drawn between structural and institutional power in the taxonomy that are often conflated in other frameworks in this discipline.

Having summarised Barnett and Duvall's framework and its advantages, a description of the framework and how it has been adapted for this study has been given below. 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 to take sustainable energy actions embedded within a complex multilevel governing structures or interactions.

Aligning with the definition offered by Barnett and Duvall (2005),[15] power is understood to be *production, in and through social relations, of effects that shape the identities, actions and conditions of actions of other actors.* 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 model comprising three main conceptual units underlying the original framework – 1) power *types*; 2) power *mechanisms*; 3) *effects* – sharing a linear relationship. Therefore, within any complex governing arena of interest, the model will analyse how power, the different *types* identified in the taxonomy, is operationalised through power *mechanisms* to produce specific (intended or unintended) *effects* on the actions, conditions, and identities of other actors.

The existing framework already offers an explicit conceptualisation of the two main units of power *types* and, to some extent, the *effects* on actors. In keeping with the more bottom-up approach of this study and acknowledging the existence of multitudinous power operationalisation even under each power category, I propose the unit of *mechanisms* to encapsulate the context-specific processes and strategies under the rubric of each type of power. 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:

---

[14] 'For the purposes of low-carbon transitions study, we view power as simultaneously agent centered, corrective, and conduct shaping, as well as structure centered, pervasive, and context shaping' (Sovacool & Brisbois, 2019:2).

3.2.1. Power types

Barnett and Duvall's four types of power generated from the two dimensions of power identified – nature and specificity of social relationship – address the first two debates of power scholarship. However, Barnett and Duvall frequently downplay the ontological differences of the power types and propose that none of the power types 'simply reflects an entirely agentic or structural perspective (to the neglect of the other)' (Barnett & Duvall, 2004:13). The four power types offered, in many ways, can be conceptualised as both sources as well as the medium of power for the actors and elements. Given this conceptual flexibility, I add a fifth power type - *material power* - that to some extent also embodies this dichotomy and reflects the disciplinary requirements of this study.

- ○ **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 conceptualisation 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 studies (Barnett & Duvall, 2004). But compulsory power need not be limited to material resources and can also work through authority and normative resources. 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 & Duvall, 2004). Direct interaction between actors is the critical identifier for this type of power.

- ○ **Institutional power**: In contrast to compulsory power, institutional power works indirectly through the formal and informally established norms, procedures, and rules between the actors. 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 & Duvall, 2004:15). Institutional power is akin but not limited to the power conceptualisation 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 dominant or elite actors where institutions embody the *mobilisation of bias,* systematically favouring certain actors over others or suppressing certain conflicts indirectly (Bachrach & Baratz, 1962:969). Barnett and Duvall (2004) further argue that this mobilisation can often be a temporal function and have an associated stickiness. Further, even benevolent, efficiency-enhancing, or attempted depoliticisation of institutions to prevent political capture through 'co-ordination and cooperation' can have power dynamics underlying it (Barnett & Duvall, 2004:17). 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 (ibid.:52).

Specifically for urban energy governance, institutional interlinkages and frameworks that exist between the higher levels of government and local governments between local government departments will act in conjunction with the energy-related institutional arrangements. In the case of institutional power, then the scope of exercising direct power reduces and is instead mediated through the established type of institutions. For instance, institutions within the energy domain have historically established that the national government is responsible for the national-level energy policies and legislation and that urban governments are bound to act within those institutional boundaries. While Barnett and Duvall (2004, 2005) do not mention this explicitly, the institutional power conceptualisation in this study takes the new institutionalism approach that, in addition to the above, also considers the cultural aspects within organisations as potential areas of power production.

○ **Structural power:** While institutions and structures have often been used without a clear distinction, including in the energy transitions and governance literature, Barnett and Duvall (2005:52) make a distinction (cf. Brisbois, 2019). They argue structures are fundamentally social relations – 'co-constitutive internal relations' - having the constitutive property of assigning specific 'capacities and interests' to actors and essentially establishing actors as specific social beings. The key differentiation of

structural power is also that it does not necessarily need an actor to operationalise 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 & Duvall, 2005; Lukes, 2005). This conceptualisation of power may be particularly useful to analyse inaction amongst local state bodies who may interpret the continued lack of capacity and authority to shape their interests despite local advantages. In essence, structures can produce unobservable effects on the agency of local authorities and consequently impact decision making. Enquiry into structural power will involve analysing the factors, rationalities, and ideologies that produce, reproduce, or alter the 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:** Conceptually, productively can be easily considered to be the same as structural power. However, in contrast to structural power, productive power entails the production of subjects and subjectivities through discourses, creation and maintaining systems of knowledge and rationalities. Akin to Foucault's conceptualisation of power, productive power works through softer media like discourses, framings, and ideas to create 'microfields' that delineate what is right, what is wrong, what is logical, what is normal, what is possible, and lastly what is a problem (Barnett & Duvall, 2005:55). It is with the establishment of these *microfields* that subjects are created and operationalised, which in turn delineate the scope, agency, and fields of action. Establishing and sustaining rationalities in any context or field is one example of the creation of *microfields*. One of the frequently studied subjects as a case for dominant rationality, and the resultant normative fields of acceptable and possible solutions created by it, is neoliberalism and its impact on technological choices. Zunino (2006) gives the example of urban Chile, where neoliberal logic and knowledge production determined the kind of information and participation that was considered valid in urban project decision-making. A contemporary example here is

64

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, and consequently, the current transition that we are witnessing may only be 'deeper realignments with existing structures' (Stirling, 2014:84). Therefore, the multilevel governance approach will also demand an analysis of how discursive and knowledge production at higher levels of state elites produce the urban government's self-understanding and position in the governing ensemble. For the urban, then, productive power will shed light on the identity, role creation of cities, position in power hierarchies through the discursive lens, and participation in knowledge production in the energy and climate change policy domains.

- **Material power**: This study adapts the power taxonomy proposed by Barnett and Duvall (2004/2005) by adding *material power* as a distinct power type in view of the specific focus on sustainable energy technologies in this study. The materiality, or the inanimate aspects, related to energy has been interpreted widely in the STT literature – energy resources, artefacts of the technology, material flows, and the ways, spatial processes and landscapes shape technologies and in turn are shaped by energy technologies (Becker, Moss, et al., 2016; Bridge et al., 2013; McEwan, 2017; Moss et al., 2016). STT literature also extends the analysis of energy materiality to the socio-political arena and vice versa. Political protests arising due to fracking or Nimbyism are one instance of the societal effects of material requirements of energy (Balmaceda et al., 2019). Kuzemko and Britton (2020) highlight how materiality associated with decentralised energy technologies can position urban governments as important actors in the energy transition efforts, thus according to more capacity. Stripple and Bulkeley (2019) argue that socio-materiality should be viewed in terms of assemblages. When power is considered to be generated rather than attributional, they argue, it will be possible to pay attention to how specific material configurations are employed for particular governing ends and creating subjects.

The materiality of energy technologies is not limited to the equipment of the technology itself but also the substrates (landscape, space, socio-economic context) on which these technologies are embedded. Scholars have highlighted the need to look at the spatiality and location of energy materials and their relationship with energy

65

technologies and infrastructure, focussing on the opportunities and constraints that are created (Becker, Moss, et al., 2016; Sovacool et al., 2020). As sustainable energy 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 materiality of energy technologies to exclude actors and places or to consolidate power in their favour (Moss et al., 2016). As Bulkeley (2015) posits, in assemblage of governance, one of the 'technologies' of governance is technology itself. Therefore, for a deeply technical and engineering-focused (exclusionary) sector like that of energy, technologies can be the object of governance and also a tool for establishing a particular kind of governance. Material aspects of sustainable energy governance bring with themselves 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. For sustainable energy governance technologies, devices, artefacts, and their assessment can range from hundreds of kilometres of grid transmission lines with complex data management techniques to a single light bulb in a household.[16] These insights demand that any framework analysing a socio-technical governance needs to account for the encompassing material power in line with the phenomenon already pursued in the literature.

Material power relates to the direct constitutive as well as relational power of inanimate components of the energy, energy technologies and the urban area. 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 realising low carbon transitions but also the way the 2) materialities are used by the decision-makers in the multilevel governing set up to rationalise their actions or '(re)production of different forms governmental

---

[16] See for instance, IEA report (IEA, 2021b) that stresses on city's role in digitisation of energy systems.

practice or governmentalities'. (Johnstone & Newell, 2018a:79).

3.2.2. Power mechanisms

Mechanisms give us an insight into the ways in which power conspicuously or inconspicuously is operationalised under the different categories of power. They are identified in the form of specific strategies and processes and aid in organising the empirical findings under each power type. In essence, mechanisms act as analytical bridges 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 organising concepts has been used already, particularly in studies of political power and climate governance (Bulkeley, 2015a; Jagers & Stripple, 2003; Johansen & Chandler, 2015; Patterson & Van Der Grijp, 2020). However, it remains under-conceptualised as a discreet, analytical unit. Within the governmentality based studies, mechanisms have been thought of as the practice of the government to accomplish governing and steer societies towards a specific end (Bulkeley, 2015b; Stripple & Bulkeley, 2019). In this stream, scrutinising calculation, audit, accounting, and participation as possible 'technologies of the government' have been conceptualised as mechanisms (Bulkeley, 2015b:12). In other studies, mechanisms are less instrumental or purposive - for instance, 'collective organisation and protesting'; 'unbroken contact with politicians and officials'; 'delimiting decision-making arena'; or 'creating compulsion'; 'threats of sanctions', among others (Ekström & Danermark, 1991). Patterson and Van der Grijp (2020:49) demarcate between a slew of mechanisms that empower or disempower urban climate initiatives.[17] Lukes (2005) too highlights the need for identifying mechanisms within the three-dimensional view of power and explains the challenges thereof. Similarly, Stirling (2019) summarises the different processes that reinforce or weaken incumbencies.

Taking inspiration from these existing discussions, mechanisms in this framework are understood as major collective or individual strategies/ processes/phenomena that, within the rubrics of Compulsory, Material, Institutional, Productive, and Structural power types,

---

[17] *Active* - 'Senior city leadership encourages/discourages climate action'; 'Strategic coalition of actors mobilizes in support/ against of urban climate initiative'; 'Policy/legal frameworks created at higher levels that support/constrain'; 'City participates in transnational networks/initiatives that create new imperatives'; 'Resources for urban climate action withheld from higher levels'. *Passive* – 'Institutional voids provide space/ constrain'; 'Institutional dynamics create windows of opportunity to secure support/ constraint'; 'Citizen awareness (/Lack of) and support for climate action creates political support for'.

produce shaping effects to constitute identities or subjectivities or shape the actions and their conditions (of urban governments in this case). They can be actively configured mechanisms by actors such as non-decision making or rule-setting, or they could be unintended generated processes that create constraints or opportunities. It may be worth reiterating here that urban has been conceptualised in this study 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 in line with the ubiquitousness attached to the concept of power. Within this complex landscape comprising multivarious power mechanisms in operation, individual mechanisms cannot be causal, only influencing. 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 thesis. Instead, a more collective influencing or shaping attribute of mechanisms has been adopted where effects are produced as a net of the multiple mechanisms at play (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 on the power relationships, the significance of material dimensions, instances of resistance and empowerments, and effects of often invisible enduring structures. In this study, I inductively identify the power mechanisms from the data collected from interviews and documents. While an attempt has been made to assort a wide range (though not exhaustive) of power mechanisms under each power type neatly, the analysis acknowledges that power mechanisms will inevitably overlap as well as interact within and across power types.

3.2.3. Effects

Effects produced by power operations are the third dimension of power analysis in this framework. While Barnett and Duvall do not flesh out 'effects' as a separate analytical unit, they broadly identify three broad categories of effects on 1) actions or behaviour of the recipient, 2) conditions of actions denoting the resources, scope and other means allowed for the urban governments; and lastly, 3) their identities as social beings emanating from constitutive effects. The last category has more significant ramifications for transition in any policy domain as constitutive power production subjectifies actors by shaping their self-

understandings, actions that they are socially empowered to undertake, and create disciplining effect through self-regulation and internalisation of constraints (Barnett & Duvall, 2004). For instance, this can potentially result in subjects' rationalising inaction or limited action despite benefits without necessarily attributing to the underlying source, originating possibly at a different level of governing. Barnett and Duvall (2004), however, explain that the conceptualisation of effects does not necessitate relating particular types of effects to specific types of power (structural power only linked to identity, for instance). While constitutive relations can influence behavioural 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 like the one being discussed in this study, multiple effects, like mechanisms, are considered to be at play simultaneously. For instance, the decentralisation scale of energy technologies can create opportunities, but a lack of resources can diminish any scope of action for urban governments. Actions or inactions on sustainable energy 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 power mechanisms and, therefore, making the underlying politics more discernible. This can generate important insights or alternative understandings in the backdrop of the largely capacity-based explanations in the Indian urban climate action literature. Secondly, it also raises questions about the differential potency of the multiple power mechanisms. Further, it is also conceptualised these effects have the potential to feedback into 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 below:
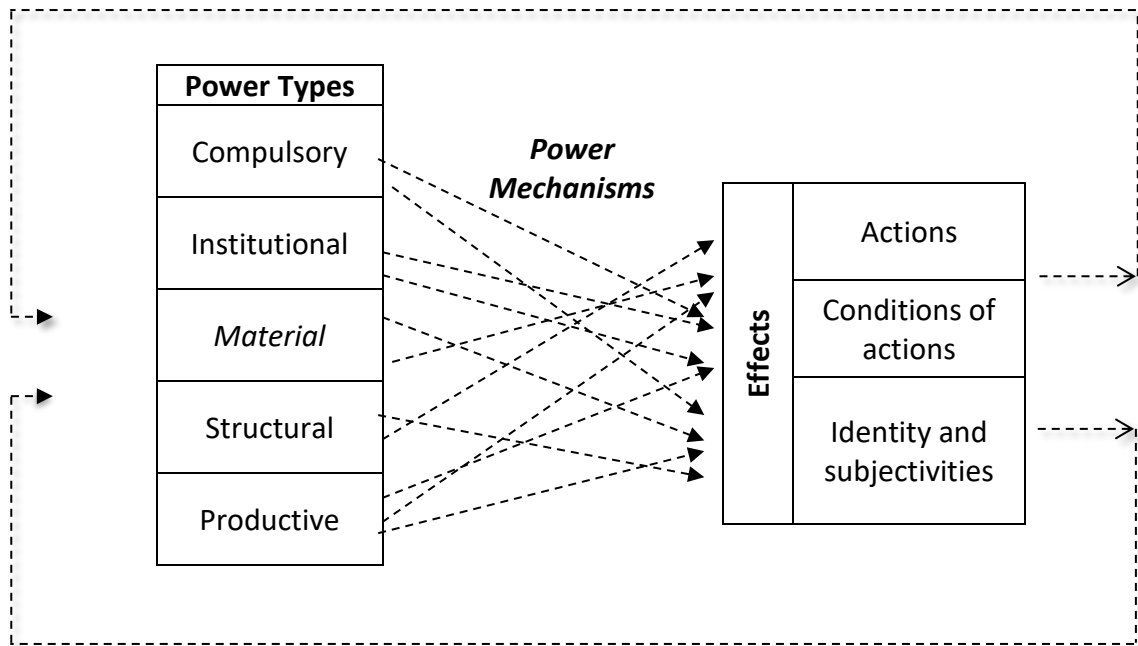
Figure 1: Analytical framework adapted from Barnett and Duval (2004, 2005)

Adapted aspects in italics

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 manoeuvre 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 sustainable energy/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 • Norms Informal norms and rules, formalised lines of responsibility, divisions of labour, 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 • Liberalisation of sustainable energy sector • Modes of production • State and non-state governing structures • Neoliberalisation			
Material	• Material Benefits (monetary, energy savings, resilience) • Artefacts • 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			

Table 1 above provides some examples below to elaborate on these concepts and terminologies discussed above (not exhaustive). Some of these examples have been captured from the governance, climate governance, and energy transition literature (Barnett & Duvall, 2004, 2005; Broto, 2017; Ekström & Danermark, 1991; Lee & Koski, 2015; Marquardt, 2016, 2017; Pasquini & Shearing, 2014; Rhodes, 1986). These examples also guide and inform the analysis in the empirical sections.

3.3. Methodology

The methodology detailed below is shaped by the requirements of the analytical framework outlined in the above section. It follows the multilevel view of urban sustainable energy governance and, subsequently, the multidimensional conceptualisation of power. The syncretic ethos of the analytical framework has also shaped the overall approach to the research design that simultaneously attempts to mitigate the various methodological challenges associated with a political power based inquiry.

3.3.1. Research approach

Barnett and Duvall's (2004) framework brings together power conceptualisation from different research traditions and even crosses over different ontological and epistemological foundations. The scholars have paid little attention to the philosophy of social sciences within their framework that Kuinsderma et al. (2012:415) characterise as 'eclectic'. Barnett and Duvall (2005) argue that this plurality of concepts and paradigms is a necessity for the framework that, unlike most other conceptualisations, the power concepts in the framework are not competing with each other but are complementary in any situation (Barnett & Duvall, 2004; Kuindersma et al., 2012). In line with this spirit, this study places itself within the research tradition of 'analytical eclecticism', an approach that allows different philosophical positions within one particular research paradigm or encompasses a plurality of paradigms in any given problem situation or social reality (Sil & Katzenstein, 2010:427).[18] 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

---

[18] Social reality has been considered to be 'realms consisting of either material (concrete) elements that are directly observable or ideational elements the existence of which must be inferred through the interpretation of their observable consequences. The approach considers the reality to be stratified between the 'action and cognition among individual agents and the analysis of structures— rules, collective beliefs and practices, patterned social relations, or the distribution of roles and capabilities—characterizing various institutions or social environments' (Sil & Katzenstein, 2010:427).

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 & Katzenstein, 2010). Further, this approach allows foregrounding the co-existence and interactions of the power mechanisms to understand outcomes or urban governments' responses irrespective of their philosophical dispositions. While this may be considered a departure from the traditional academic practice in seeking compatibility of ontological and epistemological principles, Sil and Katzenstein (2010:414-416) have argued in detail how this practice can be adopted in 'middle range' studies that do not aspire for grand theoretical contributions. This research approach that adopts frameworks encompassing different, even competing, ontological approaches finds support within the socio-technical transitions literature (Bulkeley, 2015b; Geels, 2010). Although Geels (2010:504) distances himself from regular eclecticism that he critiques as 'ad-hoc combinations', he supports 'inter-ontology crossovers' that take into account differences and build on the dynamic interplay of the different ontologies, particularly for multidimensional fields such as STT.[19]

3.3.2. Research design: case study approach

A case study approach has been adopted in line with the primary pursuit of this study, which seeks to illuminate how power shapes sustainable energy actions in Indian cities. As Yin (2017) argues case study approach is best suited for studies that pursue research questions of ' how' and 'why' and have no involvement in the contemporary phenomenon to be studied (Yin, 2017). A case study is understood to be an intensive study of a single unit for the purpose of understanding a larger class of similar units' (Gerring, 2004:342). The methodological approach has been considered particularly relevant for context-sensitive processes and effect-based outcome analysis (George & Bennett, 2005).

The case study approach extends a number of advantages for qualitative research, as it has to this study. Firstly, case studies with particular attention to context and contingencies can help achieve 'conceptual validity' for a contested concept like power that is the central analytical lens in this study; secondly, inductive research possible within case studies can lead to new and unexpected variables that add to the existing models. Lastly, case studies are

---

[19] Geels does not refer to Sil and Katzenstein's (2010) approach of 'analytical eclecticism'.

particularly amenable to the study of underlying (power) mechanisms and processes for the purpose of capturing a 'large number of intervening variables and inductively observing any unexpected aspects of the operation' (George & Bennett, 2005:20,21).

As this study also aims to generalise the findings to at least a section of Indian urban governments, it has been designed to conduct a comparative assessment of the three cities to infer the commonalities and peculiarities of the cities. Factors that generate these commonalities and peculiarities are then generalised to understand the muted but varied sustainable energy responses of Indian urban governments. Gustafsson (2017) and George and Bennett (2005) have both argued that a combination of an in-depth case analysis (within-case) as well as multiple case analysis (cross-case analysis) could generate more reliable findings for analysis of this nature. Accordingly, both within-case analysis and cross-case analysis have been carried out. The former has allowed an inductive identification of the spatially and contextually contingent multilevel power mechanisms that have effectuated conditions that, in turn, have generated or shaped urban sustainable energy responses in each of the three cities. In the latter case, these identified mechanisms are then compared to assess the commonalities and divergences between cities and the insights thereof for Indian cities at large. The comparison also elucidates how the different mechanisms interact to produce varied effects on the cities' actions. While the commonalities are expected to reflect the mechanisms that are likely to be operational in most similar cities in India, the differences are likely to reflect the agential scope as well as the geographical and scalar nature of power.

3.3.3. Case selection

The case selection was carried out keeping the above approach in mind. Given the heterogeneity, the 'Diverse case' strategy of case selection offered by Gerring (2008:97) has been adopted to select three cities that will represent the spectrum of responses of Indian cities. At the same time, care has been taken not to select completely inconsequential cities that cannot be used to generalise the results. At the first level, cities were selected on the basis of the variable this study seeks to understand - sustainable energy actions. A basic database of fifteen Indian cities taking action on sustainable energy was compiled on the basis of secondary data sources. This helped in generating a 'rough preliminary comparative mapping of membership of cases' (Beach, 2017:15). Cities were broadly and qualitatively categorised into three levels of actions: a) taking significant actions, b) minimal to no action,

and c) cities located somewhere between these ends. As the number of cities in the last two segments of the criteria is expected to be disproportionately high, a second criterion has been placed so that the contextual heterogeneity of Indian cities is also captured – in essence, the economic and political context of the city. The criterion is in line with the climate governance literature that identifies a co-constitutive and co-evolutionary relationship between local context and energy actions (Bulkeley & Kern, 2016).

Based on the above, three cities - Surat, Pune, and Kolkata - from three different states in India have been selected. A detailed description of both criteria (i.e. sustainable energy actions and context) for each city has been provided in the individual empirical chapters, while a brief comparison of the ways in which the three cities reflect their membership in the different categories of cities in India is given below in Table 2.

Table 2: Case selection criteria

City (State)	Pune (Maharashtra)	Surat (Gujarat)	Kolkata (West Bengal)
Sustainable energy actions	Early facilitative actions and several announcements without implementation	One of the leading cities in sustainable energy actions	Few token projects with no serious long term plans
The economic and political context[20]	Tier-II city with a strong educational and service sector population base. Second most important city after the capital city (Kamath et al., 2014).	Tier-I city with a history of trade and commercial activities and designated business elite families (Chu, 2016a)	State capital city with old infrastructure and history of heavy migration and stressed public services.

It bears mentioning here that little literature exists on city-specific sustainable energy actions in India except for reports by city networks or think tanks working with these city networks.

---

[20] As per the typical city classification system based on population size commonly used in India for analytical purposes. This classification is based on Mckinsey, 2010 where Tier 1 - > 4 million population; Tier 2 – 1 million to 4 million population; tier 3 - < 1 million population (Sankhe et al., 2010).

Academic research on a few cities has only recently been published (Bhardwaj & Khosla, 2017, 2018; Criqui & Zérah, 2015). For information on cities' actions, I had to depend on my own knowledge of cities' actions in the field of sustainable energy, media reports, and discussions with practitioners and experts in the field. The selection of the cities for this study reflects this challenge.

3.3.4. Data collection and reduction

The analytical framework discussed in the earlier section assumes a multidimensional nature of power where inference will take into account aspects that were not directly realised by agents, not directly visible or even comprehensible. Accordingly, data collection for this study spanned multiple levels, actors, and multiple sources for all three cities. The wide breadth of data collected was not only in keeping with the requirements of the particular framework but also to compensate for the lack of a rich literature base for both general and city-specific sustainable energy governance. The following strategies were used to collect data and ensure its validity through triangulation.

- **Semi-structured to unstructured interviews**

Close to seventy semi-structured to unstructured interviews were held between mid-2019 to early 2020.[21] The urban governments of the three cities are the central unit of analysis in this study. However, as sustainable energy governance has been viewed as a complex multilevel affair in this study, conducting elite interviews across the three levels of cities, state, and national levels were thought to be imperative. The international scale was covered through interviews with national representatives of the transnational city networks. As most of the interviews conducted were elite interviews where the time and scope of in-depth discussions are usually limited due to the busy schedule of the interviewees and the sensitivities attached to their positions, a large number of interviews were planned in response to this challenge. At the national and state government levels, interviews were held with executives of all relevant ministries and departments. Some interviews turned into focused group discussions as interviewees would voluntarily invite relevant experts/ officials to the same interview. Interviews were also held organised with non-state actors at local, state, and national levels associated with urban sustainable energy and climate actions. Non-state interviewees

---

[21] Broad categories of the interviewees have been listed in the Annexure. Sample interview questions for each category have been provided in the annex.

comprised experts and think tank representatives from sustainable energy, climate, and urban governance fields. Indian representatives from international city networks supporting city governments were also interviewed. A snowballing technique was used to identify potential interviewees in the urban sustainable energy decision-making process. A list of interviewees with appropriate coding has been presented in Appendix A. The high number of interviews helped in the triangulation of the data. The non-state actors' interviews were also used to triangulate the information collected from elite interviews and secondary sources.

The maximum number of interviews were held at the local level; interviews with apex decision-making executives, mid-level department executives, and the elected representatives in the three local governments were held to get both political and executive views. As many of the local government officials are likely to be operating within the power constraints and conditions of senior executives, special care was taken to organise interviews in settings where these challenges could be avoided. Meeting notes were also taken to pay attention to interesting interactions and mannerisms beyond the interviews.

As the interviews are expected to explore and understand the actor's account of the decisions related to local, sustainable energy governance and interpretation of the wider conditions and discourses, an overly pre-determined questionnaire was deemed unsuitable. Accordingly, interviews or focussed group discussions were largely designed to be semi or unstructured with an effort to generate reflective responses on the state, potential, and limitation of urban action in sustainable energy. The interviews were also designed to elicit responses on particularly 1) decision making processes of sustainable energy actions and policies at the city level; 2) rationalities, reasons, and interests for actions, inactions, technological application and scale choices; 3) ideas on city governments as sustainable energy actors (identity/self-understanding). Discussions were also steered towards the rationalities for not choosing other available choices or planned actions or choices that were made by other urban governments. This was done with the help of secondary data and media reports on the failed projects or planned or dropped actions. While interviews were critical for all-round data collection, it is the primary source of data collection for understanding the rationalities, interests, and self-understanding of the identities of urban governments.

- o **Document analysis**

Documents, namely laws, orders, policies, regulations, annual statements, and reports, were

some of the key sources of data collection that supported the data collected from interviews – both in terms of enriching and triangulating the data. Minutes of meetings (particularly committee meetings within the Municipal Corporations) translated from the local vernacular language were also part of the data to ascertain the speeches, discursive vision statements, objections, and political resistances within meetings. Lastly, media reports comprising the speeches, public statements, news of sustainable energy actions, plans, cancellations, collaborations, and public discontent within the city were also gathered as data.

- o **Process tracing**

I have also used process tracing as an additional data collection method for all significant sustainable energy actions in each of the three cities. Although linked, process tracing focuses exclusively on the decision-making or implementation processes. Process tracing as a methodology is particularly amenable to within-case analysis where the focus is on 'sequential processes within' and 'complex interactions' (George & Bennett, 2005:13,22; Yin, 2017). The decision-making process in urban governments in India is often scattered where the origin of the idea can be from non-state actors, domain-specific departments or higher levels of governments. Process tracing serves as a heuristic tool to inform the sequence of events and thereby can indicate the real decision-making centres and potentially new power mechanisms (George and Bennett, 2005). Process tracing in this study is realised through a combination of interviews, meeting resolution documents, and other sources (George and Bennett, 2005). I intend to utilise process-tracing as a complementary method to the above data; more as a method of data collection and analysis to understand the sequence of the events rather than claim causality. The data collected were transcribed and translated wherever required for further analysis.

3.3.5. Data analysis and drawing inferences

The data analysis was conducted in two main steps as per the research design of the project – 1) within-case and 2) cross-case analysis. Based on the theoretical framework outlined in the last section, the following steps have been taken to conduct the data analysis for each city:

A mixed-method approach combining deductive, inductive, and abductive approaches to data analysis has been taken. Within the dataset, the three broad *effects* categories of 'actions', 'conditions of actions', and 'identities and subjectivities' are the key entry points for

identifying the patterns of mechanisms in the data. Anchoring the analysis on *effects*, power *mechanisms* as defined by each power *type* in the framework were traced analytically from the data as broad patterns or themes representing strategies or processes that seemed to produce, influence, or shape the *effects* identified in the data. For instance, if the financial limitation was highlighted as one of the conditions of actions (*effect*) and was further triangulated through documents, the *mechanisms* employed to constrict the financial resources of the urban governments would be identified and categorised under institutional or structural *power type*.

The analysis was guided by the indicative list of probable *effects and mechanisms* provided in Table 1 in section 3.2.3. The identification of the variables has also been informed by academic as well as grey literature in this area. Nevertheless, as existing literature on Indian cities is limited, an open-ended approach was adopted, and *effects and mechanisms* beyond the list were also considered. However, this process of giving meaning through interpretation or inferences is particularly relevant for the power scholarship, where what is visible and what is discernible is only the entry point or one dimension of power. Therefore, what appears directly in the data would only reflect the underlying mechanisms in a limited way. As Smith and Elger (2014:15) state, 'knowledge about events and processes, let alone causes and underlying conditions, is not simply the transparent product of a conversation between interviewer and interviewee'. For the dimensions of power that are operational only through indiscernible means or work through subjectification and consciousness of other actors, knowledge about a phenomenon/ mechanism will always remain incomplete and weigh heavy on the researcher's discretion.

Therefore, the three approaches of deductive, inductive, and abductive analytical reasoning had a distinct role to play in the analytical process of identifying effects and interlinked power mechanisms. A deductive approach was adopted in identifying theory-driven *power types* and creating the distinction between different mechanisms. An inductive approach was used in the case of the more discernible variables such as techno-material interdependence or centralisation. In the case of more indiscernible variables such as mechanisms shaping identities or subjectivities, an abductive approach was used where inferences were drawn through a recursive and reflexive process between data, theory, and practice. An abductive approach is relevant to power analysis in particular, where practical instances are recontextualised or redescribed as per power theory or discipline-specific practices or context

(Danermark et al., 2005).[22] Sareen (2020:106) posits that the abductive approach in such studies 'opens up for empirical investigation, accommodates uncertainty, and retains focus on practical applicability and real-world relevance'.

As I mention earlier, the analysis appreciates and acknowledges that any particular effect may not be shaped by just one single mechanism; there may be multiple mechanisms at play. Keeping that in mind, this study only claims the presence of a particular power mechanism and does not claim causality for a specific effect or outcome. For instance, this study only points towards the presence of mechanisms such as centralisation or localised institutionalisation in the urban sustainable energy governance arena do not necessarily draw a direct causal link to the effect these mechanisms have caused. Instead, a broad interlinkage is analysed in the concluding section to illustrate how different mechanisms collectively interact and counteract to shape the sustainable energy actions, conditions of actions, and identity of the urban government. Findings of which type/(s) of power is playing the most pronounced role in the city are also discussed.

In the second level of the analysis to answer RQ2, mechanisms from each individual empirical case have been generalised for the larger landscape of sustainable energy governance in India and city governments at large. These have been discussed separately in chapters 4 and 8 in the thesis.

3.3.6. Researcher's position, limitations of the methodology, and challenges

As discussed in the earlier paragraphs, analysis of multidimensional power involves interpretation as well as inferences that implicate the researcher's perspectives, biases, and subjectivities. My ideas around clean energy governance in India have evolved along with the evolution of clean energy development in India. In developing the analysis for this study from the collected data, I draw upon my past interactions and experiences with India's energy sector policymakers and access to the national level policymaking processes. I also draw upon my learnings from the numerous focus group discussions as well as workshops that I have participated in or organised both at the national and subnational levels over the last several years of my engagement with the sector. However, this also inevitably brings along with it the

---

[22] See Danermark (2005:88: table 2) for examples of individual events being reinterpreted as general structures or another phenomenon.

challenge of an unconscious bias in data analysis as well as research design. I have tried to address this by seeking feedback from my peers and colleagues.

The methodology discussed above is also not without its limitations. The analysis is based heavily on the arguments and perceptions of the agent or the decision-maker. For instance, they may have not only internalised the power differentials and subjectivation but also actively supported it. Alternatively, interviewees can also respond in order to forward their interest where they view this study as an avenue to spotlight their challenges or successes. Interviews with apex decision-making officials often led to this situation where the objective was primarily to showcase the achievements irrespective of the questions posed. This approach, therefore, places disproportionate dependence either on the interviewee or on the researcher. The key challenge that the study had to face was the global pandemic that affected the data collection midway. City officials were at the forefront of the Covid fight at the local levels. Both Pune and Surat were two of India's worst Covid affected cities, which made any further data collection, and interviews difficult, even electronically. I have taken recourse to secondary sources and media reports to fill the data-related gaps that arose as a result of this. Lastly, conducting social science research in a highly engineering-based and gendered field that preoccupies itself with techno-economics of large-scale energy presented itself as an unprecedented challenge during data collection. In many interviews with the senior policymakers at national as well as state government levels, the idea of city governments as energy actors was dismissed as being 'gimmicky', and therefore, introspective questions on urban energy policies were not taken seriously. While it could be argued that this can be interpreted as data, particularly in a power-based analysis, detailed data gathering around the rationalities of sustainable energy transition policies at these higher levels remained a challenge.

3.4.   Conclusion

This chapter first presents the framework adopted for analysing sustainable energy actions in Indian cities through the lens of power. For this, the framework adapts and builds on Barnett and Duvall's (2004/05) relational and processual conceptualisation of power. In adapting the framework for the current problem area, a heuristic model linking power types, mechanisms and effects is proposed. Further, material power to the original taxonomy of power types has been added to reflect the understanding of the energy transitions discipline. Subsequently,

the methodology section comprises comprehensive details on the research approach and design, modes of data collection and challenges thereof, and approach to the analysis in line with the framework.

Chapter 4: Analysing power in sustainable energy governance in urban India

4.1.   Introduction

This chapter marks the beginning of the empirical section of the thesis. The phased approach to the empirical analysis in this thesis is designed taking into account that the governance of socio-technical systems (STS) like energy systems in the urban areas of India sits within a larger multilevel governing structure while simultaneously being shaped by specific local spatial and contextual influences (Haarstad, 2016). In addition to the immediate material and socio-economic and political milieu that set the conditions for their governance, cities are situated within a wider political economy that equally shapes all cities in a region or nation. Power operationalisation within this wider political-economy landscape that shapes all Indian cities equally has been covered in this chapter to avoid duplication in the city-wise empirical chapters.

In this chapter, I first set the historical and contemporary context of the urban climate and energy sector governance in India. Sustainable energy governance in Indian cities is taking place at the intersection of these two policy domains. I use the context as a base, and using the data collected and literature on the evolution of this sector; I present an empirical analysis formalising inductively identified power mechanisms under the five types of power identified as part of the analytical framework. Within this analysis, I also trace how these mechanisms produce and shape conditions, interests, and subjectivities of urban governments to shape their sustainable energy actions and inactions.

4.2.   Contextualising urban sustainable energy governance in India

At the outset, it should be established that India is a federal system with three politico-administrative levels of the national, state, and local governments. The functions of each level have been spelt out in the constitution. Some functions are shared between the national and state levels and are enlisted in what is called a concurrent list in the constitution. Electricity

falls under this concurrent list, while urban development falls under the state government purview. The discussion briefly touches upon the historical evolution of the energy, climate, and urban governance sectors that shape the governance of urban energy systems today and will serve as the background for the power analysis presented ahead.

4.2.1. Urban governance landscape in India

While the energy landscape is what shapes the technological related dimensions of urban energy, the urban governing landscape profoundly shapes India's urbanisation, frames urban challenges, and the politics within which urban governments are operating. The formation of the urban scale of governance itself has a politically charged history and a point of friction between the state and national governments (Aijaz, 2006).

The 74th Constitutional Amendment Act (CAA) passed in 1992 established the constitutional grounds for the third tier of the Indian Government and assigned the status of 'self-governing institutions' to urban local governments (Ahluwalia, 2019; Chattopadhyay, 2017). The local bodies are required to hold free and fair elections every five years and make governing decisions with the help of the elected representatives. At the time of its passage, the Act, in addition to bringing democracy to the grassroots level, aimed at facilitating public participation in the urban development works (Das, 2019). The 74th Constitutional Amendment Act (CAA) recommends eighteen broad areas of functions for urban local governments (Appendix 2). The history of the bill's passage is fraught with contestations by state governments who felt threatened by this legislation pushed by the Centre. This contestation between the two levels has essentially shaped the urban governance landscape as it stands today in India. Through the state legislature, state governments retain much of the legislative power over urban governments. The 74th CAA assigns state governments the responsibility to devolve the eighteen *recommended* areas of functions to the urban local government bodies but without any mandate for financial or other resources for adequately fulfilling these functions. Today, a number of state governments have been unsuccessful in devolving all the eighteen areas of functioning while keeping important functions like town planning to themselves, often implemented through state parastatal bodies. On the other hand, their reluctance to share resources needed for even the limited functions devolved has also left most urban bodies financially and technically weak (Ahluwalia, 2019). The election of the Mayor, the political head of the urban government, occurs according to provisions in the

municipal legislation passed by the state legislature, including the terms of appointment. State governments have been known to create a mayoral or legislative election system that makes the political arm weaker than the executive arms of the urban governments (Chattopadhyay, 2017). The executive arm of the urban body is headed by a Municipal Commissioner whom the state government typically appoints from the elite Indian Administrative Services (IAS) programme, giving more control over the city administration, particularly given the weak political arm (Bhardwaj & Khosla, 2020).

ULBs or urban governments are governed by the provisions of the state municipal legislation that also defines their relationship in many ways. Although municipal constitutive laws passed by the state legislature typically constitute three primary areas of operation for the urban governments – 1) the financing and taxation powers; 2) management structure, and; 3) governing authority (including planning), the final approval rests with the state government. The Act also mandated the state government to form two independent institutions of the State Election Commission for independent elections at local levels and the State Finance Commission to deliberate and recommend the optimal financial sharing between the states and the urban local bodies.[23] The passage of the 74th CAA has allowed for at least a semblance of institutionalisation of urban local bodies both at the National and State levels well as an autonomous body. However, as mentioned earlier, the 74th CAA has been critiqued for placing a disproportionate amount of power in the hands of state governments, prompting many urban governance experts to hold state governments responsible for any reforms expected (Ahluwalia, 2019).

At the national government level, urban development is governed by the Ministry of Housing and Urban Affairs (MoHUA). Top-down programmes to facilitate the devolution of power to urban governments have been attempted, but they have been found lacking in the true spirit of decentralisation (Bhide, 2017, 2019; Chattopadhyay, 2017; Sivaramakrishnan, 2007). The Smart Cities Mission (SCM) is one of the most recent flagship programmes by MoHUA since 2015 for initiating urban reforms. It is also politically significant as it was launched by Prime Minister Modi himself and received extensive media attention across the world during its launch. The objective of the programme was to promote sustainable and inclusive cities with the help of typical development projects using 'smart solutions' (MoHUA, 2021).[24] The

---

[23] Not all states have established this agency, reflecting on their true interests in power devolution.
[24] Mostly increasing the digital footprint of the cities.

programme's objective is to encourage area-based development such as retrofitting, redevelopment, and greenfield developments in addition to the pan-city smart solutions applications. Notably, among the aims of the programme, a sustainable environment and assured electricity supply feature prominently in its broader infrastructure development objectives. Among many other requirements, the Smart City guidelines require at least 10% of its energy requirement to be met by local solar energy applications (MoUD, 2015).[25] The programme guidelines also outline the need to set up a Special Purpose Vehicle (SPV) in the city that is set up as a corporate body with equal shareholding by the state and the urban governments with an objective to implement the planned projects and raise funding. Projects approved under the SCM are expected to be funded jointly by the centre, state and the city government. It is left up to the state government to select the cities from the state for their participation in the smart city selection process. The final selection of the smart cities is in the realm of the MoHUA.

There are several important takeaways from the above description of the urban governance domain that may serve as a backdrop for the analysis ahead. The fractured relationship between state and the national governments has also shaped the urban governance politics in India, which is widely characterised by the lack of decentralisation efforts by the state governments and strategies to administratively and structurally control weakened urban governments. A new understanding in urban governance has been to critically evaluate the role of the national government in intensifying the state governments' dependence on national funding and other resources, despite its federal mandate. At the same time, or to ostensibly counter the state governments' reluctance and the urban government's over-reliance on state government, national urban development policies are being designed and implemented in a top-down manner, often opening direct channels of coordination and dependence between national and the urban governments (Bhide, 2017, 2019; Khosla & Bhardwaj, 2018). This adds further to the decentralisation insecurities of the state government while weakening the national government's position to demand more urban decentralisation from state governments (Ahluwalia, 2019). Lastly, urban governance in India, in general, is characterised by an increasing shift to non-elected executive agencies, facilitated primarily by the national level policy frameworks but also encouraged by the state

---

[25] Each city in their smart city planning are expected to submit a pan city proposal that also includes the plan for meeting the 10% target from solar projects.

governments in the backdrop of increased competition to access global capital (Chattopadhyay, 2017).

4.2.2. Sustainable energy actions in urban India

Despite India's impressive strides in the field of sustainable energy, its application at the urban scale has remained unremarkable (Bhardwaj et al., 2019; Stehle et al., 2020). Analysis of urban climate actions from secondary data sources indicates an interesting pattern.[26] Firstly, despite the lack of any mandate or authority, cities are governing urban energy and planning and implementing interventions; secondly, a number of the assessed interventions merge or reframe local development objectives/ projects as climate action; thirdly, non-state actors, including international organisations, have been playing an important role in these actions within the city; fourthly, there is a tendency for one-off experiments or project like initiatives instead of a long-term planning/strategies (Beermann et al., 2016; Bhardwaj & Khosla, 2018). In another analysis of sixty smart city proposals across India, Bhardwaj et al. (2019) witness significant interest in energy and specifically low carbon energy projects. The cities propose to invest in five different categories linked to energy, 1) network expansion, 2) solar, 3) waste to energy, 4) lighting, and 5) e-mobility with the first two receiving the highest budgetary support in most cities. Bhardwaj et al. (2018) also find that a significant portion of the proposed Smart City Investments is on sustainable energy technologies showcasing the interest of urban governments in these low carbon technologies, despite negligible mandate. However, the highly diverse ways of making decisions on the specific kinds of technologies to be implemented amongst the cities is also equally striking. A preliminary self-analysis of sustainable energy actions in cities that are part of the international city networks, that are expected to be more progressive in their outlook than others, reveal that the most commonly implemented interventions were those that pertained to the city government's own energy demand – whether it is EE in municipal buildings, solarising the public street lights, solar roof top in municipal offices.[27] Out of the four types of governance theorised by Bulkeley and Kern (2006), these cities depended mostly on the 'self-governing' type of governance rather than broader areas of urban form, public transport, community energy, private buildings EE, among others where potential of sustainable energy application is much higher.

---

[26] Only few out of these are sustainable energy interventions.
[27] Built from case studies of city's sustainable energy or climate actions published by international city networks or aid bodies.

In summary, even within a constricted and seemingly disadvantageous space that is allowed to city governments, mired with a wide variety of external actors, cities are taking action on clean energy but in seemingly inconsistent and diverse ways. This gives rise to the central puzzle regarding the decision-making process, motivations, and factors shaping sustainable energy actions envisaged or implemented by Indian urban governments– one that cannot be explained through the frequently forwarded arguments of lack of capacity and empowerment of city governments (Rahiman et al., 2019; Sami, 2017; Sethi, 2018; WWF, 2020). At the same time, it gives rise to the questions of politics of this decision-making process as given the lack of mandate, who has the maximum influence in the sustainable energy actions in cities; how is this influence operationalised; how are local and policy conditions shaping these actions and which technologies or strategies get selected and why.

4.2.3. Sustainable energy governance at the urban scale in India

Urban sustainable energy in India is far from a neatly cleaved space for decision-making or implementation. In fact, it is at the crossroads of different organisations and institutions with competing interests and mandates, potential and capacities. Indian urban local governments are not legally mandated to take action for their energy services. Electricity demand and supply in Indian cities are serviced by local electricity distribution utilities usually owned by state governments or private companies, while fuel for transportation and energy requirements are supplied by national and state retailers. Therefore, cities have been called to be 'subservient' to state-level electricity policies and regulations, which are in turn shaped by central policies and schemes (Mascarenhas, Basu, & Bazaz, 2016:31). Interestingly, before the advent of centralised large scale electricity generation in colonial India, several cities (including the three cities considered here) managed their local electricity supply through mainly localised electricity generation.

The state municipal laws that essentially constitute the cities also establish the formal areas of authority or functions for the urban governments through the two lists of *obligatory* and *discretionary* functions. These functions are usually expected to incorporate the functions recommended in the 74th CAA (Aijaz, 2006).[28] Energy or electricity does not feature in this list. Irrespective, Beerman et al. (2016) claim that even these transfers of responsibilities have not been initiated in many cities, which has a further limiting effect on the scope of actions by

---

[28] List given in Appendix 2.

cities. Broader urban development policies are a strictly top-down affair characterised by heavy dependence of the urban governments on both state government and central government (Sharma and Tomar, 2010; Beerman, 2016). In essence, urban sustainable energy governance is embedded within the larger multilevel energy and urban institutions and their politics.

4.2.4. Energy governance and politics in India

Electricity is the dominant mode of final energy use in India. Thermal power production was made the backbone of India's electricity supply even before its independence. Post-independence, the focus of the Government was preoccupied with increasing the generation capacity so as to meet the growing industrial and agricultural demand for food production. Dubash et al. (2019:3) recount the source of India's approach to energy:

> To pursue the development priorities of powering industrialisation, electrifying rural areas and, thus, addressing regional disparity, India (post-independence) took the path of gigantism—large-scale infrastructure and monolithic institutions—that could assure economies of scale, faster electrification, and centralised coordination.

Incentives to the agricultural sector and power theft pervaded the electricity sector crippling the sector financially and making it predisposed to reforms.[29] Reforms in the Indian electricity sector were, to a large extent, shaped by the neoliberal turn of economic ideas and politics globally in the 1970s (Kale et al., 2019). Incidentally, it also coincided with the shift in the World Bank's investment decisions in favour of developing countries. The early 1990s saw India's policies turn towards encouraging private sector investments in power related services (generation, transmission and distribution). The national and state utilities that were largely nationalised and monolithic bodies were ailing financially. By the end of the decade and the beginning of the next, three crucial legislation and programmes were designed to initiate transformative reforms in this sector. The reforms were targeted at both national as well as state levels as electricity is jointly governed by both these levels of the government. The first among these was the establishment of regulatory bodies to depoliticise the electricity tariff setting process in India. The state government level utilities were transformed into corporatised bodies with the objective of managerial nature of functioning and accounting. The reforms saw a rise in private sector investments in the generation of electricity, but the

---

[29] See Sunila Kale (2004) paper questioning the nature of reforms during this time.

private participation objectives in transmission and distribution utilities remain unachieved. Nevertheless, there is a gradual rise of private sector electricity distributors in particularly large cities like Delhi, Kolkata, Mumbai, and the cities of Gujarat (including Surat). Against this backdrop, the Electricity Act of 2003, with support from the National Tariff Policy and National Electricity Policy, set the market-facing, neoliberal tone for the sustainable energy transition in India. Multiple electricity sector reforms were undertaken with the objective of attracting private investments in electricity transactions.[30] The move was also expected to increase the competition in the sector in general - one of the basic tenets of the Act.

Electricity is a concurrent subject under the Indian constitution which signifies equal power to the central government as well as all the states of India to formulate their own policies, rules and legislation. States, however, are not known to legislate on the electricity sector independently. Instead, policies and targets are put in place in response to the national targets and policies to achieve the required objectives specific to the states. National policies face resistance or support from state governments, often depending on their political dispensation (Kale et al., 2019). Agricultural subsidies and electricity pricing issues comprise much of India's conventional electricity sector politics (Kale, 2012). WB/ ADB pushed reforms and related other policy failures, including offering over-zealous incentives to attract private power producers, which led to crippling financial burdens on the state distribution companies (Khosla & Dubash, 2020). Much of this plays out at the state level in the form of political resistance to price changes, electricity reforms, and privatisation of the distribution sector. Advocates of modernising the electricity sector have often considered the constitutional obligation of sharing decision-making powers with the state government an unnecessary political roadblock for realising electricity reforms in India (Kanitkar, 2020). Therefore, Kale et al. (2018) suggest that any policy prescriptions or any analysis linked to India's energy transition necessarily needs to take into account the contextual and historically tied political economy of the electricity sector in each state (Kale et al., 2019). The friction between the national government and state governments is explicated in the following paragraph:

> The central government increasingly took control over electricity generation, driven in part
> by the economies of scale of electricity gigantism and the need to bear the associated

---

[30] India's electricity sector stands at 395 GW as of January, 2022. Thermal electricity is the major source of electricity in the mix with a rising capacity from RE. Much of the coal for the thermal power plants are sourced domestically while there has been an increasing dependence on coal imports in the last two decades.

higher risks. The state governments, for their part, have had to manage the stresses of re-distributive welfarism, to the cost of their exchequer. (Dubash et al., 2019:6)

It is within this backdrop that the transition to sustainable energy in India is taking place. It also has important implications for sustainable energy transition at the urban level as urban governments, with no direct mandate on energy or electricity, sit within the energy political economy of the respective state governments as well as the national government. The political chasms of the electricity sector only deepen the existing friction between the national and state governments, particularly in relation to urban governance. Table 3 shows the different institutions at multiple levels of energy governance in India.

4.2.5. India's evolving sustainable energy policy and political landscape

India had already started successfully experimenting with small decentralised RE technologies by the late 1980s and early 1990s when the Ministry of New and Renewable Energy (MNRE), the apex national policy body for RE, was established. Unlike some of the developed nations, the importance of RE did not emerge only from the need to mitigate climate change. Instead, RE in India was closely aligned with the oil shock and national developmental challenges like energy security, expanding electricity capacity, delivering energy access (Sami, 2017; Shidore & Busby, 2019). Today, sustainable energy technologies are governed under two key legislations – 1) the Electricity Act of 2003 and 2) the Energy Conservation Act of 2001. While there have been multiple national energy policies that have set out the long term energy pathway in India, the entry point for mainstream sustainable energy policy in India has been through its climate commitments. The National Actions Plan for Climate Change (NAPCC), in 2008, along with its seven sub-policy documents, put a spotlight on climate change as a national policy position of the Government of India. Nationally, there has been a growing recognition that 'climate change is increasingly a challenge of multilevel governance that requires integration across scales, and across multiple sets of actors—governmental and increasingly nongovernmental' (Dubash et al., 2018:172).

Table 3: Multilevel sustainable energy state actors in India

Players		Central	State	Private/Urban
	Regulators	Central Electricity Regulatory Commission	State Electricity Regulatory Commission	
	Policy makers	Ministry of Power Ministry of New and Renewable Energy (implementing arm SECI) Bureau of Energy Efficiency, MoP (implementing arm EESL) Ministry of Environment, Forest, Climate Change Ministry of Housing and Urban Affairs	State energy Departments State urban departments State environment departments State pollution control boards State Nodal Agencies (arm of MNRE) State planning authorities	Urban local governments
	Generation	NTPC, NHPC	State GENcos	Independent/captive power producers
	Transmission	Central transmission utility	State transmission companies	Independent transmission providers
	Distribution		State Distribution Companies	State Distribution Company/ Private DISCOM branches

NAPCC also underscores the co-benefits framing that characterises India's climate strategy, prioritising energy security issues, industrial development and foreign investments, sustainable environment, mass-rapid transit and electric mobility in the urban areas (Dubash, 2013; Khosla & Bhardwaj, 2018). In the past and through NAPCC, the Ministry has pursued several decentralised technology-specific programmes in the past. This included national plans, targets, subsidies, and incentives for solar water heaters, solar street lights, solar

cookers, green buildings, and other technologies relevant to urban applications. However, the budgetary allocation for decentralised programmes has dwindled significantly in the last few years, and several incentives have been discontinued.

Taking a departure from the usual technology focussed programmes, an urban government focussed multi-year programme - the Solar Cities Programme - was launched for the 12th five-year plan (2012-17) to involve sixty cities in reducing their energy consumption by at least 10% through RE and EE technologies. The MNRE committed financial support for the preparation of the plans, setting up of solar city cells in each urban government, and organised promotional activities. The solar city plans were typically prepared by external technical consultants guided by a Master Solar City Plan published at the national level. While several solar city plans were submitted, only five cities were identified as pilot cities for which additional financial support for implementing projects was committed. The solar city plans, in most cases, did not materialise even when the plans outlined the strategies for financing through public and market sources. The programme was also discontinued two years back before achieving its goals.

Energy efficiency is another important strategy that was highlighted in the NAPCC as part of sustainable energy deployment in India and is today managed primarily by the Bureau of Energy Efficiency (BEE) under the Ministry of Power as mandated under the Energy Conservation Act of 2001. The nature and structure of governance of EE in India have undergone a sea change in the last few years. The policy and the governing landscape for EE are particularly relevant for urban areas as much of the interventions will be planned within urban areas targeting urban consumers where per capita energy use is higher than in other areas. Apart from targeting EE improvements in the municipal services, lighting, and other energy appliance, one of the core initiatives of BEE has been to reduce the energy intensity of buildings as India is an increasingly urbanising country. The Energy Conservation Building Code (ECBC), designed to have a more energy-efficient new built environment in commercial buildings, has been in place for the past decade.[31] The ECBC Code for commercial buildings was updated and published again in 2017. A similar initiative was launched for residential buildings very recently. Building codes act as guidelines where state governments then customise as per climatic requirements of the state. The implementation of building codes

---

[31] Legally mandated in the EC Act amendments in 2010.

through the city building bye-laws is the only energy intervention urban governments are formally authorised to implement within the energy governance framework in India. The BEE, in its overall approach, mostly as defined in the NMEEEE, focuses on the market creation of EE services and products that can be delivered through the retail markets (star rating), energy service companies or corporatised public limited companies owned by BEE (Garnaik, 2018).

That foreign and private sector investment is going to be the primary fuel for India's energy transition, and the national government's role to be more of a catalyst or facilitative was made evident in the NAPCC and multiple subsequent policy documents. Thus, in the last decade, the focus on RE in India has shifted from primarily decentralised application to a more large scale, utility-based grid-connected approach, bolstered by the provisions in the Electricity Act 2003. Accelerating this shift to a predominant focus on large scale capacities, the newly elected nationalist party government declared a target of 175 GW by 2022 in 2015 – five times the capacity of RE in 2015 within a space of seven years.[32] One interviewee at the decision-making level mentions, 'before 2014, RE was thought of as just a source of energy (rural cooking, water heating type activities), now It is a source of electricity. (Responding to question on large scale approach of the Government)'.[33]

The international as well as national RE landscape, also witnessed a drastic decrease in RE costs around the same time. Scholars note that this phase of ambitious RE scale-up in India was marked by a disproportionate focus on large scale solar technology. Shidore and Busby (2019) find four key drivers attributable to this phenomenon – 'domestic politics, global pressure and partnerships, attracting investment, and energy sovereignty' (Shidore & Busby, 2019:1180).

Solar rooftop PV – a technology particularly relevant for urban scale - was one of the few grid-connected decentralised solar applications that received policy attention in this policy leap. However, its implementation has been largely unsuccessful or mired in multiple challenges (Jai, 2021; Lal, 2019). The shortfall has led the Government to launch a revised programme (/s) with a focus on the residential and institutional sector with enhanced budget outlay.[34] The programme made the electricity distribution companies in each state the main

---

[32] New commitment of 500 GW non-fossil fuel power generation capacity by 2030.
[33] Interview NM01.
[34] Budget outlay increased from Rs. 600 crore in the period of 2012-17 to Rs. 5000 crore till 2019-20.

implementing agency for the solar rooftop programme implementation.[35] It also offered subsidies to retail consumers for the uptake of this technology. The targets under the programme are shared by each state, which then support the overall implementation structure. The broader objective of the national government here is the formation of an active market with an organic demand for the solar rooftops amongst residential, commercial, and industrial consumers and also to create a supply chain that supports different business models with limited intervention or only a facilitative role from state governments. The implementation of solar rooftops on public buildings is implemented by Solar Energy Corporation of India Limited (SECI) – a recently established corporatised public implementation body to alleviate the lack of capacity of public actors while mobilising finances and other resources at scale. The detailed picture of the implementation framework of solar rooftop technology designed by the national policymaker helps illuminate the political ideas underlying them.

The typical peculiarities of this climate and energy trajectory that India has embarked upon are worth noting for the purpose of this study. India's climate change response has become the key conduit between the larger energy transition governance domain and the urban sustainability concerns. The sub-programmes or 'Missions' under NAPCC have pronounced implications for energy sustainability in urban areas.[36] However, as multiple studies note, the coordination and implementation of these multiple sub-programmes remain disjointed and fractured (Dubash et al., 2018; Pillai & Dubash, 2021b). While NAPCC still provides a much-needed framework for climate change governance as a multilevel intersectoral approach that also involves subnational actors like urban governments and also non-state actors, Dubash et al., 2018 argue that the policy had the expanse but lacked the depth, particularly in terms of capacity and institutionalisation in the subnational levels (Dubash et al., 2018). Pillai and Dubash (2021) posit that the institutional framework of NAPCC, which was already a top-down affair, has undergone further changes with the discontinuation of coordination bodies and is now characterised by a tendency to centralise at the level of the Prime Minister's Office (PMO) with eroding accountability at the same time. The sustainable energy policy landscape, by itself, already limits the scope for the bottom-up climate or sustainable energy responses.

---

[35] 40% central finance assistance (CFA) on the benchmark cost or cost realised through bidding for systems upto 3 kW. For Group Housing societies, CFA is 20%.

[36] More recently, air pollution has also attracted attention to the urban energy possibilities.

The Ministry of Home and Urban Affairs (MoHUA), which is one of the many Ministries required to coordinate its policies with others, stands compromised from the discontinuation of coordinating agencies, particularly in view of the lesser negotiating power it holds in the climate governance sectors. NAPCC and the ensuing politics centred around national government pushed state governments to focus more on adaptation actions rather than mitigation (Pillai & Dubash, 2021a). This has particular implications for urban sustainable energy governance as it shapes the state government's vision and position on sustainable energy in urban areas.

Further, it is evident that India's sustainable energy transition arena has a hegemonic presence of the national government, preferring specific RE technologies like solar and wind primarily for utility-scale power generation purposes. Driven primarily by the opportunities of private sector investments and the benefits of economies of scale, grid-connected large scale projects in these two technologies have usurped government attention. While initiatives like EE and electric vehicles are on the radar of the government initiatives, they are still far from enjoying the same prominence as large-scale projects of solar and wind. It needs to be mentioned here that the leadership role assumed by India in climate negotiations or RE commitments is fundamentally also a political project (Arabindoo, 2019; Mohan & Topp, 2018; Shidore & Busby, 2019). The political benefits that are likely to be accrued from the scale, hyperbole, and actors benefitted, are of particular interest to India's foreign policy, the political party in power as well as the individual aspirations of the leadership of the party (Arabindoo, 2019; Shidore & Busby, 2019). After claiming for several years that coal will remain the mainstay of India energy future, the Indian Prime Minister recently committed to a net-zero target by 2070 at COP26.

In summary, India's complex entanglements of climate change, urban, and energy policies is playing out within an already conflicted and contested zone of authority between cities, state and national governments. Over the years, India's energy transition pathway as well as broader climate change policies, have witnessed increasing centralisation tendencies at the national level, where the government is predisposed to economic profitability and energy security-related framings for sustainable energy transition (Pillai & Dubash, 2021a).

4.3.   Analysing power in sustainable energy governance in urban India

The discussion on the context of sustainable energy, climate change, and urban governance in India reflects the existing highly political, contested, and centralised nature of the three domains. As urban areas emerge as another potential political arena within the intersection of climate and energy governance, the politics of reconfiguring the arena by multiple actors with multiple interests, and multiple power dispositions, intensifies. This section presents the first level of empirical analysis that throws light on this politics through the power mechanisms that shape the possibilities of sustainable energy action for all urban areas and governments in India at large. City-specific power analysis has been undertaken in each individual empirical chapter. The power mechanisms inferred from the data have been organised under the different power types of structures, institutions, materials, and knowledge/ discourses, as conceptualised in the analytical framework.

4.3.1. Structural power – constituting the urban

Structures understood as internal constitutive relations and ensuing positions can offer insights into how identities and self-understandings of urban local governments are constituted or configured within these structures. 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.[37] Barnett and Duvall (2005) posit that structural power needs to problematise these existing understandings. The self-understandings that evolve from underlying structures serve to 'reproduce, rather than to resist, the differential capacities and privileges of structure' (Barnett and Duvall, 2005:18). Structural power can be interpreted as a larger economic or societal paradigm from which internal relations and hierarchies draw meaning. Lack of cognizance of structural power can give rise to normative ideas about societal arrangements, and power distribution can appear to be natural while any suggestion otherwise is unacceptable. As Haugaard (2010:428) puts it, 'it is only natural within a normative and evaluative game'. [38]

In this study, I draw inspiration from the emerging view in the literature that positions local

---

[37] Few interviewees declined to hold formal interviews as they did not believe cities had any formal role in India's energy sustainability transition pathway.

[38] As structural power constitute the very identity of cities in India, the discussion has not been repeated in the individual empirical chapters.

governments as policymakers in their own right in designing local, sustainable energy transitions while becoming active participants in the national and international efforts in this direction (Kuzemko, 2019). Simultaneously, this study is also guided by the spirit of the 74th CAA in India, which positions urban governments as the third tier of the government. Taking these normative structural positions makes the current view of the limited scope of cities to take action in sustainable energy a subject of political analysis rather than a pre-determined issue.

Keeping the above in view, this study looks at the underlying and evolving mechanisms within broader structures that render cities in India their identities and hierarchical positions (in general but also particularly vis-a-vis their actions on sustainable energy). In the following sections, I identify structural power as the underlying ideologies, calculatives, and rationalities and mechanisms of structural power are then understood to be the adoption or sustenance of these. Global capitalism and the way it structures society has been a frequently stated example of this (Barnett & Duvall, 2004).

Structures tend to authorise some actors to control these spheres of social organisation and shape action while rendering others with limited authority. The ways in which they change or 'stick' reflect the political agency that they embody. I use the earlier discussion on context, existing literature, legal and policy documents, and other data collected to crystallise the specific mechanisms.

- ***Mechanism 1: adopting the nation-state regime and pre-eminence of the national and state governments***

The structural power associated with the rise of nation-states, not only in energy governance but also in the large economic governance, has been of particular relevance to urban governments and questions of scale at which energy should be governed (Cherp et al., 2011; Sellers, 2002). Despite more focus on non-state actors and distribution of power beyond the state, the type 1 conceptualisation of multilevel governance adopts a hierarchical view of different governing actors where nation-states are accepted as central mediating or orchestrating entities incorporating the principle of subsidiarity or nested authority (Bulkeley & Betsill, 2005; Lee & Koski, 2015). This has been upheld and reinforced by the international climate and energy-linked agreements, where nation-states are the main accountable actors in achieving climate objectives (Castán Broto et al., 2020). While subnational governments have recently gained legitimacy in formal international climate paradigms or networks,

collective accountability is still mediated through nation-states. This structural reality bolstered by the way global economic systems function today attaches specific identity and significance to cities and city governments – one that is subordinate to higher governments and create systems of hierarchy. Hooghes and Marks (2001) posit that it is difficult to shake off the national government-related hierarchies as they are often given constitutional legitimacy, and the incentive for changing this is distributed. Studies on urban sustainable energy that were once optimistic about the dilution of the power of nation-states through the empowerment of the local had to return to pragmatism when the importance of national politics and policy framework dawned (Bulkeley & Betsill, 2005; Castán Broto & Westman, 2020; Eckersley, 2017). This relatively recent world systems structure has shaped the way both urban and energy are governed in India. The national government was given salience post-independence to manage a highly divided and economically devastated country. The structural hold of the national government on nation-wide economic and infrastructure policies has remained and strengthened in view of the international financial systems. Highlighting the institutional ramification of this national level dominance on India's federalism, Pillai and Dubash (2021:14) write,

> This institutional configuration arises from a historical skew in power and resources to the federal government, deliberately crafted in the tumult after Indian independence and just as the global conversation on federalism became more accepting of central dominance in economic and social policy.

While multilevel governance is often thought of as representing scales of functioning, all-pervasive national economic policies are the privilege of the national government. This has had two main implications: Firstly, cities, by default, fall at the bottom of the governing ladder, and therefore, the functional decentralisation or true delegation of spheres of authority remains in the control of the higher governments. In India, the historical developments linked to the development of urban as a separate governing layer and the nation-state governing of sectors like energy has empowered higher levels of the government like state and national governments. Whereas national governments have typically exercised this power to institutionally and constitutionally demarcate the spheres of authority for urban governments, state governments have shaped the extent of functional and political decentralisation to urban local governments. Even with the legal status of being *self-government* (Buddhadeb Ghosh, 2010), most cities in India have failed to gain this

recognition. This politics of urbanisation in India showcases that authority and mandates are not a function of legislation but is constructed by other actors as a function of their politics.

Secondly, the national government's structural control over the broader economic policies and paradigms of the country have, in turn, shaped how energy is governed and the relevance of urban within that. India's preoccupation with securing its energy supply and increasing access meant urban was largely ignored in the first few decades of India's independence. Ironically, the inception of the electricity sector in India started with city-based local electricity companies/ bodies managing the electricity supply for the entire city (Dubash & Rajan, 2001; Mukherjee, 2017). So much so that the Electricity Act of 1910, the first law for governing the power sector, made local governments the key responsible entities. Post-independence and with the growing need to power the economy, 'the primary concern was the supply of electricity, and also oil and coal, to support growth' (Vasudevan et al., 2011:2). As a result, the sector was increasingly centralised at the national level (see (Dubash & Rajan, 2001), as well as at the level of the newly formed states, with the formation of the State Electricity Boards (SEBs) that were nothing more than the extensions of the state governments (Dubash & Rajan, 2001).[39] This was encapsulated in the Electricity Supply Act, 1948, which gave among its 'objects and reasons' for the legislation the following:

> The coordinated development of electricity in India on a regional basis is a matter of increasingly urgent importance for post-war re-construction and development. The absence of coordinated system, in which generation is concentrated in the most efficient units and bulk supply of energy centralized under the direction and control of one authority is one of the factors that impedes the healthy and economic growth of electrical development in this country. Besides, it is becoming more and more apparent that if the benefits of electricity are to be extended to semi-urban and rural areas in the most efficient and economical manner consistent with the needs of an entire region, the area of development must transcend the geographical limits of a municipality, a cantonment board or notified area committee, as the case may be. It has, therefore, become necessary that the appropriate Government should be vested with the necessary legislative powers to link together under one control electrical development in contiguous areas by the establishment of what is generally known as the 'Grid System'. (The Electricity Supply Act,

---

[39] By 1991, SEBs controlled over 70 % of power generation and virtually all distribution. (Dubash & Rajan, 2001).

1948).

The liberalisation of the economy in the early 1990s also had a pronounced impact on the energy governance in the country – largely shaped by the national government. How these ushered new structures have been discussed in the next paragraphs. Pillai (2021) and Dubash et al. (2018) highlight that the emergence of climate governance in India also exemplifies the dominance of the national government that has historically taken the position to safeguard India's economic ambitions from unfair global pressures. With this, concentrating power at the national level to steer domestic climate policies came naturally and accepted, as has been discussed in the context section.

Essentially, the structure embodied within the nation-state regime allot a natural control to the national government (and the state government to a limited extent) over the institutional, material, as well as discursive realms in any policy domain. Politics of these levels is operationalised with the help of this control not only by rulemaking, role creation, agenda-setting, and knowledge creation but also by capacities and resource distribution discretion.

- ***Mechanism 2: economic liberalisation and ushering in neoliberal governing order in the energy sector***

Indian national government's radical economic turn towards liberalisation in the early 1990s ushered some significant changes in the way the Indian economy was structured until then. Firstly, the reforms positioned cities as India's 'engines of growth' (Smitha, 2016:7). The dire situation of cities at the time created a popular rationale for widespread reforms for the creation of 'world-class cities' (Chattopadhyay, 2017; Khan et al., 2018; MoHUA, 2018:81). Prosperous and economically significant cities like Pune, Kolkata, and Surat are still largely seen as sites that need to be exploited and advertised to boost the state and the country's economic growth. For Kolkata, this importance is amplified because of its capital city status. With this, the national government, with tacit consent from state governments, rolled out 'new public management policies' to imbue the city governments with these practices. This included 'facilitation of private-sector participation, emphasis on financial discipline and market-based finance for cities' (Chattopadhyay, 2017:308,309). This also created the foundation for city-market relations and simultaneously made ceding power to govern urban areas by both state and central governments politically and economically undesirable (Bhide, 2017). Giving a picture of the power equation between state governments and urban areas, Kennedy and Zerah (2008) write, 'Despite India's attempt towards decentralization, the state

government and its parastatal agencies exercise their power in shaping urban planning and governance and in promoting their large cities as 'nodal investment sites' (Kennedy and Zérah, 2008:7).

While the accountability for the lack of decentralisation often gets limited to state government, national governments have been equally unwilling to let go of their control over urban policies and urban areas (Bhide, 2017). In the garb of national programmes meant to usher in decentralisation reforms, national governments have often promoted technocratic parastatal agency-led governance, which only encouraged more state governments to take over and eroded cities' agency even further (Kamath & Zachariah, 2015). The opening of the city governments to the market dynamics ushers specific rationalities and identities for the city governments as global sites, engendering specific priorities and operation models.

Around the early 1990s, liberalisation of the Indian electricity sector occurred on the global templates – a decision perceived to be critical by the national government at the time of extreme national economic distress and prescribed by multilateral institutions like the ADB and the World Bank (Dubash & Rajan, 2001; Kale, 2004). This changed the structures of the Indian electricity sector. Under this, the once monolithic state government power utilities were unbundled into three companies (in most states) and, for the first time, explicitly introduced objectives of market development, increased private participation, open access, efficiency, and competition in all sectors of generation, transmission and distribution (Kale, 2004). Bridge et al. (2013) illustrate that even though these liberalisation scripts sought to limit the state control with respect to free-market dynamics, it has been unsuccessful in doing so and has instead resulted in a system that has created a more centralised state (Hess, 2011). In India, where only partial liberalisation has taken place, the structural control of the national government remains tight (if not increased) on the policy spaces, and the state government claimed its control over the implementation mechanisms to some extent (Beermann et al., 2016; Jörgensen & Wagner, 2017; Kale et al., 2019). Further, contested policy prescriptions linked to the power sector liberalisation, driven by the MDBs, have led to a financially stressed electricity distribution sector - a backbone for sustainable energy implementation.[40] In

---

[40] Mahalingam et al., 2020 write, 'At the core of DISCOM woes is the two-part tariff policy, mandated by the Ministry of Power in the 1990s at the behest of the World Bank. As more private developers came forward to invest in generation, DISCOMs were required to sign long-term power purchase agreements (PPA), committing to pay a fixed cost to the power generator, irrespective of whether the State draws the power or not, and a variable charge for fuel when it does.' (The Hindu, 2020).

addition, state governments which have direct control over DISCOMs and indirect control over state regulators benefit politically from their control over DISCOMS by controlling electricity prices.[41] The 1990s economy-wide liberalisation reforms in the electricity sector and subsequent growth of sustainable energy industrialisation from the late 2000s firmly planted the rationalities of the market and private sector participation and investment-focused rationalities in the electricity sector in India. As the liberalisation was only partial, it helped in justifying a more centralised type of governance to manage all these disparate but interdependent phenomena.

Serious concerns about sustainable energy in India were imposed and adopted in this structural context in the early 2000s.[42] Although influenced primarily by concerns of the oil crisis, resource depletion, and international climate agreements, RE and EE slowly came to be viewed as means to attract foreign and national investments and increase profit margins of industrial and commercial actors rather than as a means of delivering public welfare or services. This significantly reduced the scope for new, weak actors like urban governments in India.

Utilising their hegemony, traditional actors automatically tend to delegate authority to preferred actors, setting targets and adopting pathways that uphold their primacy in this sector. These moves, often not publicly debated or consulted, mostly enjoy assumed legitimacy, are considered a natural progression and politically uncontestable. This is also reflected in the understanding of many interviewees where the idea of urban governments taking sustainable energy decisions was too eccentric to be even considered in the Indian context.[43] Assuming the undertones of a more classical neoliberal regime, the sustainable energy sector particularly was opened to the ebbs and flows of the global capital with a 100% Foreign Direct Investments (FDI) policy and development funding and created policy conduits for the participation of foreign private sector and other non-state actors, parastatal bodies, and public-private partnerships. However, as with the larger electricity sector, the control of the national government has only increased with these developments in the sustainable energy domain. The weak state governments' capacity to enable a sustainable energy

---

[41] State regulators are tasked to ensure that electricity prices remain fair and competition is encouraged in the sector and keep away from political interference.
[42] Research and small scale applications were being pursued since 1980s.
[43] Interviews MN01, WWBE04, WBD01, GD02, GD05.

transition has fortified the national government's central position in the transition process. In addition to addressing the weak foundations of hard and soft infrastructure (grid or data centres, for instance) and increased financialisation of energy technologies, the national government also uses its large scale financial and borrowing capacities to offer targeted financial instruments (guarantees, gap funding, tax incentives) to attract and leverage private financing. This has led to further consolidation of power in favour of national governments as even state governments are dependent on the national governments for instruments attracting private capital in their individual states.

Moreover, the neoliberal policy framework underpinned by the ambition of a self-maintaining independent sustainable energy market, a core objective of the Indian government, has a homogenising effect (Shylendra, 2020). It creates specific hierarchical identities of the actors involved in the energy market - energy consumers and suppliers. In this scheme of things, urban local governments are reduced to rational energy 'consumers', responsible for their own 'conduct' or limited to municipal energy consumption.[44] Citizens are exposed to the market directly to a large extent and become responsible for their own consumption (energy conduct), removed from the safeguards or other equity and sustainability considerations for which the representative/ elected state holds direct accountability. [45] Similar findings have been witnessed even in the case of the studies of the UK urban governance under neoliberalism, where the identities of cities are reduced to being 'takers and/or purveyors' of global capital and businesses or mere economic entities (Kuzemko, 2019:81; Webb et al., 2016a:29). Neoliberal framing and principles of operation, therefore, help in weakening the agency of city governments in order to control urban energy governance from the top or by appropriating the governance of the urban geographies for capital gains. This is illustrated in the national government's decision to appoint electricity distribution companies to be responsible for solar rooftop projects even in the urban areas, undermining the authority of urban governments.[46] Recently founded public corporate energy entities like EESL and SECI are frequently contracted for Municipal EE projects as Energy (/Renewable) service companies (ESCOs or RESCOs) – a model that tries to compensate for the capacity limitations

---

[44] Interview NM03.
[45] While the grid electricity supply is regulated, the uptake of decentralised technologies or energy efficiency interventions and appliances are not.
[46] MNRE notification 2019.

of governments or other actors by absorbing upfront capital requirements. On the other hand, more market-based approaches are being implemented to encourage the adoption of energy-efficient appliances (appliance labelling programme, LED lighting) that attempt to engage with the consumers directly for behavioural changes. Inevitably, this is targeted towards urban consumers as the energy consumption per capita is higher in these spaces. These implementation models further contribute towards the relegation of urban local governments in this space: first, by shifting resources and capacitating efforts towards national corporate non-elected agencies from a locally elected government and secondly, by diminishing the scope of locally elected governments to participate in local energy transitions.[47]

A necessary corollary of market-led structuration of any sector is to make any sector particularly amenable to depoliticisation. Obliteration of the need for politics through deliberation, representation and as a means emblematic of the collective agency is a necessity for creating free market dynamics (Kuzemko, 2016). Kuzemko (2016) posits depoliticisation not just as a political strategy but also a tool that emasculates state actors (at least some in this case) and shapes their political capacities to justify the need for private or non-state actors. This does not necessarily lead to the depoliticisation of all state actors but tends to centralise the power of regulation and structuration in the hands of the most powerful. The Indian electricity sector has attempted to reduce political interference in the electricity sector for a long time, particularly at the state government level – a principle implicit in the electricity sector liberalisation templates widely advocated by multilateral development banks (Dubash et al., 2019; Kale et al., 2019). This automatically puts urban local governments in a disadvantageous position as creating another layer of politically deliberative space would be an undesirable proposition for the actors involved. For delivering decentralised sustainable energy technologies, national programmes, therefore, attempt to set up mechanisms that establish a direct seller-consumer relationship for technology uptake amongst urban citizens. This is visible in programmes targeting the uptake of small-scale solar rooftops or energy-efficient appliances.[48] I take Kuzemko's (2016) argument further to posit that in addition to

---

[47] Kamath et al., give further evidence of how the Pune Smart City Corporation is increasingly breaking the link between local civil society organisations and local governing processes.

[48] Policy documents (Operational Guidelines of Phase-II of Grid Connected Rooftop Solar Programme; NMEEE) and interview NM03.

shaping their political capacities, the neoliberal mode of governance that foregrounds market-led scaling up of the sustainable energy sector is leading to the development of 'self-understanding' of city governments who then automatically assume the identity of a market consumer. This understanding influences the interests and the types of actions prioritised by the city governments. Under such a scenario, it is conceivable that actions would remain limited to either reducing self electricity expenses or facilitating private sector participation in clean energy projects.

- ***Mechanism 3: prioritising cost efficiency, economies of scale, and profit maximisation (over social interests)***

An important implication of market-led rationalities is that it is grounded in the considerations of profitability and cost efficiency attributes of policy or technological interventions. Applying the notion of economies of scale, as measured in the classical economic traditions, large scale RE automatically becomes the obvious choice. This is not to imply that local urban governments do not or should not prioritise economic efficiency. However, traditional economic calculatives have failed to account for some of the market failures like pollution, inequities and other enviro-social costs despite repeated evidence presented by scholars (Sundqvist & Soederholm, 2002). Logic frameworks like economies of scale and cost efficiency typically promote technological utopias favouring acontextual and homogenised applications (Bolton & Foxon, 2013). These discourses are pervasive at all scales of the policymaking process and hope to tap into the benefits arising out of scale and standardisation processes that preclude value-based decision-making. This is evident in the ways the national energy sector in India is subdivided in terms of supply or demand centres or possible technological programmes that deliver the cheapest energy rather than as geographical or scalar problem-based interventions. This framing that structures the energy governance landscape in India privileges actors that deliver on these dimensions, such as those who undertake supply centric, large scale capital and technology-based enterprises. City governments that cater to limited geographical areas and populations are inexorably invalidated within such paradigms. Decentralised sustainable energy systems are geographically contingent and need an approach that embraces the complexities of governing them (Goldthau, 2014). Bridge et al. (2013:338) bring to attention the 'tendency to treat decentralised actors as remote, unpredictable or even capricious, especially when they 'fail' to behave in accordance with the preferred models of national decision-makers.' The interviews at decision-making levels

revealed that small urban applications of sustainable energy technologies are often viewed as 'gimmicky' or a 'showcase'.[49] As one power sector official put it, dismissing the urban focussed approach, 'we do not differentiate between urban electricity supply and regular electricity supply,' also highlights the dominance of electricity supply based notions in the policymaking circles (also in (Khosla & Dubash, 2020).[50]

Narratives couched in economies of scale, energy as an instrument of economic growth, investments, and national energy security, like in the case of India's Draft Energy Policy (2017), justify limiting sustainable energy transition to a specific scale and socio-technical configurations (Bridge et al., 2013). Interviews at both national and state levels voiced the concerns of efficiency compromise and increased costs in the absence of scale as one of the reasons for the limited relevance of urban governments in the sustainable energy transition in India. As Stirling (2014:85) echoes, 'the potent singularity of this 'one-track' 'race-to-the-future' 'Enlightenment' imagination is itself arguably one of the prime forces in this entrenchment.'

- ***Mechanism 4: centralised energy governance incumbency and path dependence***

In a domain that is in the process of transition and has the potential to challenge current structures, existing structures are the fundamental basis of internal relations and hierarchy. The most significant effect of structural power is that it gives control to some actors to initiate new practices, norms, and rules (institutional power and compulsory power) to initiate new structures – essentially redefine identities, relations, power dispositions, or resist them.

The current imperative of moving towards sustainable energy offers multiple pathways (Stirling, 2014). Politics is reflected in how and in what ways and to what end do these structurally powerful actors select particular pathways, rejecting others. The structures of energy production associated with conventional energy sources have made the energy landscape a preserve of large scale public and private players. The decentralised materiality of new sustainable energy technologies can bring a large number of actors as energy producers as well as consumers, potentially upending the current structures. The centralised mode of energy supply that has defined the conventional fossil fuel dominated energy system in India has facilitated the assignment of the dominant power position to national bodies

---

[49] Interviews WBE04.
[50] Interview NM01.

(national government/ national public utilities/ state energy supply companies) and incumbent actors' networks. This paradigmatic socio-technical change without the change of hands has ensured the continuity of conventional ideas, ideologies, rationalities, and interests in the evolving energy sector – resulting in the continued exclusion of urban governments. With the increasing feasibility of decentralised energy technologies and applications, the above entrenched power positions could have shifted. However, to date, India's electricity sector remains a large-scale supply dominated sector with little focus on the more contemporary demand-side management that requires smaller-scale technologies and is particularly relevant for urban areas (Bridge et al., 2013; Khosla & Dubash, 2020) .

The chasm between the centralised and decentralised modes of sustainable energy in the Indian context is captured in a few studies that identify the presence of two very different narratives on sustainable energy transition in India, often championed by a very different set of actors (Kale et al., 2019; Mohan & Topp, 2018). Whilst one (primarily espoused by NGOs, energy access enterprises, and academia) supported the continuation of the focus on decentralised energy technologies implemented through bottom-up demand-led approaches; the second (advocated by the incumbent national policymakers and executives) was driven by concerns of energy security and rightful growth aspirations of India that supported RE transition that 'is envisioned by government actors as coming from centralised, utility-scale, grid-connected projects' (Mohan & Topp, 2018: 77). Today, India is emerging as a major global player in promoting clean sources of energy. Its RE target stands at almost five times the installed capacity in 2014 to be achieved by 2022 (and now twenty times by 2030) and is dovetailed with attractions of investments, political gains, and energy security (Shidore & Busby, 2019). The narrative that emerged victorious illustrates the power of the state elites and incumbents in influencing the larger public policy but also the structural power of the underlying market philosophy that tends to favour narratives involving large corporates, financing ties, and larger economic return considerations.

Structural dominance of incumbent and higher actors, mediated through institutions, resources, knowledge and discourses, translates into a landscape where urban governments are deeply embedded within the political economy pursued by them. This provides them little agency to act as 'self-governments' as envisioned in the 74th CAA. The limited control over the technologies and implementation of energy technologies in their own area of jurisdiction combined with the historical capacity erosion has been internalised by the urban political as

well as executive officials – reducing the scope for conflict or resistance. The existing urban governance politics in India, where often state governments are implicated for unsuccessful functional and political devolution to urban governments, serves as a fertile ground for the politics of sustainable energy transition to flourish. The transition towards more sustainable energy systems in India is marked by the adoption of logical frames and economic paradigms that restrict the technologies and role that urban governments can play, limiting any potential power structure changes.

The energy STS literature has covered the issue of policy capture by traditional and structurally powerful conventional energy actors creating resistance to not only a transition to a new sustainable energy paradigm but also to a sustainable transition that is inclusive of the decentralised paradigm within a sustainable energy regime involving new actors and practices. As the structures broadly remain undisrupted, decision-making authorities and realms are also sustained, resulting in an energy transition that is 'fossilised' (Raman, 2013:172).

Within the energy sector, the power of global capital and 'seat at the table' privileges of the fossil fuel industry as a result of its importance in the extant national economy has been considered to be embodiments of structural power (Johnstone & Newell, 2018; Newell & Phillips, 2016). Brisbois (2019), in her study of the power dynamics within the Ontario electricity sector, finds that incumbent energy sector players are structurally embedded and therefore are preordained with a primary role in the context of transition to a new energy regime (Brisbois, 2019). These incumbents not only enjoy easy access to top policymakers and political leaders but also are the main knowledge producers that then aid in sustaining their positions. This is further facilitated by the critical role these incumbents play in the economy and the flow of the capital (Johnstone & Newell, 2018).

The above discussion on structural power makes it evident that structural power inherently shapes how the compulsory, institutional, and discursive types of power are operationalised. All these types of power tend to serve as extended tools/ mechanisms for retaining the structural powers or enabling transition of a particular kind. Though their role cannot be thought to be deterministic in nature, it does indicate a pecking order depicting the effectiveness of each power type and highlighting the mechanisms that are likely to be most powerful or effective in 'conducting the conduct' in the absence of wide-scale resistance.

4.3.2. Institutional power: conducting the urban

Unlike structural power, institutional power is conceptualised to be working through institutional currencies of rules, norms (formal or informal), and regulations to constrain or enable other actors' actions and fields of possibilities or broader conditions. 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. For multilevel governance arrangements, this type of power is particularly relevant as the actors, particularly state actors, are related to each other institutionally. Specific mechanisms within the institutional realm that are employed at levels higher than the state governments have been identified in this section as they shape the conditions of all urban governments.

In India, while the responsibility of energy sector policy design is shared between the national and state government, the national government, as the core institution responsible for India's energy supply and security, becomes structurally responsible for designing national sustainable energy policy frameworks technological pathways, and implementation roadmaps. I identify three broad areas within this policy framework that have shaped how the urban government can govern sustainable energy.

- ***Mechanism 1: making urban governments 'non-entities' in the energy domain***

Urban areas have been considered important areas of intervention in both India's national energy policy and internationally prepared energy policy outlooks endorsed by the national governments.[51] Uncontrolled urbanisation and the ensuing energy demand, intra-urban and inter-urban inequities, energy usage externalities and interconnections with other sectors are important issues to address in the national framework. However, the governance of these scalar issues is not authorised or even related to urban local governments but rather has been subsumed in the centralised planning of the energy system. The authority to govern urban specific issues of energy is distributed in two ways: 1) Under the different sectoral national government departments (for instance - building EE, municipal energy, electricity supply, RE generation, transport, and air pollution are handled by different ministries); and 2) Different state and quasi-state actors (power distribution utilities for instance). The authority and significance of urban governments have been restricted to issues of municipal energy consumption and services (self-consumption). The other role that was designed for urban

---

[51] National Energy Policy, 2017 and India Energy Outlook 2021(IEA).

110

governments was by incorporating building EE rules, typically notified by the state government and prepared by external consultants, in its local building approval processes. Interviews with top policymakers with both RE and EE ministries further reaffirmed that city governments are either considered non-actors or a mere consumer category whose energy efficiencies need to be improved. One national policymaker interviewee said on the importance of urban areas and urban governments in sustainable energy policymaking,

'Urban areas are particularly important for behavioural transitions towards sustainable energy. But for this, we do not coordinate with the municipal bodies but implement consumer-centric programmes for wide-scale adoption. A lot of what Municipal Corporations are doing has an aesthetic angle to it'.[52]

The interviewee further mentioned, 'except for the municipal authority specific programme, most of the urban specific energy efficiency programmes are user-centric and take a market-centric approach. We do not collaborate with Municipal Authorities for these programmes'.[53]

The current sustainable energy governance framework in India then views urban areas as areas of governing but without urban governments. Urban governments are seen merely as energy consumers for whom specific programmes are to be designed just as other retail consumers of electricity to conduct their energy conduct. In other words, programmes for enabling a sustainable energy pathway are designed at all scales except the urban. This idea of a limited role has permeated into most city governments as an accepted fact, as I also demonstrate in the other case studies. Not just role setting but rule-setting powers of national governments and related actors reinforce this mechanism. Implementation rules such as assigning solar rooftop implementation responsibilities to distribution utilities whose business interests are in conflict with scaling solar rooftop technologies; or specifying the size of the solar rooftop to target certain specific consumer groups is a further illustration of the centralised decision making and appropriation of local areas of action. It is through these seemingly mundane and bureaucratic mechanisms of formal rules and arrangements that powerful incumbent actors tend to uphold the existing power structures. Studies on socio-technical change highlight that the operationalisation of power is reflected in the actors who are chosen to implement the change and the actors who are essentially muted or invalidated (Sareen, 2020).

---

[52] Interview NM03.
[53] Interview NM03.

That urban local governments can be valid and important actors in the successful implementation of solar rooftop programmes and that there is no indispensability of distribution utilities is *not unknown* to the national or the state-level policymakers. MNRE, with aid from USAID programme PACE-D, released two knowledge reports based on wide-scale stakeholder consultation that outlined the significance, challenges, and policy options to make urban local governments key partners of India's solar rooftop programme (PACE-D, 2018b, 2018a). However, these reports stand ignored, and urban governments are undermined. With the complete omission of urban local governments from the national policymaking and implementation circles of the sustainable energy transition, the state governments too, diminish urban governments' legitimacy over local energy matters and hence obliterate the possibilities of collective political representation against or for the state's sustainable energy policies. The selection of non-elected corporatised or sometimes private actors (SECI, EESL, for instance) to deliver sustainable energy transition in urban areas is not only the reflection of the new neoliberal character of India's sustainable energy policy domain but also undermines the democratic basis for the sustainable energy transition in urban areas.

- ***Mechanism 2: setting the selective technological agenda***

The national government, through its control over the broader economic policy framework, sets the national technological priorities that, in turn, set the technological choices available for other actors. Viewed from the socio-technical systems perspective, specific types of energy technologies get associated with a particular type of actor configuration. Local actors like urban governments are typically dependent on their access to decentralised energy technologies that are also affordable. Therefore, these actors are inevitably dependent on the national frameworks for technologies that are favourable for relevant technologies.

One interviewee voiced, 'RE in India was seen earlier as just a source of energy and not really power. This led to more and more policies and programmes around off-grid and decentralized application of RE. A major shift in the national government's approach happened from 2014 onwards when the large scale targets were put together till 2022'.[54] The target of 175 GW to be achieved by 2022 clearly identified targets for different types of technologies, but with a clear preference for solar (utility-scale and rooftop) and large scale wind. Global dynamics and domestic policies inducing large scale demand and cheap financing made available

---

[54] Interview NM01, NM02, NE02.

through guarantees and subsidised loans helped in bringing down the costs of solar technology drastically, but the national government's auction policies for MW scale projects further aided in lowering the costs for solar technology (Dubash, 2013). This aggressive pursuit for solar, and to a certain extent in wind, was not pursued in the case of other technologies. Given the particular relevance of decentralised solar for urban areas, this national-level focus and price decrease has opened more options for urban governments, albeit only in a limited way, as discussed earlier. However, the national government's preference for specific technologies while extending an uncertain and dwindling policy support for decentralised technologies, in general, has limited the scope of action for the urban governments.[55] Increasing financialisation of the sector also ensured the recruitment of particular types of actors and the creation of financial instruments tailored for specific beneficiaries. Subsidies, for instance, are particularly relevant for small scale distributed sustainable energy technologies, again relevant for urban governments. However, subsidies that were earlier offered to stand-alone RE systems have been phased out over time, disturbing their demand pipeline (Upadhyay, 2014). Financial instruments such as tax breaks, preferential tariff systems, auctions, and early approvals were addressed to attract large scale global private and institutional capital into the country through private players instead.

- *Mechanism 3: 'Directed decentralisation' – top-down orchestrated localisation of climate governance*

'Directed decentralisation' is a borrowed phrase from urban studies scholar Amita Bhide (2017:1), who tries to capture the process of centralised urban reform programmes in India that do not take into account contextual urban politics or involve urban actors in programme design. Critiquing one of the flagship urban reform programmes of the national government and exemplifying the phrase, Bhide (2017) says,

'JNNURM has hardly attempted to build a public discourse around the issue of reforms. The programme was introduced as a scheme, not unlike others, whereas its scope is of ambitious change in inter-governmental and citizen–government relations. It has thus not been backed by a demand for any of these changes and instead has been converted into a

---

[55] 'DRE enterprises have expressed their concerns on the need for a stronger policy and financial environment to help their businesses flourish and cater to the energy needs of those with limited access to it. 78% of the respondents have evolved and changed their business models and offerings as a result of the government initiatives.' *CLEAN report on Decentralised RE Technologies 2018-19 (*(CLEAN, 2018)*.

wish list that is open to be hijacked by entrenched interests' (Bhide, 2017:96).[56]

The data illustrates that a similar mechanism was adopted in the case of climate and energy governance in urban areas. Despite largely according the urban governments the status of *non-entities* in the energy sector, the national government has in the past made some attempts to bring urban areas into the sustainable energy transition fold through programmes like the Solar City programme and the Smart Cities Mission. The Solar City programme,[57] for instance, stated, as one of its objectives, to 'enable/empower Urban Local Governments to address energy challenges at City – level' (MNRE, 2015). The Smart Cities Mission, launched by the urban ministry, on the other hand, argues local energy to be integral to urban economic growth and quality of life (MoHUA, 2021). However, a parallel and possibly more strategic objective of these programmes is to ensure the uptake of national schemes at the urban scale.[58] These urban programmes are designed without adequate representation from the urban governments and produce effects that may not be considered enabling or empowering, despite the objectives. I make this argument with the help of the following conditions that these programmes have established for recruiting select urban governments. Firstly, both these programmes impose a top-down short-term mandate or authority on urban governments on matters related to local energy by setting an upper limit of sustainable energy uptake (Bhardwaj et al., 2019). These targets come with technological specifications and restrict the manoeuvring space for the urban governments limiting them to specific existing sustainable energy programmes. Secondly, instead of addressing the fundamental structural problems that have incapacitated urban governments or do not allow them the space to act on sustainable energy, these programmes attempt to bypass or even exploit these challenges to implement alternate neoliberal modes of governance. This includes keeping the capacity external to the urban governments by mandating consultant based local energy plans; corporatised organisations led implementation models; encouraging project-based approach; and entrepreneurial and competitive spirit of governing. Khan et al. (2018) also voice similar findings,

> The directions taken by the governance structures of smart cities undermine the functioning and power of municipal authorities and can durably weaken urban democracy,

---

[56] JNNURM is considered the precursor of the Smart Cities Mission.
[57] Launched in 2008 and then revised multiple times later, the solar city programme.
[58] As also indicated by some of the city levels practitioners in the interviews'.

especially since the SCM creates the conditions for increasingly entrepreneurial governance by promoting out-sourcing and the use of private actors in decision support, production and management of urban services. (Khan et al., 2018:87)

- ***Mechanism 4: national policy incoherence and inconsistency***

Even the limited space that is provided by the national programmes is subverted as a result of the siloed and inconsistent working practices of different sectoral ministries. As discussed earlier, in the rapid evolution of sustainable energy governance in India, policy support to decentralised technologies and related programmes, including the solar city programme, was found to be inconsistent and were discontinued abruptly. The discontinuation of the solar city programmes, in particular, has derailed the solar city plans prepared by selected cities (as found in the case of Pune and Surat). This underlines that the creation of impermanent channels of dependence instead of addressing more structural issues can not only reverse the gains made, but because of the wasted resources (time, money), it produces a sense of disinterest in already stretched urban governments, as is also witnessed in the case of Pune city (See chapter 6).

These top-down programmes also suffer from the inherent sectoral tensions and chasms that are manifest in the informal relationships between the sectoral line ministries. For instance, the Smart Cities Mission is an intervention managed under the Ministry of Home and Urban Affairs (MoHUA) but hardly owned or supported by the national or state nodal agencies of RE (MNRE) or EE (BEE).[59] As MNRE and MoP are the nodal bodies for India's sustainable energy transition, the dismissal of urban energy programmes like SCM should be read as a power mechanism rather than a bureaucratic inefficiency. With little interest from the MNRE or the MoP in the urban sustainable energy intervention or the SCM programme, it is unlikely that there will be any major repercussions for the non-achievement of the targets. As Govindarajan and Ganesh (2021) show, the diffusion of RE in Indian cities, even after five years of SCM implementation, is less than 1% in the maximum number of cases, highlighting the failure of SCM in increasing the adoption of solar in cities.

4.3.3. Material power: producing the urban

Material power is an addition to the four types of power proposed by Barnett and Duvall (2005). The key objective of adding this distinct category was to allow discussion on the ways

---

[59] Interviews NM01, NM02, NM03.

in which inanimate and material dimensions are associated with sustainable energy technologies that condition the actions of local governments. In line with Gailing and Moss's (2016:96) argument, a more complex understanding of urban spatial and socio-economic context considering the city as 'both the product and medium of socio-material processes' is aimed here. Mechanisms under this power type capture the opportunities, challenges, constraints and interdependencies produced by the materiality of these technologies. In this chapter, the material implications that condition all cities in India are covered.

- *Mechanism 1: techno-material interdependencies*

For urban areas in general, while, on the one hand, the decentralised scale of sustainable energy technologies empower urban governments, on the other, the material virtue of generating electricity in a number of these technologies creates a specific *techno-material interdependency – connection to the electricity grid*. Within modern energy systems, the grid infrastructure is a highly interconnected network infrastructure made mandatory in the conventional energy infrastructure constellation for transmitting and distributing electricity to the general population, typically at great distances from the point of generation. Today's grid infrastructure typically embodies the logic, calculations, and subjectivities of the conventional, centralised energy sector and has been often cited as the rationale to support the perpetuation of incumbent power structures (Johnstone & Newell, 2018). 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.

This is further operationalised through electricity tariff economics and regulatory instruments to necessitate grid interconnection, particularly to avail financial returns on capital investments (cf. Dubash et al., 2019). Electricity generating technologies like electricity from waste-water treatment, large-scale ground-mounted and rooftop solar, and wind plants have to be connected to the grid, rendering urban governments potentially dependent on the associated grid institutional-political complex. This translates into the institutional dependence of new actors on other conventional energy actors like the state government distribution companies responsible for grid interconnection and revenues from electricity generation, national and state government bodies, national and state regulatory authorities,

and grid operators at multiple levels. In addition to potential regulatory and administrative restrictions imposed by regulators or higher grid managing actors, decentralised RE technologies face tangible material boundaries on the amount of electricity that can be injected into the grid (including specific frequency and voltage) from the distribution end through the state regulatory bodies (Chandrasekaran, 2021).[60]

Further, 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. Whilst discussions on the effects of institutional and structural power have been held earlier, the material imperative of grid interconnection for certain sustainable energy technologies shapes the conditions of action for urban governments by restricting their authority over sustainable electricity generation in their own geography.

Dependence on higher levels of governments and institutions (through mechanisms such as electricity grids) is also a result of the economics associated with RE technologies, which in turn stems from the input materials associated with RE that make most RE technologies capital cost-intensive. Heavy investment costs combined with the market approach to these technologies put actors such as local governments with relatively weaker resources in the lower rung of the institutional hierarchy. Alternatively, actors with higher capacity in a liberalised economy, namely nation-states and large corporates, are considered to be the key decision-making entities assigning specific roles (or constituting specific identities for the weaker actors). An interviewee indicating these implicit challenges summarises this as, 'as we were aware that we cannot invest ourselves (because of high costs), we assumed the role of facilitators'.[61] The quote is also reflective of the self-regulatory response that high capital costs of RE technologies can evoke in new actors.

The concurrent tension emerging from the infrastructure and assemblage associated with centralised versus decentralised energy technologies tends to weigh against local governments. This usually plays out as a recursive exchange between policy and materialities where one is used to producing, justify and sustain the other. Kuzemko and Britton (2020) give the example of how policies in OECD countries led to the centralisation of energy

---

[60] SMC had to downsize their solar rooftop targets due to the unavailability of roofs in the case of one of the distribution utilities.
[61] Interview SLG04.

infrastructure and institutions in the past and are now being used to justify particular energy transition policies. Therefore, one of the key sources of disempowerment of urban governments lies in the contemporary material form of the national energy infrastructure, exchange, and networks.

4.3.4. Productive power: constructing the urban

Identities and understanding produced by discourses and systems of knowledge exemplify productive power as conceptualised in this study. I identify productive power mechanisms as processes of discourse production emanating at the national as well as international levels that shape the way urban governments can develop self-understandings about their identity and role in energy.

- ***Mechanism 1: producing urban as the key site for climate action***

In the last two decades, urbanisation has increasingly come to be implicated in the global climate change response. This understanding has evolved from considering 'cities as cause to victims, and cities as sites for climate action, a new narrative is on the rise (cities as saviours)' (Van der Heijden, 2019:2). Bolstered by new technologies, leadership demonstrated primarily by the city governments of the North, multilateral organisations such as the United Nations Conference on Housing and Sustainable Urban Development, Sustainable Development Goals (SDGs), IRENA, REN21, and the Paris Agreement have positioned city governments as an interconnected but decision making, target setting actors (UN (SDG), 2016). In line with this, international knowledge generation organisations (and academics) with significant influence on national and international energy policymaking contributed by generating evidence on the significance of urban climate action and, more notably, urban governments' role in driving energy sustainability (IEA, 2021a; Kuzemko, 2019). Transnational and national city networks like ACCRN, ICLEI, and C40, in particular, have not only strengthened this call by pitching cities critical for the Paris Agreement pathway but have also served as the conduits of this knowledge to the cities of both global north and global south (Fisher, 2014). In the case of India, for instance, transnational city networks and international networks, in general, have been notably influential in building the discourse of city governments as serious actors in climate and energy sustainable energy. This understanding involves contributing to building technological and knowledge capacity but more critically it embodies the notion of urban governments as legitimate governing authorities for local climate and energy issues and

opportunities (Fisher, 2014). As Kuzemko (2019) also suggests about city networks influencing national policies, transnational city networks like ICLEI were also able to influence national policymaking bodies shaping the Solar City Programme nationally that contributed towards establishing a serious place for cities in the energy sustainability field in India and vice versa. City governments in India have typically reproduced and localised this discourse with the production of city plans and city-wide stakeholder consultation.

- *Mechanism 2: discursive production of 'national' technologies*

Dominant discourses of efficiency, security, and access to the rural and agricultural population in India's energy policy landscape since the beginning of its journey as an independent country until even now have particularly defined the framings of the energy sector (See Dubash et al., 2019; IEA, 2021). As a result, the solutions that gain significance are 'clean coal', large scale RE, nuclear power, and regional electricity trading that can fulfil these objectives. Accordingly, there is a discursive production of a valid set of sustainable energy technologies while dismissing others. For instance, IEA 2021 India Report, a key policy outlook paper prepared in coordination with the national government, highlights the critical significance of India's urban areas and urbanisation process for the country's energy future without referring to urban governments. This kind of logic validates the present centralised configuration of policy and implementation actors, bypassing the need for mediation through the local governments. The international climate discourse that is building to yield

Figure 2: PM Modi inaugurating large-scale solar project (The Hindu, 2014)

net-zero targets from the highest emitters at the earliest acts as a normative argument for the national government to aim for large scale clean energy targets – a pathway that claims to ensure development in India but also delivers net-zero targets.

This is further exemplified in India's current political discourse on climate and sustainable energy. The current Hindu nationalist leadership in India is pursuing an international strategy to position India as a 'vanguard' of the global clean energy acceleration through what has

been termed by the Prime Minister himself as the 'Saffron Revolution' (Arabindoo, 2019:2; The Hindu, 2014). This ambition is built on the back of a carefully crafted national political strategy to position PM Modi as a visionary leader of RE and climate change in India and internationally (Shidore & Busby, 2019). Since the year 2014, when PM Modi was elected to power, India witnessed unprecedented growth in ambitions and policy pace vis-à-vis sustainable energy.

This paragraph by (Sareen & Kale, 2018:271) sums up this growth:

> Over the last several years, the Indian central government has become an ever more vocal champion of India's green future, setting ambitious targets and publicising India's accomplishments in international fora: in 2017, it joined the International Energy Agency. The present Indian government, led by Prime Minister Narendra Modi, has made the ambitious pledge to develop 100 GW solar energy by 2022………These are outstanding figures when one considers that global solar capacity in 2010 was approximately 40 GW.

Symbolically and discursively, PM Modi positioned sustainable energy technologies, particularly solar, as artefacts of 'future modernity to both elite and mass audiences' (Shidore & Busby, 2019:1184). The 'hype' around India's clean energy leadership and mega targets for large scale RE capacity need to be read along with the centralising and uniformising nature of India's energy transition pathway (Arabindoo, 2019:4). This production of a discursive techno-utopian vision of RE led grand economic prosperity and international recognition does creates a temporary euphoria in citizens (as is also evident in the case of Pune and Surat). On the flip side, this kind of discourse builds the ground for a sustainable energy transition where the leadership (both policy and execution) of the national government, large corporates and corporatised public companies becomes inevitable. In such discourses that inherently carry undertones of nation-building, 'revolution', and profit building, smaller marginalised actors find little value in the overall policy framework.

4.4.   Conclusion

The above discussion on the broader structural, institutional, material, and productive power mechanisms that constitute or condition urban sustainable energy governance in India show that structurally powerful actors who have been responsible for governing a centralised energy system are now steering India's transition to sustainable energy. Power is operationalised not just to sustain the conventional frames, rationalities, and actors' groups

but to actively discourage new political entrants like urban governments from governing urban energy. This has two main implications for the current understanding of cities' actions on sustainable energy in India and also energy policymaking:

- It adds nuance and depth to the argument of weak capacity in urban governments by situating urban governments in the larger policy and political landscape. The structural power of the actors helps in facilitating dominance over other types of power and manifests in favourable institutional design, distribution of resources and authority, and knowledge hegemony.

- It also questions the ad-hoc centrally designed urban programmes to encourage urban governments' sustainable energy actions. The power analysis shows that unless urban governments are integrated structurally into the national sustainable energy policy domain, local plans and actions will always stand the risk of being jeopardised.

In the following three chapters, I delve into the power analysis of the specific sustainable energy actions and conditions of actions in the three cities that have also fed into the above analysis.

Chapter 5: Analysing power in sustainable energy governance in Surat, Gujarat

5.1.   Introduction

Gujarat, a western state in India, is well known for its cities heralding progressive climate actions locally. The delta city of Surat in Gujarat stands out even amongst these frontrunner cities in its climate resilience and mitigation linked actions. Surat's tryst with multiple environmental disasters like flood and flood-induced epidemics in the last two decades has been one of the defining events that forever influenced the city's development. Several studies have projected increasing temperature and rainfall variability impacting the city in the last two decades, indicating the city's increasing vulnerability to climate change (Rajasekar, Chakraborty, & Bhat, 2018). This has Surat Municipal Corporation (SMC), the elected local governing body of Surat, to be particularly receptive and responsive to climate change programmes (Chu, 2018). Within the rubric of urban climate responses in India, where city governments are known to underperform on sustainable energy actions due to multiple constraints, Surat's deviant case solicits further research.

Responding to the local spatio-material imperatives and buoyant national and international discourse on cities and sustainable energy, SMC's executive's entrepreneurial leadership has been instrumental in initiating and sustaining SMC's actions in predominantly RE. However, they remain limited as a result of the constraints created by the larger sectoral politics deployed by both national and state governments. This first empirical chapter elaborates on this broad finding. In doing so, the chapter situates Surat's urban sustainable energy governance within the broader multilevel politics of urban and energy governance in India that have shaped SMC's conditions and identity. Accordingly, this case study should be read with the analysis in Chapter 4.

5.2.   Background

Surat has historically been a trading city, with traditionally held family businesses making up most of the industrial and commercial citizenry (Chu, 2016). The sizeable industrial base of

the city has also attracted a large migrant population resulting in a rapid expansion of the city. Surat, today, is the ninth largest city in India, with an area that expanded about fifty times from 1961 due to rapid population rise. The recurring floods in 1994 and 2006 and the plague epidemic in 1994 have been a turning point not only for Surat but also for India's national urban governance outlook.[62] Capital intensive infrastructure-based steps were planned to manage and prevent these disasters from recurring. One of the strategies to cope with the additional financial burden arising on account of the resilience-related infrastructure was to usher in radical financial management reforms that led to Surat being a financially independent city.[63] Surat's vulnerability and subsequent proactive reforms also garnered the international development community's attention and attracted a number of climate change programmes targeted towards vulnerability and adaptation. Urban climate governance scholars, who have studied Surat's climate change adaptation actions, academically, have highlighted that Surat capitalised on its financial and political strengths to create institutional capacities, but its actions are also shaped by the local political economy (Bhardwaj & Khosla, 2020; Chu, 2016). Whilst Surat's governance on climate adaptation and resilience governance has received significant scrutiny from academic scholars, Surat's initiatives and governing approach on sustainable energy – a field of its own - remain understudied.

As the key unit of analysis for this study, I summarise below SMC's governing approach, plans and policies, actions and inactions employed in the sustainable energy domain within its city boundaries.

5.3.   Sustainable energy governance in Surat

Surat's initiatives on sustainable energy started in 2001, much before sustainable energy was considered to be a mainstream policy area even at the national level (Ray & Tewari, 2018; Shah, 1997). As early as 2001, SMC set up India's first Energy Efficiency (EE) Cell as part of its financial reforms to identify strategies for reducing the burgeoning electricity costs of the Corporation.

---

[62] The plague incident was such a shocking incident in India that Surat city became synonymous with the epidemic and was a matter of embarrassment for the city administration. It attracted national policy attention wherein Ministry of Urban Affairs and some multilateral development agencies made sanitation and water supply an immediate area of policy intervention. The state as well as the city administration were under tremendous pressure to work towards mitigating similar occurrences in the future and some of the senior state officials were transferred to the city manage the city administration.

[63] Many city governments suffer from financial incapacity and are dependent on the state government or the market to mobilise funding even for basic functions.
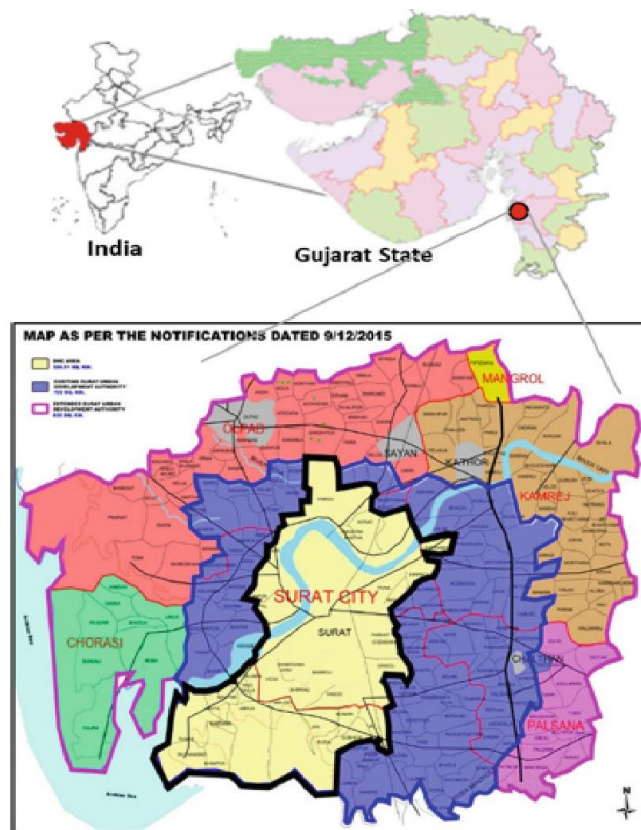
Figure 3: Map of Surat and the state of Gujarat

(Source: Bhatt, Kumar, & Sharma, 2020)

The strategies of the EE Cell included identification of EE opportunities in the Corporation's operation and even representing the Corporation's interest at the state electricity regulatory body. This was the first-ever sustainable energy linked department in any urban government in India. One of the earliest initiatives that also became the bellwether for more innovative actions by the city government (SMC) was the generation of power from waste-water treatment plants. The project was initiated with the help of the MNRE and the United Nations Development Programme (UNDP), with 50% funding from MNRE on the capital cost. A number of these technologies were installed across the city at SMCs wastewater treatment facilities. With more waste-water treatment plants in the pipeline, SMC transformed this experimental project into a policy that ensures every new waste-water treatment plant is installed with a power generation facility.

The establishment of EE cell set the ball rolling on a number of aspects within the Corporation that included regular checks on the electricity expenditure, regular energy audits of the Corporation's activities and lastly, EE activities within the Corporation's public services like

streetlights. One of the more interesting actions of SMC's EE cell has been its investments in RE technologies for self-consumption to reduce Corporation's electricity consumption costs.[64] The first investment in wind power plants was carried out in 2010. Like in the case of the power generation from wastewater treatment facilities project, this was the first-ever RE investment in a large scale RE plant by a Municipal Corporation in India and has now influenced other Corporations in the Gujarat state. By 2019-20, SMC planned to add close to 35 MW of wind power plants to be billed against the electricity consumption of SMC's water infrastructure-related activities resulting in significant cost savings. The EE cell has been equally optimistic about solar technologies and has a target of installing 30 MW of solar in total. Such capital investments in sustainable energy technologies, demonstrating the managerial, enterprise like the set-up of SMC, is not common practice in Indian cities.

In addition to short-term interventions outlined earlier, SMC has more significantly institutionalised many of the interventions either in the form of long term policies or institutional practices for a more planned but also strategic development of the sustainable energy governance of the city. The institutionalisation of Surat's climate-related interventions, which included sustainable energy got further support from the Rockefeller Foundation, which led to Surat's association with the Asian Cities Climate Change Resilience Network (ACCCRN).

More directly linked to sustainable energy, the SMC participated in the national government's Solar City programme (see Chapter 4) and prepared a plan wherein 10% of the city's electricity is to be procured from RE and EE technologies in the near future. On the discontinuation of this programme, the interventions were carried over to the SCM programme.[65]

Surat has further become one of the first urban governments to encourage the adoption of sustainable energy technologies amongst its residents and stakeholders of the city in order to implement a city-wide energy transition. The first effort was a pilot for Cool Rooftops technologies as part of its Climate Resilience Strategy. The project attempted to demonstrate different low-cost material strategies for achieving protection from climate change linked to temperature increases in the low-income households of the city. The intervention reduces

---

[64] In 2010, Government of India extended financial incentives to attract private sector investors/industry. At the time, incentives like accelerated depreciation of 80% in the first year was extended with attractive feed-in-tariffs for wind power projects and subsequently for solar projects.
[65] Interview PLG03.

the final electricity consumption required to cool built areas. On solar rooftop adoption across the city, SMC forged multiple alliances and partnerships with a number of national, state and city-level actors to facilitate easy solar rooftop installation and transfer of government incentives. SMC carried out city-wide awareness programmes for its residents, launched a rooftop solar potential calculator, established an online portal that will act as a single-window system for interested parties and reduced bureaucratic delays. It partnered with local distribution utilities and financing institutions to build their capacities in order to support the solar rooftop projects across the consumer's categories.[66] SMC's involvement in facilitating the increased uptake of solar PV rooftop is once again unusual for city governments in India, where solar rooftop projects are predominantly implemented by state government agencies and distribution utilities (can be both private and corporatised state agencies independently regulated).[67]

However, not all the efforts may have endured the test of time. For instance, climate change has stopped being part of the Corporation's budget and SCCT is yet to find a formal space within the SMC. Its sustainability remains unstable due to the lack of formalisation by the SMC and has to depend on international network programmes. Further, SMC has not taken any steps in the direction of building EE or energy considerations in urban planning (city expansion) even when city governments are mandated to implement these programmes under the leadership of the state governments. The solar single window facility stands terminated today, and active awareness generation has been slowed down.[68]

In many ways, Surat is a deviant player among the three cases selected for this thesis. Surat is one of the only cities to formally accept a long-term vision and commitment to utilise sustainable energy for its local climate resilience, economic development, and sustainability-related objectives. I find that even in the absence of a formal mandate Surat has been able to establish its authority on energy matters from the contextual realities and has been able to leverage the existing institutional provisions. The findings in Surat, in effect, challenge the

---

[66] With the help of a technical consultant, Surat managed to estimate its solar rooftop aim to be around 418 MW under the smart cities mission programme (Interview GE03).

[67] The campaign was launched on September 22, 2016, by the Hon'ble Mayor of the city in the presence of the senior officials from national and state senior power sector officials and financial institutions and other implementing agencies. On the same day a website and mobile application for the citizens was also launched. To engage the youngsters, 200 students from various engineering colleges across the city were chosen as ambassadors (Interview GE03).

[68] A booklet of solar rooftop adoption in Surat in under preparation (Interview SLG04).

predominant notion that Indian cities are taking only limited action on sustainable energy or are bound by capacity inadequacies. However, it remains bound by the very norms and provisions offered by the current institutional and structural frameworks in the energy domain from which it hopes to benefit. This is particularly helpful in understanding the more recent challenges of SMC's actual implementation. In line with the objective of this study, the following sections critically analyse Surat's decision-making with regard to selecting, implementing and scaling sustainable energy programmes at the local scale. The analysis below views these policy practices as the net effect of the multivarious competing and sometimes collaborative power operations between the multilevel players that occupy the energy space.

5.4. Power operationalisation within sustainable energy governance in Surat

The praxis of governance by city governments starts with how its authority is claimed and sustained, the actions it takes up and the ones that are struck off the list, and the approach and role it assumes while governing. I try to understand how power is exercised to constitute and shape these aspects that define this governance. Power, when conceptualised as the 'production of effects', can work through multiple overlapping and interacting mechanisms. An attempt has been made that not only visible and more obvious mechanisms of power are identified, but more underlying and latent mechanisms are identified, drawing from the acknowledgement of wider sectoral framings and hegemonic knowledge foundations.

5.4.1. Material power

Material power is an adapted feature of the study's analytical framework presented in Chapter 3 for better application of the framework to socio-technical systems. Material power, in this framework, encompasses the effects that are produced by the inanimate aspects related to energy technologies. Therefore, this includes the technologies or infrastructure for utilisation of energy but also the energy flows, resource inputs, and externalities that emerge from the interactions of these technologies with the other ecological and socio-economic systems. The effects produced by the material power of energy in a multilevel form have facilitated a specific type of governing assemblage or configuration within the city of Surat. I broadly categorise two mechanisms through which these effects are articulated.

- *Mechanism 1 – generating local imperatives from spatio-economic energy embeddedness*

Energy was brought under the governing fold in Surat as a result of local socio-economic and spatio-material interactions that had implications on the embedded energy needs of the city. Surat's early experience with climate and infrastructure linked disasters (floods and plague in 1994 and 2004), textile dominated local industry,[69] and rapid growth of the population of the city (in the early 2000s) created the space specific demand for formalised water (including wastewater) infrastructure. This context-specific energy embeddedness created the imperative for SMC to mitigate the high electricity demand for this infrastructure and the ensuing costs. Local technological interventions of local power generation from wastewater treatment plants, EE measures, and investment in large scale RE projects to generate revenue for the Corporation's cost.[70] While the general empowering effects of the decentralised application of sustainable energy technologies have been highlighted in the general analysis in Chapter 4, here effects of localised energy embeddedness within urban activities are delineated as a distinct mechanism.

The 1994 flood particularly was a watershed moment in Surat's history that made city-wide sewage infrastructure coverage a priority. This shaped SMC's key interest in developing self-sufficient local administrative and economic capacities and building infrastructure to avoid future calamities whilst achieving a high rate of development for its industrial economy (SMC, 2004). Wastewater infrastructure, and its upgradation, became a particular priority for the Corporation as inadequate sewers are considered to have led to the flooding and plague (Bhat et al., 2013). In the early 2000s, Surat had to undertake a three times increase in the expansion of local infrastructure and formalisation of municipal utilities to almost all parts of Surat city because of the rapid migration and housing demand. Being a coastal city, Surat additionally faces the problem of salinization of groundwater, reinforcing the need for formal water infrastructure in the city. By 1999, water (including wastewater) services formed more than 50% of its Corporation's costs as a result of high formalisation levels. One of the interviewee privy to decision making mentioned,

'For SMC, water pumping comprises one of the biggest loads for electricity (close to 50%).

---

[69] High water consuming industry.
[70] In the early 2000s SMC launched a campaign that pitched Surat as a 'global city with global standards'.

Therefore, this has been a priority. The important electricity load is sewage. Almost Rs. 7. 7 crore of energy savings have been made already'.[71]

In essence, the energy-linked material dimensions of the physical and socio-economic context of the city produced clear implications that put energy within the governing scope of SMC, constituting SMC's identity and authority over local energy matters. Local urban governments are often responsible for the implementation of programmes but are bound by the resources and restraints of their locally contingent spatial, social and political characteristics. SMC's sustainable energy interventions have been primarily a response to the very material implications of its distinct spatial landscape. Surat's increasing financial pressures were a result of the infrastructure demands due to a rapid increase in economy, migration and the indispensable need to prepare for future natural calamities. The urban climate governance literature has highlighted several cases where climate change mitigation prospects, as well as approaches, are contingent upon socio-material specific characteristics of the city (Knuth, 2010).

- ***Mechanism 2 – generating local opportunities for urban governments through decentralised applications***

In addition to material implications of the local physical and socio-economic context, the material characteristic/ being of energy resources, apparatus, artefacts, networks, and flows have significantly shaped the local, sustainable energy governing dimensions (Becker, Moss, et al., 2016; Moss et al., 2016). SMC was enabled to rescale energy actions because of the decentralised materiality of the sustainable energy applications today and their ability to yield local benefits. In other words, both economic and political opportunities – and empowering conditions - presented through the application of local decentralised sustainable energy technologies were one of the key rationalities for SMC to initiate its sustainable energy governance. It further facilitated the setting up of the EE cell and institutionalised the agenda of sustainable energy – multiplying the benefits.

In SMC, interviews at senior levels indicate that sustainable energy governing was initiated as policymakers wanted to implement technologies that were more *'challenging'*, *'socially relevant'*, and *'unique'* to the city.[72] Closely interconnected to the decentralised nature of

---

[71] Interview SLG04.
[72] Interview SLG05.

sustainable energy technologies are financial benefits that these technologies deliver through, for example, energy savings and financial revenues. The mission statement and role of the EE cell reveal that SMC's main interest in sustainable energy technologies is through the financial benefits it expects to accrue.[73] The financial as well as political benefits delivered by these technologies helped strengthen the capacities of SMC and have led to the scaling up of specific technologies such as power generation from waste-water treatment plants, municipal EE and investments in large RE generation. In contrast, the technologies of building EE and sustainable energy-based urban planning, where these benefits are likely to be more distributed to the public, are less important for SMC.[74] Evidence of differential attention paid to different departments within SMC was also clear during the interviews/ interactions. Whilst this will be discussed in detail later, the significance of the EE cell within SMC was much higher as a result of its success in delivering significant capital revenues to the organisation. One interviewee said, indicating why EE Cell was able to push its agenda of capital-intensive technologies within the SMC (as against buildings EE), 'resource begets resource. Since they were able to deliver on the profitability of the early investments, they were given more importance'.[75]

- ***Mechanism 3: conducting politics of visibility***

In addition to the inherent material characteristics of sustainable energy technologies, the visible appeal of these technologies was also found to be a differentiating factor. The effect of the decentralised solar energy equipment in inducing public interest was found to be an important rationale for SMC to implement solar rooftop projects locally. SMC's ambitious programme on solar rooftop implementation both in its own buildings and for general public uptake is attributed to this. Discreet applications like building EE for scaling sustainable energy amongst the citizens of Surat further fall short on this front. One interviewee at higher levels attributes this partly to the visibility garnered by complex technologies like a solar rooftop. She mentions,

> RE is given more importance in the current regime (seems like state and national level) both. EE is not tangible, except for energy savings. Whereas RE, there is an artefact, clearly

---

[73] https://www.suratmunicipal.gov.in/Departments/EnergyEfficiencyCellHome.
[74] Interview with buildings department head. Ironically, city building EE was the responsibility of the buildings department and not the EE cell.
[75] Interview GE02, GE04.

seen, so it is given more importance by the current policymakers. National level policies and framework (BEE, etc.) also work the same way, where MNRE is a separate ministry solely responsible for RE and has an exclusive budgetary allocation. Because of its political attractiveness, RE is also favoured by the Chief Minister.[76]

Luque-Ayala (2016) illustrates, through case studies in two cities of India and Brazil, how solar water heating technology is used to re-territorialise energy by the local municipal bodies – that is making energy an 'urban problem' - often through the reconfiguration of energy infrastructure, making government visible through material technology and creating specific subjects through these technological applications (Luque-Ayala, 2014:180). The visibility dimension of sustainable energy technologies plays out markedly differently in the global north where public opposition to the artefacts of sustainable energy technologies - 'Not in my Backyard' (NIMBY) ism - has been more common and widely covered in the literature (Goldthau, 2014). Much less understood is the politicisation of the material artefacts of energy technologies for electoral gains, mobilising public consensus for national policy changes, or even showcasing public accountability. This can serve as additional dimensions for future materiality research, particularly in the context of the global south.

SMC's attempts toward low carbon transition, when seen in this light of material power, reveal the importance of both the economic and political imperatives and opportunities arising from the material characteristics of sustainable energy technologies in rescaling energy governance. The imperatives and calculatives also shaped the choice of generation based technological actions but also helped in delivering *'unique'* and *'socially relevant'* governing strategies to the public. More importantly, SMC (and the EE cell within it) has been able to utilise these ends to attract more power, capacity, resources, and influence from both national and international actors.

5.4.2. Compulsory power

Compulsory power represents the most intuitively understood form of power operationalised by directly related actors. This type of power then engenders action or inaction through the mechanisms such as command, coercion, leadership, or resource incentives and capacity commitments between two actors. Unlike material power, where the interaction of the non-human elements of energy with the governing arena is key, this type of power focuses on the

---

[76] Interview GD03.

direct interaction between actors. Barnett and Duvall (2005) also conceptualise power that is held but may or may not be exercised on other actors, to be accounted under this power type as even that can influence actions. Accordingly, attention needs to be given to 'a range of technologies and mechanisms as they consider how one actor is able to directly control the conditions of the behaviour of another actor' (Barnett & Duvall, 2005:15).

- ***Mechanism 1: executive leadership by individual officials [77]***

In the absence of a national or a state government policy focus on urban sustainable energy, SMC's actions were significantly shaped as a result of the decisions taken by the executives in SMC. The executive head of SMC, in general, as well as the leadership within energy department, commanded these actions in the backdrop of a managerial and organisational culture that is results/ delivery oriented, with the goal towards strengthening SMC financially. At least three interviewees pointed towards the interest and entrepreneurialism of the executives and the management as the key driver of SMC's action.[78] One official said,

> It is mostly about this drive within the department to do something new and different for the Corporation. I was following the schemes of the Government of India closely, and when the right scheme was launched, I decided to invest SMC's revenue to wind power and utilise it to mitigate the expenditure incurred in the water infrastructure. This was the first time any city had participated in such a scheme, so there were regulatory obstacles. We fought these regulations legally and created space for ourselves and also other cities.[79]

An interviewee highlights,

> Perseverance has been a key to the success of RE projects as most of the national level policies did not include corporations as potential participants or beneficiaries. However, SMC officials institutionally negotiated and persevered with national-level authorities to include corporations as part of the beneficiaries through reforms in their rules and regulations.[80]

Individual leadership by local government executives have been noted to have influenced local action on climate change in the literature as well (Kuzemko et al., 2016; Bulkeley, 2010). How leadership in one city can create 'learning, demonstration, and credibility' for bringing

---

[77] To be read with institutional power mechanism 3 – Bureaucratisation.
[78] Interview GE02, GE03, SLG01.
[79] Interview SLG04.
[80] Interview SLG05.

about change in the case of other cities, like in the case of SMC, has also been documented by Kuzemko (2019:93).

During my interactions, as also evident in the above quote, there was a constant tendency during the group discussions to recount the number of projects that SMC was the first urban government in the country to initiate. The agility of the local bureaucracy is also evident in the fact that when international discourse started framing energy as a climate or sustainability issue, the executives also changed the organisation's tack or outlook. Fisher (2014) terms this phenomenon as a case of 'policy boosterism' in that local municipal officials tend to make the framing of existing policy actions amenable to different policy spaces to gain international and national recognition,[81] attract resources, and boost individual professional legacy (Fisher, 2014).

The direct leadership of SMC officials also engendered institutional change that shaped the nature of SMCs governance of sustainable energy. This also serves as one of the many examples of how power types *interact* to bolster a particular condition for action. Firstly, by establishing an EE cell within the urban government or Municipal Corporation with a specific energy-saving mandate created not only local capacity but also initiated a continual process of direct incentive creation for implementing sustainable energy in the city. Technological choices or interventions have primarily been led by the EE Cell, a highly valued department within the SMC occupied by engineers. The success of the projects locally created prepared the ground for SMC city-wide initiatives and planning. One executive interviewee mentions, 'SMC serves as an experimentation platform before rolling out the technologies in the general public'.[82]

The SMC executive leadership established an internal norm of working with a long-term outlook across all sectors. As a rule, after a successful demonstration in any of functioning, a long term plan is developed with the help of external experts/consultants, and ad-hocism is avoided. Reflecting on the Corporation's initiative to undertake serious long term planning exercises on the issue of sustainable energy, an interviewee states,

> The Masterplan for the solar city was done by Deloitte. Based on the sectoral consumption
> of Surat. This was finalised in 2013 and approved. It took so much time because the SMC

---

[81] Long list of awards by the national government https://pearl.niua.org/sites/default/files/GP-IN5_REFORMS.pdf.

[82] Interview SLG 04.

wanted to be the final roadmap of sorts for Surat. This practice was inculcated in the Municipal Corporation by two municipal commissioners in the past who insisted on working with a vision in mind. They helped in the solar city plan to become a road map of sorts. [83]

- ***Mechanism 2: extending technical and financial capacity through international programmes***

Surat's climate vulnerability and openness of the administration to external resources has attracted the attention of the global climate community, particularly city-based resilience and adaptation focused global networks. Through the preparation of multiple local climate change resilience-related studies, plans, and demonstration projects, international networks and institutions have been able to influence the climate action agenda and conditions of sustainable energy actions by SMC. A key influence involved recognising energy interventions required for achieving climate adaptation and resilience objectives.[84] The *cool roofs* project was expected to deliver EE to the low-income housing stock as part of one such partnership. One interviewee involved in similar initiatives mentioned,

> Just like they were continuously scouting for domestic resources and incentives, SMC officials were also keen to tap the international resources. One of the key reasons for Surat to attract a large number of international actors was also that the Commissioners were very welcoming of new knowledge and technical support that these partnerships yielded. SMC often contributed to these partnerships by allocating its human resources on the projects implemented by these organisations.[85]

As most urban local governments lack updated knowledge and technical capacities on sustainable energies, external and non-state actors often find this a major channel for exercise of institutional influence and gain entry to the decision-makers. The main point of interest for international actors with respect to Surat has been climate change adaptation due to Surat's vulnerability towards climate change and its receptive bureaucracy.

5.4.3. Institutional power

Indirect mechanisms of power operate through institutional channels where conditions are created for specific actors to act or specific acts to happen in a specific way. I identify here

---

[83] Interview SLG04.
[84] City Resilience Study by Shell, 2015; Surat Resilience Strategy 2017.
[85] Interview GE04.

some of these indirect mechanisms - formal and informal - that have affected the actions and conditions of the SMC in particular. These mechanisms need to be read with the general institutional mechanisms of power and effects identified in the earlier chapter (Chapter 4).

- *Mechanism 1: making urban governments 'non-entities' in the state energy transition*

The power mechanism of making urban governments 'non-entities' in the Indian energy transition storyline, as evidenced in the national policy framework (Mechanism 1 of 4.3.2), was also found in the case of the state of Gujarat. Within the state policy frameworks for sustainable energy technologies, the envisaged roles for urban local governments are either non-existent or limited to the implementation of specific technologies.[86] Officials from even sectoral nodal departments were barely aware of SMCs initiatives in multiple interviews, terming these as independent initiatives by the Corporation.[87]

Surat's actions, as also confirmed during the interviews, was driven by the institutional and executive culture of strategically tapping national and state-related urban funding/ development programmes (Ghosh et al., 2015; Ray & Tewari, 2018). However, this also subjects Surat to comply with the roles and identities assigned within these national and state-level programmes and policy frameworks. With urban governments like SMC reduced to 'non-entities', Surat depends on the technological enabling frameworks put in place for general market development by the national government like other electricity consumers (see quotes 89, 90 in the previous section) – perpetuating a neoliberal identity. The uncertainty around solar rooftop subsidies and regulations is one example of how SMC's city-wide solar rooftop based plans may be affected in the future.

Interestingly, SMC also identifies itself as a 'facilitator' in progressing sustainable energy adoption locally.[88] This was enabled by the national policy spaces created by the national government through both Solar City and Smart City Mission (See 'Directed Decentralisation mechanism' Section 4.3.2). One of the interviewees explained how these roles are defined by SMC,

> The solar city plan was prepared with a target of 10% of the city's electricity consumption

---

[86] The non-implementation of Building EE rules, for instance. No roles recognised for urban governments in the new Gujarat Solar Policy 2020 either.
[87] Interview GD06, GD05, GD02.
[88] Interview SLG04.

to be met from RE and EE technologies. The Corporation's consumption constitutes only 4-5 % of the total electricity consumption. That is why we had to involve the household and industrial sectors as well. We tried all the technologies on our facilities; now we are ready to offer these technologies for the benefit of the public. We realised that we couldn't invest or finance these technologies ourselves due to limited finances, so we decided to act as facilitators. We decided to implement measures like single window clearance, sign MoU with GEDA and local distribution companies, capacity building and awareness programmes for financing institutions, solar resource potential for rooftops.[89]

Despite the enablement extended by these programmes, the precarious nature of these roles/policies was evident when the Solar City programme by MNRE was discontinued in 2018. The city governments had to manage some of the planned interventions under the SCM, under which Surat was selected in 2015. As I mentioned in the earlier section, the SCM is hardly coordinated by the national or state nodal agencies of RE or EE.[90] In the absence of identity at the national as well as the state government level, SMC's actions indicate the emergence of transient small shadow pockets of opportunity inadvertently created during the institutional evolution of India's energy transition pathway. Sustenance of their actions is then predicated on their executive nimbleness to tap these pockets and consistency of the national programmes and incentives shaped by institutional and market factors operating at the higher levels. [91]

- ***Mechanism 2: control over the implementation processes – regulations, approvals, and connections***

State governments (Gujarat in the case of Surat) are responsible for the implementation of the national government's sustainable energy policies and technically with most 'skin' in the game (Jörgensen & Wagner, 2017; Kale et al., 2019). Specific bricks and mortar of the energy sector's implementation (including sustainable energy) like land, resource assessments, grid interconnection, regulation, and economic implications are mediated through the state government through different institutions. For instance, guidelines for building EE, or applications for solar rooftops, are managed by a state government department chronically devoid of adequate capacity. These regulations, prepared by external consultants for the

---

[89] Interview SLG04.
[90] MNRE and BEE.
[91] As RE technologies mature and more market led, systems are put in place.

entire state, have not yet been published by the state government. Concerned officials at SMC mentioned that one of the reasons SMC has been unable to take any action on building EE is because of the delay or little interest shown by the state government.[92]

More importantly, regulatory and economic aspects that directly affect the advantages associated with these technologies like a favourable tariff, net metering regulations or approvals lie under the control of the state entities, often closely connected to each other formally and informally (Prasad, 2019).[93] Gujarat is known to be one of the most progressive states on large scale RE capacities brought about primarily by the political leadership. However, Sareen and Kale (2018) illustrate through their study on Gujarat's power sector that state utilities and supportive regulatory agencies have created institutional and regulatory hurdles to prevent large-scale adoption of rooftop solar PV in the state. Decentralised RE technologies are considered to be a major threat to the commercial interests of distribution entities as they reduce the electricity demand of high paying consumers. However, Surat has managed to evade this potential challenge to a certain degree as the private distribution utility serving it has the advantage of serving a large industrial consumer base.[94] SMC, until now, has focussed on the uptake amongst residential consumers but plans to target industrial consumers.[95] Until the scales of the installation do not affect their core business, the utilities do not put up an upfront resistance to local solar rooftop programmes. An expert in the Indian power sector says, 'these utilities (Surat) are some of the richest utilities with a large proportion of industrial consumers (Surat is an industrial and commercial hub). They can't be bothered about a few solar rooftops on residential buildings'.[96]

The primary responsibility of ensuring a grid connection to grid-dependent projects like solar rooftop PV, billing and financial remuneration is linked to the local distribution utilities. Recent contestation between local utilities and SMC overcompensation tariffs for SMC's solar rooftop projects raise important questions about the sustainability of the current partnership.

- ***Mechanism 3: entrepreneurial bureaucratisation: setting informal and/or indirect institutional rules, incentives, and practices***

Gujarat's urban governance is characterised by a weak political arm but a strong executive

---

[92] Interview SLG06.

[93] https://mercomindia.com/torrent-power-revised-tariff-rooftop-solar/.

[94] This is not the case for most other state distribution utilities.

[95] Interview SLG06.

[96] Interview GE03.

branch. It is a tactic followed by a number of state governments to exert more control on city governments as appointments of city executive leadership are usually the authority of state governments (Bhardwaj & Khosla, 2020).[97] Beyond the direct support or sanctions, the state government formally and informally sets rules and norms for their management of the urban governments in order to forward its interests and policy outlook (cf. Shah, 2013).

Surat's bureaucratic performance and entrepreneurial interests, too, need to be seen in the context of the state government's relationship with the SMC, its urban policy, and the position of cities in the political economy of the state. Whilst SMC enjoys a significant degree of autonomy in its day-to-day operations, the Gujarat state holds the main power to implement SMC's constitutive Municipal Corporation Act, allocate fiscal resources for urban governments,[98] approval and funding of state government-mandated or other infrastructure projects, and extends general political as well as executive patronage to the Surat city government. This creates conditions that leave little scope for contrarian policy positions/resistance and instead ensures compliance and conformation.[99]

The Government of Gujarat, supported by multilateral institutions like the World Bank and ADB, adopted the 'good governance' paradigm that shaped some of the key fiscal and other administrative practices in the state (Shah, 2013). At the urban level, this meant programmes that increased the creditworthiness of the city governments were prioritised so that they could borrow funds from the market rather than depending on the state government revenue transfer or aid.[100] This approach helped in establishing the urban infrastructure development paradigm that is state government steered, but the private sector led, primarily to service the industrial growth within the state. For the political leadership that took charge since 2002, this has become the cornerstone of its overarching policy for the state government (Datta, 2015). Terming the state government as a regional scale 'entrepreneurial state' that is constantly announcing big, bold ideas, Dutta (2015) posits that Gujarat's urbanisation, therefore, needs to be seen as a business model or a case of 'entrepreneurial urbanisation'

---

[97] In some states this is done in consultation with the political branch of the city.

[98] 15th Finance Commission report on Outcome Evaluation of State Finances - Gujarat, 2019.

[99] For instance, even when the state government has not performed well in extending formal policy support or frameworks to urban governments for sustainable energy interventions, most interviewees with formal positions in the SMC refused to comment on it and maintained that the state government has been 'very supportive'.

[100] Gujarat does not have a formal revenue sharing mechanism in the state, a key urban reform required by the 74th CAA. The Gujarat Finance Commission, an independent body under the 74th CAA has not been constituted since 2011 when it is mandatory to be set up every five years (Baxi & Yadav, 2019).

(Datta, 2015:3). She writes,

> Whilst Gujarat had focused so far on industrialization-led urbanization, it has now entered a new phase of entrepreneurial urbanization that (following Jessop and Sum, 2000) pursues innovative strategies to enhance urbanization for economic growth, formulates explicit policies on urbanization and actively pursues these to realization and circulates entrepreneurial discourses through state agents. (Datta, 2015:9)

The entrepreneurial nature of SMC's sustainable energy projects echoes the above observation by Datta (2015). The primacy of the executive arm over the elected representatives helps in implementing the State Government's broader vision in the individual urban centres (Niti Aayog, 2015). This is further nudged by the state government's urban policy to push the urban governments to raise funds from the market and reduce dependence on the state government.[101],[102] Executives of key urban centres in the state (including Surat) are indirectly incentivised for announcing big-ticket green/ sustainability linked projects and are forced to maintain balance sheets that focus on market based instruments or tapping on national government incentives.

SMC's executive entrepreneurialism may be playing out at a different scale but is inexorably linked to Gujarat's political turned policy narratives of 'technology-led utopian urban imaginings' (Datta, 2015:5) to attract international capital and cater to the local industrial and business community.[103] The interviews with the executive branch of SMC demonstrates the close alignment of SMC's vision with that of the state of Gujarat's overall urban development approach.

> One of the key objectives to use wide-scale RE technologies for SMC was to capitalise on the financial advantages offered by the RE market in India.[104]
>
> Surat's sustainable energy efforts are part of our plans to transform Surat into a futuristic city. We are already trying to experiment with and are quite receptive to new approaches and practices. Thankfully, we have successive responsive commissioners who continue to

---

[101] Executive leadership not only has to regularly report to the State government periodically, but also is dependent on it for its future progress in the state administrative services.

[102] Rajshekhar (2021) notes what Gujarat created, through the urban development authorities, was a system run by bureaucrats who reported to the Urban Planning Department and the Chief Minister's Office, leading to a political capture of municipal functions.' - (M. Rajshekhar, 2021).

[103] Gujarat's neoliberal and industry focussed agenda is led by the long time Chief Minister Narendra Modi (2002-2014) who is currently serving as the Prime Minister of India. One of Modi's key election planks were the scaling the 'Gujarat model of Development' to the entire country.

[104] Interview SLG03.

take these efforts forward.[105]

> Smart utilization of Surat's potential for enhancing the quality of life for the citizens by providing equal access to best quality physical infrastructure, social infrastructure and mobility; Thus, making Surat a futuristic global city with a focus on enhancing the economy, protecting the ecology and preserving the culture of the city.[106] – Surat Smart City Vision

Whilst it may appear that SMC enjoys more autonomy than most other city governments in India, the broader urban policies of the state government of Gujarat have been instrumental in shaping the actions and conditions of SMC indirectly in two ways. Firstly, the bureaucratisation of urban local governments has ensured the alignment of SMC's broader interests with the state governments' interests (industry-focussed urban growth). Secondly, prioritising institutional norms like market logic and financial self-sufficiency means limiting actions to commercially beneficial projects and ensuring returns to the Corporation rather than the larger socio-economic and equity considerations.

5.4.4. Productive power

Productive power constitutes identities and capacities through systems of knowledge and discursive practices. By their own admission, Barnett and Duvall (2005:20) see the overlaps between productive power and structural power but underline that productive power works 'beyond structures' (i.e. discursively) and in a diffused way.

Unlike Barnett and Duvall's eclectic approach, this study takes the position that in the long-running and highly technological domains, discourse and systems of knowledge, particularly the hegemonic discourse, are very much a function of the underlying structures and structurally empowered actors. Mechanisms within this type of power are chosen on the basis of the discursive framings and tools used to instil new or perpetuate traditional ideas about urban energy governance or governments. The ones discussed below are reflective of the discursive landscape within which SMC is operating and the frames that SMC uses for legitimising its actions or inactions:

- ***Mechanism 1: producing urban as key site for climate action***

As discussed earlier, the evolving international discourses on energy, climate, and urbanisation are increasingly pitching cities as key sites for climate change. This has in many

---

[105] Interview SLG03.
[106] https://www.suratsmartcity.com/SuratSmartCity/SmartCityVision.

ways created a resistive space for urban climate and sustainable energy action countering the highly centralised energy institutional framework within which Indian cities are operating. This has shaped SMC's arena of action as well. International urban climate action networks have been the key conduits in constituting the identity of urban governments like SMC as the legitimate urban level body for governing local energy issues. Through technical reports,[107] international study tours, and regular stakeholder meetings within the city, they were able to not just strengthen SMC's know-how but also to add its larger understanding of the significance of urban energy interventions within the frame of climate action.[108] The updated knowledge and understanding of the impacts of climate change on the city have helped SMC legitimise its actions on sustainable energy. An interviewee pointed out that the local business community is highly concerned about these impacts on their businesses, closely involved with the day-to-day processes of SMC. [109] Therefore, demonstrable projects that will be beneficial to the city, as well as aid climate change mitigation, is imperative for a responsive institution like SMC.

The international network also, through their technical reports, helped in weaving the sustainable energy opportunities within climate resilience and adaptation strategies. The discourse on sustainable energy interventions in resilience and adaptation has been weak in India's national energy or climate governance landscape, with scarce interaction between energy departments and climate change governing departments (Stehle et al., 2020). Bringing energy considerations in the adaptation and resilience framings increases the relevance of urban governments as these interventions are commonly perceived to be more appropriate for the urban scale.

- *Mechanism 2: discursive consensus building around climate change and RE*

The state of Gujarat has been considered one of the frontrunners in the development of RE capacities in India. In what is quite a departure from the rest of the country, there is not just a political buy-in in the state but also a political proactiveness in pushing for a renewable energy agenda for the state government. The former long term chief minister, Narendra Modi, and now the current Prime Minister of India, has been considered to be the major force

---

[107] In phase 2 of ACCCRN, Surat evaluated a broad array of green and conventional energy options as a way of increasing both the resilience of the city as a whole while also reducing carbon emissions.
[108] Energy specific study carried out by ACCCRN in Surat City - Energy Security for Surat sectoral study.
[109] Interview SLG 04.

behind the RE shift in the state (Sareen and Kale, 2018). This was often in the nature of innovative and grand solar project announcements (solar canal/solar parks), resulting in gaining significant attention from the global climate and new energy sectors (Carrington, 2014).[110] With the single-party rule for the last 18 years in the state, the discourse on RE has taken root in the state with noticeable political capital around RE activities. Several experts who have worked with Indian cities mentioned that urban governments in Gujarat, in general, have higher awareness and knowledge with respect to sustainable energy than one would find in other states. Citizens are appreciative of these actions by the local governments because of the general goodwill about RE technologies in the state. Beyond the state, the enthusiasm surrounding the large scale RE targets has further helped strengthen SMC's position on RE. Key interviewees mentioned that one of SMC's earliest sustainable energy interventions was made possible because of the emergent discourse on RE (being an innovative technology) at the national level. Showcasing these innovative technologies in their city was also a major motivation for SMC to invest in RE technologies.

The discursive space being a more democratic arena tends to accommodate multiple understandings of urban sustainable energy governance. In this case study, the discourses advocated by non-state and international actors, particularly, have shaped SMC's very interests and identity by demonstrating the wider possibilities of its role in managing local energy issues. The national and state-level techno-utopia about RE as not just an environmentally friendly technology but also a potential avenue for attracting investments and international businesses has further pushed Surat to position itself as a 'green energy champion'.[111] Whether these will be enough to challenge the dominant discourse prevailing remains to be seen.

5.5.   Discussion and conclusion

This chapter presents the analyses of a comprehensive set of power mechanisms that have or are shaping SMC's urban energy governing space. These disparate yet interconnected mechanisms help illuminate not just indirect, insidious, or even inadvertent ways in which higher levels of governments are obliterating democratic possibilities of participation or shaping action for their preferred objectives. It also illuminates how in the face of such

---

[110] For a more measured reading on Narendra Modi's green leadership in Gujarat state, read Arabindoo, 2019.
[111] Source: Smart City Proposal, Surat Municipal Corporation.

continuous centralisation, urban governments like SMC have been organically attempting to create their own authority on local energy and paving the way for other cities.

The financial and material manifestations of the highly interconnected embedded energy flows were the most important force behind establishing SMC's legitimacy to govern energy issues. Therefore, SMC's initial intervention in governing energy was not externally driven by actors but emerged locally as a result of the institutional aims of economic efficiency and disaster preparedness. It will probably be parochial if SMC's actions are perceived strictly as a method of greening the city's utilities, as also warned by Kern and Alber (2009). Interviews revealed that Surat's main objective to implement clean energy projects commenced with a desire to reduce the present and future economic burden of the Corporation. However, the local administration was able to view sustainable energy in a more tactical light where it could meet its aims of being a 'futuristic city' goal of attracting global capital to boost the economy. Surat has successfully territorialised the sustainable energy narrative in India at the urban level by participating in the energy market and depending on the incentives designed by the national and state actors with the benefit of secure financial capacity.

Analysis of the data further indicates the profound effect that institutional and structural powers have in not just setting the conditions and possibilities of actions for SMC but justify the exclusion of urban governments like SMC from the governance of energy issues in their own area of authority. These powers also shape the identities of specific actors and create and mould their self-understanding so much so that they regulate their own actions and assume specific roles instead of resisting. The interviews show that both state and national level policy frameworks have established SMC's identity to that of a mere 'municipal consumer' instead of its constitutional status of being a local government. SMC, however, working within the neoliberal order of the energy sector, but empowered through the knowledge of new scopes, new materialities and local energy imperatives, has developed its self-understanding of that of a 'facilitator' or 'experimenting platform' for new energy technologies. With SMC stepping into a policymaker's zone for its city's sustainable energy transition in a centralised, large scale favouring, liberalised energy market, the sustenance of its programmes seems challenged.

Chapter 6: Analysing power in sustainable energy governance in Pune, Maharashtra

6.1.   Introduction

Pune has been well known for its forward-looking policy position on issues of the urban environment, with local civil society organisations (CSOs) playing an influential role. Pune Municipal Corporation (PMC)'s pioneering attempts at launching multiple sustainable energy initiatives started around 2005 and, in many ways, mirrored India's sustainable energy journey in the first decade of this century. However, as India entered an era of mainstreaming its sustainable energy efforts at an industrial scale in the second decade, Pune's efforts did not keep pace with the progression of sustainable energy in the country. This case study attempts to understand this through the lens of power in the backdrop of India's multilevel governing arrangement. Pune's trajectory of its sustainable energy efforts, therefore, lends itself well to a multilevel analysis of the power mechanisms that have played a role in initiating, moulding, and sustaining it. This chapter uses a conceptual framework based on a multi-dimensional view of power to examine Pune's sustainable energy governance trajectory (actions and inactions). In doing this, I identify the actors and/or the specific mechanisms that affect and shape the PMC's circumstances and actions on sustainable energy in the city.

The analysis finds that Pune's local governance of energy sustainability matters has been a fundamentally contested process negotiated both successfully and unsuccessfully between multiple actors and their pulls and pushes. While this negotiation successfully led to the partial embracement of energy as an area of a local authority under PMC, formalised through public reports and master plans, PMC fell short of implementing them fully. Institutional centralisation at both national and state levels, reinforced by the structural hegemony of these actors in the energy domain, has gradually eroded Pune's agency on local energy matters. Unlike Surat, PMC has limited its actions within the restricted institutional spaces allowed to it, conforming to the imposed energy identity for itself. I elaborate on these analyses in the paragraphs below.

6.2. Background

Pune, in the state of Maharashtra, is the eighth-largest city in India in terms of population but the seventh-largest city in terms of GDP (Butsch et al., 2017; Chen et al., 2017). Much of Pune's growth was shaped as a result of its position as a neighbouring city of the mega-city of Mumbai, which is also called the commercial capital of India (Butsch et al., 2017). In addition to a significant number of industries in and around the city, Pune is known as the 'oxford of the east' for its large concentration of educational institutions (100 Resilient Cities, 2019). After the liberalisation of the Indian economy in the 90s, Pune has also witnessed another change with significant growth of Information Technology (IT) and related services in the city, leading to an in-flow of non-resident Indians and expatriates in the region and a boom in the real estate market. However, along with these developments that mark the city's prosperity, there is also significant migration of the poor in search of economic opportunities (Butsch et al., 2017). The growth of slums in the city has been noteworthy, which accommodate 22% of the city's population as per the Census of 2011 (100 Resilient Cities, 2019). While overall infrastructure availability is better than in other cities in Maharashtra, access to electricity for slums stands at 90% (100% in most of the city). Energy inequality and poverty are noteworthy in the city, where ambient discomfort from heat, unequal access to energy-efficient appliances, and power outages are commonplace (Kaul et al., 2020).
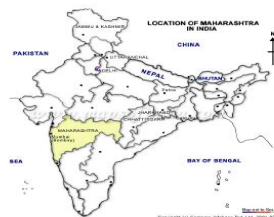

Figure 1.1 Maharashtra in India   Figure 1.2 Pune District in Maharashtra

Figure 1.3: Pune Municipal Corporation   Figure 1.4: Pune Municipal Corporation-Area

Figure 4: Map of Pune and the state of Maharashtra

Source: Pune City Development Plan 2011, PMC

At the same time, Pune is also experiencing persistent growth in electricity demand owing to the exponential growth of the city. There is also a constant expansion of the city limits- as more surrounding villages are added to provide space for the 'unsustainable' growth (Butsch et al., 2017; L. Kamath et al., 2014). Administratively, Pune is governed by the Pune Municipal Corporation (PMC), which comprises both administrative and political branches. Maharashtra Municipal Corporations Act, 1949 serves as the constitutive law that accords authority to PMC and defines its functions. PMC has been well known for being one of the well-managed, financially stable urban governments in India. Largely considered to enjoy significant autonomy in its day-to-day functioning from the Maharashtra state government, PMC has earned several accolades from independent evaluation exercises. Beyond the administrative area of Pune city, the land and its development are managed by another state government established but 'autonomous' organisation Pune Metropolitan Regional Development Authority (PMRDA), responsible for the development of the larger Metropolitan area.

6.3.   Sustainable energy governance in Pune

Environmental concern and sustainability have always been an important part of Pune's local agenda (Kamath et al., 2014). PMC's initial action in energy conservation started as early as the 2000s and involved small scale changes in its electrical fittings aimed at reducing PMC's energy-related expenses.[112] One of the earliest policies was launched in 2005 when green buildings and energy conservation buildings were brought to PMC's attention. Unlike most other cities in India, PMC can be considered a pioneer in implementing building EE related interventions at the city level and has been a constant feature in its local energy sustainability efforts.

The Eco-housing certification programme was a voluntary scheme launched in 2005 to promote sustainable building designs in residential buildings. It established a set of assessment criteria for the environmental performance of residential buildings. This also included energy conservation and embedded EE related criteria. To encourage real estate developers, PMC offered financial incentives for Eco-housing projects.[113] Developers and end-users were invited to utilise this assessment methodology to evaluate their building performance and avail of incentives offered by the PMC. The Eco-housing Programme was a

---

[112] Collated from official documents, reports, and interviews.
[113] Rebate of 10-50% on Premium charges payable to PMC was allowed to Eco-housing projects (Chen et al., 2017).

multi-stakeholder initiative. It was launched with the technical and financial assessment of the United States Agency for International Development (USAID) and prepared with the help of a multitude of local and national expert organisations. PMC agreed to pilot the programme in 2005 (IIEC, 2009). Widescale stakeholder consultation with the city elites helped in finalising the assessment criteria (IIEC, 2009). A number of local civil society and educational organisations were also involved in capacity building, training and awareness generation surrounding the project. Support for the programme by the PMC spurred wider responses where local banks offered house loan rebates to encourage the adoption. The programme was soon successfully adopted by the other Municipal Corporations in Maharashtra (Sawant, 2009). The programme was later made part of the Development Control Regulations, 2017 by PMC (Chen et al., 2017). PMC's demonstration of its interest in encouraging green buildings locally attracted several independent green building rating agencies to the city, boosting the sector further.[114] The enthusiasm around eco-housing fizzled out around 2016-17, even after the launch of updated assessment criteria after more advanced voluntary green building certification programmes like Green Rating for Integrated Habitat Assessment (GRIHA),[115] Indian Green Building Council (IGBC), and EDGE.[116] PMC also offered incentives for buildings opting for these new rating systems in addition to making it mandatory for government buildings.[117] A local expert mentioned that the 'overcrowding' of the sector took away the focus from the homegrown Eco-housing programme.[118]

Immediately after the Eco-housing programme was launched, leadership within PMC wanted to continue the momentum of sustainable energy in buildings that are either already built or are likely to be built without opting for the Eco-housing certifications. In 2007, PMC started offering rebates for the installation of sustainable technologies like vermicomposting, solar

---

[114] PMC signed an MoU with IGBC in 2018 that focussed on commercial buildings and committed to an IGBC cell within the Corporation among other things. The IGBC also published a Green Building Pune report documenting the IGBC rated green buildings that were implemented in the city and were supported by PMC. https://www.pmc.gov.in/sites/default/files/project-glimpses/01_IGBC_HANDBOOK.pdf

[115] GRIHA is voluntary green building rating system prepared initially by TERI, a national non-governmental policy think tank that works closely with the government, and later adopted by the Government of India. The GRIHA ratings include the national building energy conservation rules and also includes provisions that mandate solar water heating systems.

[116] The EDGE, a software for sustainable building design assessment software, is owned and advocated by the International Finance Corporation (IFC), supported by the European Commission's Eco-cities project that has now struck an agreement with PMC in 2017 to promote EDGE based assessment and certification.

[117] Floor Space Index based incentive.

[118] Interview PLG04.

water heaters, and water conservation in new buildings.[119] Although all three technologies are linked to energy conservation, PMC's solar water heater has been a particularly successful intervention (Market Assessment of Solar Water Heating Systems, 2011).

Pune also attempted to formalise these processes further in the Development Control Regulations (DCR) for Pune city.[120] For instance, in the Draft DCR 2013, Energy Conservation Building Codes (ECBC), mandating solar energy procurement for new townships, mandating solar water heaters for commercial entities and other similar provisions were included. These were, however, toned down considerably by the time the final DCR was published in 2017 after the state government's approval. Only incentives for rated green buildings and mandatory provisions for solar water heater/ Rooftop solar for building above certain area were retained.[121]

Responding to the burgeoning slum areas and energy inequality, PMC also implemented a long-term slum rehabilitation programme that involved in-situ building construction to provide more secure housing and affordable cost of living for the poorer population of the city (through installation of solar water heating and water conservation techniques).[122]

Within the green building agenda, PMC has focused on the challenge of 'urban heat islands' initiating policies towards conserving/creating ample green areas to help balance ambient temperature and provide basic comfort (ESR 2016-17).[123] In 2019, PMC extended its efforts in this direction with the help of the partnership with NRDC and other expert institutions for establishing a cool roofs programme.[124]

Parallel to the above, PMC has also undertaken significant actions to manage its own energy consumption by implementing energy-efficient measures in street lighting, water supply, and other sectors. This includes some embedded energy measures in the water distribution and conservation areas to reduce the total energy expenses of PMC. It is also taking action to

---

[119] This was in addition to the clause for 2005 mandating the use of Solar water heater a) Hospitals & Nursing Homes b) Hotels, Lodges, and Guest houses c) Hostels, Training Centres d) Canteen e) Laboratory and Research Centre f) Community Centre, Welfare Offices in accordance with the national government guidelines.

[120] Development Control Regulations (DCR) are regulations to control the use of land and built area development/construction of a city.

[121] Building Bye laws.

[122] INSITU Rehabilitation (Incremental Housing) Scheme for Urban Poor Staying in Slum in City of Pune under BSUP.

[123] This also has implications for energy as higher areas will reduce need for cooling.

[124] https://www.pmc.gov.in/en/pmc-mou-air-pollution-control. The PMC has also argued for higher green cover in the city to counter the urban heat effect within the city and create more comfortable environment for the residents.

power PMC linked public buildings solar with solar rooftop power plants in many of its own buildings or managed public buildings.[125] Public awareness generation has formed a core part of PMC's strategy to encourage public uptake of environmentally friendly and sustainable energy-related behavioural shifts. This includes organising 'green fairs' and other awareness campaigns on several of these interlinked issues.

A key distinction of PMC's approach to governing energy sustainability is that it formally recognised the local nature and scope of energy as an issue. This has contextualised energy as an area of governing and lent an indirect rationale for its governance by PMC. Although energy does not form part of its formal mandate, PMC has created a formal space for governing through alternate means or 'softer actions' like creating databases (carbon inventory), understanding the implications and source of issues, knowledge and assessment reports. While this may not fall under the conventional 'actions' category, it lays the foundation for a long term, systematic governing view of energy to generate well thought out, stable actions and responses within the existing constraints.

PMC had also launched the preparation of at least two different plans that incorporated energy sustainability in the city's long-term development – the Pune Development Plan and the City Development Plan.[126] While the former laid out the scope of energy sustainability actions in the newly expanded areas of the city, the latter looked at interventions within the city. In addition, similar but more sustainable energy focused report was produced in the form of the Solar City Master Plan around 2015-16 by ICLEI - an international network of more than 2500 local and regional governments. Another knowledge report/plan that anchored energy interventions in the city was the Pune Resilience Strategy (2019) which was prepared with the objective of making Pune resilient to climate disasters and extremities. Lastly, a major institutional measure was taken into account of the national government's Smart Cities Mission, which mandates that at least 10% of the city's electricity needs are met from solar technologies. PMC struck agreements with a slew of organisations, mostly tapping the capacity available within the city, to formulate Pune's smart city plan. This included smart and microgrid projects, solar rooftop based projects, and green buildings, among others.

All these plans and reports form part of the institutionalised knowledge and evidence in

---

[125] By the middle of 2019, PMC has already installed solar power projects of 1.2 MW capacity on its buildings.
[126] The preliminary study supported by SIDA that helped in hiring international consultants who helped in the process. The final report does not take into account any of these issues.

favour of an energy sustainability transformation in the city that is localised, imperative, and possible. More generally, they are testaments against the common perception of the limited scope of cities in India's sustainable energy transition. Further, through these above actions and the prospective plans, PMC has been able to articulate a space/ role for itself as the main driver of sustainable energy transitions in the city. These forward-looking knowledge documents have not yielded actual ground action on sustainable energy. Except for the release of environmental status reports and rebates for solar water heaters, most actions have been discontinued. Interviews also reflect that the sustainable energy actions recommended under the Smart Cities Mission have not even been initiated yet. Further, despite beginning with a clear objective of reducing Pune's carbon footprint and thereby taking steps to reducing energy consumption or switching to sustainable energy, PMC's interest in encouraging its citizens to reduce energy consumption has waned in the last few years. In the following sections, I analyse some of the mechanisms linked to power and politics that have shaped the above sustainable energy actions and will shape their future sustenance.

6.4. Power operationalisation within sustainable energy governance in Pune

Using the framework outlined in Chapter 3, I structure the power analysis as mechanisms identified from the data under the four types of power. It may be helpful to reiterate here that mechanisms so identified can occupy an overlapping space between two different power types, or mechanisms of different power types can be closely intertwined with each other.

6.4.1. Material power

This section includes the material powers that specifically arise in Pune. Interviews and official documents point toward two main material phenomena that have generated two specific policy responses/actions that differentiated Pune from other cities.

- *Mechanism 1: generating local imperative from socio-economic energy embeddedness*

Firstly, PMC's focus on energy sustainability in buildings, in particular, was not acontextual but a function of the evolving built area of the city. Residential buildings are the biggest contributors to the city's electricity demand and GHG emissions. The city experienced exponential growth since the latter half of the 1990s, primarily due to the growth in its education and ITES sectors. This not only meant a significant influx of population and high

demand for residential buildings in the city, but it also generated demand for specific types of buildings. The growth of the service sector industries comprised mostly of multinational companies led to the influx of the rich and well-off citizens, including expatriates and NRIs who wanted residential spaces of a particular type that also met global standards. As one interviewee involved in building EE mentioned,

> While there were a number of growing cities in Maharashtra at the time, none had the urban sprawl like Pune. Pune was widely being recognised as a suitable retirement city and an education hub. The IT industry too was growing at the time. There was a large inflow of NRIs who were returning to Pune. There was not only a huge transfer of agricultural land to non-agricultural land but there was also an increasing appetite for good housing. Locally, the rampant growth of building sprawl was destroying local environmental, lakes and causing immense air and waste-related pollution.[127]

The demand for high-quality buildings by a gentry that may have the willingness to pay for environmentally friendly technologies was a key differentiator for initiating the Eco-housing scheme. These circumstances also set the tone of Pune's sustainable energy actions for the next few years, where it focused on building EE and the development plans of the city.

- ***Mechanism 2: generating spatially contingent opportunities***

Closely linked to the above, the second critical aspect of materiality that has shaped PMC's response has been the potential for solar water heaters in the city. The local climatic conditions and cultural practices locally necessitate a very material need for hot water throughout the year, making Pune a natural demand centre for technologies like solar water heaters that use the thermal heat of the sun to heat water circulate in the buildings (*Market Assessment of Solar Water Heating Systems*, 2011). Early real estate businesses tapped this technology to demonstrate 'green' residential complexes to attract residents and showcase the potential for such technologies in the city. PMC, witnessing the local potential/demand for solar water heaters and as a relatively hassle-free technology configuration to perform its green credentials, pushed for its adoption through additional incentives and building regulation. Pune has seen a particularly remarkable adoption of solar water heaters as compared to other cities in Maharashtra despite similar national and state regulatory and incentivising structures indicating its material and local context contingency.

---

[127] Interview PE06.

The above embedded and generative energy materiality helped in crystalising Pune's key area of action for local energy sustainability – building energy sustainability. It should be mentioned here that building energy sustainability has been an Achilles heel for the collective sustainable energy policy landscape in India, where very few urban local governments have launched serious policies for it. Implementation at local levels, as envisaged by the national policies, has been a significant hurdle across the country. Further, building infrastructure and built environment in cities also characterises a material power that has the capacity to transform into more perpetual and structural forms of power. Buildings, once constructed, lock-in a particular type of energy system configuration and usage pattern that are likely to last for several decades. Sustainable energy transitions in such contexts become challenging, as has been witnessed in many European cities. In many ways, Pune's decisions and success on this front will reflect its sustainable energy pathway for the foreseeable future.

Material power in Pune has worked in ways that reinforce particular types of socio-technical configurations shaping the conditions for actions of PMC. The building sector and its sustainability-related demands in Pune, for instance, have attracted specific types of non-state actors to the city. In addition to major real estate businesses, Pune's building sector has attracted rich technical and architectural capacity at the local levels that later added to the capacities of PMC by allowing collaboration on the policies of green buildings. This was also witnessed in the case of the solar heating market in the city where related actor groups flourished, as the following paragraph reflects.

> The growth of apartment-centric businesses at Pune has facilitated the rise of integrators who procure from various sources and put together the installation. The apartment segment denotes bulk orders, and hence the significance of integrators might escalate' (Maithel et al., 2011:47).

Together these non-state actors convened as a result of what is fundamentally the material demands of the building sector in Pune. In multilevel governing regimes that characterise the contemporary climate and distributed energy transitions, actor groups such as the above help in distributing the power concentrated in formal decision-making circles and, in some cases, become lobby groups to advocate a certain type of sustainable transition pathway.[128]

---

[128] Interviews also suggested that the real-estate related lobby groups were close to PMC officials as general building permissions power remained in the hands of PMC (PE04, PE08).

6.4.2. Compulsory power

Compulsory represents the most instinctively understood form of power where one actor directly controls the fate and circumstances of the other actors (Barnett & Duvall, 2004). It is fundamentally relational and is understood to take place through direct control of resources, commands, coercive threats and also incentives.

Maharashtra, one of the most urbanised states in India, does not score very highly in its decentralisation tendencies (Bhide, 2017). PMC, being one of the largest urban governments in Maharashtra after Mumbai, is a bit of an exception on this front. Nonetheless, the state government has the direct control to alter some of PMC's circumstances and actions related to sustainable energy. I highlight some of the most consequential ones.

- *Mechanism 1: non-devolution of energy as a governing area*

As the state government of Maharashtra is constitutionally in charge of the functions that are to be delegated to the ULBs in the state, it enjoys direct power to determine the areas in which Pune has authority. Electricity procurement falls under the discretionary function of the MMCA (1949), the constitutive law of PMC. While it enjoys partial authority over energy embedded areas of building permissions, water supply, waste management, and planning, no electricity linked function apart from the public lighting requirements has been delegated to the PMC. To put it in perspective, electricity is the biggest energy component in cities. Restricted authority over urban energy matters is not the only casualty in the case of Pune but emblematic of the larger decentralisation failures or centralisation design in Maharashtra. The state government can also regulate PMC's authority in specific areas through state-level policies. This has been discussed in the institutional power segment.

- *Mechanism 2: imposed financial 'autonomy' by the state government*

The state government is also responsible for shaping the financial capacities of PMC. It can not only decide the taxation regime of the Corporation but also determine the grants and revenue share it receives from the state government.[129] However, the state government has additionally and informally imposed a condition that larger Municipal Corporations like PMC are not likely to get additional support from the state government due to competing priorities with the state government. This includes other weaker city governments in the state. This has

---

[129] https://www.pmc.gov.in/en/lbt.

put PMC in a position where sustaining its financial stability has become its key priority. [130] Inexorably, PMC evades committing to high-capacity long term programmes, particularly in the case of risky and expensive technologies like sustainable energy.[131] It was also cited as one of the reasons for prioritising sustainable energy actions that were financially beneficial to the Corporation. Essentially, their own facilities. One influential interviewee mentioned, 'we are still struggling with providing the basics to some of our citizens, so putting money in solar and such technologies doesn't become a priority easily'.[132]

While state governments controlling the financial regime of urban governments is well known in Indian urban studies, such informal pressure on financially strong urban bodies is significant. Urban governments with a strong financial background like PMC have been asked by higher governments to raise funding for large scale infrastructure programmes from the debt market through Municipal Bonds. PMC has recently successfully raised funds from municipal bonds to enhance its water management services.[133] This is an instance where the direct exercise of power by state governments exposes actors to further, more unpredictable dependencies linked to markets. While this does affect PMC's financial position positively in the short run, it is not clear if the funds will be used for sustainable energy.

- *Mechanism 3: building in-house technical capacity*

Sustainable energy is technically complex and can be constraining for new actors with no prior experience. Like in many other cities, Pune has depended on primarily external actors to build its capacity, despite an appointed environmental officer in the Corporation.[134] This includes local, national, and international non-state organisations. Transnational networks and other International Organisations (IOs) with specific technological interests have filled this institutional void in Pune through a variety of instruments such as criteria assessment for green buildings, GHG emission baselines studies, RE city planning reports, training and workshops. Beyond the bare minimum technological knowledge about sustainable energy, they have been more instrumental in building an epistemic universe – including the framing, technological options, vocabulary, and implementation models, among others – often

---

[130] Despite the challenges associated with such financial control by Government of Maharashtra, PMC's financial status is described to be stable and self-sufficient, according to the officials of PMC.
[131] Interview PLG03.
[132] Interview PLG03.
[133] Pune's success in raising funds from the municipal bond market is one of the first successful cases of its kind.
[134] On wet waste and transport interventions, local CSOs were more involved in PMC's capacity building.

imported from the international technical and other understandings of the subject.

Whether this capacity translates into actual actions can be debatable for these have to stand up to structural challenges that face PMC and Indian urban local bodies in general. In the cases of solar city and Green DP of Pune, where specific support was sought from external experts' organisations, implementation had to be stalled for arbitrariness/ad-hocism at higher levels. However, it must be qualified here that, unlike other cities, most policies or actions proposed by external actors have been institutionalised by the PMC in the form of expert cells (solar city cell, eco-housing cell) and official endorsement of reports presented. Several interviewees claim this to be a result of executive leadership's foresightedness and citizen sustainability action demands.[135]

- ***Mechanism 4: leadership by the executive head***

Municipal Commissioners have direct control over the day to day as well as all major policy and project decisions of the ULBs. Multiple interviewees have highlighted that executive leadership has mattered in how new, out-of-the-mandate, experimental projects are received. Several new initiatives on sustainable energy, including the solar water heater incentives and Eco-housing certifications, were initiated independently by the sitting Commissioner of the time. The executive leadership was also responsible for opening doors to local CSO engagement.[136] Considering Pune's economic, political, and cultural importance as a city, state governments have often deputed senior high-performing Indian Administrative Services (IAS) officers to PMC.

Individual executive entrepreneurialism in the case of sustainable energy programmes/projects, however, run the risk of being used as trophy projects and being abandoned when deemed too risky, long term, not delivering outcomes suited to the higher governments. Pune's initial sustainable energy actions, particularly building sustainability, and subsequent discontinuation reflects this aspect. In many cases, projects like Solar City plans, City Development Plans or projects planned for Smart City Mission were not followed through. This becomes apparent when compared to Surat, where sustainable energy actions were initiated and sustained more uniformly by the leadership of mid-ranking officers (long term appointment).

---

[135] Interview PE05, PE08.

[136] Interview PE08.

6.4.3. Institutional power

Exercise of institutional power involves disciplining the distant other and, for this study, through the realm of institutions. Though still relational like compulsory power, unlike compulsory power, however, institutional power is operationalised in indirect ways. Thus, in my analysis of institutional power, I include power mechanisms that are employed by local non-state actors who cannot directly command or coerce due to their informal nature; or by state actors through indirect policies and practices that are not directed specifically towards PMC but indirectly affect its circumstances and actions.

- ***Mechanism 1: enabling citizens' activism and institutional participation***

Pune city is well known for its active civil society engagement on matters of local governance but also, particularly the environment. The exponential growth and random real estate construction in the city around the 1990s, often in the richly forested areas surrounding the city, has been the main cause of concern for the traditional citizens, contributing to a dynamic civil society activism culture. Soon coalitions formed on various sub-sectors, gaining public legitimacy and political power.[137] PMC also engaged with these coalition groups through formal institutional spaces and processes, keeping an open-door policy to citizen voices. Kamath et al. (2018) write:

> CSOs started to develop their knowledge in different domains and to discuss paths towards sustainability. While they initially focused on the environment, they slowly broadened their attention to consider MSWM and transport. During this period, CSOs introduced policy ideas and models to the PMC and started to build working relationships with the PMC (Kamath et al., 2014:7).

The influence of local citizens' activism on PMC's sustainable energy outlook was a constant feature in most interviews carried out at the local level – both within PMC and outside of it. One interviewee mentions about Pune's particular interest in encouraging green buildings.

'It is primarily due to citizen activism. Pune has always been a progressive city. Questions asked to PMC is usually taken seriously, and the officials usually take note of the public opinion from the local reporting in the media. Further, with several educational institutions and research institutions, there is a lot of local knowledge and awareness that exists in the

---

[137] Pune citizens keep watchful eye on their city (downtoearth.org.in)

masses'.[138]

Another CSO employee states,

> One of the key enabling factors is that the state government's involvement in everyday functioning has not been overwhelming. As a result, citizens could make themselves heard. The PMC, too on its part has maintained the tradition of citizen engagement despite several changes in leadership.[139]

Citizen involvement has been both coercive through movements and lawsuits against the PMC, but they have also been collaborative and cooperative in nature where they have been involved in the formal policies like citizen forums, participatory budgeting exercises, and regular stakeholder consultation for all policies.[140] For instance, the PMC set up a Pune Citizen's Environmental Forum (PCEF) in 2007 to provide a formal space for garnering public comments on PMC's policies, including the Development Plan, Eco-housing policies, energy and sustainability considerations on the DCR, and the Environmental Status Report (ESR).[141,142]

The PCEF Eco-housing working group was tasked with analysing the criteria of the Eco Housing assessment that included the use of RE for water heating applications (Kamath et al., 2014). PMC, in accordance with the tax remit suggested by the PCEF, offered incentives to existing households who would opt for solar water heaters and other EE measures like vermicomposting and rainwater harvesting (Kamath et al., 2014) (see section 3). The CSOs were also able to influence the Development Plan report of Pune when as a result of the environmental protests in the city, PMC was pushed to seek aid from SIDA for the preparation of a green DP.[143]

A more enduring influence that was made possible, mainly through Pune's CSO community's demands of transparency and accountability in the Corporation's environmental actions, is the regular publication of the Environmental Status Report (ESR) published annually for the past eighteen years by PMC (Chen et al., 2017). This is a rare occurrence even in a state like

---

[138] Interview PE08.
[139] Interview PE05.
[140] Interview PE04.
[141] http://pcef.blogspot.com/search/label/DC%20Rules.
[142] The PCEF was set up by the then Municipal Commissioner after the much criticism around the Development Plan prepared for Pune.
[143] Green DP was not finally prepared but the international consultants hired as part of this project delivered a Strategic Environmental Assessment scoping report and framework. The report and the framework as part of many other interventions also looked at sustainable energy possibilities.

Maharashtra where the state government is relatively more involved in urban environment than other state governments.[144] This was also stated to be one of the key inspirations for PMC to continue to strive toward environmental sustainability (also linked to sustainable energy).[145] PMC's active engagement with the CSOs has galvanised other private actors like architects, energy experts, and industry to engage with PMC on issues of environment largely but also on energy sustainability (particularly green buildings).[146] For instance, PMC partnered with local energy expert organisation Prayas Energy Group to design the implementation roadmap for using solar energy locally.

However, this kind of operation of institutional power, where the locus is outside the Corporation, has its own limitation that, in turn has implications for PMC's sustainable energy agenda. These limitations reflect the strength to challenge the entrenched power positions or retain themselves in view of the increasingly neoliberal nature of policy implementation.

Leaving aside a few, the broader CSOs communities have been able to focus on energy as a local sustainability issue only in a limited way.[147] One of the interviewees pointed out that during the stakeholder consultations for Pune's Climate Resilience study, only a few citizen stakeholders raised the issue of energy per se.[148] This, the interviewee thinks, can be attributed to the fact that Pune has been largely energy surplus in the recent past and not many local CSOs bother about the interlinkages of energy issues. Further, electricity is perceived primarily to be a domain of the state government-backed by distribution utility and, therefore, not an area of local civic or political intervention.[149] This view is a reductive one. Pune has had its share of power blackouts in the 2000s. Around the same time, the local slums had an electrification rate of 93% only, which made local electricity availability a key priority for this section of the population. The business community floated local power generation proposals with conventional fuels to meet the power demand and supply gap locally. This model, named the *Pune zero load-shedding model,* gained recognition across the power-cut

---

144 http://pcef.blogspot.com/search/label/Environment%20Status%20Report .
145 Interview PLG04.
146   Pune   has   the   second   highest   concentration   of   green   buildings. https://www.grihaindia.org/grihasummit/presentations/JP-Shroff.pdf
147 There have been some recent instances where select few organisations have tried to initiate a local discourse to position Pune city in taking leadership role in climate change mitigation, this has found limited traction locally.
148 Interview PE03.
149 Interviews PE03 and PE05.

ridden state.[150] It not only involved leadership from local actors in Pune but also, in many ways, bypassed the state local distribution utility to keep costs and benefits within the local area. This instance is illustrative of how electricity supply as an issue can be operationally localised if the right framings are used, but the framings differ for different actor groups even in the same city. Local CSOs, primarily belonging to the city's elite class, tend to frame sustainability from the perspective of local liveability and well-being of the local population and not from the point of view of climate change or energy poverty. This points toward a contradiction within the CSO community and non-state actors in general. While many City Vision/plans are articulated in regular consultation with Pune citizen groups/representatives and emphasise a broader environmental role of Pune in reducing its footprint,[151] the actual concerns of these groups remain limited to local environmental or well-being issues.

Thus, through formal and informal institutional participation, urban citizens of Pune were able to push for and sustain the issues of environment and sustainability high on PMC's governing agenda. It is within this rubric and the need for PMC to perform in the face of active citizens' demand that sustainable energy found a place in PMC. However, like most power mechanisms, citizen involvement has its limits and has had a limited influence beyond the early actions and policies of PMC. The industry actors, experts, external and local, and the state pollution control board's policies took the sustainable energy agenda ahead that in turn translated into ambitious plans.

- ***Mechanism 2: bureaucratisation of PMC***

Although PMC is considered to enjoy more autonomy than most other urban bodies, the state government of Maharashtra (like many other states) can determine the executive strength of the organisation and influence the appointment of key executive heads of PMC, including the Municipal Commissioner (Khosla & Bhardwaj, 2018).[152] It also can potentially exercise control over the future appointments of Municipal Commissioners, disincentivising any radical long term policy step going out of the state government line. At the same time, projects that are 'visible' are important for the executive to showcase performance (see Bhardwaj and Khosla, 2020 for bureaucratic response to climate action in the absence of a mandate). This has direct

---

[150]   https://www.business-standard.com/article/press-releases/pune-power-typel-a-successful-example-of-ppp-pattern-108063001078_1.html.
[151] Carbon Inventory of Pune (2012), Pune City Development Plans
[152] The state government, as per the Maharashtra Municipal Corporation Act, also has the powers to determine the broad structure and overall capacities.

implications for PMC's energy governance and the way it is governed. Pune's economic, political, and cultural importance as a city has attracted the appointment of senior high-performing IAS officers to PMC.[153] Individual leadership by subsequent powerful Municipal Commissioners has greatly shaped Pune's sustainable energy governance, as has been discussed in the Compulsory power section. The supremacy of the executive leadership without equally empowering the political leadership needs to be seen as a controlling apparatus of the state governments reinforced by the long-standing structural disempowerment of urban governments. Municipal Commissioners who are IAS officers are usually posted for a short term and are informally incentivised, through promotions and new roles, to toe the state's line. Kamath et al. (2014) give an account of the problems of an executive-commanded local government in Pune, where traditions of CSO engagement is jeopardised in favour of a more corporatised approach that was witnessed in Smart Cities Mission. Individual executive entrepreneurialism in the case of sustainable energy programmes/projects, too, run the risk of being used as trophy projects and being abandoned when deemed too risky, long term, not delivering outcomes suited to the higher governments. Pune's initial sustainable energy actions, particularly buildings sustainability, and subsequent discontinuation reflects this aspect. In many cases, projects like Solar City plans, City Development Plans or projects planned for Smart City Mission were not followed through. This becomes apparent when compared to Surat, where sustainable energy actions were initiated and sustained more uniformly by the mid-ranking officers and institutionalised incentives that were not subject to frequent state intervention.

- ***Mechanism 3: 'Directed Decentralisation' – top-down orchestrated localisation of climate governance (state)*** [154]

 One of the main influences that made PMC account for the energy interactions and sustainable energy potential in the city was the Maharashtra Pollution Control Board (MPCB)'s decision to overhaul environmental reporting by the urban governments. It aimed at positioning ESRs as policy documents that lead to positive transformational changes in the city (Maharashtra Pollution Control Board, 2009). The MPCB positioned cities not only in the context of their local environment but also placed them in the global dynamics of climate

---

[153] Indian Administrative Services.
[154] As this mechanism has been discussed for the national level in Chapter 4 already, specifics of Pune and Maharashtra state government has been discussed here.

change – designating them as actors in addressing challenges of climate change, particularly mitigation. By establishing a framework for reporting the status of the local environmental indicators, the MPCB set uniform reporting requirements that included a certain percentage of their energy requirements from sustainable energy sources.

The executive leadership of PMC welcomed this and appointed TERI, a well-known national energy think tank, to prepare the next ESR that would serve as the template for all future ESRs (TNN, 2009). The exercise conducted by TERI, however, led to the clear identification of local energy access and deficit issues that made a case for EE and RE initiatives within the city (ESR 2009-10:61). TERI was also later appointed to map the carbon footprint of the city in 2010 with the objective of 'initiating steps to check carbon emission from its jurisdiction'.[155] PMC became the first city to establish such a carbon baseline for the city and assumed responsibility for addressing its carbon footprint. This line of thinking of connecting the local city-level population to global emissions and the mandate to reduce this gave the impetus to PMC to assume the role of a global actor, scale its sustainable energy initiatives, and involve the larger public in these initiatives.

> In other words, we can save 2 lakh 62 thousand 500 tons of coal required to generate 35 crore units of electricity. In other words, if the city of Pune saves 5% electricity through public participation, it will be able to save 719 tons of coal per day. We can easily save electricity on an individual level as well. If the corporation makes such an effort with the participation of the people, we can save not only 5% but also 20% electricity. – *PMC ESR (2010-11)*

This was the first state government origin mechanism that led to making RE and EE part of the formal policy circles in PMC. This set a precedence for PMC, and the Corporation carried on its exercise of preparing periodical reports on energy and carbon footprint.

PMC's continued focus on local, sustainable energy planning was also supported by its participation in the policy spaces like Solar city or Smart city Mission, irrespective of their restrictive nature. When Pune was not able to compete in the solar city programme,[156] the recommended measures were carried over in the smart city proposal that was submitted and awarded to PMC later. These programmes also expand the city's self-understanding of the

---

[155] Quote by Environment office of PMC in https://indianexpress.com/article/cities/pune/citys-carbon-footprint-report-soon/.
[156] Interview PLG08.

scope of an urban government's actions and imbibe a cross-sectoral or city-wide applications approach. The program led the PMC to exercise its convening power to collaborate with private and civil society partners and create an institutional vision that was not present earlier.[157] As the following statement shows, these policies are able to encourage urban governments like PMC to create an identity of important players in India's energy transitions story.

> After being declared as the runner up in the Smart Cities Mission of the Central Government, Pune has vehemently started working towards pursuing its objective of being a Smart City. One of the important objectives under this is to substantially increase the use of Solar power and, in particular, Rooftop Solar Photo Voltaic system. Pune has the potential of significantly contribute towards the national goal of 100GW of solar power by 2022 by increasing from its current capacity of 6GW. (Pune Smart City Plan) [158]

Even in the case of Pune, the limits of these policy spaces to encourage local, sustainable energy to become evident as ambitious agreements and plans forged by PMC as part of the smart city proposal are yet to be taken up. As discussed in section 4.2.2, I term these programmes designed at higher levels 'directed decentralisation' (Bhide, 2017), where the orchestrated response from select urban governments is solicited while promising national funding support, investments, and jobs. However, because these are essentially policy 'patchwork' (Van der Heijden, 2016), they often do not address the deeper structural fractures and are challenged by the institutional mechanisms of the incumbent energy sector.

- ***Mechanism 4: co-optation through administrative procedures***

 Closely linked to the above, one of these key mechanisms is the increasing co-optation of the urban sustainable energy authority by non-urban non-elected bodies like the distribution utilities through procedures and regulations. The rules and regulations originate at the national level (Chapter 4), and its manifestation in Maharashtra state is analysed below. For instance, implementation of critical umbrella policies like the RE Policy of Maharashtra, 2021, Solar Policy of 2019, and Energy Conservation Policy of 2017 that have crucial implications on how energy is governed at the urban level, have been assigned to state governed bodies like distribution utility (MSEDCL/ Maha DISCOM) or the state energy development agency

---

[157] SmartCityPlan_ Pune Municipal Corporation_Final_14 Dec ver 2.0 editable.pdf (niua.org)

[158] The press note for Pune Maximum solar city workshop held on 10th May, 2016.

(Maharashtra Energy Development Agency). In all the policies, there is no provision within these policies to involve the local governments (urban/rural) in the programmes implemented within their jurisdiction, nor is there an outlook to heed the local context for implementing these programmes. This was also reiterated during an interview with one of these organisations, where it was pointed out that there was no interaction of the organisation with the state's city governments in any of these programmes.[159]

The case of MSEDCL (the state distribution utility) being made the designated authority for solar rooftop is particularly emblematic of the underlying structural realities of the energy policy domain that results in the systematic exclusion of urban governments. Solar rooftop PV is a particularly relevant application for local solar energy generation in urban areas and is used to bring down monthly electricity bills or ensure a reliable source of energy or, in general, reduce reliance on external actors. Distribution utilities have been well-known opponents of rooftop solar interventions as it directly impedes their revenue generation as more wealthy consumers shift to self-generation of electricity. While this is a cross-country phenomenon, Maharashtra's distribution utility stands further limited due to its entrenchment in high costs of electricity supply infrastructure – a result of past decisions linked to power capacity enhancement of the state (see path dependence section). Established as a company with commercial interests, MSEDCL was formed after the power sector liberalisation reforms were initiated in the state of Maharashtra in accordance with the Electricity Act of 2003. Contrary to the objectives of the reforms, the state government still exercises a significant amount of control over the utility (Dixit, 2018). Several interviewees conceded that the distribution utilities and the related political economy are the main hurdles in the wide-scale implementation of solar rooftop projects in urban areas. This has also been a concern expressed in local media (Dharwadkar, 2018).

One interviewee mentions, 'there is no way distribution utilities are ever going to be interested in promoting solar rooftop PV unless significant accounting and institutional reforms are implemented'.[160]

To link the distribution utilities in the planning of solar rooftop projects becomes necessary because of the material needs of solar rooftop projects to be connected to the local distribution power grid. However, to allow the hegemony of an institution whose interests lie

---

[159] Interview MD02, PLG09.
[160] Interview PE07. This view was supported by three other interviewees as well.

in contrast to the interest of the policy reflects the Maharashtra government's intention to maintain its control over an energy transition that will essentially play out at another scale and possibly at the cost of the energy transition itself.

- ***Mechanism 5: centralisation through uniformisation***

Dysfunctional or failed decentralisation efforts are further bolstered by the centralisation mechanisms in other areas. I find that increased interest in the understanding of urban and the imperative to act on energy sustainability at the urban scale has provided new avenues for increased centralisation by the state and the national governments. Centralisation tactics not only determine the urban government's action but also reduce it to a governing subject or an implementing agency. Recent policies by the state government of Maharashtra on Development Control Regulations (DCR) and Green Building policies demonstrate the continuing centralisation tendencies of the Government of Maharashtra in governing its urban areas. [161]

The DCR for Pune was traditionally prepared by the PMC with extensive citizen consultation and keeping in mind the local material context and energy sustainability aspirations of the city. DCR served as one of the main avenues for PMC to pursue and ratchet up sustainable energy in buildings and the built environment in general. The state government of Maharashtra released the Unified Development Control Regulations in 2020 that basically made DCRs of all cities in Maharashtra uniform. The move for a Unified Development Control Regulations 2020 draws support from the Department for Industrial Policy and Promotion (DIPP), the Government of India – a department responsible for the country's industrial policy – that expressed a need for a common development regulation for all Municipal bodies to promote Ease of Doing Business in the country. The move is expected to benefit the real estate industry in India that has been struggling due to the economic slowdown.[162] The policy has been widely appreciated by the real estate sector but has caused concern amongst environmental experts (Kamath, 2020). The regulations erode the autonomy of urban governments to oversee a contextual, people centric development in the city.

An interviewee highlighting the concern that uniform DCR actually undermines the city level action for greening the building sector says

---

[161] Development Control Regulations (DCR) are regulations to control the use of land and built area development/construction of a city.
[162] The Uniform building bye laws of 2018 documents.

'The DCR was made uniform to help the smaller cities that do not have the capacity to make a good DCR and suffer from rampant construction. However, in doing that, cities that were almost national leaders are having to suffer. The state government should have made a more targeted intervention that dealt with the weaker cities while encouraging the leaders'.[163]

The Green Building policy of the Government of Maharashtra (2018) further validates this argument. Green building policies were earlier prepared and implemented by urban governments. PMC was among the frontrunners of the cities encouraging green buildings. This new policy concentrates the bulk of the implementation as well as policymaking responsibilities at the state government level while urban governments are relegated to being record keepers of green buildings in the state. The policy overlooks the advanced steps that PMC had already taken in this area and will potentially weaken the participation of the civil society entities in these important development matters of the city.

6.4.4. Productive power

Cities in India operate in the climate and particularly sustainable energy domain at the intersection of the national, local, and international urban climate/energy action discourses. Productive power involves the mechanisms involving these discourses and knowledge realms producing constitutive effects and hence specific identities, action or inaction.

In the following section, I first give a broad picture of PMCs' self-identity/self-understanding that was instrumental in shaping its own authority on local, sustainable energy issues, how national, local, and transnational forces have constituted this and subsequently shaped this; then draw on the above-referred discussions to focus on the effect these collective discursive forces have in the production of identity and subjectivities of Pune city and PMC.

The predominant discursive identity that runs through both the executive and political leadership in the city is the citizen-centric, high liveability, 'progressive city' image of the city. This identity is hard wrought with the help of its tradition of intensive citizen engagement.

In an attempt to be responsive, perform, and seem performative, Pune has always embraced new programmes and ideas on the environment, including in the area of sustainable energy. Through public statements, expressions of support to international agencies, and statements presenting accountability documents like the annual Environmental Status Reports, PMC

---

[163] Interview PE08.

officials have tried to establish their authority on the issues of local sustainable energy – primarily viewing sustainable energy as a tool to tackle carbon emissions and climate change; manage the burgeoning energy demand in the city (and that MSEDCL is stressed); be financially prudent and bring economic benefits to local citizens.

The following section looks at how mechanisms of discourse production have contributed to this identity and are shaping it further.

- ***Mechanism 1: local knowledge production, framing, and vision setting***

Reports and planning documents are critical avenues for producing and maintaining specific identities that outline the scope, role, and pathways that an actor might take discursively. The process of knowledge production in both formal and informal circles through reports and plans has been particularly prevalent in Pune. Three types of documents have been instrumental primarily – 1) City based plans and long term visions (including the ESRs) produced by PMC in extensive consultation with the CSOs; 2) Climate change and energy knowledge and policy reports specifically for Pune produced by international and national think tanks and expert organisations; 3) vision documents produced by local CSOs.

In addition to both adversarial and collaborative institutional exercise of power, PMC's consultation with the local CSOs also established a discourse of Pune city and, by that extension, PMC - one that was a departure from the neoliberal paradigm of the national urban and energy policies. Even when the vision statements in the city's development documents did establish the importance of economic development, the issues of liveability and sustainability were given equal importance. Some of the vision statements have been given below as an illustration. The Development Plan (draft) that came out of extensive citizen consultation (though not taken up finally) formulated its objective to plan Pune as, 'an economically vibrant and sustainable city with diverse opportunities and rich culture; where all citizens enjoy a safe and liveable environment with good connectivity.

The Smart City plan for Pune states its vision to be:

> Leveraging its rich cultural and natural heritage, strong human capital and strong business environment as key strengths, Pune aspires to become one of the most liveable cities in India by solving its core infrastructure issues in a future-proof way and by making neighbourhoods beautiful, clean, green and liveable.

Specific vision and ideas about the role of sustainable energy, however, within the city, were

formulated primarily by actors external to the city through reports or guidelines like Eco-housing (IEEE), Sustainable city planning report (Ramboll consultants commissioned by SIDA), Environmental Performance Index (MPCB), Carbon inventory report (TERI), Climate resilience report (100 RC network/ACCRN/ Rockefeller Foundation), and the District energy planning assessment study (UNEP) for Pune. All these knowledge documents were completed with wide city based stakeholder consultation and were formally accepted by the PMC.

In addition to external or international actors, local actors, though only recently, like Pune International Centre and the Climate Collective, published reports that positioned PMC as an actor who should take a leadership position on clean energy generation and climate change mitigation. For instance, Pune International Centre (PIC)'s recent studies draw out plans and approaches to either use solar energy to develop large parts of Pune city or plan to achieve carbon neutrality by 2030. [164],[165] Achievability apart, imagining Pune city as an environmental leader not just for its local population but also for general global leadership on the environment has clearly created an alternative discourse on sustainability and environment compared to the more investment and global capital attracting discourse in other cities.

These reports, often endorsed by PMC, aid in establishing and sustaining the agenda of local sustainable energy to be pursued by Pune and can almost be seen as acts of resistance to the mainstream notion of sustainable energy in India.

In the City Development Plan prepared in 2012, we can witness the change in the framing of the urban sustainability or environment in formal spaces. The City Development Planning document, officially adopted by PMC and prepared with extensive consultation civic stakeholders, brought the city's GHG emissions as one of the key concerns of the urban environment/sustainability. The Plan accordingly identifies some strategies that would reduce Pune's GHG footprint that gave the justification for the continuation of the Eco-housing policy and TERI recommended strategies.

Further, not only do these reports establish the knowledge on the possibilities of local energy generation and EE measures, but also measures that address embedded energy interlinkages with other city systems.[166] As these reports are prepared after extensive consultation with

---

[164] Pune: Maximum Solar City (In coordination with a local energy specific CSO and PMC.
[165] Making Pune Metropolitan Region Carbon Neutral By 2030 A Policy Roadmap, January 2020.
[166] Climate resilience report, 2019; District energy report; City environment planning prepared by experts: TERI Report.

public stakeholders in the city, they often carry embedded notions of democratic legitimacy. The endorsement of PMC of such reports further reflects that there is acceptance of/ willingness to govern energy locally.

My interviews also indicate that the non-experts, including executives and political representatives, frequently view RE (in particular) as the means to a number of environmental sustainability ends like climate change adaptation, disaster management, local air pollution (which in practice may not be addressed by just RE technologies). I posit that this is a result of both technological ignorance and the hype around RE created in the country nationally (next section). While this may not have directly affected PMC's plans and scope, it may have contributed to creating a political consensus locally for sustainable energy technologies and given PMC room for performing environmental governance through RE artefacts.

- ***Mechanism 2: discursive consensus building around climate change and RE***

While the national discourse on sustainable energy and the validity it establishes for the continuation of incumbent players has been discussed in section 4.2.3, I find that, like in the case of Surat, in Pune, the discourse on large scale RE tends to create local awareness as well as political consensus. In Pune, interviews indicate that the policy impetus to sustainable energy from 2014 raised enthusiasm around energy sustainability in Pune. People (political leadership) were ready to adopt the technology, more private entrepreneurs proposed uptake of new models, and in general, PMC officials were keen to exploit this hype to showcase performance both to their seniors and local citizens. One interviewee mentioned that in addition to the popularity of RE technologies, the fact that solar was getting affordable by the day gave further impetus.

Another factor that contributed to the strengthening of the national discourse at the local level is that the same party as the national leadership won the urban local elections in 2017. The stress on the Prime Minister's RE vision to justify sustainable energy policy decisions is clear from PMC's webpage on its initiative on Maximum Solar City.

> This began a journey to deliver 200 MW+ of Rooftop solar capacity across the city of Pune by 2020 itself. Aligned with the goal of Honorable (sic) Prime Minister to deliver 100 GW of Solar by 2022 and 40 GW of that from Roof Top Solar, Pune aspires to become a 'Maximum Solar City'. Thanks to this initiative, the city will benefit with improved energy

sufficiency, cost savings for consumers and environmental sustainabilities. [167]

The transient nature of such discursive spaces created where roles are constructed rather than formally carved out has been evident in this case. It also appears that as sustainable energy increasingly becomes mainstream and hence rules and norms more formalised, space for independent actors like urban governments to act is further curtailed. This section's discussion encapsulates how the vision of PMC - if and how PMC should govern sustainable energy - is being produced or challenged at the intersection of multiple discourses. A litany of knowledge reports and plans at the local level produced by a large number of non-governmental actors establish the need for a bottom-up contingent sustainable energy application and thereby establishing the legitimacy of a representative public body like PMC. This has not gained traction at the higher levels of the government. Instead, the upper echelons of energy decision making have employed discursive mechanisms to build political rhetoric around RE that may make it seem like an issue to be of national importance and gain wide sanction through national-level expert reports, policies, and regulations. This has created goodwill and willingness to take action locally, but this has not yielded wide-scale results due to a lack of supportive mechanisms.

6.5. Discussion and conclusion

The analysis elucidates that Pune's foray into sustainable energy was enabled by a complex, bottom-up mesh of power dynamics in the city in the early 2000s. The combined effects of Pune's material changes and institutional engagement by local and international actors not only aided in identifying sustainable energy interventions at the city scale it also, in many ways, shaped the main technological area of intervention – buildings sustainability. Responding to the local opportunity with the help of a nimble executive leadership, PMC emerged as one of the first urban governments to act on the citywide consumption of energy by offering incentives to the local citizens for building sustainability. Constant demands and engagement by CSOs of Pune ensured PMC's engagement with the issue of sustainable energy through city planning documents (again one of the earliest and only known efforts) and knowledge reports prepared by local and international expert organisations. In addition to the technical capacity extended by these external agencies, the policy programmes, though ad hoc, created by national and state governments also played an important role in keeping

---

[167] https://www.pmc.gov.in/en/pune-maximum-solar-city.

sustainable energy high on PMC's agenda (by assigning mandates and also discursively).

However, PMC's plans and actions stand challenged and stymied by the structural constraints within which it operates. Underlying structural frameworks that allow intensification of centralising tendencies of the state government of local energy interventions, path-dependence of the powerful energy actors (non-cooperation of distribution utilities and energy departments), and the emergence of an exclusionary sustainable energy transition pathway (favouring large scale narrative and non-recognition of cities as actors) are not particularly amenable to new political players. Collectively, these power mechanisms are incapacitating PMC to the extent of eroding its scope as well as willingness to govern sustainable energy locally. Unlike Surat, there is little resistance to this from PMC as much of PMC's agency is in the hands of the state-controlled executive leadership. I argue that it is on account of the above that PMC has shaped its self-interests and accepted the imposed role of being a non-actor in the wider sustainable energy actions/transitions in India and is reduced to a consumer of energy services and implementor of higher level policies.

One interviewee argued against PMC taking any action on city-wide sustainable energy.[168] This is a telling statement as multiple expert reports from local stakeholder organisations, including many endorsed by PMC, have highlighted the role of urban governments, particularly in building energy sustainability policies. PMC's in-house reports have outlined the sustainable energy actions that PMC can implement to not just reduce its carbon emissions but also strengthen its climate resilience. PMC's smart city proposal comprised of MoUs with a large number of stakeholders to initiate actions on sustainable energy in the city. Many national and local energy experts advising PMC have reinforced PMC's recently evolved view through reports that engrain/accommodate the constricted view about urban governments rather than resisting/challenging them. One energy expert from the city mentioned that cities could play a role in the sustainable energy sector, but *'more practically'*, in the Indian situation, there is hardly a scope for cities to participate in the energy sector. [169] PMC increasingly depends on these external sources of experts who feed these accepted uncritical norms to PMC decision-makers. Non-state national experts are often cut out of the same hegemonic cloth that cloaks a sector and becomes purveyors of accepted norms and logic at different scales. This has also led to the side-lining of the other potential roles that

---

[168] Interview PLG04.

[169] Interview PE07.

PMC could have played as a facilitator/convenor of actors responsible for local energy management (like state utilities, national EE institutions, private sector, consumers), as it has in the past.

Chapter 7: Analysing power in sustainable energy governance in Kolkata, West Bengal

7.1.   Introduction

Kolkata is the capital city of the state of West Bengal. Kolkata incidentally was also the capital city of pre-independent India for more than 100 years, and therefore the process of urbanisation and its institutional administration had begun earlier than in most cities in India. Surrounded by some of the poorest states in India, the city has been the only economic centre in the region and has attracted heavy migration since its formation. This historical evolution of the city has profoundly shaped its development objectives, local politics, and its sustainability priorities. On sustainable energy, Kolkata Municipal Corporation (KMC), the urban government of Kolkata, has shown little interest, barring a few ad hoc initiatives. This is despite its status as a metropolitan capital, access to international development capital with a strong legal and institutional framework for decentralisation. Kolkata's interventions in sustainable energy mirror the sustainable energy policies and actions of the state of West Bengal, which has been considered a laggard in RE adoption as compared to other states in India.[170]

Using the framework of power set out earlier, I attempt to understand Kolkata's response or decisions on sustainable energy. After a brief background of the city, KMC's sustainable energy plans, actions, and related aspects will be discussed and analysed.

7.2.   Background

The Kolkata Municipal area has chronically faced the brunt of migration and population growth for the last several decades, with the Kolkata Metropolitan Area comprising 48% of the urban population of the State (Samanta, 2020). The extreme pressure on the city's infrastructure due to this growing population has left two significant imprints on the development trajectory of the city (Biswajit Ghosh & Chakma, 2014). First, the sanitary and

---

[170] Until recently, West Bengal has just started taking interest in RE technologies and floated tenders and school electrification initiatives.

public infrastructure situation in Kolkata had started crumbling in the 1960s and 1970s and, in a way, paved the way for international development agencies to offer support in commencing the technical, financial as well as administrative reforms for the city. Multiple programmes with the World Bank, DFID, and ADB, were initiated during this period. Secondly, an urban planning regime was initiated that involved expansion of the city to a larger urban area called the Kolkata Metropolitan Area. As early as the mid-1960s, the Basic Development Plan and
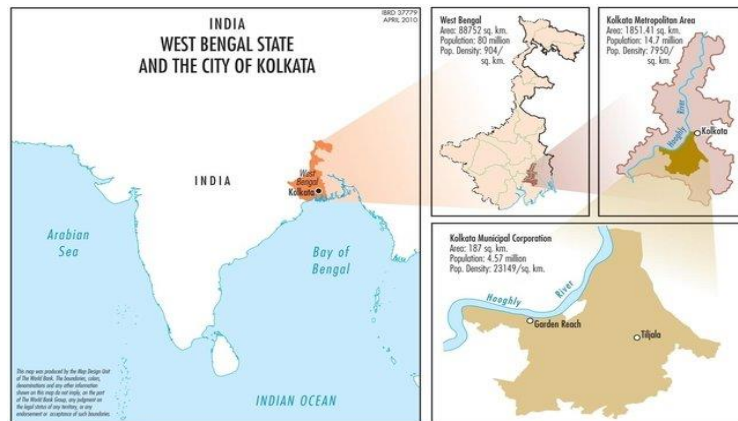

Figure 5: Map of Kolkata and the state of West Bengal

Source: World Bank, 2011

subsequent 'Vision 2025', developed by two successive parastatal planning bodies, sought to decentre urban population growth in Kolkata by developing adjoining semi-urban areas and also devolving development into other smaller cities of West Bengal.[171]

What makes West Bengal's and, therefore, Kolkata's political history particularly distinct from the rest of the Indian states is that it was under the left rule for more than four decades. The period was marked by a decline of industrialisation across the state that affected the development of other sectors (Banerjee et al., 2002; Löfgren, 2016). The Kolkata region was seen to be critical for a turnaround in the economy (Banerjee et al., 2002); and as a response, a slew of urban reforms was introduced by the West Bengal state government for the entire state. This also included the new Calcutta Municipal Corporation Act 1980 which allowed larger autonomy from the state government and bottom-up public participation and ward level representation (Mukhopadhyay, 2020). The reforms also saw a shift in urban governance modes where more parastatal bodies were established or involved, bolstering the state government's control over the urban areas. The Kolkata Metropolitan Development Authority, which is responsible for governing areas of the larger metropolitan region rather than the main Kolkata city region, is one of them.

The reforms included heralding a 'technocratic' shift in the governance of the electricity

---

[171] This was also part of the policy paper development by the Urban Strategy Committee set up by the Left Government to deal with the issue of urbanisation (Mukhopadhyay, 2020).

sector in West Bengal in view of the deteriorating conditions of the state's coal-dependent power and energy sectors (Chatterjee, 2017:5). This involved corporatisation and bifurcation of state power utilities to increase efficiency while keeping the control of the state government intact. This institutional practice of strong control over power utilities is continued by the new political regime in the state. Breaking conventions, the Left Government also allowed the privatisation of Calcutta Electricity Supply Company (CESC), the electricity supplier for the Kolkata city, in 1989 (Chatterjee, 2017).[172] The company is now owned by one of the largest private industries still left in the state. This makes CESC an influential body not just in the state's power sector but also with the political brass. With its own power generation capacity and captive coal mines, CESC is also deeply embedded in the West Bengal state's political economy of conventional electricity generation and coal mining. Nevertheless, Kolkata today is one of the few Indian cities to source electricity entirely from a private electricity distribution company with its own generation and fuel capacity, albeit coal-based. Being untethered from the national or state government generation capacities ((though grid connected) could have aided in transitioning to RE sources of energy. However, that has not materialised yet.

7.3.   Sustainable energy governance in Kolkata

Kolkata has not been the brightest in the list of cities well-known for its climate response. Larger environmental sustainability, especially related to sanitation and water supply, has been high on the agenda partially due to the felt need within the city and push by the international development organisations like Asian Development Bank (ADB), World Bank (WB) and Department for International Development (DFID), UK Government.[173] On particularly sustainable energy, KMC again has had very limited focus.[174] It is not because of the lack of opportunities or imperatives. Kolkata city, as a densely populated metropolitan, has a higher carbon footprint as compared to some other cities in India (Ramachandra et al., 2015). As mentioned earlier, Kolkata has the unique position of having a distribution utility with self power generation capacity. This presents an opportunity to shift to RE based electricity in collaboration with the private utility. With a substantial built area already and very little newly constructed area, EE interventions, particularly in view of the embedded

---

[172] The Company was handed to a Kolkata based business group RPSG group.
[173] Refer to projects like KEIIP, KUSP, and CUDP.
[174] KMC's response collated from public documents, interviews, and media articles.

174

nature of energy in urban infrastructure, become critical, unlike other cities in India where much of the construction is still being planned. Gouldson et al. (2016:13) find that 'Kolkata could reduce its carbon emissions by 20.7% in 2025 relative to current levels through economically attractive investments within the city'. Beyond purely climate mitigation agenda, Kolkata's rampant unequal access to energy and other services, wide socio-economic divide, extreme vulnerability to climate change events, and high air pollution levels demand that decentralised energy interventions are made part of overall city planning and development activities (Colenbrander et al., 2017). Further, Colenbrander et al. (2017) argue that unless climate change and particularly sustainable energy strategies are planned through a bottom-up approach involving local communities and prioritising equity and inclusivity, any top-down climate mitigation efforts can exacerbate injustice and equity issues in the city. These aspects, however, have not led KMC to undertake substantial action or planning related to sustainable energy. Contrary to the other two cities, Kolkata has not received as much attention as some other cities in India from international city networks supporting city climate change related actions either, despite being one of the most vulnerable cities in the world. KMC has instead received some limited support from one international organisation through their local offices. I find that this support galvanised additional local and international actors to deliver sporadic actions on the RE and EE front routed through the electrical department (traditionally in charge of just lighting) but also closely involving the state government. Below is a short description of the actions and plans that KMC has implemented in partnership with multiple non-state actors but routed through the state government actors.

- *Energy-efficient streetlights – pilot programme and expansion*

One of the first projects on sustainable energy implemented in the KMC area was a pilot project of 273 energy-efficient streetlights.[175] The pilot project was formulated by the UK based The Climate Group (TCG) that forged a partnership between all three levels -KMC, the national Bureau of Energy Efficient (BEE), state distribution utility and the State Pollution Control Board for the implementation (The Climate Group, 2015). The BEE funded 50% of the project through a grant for promoting municipal pilot LED street lighting projects, and the rest 50% was funded by KMC. KMC also plans to carry forward the LED street lighting transition across the city in the future. Under the Government of West Bengal's Green City Mission,

---

[175] https://www.kmcgov.in/KMCPortal/outside_jsp/LedStreetLightingProjectKMC.jsp

KMC has undertaken a broader application of energy-efficient LED lights across the city (under the directive of the state government).[176] It would also embark on a new type of implementation involving the EESL that, in the capacity of an Energy Service Company (ESCO), will make the upfront investments itself (Sengupta, 2019). KMC has also recently expressed interest in participating in EESL's Municipal EE programme, which will be launched shortly.

- *'Carbon neutral' solar lights in public parks KMC's novel initiative*

One of the novel interventions by KMC in this direction has been the installation of solar PV panels for lighting 28 public parks in the city. Each 'carbon-neutral' streetlight in the park is attached to a small PV module and inverter. These lights are grid-tied and, therefore, generate and feed power to the grid during the day. In the evening, these lights draw electricity from the grid for lighting. Excess electricity, in case any, is contributed to the grid. The concept is the same as a grid-tied solar PV rooftop plant but without the net metering regulations. The projects have been funded partially by the state Government and partially through the KMC budget and some CSR funding. KMC plans to expand it further.

- *KMC Building Rules, 2009 – Mandatory solar for new buildings provisions*

As legally provided by the Kolkata Municipal Corporation Act 1980, the KMC has also formulated the Building Rules for the Kolkata Municipal Area to regulate the development of new buildings in the city. One of the key rules linked to new constructions in the city is the mandatory requirement for solar installation (PV or water heaters) for every building above the height of 15.5m. The Building Rules, 2009 also extend an incentive for an additional Floor Area Ratio (FAR) of 10% is offered as an incentive for green buildings. [177] The ECBC 2016 and subsequently the recently published 2020 guidelines are yet to be incorporated into these building rules. The implementation of these building rules is directly under the purview of the KMC Building department, who are expected to issue approvals linked to newly constructed buildings. In addition, to the above interventions, KMC also plans to use solar PV on the Corporation's own buildings. These plans are either in the tendering phase or are still in the feasibility assessment phase.

---

[176] Interview WBD04 KLG05.
[177] 'Floor Area Ratio (FAR)'- The quotient obtained by dividing the combined covered area (plinth area) of all floors, excepting areas specifically exempted under these regulations, by the total area of the plot (Typel Building Bye-Laws, 2016.

The Corporation's steps on RE and EE technologies have been largely driven by the aim to manage its own electricity consumption – self-governing mode (Betsill & Bulkeley, 2006).[178] Although admittedly significant due to the corporation's expansive area of service and therefore understandably a priority, KMC has not pursued any long-term planning for promoting both these technologies within the city or for its residents. Projects are largely taken up on an ad hoc basis, as and when state and national governments notify or external actors present with an opportunity. The only exception here is the mandatory and incentivising provisions under the Building Rules of 2009. However, the implementation of these rules has been called to question by experts and implementers. [179] In many ways, KMC's actions on sustainable energy technologies have been representative of most other city climate actions across India (Khosla & Bhardwaj, 2018) – ad hoc, addressing self-consumption, and parochial. Alternatively, KMC's actions can also be seen as an experimentation approach rather than a city-wide sustainability transition programmatic approach. Experimentation in socio-technical and climate governance has been a widely followed strategy to govern climate change as well as energy in cities where experimentation is understood as a mode of governance and 'interventions to try out new ideas and methods in the context of future uncertainties' (Anguelovski et al., 2014; Broto & Bulkeley, 2013:93; Bulkeley et al., 2014). However, whether these experimentations deliver transformative change to 'overcome key rigidities' is predicated on multiple factors (Sovacool et al., 2020:13). In Kolkata's case, these experiments were dependent on the resources and implementation available from other actors. Colenbrander et al. (2017) also find that representatives of the power sector perceive a lack of mandate on power utilities as the main barrier in the transition to RE - 'without policy mandates, utilities are reluctant to challenge the economic status quo by seeking alternatives to low-quality domestic coal or promoting the use of renewables at the expense of coal-fired power plants.' (Colenbrander et al., 2017:153). Gouldson et al. (2016) note challenges to climate change mitigation in Kolkata,

> '(In) 'electricity supply, the power to influence was not concentrated at the city scale, and municipal agencies depended on state and national level policies and wider market conditions over which they had very little influence. Multilevel governance arrangements were more of a top-down than a bottom-up nature, and so the capacity to adopt key

---

[178] Interview WBLG04.
[179] Interview WBE01.

aspects of urban LEDs was restricted' (Gouldson et al., 2016:17).

7.4. Power operationalisation within sustainable energy governance in Kolkata

In this section, I apply the framework of power and power mechanisms that I have set out in Chapter 3 to analyse how KMC's sustainable energy responses and governance approach, in general, were forged and shaped by different mechanisms of power.

7.4.1. Material power

- ***Mechanism 1: creating spatial contingency and material constraints***

Decentralisation of energy technologies and the ability to be implemented in a wide variety of spaces and scales brings along certain spatial contingencies. This particularly relates to the material requirements of energy resources like solar, wind, or biomass or sound infrastructure or land availability for mounting solar rooftops. Kolkata's location in the rain-prone agriculture-dependent area with historical development challenges holds special significance not just for its own form and social composition but also for what kind of material development can take place. The city's journey from being the capital of India under colonial rule to the biggest economic centre in eastern India and the ensuing unprecedented and unmanaged migration gave rise to material implications like old building stock, dense development, informal buildings, and stressed civic infrastructure. These material implications, along with the regional climatic conditions, seemingly constrain technologies like a solar rooftop or building EE. Several interviewees (on the policymakers' side) highlighted the problem of 'cloudy days' and 'old, dilapidated' buildings and small roofs to justify the inaction of KMC on these two technologies.[180] This has also influenced the state government to focus its efforts on solar rooftop implementation in areas outside of Kolkata main city. For instance, New Town Kolkata Development Authority (NKDA), a recently established satellite town just outside of Kolkata, has been nominated for the Smart Cities Mission as well as the Solar city programme where multiple solar rooftop projects are being developed. This has, in turn, empowered the state parastatal bodies as these new surrounding areas are governed initially by parastatal bodies, in line with the new turn of West Bengal urban governance politics- exemplifying the interaction of two power mechanisms of material and institutional

---

[180] Interviewee KLG06 WBD01, WBD02.

power. Interestingly, in many ways, Kolkata, with high migration and pressures on infrastructure, was faced with similar material implications as Surat in its initial days, albeit in recent times. However, the two cities elicited two different responses underlining the limitation of one type of power to explain actions.

- ***Mechanism 2: creating techno-material interdependencies – connection to the electricity grid (city/ state level)***

Like in the case of the other cities, technologies like solar rooftop PV, 'carbon neutral lights' need to be connected to the electric grid to make economic sense. This makes any plans related to solar rooftop PV directly dependent on the grid managers and grid regulators, usually at the state or the national government levels. These actors are variably influenced by the politics of the state or the national government. The restrictive regulations of solar applications published by the state electricity regulator also have a similar impact.[181] The regulations (as in 2019) comprised several provisions that discourage small scale users (below 5kW) from installing grid-connected solar rooftops and generating revenue. [182] This directly excludes residential users from taking benefit of the policies put in place by the national government. As a consequence, these restrictive regulations, as well as a lack of policy, directly undermines the progressive provisions of KMC's Building Rules of 2009 and diffuses the efforts of KMC in the adoption of this technology. Chatterjee (2017) illustrates in detail the influence of the state government and utilities (even private) on the state's electricity regulatory body (responsible for solar rooftop regulations). In comparison, KMC's relatively weaker structural position in the electricity sector means it has little influence on the regulatory decisions on the solar energy governance even in its area of jurisdiction. Interviews with power utilities also reveal the opposition of the private distribution utility of Kolkata to large scale adoption of solar rooftop technology in the city, citing issues of pricing.[183] The same concern that essentially benefitted the local private utility was echoed by KMC officials keeping aside the concern of the local citizens.[184] This further demonstrates the close relationship of the local urban government with state-level bodies as well as the privilege that

---

[181] The lack of autonomy of state electricity regulatory commissions has been highlighted by many experts. The close relationship between CESC and WBERC and the state and the WBERC can be read in detail in Chatterjee (2017).
[182] Regulations allow grid connections only to systems with more than 5 kW capacity.
[183] Interview KLG08.
[184] Interview KLG06.

the private utility enjoys in establishing particularly knowledge.

7.4.2. Compulsory power

The hierarchical nature of different scales of governments within a country has been often taken for granted, and therefore the division of powers between the three levels has always been a contested matter in India. The following section attempts to provide a comprehensive account of the direct powers that govern Kolkata city and impact its responses to clean energy applications.

- ***Mechanism 1: direct control over area of work, financial, and administrative capacity***

Like most other cities, the state government of West Bengal directly holds power to establish the administrative, financial and functional areas of the authority for the state's urban governments. The biggest instance of the exercise of this power was the enactment of the Kolkata Municipal Corporation Act 1980 by the state legislature as part of the Left Front Government's efforts toward wide-scale urban reforms. While this was widely seen as a progressive move toward decentralisation, the Act retained several crucial powers with the state Government and sustained the hierarchy between the city government and state government relationship. For instance, the KMC Act 1980 allows the state government to directly make rules and regulations on matters related to the KMC Act. Further, any regulation that is passed by the Corporation needs to be approved by the state government, which can also amend or cancel these regulations (Section 600- 605). The implementation of the provisions of the Act lies in the state government's court.

This has a more direct implication on KMC's area of authority, albeit not in the form of direct action but more in the sense of *inaction on an issue*. For electricity supply, for instance, the only related obligatory function that the KMC Act allows is for the Corporation to ensure adequate lighting for the public facilities (streetlights, parks, buildings, etc.). The KMC, as per this Act, also has the discretionary power to generate its own electricity for this purpose (section 389).[185] Not only has this clause of the KMC Act not been implemented functionally, but the state government has not taken action to widen the scope of KMC's power supply, given the changes in technological possibilities. This instance of inaction becomes starker

---

[185] Section 389. Power to take measures for generation of electricity—The Corporation may on its own or in collaboration with any one erect plants for 'the generation of electric power subject to such regulations as may be made in this behalf.

when one compares the other urban body legislations by the same state government. The West Bengal Municipal Act 1993 (2015 amendment), applicable to other Municipal bodies in the state, allows under the Discretionary functions the promotion of non-conventional sources of energy (section 64.3.c). It is noteworthy that KMC Act was passed in 1980 when the form and institutional possibilities of electricity supply were severely limited. The increased scope in the decentralisation of electricity generation, made possible through the newer sustainable energy, has also not led the state to increase the scope of functions or responsibilities for the Kolkata local government. The areas or functions that the state government through the legislature devolves or does not devolve, even if in theory, to the Corporation for it to act as an 'institution of self-government' (Section 243 W (a), 74th CAA) is a useful indication of the politics of sectoral governance.

The financial state of the urban government is another area of direct control. Recent studies have shown that KMC's dependence on state grants has only increased in recent years due to a decrease in property tax revenue arising out of the state government's refusal to increase property tax rates. One interviewee narrated at least two incidents where fee reforms for infrastructure provision by KMC were rejected by the state government, resulting in further stress to the finances of the Municipal Corporation further.[186] Interviewees also pointed towards the acrimonious centre-state political relations that become an impediment for accessing resources from national-level schemes and policies (Scroll, 2020).[187]

Therefore, reduction in the high electricity expenses of the Corporation also became a policy priority for the Corporation. When asked about KMC's lack of citywide interests, one interviewee mentions, 'KMC electricity costs are huge. Reducing the expenses is the priority'.[188] Another interviewee mentioned, 'there is a significant push from the state government for green technologies by Corporations to particularly address their own peak demand'.[189]

Lastly, the state government also enjoys control over the human capacity of the Corporation. Commissioners are appointed by state governments and act as the arms of the state government essentially (Ahluwalia, 2019). Although the legislative arm of the Corporation has

---

[186] Interview KLG06.
[187] Interview WBD04.
[188] Interview KLG06.
[189] Interview KLG05.

been given some joint powers, state government prevails, especially since both state and local governments have same the political party in power.

In summary, legislative powers bestowed upon the state legislature by the 74th CAA gives the state government direct authority to define the scope of participation as well conditions of sustainable energy by KMC. The effects created by these active or latent power mechanisms almost act as the domineering landscape within which urban governments like KMC have to make decisions.

- ***Mechanism 2: informal operational command and control by state government***

The interviews at various levels of the state and the local government brought to light the relationship between the state government and the KMC, particularly within the bureaucratic channels. The commanding nature of this relationship where state government officials issue commands for KMC officials to follow through formal and informal channels, was also evident. This not only arises from the already skewed legal powers assigned to the state governments but also through politico-administrative practices where the then Minister of Urban Development in the state government is elected as the Mayor of the city. Further, the reporting of the individual departments of the KMC is often set at the state government departments.

Interviews revealed that a number of projects for energy-efficient lighting have been a result of directives issued by the state government. One interviewee associated formally with the process stated that KMC acts mostly as implementers.[190] They do what the state governments ask the individual departments to do.[191] The energy-efficient lighting was a particular focus of the state government.[192] Securing the acquiescence of the officials of the KMC is not difficult for the state government due to the administrative incentives associated with interdepartmental cooperation and financial dependence on the state government grants. This direct command and controlling mechanism by the state government in the case of Kolkata is markedly different from the other two cities and can be attributed to its capital city status.[193] This is despite KMC's strong legislative foundations where decentralisation of powers at the local level was a key objective. Kolkata's central position in West Bengal's

---

[190] Interview KLG04.
[191] Interview KLG05.
[192] Interview KLG06.
[193] Seconded by urban expert interviewee GE04.

overall politics may be one explanation for this. One practitioner who has worked with multiple urban governments affirms that capital cities are more vulnerable to complete political capture. Contrary to the more common understanding, second-tier cities have more autonomy (owing to their operational day-to-day distance from the state government) than capital or large cities. Interestingly, KMC's case also highlights the limits of legislative provisions and the shaping power of multilevel politics in any geography.

- *Mechanism 3: offering external technical capacity*

Instead of a stable policy for the selection of the projects, KMC has depended on the ad hoc and experimentative proposals forwarded by international actors. As evident from the documents, these international actors have supported KMC through knowledge reports, basic research, and partnership with relevant resource actors who can, in turn, help KMC to implement sustainable energy within the city. Kolkata, unlike some of the other cities with support from transnational networks, never institutionally embedded the support (like in Pune or Surat). Dependence on externally generated support also raises concern that choices are often made 'for' instead of 'by' local urban agencies. While the project LightSavers formulated by The Climate Group was framed to be a trial project for LED lighting in cities, the technology as well as the application was offered as a pre-condition to KMC. The international project had support from the HSBC Climate Partnership and a private company named Philip Lighting with business interests in the energy-efficient lighting segment. The erstwhile Mayor of Kolkata, in the final report for this trial project, not only highlights the electricity savings to KMC but also indicates how this trial project will also determine the future trajectory of the city's lighting arrangement,

> The LightSaver project was an instance where technological choices available to local, typically less powerful actors mirror international climate material development and market dynamics (in terms of low carbon technologies). Mediation occurs through development aid or non-governmental organisations where logic of sustainability and climate friendliness are offered to configure new consumers and markets for particular technologies.

Compulsory power in the case of Kolkata has played a more distinct role than in other cities in primarily defining conditions of actions and technological choices for Kolkata but also illustrating the relationship KMC shares with the state government.

7.4.3. Institutional power

Extant institutional arrangements become a source of power from where organisations draw their authority and legitimacy to create rules, norms, and design institutional structures to devolve power. This section elaborates on the formal and informal institutional rules and norms that are exploited or practised that indirectly shape Kolkata Municipal Corporations' actions for the sustainable energy transition.

- ***Mechanism 1:*** ***making urban governments 'non-entities' in the state energy transition***

Structurally ordained policymaking powers resting at the level of state government give them authority to design the institutional realm in a particular sector – highlighting which actors are important, the role and rules of engagement of the specific actors, and therefore, the resource and capacity needed to achieve the objectives highlighted. This reflects Clegg's (1989) argument that 'what becomes institutionalised depends precisely on the power of agents' translation' (Clegg, 1989:227). Further, Barnett and Duvall (2004) write, 'yet institutional rules that establish a particular focal point also serve to generate unequal leverage in determining collective outcomes'. Therefore, policymaking is an important mechanism to mobilise the politics of the powerful. The government of West Bengal's politics of measured advancement of sustainable energy by keeping control over its enrolment is mobilised here while simultaneously controlling the city governments as its own executive arm.

The government of West Bengal's electricity sector is a suitable illustration for this to witness the exercise of these powers of the state governments. Robust and reliable electricity supply in the state has been the main economic and political preoccupation of the West Bengal Government in order to attract private sector led industrialisation. Therefore, until recently, the West Bengal government has been opposed to the national government's RE push and has been generally declared a 'laggard' (Chakraborti, 2015). One reason for this is also West Bengal's deep political-economic embeddedness in the Indian coal extraction and generation industry. Within this institutional setting that has its interests tied with the conventional energy industry, the state government's approach to promoting the adoption of sustainable energy needs to be viewed. The institutional role assigned, the dependencies created, and the final sustainable energy governance by urban governments like KMC should be seen in

this light.

Further, West Bengal's 'power surplus' status, as well as fertile agricultural land, have been two of the key defences against setting higher policy ambitions for RE in the state. At least three power sector linked interviewees offered both these arguments when asked about West Bengal's policies on RE. In a scenario where national RE policy commitment was more than 175 GW, West Bengal's RE policy sets a target of only 2.7 GW.[194] Despite claims of land scarcity, the state RE authority has allocated just 25% of its RE capacity targets to rooftop and small-scale solar installations that occupy much lesser land than grid-connected large scale solar PV projects – also are particularly relevant to urban areas. The above figures indicate the lack of serious interest in scaling solar rooftop PV. Interview with an expert associated with the city government highlights that one of the reasons for the state government to not opt for a more ambitious rooftop solar policy is that solar as a technology is a *'particular sticking point for the state bureaucracy frequently referring to low solar resource availability in the area as a hindrance to higher ambition. The local industry is also not too supportive of technology'*.[195]

Further, the West Bengal Government's use of policymaking powers to favour certain actors and scale of application is clear from the following instance highlighted by an interviewee. A solar rooftop plan for the city of Kolkata was underway by local experts (funded by the local DFID) and was set to be released by the Minister for power in the state government (Times of India, 2014). This was eventually discarded. One interviewee highlights that the Draft Solar Rooftop Policy prepared by a private RE expert firm (as part of the UK-KMC MoU) was submitted and approved by the then state Power Minister but was finally rejected by the state cabinet (Times of India, 2015). The interviewee believes that this could be due to the pressure from the distribution utilities, which are structurally one of the more powerful energy actors due to their role in the conventional power sector.

The West Bengal Department of Urban and Municipal Affairs also floated the policy of 'Green City Mission' (GCM) in the year 2014. Although the policy does put substantial stress on heralding 'energy positive' cities in the state, there have been no projects approved yet that are linked to sustainable energy barring some energy-efficient lighting projects. The state

---

[194] West Bengal RE Policy, 2012.
[195] Studies have, however, shown that solar resource is adequate (Colenbrander et al., 2016; Petrie et al., 2017).

government's traditional hold on the electricity supply for the state and continued endurance of these systems, supported by the institutional scaffold from the top, has enabled the reproduction of the existing power structures. Having resisted the national winds of energy transition until recently, the government of West Bengal's foray into RE came in the form of some state government led programmes for decentralised RE systems and EE projects. Despite the obvious opportunities presented by these technologies, West Bengal charted out a path and an arrangement that only reproduced the power configuration and eschewed any devolution of its powers to its local governments. RE policy of the state has predetermined the role of urban governments as only implementers. Where opportunities were extended through central government programmes, greenfield smaller cities managed by parastatals were preferred instead of large cities like Kolkata. Therefore, in sectorally defined policy domains, what cities are doing or not doing needs to be tied to the institutionalisation of policymaking itself. The space allowed to act, technologies incentivised, and capacity mobilisation mode is chosen not only influence the cities' actions or inactions but, more importantly, are part of a larger politics of the policymaker/ policymaking level.

- ***Mechanism 2: 'Directed decentralisation' – orchestrated localisation of climate change (city/ state level)***

Like in the case of Maharashtra, the state government of West Bengal has also engaged in sustainability programmes for city governments that involve energy technologies. The Green City Mission (GCM) programme of the state government has been a particularly favourable avenue to encourage energy-efficient lighting projects in the state.[196] Interviews in relevant departments confirmed LED streetlight conversion project proposed by KMC under the GCM was 'as per the suggestion of the State Government'.[197] West Bengal Government's GCM, [198] a policy measure floated to counter the national government's Smart City Mission, could have been a step towards extending autonomy over the sustainability measures in all cities of West Bengal. However, state executives dominated the decision-making board, clouds the notion of decisions being in favour of city governments. The tight categories or the over-specification

---

[196] Typically small scale, low investment projects.

[197] Interview KLG05.

[198] The Green City Mission was launched by the Government of West Bengal as an alternative to Government of India's Smart City Mission. Among other interventions, the Mission encourages Building Energy Positive City –(i) Installation of solar panel at important buildings (ii) Use of LED lights at roads and public spaces (iii) Introducing incentives for Green Building.

of possible projects and inclusion of regular state department schemes (Aloshree programme, for instance) contradict the bottom-up urban sustainability aim of the Mission and reflects the centralisation intentions of the programme. It also encourages city governments to undertake short term project-based approaches towards sustainable energy actions. The programme, in its preamble, acknowledges the lack of technical capacity in the urban local bodies, but instead of building the institutional capacities of the local bodies, the GCM builds a technical support team at the state government level for the preparation and execution of the urban projects. While GCM may seem to provide an opportunity for urban bodies like KMC to generate its own sustainability projects, the state government, through direct power and institutional power, does little to empower KMC to operate independently. One interviewee stated,

> The GCM was formulated in a hurried way without a holistic outlook. It can be considered more of a reactionary policy against the Smart City Mission of Government of India. The objective was to float a policy that could confer a sustainability tag on the state government. [199]

- ***Mechanism 3: subversion through control over implementation regulations and processes***

The regulations of solar applications published by the WBERC also have a similar exclusionary impact.[200] The regulations comprised several provisions that discourage small scale users from installing solar rooftops and generating revenue.[201] This directly excludes residential users from taking benefit of the policies put in place by the national government. As a consequence, these restrictive regulations, as well as lack of policy, directly undermines the progressive provisions of KMC's Building Rules of 2009 that mandated solar rooftop for larger buildings and diffuses the efforts of KMC in the adoption of this technology.

The government's own policy for meeting its rooftop targets is published by the Power Department of Government of West Bengal. It envisages solar rooftop PV implementation at KMC buildings but has assigned the implementation responsibilities to a state government body instead of building the capacity of KMC on this front. This is unlike Surat and Pune, once

---

[199] Interview WBE01.
[200] The lack of autonomy of state electricity regulatory commissions has been highlighted by many experts. See Chatterjee (2017).
[201] Regulations allow grid connections only to systems with more than 5 kW capacity.

again, where solar rooftop application on their own buildings was carried out at least partially by SMC and PMC, respectively. The KMC case highlights the absolute control exercised by the government of West Bengal. Emblematic of the above, KMC has delivered only a weak commitment towards the uptake of solar rooftop projects on its own buildings despite electricity being one of the main sources of expenditure in the last few years (Bandyopadhyay & Sharma, 2020).

Lastly, there is an increasing shift of implementation responsibilities of both national and state government policies on parastatal agencies in the state. The schemes of both the solar city programme and the Smart City programme, for instance, were channelled to more upcoming urban areas like New Town (managed by a parastatal body called New Town Development Agency) within the state. This is in line with the Government of West Bengal's drive to build modern cities to attract more investments. As one of the interviewees commented, reflecting on this disparate treatment of the two cities, 'there is a fair bit demonstrative element in initiatives in the city (New Town). The state leadership is keen on such projects and is personally monitoring the developments'.[202] This is also in line with the argument that climate change and urban areas in India are often 'used as a showcase' to attract global capital, making parastatal bodies the preferred route for implementation.

- ***Mechanism 4: convening local expertise for institutional capacity building***

While it would not be overstating that most of Kolkata's technological choices are, both directly and indirectly, disproportionately influenced or constricted as a result of external actors, it can mask the autonomous technological choices made by the High-Powered Committee on RE and Climate Change (CRECC), a consultative committee of local experts housed within the KMC. Although CRECC's choices were still informed and conditioned by the resources sanctioned or approved by the state government, its technological recommendations went beyond the remit of the projects pushed by the state government. This 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).

CRECC is a small institutional effort within the Kolkata Municipal Corporation under the leadership of a few of the elected representatives with support from BHC. It brings together

---

[202] Interview WBE03.

local experts to advise the Corporation on the adoption of sustainable energy technologies within the city as a response to the local air pollution problems and Kolkata's general climate change linked vulnerability. One interviewee mentioned,

> The threat of rising sea levels and inevitable flooding in Kolkata is a huge concern for the administration as well as the general public. The Sundarbans, hardly a few hundred kilometres away, are going to get submerged very soon. As politicians, we will have to do something about this.[203]

The Committee meets periodically to discuss the strategies that KMC can adopt to scale sustainable energy solutions. The limits to CRECC's autonomy become visible when the Committee suggests technologies that challenge the dominant technological preferences and arrangements of the state government and utilities.

7.4.4. Productive power

This section critically analyses the mechanisms that produce meanings, significance, and characterisations attached to urban governments participating in the decentralised energy transition within the predominant discourses. Therefore, how sustainable energy transition is allotted specific significance, how different actors are characterised to play a role in this transition and how that shapes the capacities that they are allotted are some of the key areas of discussion here.

- ***Mechanism 1: constructing urban governments as 'implementing agency'***

In Kolkata, a dominant discourse on the identity of urban governments that was found was that of urban governments as 'implementing agencies'. This has been stated to be one of the reasons why KMC need not have a formal strategy for energy sustainability.[204] This self-identity is not limited to the energy/ power sector but has wider sectoral applicability. In fact, one senior decision-maker was noticeably surprised at the proposition of long-term policies in urban governments and mock-asked others around the room, 'Do you see yourself as policymakers? We act only as implementers'.[205] Interviewees also recognised the hierarchical nature of the current urban governance and especially the electricity sector governance where cities, like KMC, are only 'small players with limited role and ability' and 'heavily

---

[203] Interview KL03.
[204] Interviewee also mentioned that KMC does plan to scale its sustainable energy options in future in different directions.
[205] Interview KL06.

dependent on higher governments'.[206] There was also a ready acceptance of the fact that any larger responsibility for energy sustainability in the city needs to be taken by the power department and RE Department (WBREDA) of the state government. This, ironically, underlines that most executives of KMC see themselves as part of the state government and not as a 'third-tier government' or as a potential policymaker for their own area of jurisdiction.

 This is also not specific to KMC. Khosla and Bharadwaj (2018) argue that it is the predominant role of city governments as 'mere implementers' that encourages short term project approach rather than strategic approaches (Khosla & Bhardwaj, 2018). This originates in the broader politics of urban or local governance in India that has shaped the functional role or identity of urban local bodies. Some, therefore, view the importance of urban local governments as limited to that of being an *implementation agency* or *local agency for the state governments*.[207] This is particularly the case in EE policies where municipal governments are relegated to implementing the EE codes in buildings. This is a position that national planning documents like National Electricity Plan by Central Electricity Authority as well as Draft National Energy Policy by Niti Aayog also reinforce this position while frequently emphasizing the energy challenges brought in by the rapid urbanisation in India.[208] As also mentioned in the earlier sections, the National Electricity Plan prepared under a fifteen-member committee (executives from the central government) underlines the importance of reducing the electricity consumption of the 'municipal sector' through multiple programmes; however, the role of municipal governments outside their electricity consumption is limited to implementing the limited central/state programmes for building EE.

The clean electricity actors at the national as well as state levels also borrow the idea of 'capacity' (or the lack of it) to define local urban governments. While some policymakers agreed that this is an issue that needs to be changed, some others invoked this as an innate characteristic of local governments that justified circumventing their authority to minimise their role or limit it to implementing higher-level programmes. A number of experts highlighted, for instance, specifically in the case of KMC, that it cannot be expected to

---

[206] Interview KLG04, KLG05.
[207] See discussion on local governments being identified as 'implementing agencies' by Budhhadeb Ghosh in 'Decentralisation: A Constitutional Mandate or Rhetoric?' (Buddhadeb Ghosh, 2010).
[208] Energy planning and forecasting authority of the Ministry of Power.

participate in the cities' clean energy transition as it is 'technically incompetent' or financially challenged due to other immediate challenges facing the city. Others highlighted that as it is expected that it will act as the implementing agency for the state government as it is dependent on state government resources.

- ***Mechanism 2: discursive production of meaning and significance of distributed RE***

Local policymakers and interviewees involved in decision-making in KMC incidentally rationalised the lack of long-term plans for sustainable energy in the city by using the same phrases heard in the state government interviews - phrases such as 'power surplus state', 'low solar resource' and 'agricultural land' were some of the key terms used. This demonstrates how specific phrases are used as discursive tools to rationalise self-action but also shows how discursive tools gather traction between different hierarchical levels or are made mobile to build a general discursive understanding amongst co-actors. The state government's arguments around sustainable energy technologies were, in turn, couched in terms of achieving a 'green' tag, cost-saving, and attracting investments for the state in general rather than questions of long-term sustainability, addressing local availability and equity issues or bottom-up democracy. Small scale RE projects and, in particular, urban sustainable energy interventions are considered 'gimmicky' and 'demonstrative' by the highest echelon of the decision-making tier. On the other hand, constructs of loss of revenue to the private distribution utility from solar rooftop projects are sympathised within the power department to justify the lack of higher and more bottom-up targets for urban energy sustainability.

Interestingly, sustainable energy technology innovation related knowledge created by international and non-state actors had not permeated the perceptions and imaginaries of the local policymakers and hence have played a limited role in expanding the imaginaries of the city government actors as compared to the state government's discourses. In the political realm, the discourse on sustainable energy transition needed at the local level was informed not by the need for clean energy transition planning and policy for the Kolkata city but rather driven by two interlinked but very different aspects: 1) the political need to deliver actions on the ground on account climate change risks to the city and the country and 2) the

international spotlight on cities and their role in climate mitigation as well adaptation.[209] This has, however, had a limited purchase in the executive branch of KMC.

This phenomenon of interpreting roles and self-identities from the present realities and uncritical adoption of rationalities of incumbent and more powerful actors can have a profound impact on the actors' willingness and operation to govern. This face of power that results in 'self-governing individuals which enact particular discourses of action through their own conduct' has been interpreted as climate governmentalities by Bulkeley (2015) (Bulkeley, 2015a; Castán Broto, 2017:8). If structures produce subjects and shape identities, discourses and ideas help reproduce and sustain them. The conventional electricity logic and urban governance ideologies have given rise to a knowledge system that does not consider decentralisation and increased autonomy of urban areas in India's sustainable energy transitions a 'possible' or 'required' initiative. When dovetailed with the historical unwillingness of state governments to rightfully establish an independent local government, this has enabled a new knowledge system where urban governments are considered unfit for heralding the transition and are best kept out of the policy and decision-making fields. This, once again, limits the agency of urban local bodies to their own consumption (except for some limited implementation roles). During the interviews at the local level, the fact that many local-level actors reverberated similar discursive anchors as state government officials when talking about KMC's actions further underlines how powerful actors lead the formation of discursive practices that, in turn, create bounded space and ideas for actors to act.

7.5. Discussion and conclusion

This chapter set out to understand the muted response of Kolkata in urban sustainable energy actions, despite being one of the oldest urban governments and clear localised energy needs. Through the power framework applied above, the chapter finds that despite the legal foundations of a more autonomous urban government, there is a complete capture of the urban as well as the energy space by the state governments – both administratively as well as politically. While Kolkata exemplifies the established notion in Indian urban climate governance scholarship of the typical – capacity less and mandate less -urban government, the direct control of the state government in every aspect of urban governance to the extent

---

[209] Kolkata received a an international aware from the C40 network of cities for its initiatives in promoting electric transport.

of subverting local initiatives was revealing as well as slightly different from the other two states. The structures underlying the national sustainable energy sector only exacerbates the situation of complete undermining by the state government.

This case study generates the following insights that can add to the understanding of urban climate governance literature in India.

- Cities are deeply embedded in not only the national governing systems but also the regional or state government systems. The political economy that defines the state government will equally shape the space made available to urban governments to act on urban sustainable energy. In the case of Kolkata, the state politics of energy and urban governance both have had a deterministic effect on Kolkata's inaction. The capital city status and the ensuing historical importance of Kolkata further rationalised the state government control.

- Further, the interaction of mechanisms and power types at each governing level to have a net effect on the urban governments should be assessed. Also, simultaneous attention needs to be paid to the interactions of the different sectors involved – in particular energy and governance. Are these levels or scales countering each other or feeding off each other's weaknesses? Did the national government policies like the Smart Cities Mission or Solar City programme attempt to counter the historical institutional weakening of cities like KMC? Or did it benefit from the centralisation at the state level and reinforce this centralisation by making cities non-entities in India's energy transition pathway and opening positions for parastatal bodies instead? Questions of capacity and lack of mandate need to be assessed from this complex political landscape and traced the politics by the powerful agents and underlying structures that the powerful tend to retain. Therefore, the understanding of Kolkata's muted actions in sustainable energy needs to be framed as also a structural and path dependence challenge at both state and national government. This framing will allow different approaches to responses if an inclusive energy transition is to be achieved.

- The study also shows that in the case of the extremely constricted agency, like in the case of KMC, there is a possibility of political leadership in place of executive leadership. This is an aspect that has not been explored in urban climate governance literature, which has

largely been limited to the understanding of executive led initiatives, particularly addressing local development challenges (Bhardwaj & Khosla, 2020).[210]

---

[210] Also an aspect that came up in a number of interviews.

Chapter 8: Discussion

8.1. Introduction

The thesis sets out to understand the sustainable energy responses in Indian cities through the framework of power and its operationalisation in multilevel governance regimes. Power understood as the 'production of effects that changes circumstances and action', based on the conceptualisation by Barnett and Duvall (2005), which has been deliberately adapted in a broad manner. This view of power loosely aligns with the Foucauldian understanding of power in relational form or as a process – 'as mediating techniques and discursive regimes rather than the property of specific actors' (Klauser & Söderström, 2014:872; Stripple & Bulkeley, 2019). As no other study has delved into a power analysis of sustainable energy governance in Indian cities, the broad conceptualisation of power was a deliberate choice to prevent the erasure/omission of nuanced mechanics of power.

For conceptualising the operationalisation of power, an analytical framework has been established suggesting a relationship between three main concepts – 1) Power types (based on Barnett and Duvall (2004/5) and STT literature), 2) power mechanisms (analysed from the data and guided by the power type), and 3) effects on actions and conditions of actions, and identity (as discernible empirically). Having explored the power operationalisation with the help of this framework in each of the three cases in the earlier three chapters as a response to RQ1, this chapter compares and synthesises these findings keeping two aims, in particular:

1) To elaborate on the power mechanisms that are generating differential sustainable energy responses in the three cities (RQ2).

2) To undertake a discussion in order to generalise the findings for the broader urban sustainable energy governance in all cities in India (RQ1).

In the process of doing so, the analysis critically unpacks the politics of sustainable energy transition governance in India

8.2. Comparative analysis of power operationalisation

Like in the earlier chapters, the sub-sections below assimilate the discussion under each type/category of power identified in the framework. However, as the objective here is to move from local context-specific interactive mechanisms that influenced city's actions or

inactions to a more general policy landscape, the order of power types differs from the earlier arrangements. The analysis within each type of power has been structured to broadly comprise 1) comparative discussion on the significant mechanisms highlighting the similarities and diversities. These reflect the mechanism that can be generalised to other cities in contrast to the ones that generate the differences in actions; 2) compare the effects of the mechanisms; 3) ground the findings in the theoretical understandings of the MLG, STT, and Indian urban climate governance literature, highlighting the alignments and potential contributions (though not necessarily in that order). The discussion also highlights the interactions of different power types wherever they have been identified. Table 4 summarises the different types and mechanisms of power across the three cities in a tabular format.

8.2.1. Material power

Analysis within material power illustrates the interactions and counteractions of two main mechanisms – spatialising agency by creating local governing issues and opportunities for local governments to act and the homogenisation or de-spatialisation of agency by necessitating connection to the national grid infrastructure. The latter is also a representation of a mechanism that interacts with another power type (Institutional Power) for specific effects. At a more general level applicable to all city actors, the modular and decentralised nature of the contemporary clean energy technologies has created the specific effect of bringing cities into the fold of sustainable energy transition. It has (re)constituted urban governments as potential actors who do not just shape/ participate but bring about sustainable energy transitions. Globally, with increasing technological possibilities, cities have emerged as new sites of intervention, expanding the scope of possibilities for city governments (Kuzemko, 2019). Becker et al. (2015) also argue that this remunicipalisation of energy infrastructure also gives rise to a new kind of urban citizen - one that is interested in the 'rights to the city' agenda (Harvey, 2008:37). This view argues for rights to the city in both social and material relations, and it positions the city as a political scape (Becker et al., 2015). Essentially, the rescaling of energy technologies, infrastructures, and services has the potential to contest the pervasive neoliberal identity of urban citizens being mere consumers and urban areas as just implementation space/ vehicles for the higher governments or 'purveyors of global rules and norms' (Kuzemko, 2019:81; Srivastava, 2018).

In the three cases analysed, both Pune and Surat initiated early interventions enabled by the

decentralised nature of the new sustainable energy technologies locally to address material concerns (water demand and energy expenses) arising as a result of the rapid growth in the city population. The local nature of this initiative is evident from the fact that the national context at the time did not have a strong policy focus on EE matters. Therefore, as different scalar specificities of energy technologies correspond to particular state configurations, decentralised scales of energy technologies in urban areas can potentially constitute the energy identity /authority of local urban governments.

Further, the local material context has served as a key element in initiating as well as distinctly shaping sustainable energy actions in all three cities (RQ1, RQ2). This was more pronounced in the case of Surat and Pune, where contextual material effects led to institutional changes that helped establish the ideas surrounding energy sustainability within the institutional vision of the two urban governments. For Surat, it was its entangled geographical and socio-economic context of a business-centred city that resulted in its vulnerability to climatic changes and created the impending need for formalised water infrastructure. Consequently, an anticipated burden of energy expenses led to the formation of an EE cell within the organisation. On the other hand, localised material implications of the interconnected global as well as local socio-economic processes in Pune translated into a rapidly expanding building base that set not only the energy sustainability agenda but also shaped the technological agenda for the PMC for years to come.

In Kolkata, on the other hand, the local spatial, as well as the socio-material context of the city produced an ostensibly opposite effect. As one of India's earliest built and most densely occupied cities, local interviewees attribute the lack of remarkable sustainable energy programme to the materials dimensions of old and dense building stock that would be unable to support technologies, such as solar rooftop PV or solar water heaters. The local officials also repeatedly referred to the rain heavy climatic conditions of Kolkata city as a key barrier to solar-based technologies that need sunlight for operating. Spatial variation in RE resource availability can drastically shape the geographies as well as the technological scope of the energy sustainability transitions (Kuzemko & Britton, 2020). However, these views are often not based on formal resource assessment studies; expert studies have identified techno-economically feasible solar applications suitable for the city, challenging this understanding. Solar applications are also encouraged in the neighbouring satellite town by the state government, providing further evidence of the lack of scientific basis for these claims. This

not only highlights the inevitable material dependency of energy technologies on the geographical spread of energy resources but is also a potential illustration of how material aspects of technological systems can be used to rationalise specific political ends. This was also witnessed in Surat, where the visible artefacts of RE technologies were claimed to be preferred as an urban technology option over the more inconspicuous EE technologies.[211] This is despite the cost-effectiveness of energy-efficient technologies. Therefore, the local energy linked material context and exercise of local agency in exploiting local energy materialities have been the most notable differentiator in the sustainable energy actions between the three cities. This has also been captured by the urban energy transitions literature (Dowling et al., 2018; Haarstad, 2016; Kuzemko & Britton, 2020).

While local and decentralised materialities seem to engender diversity, the grid interdependency of sustainable energy technologies has been seen to be acting in a counteractive way. Urban area relevant generation technologies, like solar rooftop and other decentralised technologies that need to be connected to the power grid, are illustrative of these interdependencies. In India, solar rooftops in urban areas are typically propagated as grid-connected/ interactive technologies through either net-metering or gross metering, depending on the state regulations.[212] The grid dependency of such systems makes them part of a large techno-institutional complex, making them more predisposed to state and national governments and regulatory body interventions. In all three cases, there exists an interest in solar rooftop projects amongst the city governments, albeit in varying degrees, expressed through local knowledge reports, plans, programmes, and proposals for national programmes. In addition to solar rooftop adoption in public buildings, both Pune and Surat have demonstrated their willingness to pursue large scale solar rooftop adoption by the urban citizens. On the other hand, Kolkata has been less serious about solar rooftop adoption amongst the larger public through specific programmes but has nevertheless incorporated the building rules locally.

Often positioned as an inevitable choice for city-based energy generation units such as rooftop solar PV, grid interconnection legitimises the involvement of actors, processes, and

---

[211] This argument has been made in other interviews and earlier meetings where I participated as a professional.
[212] As most urban areas already have grid-based electricity for the larger population, electricity from RE is no more a question of access but more a question of cost savings or sustainability. Policymakers and regulators frequently resort to conventional cost-benefit economics to argue for grid connected systems.

institutions that are simultaneously associated with the large scale centralised energy supply sector (Johnstone & Newell, 2018). The grid management in India operates within a specific techno-economic-institutional-political assemblage that is largely managed at the national level and operationally decentralised in cities through state government grid operators and distribution companies. Further, regulators in charge of the electricity sector have clear allegiance to state governments and, by extension, the state distribution companies (Kale et al., 2019). They are put in charge of the tariff rates, scale, and other system specifications to safeguard the grid as well as all grid consumers. Within the decentralised sustainable energy interventions, the wider policy and regulatory environment in the Indian energy sector is designed to favour technologies with grid interconnection, and centralising power with higher governments for scaling these technologies. For instance, the state electricity distribution companies have become the preferred implementing organisation for the national government's solar rooftop programme by virtue of their control over the local distribution grid. As multiple interviews indicate, solar rooftop projects are inherently against the revenue interests of the state distribution utilities as it removes high paying consumers away from their accounts. The reluctance of state distribution utilities to encourage solar rooftops also lies in the historical financial challenges associated with most state government conventional power sector and state distribution utilities (cf (Dixit, 2018; Kale et al., 2019). This has resulted in impeding the city-wide solar rooftop plans, as witnessed in Kolkata and Pune. In Surat, as I show in my analysis, the solar rooftop initiative for Surat citizens could be possible because of a very typical electricity consumer base of the local distribution utility, one that was dominated by large scale commercial and industrial consumers (Sareen & Kale, 2018). Therefore, a few residential and commercial consumers opting for solar rooftop were not expected to alter the revenue generation for the state's DISCOMs. This could, however, be only a temporary phenomenon as the Gujarat state government and regulators have launched regulations that may challenge the widespread scale-up of solar PV rooftop technologies in the state. Therefore, while the grid aided by related institutional mechanisms (rules, regulations) can be considered a uniformising power for all cities, responses by city governments, in general, can additionally be dependent on the state level political economy of the electricity sector.

As an extension to the above discussion, it is also fitting to additionally discuss here that the study confirms that electrical grids can be considered a material mechanism or conduit for

'conducting the (energy) conduct' of its citizens and, by that extension conducting their governance in lieu of the local governments (including urban). In the process, it aids in bolstering the structural and institutional powers of the national and the state governments necessitating regulations and excluding local urban governments from their own area of jurisdiction (Luque-Ayala, 2014).

Socio-technical transitions studies and, more specifically, sustainable energy transitions studies have already theorised electricity grids as a governmentality mechanism – a tool for exercising state power to regulate or change the conduct of its citizens (Bulkeley et al., 2016; Luque-Ayala, 2014; Luque-Ayala et al., 2016). As Burke and Stephens (2018) put it, 'renewable systems open the grid to political contest in ways not seen since the grid's early development, and therefore energy democracy seeks to reclaim control of the electricity grid' (Burke & Stephens, 2018:83). However, in areas where democratic institutions are weak, grids serve to control their consumers and sustain the power structures.

To a lesser degree, scholars have clearly articulated electricity grids being the transmitter or conductor of specific rationalities and selective governing configurations that tend to automatically eschew some sub-state actors or shape their areas, particularly relevant to urban governments. For instance, urban local governments of Pune and Kolkata, for instance, have to abandon their solar rooftop plans because this interferes with the electricity grid linked calculations adopted by the national and state government level policymakers. Studies in a similar energy system like the UK show how grid and grid operatives have been used as gatekeeping devices by underscoring the grid system's 'highly technical' nature (Brisbois, 2020b:57; Lockwood, Mitchell, et al., 2017). Johnstone and Newell (2018) urge

> Understanding how forms of state governance are reproduced through certain 'objects of governance' (Brenner et al., 2009:79) as well as how established forms of spatial-institutional arrangements of the state interact with technological pathways, affords another potentially useful line of enquiry.

This points towards the larger implications of the materiality of sustainable energy technologies on policy decision-making and the overall governance of energy transition at the urban scale. Urban rescaling and contextualisation of energy imperative and, therefore, energy systems help counter the supply centric centralised approach to energy, particularly in the global south. While decentralised technology may not necessarily guarantee a devolution of governing authority (Burke & Stephens, 2018), these locally originating tangible

material issues combined with the decentralised energy technologies accord more 'political authority' (Kuzemko & Britton, 2020:2) and legitimacy for local urban governments to govern their cities. Through the above discussion, I have attempted to add to an important theoretical argument forwarded by Kuzemko and Britton (2020). I argue that in addition to the decentralisation of energy technologies, the material embodiments of the spatial and social context of the city play an equally important role of empowering local governments to act upon sustainable energy territorially. This notion also draws from the emerging urban STT scholarship that calls for the recognition of a more integrated and embedded notion of energy in everyday urbanism (Goldthau, 2014; Rutherford & Coutard, 2014).

While the analysis highlights the constraining and enabling/ empowering effects of material aspects of sustainable energy transitions, it is worth noting how these characteristics come to be used in configuring transition pathways by both structurally strong and weak actors (Allen, 2004; Stripple & Bulkeley, 2019). On the one hand, powerful national actors categorically use the electric grid network to engage incumbent actors like distribution utilities. On the other, urban policymakers resort to more local level material issues to rationalise or shape their actions or inactions.[213] The focus on the visibility of RE technologies is particularly illuminating in this case. STT literature has widely covered the co-dependence and co-evolution of the artefacts and objects of energy technologies with society at large (Broto, 2015; Wüstenhagen et al., 2007). This study highlights how visibility or 'objectification' can pitch one sustainable energy technology against another and shape the energy transition pathways (Moss et al., 2016:48). Recent studies in Indian urban climate responses have also accounted for the importance of 'visibility' as a technology for delivering accountability to general citizens (Bhardwaj & Khosla, 2020), creating local energy subjects (Luque-Ayala, 2014). Further analysis on why city governments feel the need to perform climate governance despite their limited mandate will be a useful addition to this literature.

The material dimension of any socio-technical system needs a complex multi-layered understanding where interactions of the material dimensions of the local context, new sustainable energy interventions, and conventional power systems need to be taken into account collectively. In summary, the following insights are worth highlighting: firstly, local contextual materialities helped constitute distinct energy identities of urban governments

---

[213] Also reflected in Interviews as well – KLG04, SLG03.

and influenced the initiation of sustainable energy governing, shaped the technological choices, and led to institutional co-evolution. Secondly, material dimensions can also be used politically to privilege specific actors and technologies or generically to justify inaction. Thirdly, material dimensions of energy technologies can be utilised as a conduit to directly or indirectly constitute urban citizens as energy subjects, eliminating the need for local urban governments. Lastly, material dimensions can be particularly illuminating in understanding the heterogeneous responses from cities (RQ2). However, as Kolkata's instance shows, it cannot be considered in isolation.

8.2.2. Compulsory power

Compulsory power occurs through the direct interactions between actors that bring about change, not just in actions but also in the conditions of actions. Barnett and Duvall (2004) also allow accounts for power that is held, even if not exercised, as even the knowledge of a powerful actor can shape actions.[214] Accordingly, one of the defining power mechanisms that directly affect city governments in all three cases is the power bestowed upon the state governments to constitute city governments' areas of functioning, finance, administrative strength and composition. Sivaramakrishnan (2007) terms this disproportionate power held by state governments as a 'decentralisation deficit' while others have described India's urban governance as largely 'centralised' (Bhardwaj & Khosla, 2017:3).

The selection of the three case cities in this study had tried to adjust these centralised governing structures in India to some extent. All the three cities selected as case studies were pre-independent Indian cities and had a long history of operating as distinct/independent administrative units. All three cities have separate constitutive laws for their administration and areas of authority enacted much before the 74th CAA. Even with these safeguards, the state governments of the three cities retained some of the crucial powers to themselves, albeit in different degrees and different ways.

Three areas of control held by the state government were of main significance - devolution of energy authority, financial capacity, and administrative capacity. The control pattern for the first two aspects was found to be broadly common for all three cities. Despite electricity/ energy supply to the city being listed as a discretionary area of functioning for the city

---

[214] This raises questions on the conceptualisation of power by Barnett and Duvall and has been highlighted later in the chapter.

governments in their constitutive laws, all the three state governments have refrained from assigning energy governance as a formal function to the respective city governments. Kolkata's case illustrates one potential effect of the WeB state government's direct control over the areas of function for urban governments where devolution of the legal function of 'promotion of non-conventional energy sources' has been unevenly distributed between cities. For example, the KMC Act 1980 states that KMC may generate its own electricity itself or through external collaboration as a discretionary function. The West Bengal Municipal Act 1993 (2015 amendment), on the other hand, enacted by the same state government to regulate other smaller-scale cities, encourages non-conventional energy sources as a discretionary area of function. While allocation (or non-allocation) of energy authority highlights the overall sectoral politics in the West Bengal state, the differential allocation of sustainable energy as an urban mandate indicates the spatial nature of the urban governance politics.

This resistance to the devolution of energy governance functions to local urban governments is common to almost all states and can be thought of as a function of the overall political economy of the Indian energy sector and the entrenchment of the ideas associated with conventional large scale energy operations. Sami (2017) identifies the lack of authority/ mandate of climate or energy governance to the local governments as one of the main challenges in city-level responses.[215] It may be argued that it is still possible to orchestrate an urban energy transition without a strict legal mandate or that having a mandate does not guarantee actions, as can be said in the case of the other West Bengal Municipal bodies.[216] However, the absence of one allots an informal, parochial and slippery status to the sustainable energy actions planned by the city government, if at all. The lack of accountability, then, makes it convenient to fall back on rationalities such as *'we have no mandate'* or non-implementation of city-wide sustainable energy commitments or plans.[217]

 Further, the financial capacity of urban governments can be shaped directly by the state government's taxation and revenue sharing policies, in the backdrop of the broader municipal

---

[215] Lack of legal/formal authority was also one of the most frequently cited issues by interviewees.
[216] Lack of formal authority as an argument to dismiss cities as energy actors stands on thin grounds as authority has been extended through national government programmes; cities (like Surat) have set their self targets; national policies have fleetingly explored energy governing responsibilities to city governments.
[217] Interview PLG04

financing policies at both national and state government levels (Judge et al., 2019).[218] While the reign of state governments, and to some extent the national governments, on the financial capacity is common to all cities, the nature of this financial dependence varies for each city. For instance, in the case of the capital city of Kolkata, the West Bengal Government has used the tool of grants to increase KMC's dependence on the state government rather than strengthening financial autonomy through taxation. For both Surat and Pune, this has manifested slightly differently. While both the Municipal Corporations take pride in the financial independence from the state government, frequently changing state-wide taxation and revenue sharing policies create a sense of precarity and limit the city government's capacity to plan its own finances. Further, Surat and Pune's financial sufficiency has become a liability as these city administrations are now expected to continue their self-sufficiency despite their additional constraints. Surat and Pune both financed their own sustainable energy projects. While they can be considered to have relatively more financial autonomy over financing new projects, they are still conditioned by the financial insecurities created by the state and national governments. This is an interesting finding from the perspective of power, where *compulsory power* can produce wider effects or shape conditions of actions. This has had an effect on the type of actions that both SMC and PMC take. With financial self-sufficiency becoming a priority, it has resulted in the two organisations either rejecting sustainable energy initiatives with high upfront capital costs or prioritising projects that deliver financial revenues for the organisation. Project-based financing from the state government was found only in the case of KMC, where the clean energy projects of solar park lighting were financed through the state government's direct finances. Even though new projects may be conceptualised at the level of KMC, the funding of the projects is entirely dependent on the state government's agenda. As a result, long term sustainable energy planning, cost-heavy sustainable energy projects are automatically put out of the agenda, or inaction becomes the norm, as is the case with KMC.

India's urban governance has long been understood as suffering from weak financial capacities, instrumentalised by the state and national governments' urban policies. Mohanty (2016) considers vertical imbalance and financial dependency are embedded into India's fiscal federalism and that India's urban governance suffers from 'rich city, poor urban governance

---

[218] National governments also play a role in determining the finances of the city governments. Through direct programme based funding and overall taxation regime (such as Goods and Services Tax recently).

syndrome' (Mohanty, 2016:20). Financial control and manipulation have long been considered to be one of the most common power mechanisms used by powerful actors.

The nature of the state government's control over defining the administrative capacity or make-up of city governments has yielded consequential effects in initiating and sustaining energy responses by city governments. With the help of institutional and structural powers that have weakened the political/ elected arm of the city governments, the administrative head automatically becomes more powerful within the institution (Sivaramakrishnan & Joshi, 2015). In the case of Pune and Surat, the direct appointment of municipal commissioners has further implications for *compulsory power* type. As these cities are economically and politically significant, state governments have ensured the appointment of influential senior executives from the state cadre as the municipal commissioners. The executive leadership has been instrumental in initiating and sustaining sustainable energy actions in both Pune and Surat and has been identified as a distinct mechanism of compulsory power in Surat and Pune. In Surat, it has contributed to the establishment of institutional practices (long term plan-based approach) with respect to sustainable energy that has subsequently shaped SMC's clean energy agenda. As the interviews reveal, the executive leadership has also sustained the organisation's interest in sustainable energy projects – both directly and indirectly. In Pune, strong executive leadership was the reason for initial sustainable energy linked initiatives in the city and helped sustain the institutionalisation of citizens' engagement.[219] Pune and Surat, both second-tier cities in their respective states of Maharashtra and Gujarat, also exhibit a relatively distant relationship with the state government, where there is more autonomy in their day-to-day operations.[220,221] Under such circumstances, even if the state government controls the appointment of senior high performing executive leadership to the city administration, there is room for administrative openness or readiness towards new ideas and experimentation by the executive leadership (also for legacy interests). Literature and interviews indicate the prominent role of 'dynamic leadership' in initiating sustainable energy interventions in Surat and Pune (Ray & Tewari, 2018). However, much of this dynamic leadership in both the cities have taken place within this transient shadow space created under the state government's view.

---

[219] Interviews PE08.
[220] Interviews SLG05.
[221] Interview PE05.

Kolkata partially deviates from these phenomena as the elected legislature makes the appointment of the executive head (Sivaramakrishnan, 2013). However, with the same political parties elected both at the state and city government level, this little autonomy allowed in the legislation is denied. The state government's interference in its day-to-day operations is much also much higher in Kolkata. A comparative assessment of the interviews from the three cities affirms that KMC works under the direct control of the state urban development department with very little autonomy of its own.[222] This is primarily due to its central status in West Bengal state politics. The importance that Kolkata holds for the larger politics of West Bengal becomes apparent from the fact that the current state minister for the Urban Development Ministry also holds the position of the Mayor of the city.[223] Inadvertently, this has also made the political arm more powerful than the executive one and may have been one of the reasons for the successful initiation of the experimental solar park projects at the KMC level and funding allocation from the state government. Kolkata has also witnessed political leadership in convening local expertise and stakeholder to establish an official committee for RE interventions within the city. As the empirical chapter illustrates, the political response was due to the environmental accountability sought by local citizens. However, this has not translated into the adoption of the Kolkata solar rooftop plan or other sustainable energy actions (chapter 7).

The above discussion on the *state-city relationship* adds another dimension to the current understanding of the complete centralisation by state governments in the urban climate change literature (Beermann et al., 2016; Bhardwaj & Khosla, 2020; Khosla & Bhardwaj, 2018; Sami, 2017). Through this analysis, I showcase that the nature of the state-city relationship (representing control over the administration of the city) varies depending on the standing of the city within the state's political economy and, therefore, the room allowed for city governments to make their own decisions on sustainable energy also varies, albeit to a limited degree only (RQ2).

Lastly, the role of international organisations in all the three cities has been quite critical in initiating some of the first sustainable energy actions in the cities, shaping the technical choices as well as capacitating the urban governments with data and technological options. They also shaped the future course of action for the cities depending on the mechanism and

[222] Interview KLG05.

area of intervention, which was distinct for all three cities. This has contributed to the heterogeneous actions (RQ2) that were witnessed in all three cities. In the case of Kolkata, for instance, the local British High Commission commissioned knowledge reports, advocated for an institutional committee within the Corporation in close collaboration with the elected councillors, as well as supported a solar rooftop study for Kolkata. For Surat, the UNDP indirectly influenced and supported the first wastewater treatment-related intervention, but subsequently, the ACCRN helped build institutional, technical (city reports and plan) and financial support for some of the interventions (Chu, 2018).[224] For Pune, international expertise was mediated in the form of building certification guidelines that helped in initiating actions on building EE, city plans, and resilience reports. What also made a potential difference was the extent of institutionalisation that occurred from these capacity-building exercises - Surat Climate Change Trust in Surat and Climate Resilience Officer in Pune. It is unclear how much of a tangible difference these efforts of institutionalisation play in long term sustainable energy decision-making.

Cities in the global south are characterised by centralised governance of the energy transitions; therefore, compulsory power is the most instinctively understood form of power. For the same reasons, there is a tendency to limit academic analysis to this realm, as is reflected in the nascent Indian scholarship in this area. Compulsory power analysis here broadly confirms the extant understanding within scholarship. State governments possess direct control of some of the critical conditions of the city governments that has significant implications for local, sustainable energy governance. Power is mobilised not just through the existing legislative provisions that extend these powers to the state governments but also in state governments retaining these antiquated laws and resisting any reforms. The comprehensive power analysis reveals, however, that there are mechanisms (executive leadership and international actors) that advertently and inadvertently counter the mechanisms of complete control and establish and shape conditions for urban governments to undertake a limited range of sustainable energy related actions. This limited range closely interlinked with the state-city relationship allows diverse, sustainable energy decision-making in cities, even in the highly hierarchical structures. Interestingly, compulsory power mechanisms, particularly as operationalised by state governments, was found to be given rise

---

[224] Interview GE02.

to specific institutional power mechanisms, as will be discussed later. The limited scope of compulsory power, however, demands a more layered understanding of the complex landscape. The other power types attempt to add to this layered understanding.

8.2.3. Productive power

Barnett and Duvall (2004) position discursive production of identities, ideas, and other conditions as a productive power. The focus on discourses and knowledge production differentiates productive power from structural power as the former attempts to understand the more diffused and indirect forms of production of identity, relations, and capacities. As with other types of power, the focus in this study has been the discursive processes that either constitute or sustain the identity of urban governments, their role in sustainable energy transition, and other subjectivities.

An important point to start with is that Barnett and Duvall's (2005) conceptualisation of productive power does not explicitly articulate the relationship between the structural and productive types of power. The analysis in this study suggests a possible relationship between the two power types where productive power is primarily employed by structurally empowered actors. This view also echoes in the elite power literature that highlights the control of elites on knowledge shaping exercises (Domhoff, 1951; Sovacool & Brisbois, 2019). The power elite of the energy sector – often national governments and partners in a centralised energy sector - are in charge of producing acceptable knowledge, legitimising actors and their fields of action in the area of the sustainable energy transition. The source of this power can be traced to the incumbency in their conventional energy policy domain as well as the highly technical nature of the energy infrastructure. In path-dependent domains like conventional energy, structurally empowered actors – namely the national government in India – have been traditionally the source of knowledge and dominant discourses around energy. While it is acknowledged that power elites can bring about social transformation as required in the case of energy sustainability due to evolving technologies and global pressures, it is also well established in the literature that elites also tend to set up discourses that tend to preserve their incumbency (Becker et al., 2016). Processes to influence or shape discourses include knowledge generation, use of symbols, 'value commitments', and discourse generation (Sovacool & Brisbois, 2019). Sareen (2019:9) elaborate further on the effects of practices discourse establishment,

Practices of discursive legitimation thus play a key role in energy transition: validating particular acts and shoring up the credibility of institutional authorities and their decisions against critique; issuing challenges to specific decisions and even decision-making processes and suggesting alternatives, thus opening up space for debate and the emergence of competing actors; and closing down particular claims by pointing to countervailing accounts, often more established ones with some formal backing.

Like in the case of other power types discussed until now, the discursive and knowledge production mechanisms related to urban government's role in energy transition emerge at different levels and once again exhibit interactive and counteractive dynamics to produce a net effect. Two contrasting discourses are juxtaposed against each other: the global and local discourse on cities' role in climate and energy that has helped in reinforcing policy imaginaries of local government authority on energy and the city's energy future; On the other hand, an aggrandising discourse of RE is emerging at the national level supported by the international scale that privileges large scale interventions and actors and appropriates urban without considering urban governments. It is important to note here how incumbent national discourses and paradigms of knowledge interact with the emerging discourses – which discourses are espoused while which ones are ignored.

The developing global discourse on cities as 'key' actors in climate change, which has both normative and market-centred undertones, has created effects in spurring policy imaginaries and visions for city-level policymakers. City-based vision documents also highlighted that sustainability, particularly sustainable energy, has been found to be another avenue that can help cities access the international market for some cities and facilitate better sustainable life for others. To a significant degree, the city governments accessed the international discourse on cities through the international city networks and international expert organisations, particularly in Pune and Surat. In the case of Kolkata, the discourse was translated for KMC by a bilateral donor organisation located locally. In the case of Pune, interviews with citizen action groups also highlighted their linkages with the evolving global discourse of cities and sustainability. However, interviewees from these groups mentioned that existing rules and regulations and institutional challenges of urban governance in India had limited their efforts considerably.[225] Stirling's (2014) maxim on transformative power, 'power is necessary for

---

[225] Interviews NE03, NE04, NE05, PE05.

transformation, but this may be subverted if power itself is not transformed' may be most relevant to this phenomenon. Linked to the mechanisms employed to sustain the current structural hierarchies and keep undesirable actors out of energy policy configuration, much of the knowledge production and 'systems of meaning and signification' that define the Indian energy transition pathway have been carried over from the earlier conventional power system. A large part of the national knowledge and value commitments that dominate the electricity sector today, where India's main climate mitigation and sustainability transition is unfolding, is based on the Electricity Act of 2003. Electricity Act of 2003 embodies the principles of a World Bank induced, recently liberalised electricity sector that aimed at increasing rural access through increasing competition and delivering fairly priced electricity to consumers. Although it set the framework for the entry of RE technologies, the technologies were nascent, suffered from high capital costs, and low efficiency were the key challenges involved. Therefore, the large scale and centralised mode of governance were continued. The large scale energy transition that has been envisaged in the last decade carries over these same principles and priorities even now when decentralised sustainable energy technologies have been proven to be efficient and affordable. Further, the technical expert and consultant networks forged in the initial years to support the government departments during the development of India's conventional electricity sector are also sustained.[226] These networks are not only manifestations of the underlying structures but also have interests in upholding the current power structures, in some cases, for their positions. New evidence and knowledge reports from the urban governments are ignored by the decision-making zones, perpetuating predated ideas about the urban energy landscape and how it should be governed. This should be noted along with the fact that a similar script was playing out for the decentralised renewable energy (DRE) technologies and their market development simultaneously.[227] Knowledge reports, national and state policies on climate and sustainable energy, and grey literature endorsed by governments form an essential means of meaning-making in productive power. Following endorsed discourses can be found within the mainstream policymaking circles parallelly that disadvantage and exclude urban government's legitimate participation: 1) discuss the importance of addressing energy

---

[226] Multiple meetings and conference observations that I attended over the years during my professional engagement in the industry.

[227] See footnote 59 and CLEAN report on Decentralised RE Technologies 2018-19.

challenges of urban areas, including clean energy application potential, without bringing in urban governments – delegitimising urban governments' potential authority in transitions of urban (Aayog, 2017; IEA, 2021c). 2) dismiss the legitimacy of urban governments further by uniformly declaring them weak (Ministry of Finance, 2018). 3) normalise assuming urban citizens as RE subjects in urban areas by identifying as energy consumers and linking them to market and commercial actors directly (eliminating the need for a local government) (Aayog, 2017; Garnaik, 2018). 4) position urban governments as implementation channels of national and state government programme implementation.[228] In a sector defined by antiquated laws and regulations, policy documents and new knowledge reports could potentially discursively create space for new actors and possibilities. The absence of this at both national and state-level policies needs to be viewed as an exercise of power that has the effect of discursively validating certain actors in public while invalidating others.

Beyond the discourses carried over from India's conventional energy sector, the high-pitched political discourse ('hype') related to RE has produced interesting effects at the city level, the empirical analysis finds. In Surat and Pune, this has generated awareness as well as local enthusiasm within the city governments about RE. Most recent sustainable energy programmes in both Surat and Pune frequently refer back to the Prime Minister's vision or the national targets. Interviews also highlight that the political class at the urban level has developed a higher understanding of RE technologies and has translated their importance to the city. Despite the increased awareness of RE, there is also a conflation of the issues of climate mitigation, resilience, and adaptation among the general public and the political representatives. Climate-related disasters are becoming a common feature in particularly vulnerable cities like Kolkata and Surat. For instance, political representatives support initiating solar power projects in response to local climate change linked calamities within the city. This, however, draws attention to the broader question of scale at which climate change should be addressed (responded), particularly reflecting on where the impacts are felt and where governing accountability should be sought. It should be mentioned here that in both Surat and Pune, the party in power at both state and city levels was the same as the national level party forming the government. In contrast, Kolkata is governed by another political party and did not exhibit the same enthusiasm about RE. This, once again, underscores the

---

[228] Maharashtra state government urban and energy policies.

significance of national government politics and its relationship with the city in matters of sustainable energy governance.

However, this national level skewed political salience around RE (versus other types of energy sustainability) needs to be seen in concurrence with the kind of actor-technology configuration it intends to propagate. The overt focus on large scale targets and private sector participation reinforces the primacy of national government, large corporations, and grid-based projects while taking away the authority from marginal potential actors like the city governments. It also calls into question the motivation behind this nationalism - whether climate change mitigation or other environmental benefits are really the motivation behind this policy and political attention. For instance, one interviewee mentioned that the overwhelming focus on RE has done a '*disservice*' to the field by ignoring more easily implementable technologies.[229] Shidore and Busby (2019:1187) come to a similar conclusion in their analysis of this sudden meteoric increase in India's large-scale solar ambitions. They posit,

> However, the national state has also exhibited a strong autonomous instinct that has its origins in the agency of the Prime Minister and India's own distinctive developmental nationalism and desire to rise in the global system. Although interest groups are important barriers in the solar scale-up, the central government has demonstrated significant autonomy from some of these interests in its developmental push for solar in India.

Within the larger exclusionary discursive space for urban governments, what can be considered as a green shoot of resistance by city governments, is the mechanism of local knowledge generation through reports, stakeholder consultation, and citizen engagements that attempts to claim its right to govern. For instance, knowledge reports and regular citizen consultation in Pune city, and to some extent in Surat city, extended their informal authority or legitimacy over local, sustainable energy matters. This discursive and dialogic power type establishes a new form of the authority of the local urban government beyond the scope of legal and administrative mandates. They also create institutional memory of these city governments and have the potential to tide over the frequent change in political and executive leadership in these institutions.

Additionally, the mission or vision statements embedded in the knowledge and other

---

[229] Interview PE03.

documents across the three cities expound on the nature of governance that can be expected from these local authorities. In their Smart City proposals that included a component of sustainable energy actions, Surat and Pune both articulate different kinds of local urban visions. While Surat envisioned a futuristic city inviting investments and global capital, Pune envisioned a more liveable city through the intervention of sustainable energy technologies. In both cases, the vision statements were able to integrate sustainable energy into the local ambitions. However, the respective articulations will continue to shape the kind of sustainable energy actions the respective urban governments will take in the future.[230] In Pune, for instance, the concern for increasing pollution within the city has influenced the Corporation's recent work in non-motorised mobility or e-vehicles. Without exaggerating the significance of the knowledge reports and citizen engagement, these practices, I argue, are instances of small autonomous political actions by the city governments and citizens, which create space for local action, potentially for posterity.

The above discussion on productive power highlights the inherent tension or conflict between a (re)emerging discourse on urbanised energy sustainability transition and the entrenched ideas of energy sustainability that align with the neoliberal and globalising ideologies more than the democratic and equitable principles advocated as part of climate change discourses. The entrenchment is deepened with the help of knowledge networks and products.

8.2.4. Institutional power

Institutional power represents the power operation mediated through institutional means such as rules, regulations, and informal culture. It is differentiated from the compulsory power in the indirect and diffused ways it gets operationalised. The analysis of institutional power in the three cities presents overwhelming evidence of continued power capture by both national and state governments over the processes that could foster urban sustainable energy transitions. In other words, not only are urban governments subjected to subordinate positions structurally with multiple direct controls over its crucial conditions by the state and national governments but also, in fact, both governments are actively designing strategies to gain further control over urban energy processes. This counters most other city-specific institutional processes that have the potential to empower urban governments. Institutional power can be thought of as the most tangible representation of the structural power

mechanisms identified in the following section. Taken together, a complete picture with the potential understanding of the rationalities for such power capture can be illuminated. The mechanisms also encourage more homogenising effects than engendering the heterogeneous responses. Only to a limited extent can institutional mechanisms be linked to the heterogeneity in the cities' actions. In India, the national government has the defining power not only to set the national policy frameworks in the development of the energy domain, influenced by the international discourse on sustainable energy and the underlying structures of the energy sector (Kale et al., 2019); but also, it establishes the institutional scaffolding for its implementation. The operative aspect in this process of forging a national energy sustainability transition is to note which actors are deemed relevant and which actors are kept out of this calculative assemblage. Paying attention to this helps elucidate the underlying politics of this transition.

One of the most dominant mechanisms that have affected urban sustainable energy governance, in general, is the construction of urban governments as *non-entities* or *non-actors* in India's energy transition. Even within the limited focus on sustainable energy application in urban areas, policy interventions are being planned through parastatal bodies or state governments. This has essentially kept urban governments out of all policymaking, implementation, and even urban energy policy consultation spaces. I would argue that a power operation of this kind goes beyond controlling one's actions, capacities, agenda, or elite (in)access.

The idea of non-entity shares parallels with the idea of 'non-participation' in the context of community power, as mentioned by scholars like Schattschneider (1961) and Gaventa (1980). This concept otherwise remains undertheorised in the conventional urban climate governance literature. Shattschneider (19060) writes:

> Absenteeism reflects the suppression of options and alternatives that reflects the needs of the non-participants. It is not necessarily true that people with greatest needs participate in politics most actively - whoever decides what the game is about also decides who gets in the game in (Gaventa, 1981:8,9).

Gaventa (1983) advocates a similar approach in his thesis 'Power and Participation' where he argues that for understanding the complex mechanisms of power, one needs to study the 'non-actors and non-leaders' (Gaventa, 1981:27). The exclusion of certain actors is not usually as innocuous as it is made to sound (even in some interviews). Seen from this power

perspective, keeping certain potential actors completely out of the national policy framework or the making of non-entities/non-actors out of them, even when technological possibilities and ethical imperatives exist, is a marker for a calculated mechanism to shape the policy outcome in a certain way – mostly as per the desires of the structurally appointed decision-makers.

Both Schattschneider (1961) and Gaventa (1981) also extend the concept of non-participation to acquiescence by weaker actors or non-actors (Gaventa, 1981). Acquiescence is achieved by changing the very interests of the weaker actors and shaping the consciousness of an alternative to the current status quo (Gaventa, 1981). Gaventa (1981:269) also suggests that acquiescence is facilitated by 'uncritical or multiple consciousnesses about issues and actions of B due to influencing or shaping by A and due to maintenance of non-participation by A'.

The interviews at the city level also broadly reflect this, particularly in the case of Kolkata and Pune, wherein the status of being a non-actor or non-entity in the sustainable energy transition has permeated the city governments and local non-state actors' consciousness. There is an uncritical understanding of urban government's role in national energy transition, and often democratic, bottom-up needs for energy governance are unimagined or dismissed. 'We do what the state government asks us to do'; 'Are we really policymakers? We are just implementers'; 'We have no mandate, why should we do it' reflect such ideas.[231] I would extend this suggestion that Surat's self-understanding of its role as 'facilitators' embodies these powerful effects as well. As city governments are also more bureaucratised than politically empowered, the acquiescence has been easier. Therefore, policy frameworks and institutional designs led primarily by the national actors keep out the unconventional/ new actors like urban governments and shape their understanding of their own role and interests in the national or local sustainable energy transitions by keeping them chronically out of policymaking circles. Alternatively, even if city governments were to accrue capacity (technical, financial, or knowledge) for their potential roles and benefits from non-state and international actors, it would remain short-lived as the organisational consciousness remains 'malleable' and 'vulnerable' to more powerful narratives of cities and they remain non-entities in the energy domain (Gaventa, 1981:19).

Appropriation of urban areas through power mechanisms like centralisation of administrative

---

[231] Interview PLG04, KLG04, KLG06.

rules and nationally orchestrated urban energy programmes are prevalent both at the national and state level. The degree and nature of these centralisation techniques deliver differences in actions at city levels (RQ2). Centralisation, in this study, has been witnessed particularly in the realm of implementation procedures set typically by state governments for urban governments to act on sustainable energy decisions. Urban governments tend to experience different degrees of centralisation, depending on the urban politics of the respective state governments. For instance, in the case of Kolkata, in addition to a direct and domineering relationship with KMC, the state has complete control over how and where national programmes are implemented within the state. As the national institutional rules accorded state governments the right to choose the beneficiary city for the national programme, the WeB state government used the process to sideline Kolkata and nominate the satellite town of New Town for the programme. New Town is governed by a parastatal body and is an important project for the state government's political leadership. National laws and regulations allow complete state governments' control over the preparation of building codes that carry important provisions for energy conservation in city buildings. In the case of Surat, building codes preparation is once again restricted to the level of the state government that has not been formally published for many years now.[232] One of the reasons cited in the interviews for not having building EE as one of its priority areas of sustainable energy policies is this delay from the state government. Building codes shape how old and new buildings use energy both at the time of their construction and during their lifetime. This is particularly relevant for Indian cities where there is high demand for new buildings. Buildings constructed today can lock-in current levels of energy consumption for their lifetime.

The institutional centralisation of urban governance has been most prominent in the case of the state of Maharashtra where implementation policies and rules are increasingly being concentrated at the state government level. Policies like the Green Building Policy or the Uniform Development Control Regulations that were once prepared by the city governments are now published by the state government with the rationale of uniformisation. These instances throw light on how the technological agenda of different urban governments are also shaped by the technological politics of the state government.

 Urban climate or energy governance related national programmes designed purportedly to

---

[232] Interview GD03.

decentralise governance of these issues tend to impose top-down targets and implementation mechanisms that have little purchase within the actual beneficiaries (Solar city programme or Smart City Mission). This mechanism has been termed 'directed decentralisation' and impacts all participating cities (Pune and Surat particularly) (Bhide, 2017). Such national level schemes are often a pathway to gain direct access to the city governance and bypass the state governments (Bhide, 2017). These programmes have created temporary channels of implementation through external actors and technical and financial support instead of strengthening city governments themselves (Khan et al., 2018). This dependence on external actors and sources (experts, grants or debt instruments) is often deepened with arbitrariness or precarity in-built into the programmes. Sudden discontinuation of the urban energy programmes like rebates in solar water heaters, solar city programme or lack of necessary accountability in the solar Cities Mission by the national government have adversely affected the long-term development of the interest and capacity of the urban governments.

Particularly with respect to SCM, Arabindoo (2019) argues that, as on date, SCM demonstrates a missed opportunity as it merely depends on token targets to initiate sustainable energy transition in cities. Instead of reconfiguring energy (and its sustainability transition) as an essentially urban problem, thereby according legitimacy and authority to govern sustainable energy transition along with the current incumbents, only 'gestural' actions have been encouraged (Arabindoo, 2019). This was further underpinned during my interviews at the national level, where involvement/coordination of ministries governing RE at the national level dismissed the SCM targets (governed by the urban ministry) as well as their involvement under the programme.[233] Alternatively, while the policy incoherence particularly related to SCM may be considered a mere bureaucratic lapse or oversight,[234] I posit that with the help of a power lens, this may be viewed as a reflection of the underlying energy politics in India, where urban is not seen as a significant policy agenda for the central ministry of energy.

Consolidation of power through centralisation and co-optation by the powerful elite/ incumbents while marginalising new actors has been widely covered in the scholarships of

---

[233] Interview NM01, NM02, NM03
[234] Departmental siloism is also often offered as an explanation in exisiting literature (Dubash & Joseph, 2016; Khosla & Dubash, 2020; Rahiman et al., 2019)

sustainable energy governance as well as urban politics (Burke & Stephens, 2018; Lockwood, Kuzemko, et al., 2017). Burke and Stephens (2018:84) posit, 'energy democracy advocates view this centralized RE model as a product of concentrated financial and economic power as well as institutional inertia following a century of centralization, and rarely resulting from democratic community-level action'. Indian climate governance literature has successfully captured the centralised nature of the electricity sector and urban governance efforts (Bhardwaj et al., 2019; Bhardwaj & Khosla, 2020; Khosla, 2018; Pillai & Dubash, 2021a). The above discussions emerging from this study not only add further granular evidence on this front but also identify some of the mechanisms of centralisation, especially with respect to the chosen city cases.

Further, centralisation creates barriers to the participation of the urban governments in even informal implementation processes and frameworks at the local level, reducing them to mere consumers. While this does make them more vulnerable to compulsory mechanisms of power exercised by the higher governments; more significantly, this erodes the contextual agency or local imperatives to pursue sustainable energy transitions at the urban scale. From the above discussion, one is also drawn to Gaventa (1981:16)'s proposition of another indirect mechanism that reinforces powerlessness in weaker actors – 'adaptive response to continual defeat'. This holds true, particularly for more progressive cities like Surat and Pune, where sustainable energy decisions were launched independently with much enthusiasm in the initial years of the policy and technological onset, but these decisions later faded out, facing continuous push-back, non-recognition, reversals and policy formalisation at state levels.

While the above paragraphs discuss the general institutional mechanisms affecting all urban governments, two institutional mechanisms that have generated more localised city-specific effects were also identified. Firstly, citizen organisations seeking environmental accountability and PMC's responsive culture of 'keeping the doors open' for citizen engagement was a unique feature.[235] The citizen engagement maintained by the changing leadership over several years helped in prioritising environmental sustainability as a governance area for PMC. [236] Interviews, documents, and media reports demonstrate that it is often within this rubric and in regular consultation with local citizen advocacy groups that PMC initiated actions related to sustainable energy actions. For instance, PMC's focus on

---

[235] Interview PE04.
[236] Interview PLG05, PE04.

sustainable energy interventions in planning and building has been a contribution to this organisational culture. To a much lesser degree, citizen engagement and pressure could be witnessed in Kolkata and Surat. In Kolkata, city elected representatives who have been the main movers of the sustainable energy agenda in the institution consider it important to showcase KMC's attempts to address climate change-related disasters.[237] In Surat, a citizen-based institutional engagement to shape sustainable energy decisions at the local level was not very evident except for the sustainable energy interventions planned for the local industries. Chu (2016), on the other hand, finds a strong relationship between the local business community and SMC's broader climate action.

Secondly, in the case of Surat, the state government was able to indirectly influence the local organisational culture of the SMC through the executive branch. This was facilitated through the historical institutional strengthening of the SMC as well as the weakening of the political branch of the urban government (for institutional development history, read Ray and Tewari, 2018 and Shah, 1997). An institutional, cultural influence of more entrepreneurial behaviour, market openness and constant focus on the financial soundness of the urban government characterised this focus. Gujarat's explicitly neoliberal approach to urban governance also contributed to the assumed role of a 'facilitator' and economically profitable framing of sustainable energy projects by SMC officials.[238] Sustainable energy actions driven only by bureaucratic leadership can have their own limits. In a bid to align with the state government for self-interest, all resistance to potentially adverse policy and implementation decisions are quashed. This could help understand why SMC seems to have slowed down its independent solar rooftop projects for its citizens. This can be considered to be akin to bureaucratisation. Bureaucratisation is defined as 'how particular bureaucratic practices influence the formulation, implementation and management of climate action' (Bhardwaj & Khosla, 2020:7). In addition to the overt bureaucratic practices and actions, literature capturing these mechanisms also identify the implicit practices and interests that shape these actions (Bhardwaj & Khosla, 2020; Chu, 2018; Knox-Hayes & Hayes, 2014).

Institutional power-related analysis in this study has illuminated more clearly the mechanisms through which primarily national and state governments are setting India's energy transition as well as urban development on a pathway that necessitates orchestrating the exclusion of

---

[237] Interview KLG03.
[238] Interview SLG04.

219

urban governments to avoid conflict. It is possible to view this as a strategy and not an inadvertent fallout, as in the case of some of the mechanisms discussed above and it can be seen to have an agential dimension. This also aids in the understanding why some cities like Pune and Surat that assumed early leadership in this area of governance are increasingly discontinuing or limiting their actions, or their actions stand jeopardised.

The three case studies and the above discussion deliver an additional layer to the evolving nature of the national government's political role in energy transition and its relationship with the urban. Literature has established the ongoing centralisation tendencies of both levels of government but particularly state governments in urban governance policies. The addition of the sustainable energy transitions lens illustrates the equally significant centralisation tendencies of the national government as well. The above discussions show that the governance of sustainable energy transitions in urban areas has become another vehicle/pretext to consolidate more power and wrest more control over the urban governments and the urban commons. In other words, new and selective rationalities associated with climate change and sustainability are being deployed as a 'means to organise materials and spaces, orchestrating new types of service provision and alternative urban futures' (Castán Broto, 2017:9).

With the help of the above discussion, I make the case that the prevalent understanding of the insufficient capacity of urban governments prevents urban governments from participating in sustainable energy transition (both national and local), and broader climate change governance needs to be deepened and placed within the political-economy of the concerned sectors (Bhardwaj & Khosla, 2018; Kuzemko & Britton, 2020; WWF, 2020). I argue that there is a need for further problematisation of this argument through future research and discussion in India as well as in other emerging economies. Can higher capacities of city governments be expected when they have been devoid of any significant role in national energy transition pathways? Can refraining city governments from occupying more consequential roles in sustainable energy be justified on account of their incapacities? Can the higher levels of governments, as the architects of the sustainable energy policymaking fields, even attempt to resolve the issue of incapacity in local governments when their interests lie in co-opting the urban for specific ends?

Analysis of institutional power is not particularly enlightening on the heterogeneity of the cities' responses but cannot be dismissed either (RQ2). The state-city government relation,

which is in turn shaped by the state-specific urban politics, has largely shaped the city government's autonomy on local issues and centralisation tendencies, leading to differential responses. Local urban government and citizen relationship and its institutionalisation is another area that has influenced sustainable energy decision-making.

Lastly, while institutional power spotlights the actual processes through which power operates in institutional realms, it does not reveal the rationalisation behind the power operationalisation or orchestration or how the current powerful and powerless actors are configured. Discussions on structural power have helped in adding this dimension. I summarise the understanding developed below as chapter 4 comprises the detailed discussion.

8.2.5. Structural power

Structures, as Barnett and Duvall (2004:20) posit, are the 'production and reproduction of internally related positions of super and subordination, or domination that actors occupy'. Accordingly, I have conceptualised mechanisms of structural power as rationalities and ideologies that produce and reproduce differential power positions of different actors and assign them different identities. While Barnett and Duvall (2005) encourage the conceptualisation of all types of powers operationalised concurrently, I find that structural power serves to be the bedrock upon which other power types and their mechanisms of power take shape. This stems from the propensity that structures ordain only a few actors in a multilevel governance system, the control to design the institutional norms and rules, distribute capacities and authorities and establish systems of knowledge and meaning.[239] As we see above from our discussion in the compulsory, institutional, and productive power section, structurally powerful actors such as national and state governments, in the Indian context, operationalise power in ways that reinforce and sustain their positions while ousting other potentially competitive actors. This understanding does not obliterate the structure agency duality but bases itself on the idea that structures largely set the conditions for actors to interpret and take action (or inaction). The actions interact with the structural elements to

---

[239] This is not a unique take, according to Barnett and Duvall (2004). Highlighting this tendency in particularly Marxist scholars they mention, 'Explicitly following Lukes and Gramsci, Gill and Law argue that while power exists in coercion and institutional arrangements, to understand the workings of the global capitalist economy requires recognition of global production relations as constitutive structure.[56] For them, as well as other Gramscians and historical materialists, the structure of global capitalism substantially determines the capacities and resources of actors.' (54).

potentially bring about the change in them. The proclivity of the already powerful actors is to bring in transition without upending or transforming the structures entirely in order to prevent new social relations and power hierarchies. We witness this in this study as well.

In the next paragraph, I primarily discuss the basis of this argument and correlate it with the analysis conducted until now. I attempt to present the interconnections and interdependencies between the structural power and the other types of power and the combined effects it produces for the three cities studied, in particular, and other Indian cities in general.

Urban energy in India is conceptualised as an arena that is at the intersection of the structures underlying the multiple domains of energy, national economy, climate and urban governance. At the very fundamental level is the inherently hierarchical nature of the federal system of governance, where local governments are the least autonomous in governing. While national and state (provincial) governments are expected to operate with some independence from each other, urban governments are fundamentally considered to be nestled within this hierarchy. Even within these two entities, I find that national governments tend to occupy a position of primacy on account of their constitutional power to implement laws, control over the conventional energy sector, and access to global capital flows and markets (Kumar & Naik, 2019; Pillai & Dubash, 2021a). India's federal structure is often characterised to be 'centralised federalism' pithily underpinning the dominance of national governments across all governing sectors (Kumar Ghosh, 2020). New research by Pillai and Dubash (2021) and Aiyar and Tilin (2019) illustrates that, as a result, the national government has become the key orchestrator of climate change responses in India and diminishing independent roles of even the state governments. There are also insecurities amongst state governments in view of the progressing centralisation and perverse financial control by the national government in other fields of the economy as well (Parthasarathy, 2020). The state governments have been empowered through the 74th CAA, which was implemented to enhance decentralisation, and urban government empowerment was put into the hands of state governments for the devolution of functioning areas (Buddhadeb Ghosh, 2010). Therefore, the Indian federal structure that defines the authority and legitimacy of urban governments itself positions urban governments in a considerably disadvantageous position, disposing it to the subjectivities meted out by the state and national governments. However, with the control of the main institutions and institutional mechanisms, the degree of subsidiarity, as

well as the deepening of democratic participation, will implicate the national government and the politics pursued by it. The failure of state governments to recognise the discretionary authority of urban governments on local energy matters needs to be seen in consonance with the national government's failure to devolve sustainable energy policymaking to urban governments. As I show in my analysis, through the national government's power on policy design and implementation framework to exclude specific actors, urban governments have been reduced to the identity of consumers of electricity, a partial implementer of top-down policies or fundamentally non-entities in urban sustainable energy governance. This politics, in turn, will reflect other co-existing structures that add to the layered identity of these actors shaping their interests and rationalities.

The liberalisation of India's economy in the 1990s was an inflection point for the country when the country attempted to shift from a largely socialist welfare state to a market-oriented, competitive and competition fostering, global capital attracting state. This brought about significant changes in the individual sectoral policies of the country – one that affects how cities, energy, and their relationship came to be envisioned. Firstly, with the turn towards boosting the service sector, cities have become conduits for attracting global capital and have been discursively accorded the status of 'engines of growth' that has predisposed cities to more subjectivation by state and national governments. The Indian literature on urban governance has comprehensively captured this phenomenon of state governments, and now national governments, endlessly attempting to either centralise or bureaucratise the urban governance from a distance to bring about a 'directed decentralisation' (Bhide, 2017).

Kennedy and Zerah (2009) detail the structural factors that led to cities' significance as economic actors in an increasingly globalised world that shelters different forms of capitalism. This relates to the linkages to international capital flows and prioritising sectors that make cities inevitably important as concentrators of infrastructure. They posit that 'the role of the state government in urban affairs remains central, as exemplified by their efforts to promote their capital cities as a nodal investment sites' (Kennedy & Zérah, 2008:8). Bhide (2017) further opines on state government involvement,

> The transfer of functions and functionaries is more notional than actual. The transferred
> functions are being executed at the local level by multiple institutions, or by functionaries
> who are part of a state cadre, or under the directions of parastatals at the state
> government level. Municipalisation has become even more entrenched in parts of the

country where it was non-existent. It is a structure where local governments will perhaps be key service providers but under directives of several other institutions (Bhide, 2017:179).

Essentially, economic liberalisation and opening up to the global capital have accorded this new identity to urban areas as products or vessels of global commercial and industrial activities, normalising the eradication of the 'local' or bottom-up approaches and diversity of local aspects. Within this view, the small scale, decentralised technologies relevant for contextual need-based urban applications do not find equivalent salience. Secondly, with liberalisation, related aspects of profit maximisation and investment attraction came to be prioritised in an otherwise social welfare sector of electricity, particularly in the background of the sustainability transition. This changes the nature of the state (both national and state government level) and necessitates the participation of actors that have the capability to access large scale financial markets and implement efficiency parameters rather than welfare parameters.

To deliver the transition within these structural parameters, a shift in the governance approach from government to corporatised public entities or private commercial entities has become more common in both urban and the energy sector – this further disempowered city governments, reducing their political and administrative attractiveness. The preference for neoliberal modes in the urban governance in India only reinforces the exclusionary structures on which India's energy transition is being wrought.

Reinforcing the power structure and governing rationalities of conventional energy that still dominate India's energy composition is the path dependence of the sector in its transition to sustainability.[240] India's energy scholars have captured the path-dependent nature of India's energy transition in recent literature (Kale, 2012; Shidore & Busby, 2019). The centralised nature of the conventional energy system, where the national government owns much of the infrastructure and controls most of the institutions even now, makes them indispensable for the decision-making area. Therefore, path dependence of the evolution of the energy sector has reinforced and reproduced the structural supremacy of both these levels of actors where they can act as both gatekeepers of new entrants, designers, and knowledge producers of

---

[240] Path dependence – defined as 'decisions taken in the past can restrain future choices' (Schreyögg and Sydow 2009 , p. 4; in (Becker, Beveridge, et al., 2016:6)). While most studies consider it part of institutional change, I have used the concept as a structural power mechanism as it tends to sustain the existing structures.

new sustainability pathways. While the institutional absence of urban governments from decision-making arena has already been discussed earlier, path dependence on the energy sector has also allowed for the national governments players to carry over the ideologies and rationalities of the conventional power sector, giving rise to a focus on the large scale capacity-oriented and investment-boosting RE sector. Path dependence has been widely used in the STT literature to signify the obduracy of legacy structure that sectoral transformation should ideally dismantle (Kuzemko, 2019; Sareen Siddharth, 2020; Stirling, 2014). Highlighting the effect of the structural mechanism of path dependence, Sareen (2020:123) posits, 'it directs attention not only to overt confrontation and contestation but also to the absence of important deliberations where power grabs or incumbency prematurely close particular energy futures.'

The analysis of the underlying structural mechanisms shows that urban governments in India have been operating from a very marginalised position, if at all. This is expected to continue in the near future. Because of the failure of an attempted structural change that was the urban decentralisation process, cities are still under the direct and indirect control of higher governments. Path-dependence on the current structures implies that the dominance of incumbent conventional energy actors on institutions, knowledge production, and resources is going to continue and intensify as we witness in the recent attempts towards further centralisation unless externally induced. Finally, both these realities are deepened by the structural changes underway as a result of the adoption of neoliberal modes of governing where parastatal and private bodies are being empowered in both energy and urban governance domains at the cost of political representative bodies.

Although it has not been discussed in the main text, globalisation could potentially bring some change in cities' current status of being bound by a domestic hierarchical set-up. Both Pune and Surat are positioning themselves as global cities with the objective of attracting industries and businesses. This is evident from their annual reports or efforts ideated in Smart City proposals. Attracting competitive global capital as well as services have more recently warranted 'green' credentials, and India's favourable RE policy environment can serve as an enabler with cities acting as little more than consumers. Globalisation might have an opposite effect on Kolkata as much of the state government's attention will shift towards other greenfield cities that can be better orchestrated to attract global attention. Webb et al. (2016:34) articulate the risks of this eventuality as

Urban energy governing is hence rendered susceptible to co-optation for green branding, which risks treating climate change as a new opportunity for capital accumulation and normalising the continuing mass consumption of resources, rather than building long-term foundations for low energy, low carbon municipalities.

Structural power, therefore, in addition to making a few powerful and some interventions more important than others, shapes one of the most fundamental conditions for the urban governments in India – their identity as non-entities, consumers, self-governing organisations, and erodes their original identity as the 'third-tier' of the democratic state. As these mould the self-understanding, subjectivities, and interests of the city governments, it might help in understanding their inaction or decisional tendencies such as 'superimposition' and 'lack of willingness to act' as identified in the literature (Bhardwaj & Khosla, 2020; Sami, 2017:107). This is illustrated through these three case studies where all the three cities' actions correlate with their distinct self-understanding about their role in local urban sustainable energy transitions. While Surat sees itself as a facilitator, Kolkata has limited itself to being an implementing agency for the state government. Pune's self-identity has evolved from being an enabler to viewing city-wide energy transition as a non-issue for PMC.

8.3.   Reflections on the analytical framework

8.3.1. Overlaps and interacting power categorisation

One of the main challenges that I faced during the analysis was the reconciliation between different types of power. Barnett and Duvall's (2004) conceptualisation of power allows concurrent analysis of all types of power but does not focus too much on the potential and sometimes obvious interconnections between the different types of power. This leads to the conundrum of whether the power that is still not exercised or where 'production of effect' has not yet occurred qualifies as part of the analysis. The conundrum here is pronounced where agents that are structurally more powerful can potentially exercise a large range of power mechanisms on structurally weaker agents – some directly and some indirectly. Should this be considered an exercise of structural or compulsory power? Further, within compulsory power, Barnett and Duvall (2004) allow the consideration of 'held' power as a compulsory power type. This then includes capacity related notions of power, for instance, effects on financial or technical resources through incentives and penalties, and could include direct commands and official orders. However, the fundamental conceptualisation of power was a

relational notion of power. The contradiction remains unclear throughout the study.

I also find potential overlaps between power types of institutional and compulsory power, particularly in the case of governing arrangements that are embedded within formal institutional realms like in this case. Instances of direct commands or resource offers are rare and difficult to triangulate. Instead, these incentives or coercive acts take place through institutional mechanisms such as rules and laws. Therefore, state governments are directly responsible for city governments' capacities and authority determination, but they can implement this only through institutional means. As a result, several mechanisms identified here as compulsory power here share aspects that can potentially be claimed to be an institutional exercise of power as well. I have tried to contain the overlap by identifying mechanisms affecting specifically the urban government understudy as compulsory power, and mechanisms that affect the urban governments of the respective state or country at large are identified as institutional power.

8.3.2. Accounting for temporality

An aspect that needs more debate in the area of power is the concept of temporality. In place and scalar specific studies, power structures and emanating power mechanisms by actors are bound to operate over a period of time, establishing the 'context' – setting the conditions for the actions of different actors. Context, a geography-specific emergent feature arising out of the interplay between different mechanisms of power, can be a composite embodiment of power itself that then conditions agents' actions. Barnett and Duvall (2004) pay attention to 'context' only fleetingly where they subsume the context related discussion within the agent-structure debate. The future conceptualisation of temporality within power debates in the STS literature will be worth exploring (cf. Sovacool, 2016).

Power type/ Cities	General (Nation/international)	Surat	Pune	Kolkata
Structural	• Adopting the nation-state regime and pre-eminence of the national and state governments • Economic liberalisation and ushering in neoliberal governing order in the energy sector • Prioritising cost efficiency, economies of scale, and profit maximisation (over social interests) • Centralised energy governance incumbency and path dependence			
Institutional	• Making urban governments 'non-entities' in the energy domain • Setting the selective technological agenda • 'Directed decentralisation' – top-down selective localisation of climate governance • National policy incoherence and inconsistency	• Making urban governments 'non-entities' in the state energy transition • Control over the implementation processes – regulations, approvals, and connections • Entrepreneurial bureaucratisation: Setting informal and/or indirect institutional rules, incentives, and practices	• Enabling citizens' activism and institutional participation • Bureaucratisation of PMC • 'Directed Decentralisation' – top-down orchestrated localisation of climate governance (state) • Co-optation through administrative procedures • Centralisation through uniformisation	• Making urban governments 'non-entities' in the state energy transition • 'Directed decentralisation - – Orchestrated localisation of climate change • Subversion through control over implementation regulations and processes • Convening local expertise for institutional capacity building
Productive	• Producing urban as the key site for climate action • Discursive production of 'national' technologies	• Producing urban as the key site for climate action • Discursive consensus building around climate change and RE	• Local knowledge production, framing, and vision setting • Discursive consensus building around climate change and RE	• Constructing urban governments as 'implementing agency' • Discursive production of meaning and

				significance of distributed RE
Compulsory	• N/A at general level	• Executive leadership by individual officials • Extending technical and financial capacity through international programmes	• Non devolution of energy as a governing area • Imposed financial 'autonomy' by state government • Building in-house technical capacity • Leadership by the executive head	• Direct control over area of work, financial, and administrative capacity • Informal operational command and control by state government • Offering external technical capacity
Material	• Techno-material interdependencies	• Generating local imperatives from spatio-economic energy embeddedness • Generating local opportunities for urban governments through decentralised applications • Conducting politics of visibility	• Generating local imperative from socio-economic energy embeddedness • Generating spatially contingent opportunities	• Creating spatial contingency and material constraints • Creating techno-material interdependencies – connection to the electricity grid (City/ state level)

229

Chapter 9: Conclusion

9.1.   Introduction

This thesis set out to explore how politics and power within a multilevel governance arrangement shape urban sustainable energy responses in Indian cities. This includes understanding the actions, inactions and the heterogeneity of such responses. A power lens has been used to understand these phenomena taking into account the multilevel nature of the urban energy governing arena. After an initial introduction to the study and the multidisciplinary literature review in Chapters 1 and 2, I lay out the multidimensional power-based analytical framework and the methodology used to conduct the study in chapter 3. The analytical framework builds on Barnett and Duvall's power framework and taxonomy and introduces a heuristic model, proposing a linkage between three units of Power Types, Mechanisms, and Effects. The mechanisms under each of the five power types identified in the framework, depicting power-in-operation within a multilevel governing arena, are identified inductively from the data and serve as the main organising units within the empirical analysis in this thesis. The analysis has been carried out in three levels captured in Chapters 4-8. Chapter 4 serves as the first level of empirical analysis. At the outset, the political context within which urban sustainable energy governance is detailed to outline the hierarchical multilevel multisectoral landscape of urban and energy governance in India. The first level of empirical analysis is presented with a discussion on the five different power types and the corresponding mechanisms that affect the urban governments' energy responses in general. The discussion also comprises the effects/ conditions that the power mechanisms collectively produce for all Indian cities, shaping sustainable energy actions or inactions. The analysis starts with a detailed discussion on the mechanisms of structural power that constitute social relations, identities, and capacities of actors and form the scaffold on which other power types unfold. As the structures are common to all cities, a separate discussion on structural power has not been carried out in the individual empirical chapters to avoid duplication. The following three Chapters 5, 6, and 7 discuss the empirical findings on the three case cities in-depth. A comparative analysis of the power operations found in the three cases is conducted in Chapter 8, and the findings are synthesised to present a generalised

analysis for the broader urban sustainable energy governance in India. The findings of the study in specific response to the two sub-research questions have been summarised below:

9.2.   General discussion and summary of findings

The above discussions on the different power mechanisms across the three cities attempt to answer research questions that guide this thesis and have been set out in Chapter 1. I will summarise below concisely how the main research question was answered through the two sub research questions that collectively respond to the main question.

RQ1. How are multidimensional types of power operationalised to shape the sustainable energy actions of, and conditions of actions for, urban governments?

The analytical framework that I have used to understand the complex field of urban energy governance in India allows a fairly expansive conception of power as the production of effects that shape conditions as well as actions of other actors. This helps specifically in the context of this study by locating the analysis beyond what kind of actions are being undertaken, which has been the most common objective of enquiry in the urban climate governance literature in India (Bhardwaj & Khosla, 2020; Criqui & Zérah, 2015). Instead, it also allows understanding of inactions through the conditions and ideas under which decisions or actions are implemented or remain unimplemented.

Therefore, the analysis of the three cities based on the framework suggests that sustainable energy decision-making in Indian cities occurs in a multilevel, complex, and contested policy, political, and socio-material landscape. As a result, sustainable energy governance is initiated, forged, and shaped by the pulls and pushes of multiple power mechanisms. With the benefit of new insights into institutional, productive, and structural power operationalisation, the study finds that the agency of urban governments is being constricted, and urban sustainable energy governance is being co-opted and orchestrated by higher-level powerful state actors pursuing a sustainable energy transition pathway that excludes the local urban governments. This is facilitated by shaping their identity, role, capacities, authority, and area of action through a slew of power mechanisms such as increasing centralisation, empowering non-democratic entities for implementation, rendering urban governments as non-entities and energy consumers, prioritising non-welfare related parameters, discursive production of nationalist priorities and RE technologies. In many ways, the findings in this study are in line

with Arora et al.'s (2019) proposition that 'a complex range of interacting pressures operate to diminish the diversity of possible pathways and to entrench just one pathway (Stirling 2009)'.[241]

To elaborate, on the one hand, local socio-economic and material imperatives created the 'empowering' conditions for the urban governments to urbanise sustainable energy technologies (*initiate*) where local non-state actors and international city networks contributed towards *configuring (setting the agenda)* and sustaining the sustainable energy agenda and actions at the local level. This was aided by national level short-term programmes by the national actors. On the other, historically institutional and discursive weakening, administrative and political centralisation, and evolving state-market-citizen relationships have and continued to invalidate urban governments as state participants in the sustainable energy sector. This has been facilitated by creating 'disempowering' conditions by either significantly reducing the scope of cities' actions or derailing the planned actions while encouraging other actors to undertake local, sustainable energy action and shaping the consciousness of the urban governments. The conditions that prevailed are a function of the underlying structures that allow certain levels of actors to be more powerful than others, some actions more valuable than others, and some values more important than others. In this case, structural mechanisms, as I find, constitute, reinforce, and augment the powers of higher states of national and, to some extent, state governments by controlling law-making, rulemaking, knowledge-producing, and decision-making arenas that lead to these conditions while marginalising and excluding others.

New reforms to these structures brought about by international economic and environmental dynamics, heralded mostly by these national incumbents, powerful actors, have led to the recent intensification of power consolidation in favour of the national government of India. The combined effect produced by these disempowering power mechanics has rendered the city governments not just *out of the decision-making realm* but, as I show in my case studies, orchestrated its identity to that of an *implementation agency, facilitator, or a non-entity* altogether – co-opting the sustainable energy trajectory of the city for the future. Hope for a more plural democratic, sustainable energy trajectory lies in the intensification of the green shoots visible within this oppressive power landscape in the form of local material and

---

[241] See page 32 (Arora et al., 2019) for more parallel in findings.

contextual imperatives and deeper citizen-local state engagement that has its foundation in just and fair environmental accountability.

RQ2: How do power mechanisms elucidate the heterogeneous nature of sustainable energy responses by the urban governments of India?

Even within the limited sustainable energy responses by urban governments, the diversity confounds and challenges the totalising effects of some of the power mechanisms – particularly through underlying entrenched structures. The comparative discussion in the earlier chapter identifies the specific mechanisms and other emergent factors that give rise to this heterogeneous set of responses. I summarise it here.

9.2.1. State-city relationship and state-level urban politics

The state government's relationship with the city through the exercise of compulsory or institutional power significantly shapes the responses of the city governments. The control a state government has on the authority, financial, and administrative capacities of the urban government inevitably make the government susceptible to the state's broader political economy. Shaped by the state's urban governance politics, the day-to-day formal as well as informal interactions between the state government and urban government differed across the three cities. This was particularly evident in the differences between Kolkata and the other two cities. The state government of West Bengal has control over the everyday operations of KMC, where it is able to exercise direct control over officials and other conditions. KMC's foray into sustainable energy through energy-efficient lighting was a direct command by the state government, as also mentioned by the officials. KMC also directly depends on the state government's resources for most of its implementation. As a result, to understand why KMC has exhibited a muted response on this front, one needs to take into account the state government's political position on sustainable energy. Surat and Pune enjoy some autonomy from their respective state governments. A key contributing factor is the capital city status of Kolkata and its critical significance in West Bengal's politics.[242]

Further, an analysis of the institutional power mechanisms also demonstrates that the state government's evolving urban and energy politics fundamentally grounds the administrative rules and regulations within the state. These formal and informal rules, in turn, shape the

---

[242] Also highlighted in interviews with urban experts.

political as well as functional autonomy that will be allowed to the urban governments. Maharashtra's Green Building policy, as well as Uniform DCR Rules, are illustrative of this. Surat, on the other hand, has been influenced significantly by the Gujarat state government's competitive entrepreneurial urban governance push, shaping the way SMC has taken actions on sustainable energy.

The historical evolution and current political economy of energy in the state, in turn, has determined the state distribution utility's response to urban grid-connected projects such as a solar rooftop PV. Both these dimensions have been instrumental in understanding the inactions of urban governments. It explains why PMC was not able to implement many of the sustainable energy interventions in its DCR or why KMC and PMC, in particular, have not enabled citizen adoption of solar rooftop projects.

9.2.2. Contextual material conditions of the city

The local material and materially mediated socio-economic and spatial conditions have been key in generating location-specific heterogeneous actions and decisions. The local imperatives and opportunities so generated provide the local urban governments with their identity as energy governing 'entity' and the legitimacy to act on sustainable energy as a local urban issue. In Pune, local material conditions were the result of the early global structural linkages that led to service sector growth in the city, indicating close interconnections between different types of power. The high real estate demand, often considered a corollary of the service and educational industry growth, has been a key driver of the early sustainable energy actions in the city (cf. Sudhira, 2019 for a similar condition in another Indian city). In the case of Surat, we witness a different local context that was wrought primarily by the geographical setting and historical and economic context of the city. Surat's strong focus on clean actions locally was triggered by its flood-related disasters and high expense of water infrastructure concerns. Surat also plans to continue its sustainable energy agenda because of the benefits of these material interventions and in anticipation of climate-related vulnerabilities in the near future.

9.2.3. Non-state actors and transnational city networks

Lastly, the technical and knowledge capacity facilitated primarily by international organisations and, to some extent, the national or local non-state actors shaped the actions that were implemented or planned specifically for the city. The technical capacity extended

by the USAID funded programme on building EE helped build the building EE programme in Pune for many years subsequently. The technical aid provided by a national technical institute and UNDP helped Surat in setting up their power generation from wastewater treatment plants.

The study attempts to contribute to three key literature streams: 1) Indian urban climate governance scholarship; 2) multilevel climate and energy governance; 3) the broader political power scholarship. Lastly, the avenues for future research are discussed.

9.3.   Key contributions of the study to the literature

9.3.1. Urban climate governance scholarship in India

The urban climate governance scholarship in India has been emerging in the last few years and often covers a wide gamut of climate change related responses - energy being only one of them. Therefore, at a very fundamental level, this research contributes by presenting detailed empirical cases of three Indian cities engaged in urban sustainable energy governance that remain unresearched in the existing literature until now. While Indian urban climate governance scholars have attempted to understand climate decisions, planning, and governance in Indian cities where energy has formed only a part, I focus the analysis on the sustainable energy sector that forms a critical part of climate response in cities across the world. Focusing on the energy sector helps make the politics of sustainable energy transitions in India and urban climate governance central to the analysis. More importantly, multilevel and multisectoral politics and power dynamics have received limited attention in the literature. This study proposes an alternative approach to develop a comprehensive understanding of the sustainable energy governance arena as a multilevel and multisectoral site through the lens of power. This follows Rutherford and Coutard's (2014) suggestion to view urban energy governance in all its political complexity. They posit,

> A more direct engagement with urban energy requires seeing it as more than a governance tool or one of the means to a governance tool or one of the means to address and implement a particular wide-ranging policy, and taking both the materiality of its flows and its socio- technical characteristics seriously, and the varied, contrasting, sometimes competing, political projects for which it works. (Rutherford & Coutard, 2014:1358)

The importance of the geographically situated nature of material power and how these tend to justify the involvement of local governments in energy governance is another area through

which I hope to contribute to this literature. As I demonstrate, material power helped in bringing the energy agenda to city governments with the help of its decentralised scale and the manifestation of the socio-economic and socio-ecologic context in the form of opportunities and constraints. It also helped in institutionalising the urban energy agenda within the urban governments, capacitating them to take or even deliberate future actions on energy sustainability. In the case of Surat, for instance, this was quite direct through the setting up of the EE cell. The materiality of the socio-technical system is still a nascent area in the urban climate and energy governance. Criqui and Zerah (2015) examined that conventional electricity access to informal communities in Delhi is shaped by the materiality of space (Criqui & Zérah, 2015). Bhardwaj and Khosla (2020), through their research in two different cities, highlight the need for the bureaucrats to perform governance through 'visible' material aspects of any urban government action and how it impacts local climate action (not necessarily energy); while Luque Ayala (2014) illustrates how the visibility of sustainable energy is used to recruit energy citizens for configuring climate action (Luque-Ayala, 2014). This study contributes to this nascent area of academic enquiry by offering evidence for a more multidimensional nature of materiality as a type of power. For instance, it demonstrates one dimension where material aspects of 'visibility' and resource can be utilised for specific political ends by decision-makers (see Surat and Kolkata cases). Further, I add to the current understanding of the motivations for sustainable energy actions in cities. In all three cities, I find elements of experimentation and autonomous decision-making to implement projects that were forged explicitly for energy sustainability (Pune), the financial security of the urban government and local climate resilience (Surat), and experimentation and financial gains for the Corporation (KMC). This adds to concepts such as 'superimposition' that theorises how city bureaucrats juxtapose climate actions in generic development projects or vice versa (Bhardwaj & Khosla, 2020).

Lastly, as discussed earlier, this study contributes to this literature stream by problematising the widely held notion that it is the lack of capacity and authority that makes city governments muted and possibly unsuitable actors for energy and climate actions (Alankar, 2015; Sami, 2017; WWF, 2020). The diminishing relevance of urban governments - a local elected state body – within a public governing arena that is a corollary of the chronic capacity and mandate deficit is part of the depoliticisation process that accompanies neoliberal mode of governance. I further argue that the erosion of their agency is in the interest of the state and

national governments and something that was orchestrated to be achieved.

This, in turn, has implications for the policymaking community involved in urban climate or energy sustainability (including transnational city climate networks). Unless city governments are structurally empowered as legitimate and accountable local state entities, ad hoc programmes and plans initiated primarily at any level will be unable to deliver a transformative change needed to realise early long-term but democratic and fair sustainable energy systems.

9.3.2. Broader urban climate governance literature

As discussed in the literature review earlier, the urban climate governance literature suffers from an over-representation of the global north (Van der Heijden, 2019). Therefore, at the very first level, this study contributes to the emerging field by bringing evidence from the global south. I also add to the budding sub-field of climate governance studies using the power framework to understand politics where Barnett and Duvall's taxonomy remains underexplored. Secondly, at the centre of my analysis in this study are the urban governments in India. By focussing on the local state, I hope to contribute to the trend of return to state power analysis in urban climate governance literature (Castán Broto & Westman, 2020). This study also highlights that the state itself is not a monolithic body, and multilevel state actors and multisectoral dynamics are playing out within the state (Johnstone & Newell, 2018a). For the powerful within this statal configuration to prevail, they will have to coerce, persuade, manipulate, seduce, negotiate, and induce these co-actors to act in a certain way or not act at all to avoid conflict (Castán Broto, 2017; Fisher, 2012). This aligns with the critical theory on governance and new notions of governmentality in climate literature, where the 'art of government' involves 'orchestration of different types of power', 'involving coordination and negotiation of actors whereby power is consented' (Bulkeley, 2015:8; Castán Broto, 2017). Whereas governmentality studies in urban climate governance have extensively involved the recruitment of citizens as subjects, I use the agency of urban governments, a democratically representative body, as the objects as well as subjects of climate governance (the multidimensional power framework allows these multiple conceptualisations). In a scenario where the state actors are distributed and operate at different scales, the most powerful state actor will have to first 'conduct the conduct' of other state actors (like urban governments in this case) to reduce conflict to its minimum. Urban climate governance scholarship has

highlighted how national and global policies have shaped local climate action (Eckersley, 2017; Webb et al., 2016) but have not necessarily used the lens of power to view this. Governmentality or the power lens, in general, allows the engagement with the idea that sub-state actors can be disempowered to shape their own actions and self-identities.

A third insight that this study generates is that along with the multilevel actors, the multi-sectoral politics, like energy, urban, and climate governance in this case, can potentially form a new locus of analysis in this literature. The Indian climate governance policy landscape is essentially a fragmented one (Fisher, 2012; Kumar & Naik, 2019). As the analysis illustrates, the lack of an integrated response to climate change has meant that each implicated sector acts, intentionally or unintentionally, in ways sometimes unbeknownst to other responsible authorities. Chapters 4 and 8 highlight the ways in which two different sectors of urban and energy governance have evolved in response to international and national discourses. In the particular case of cities, while the national and state urban governing actors have been able to assimilate the emerging idea of cities as key sites of sustainable energy actions *implemented by the city governments*, the national energy policy actors seem to be resistant and dismissive about these policy spaces emerging in urban governance.

9.3.3. Political power scholarship

In this thesis, I base my analytical framework on the taxonomy of power offered by Barnett and Duvall (2005), originally proposed in the context of global governance scholarship. The broad conceptualisation of power helps in adapting the original framework for other disciplines as a heuristic to understand the power in any multilevel governing arena. To ensure that the framework reflects the established knowledge within the political studies of socio-technical transitions, an additional power type of *material power* has been to the framework's power taxonomy. Focussing on the shaping, constraining, and facilitating qualities of the material component of energy infrastructure, many scholars have considered materiality as an interconnected type of power (Johnstone & Newell, 2018; Kuzemko & Britton, 2020; Rutherford & Coutard, 2014; Sareen, 2020). The conceptualisation of material in this study has been described in detail in Chapter 3. The broad conceptualisation also works against the framework's favour, particularly when assessing a complex governing arena, as the analysis may get too broad. Accordingly, the concept of mechanisms has been introduced within the framework to capture the operational and dynamic aspects of power incidence in the

governing process. Mechanisms are strategies and processes of power that help structure the findings under each power type and relate to the effects broadly. This latter adaptation, in particular, may find relevance in other applications or disciplines using Barnett and Duvall (2004, 2005).

9.4.   Future research avenues

The enquiry on political power – its relationships, dimensions, and mechanisms, has largely eluded the Indian urban climate or energy governance literature. I believe questions of power need more research, particularly on how power relationships historically emerge between different state actors in this domain. This study illustrates that the relationship between the state government and the cities depends on not only the urban political economy of the state but also the socio-economic context of the city. Capital cities like Kolkata experience more direct control than other second-tier cities like Pune and Surat. The latter two are governed only from a distance, giving a semblance of more local autonomy. How these differential relationships within one state develop and how they impact local climate interventions need further study.

At the local level, the new politics of citizen engagement too can open new dimensions of power dynamics within a city. The local citizen and expert engagement with urban governments in all three cities show that while there is an increased engagement with local citizens on the local agenda-setting for climate and energy, the process cannot be called unqualifiedly participatory. The interviews conducted in this study and existing sustainability literature indicate that the engagement is usually limited to the city elites with close access to policymakers. This lends itself to the power analysis of the local non-state engagement with the urban governments where who is allowed to participate in the decision-making arena, which section of the population gets their issues recognised and addressed, which do not can be important. Are climate or energy decisions being made (or withheld) keeping these elite issues in mind, or are other social justice-related issues prioritised? Are there multilevel dynamics to the issues of energy transition that are prioritised by the urban governments, if at all?

While this study attempts to contribute to the theorisation of power in a global south context in a very specified field, where the distribution of power in the governing field has been inconsistent and often superficial, there is a need for further enrichment in this area with

evidence from the global south. In a centralised society and a socio-technical arena that has been often depoliticised, how conflict is avoided without visible coercive use of power needs more exploration. Possibly, there is scope for a fourth/ fifth face of power, particularly in the case of transitions here, going beyond the third face of power of preference shaping where historical depoliticisation and impoverishment join hands to shape the agency of the social actors to the extent that even the option of seeking knowledge about the alternative pathways is resisted. Lastly, India's sustainable energy transitions field is constantly evolving. For instance, new rules and policies have been announced prioritising 'behind-the-meter' and waste to energy projects that can have important implications for the urban areas. The SCM has been reformed to include more climate considerations. Given the dynamic developments, future urban sustainable energy/ climate politics studies will need to continue engaging with the multilevel governance agenda.

9.5. Concluding thoughts

At the beginning of this study, urban sustainable energy governance was still a fuzzy area given the limited literature. For me, an energy sector professional, this fuzziness emerged despite the privilege of having a relatively in-depth understanding of the energy sector in India. While cities were increasingly being considered important actors for particularly decentralised sustainable energy technologies since the beginning of the energy transition discussions, the discussion around cities diminished considerably in the mainstream RE sector with the advent of India's big push on RE targets in 2015. The dwindling enthusiasm around urban energy sustainability in national programmes or interventions by international city networks was one indicator of this. Yet, programmes like Smart Cities Mission with solar energy ambitions were launched; ambitious plans were announced by city governments comprising influential partnerships that were eventually not realised. Urban climate governance literature that pointed to challenges such as the lack of capacity and, more recently, centralisation tendencies of the state governments seemed incomplete as they did not explain why higher levels of governments did not address these challenges. Further, if indeed cities are so challenged, why were some of them still taking local, sustainable energy actions and preparing plans and knowledge reports? This initial motivation in this area led me to explore the offerings of the power scholarship, a largely unexplored framework in Indian urban climate governance studies. The power literature that allowed an understanding of

power mechanics beyond just domination through resource constraints, encompassing inducements, acquiescence, seduction, and other insidious ideas of power exercise to bring actors of a sociotechnical configuration to act in a certain way, seemed more appropriate.

The analysis presented in this study responds to these initial questions and hopefully has been able to showcase the deeply entrenched forces that an alternative sustainable energy transition pathway involving bottom-up, need-based, just, and democratic practices have to challenge. This transition where city governments have been pushed back into being non-entities mirrors the evolution of India's sustainable energy transition from an application-oriented approach to an economic growth-based approach and reveals the changes in its political foundations. Consequent structural reconfigurations influenced by the onset of a globalised market, neoliberalism, and path-dependence have validated the concentration of power in the hands of the national level state, incapacitating state actors of lower scales while ushering private and other non-state actors. This structural power, on the other hand, is embodied/ operationalised in the institutional realms through rules, norms, production of knowledge and discourses of the probable and improbable, resulting in further centralised decision-making and implementation. In sum, the argument that powerful actors tend to underpin and sustain the current power hierarchies stands true in India's energy transition context as well. It is through these power lenses of power capture, centralisation, and obduracy that capacity or the lack of it in urban governments should be viewed.

The power approach also helps to understand why no political and bureaucratic resistance (independent plans and actions) or political organisation of Indian cities can be expected through the lens of acquiescence. Transformative policy action that enables structural reforms enabled by institutional and discursive reforms will be key to reversing this trend of centralisation or exclusionary pathways in sustainable energy and general sustainability in India. Arora et al. (2019:34), positing the need for more pluralistic sustainability pathways in India, encapsulate the key argument also embedded in this thesis,

> Social dynamics reproducing particular pathways operate as much from "outside in" as from "inside out" of the pathways. This means that effecting shifts away from dominant pathways is a "gestalt" process (Naess 1995), also requiring engagement with entire political milieu. (Stirling 2018)

Bibliography

100 Resilient Cities. (2019). *Resilient Pune: Preliminary Resilience Assessment*. https://www.pmc.gov.in/sites/default/files/100_rc/Preliminary Resilience Assessment Full Report_0.pdf

Aayog, N. (2017). *Draft National Energy Policy, Government of India*. https://www.niti.gov.in/writereaddata/files/document_publication/NEP-ID_27.06.2017.pdf

Abbott, K. W. (2018). Orchestration. In A. Jordan, D. Huitema, H. van Asselt, & J. Forster (Eds.), *Governing climate change* (pp. 188–209). Cambridge University Press. https://doi.org/10.1017/9781108284646.012

Ahluwalia, I. J. (2019). Urban governance in India. *Journal of Urban Affairs*, *41*(1), 83–102. https://doi.org/10.1080/07352166.2016.1271614

Aijaz, R. (2006). *Challenges for Urban Local Governments in India* (No. 19). www.lse.ac.uk/collections/asiaResearchCentre

Alankar. (2015). *India's Megacities and Climate Change: Explorations from Delhi and Mumbai Alankar* (No. 79; Working Papers from the STEPS Centre). www.steps-centre.org/publications

Alber, G., & Kern, K. (2009). Governing Climate Change in Cities: Modes of Urban Climate Governance in Multi-level Systems. In *The international conference on Competitive Cities and Climate Change, Milan, Italy,* (Issue October).

Allen, J. (2004). The whereabouts of power: politics, government and space. *Human Geography*, *86*(1), 19–32. https://doi.org/10.1111/j.0435-3684.2004.00151.x

Andersen, H. T. (2008). The emerging Danish government reform-centralised decentralisation. *Urban Research & Practice*, *1*(1), 3–17. https://doi.org/10.1080/17535060701795298

Anguelovski, I., Chu, E., & Carmin, J. A. (2014). Variations in approaches to urban climate adaptation: Experiences and experimentation from the global South. *Global Environmental Change*, *27*(1), 156–167. https://doi.org/10.1016/j.gloenvcha.2014.05.010

Arabindoo, P. (2019). Renewable energy, sustainability paradox and the post-urban question. *Urban Studies*, *57*(11), 2300–2320. https://doi.org/10.1177/0042098019885080

Arora, S., Vijayabaskar, M., Sharma, D., & Stirling, A. (2019). Sustainable Development through Diversifying Pathways in India. *Economic and Political Weekly*, *LIV*(46), 32–37.

Arts, B., & Tatenhove, J. Van. (2005). Policy and power : A conceptual framework between the 'old' and 'new' policy idioms. *Policy Sciences*, *37*, 339–356. https://doi.org/10.1007/s11077-005-0156-9

Avelino, F., & Rotmans, J. (2011). A dynamic conceptualization of power for sustainability research. *Journal of Cleaner Production*, *19*(8), 796–804. https://doi.org/10.1016/j.jclepro.2010.11.012

Aylett, A. (2011). Municipal bureaucracies and integrated urban transitions to a low carbon future. In H. A. Bulkeley, V. Castán Broto, M. Hodson, & S. Marvin (Eds.), *Cities and Low Carbon Transitions* (1st ed., pp. 142–158). Routledge. https://doi.org/10.4324/9780203839249

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

Bachrach, P., & Baratz, M. S. (1962). Two Faces of Power. *The American Political Science Review*, *56*(4), 947–952. http://www.jstor.org/

Bai, X., Surveyer, A., Elmqvist, T., Gatzweiler, F. W., Gü Neralp, B., Parnell, S., Lè Ne Prieur-Richard, A.-H., Shrivastava, P., Siri, J. G., Stafford-Smith, M., Toussaint, J.-P., Webb, R., Brondizio, E., Leemans, R., & Solecki, W. (2016). Defining and advancing a systems approach for sustainable cities. *Current Opinion in Environmental Sustainability*, *23*(1), 69–78. https://doi.org/10.1016/j.cosust.2016.11.010

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

Balmaceda, M., Högselius, P., Johnson, C., Pleines, H., Rogers, D., & Tynkkynen, V. P. (2019). Energy materiality: A conceptual review of multi-disciplinary approaches. *Energy Research and Social Science*, *56*, 101220. https://doi.org/10.1016/j.erss.2019.101220

Bandyopadhyay, S., & Sharma, A. (2020). *Assessing the Performance of Kolkata Municipal Corporation: Implications for Service Delivery*. http://icepp.gsu.edu/

Banerjee, A., Bardhan, P., Basu, K., Chaudhuri, D., Ghatak, M., Sanjay Guha, A., Majumdar, M., Mookherjee, D., & Ray, D. (2002). Strategy for Economic Reform in West Bengal. *Economic and Political Weekly*, *37*(41), 4203–4218.

Barnett, M., & Duvall, R. (2004). Power in global governance. In M. Barnett & R. Duvall (Eds.), *Power in Global Governance*. Cambridge University Press. https://doi.org/10.1017/CBO9780511491207.001

Barnett, M., & Duvall, R. (2005). Power in International Politics. *International Organization Foundation*, *59*(1), 39–75. http://www.jstor.org/stable/3877878

Basu, S., Bale, C. S. E., Wehnert, T., & Topp, K. (2019). A complexity approach to defining urban

energy systems. *Cities*, *95*, 1–13. https://doi.org/10.1016/j.cities.2019.05.027

Beach, D. (2017). Process-tracing methods in social science. In W. R. Thompson (Ed.), *Oxford Research Encyclopedias, Politics*. Oxford University Press.

Becker, S., Angel, J., & Naumann, M. (2019). Energy democracy as the right to the city: Urban energy struggles in Berlin and London: *EPA: Economy and Space*, *52*(6), 1093–1111. https://doi.org/10.1177/0308518X19881164

Becker, S., Beveridge, R., & Naumann, M. (2015). Remunicipalization in German cities: contesting neo-liberalism and reimagining urban governance? *Space and Polity*, *19*(1), 76–90. https://doi.org/10.1080/13562576.2014.991119

Becker, S., Beveridge, R., & Röhring, A. (2016). Energy transitions and institutional change: Between structure and agency. In L. Gailing & T. Moss (Eds.), *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space* (pp. 21–41). Palgrave Macmillan. https://doi.org/10.1057/978-1-137-50593-4_3

Becker, S., Moss, T., & Naumann, M. (2016). The importance of space: Towards a socio-material and political geography of energy transitions. In *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space* (pp. 93–108). Palgrave Macmillan. https://doi.org/10.1057/978-1-137-50593-4_6

Beermann, J., Damodaran, A., Jörgensen, K., & Schreurs, M. A. (2016a). Climate action in Indian cities: an emerging new research area. *Journal of Integrative Environmental Sciences*, *13*(1), 55–66. https://doi.org/10.1080/1943815X.2015.1130723

Betsill, M. M., & Bulkeley, H. (2006). Cities and the Multilevel Governance of Global Climate Change. *Global Governance*, *12*(2), 141. http://www.jstor.org/stable/27800607

Bevir, M. (1999). *Foucault and Critique: Deploying Agency against Autonomy*. *27*(1), 65–84. https://www.jstor.org/stable/192161

Bhardwaj, A., De Lorenzo, F., & Zérah, M.-H. (2019). *NEW POWERS: HOW INDIA'S SMART CITIES ARE GOVERNING AND TRANSITIONING TO LOW-CARBON ENERGY Acknowledgements*. https://cprindia.org/sites/default/files/New Powers_ Working Paper_28 Aug.pdf

Bhardwaj, A., & Khosla, R. (2017). *Mainstreaming climate action in Indian cities: Case study of Rajkot (Policy Brief)*. http://cprindia.org/research/reports/mainstreaming-climate-action-indian-cities-case-study-rajkot

Bhardwaj, A., & Khosla, R. (2018). *Integrating urban development and climate Objectives : insights from Coimbatore*. https://www.cprindia.org/system/tdf/policy-briefs/ICEE_Coimbatore Policy Brief July 19 (3).pdf?file=1&type=node&id=7054&force=1

Bhardwaj, A., & Khosla, R. (2020). Superimposition: How Indian city bureaucracies are responding to climate change. *Environment and Planning E: Nature and Space*, *0*(0), 1–

32. https://doi.org/10.1177/2514848620949096

Bhide, A. (2017). Directed decentralisation: Analysing the experience of decentralisation via jnnurm in Maharashtra. In *Exploring Urban Change in South Asia* (pp. 81–97). Springer. https://doi.org/10.1007/978-81-322-3741-9_5

Bhide, A. (2019). Changing Trajectories of Urban Local Governance. In S. Patel & O. Goyal (Eds.), *India's Contemporary Urban Conundrum* (1st ed., Issue May, pp. 172–183). Routledge India. https://doi.org/10.4324/9780429023996-14

Bolton, R., & Foxon, T. J. (2013). Urban infrastructure dynamics: Market regulation and the shaping of district energy in UK cities. *Environment and Planning A*, *45*(9), 2194–2211. https://doi.org/10.1068/a45575

Bridge, G., Bouzarovski, S., Bradshaw, M., & Eyre, N. (2013). Geographies of energy transition: Space, place and the low-carbon economy. *Energy Policy*, *53*, 331–340. https://doi.org/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 Research and Social Science*, *50*, 151–161. https://doi.org/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 Transitions*, *2*, 16–25. https://doi.org/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. *Environmental Innovation and Societal Transitions*, *36*, 49–69. https://doi.org/10.1016/j.eist.2020.04.007

Brooks, S. (2017). No, Cities Are Not Actually Leading on Climate. Enough With the Mindless Cheerleading | Greentech Media. *Greentech Media*. https://www.greentechmedia.com/articles/read/hard-truths-about-city-failures-with-clean-energy

Broto, V. C. (2015). Urban Energy Landscapes and Transitions to Sustainability: Notes from Hong Konga. *Network Industries Quarterly*, *17*, 3–7.

Broto, V. C. (2017). Energy landscapes and urban trajectories towards sustainability. *Energy Policy*, *108*, 755–764. https://doi.org/10.1016/j.enpol.2017.01.009

Broto, V. C., & Bulkeley, H. (2013). A survey of urban climate change experiments in 100 cities. *Global Environmental Change*, *23*(1), 92–102. https://doi.org/10.1016/J.GLOENVCHA.2012.07.005

Bulkeley, H. (2010). Cities and the Governing of Climate Change. *Annual Review of Environment and Resources*, *35*(1), 229–253. https://doi.org/10.1146/annurev-environ-072809-101747

Bulkeley, H. (2015a). *Accomplishing Climate Governance*. Cambridge University Press. https://doi.org/10.1017/CBO9781139839204

Bulkeley, H. (2015b). Climate Problematics. In *Accomplishing Climate Governance* (pp. 1–23). Cambridge University Press. https://doi.org/10.1017/CBO9781139839204.001

Bulkeley, H. A., Broto, V. C., & Edwards, G. A. S. (2015). *An urban politics of climate change : experimentation and the governing of socio-technical transitions* (First). Routledge. https://www.routledge.com/An-Urban-Politics-of-Climate-Change-Experimentation-and-the-Governing/Bulkeley-Broto-Edwards/p/book/9781138791107

Bulkeley, H., & Betsill, M. (2005). Rethinking Sustainable Cities: Multilevel Governance and the "Urban" Politics of Climate Change. *Environmental Politics*, *14*(1), 42–63. https://doi.org/10.1080/0964401042000310178

Bulkeley, H., & Betsill, M. M. (2013). Revisiting the urban politics of climate change. *Environmental Politics*, *22*(1), 136–154. https://doi.org/10.1080/09644016.2013.755797

Bulkeley, H., & Castán Broto, V. (2013). Government by experiment? Global cities and the governing of climate change. *Transactions of the Institute of British Geographers*, *38*(3), 361–375. https://doi.org/10.1111/J.1475-5661.2012.00535.X

Bulkeley, H., & Kern, K. (2016). Local Government and the Governing of Climate Change in Germany and the UK: *Urban Studies*, *43*(12), 2237–2259. https://doi.org/10.1080/00420980600936491

Bulkeley, H., Luque-Ayala, A., & Silver, J. (2014). Housing and the (re)configuration of energy provision in Cape Town and São Paulo: making space for a progressive urban climate politics? *Political Geography*, *40*, 25–34. https://doi.org/10.1016/j.polgeo.2014.02.003

Bulkeley, H., Powells, G., & Bell, S. (2016). Smart grids and the constitution of solar electricity conduct. *Environment and Planning A*, *48*(1), 7–23. https://doi.org/10.1177/0308518X15596748

Burke, M. J., & Stephens, J. C. (2018). Political power and renewable energy futures: A critical review. *Energy Research and Social Science*, *35*, 78–93. https://doi.org/10.1016/j.erss.2017.10.018

Butsch, C., Kumar, S., Wagner, P. D., Kroll, M., Kantakumar, L. N., Bharucha, E., Schneider, K., & Kraas, F. (2017). Growing "Smart"? Urbanization processes in the Pune urban agglomeration. *Sustainability (Switzerland)*, *9*(12), 1–21. https://doi.org/10.3390/su9122335

Cairney, P. (2019). Power and Public Policy. In *Understanding Public Policy: Theories and Issues* (2nd ed.).

Carrington, D. (2014, September 30). Can Narendra Modi bring the solar power revolution to India? | Renewable energy | The Guardian. *The Guardian*. https://www.theguardian.com/environment/2014/sep/30/-sp-narendra-modi-india-

solar-renewables-energy

Castán Broto, V. (2017). Urban Governance and the Politics of Climate change. *World Development*, *93*, 1–15. https://doi.org/10.1016/j.worlddev.2016.12.031

Castán Broto, V. (2020). Climate change politics and the urban contexts of messy governmentalities. *Territory, Politics, Governance*, *8*(2), 241–258. https://doi.org/10.1080/21622671.2019.1632220

Castán Broto, V., Robin, E., & While, A. (2020). *Climate Urbanism. Towards a critical research agenda.* Palgrave Macmillan, Cham. https://doi.org/https://doi.org/10.1007/978-3-030-53386-1

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

Castán Broto, V., & Westman, L. K. (2020). Ten years after Copenhagen: Reimagining climate change governance in urban areas. *Wiley Interdisciplinary Reviews: Climate Change*, *11*(4). https://doi.org/10.1002/WCC.643

Chakraborti, S. (2015, July). West Bengal lags in solar power promotion | Kolkata News - Times of India. *The Times of India*. https://timesofindia.indiatimes.com/city/kolkata/west-bengal-lags-in-solar-power-promotion/articleshow/48138012.cms

Chandrasekaran, K. (2021, February 19). Nitin Gadkari urges power minister to reconsider restriction on solar rooftop projects - The Economic Times. *The Economic Times*. https://economictimes.indiatimes.com/industry/energy/power/nitin-gadkari-asks-r-k-singh-to-rethink-solar-rooftop-metering-restrictions/articleshow/81101765.cms?from=mdr

Chatterjee, E. (2017). *Insulated Wires: The Precarious Rise of West Bengal's Power Sector Working Paper Mapping Power Project*. http://www.cprindia.org/projects/mapping-power

Chattopadhyay, S. (2017). Neoliberal Urban Transformations in Indian Cities: Paradoxes and Predicaments. *Progress in Development Studies*, *17*, 307–321. https://doi.org/10.1177/1464993417716355

Chen, Z., Kolsepatil, N., Jha, K., Shinde, T., Chaturvedula, S., Kumar, E., Hickman, B., Mohanty, P., & Riahi, L. (2017). *Rapid assessments of five Indian cities: Pune*. http://www.districtenergyinitiative.org/sites/default/files/Pune Rapid Assessment Report Version 1.0.pdf

Cherp, A., Jewell, J., & Goldthau, A. (2011). Governing Global Energy: Systems, Transitions, Complexity. *Global Policy*, *2*(1), 75–88. https://doi.org/10.1111/j.1758-5899.2010.00059.x

Chu, E. (2016a). The political economy of urban climate adaptation and development planning in Surat, India. *Environment and Planning C: Government and Policy*, *34*(2), 281–298. https://doi.org/10.1177/0263774X15614174

Chu, E. (2016b). The Governance of Climate Change Adaptation Through Urban Policy Experiments. *Environmental Policy and Governance*, *26*(6), 439–451. https://doi.org/10.1002/eet.1727

Chu, E. K. (2018). Transnational Support for Urban Climate Adaptation: Emerging Forms of Agency and Dependency. *Global Environmental Politics*, *18*(3), 25–46. https://doi.org/10.1162/glep_a_00467

CLEAN. (2018). *State of the Decentralized Renewable Energy Sector in India*. https://www.thecleannetwork.org/pdf/State-of-DRE-Sector-in-India-2019_Web.pdf

Clegg, S. (1989). Frameworks of Power. In *Sage Publications Limited*. SAGE Publications Ltd. https://doi.org/10.4135/9781446279267

Climate Change in Cities: Innovations in Multi-Level Governance. (2018). In S. Hughes, E. K. Chu, & S. G. Mason (Eds.), *The Urban Book Series*. Springer. http://www.springer.com/series/14773

Colenbrander, S., Gouldson, A., Roy, J., Kerr, N., Sarkar, S., Hall, S., Sudmant, A., Ghatak, A., Chakravarty, D., Ganguly, D., & Mcanulla, F. (2016). Can low-carbon urban development be pro-poor? The case of Kolkata, India. *Environment & Urbanization*, *29*(1), 139–158. https://doi.org/10.1177/0956247816677775

Colenbrander, S., Gouldson, A., Roy, J., Kerr, N., Sarkar, S., Hall, S., Sudmant, A., Ghatak, A., Chakravarty, D., Ganguly, D., & Mcanulla, F. (2017). Can low-carbon urban development be pro-poor? The case of Kolkata, India. *Environment and Urbanization*, *29*(1), 139–158. https://doi.org/10.1177/0956247816677775

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

Creutzig, F., Baiocchi, G., Bierkandt, R., Pichler, P.-P., & Seto, K. C. (2015). Global typology of urban energy use and potentials for an urbanization mitigation wedge. *PNAS*, *112*(20), 6283–6288. https://doi.org/10.1073/pnas.1315545112

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

D'Souza, R. (2019). Should Clean Energy Be Politics As Usual? Reflections on India's Energy Transition. *Georgetown Journal of Asian Affairs*, *4*(2). https://repository.library.georgetown.edu/handle/10822/1053150

Dahl, R. A. (1957). The Concept of Power. *Behavioral Science*, *2*(3), 1–12.

https://doi.org/10.4324/9781315515014-2

Danermark, B., Ekstrom, M., Jakobsen, L., & Karlsson, J. C. (2005). *Explaining Society: Critical Realism in the Social Sciences* (Third). Routledge. https://profs.basu.ac.ir/spakseresht/free_space/explaining society.pdf

Das, E. (2019). *Looking Back at 25 Years: A Review of 74th Constitutional Amendment Act A National Level Roundtable A Review of 74th Constitutional Amendment Act: A National Level Roundtable Roundtable*. www.igsss.org

Datta, A. (2015). New urban utopias of postcolonial India: "Entrepreneurial urbanization" in Dholera smart city, Gujarat. *Dialogues in Human Geography*, *5*(1), 3–22. https://doi.org/10.1177/2043820614565748

Debnath, R., Simoes, G. M. F., Bardhan, R., Leder, S. M., Lamberts, R., & Sunikka-Blank, M. (2020). Energy justice in slum rehabilitation housing: An empirical exploration of built environment effects on socio-cultural energy demand. *Sustainability (Switzerland)*, *12*(7), 1–27. https://doi.org/10.3390/su12073027

Dharwadkar, J. (2018, June 20). *MSEDCL policy hurdles eclipse Pune's 'maximum solar city' dream - Hindustan Times*. https://www.hindustantimes.com/pune-news/msedcl-policy-hurdles-eclipse-pune-s-maximum-solar-city-dream/story-Ylw3FHaJLtdXfy6ZUXbZXN.html

Di Gregorio, M., Fatorelli, L., Paavola, J., Locatelli, B., Pramova, E., Nurrochmat, D. R., May, P. H., Brockhaus, M., Sari, I. M., & Kusumadewi, S. D. (2019). Multi-level governance and power in climate change policy networks. *Global Environmental Change*, *54*, 64–77. https://doi.org/10.1016/j.gloenvcha.2018.10.003

Dixit, K. (2018). Paradoxes of Distribution Reforms in Maharashtra. In N. K. Dubash, S. S. an. Kale, & R. Bharvirkar (Eds.), *Mapping Power* (pp. 176–192). Oxford University Press. https://doi.org/10.1093/oso/9780199487820.003.0009

Domhoff, G., William. (1951). Mills' s The Power Elite 50 Years Later. *Contemporary Science*, *35*(6), 547–550.

Dowling, R., Mcguirk, P. M., & Bulkeley, H. (2014). Retrofitting cities: Local governance in Sydney, Australia. *Cities*, *38*(18–24). http://ro.uow.edu.au/sspapers/2146

Dowling, R., Mcguirk, P. M., & 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 Research and Social Science*, *44*, 260–267. https://ro.uow.edu.au/sspapers/4449

Dubash, N. K. (2013). The politics of climate change in India: narratives of equity and cobenefits. *WIREs Clim Change*, *4*, 191–201. https://doi.org/10.1002/wcc.210

Dubash, N. K., & Joseph, N. B. (2016). Evolution of Institutions for Climate Policy in India. *Economic and Political Weekly*, *LI*(3), 44–54.

Dubash, N. K., Khosla, R., Kelkar, U., & Lele, S. (2018). India and Climate Change: Evolving Ideas and Increasing Policy Engagement . *Annual Review of Environment and Resources*, 395–424. https://doi.org/10.1146/annurev-environ

Dubash, N. K., & Rajan, S. C. (2001). Power Politics: Process of Power Sector Reform in India. *Economic and Political Weekly*, *36*(35), 3367–3390. http://www.jstor.org/stable/4411059

Dubash, N. K., Swain, A. K., & Bhatia, P. (2019). The Disruptive Politics of Renewable Energy. *The India Forum*. www.TheIndiaForum.in

Eckersley, P. (2017). A new framework for understanding subnational policy-making and local choice. *Policy Studies*, *38*(1), 76–90. https://doi.org/10.1080/01442872.2016.1188910

Eckersley, P. (2018). Who shapes local climate policy? Unpicking governance arrangements in English and German cities. *Environmental Politics*, *27*(1), 139–160. https://doi.org/10.1080/09644016.2017.1380963

Ekström, M., & Danermark, B. (1991). The study of power mechanisms-An interactive and generative approach to a case study of Swedish urban renewal. *Scandinavian Housing & Planning Research*, *8*(3), 153–170. https://doi.org/10.1080/02815739108730269

Energy, Power and Protest on the Urban Grid. (2016). In Andres Luque-Ayala & J. Silver (Eds.), *Energy, Power and Protest on the Urban Grid*. Routledge. https://doi.org/10.4324/9781315579597

Engberg, L. A. (2018). Climate Adaptation and Citizens' Participation in Denmark: Experiences from Copenhagen. In S. Hughes, E. K. Chu, & S. G. Mason (Eds.), *Urban Book Series* (pp. 139–161). Springer, Cham. https://doi.org/10.1007/978-3-319-65003-6_8

Evans, J., & Karvonen, A. (2011). Living laboratories for sustainability: Exploring the politics and epistemology of urban transition. In H. Bulkeley, V. C. Broto, M. Hodson, & S. Marvin (Eds.), *Cities and Low Carbon Transitions* (pp. 142–157). Routledge. https://doi.org/10.4324/9780203839249-17

Fisher, S. (2012a). Policy storylines in Indian climate politics: opening new political spaces? *Environment and Planning C: Government and Policy*, *30*, 109–127. https://journals.sagepub.com/doi/pdf/10.1068/c10186

Fisher, S. (2014). Exploring nascent climate policies in Indian cities: a role for policy mobilities? *International Journal of Urban Sustainable Development*, *6*(2), 154–173. https://doi.org/10.1080/19463138.2014.892006

Foucault, M. (1977). *Discipline and Punish: The birth of the prison*. Random House.

Foucault, M. (1982). The Subject and Power Why Study Power? The Question of the Subject. *Critical Inquiry*, *8*(4), 777–795. http://www.jstor.org/stable/1343197

Fuchs, G., & Hinderer, N. (2014). Situative governance and energy transitions in a spatial

context: case studies from Germany. *Energy, Sustainability and Society*, *4*(1), 1–11. https://doi.org/10.1186/s13705-014-0016-6

Gabillet, P. (2015). Energy supply and urban planning projects: Analysing tensions around district heating provision in a French eco-district. *Energy Policy*, *78*, 189–197. https://doi.org/10.1016/j.enpol.2014.11.006

Garnaik, S. P. (2018). *National Mission for Enhanced Energy Efficiency*.

Gaventa, J. (1981). Power and Participation. In *Power and Powerlessness: Quiescence and Rebellion in an Appalachian Valley* (pp. 768–769). Urbana: University of Illinois Press. https://doi.org/10.2307/1960999

Geels, F. W. (2010). Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy*, *39*(4), 495–510. https://doi.org/10.1016/j.respol.2010.01.022

George, A. L., & Bennett, A. (2005). Case Studies and Theory Development in the Social Sciences. In *MIT Press* (Issue 0). MIT press. https://doi.org/10.1017/s1537592707070491

Gerring, J. (2004). What is a case study and what is it good for? *American Political Science Review*, *98*(2), 341–354. https://doi.org/10.1017/S0003055404001182

Ghosh, Biswajit, & Chakma, N. (2014). Urbanisation in West Bengal: An analysis of recent processes. *Space and Culture, India*, *2*(2), 28–41. https://doi.org/10.20896/saci.v2i2.86

Ghosh, Buddhadeb. (2010). Decentralisation: A Constitutional Mandate or Rhetoric? *Economic and Political Weekly*, *xlv*(38), 83–84.

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

Goldthau, A. (2014). Rethinking the governance of energy infrastructure: Scale, decentralization and polycentrism. *Energy Research & Social Science*, *1*, 134–140. https://doi.org/10.1016/j.erss.2014.02.009

Gordon, D. J., & Johnson, C. A. (2017). The orchestration of global urban climate governance: conducting power in the post-Paris climate regime. *Environmental Politics*, *26*(4), 694–714. https://doi.org/10.1080/09644016.2017.1320829

Gouldson, A., Colenbrander, S., Sudmant, A., Papargyropoulou, E., Kerr, N., McAnulla, F., & Hall, S. (2016). Cities and climate change mitigation: Economic opportunities and governance challenges in Asia. *Cities*, *54*, 11–19. https://doi.org/10.1016/j.cities.2015.10.010

The Electricity Supply Act, (1948).

Graham, S. (2002). Splintering Urbanism : Networked Infrastructures, Technological Mobilities and the Urban Condition. *Splintering Urbanism*. https://doi.org/10.4324/9780203452202

Griffin, L. (2012). Where is Power in Governance? Why Geography Matters in the Theory of Governance. *Political Studies Review*, *10*(2), 208–220. https://doi.org/10.1111/J.1478-9302.2012.00260.X

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

Harvey, D. (2008). The Right to the City. *New Left Review*, *53*, 23–40. https://doi.org/https://doi.org/10.1111/j.0309-1317.2003.00492.x

Haugaard, M. (2010). Power: A "family resemblance" concept. *European Journal of Cultural Studies*, *13*(4), 419–438. https://doi.org/10.1177/1367549410377152

Haugaard, M. (2012a). Rethinking the Four Dimensions of Power : Domination and Empowerment. *Journal of Political Power*, *5*(1), 33–54. https://doi.org/10.1080/2158379X.2012.660810

Haugaard, M. (2012b). Editorial: reflections upon *power over, power to, power with* , and the four dimensions of power. *Journal of Political Power*, *5*(3), 353–358. https://doi.org/10.1080/2158379X.2012.735113

Haugaard, M., & Clegg, S. . (2009). Introduction: Why power is the central concept of the social sciences. In *The Sage Handbook on Power* (Vol. 1, pp. 1–24). Sage Publications. https://opus.lib.uts.edu.au/handle/10453/11724

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

Hearn, J. (2014). On the social evolution of power to/over. *Journal of Political Power*, *7*(2), 175–191. https://doi.org/10.1080/2158379X.2014.927963

Hess, D. J. (2011). Electricity transformed: Neoliberalism and local energy in the United States. *Antipode*, *43*(4), 1056–1077. https://doi.org/10.1111/j.1467-8330.2010.00842.x

Hindess, B. (1996). *Discourses of power : from Hobbes to Foucault*. Blackwell Publishers.

Hodson, M., & Marvin, S. (2010). Can cities shape socio-technical transitions and how would we know if they were? *Research Policy*, *39*, 477–485. https://doi.org/10.1016/j.respol.2010.01.020

Hooghe, L., & Marks, G. (2001). Types of multi-level governance. *Handbook on Multi-Level Governance*, *5*, 17–31. https://doi.org/10.4337/9781849809047.00007

IEA. (2021a). *Empowering Cities for a Net Zero Future: Unlocking resilient, smart, sustainable urban energy systems*. https://iea.blob.core.windows.net/assets/4d5c939d-9c37-490b-bb53-2c0d23f2cf3d/G20EmpoweringCitiesforaNetZeroFuture.pdf

IEA. (2021b). *India Energy Outlook 2021 World Energy Outlook Special Report*. www.iea.org/t&c/

IIEC. (2009). *Eco-housing Assessment Criteria*.

IPCC. (2021). *Assessment Report 6 Climate Change 2021: The Physical Science Basis*. https://www.ipcc.ch/report/ar6/wg1/

IRENA. (2020). *Rise of renewables in cities : Energy solutions for the urban future*. www.irena.org/publicationsrena.org/publications

IRENA. (2021). World Energy Transitions Outlook: 1.5°C Pathway. In *International Renewable Energy Agency*. https://irena.org/publications/2021/March/World-Energy-Transitions-Outlook

Jagers, S. C., & Stripple, J. (2003). Climate Governance Beyond the State. *Global Governance*, *9*(3), 385–399. https://about.jstor.org/terms

Jaglin, S. (2014). Urban Energy Policies and the Governance of Multilevel Issues in Cape Town. *Urban Studies*, *51*(7), 1394–1414. https://doi.org/10.1177/0042098013500091

Jai, S. (2021, June 19). Policy flip flops, discoms hinder progress in solar rooftop projects | Business Standard News. *Business Standard*. https://www.business-standard.com/article/economy-policy/policy-flip-flops-discoms-hinder-progress-in-solar-rooftop-projects-121061900036_1.html

Jasper, R., Deger, S., & Kieffer, G. (2016). *Renewable Energy in Cities*. http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_Energy_in_Cities_2016.pdf

Johansen, P. H., & Chandler, T. L. (2015). Mechanisms of power in participatory rural planning. *Journal of Rural Studies*, *40*, 12–20. https://doi.org/10.1016/j.jrurstud.2015.05.006

Johnstone, P., & Newell, P. (2018a). Sustainability transitions and the state. *Environmental Innovation and Societal Transitions*, *27*(October), 72–82. https://doi.org/10.1016/j.eist.2017.10.006

Jörgensen, K., & Wagner, C. (2017). Low Carbon Governance in Multi-level Structures: EU-India relations on energy and climate. *Environmental Policy and Governance*, *27*, 137–148. https://doi.org/10.1002/eet.1749

Judge, I., Mohanty, A. P. K., Mathur, O., Roy, D., Khare, A., & Mangla, S. (2019). *State of Municipal Finances in India*.

Kale, S. S. (2012). *Electrifying India : regional political economies of development*. Stanford University Press.

Kale, S. S. . (2004). Current Reforms: The Politics of Policy Change in India's Electricity Sector. *Pacific Affairs, University of British Columbia*, *77*(3), 467–491. https://www.jstor.org/stable/40022911

Kale, S. S., Dubash, N. K., & Bharvirkar, R. (2019). Mapping Power: The Political Economy of Electricity in India's States Introduction A Framework for Mapping Power. In N. K.

Dubash, S. S. Kale, & R. Bharvirkar (Eds.), *Mapping Power: The Political Economy of Electricity in India's States*. Oxford University Press. https://doi.org/10.1093/oso/9780199487820.001.0001

Kamath, L., Burte, H., Madhale, A., & King, R. (2014). *Pune: Civil Society Coalitions, Policy Contradictions, and Unsteady Transformation*. www.citiesforall.org.

Kamath, N. (2020, December 5). *Maharashtra unveils uniform developmental rules in the state to boost real estate activity | Mumbai news - Hindustan Times*. Hindustan Times. https://www.hindustantimes.com/mumbai-news/maharashtra-unveils-uniform-developmental-rules-in-the-state-to-boost-real-estate-activity/story-JPGRuOJXIi517ZttHpHxAJ.html

Kanitkar, T. (2020, July). Power play. *Frontline*. https://doi.org/10.2/JQUERY.MIN.JS

Kaul, M., Sahasrabudhe, A., Kulkarni, S., & Chunekar, A. (2020). *Energy Consumption Patterns in Indian Households*. https://www.prayaspune.org/peg/publications/item/download/1061_44ebf197f34caa1507bbdf03f051dfdc.html

Kennedy, L., & Zérah, M. H. (2008). The shift to city-centric growth strategies: Perspectives from Hyderabad and Mumbai. *Economic and Political Weekly*, *43*(39), 110–117.

Khan, S., Taraporevala, P., & Zérah, M.-H. (2018). Mission Impossible Defining Indian Smart Cities. *Economic and Political Weekly*, *lIil*(49), 80–88.

Khosla, R. (2018). Chapter 29 : Building Cities. In T. ELMQVIST, X. BAI, N. FRANTZESKAKI, C. GRIFFITH, D. MADDOX, T. MCPHEARSON, S. PARNELL, P. ROMERO-LANKAO, D. SIMON, & M. WATKINS (Eds.), *Urban Planet: Knowledge towards Sustainable Cities* (pp. 388–390). Cambridge University Press.

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

Khosla, R., & Bhardwaj, A. (2018). Urbanization in the time of climate change: Examining the response of Indian cities. *WIREs Clim Change*, *10*(1). https://doi.org/10.1002/wcc.560

Khosla, R., & Bhardwaj, A. (2019). Urban India and Climate Change. In N. K. Dubash (Ed.), *India in a Warming World: Integrating Climate Change and Development* (pp. 459–470). Oxford University Press. https://doi.org/10.1093/oso/9780199498734.001.0001

Khosla, R., & Dubash, N. K. (2020). Rethinking India ' s Energy Policy: Development Challenge around Multiple Objectives. *Economic and Political Weekly*, *lV nos*(32 & 33).

Klauser, F., & Söderström, O. (2014). Michel Foucault and the smart city: power dynamics inherent in contemporary governing through code. *Society and Space*, *32*, 869–885. https://doi.org/10.1068/d13041p

Knox-Hayes, J., & Hayes, J. (2014). Technocratic norms, political culture and climate change governance. *Geografiska Annaler, Series B: Human Geography*, *96*(3), 261–276. https://doi.org/10.1111/geob.12050

Knuth, S. E. (2010). Addressing place in climate change mitigation: Reducing emissions in a suburban landscape. *Applied Geography*, *30*(4), 518–531. https://doi.org/10.1016/j.apgeog.2010.01.001

Koepke, M., Monstadt, J., Pilo', F., & Otsuki, K. (2021). Rethinking energy transitions in Southern cities: Urban and infrastructural heterogeneity in Dar es Salaam. *Energy Research and Social Science*, *74*, 2214–6296. https://doi.org/10.1016/j.erss.2021.101937

Kokx, A., & Van Kempen, R. (2010). Dutch urban governance: Multi-level or multi-scalar? *European Urban and Regional Studies*, *17*(4), 355–369. https://doi.org/10.1177/0969776409350691

Kuindersma, W., Arts, B., & Van Der Zouwen, M. W. (2012). Power faces in regional governance. *Journal of Political Power*, *5*(3), 411–429. https://doi.org/10.1080/2158379X.2012.735116

Kumar Ghosh, A. (2020). *The Paradox of "Centralised Federalism": An Analysis of the Challenges to India's Federal Design* (No. 272; ORF Occasional Paper).

Kumar, P., & Naik, A. (2019). India 's Domestic Climate Policy is Fragmented and India 's Nationally Determined Contributions and the Progress So Far. *Economic & Political Weekly*, *54*(7). https://www.epw.in/node/153770/pdf

Kuzemko, C. (2019). Re-scaling IPE: local government, sustainable energy and change. *Review of International Political Economy*, *26*(1), 80–103. https://doi.org/10.1080/09692290.2018.1527239

Kuzemko, C., & Britton, J. (2020). Policy, politics and materiality across scales: A framework for understanding local government sustainable energy capacity applied in England. *Energy Research and Social Science*, *62*. https://doi.org/10.1016/j.erss.2019.101367

Kuzemko, C., Lockwood, M., Mitchell, C., & Hoggett, R. (2016). Governing for sustainable energy system change: Politics, contexts and contingency. *Energy Research and Social Science*, *12*, 96–105. https://doi.org/10.1016/j.erss.2015.12.022

Lal, P. V. (2019, March 13). Phase II of Rooftop Solar Scheme approved – pv magazine India. *PV Magazine*. https://www.pv-magazine-india.com/2019/03/13/phase-ii-of-rooftop-solar-scheme-approved/

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

Lawhon, M., Nilsson, D., Silver, J., Ernstson, H., & Lwasa, S. (2018). Thinking through heterogeneous infrastructure configurations. *Critical Commentary Urban Studies*, *55*(4),

720–732. https://doi.org/10.1177/0042098017720149

Lee, T., & Koski, C. (2015). Multilevel governance and urban climate change mitigation. *Environment and Planning C: Government and Policy*, *33*, 1501–1517. https://doi.org/10.1177/0263774X15614700

Lockwood, M., Kuzemko, C., Mitchell, C., & Hoggett, R. (2017). Historical institutionalism and the politics of sustainable energy transitions: A research agenda. *Politics and Space*, *35*(2), 312–333. https://doi.org/10.1177/0263774X16660561

Lockwood, M., Mitchell, C., Hoggett, R., & Kuzemko, C. (2017). The governance of industry rules and energy system innovation: The case of codes in Great Britain. *Utilities Policy*, *47*, 41–49. https://doi.org/10.1016/J.JUP.2017.06.008

Löfgren, H. (2016). The Communist Party of India (Marxist) and the Left Government in West Bengal, 1977–2011: Strains of Governance and Socialist Imagination. *Studies in Indian Politics*, *4*(1), 102–115. https://doi.org/10.1177/2321023016634947

Lukes, S. (2005). *POWER: A RADICAL VIEW, SECOND EDITION* (2nd ed.). Palgrave Macmillan.

Luque-Ayala, Andres. (2014). *Reconfiguring the city in the global South : rationalities, techniques and subjectivities in the local governance of energy*. http://etheses.dur.ac.uk/10606/

Luque-Ayala, Andrés, Bulkeley, H., & Marvin, S. (2018). Rethinking urban transitions: an analytical framework. In Andrés Luque-Ayala, S. Marvin, & H. Bulkeley (Eds.), *Rethinking urban transitions: Politics in the low carbon city* (pp. 1–275). Routledge. https://doi.org/10.4324/9781315164779-2

Luque-Ayala, Andrés, & Silver, J. (2018). Introduction. In Andres Luque-Ayala & J. Silver (Eds.), *Energy, Power and Protest on the Urban Grid* (pp. 1–17). Routledge. https://doi.org/10.4324/9781315579597-1

Maharashtra Pollution Control Board. (2009). *Evaluation of Environmental Status Reports of Cities in Maharashtra* (Issue June). https://mpcb.gov.in/sites/default/files/focus-area-reports-documents/Evaluation_of_ESRs.pdf

Maithel, S., Modi, S., Ameen, M., Bhanware, P., & Rai, R. (2011). *MARKET ASSESSMENT OF SOLAR WATER HEATING SYSTEMS IN FIVE POTENTIAL STATES/NCR REGION*. www.greentechsolution.co.in

Mann, M. (1986). *The Sources of Social Power* (Vol. 1). Cambridge University Press. https://doi.org/10.1017/CBO9780511570896

Marquardt, J. (2016). How Power Shapes Energy Transitions in Southeast Asia. In *How Power Shapes Energy Transitions in Southeast Asia*. Routledge. https://doi.org/10.4324/9781315559261

Marquardt, J. (2017a). Conceptualizing power in multi-level climate governance. *Journal of*

Cleaner Production, *154*, 167–175. https://doi.org/10.1016/j.jclepro.2017.03.176

Mascarenhas, K., Basu, R., & Amir Bazaz, &. (2016). *Affordable and Clean Energy: An Indian Perspective Sustainable Development Goal 7: Affordable and Clean Energy*. http://iihs.co.in/knowledge-gateway/wp-content/uploads/2017/10/Affordable-and-Clean-Energy-An-Indian-Perspective.pdf

McEwan, C. (2017a). Spatial processes and politics of renewable energy transition: Land, zones and frictions in South Africa. *Political Geography*, *56*, 1–12. https://doi.org/10.1016/j.polgeo.2016.10.001

McGuirk, P., Dowling, R., & Bulkeley, H. (2014). Repositioning urban governments? Energy efficiency and Australia's changing climate and energy governance regimes. *Urban Studies Journal Limited*, *51*(13), 2717–2734. https://doi.org/10.1177/0042098014533732

Miao, B., & Li, Y. wai V. (2017). Local Climate Governance under the Shadow of Hierarchy: Evidence from China's Yangtze River Delta. *Urban Policy and Research*, *35*(3), 298–311. https://doi.org/10.1080/08111146.2017.1289912

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

Ministry of Finance. (2018). *Economic survey 2017-18*. https://mofapp.nic.in/economicsurvey/economicsurvey/index.html

MNRE. (2015). *Solar / Green Cities*. Ministry of New and Renewable Energy , Government of India. http://164.100.94.214/solar-cities

MNRE, & Government of India. (2021, August 12). *India achieves 100 GW Milestone of Installed Renewable Energy*. Press Information Bureau. https://pib.gov.in/PressReleasePage.aspx?PRID=1745254

Mohan, A., & Topp, K. (2018). India's energy future: Contested narratives of change. *Energy Research and Social Science*, *44*, 75–82. https://doi.org/10.1016/j.erss.2018.04.040

Mohanty, P. K. (2016). *Financing Cities in India* . Sage Publishing India. https://uk.sagepub.com/en-gb/eur/financing-cities-in-india/book251614

MoHUA. (2018). *National Urban Policy Framework 2018 | Smartnet*. https://smartnet.niua.org/nupf

MoHUA. (2021). *Smart Cities Mission*. Government of India. https://smartcities.gov.in/about-the-mission

Montrone, L., Ohlendorf, N., & Chandra, R. (2021). The political economy of coal in India – Evidence from expert interviews. *Energy for Sustainable Development*, *61*, 230–240. https://doi.org/10.1016/j.esd.2021.02.003

Moon, S. (2019). Power in global governance: an expanded typology from global health. *Globalization and Health*, *15*(1), 1–9. https://doi.org/10.1186/S12992-019-0515-5/TABLES/2

Morriss, P. (2002b). Power: A Philosophical Analysis, 2nd edition. *Contemporary Political Theory*, *2*, 355–357. https://doi.org/10.1057/palgrave.cpt.9300080

Moss, T. (2014). Socio-technical Change and the Politics of Urban Infrastructure: Managing Energy in Berlin between Dictatorship and Democracy. *Urban Studies*, *51*(7), 1432–1448. https://doi.org/10.1177/0042098013500086

Moss, T., Becker, S., & Gailing, L. (2016). Energy Transitions and Materiality: Between Dispositives, Assemblages and Metabolisms. In L. Gailing & T. Moss (Eds.), *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space*. Palgrave Macmillan. https://doi.org/10.1057/978-1-137-50593-4

MoUD, G. (2015). *Smart Cities Mission Statement & Guidelines Government of India Ministry of Urban Development*.

Mukherjee, S. C. (2017). Steps of Power: Notes on the history of electrification in India. *Proceedings of the Indian History Congress*, *78*, 498–506.

Mukhopadhyay, A. (2020). Governing Urban West Bengal: The Left Front Experiment. In Chatterji Rakhahari & Basu Partha Pratim (Eds.), *West Bengal under the Left 1977-2011* (1st ed., pp. 91–112). Routledge. https://doi.org/10.4324/9780429328442-5

Nederhand, J., Bekkers, V., & Voorberg, W. (2016). Self-Organization and the Role of Government: How and why does self-organization evolve in the shadow of hierarchy? *Public Management Review*, *18*(7), 1063–1084. https://doi.org/10.1080/14719037.2015.1066417

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

PACE-D. (2018a). *Guidelines on Solar Rooftop Adoption by Urban Local Bodies*.

PACE-D. (2018b). *Issue Paper on Solar Rooftop Adoption by Urban Local Bodies*.

Parthasarathy, S. (2020, April 9). Needed, greater decentralisation of power - The Hindu. *The Hindu*. https://www.thehindu.com/opinion/lead/needed-greater-decentralisation-of-power/article31293086.ece

Pasquini, L., & Shearing, C. (2014). Municipalities, Politics, and Climate Change: An Example of the Process of Institutionalizing an Environmental Agenda Within Local Government. *Journal of Environment & Development*, *23*(2), 271–296. https://doi.org/10.1177/1070496514525406

Patterson, J. J., & Van Der Grijp, N. (2020). Empowerment and Disempowerment of Urban Climate Governance Initiatives An Exploratory Typology of Mechanisms. In J. van der

Heijden, H. Bulkeley, & C. Certomà (Eds.), *Urban Climate Politics*. https://doi.org/10.1017/9781108632157.003

Petrie, S., Poddar, H., & Dutta, R. (2017). *Roadmap for Low Carbon Climate Resilient Kolkata*.

Pillai, A. V., & Dubash, N. (2021a). Compensatory climate governance in Indian federalism. https://www.cprindia.org/system/tdf/policy-briefs/Pillai and Dubash 2021_Compensatory climate governance in *Indian federalism*.pdf?file=1&type=node&id=9626&force=1

Pillai, A. V., & Dubash, N. K. (2021b). The limits of opportunism: the uneven emergence of climate institutions in India. *Environmental Politics*. https://doi.org/10.1080/09644016.2021.1933800

Prasad, N. (2019, December 31). *Torrent Power to Pay Revised Tariff for 750 kW of Rooftop Solar to Surat's Municipal Body - Mercom India*. https://mercomindia.com/torrent-power-revised-tariff-rooftop-solar/

Puppim de Oliveira, J. A., & Doll, C. N. H. (2016). Governance and networks for health co-benefits of climate change mitigation: Lessons from two Indian cities. *Environment International*, *97*, 146–154. https://doi.org/10.1016/j.envint.2016.08.020

Rahiman, R., Yenneti, K., & Panda, A. (2019). *MAKING INDIAN CITIES ENERGY SMART, TERI-UNSW Policy Brief*.

Ramachandra, T. V., Aithal, B. H., & Sreejith, K. (2015). GHG footprint of major cities in India. *Renewable and Sustainable Energy Reviews*, *44*, 473–495. https://doi.org/10.1016/j.rser.2014.12.036

Ramamurthy, A., & Devadas, M. D. (2013). Smart Sustainable Cities : An Integrated Planning Approach towards Sustainable Urban Energy. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, *7*(1), 252–272.

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

Ray, I., & Tewari, M. (2018). *Meeting the Challenges of Climate-Proofing a Water System: How Surat Learned and Adapted*. https://icrier.org/pdf/Meeting_the_Challenges_of_Climate_Proofing_Water_System.pdf

REN21. (2019). *Renewables in Cities - 2019 Global status report*. https://www.ren21.net/wp-content/uploads/2019/05/REC-2019-GSR_Full_Report_web.pdf

REN21. (2021). *Renewable in Cities 2021 Global Status Report*. https://www.ren21.net/wp-content/uploads/2019/05/REC_2021_full-report_en.pdf

Rhodes, R. A. W. (1986). *Control and power in central-local government relations* (1st ed.).

Gower. https://eprints.soton.ac.uk/336572/

Roy, B., & Schaffartzik, A. (2021). Talk renewables, walk coal: The paradox of India's energy transition. *Ecological Economics*, *180*. https://doi.org/10.1016/j.ecolecon.2020.106871

Rumbach, A. (2016). Decentralization and small cities: Towards more effective urban disaster governance? *Habitat International*, *52*, 35–42. https://doi.org/10.1016/J.HABITATINT.2015.08.026

Rutherford, J. (2018). Seeking effective infrastructures of decarbonization in Paris. In Andrés Luque-Ayala, S. Marvin, & H. Bulkeley (Eds.), *Rethinking Urban Transitions* (pp. 38–54). Routledge. https://doi.org/10.4324/9781315164779-3

Rutherford, J., & Coutard, O. (2014). Urban Energy Transitions: Places, Processes and Politics of Socio-technical Change. *Urban Studies*, *51*(7), 1353–1377. https://doi.org/10.1177/0042098013500090

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

Samanta, G. (2020). Decentralized Governance Versus State Dependence: Financial Challenges and Participatory Development in Small Cities of West Bengal. In R. R. Thakur, A. K. Dutt, S. K. Thakur, & G. M. Pomeroy (Eds.), *Urban and Regional Planning and Development: 20th Century Forms and 21st Century Transformations* (1st ed., pp. 321–336). Springer, Cham.

Sami, N. (2017). Multi-Level Climate Change Planning. In S. Moloney, H. Fünfgeld, & Mikael Granberg (Eds.), *Local Action on Climate Change - Opportunities and Constraints* (pp. 92–110). Routledge. https://doi.org/https://doi.org/10.4324/9781315174815

Sankhe, S., Vittal, I., Mohan, A., Gulati, A., Ablett, J., Gupta, S., Kim, A., Paul, S., Sanghvi, A., & Sethy, G. (2010). *McKinsey Global Institute India's urban awakening: Building inclusive cities, sustaining economic growth*.

Sareen, S., & Kale, S. S. (2018). Solar 'power': Socio-political dynamics of infrastructural development in two Western Indian states. *Energy Research and Social Science*, *41*, 270–278. https://doi.org/10.1016/j.erss.2018.03.023

Sareen, S., & Rommetveit, K. (2019). Smart gridlock? Challenging hegemonic framings of mitigation solutions and scalability. *Environmental Research Letters*, *14*(7), 075004. https://doi.org/10.1088/1748-9326/ab21e6

Sareen Siddharth. (2020). Reframing Energy Transitions as Resolving Accountability Crises. In S. Sareen (Ed.), *Enabling Sustainable Energy Transitions Practices of legitimation and accountable governance* (pp. 3–11). https://doi.org/10.1007%2F978-3-030-26891-6

Sawant, S. (2009, October). Cities in state to emulate PMC's eco-housing programme | Pune News - Times of India. *Time of India*.

https://timesofindia.indiatimes.com/city/pune/cities-in-state-to-emulate-pmcs-eco-housing-programme/articleshow/5113599.cms

Schreurs, M. A. (2008). From the Bottom Up: Local and Subnational Climate Change Politics. *The Journal of Environment & Development*, *17*(4), 343–355. https://doi.org/10.1177/1070496508326432

Scroll. (2020, February 20). *Mamata Banerjee writes to PM Modi, says Centre owes West Bengal 50,000 crore*. https://scroll.in/latest/953802/centre-reducing-funds-for-west-bengal-owes-rs-50000-crore-mamata-banerjee-writes-to-modi

Sehested, K. (2009). Urban Planners as Network Managers and Metagovernors. *Planning Theory & Practice*, *10*(2), 245–263. https://doi.org/10.1080/14649350902884516

Sellers, J. M. (2002). THE NATION-STATE AND URBAN GOVERNANCE Toward Multilevel Analysis. *Urban Affairs Review*, *37*(5), 611–641. https://doi.org/https://doi.org/10.1177/107808740203700501

Sengupta, D. (2019, August). EESL to install 1.56 lakh smart LED streetlight in West Bengal. *The Economic Times*. https://economictimes.indiatimes.com/news/politics-and-nation/eesl-to-install-1-56-lakh-smart-led-streetlight-in-west-bengal/articleshow/70791795.cms?from=mdr

Sethi, M. (2018). Co-benefits of energy sector. In *Exploring Urban Change in South Asia Mainstreaming Climate Co- Benefits in Indian Cities* (pp. 123–144).

Sethi, M., Lamb, W., Minx, J., & Creutzig, F. (2020). Climate change mitigation in cities: A systematic scoping of case studies. *Environmental Research Letters*, *15*(9), 093008. https://doi.org/10.1088/1748-9326/ab99ff

Shah, G. (1997). Bureaucracy and Urban Improvement: Can It Made to Last? Post-Plague Scenario in Surat. *Economic and Political Weekly*, *32*(12), 607–613.

Shah, G. (2013). Politics of Governance: A Study of Gujarat. *Studies in Indian Politics*, *66*(1(1)), 65–77. https://doi.org/10.1177/2321023013482788

Shidore, S., & Busby, J. W. (2019a). What explains India's embrace of solar? State-led energy transition in a developmental polity. *Energy Policy*, *129*(June 2018), 1179–1189. https://doi.org/10.1016/j.enpol.2019.02.032

Sil, R., & Katzenstein, P. J. (2010). Analytic eclecticism in the study of world politics: Reconfiguring problems and mechanisms across research traditions. *Perspectives on Politics*, *8*(2), 411–431. https://doi.org/10.1017/S1537592710001179

Sivaramakrishnan, K. C. (2007). *Democracy in urban India* . Urban Age, LSE. https://urbanage.lsecities.net/essays/democracy-in-urban-india

Sivaramakrishnan, K. C. (2013). *Revisiting the 74th Constitutional Amendment for Better Metropolitan Governance*. *48*(13). https://www.epw.in/author/k-c-sivaramakrishnan

Sivaramakrishnan, K., & Joshi, B. (2015). Who rules the city? | The Indian Express. *Indian Express*. https://indianexpress.com/article/opinion/columns/who-rules-the-city/

Smith, M. (2009). *Power and the state*. Palgrave Macmillan.

Smitha, K. C. (2016). Entrepreneurial urbanism in India: The politics of spatial restructuring and local contestation. In *Entrepreneurial Urbanism in India: The Politics of Spatial Restructuring and Local Contestation*. Springer Singapore. https://doi.org/10.1007/978-981-10-2236-4

Sovacool, B. K. (2016). How long will it take? Conceptualizing the temporal dynamics of energy transitions. *Energy Research and Social Science*, *13*, 202–215. https://doi.org/10.1016/j.erss.2015.12.020

Sovacool, B. K., & Brisbois, M. C. (2019). Elite power in low-carbon transitions: A critical and interdisciplinary review. *Energy Research and Social Science*, *57*(101242), 1–10. https://doi.org/10.1016/j.erss.2019.101242

Sovacool, B. K., Hess, D. J., Amir, S., Geels, F. W., Hirsh, R., Rodriguez Medina, L., Miller, C., Alvial Palavicino, C., Phadke, R., Ryghaug, M., Schot, J., Silvast, A., Stephens, J., Stirling, A., Turnheim, B., van der Vleuten, E., van Lente, H., & Yearley, S. (2020). Sociotechnical agendas: Reviewing future directions for energy and climate research. *Energy Research & Social Science*, *70*(101617). https://doi.org/10.1016/J.ERSS.2020.101617

Srivastava, S. (2018). Post-National Urbanism. In *India's Contemporary Urban Conundrum* (pp. 210–221). Taylor & Francis Group.

Stehle, F., Höhne, C., Hickmann, T., & Lederer, M. (2020). The Effects of Transnational Municipal Networks on Urban Climate Politics in the Global South. In J. van der Heijden, H. Bulkeley, & C. Certomà (Eds.), *Urban Climate Politics* (pp. 210–230). Cambridge University Press. https://doi.org/10.1017/9781108632157.012

Stein, M., & Turkewitsch, L. (2009). *Similarities and Differences in Patterns of Intergovernmental Relations in Parliamentary and Presidential Federations: A Comparative Analysis*. http://paperroom.ipsa.org/papers/paper_489.pdf

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

Stirling, A. (2014). Transforming power: Social science and the politics of energy choices. *Energy Research & Social Science*, *1*, 83–95. https://doi.org/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 Research & Social Science*, *58*, 101239. https://doi.org/10.1016/J.ERSS.2019.101239

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

Sudhira, H. (2019). Engineering modernity: Water, electricity and the infrastructure landscapes of Bangalore, India HS Sudhira. *Urban Studies*, *56*(11), 2261–2279. https://doi.org/10.1177/0042098018815600

Sundqvist, T., & Soederholm, P. (2002). *Valuing the Environmental Impacts of Electricity Generation: A Critical Survey*.

The Climate Group. (2015). *KOLKATA LED TRIAL: FINAL REPORT* .

The Hindu. (2014, February 26). India's largest solar plant in MP, Modi calls it 'saffron revolution' - The Hindu. *The Hindu*. https://www.thehindu.com/news/national/indias-largest-solar-plant-in-mp-modi-calls-it-saffron-revolution/article5729436.ece

Times of India. (2014, July). *Without solar panel, no nod to big building plan | Kolkata News - Times of India*. https://timesofindia.indiatimes.com/city/kolkata/without-solar-panel-no-nod-to-big-building-plan/articleshow/38282111.cms

Times of India. (2015, April). *Boost to rooftop solar power | Kolkata News - Times of India*. https://timesofindia.indiatimes.com/city/kolkata/Boost-to-rooftop-solar-power/articleshow/46790753.cms

TNN. (2009, July 31). ESR could be improved: Zagade | Pune News - Times of India. *The Times of India*. https://timesofindia.indiatimes.com/city/pune/esr-could-be-improved-zagade/articleshow/4839451.cms

UN (SDG). (2016, November 10). *Cities striving to play key role in implementing Paris Agreement - United Nations Sustainable Development*. Goal 11: Sustainable Cities, Goal 13: Climate Action, News. https://www.un.org/sustainabledevelopment/blog/2016/11/cities-striving-to-play-key-role-in-implementing-paris-agreement/

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

Unruh, G. C. (2000). Understanding carbon lock-in. *Energy Policy*, *28*(12), 817–830. https://doi.org/10.1016/S0301-4215(00)00070-7

Upadhyay, A. (2014). *Discontinuation of subsidy forcing many solar water heater makers to shut down operations - The Economic Times*. Economic Times. https://economictimes.indiatimes.com/industry/cons-products/durables/discontinuation-of-subsidy-forcing-many-solar-water-heater-makers-to-shut-down-operations/articleshow/44989316.cms?from=mdr

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 System Governance*, *1*, 100005. https://doi.org/10.1016/j.esg.2019.100005

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

System Governance, *1*, 100005. https://doi.org/10.1016/j.esg.2019.100005

Vasudevan, R., Cherail, K., Bhatia, C. R., & Jayaram, N. (2011). *Energy Efficiency in India History and Overview*. www.aeee.in

Verbong, G., & Geels, F. (2007). The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the Dutch electricity system (1960-2004). *Energy Policy*, *35*(2), 1025–1037. https://doi.org/10.1016/j.enpol.2006.02.010

Voß, J.-P., Newig, J., Kastens, B., Monstadt, J., & Nölting, B. (2010). Journal of Environmental Policy & Planning Steering for Sustainable Development: a Typology of Problems and Strategies with respect to Ambivalence, Uncertainty and Distributed Power. *Journal of Environmental Policy & Planning, 9*(3–4), 193–212. https://doi.org/10.1080/15239080701622881

Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*, *123*, 45–54. https://doi.org/10.1016/J.JCLEPRO.2015.08.053

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

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

Westman, L. K., Castán Broto, V., & Huang, P. (2019). Revisiting multi-level governance theory: Politics and innovation in the urban climate transition in Rizhao, China. *Political Geography*, *70*(July 2018), 14–23. https://doi.org/10.1016/j.polgeo.2019.01.002

While, A. (2020). Climate Urbanism. In *Climate Urbanism*. https://doi.org/10.1007/978-3-030-53386-1

Wolf, S. (2020). Accountability and the Regulation of Legitimacy: Biodiversity Conservation and Energy Extraction in the American West. *Enabling Sustainable Energy Transitions: Practices of Legitimation and Accountable Governance*, 89–102. https://doi.org/10.1007/978-3-030-26891-6_8

Wüstenhagen, R., Wolsink, M., & Bürer, M. J. (2007). Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy*, *35*(5), 2683–2691. https://doi.org/10.1016/J.ENPOL.2006.12.001

WWF. (2020). Cities and climate change: The Indian Context. In *World Wildlife Fund*. https://doi.org/10.4324/9780203077207

Yin, R. K. (2017). *Case Study Research and Applications: Design and Methods*. SAGE Publications.

Appendix 1

List of Interviews

Level	Interviewee affiliation	Interviewee type	Code	
National (N)	Ministry officials (M)	MNRE	NM01(1)	21/08/2019
		MoHuA	NM02(2)	24/08/2019
		MoP	NM03(3)	13/08/2019
	Non-state: Experts/ex-officials (E)			
		Energy expert	NE01(4)	15/08/2019
		Energy expert	NE02(5)	17/08/2019
		Urban climate expert	NE03(6)	12/08/2019
		Urban climate expert	NE04(7)	12/08/2019
		Urban climate expert	NE05(8)	12/08/2019
		Urban climate expert	NE06(9)	27/09/2019
		Urban climate expert	NE07(10)	15/01/2020
State: Maharashtra (M)				
	Department official (D)	Energy related	MD01(11)	02/09/2019
		Energy related	MD02(12)	26/08/2019
		Energy related	MD03(13)	26/08/2019
		Energy related	MD04(14)	26/08/2019
City: Pune (P)	Local Government (LG)			
		Elected official	PLG01(15)	27/08/2019
		Elected official	PLG02(16)	27/08/2019
		Appointed official	PLG03(17)	28/08/2019
		Appointed official	PLG04(18)	28/08/2019
		Appointed official	PLG05(19)	28/08/2019
		Appointed official	PLG06 (20)	30/08/2019
		Appointed official	PLG07 (21)	30/08/2019
		Appointed official	PLG08 (22)	31/08/2019

		Utility provider	PLG09 (23)	02/09/2019
	Non-state: Experts/inte rnational agencies/ civil society activists (E)			
		Energy/ sustainability related	PE01(24)	02/09/2019
		Sustainability related	PE02(25)	03/09/2019
		International city networks	PE03(26)	03/09/2019
		Urban sustainability related	PE04(27)	03/10/2019
		Urban sustainability related	PE05(28)	04/10/2019
		Urban sustainability related	PE06(29)	10/10/2019
		Urban sustainability related	PE07(30)	15/10/2019
		Urban sustainability related	PE08(31)	14/10/2019
State: West Bengal (WeB)				
	Department official (D)			
		Energy related	WBD01(32)	16/09/2019
		Energy related	WBD02(33)	17/09/2019
		Energy related	WBD03(34)	20/09/2019
		Urban related	WBD04(35)	20/09/2019
		Urban related	WBD05(36)	20/09/2019
		Urban related	WBD06(37)	12/09/2019
		Urban related	WBD07(38)	12/09/2019
		Urban related	WBD08(39)	11/09/2019
City: Kolkata (K)				
	Local government (LG)			
		Elected official	KLG01(40)	25/10/2019
		Elected official	KLG02(42)	22/10/2019

		Elected official	KLG03(43)	22/10/2019
		Appointed official	KLG04(44)	25/10/2019
		Appointed official	KLG05(45)	25/10/2019
		Appointed official	KLG06(46)	23/10/2019
		Appointed official	KLG07(47)	23/10/2019
		Utility provider	KLG08(48)	23/10/2019
	Non-state: Experts/inte rnational agencies (E)			
		International donor body	WBE01(49)	24/10/2019
		Expert	WBE02(50)	24/10/2019
		Expert	WBE03(51)	26/10/2019
		Ex-official/ Minister	WBE04(52)	24/10/2019
State: Gujarat				
	Department official (D)			
		Urban related	GD01(53)	18/09/2019
		Energy related	GD02(54)	19/09/2019
		Energy related	GD03 (55)	19/09/2019
		Urban related	GD04(56)	18/09/2019
		Energy related	GD05(57)	20/09/2019
		Climate change related	GD06(58)	18/09/2019
City: Surat (S)				
	Local government (LG)			
		Elected official	SLG01(59)	16/10/2019
		Elected official	SLG02(60)	16/10/2019
		Appointed official	SLG03(61)	15/10/2019
		Appointed official	SLG04(62)	15/10/2019
		Appointed official	SLG05(63)	15/10/2019
		Appointed official	SLG06(64)	15/10/2019
		Appointed official	SLG07(65)	17/10/2019
		Utility provider	SLG08(66)	17/10/2019
	Non-state: Experts/inte rnational agencies (E)			
		Expert	GE01(67)	16/10/2019
		Expert	GE02(68)	17/01/2020

		Expert	GE03(69)	12/12/2019
		Expert	GE04(70)	17/12/2019

Appendix 2

Twefth Schedule of the 74th Amendment – List of recommended areas that can be devolved to local urban governments by the state governments

1. Urban planning including town planning.

2. Regulation of land-use and construction of buildings.

3. Planning for economic and social development.

4. Roads and bridges.

5. Water supply for domestic, industrial and commercial purposes.

6. Public health, sanitation conservancy and solid waste management.

7. Fire services.

8. Urban forestry, protection of the environment and promotion of ecological aspects.

9. Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded.

10. Slum improvement and upgradation.

11. Urban poverty alleviation.

12. Provision of urban amenities and facilities such as parks, gardens, playgrounds.

13. Promotion of cultural, educational and aesthetic aspects.

14. Burials and burial grounds; cremations, cremation grounds; and electric crematoriums.

15. Cattle pounds; prevention of cruelty to animals.

16. Vital statistics including registration of births and deaths.

17. Public amenities including street lighting, parking lots, bus stops and public conveniences.

18. Regulation of slaughter houses and tanneries.