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From linesmen to local leaders: How does informal governance influence India's electricity policy outcomes?

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ABSTRACT

Global progress toward universal electricity access (Goal 7) underpins the success of several other sustainable development goals (SDGs), given the role of electricity in powering lives, livelihoods, businesses, and community services. In India, the world's most populous country, a suite of policies, programmes and regulatory reforms have focussed on bridging the electricity access gap with significant success. However, many regions in India continue to grapple with an unreliable and poor-quality electricity supply, despite repeated reform measures. This is symptomatic of a vicious cycle of poor revenue recovery by electricity utilities, inadequate investment in infrastructure, electricity theft, and poor payment discipline among electricity users. Breaking this cycle requires understanding how policies function in practice, and the underlying causes of deviation from policy goals.

The literature points to a strong influence of the political economy on electricity sector governance. This study explores how informal governance and local socio-economic factors influence policy outcomes concerning electricity access in India. To do so, we use the Institutional Analysis and Development (IAD) framework to analyse the interactions among key local actors in Malihabad, an electricity distribution region in the state of Uttar Pradesh.

Our research indicates a complex layering of institutional rules that shape the decisions of local actors, providing both constraints and opportunities, and allowing for discretionary powers to the local actors such as the linesmen, village heads, and outsourced agents of the distribution company (discom), beyond formal roles. Further, the interplay of socio-economic realities, local social relations, and institutional conditions affect governance outcomes, often deviating from the intended policy goals. We argue that informal governance, rather than being viewed as a problem to solve, should be understood as a valuable resource that can inform and guide policy decisions for more effective outcomes.

1. Introduction

Over the past three decades, several reforms have been introduced to modernise the electricity sector across the developing world [1–3]. Spearheaded by international organisations like the World Bank, the reform strategies in India and other developing countries involved corporatising public utilities, establishing independent regulatory regimes, and, in some cases, privatising electricity discoms [1,3–5]. The objective was mainly to depoliticise the sector, improve operational efficiency, foster competition, safeguard consumer interests and ensure the sector's financial sustainability [5,6]. However, the reforms have produced mixed results in achieving these objectives, as is also evident in India [2,6–8].

On the positive front, sectoral reforms can be credited for the remarkable growth of India's power sector, including the six-fold rise in generation capacity, private sector participation, and an evolving power market [9]. However, most public discoms in India struggle to provide reliable electricity to all consumers while maintaining financial sustainability [10–12]. These issues are particularly acute in the state of Uttar Pradesh (UP), with financial losses of discoms exceeding the national average, frequent power outages, and consumer dissatisfaction in underserved rural areas [11,13–18]. This poor financial performance perpetuates a vicious cycle: underinvestment and inadequate maintenance of the distribution network have led to poor service quality, consumer dissatisfaction, electricity theft, and non-payment by consumers [19,20].

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This work reflects the authors' ongoing efforts to enhance the operational efficiency of India's discoms, built on over seven years of close collaboration with electricity utilities and other actors across multiple states, including UP. Leveraging this extensive engagement, this study integrates insights from field research and evidence from the literature to provide a robust and well-supported analysis.

This study acknowledges that the challenges facing discoms are not solely operational or technical, but are deeply intertwined with structural and institutional issues in India's electricity sector. Researchers have argued that, despite the creation of independent regulatory bodies, India's State Electricity Regulatory Commissions (SERCs) and discoms remain subject to the state's influence, limiting their autonomy and accountability [21–25]. These challenges reflect deeper political economy factors, as state governments face pressures to maintain subsidised electricity prices for certain groups, maintain employment in discoms, and intervene in discom management [12,18].

As highlighted in contributions to an Energy Research & Social Science special issue 'Energy infrastructure and the fate of the nation' (Volume 41, 2018), large-scale energy infrastructure policies often fall short of their goals due to institutional and political economy factors [26]. Researchers argue that national-scale energy infrastructure, far from being neutral technical interventions, are embedded in social and political frameworks that influence their success, and reinforce inequalities and sustain particular forms of political economy [27–30]. This is evident in the way energy projects, especially in the Global South, unevenly distribute social costs and benefits, perpetuating socio-economic disparities on multiple scales, from local to global [30,31]. Another body of literature argues that infrastructure policies are inherently political, as they embed power dynamics and create 'systems of substrates' that organise social relations, determining who benefits from access to energy resources [32,33].

In India, where electricity infrastructure and services involve complex layers of governance from the national to the local level, large-scale national policies often encounter significant barriers to effective implementation on the ground. While several studies address high-level institutional challenges and the role of international actors in shaping energy policies, relatively little attention has been given to local dynamics. Many studies often overlook informal governance practices, local socio-economic conditions, and how social relations structured by infrastructure influence policy enactment, leaving a gap in understanding how these ground-level dynamics impact the effectiveness of policy goals. Research by Mahadevan [34], Sharma et al. [35], Ganesan et al. [19], and Balls [11], has explored the roles of local actors such as discom staff, linesmen, meter readers and politicians in influencing electricity supply quality and discom finances. However, a significant gap remains in understanding how the interactions between actors and institutions create formal and informal governance dynamics, sometimes circumventing the formal regulations/policy provisions.

This study addresses this gap in the literature by examining the on-ground implementation of national-scale policies for universal electrification, supply quality improvement, and discom financial recovery, through a case study of a rural region of Malihabad in UP. Malihabad presents a case of significant gaps between policy objectives and outcomes, with high discom financial losses and significant supply quality issues, despite reform efforts.

By employing the Institutional Analysis and Development (IAD) framework, developed by Vincent and Elinor Ostrom and other scholars affiliated with the Workshop in Political Theory and Policy Analysis [36–39], the research unravels the intricate web of actors and institutional conditions/rules influencing governance outcomes. The framework provides a structure to analyse how the formal and informal institutional rules, along with socio-economic factors in the community, influence the actors' actions, creating outcomes that diverge from national policy goals at the local level in Malihabad. In this study, we leverage the definition of an 'actor' as a social entity, encompassing a person, organisation, or a collective of individuals and organisations, that possesses the capacity to take action [40]. The systematic IAD framework enables us to address our research objective by analysing the following research questions in a structured sequence:

- Which actors are involved in the formal and informal governance processes surrounding electrification, quality of supply, and discoms' revenue recovery?
- How do the actors and the institutional rules interact with each other to influence the governance of policy provisions, and result in deviation of outcomes from the policy goals?

In Malihabad, as in much of rural India, local discom agents—including linesmen, meter readers, and field staff—engage directly with consumers, often negotiating informally to manage the utility's revenue collection, handle complaints, and maintain supply. Through such interactions, local actors interpret and sometimes deviate from formal institutional rules, shaping the on-ground outcomes of large-scale policies. Our research suggests that this is partly a result of gaps in discoms' monitoring of local agents amid a fast-expanding distribution network, growing user base and political-economy constraints.

The study demonstrates that place-based socio-economic factors interact closely with the social relations between actors on the ground, and the informal institutional rules limit the accountability of local actors, creating opportunities for them to shape governance outcomes according to their interests. Echoing earlier research on the shortcomings of power sector reforms that overlook ground realities and local contexts [2,4,7,41], our analysis further argues that to ensure effective governance of a dynamically evolving power sector in India, policies need to account for the motivations of key local actors, the institutional conditions they operate within, and the socio-economic factors shaping sector governance.

In Section 2, we provide a review of the literature on formal and informal governance, defining how these concepts are understood within this study and establishing a foundation for their application. Section 3 discusses the various actors involved in electricity distribution governance across India, drawing insights from the literature to outline their roles and interactions. Section 4 narrows the focus to the governance context specific to the UP state, highlighting the actors and dynamics unique to this region. In Section 5, we introduce the theoretical framework for this study, employing the IAD framework to organise our analysis and clarify the structure used to examine data. Section 6 details the methodology, outlining the study's approach to data collection and analysis. Section 7 presents the key findings from the Malihabad case study, highlighting the practical challenges faced by the actors, and the real-world implications of governance. It examines the interplay between institutional rules and actors, analysing how these dynamics influence governance outcomes on the ground. Finally, Section 8 provides the discussion and conclusion, synthesising insights from the study and their implications for electricity distribution governance in India.

2. Formal and informal governance

Governance encompasses a spectrum of decision-making processes involving various actors beyond traditional government institutions. Christiansen and Piattoni [42] define governance as the production of authoritative decisions not confined to hierarchical structures such as democratically elected bodies, but emerging from interactions among diverse actors including public, private, collective, and individual participants. This broad understanding underscores the multifaceted nature of governance, integrating both formal and informal elements.

Formal governance is typically characterised by codified laws, policies, and institutional frameworks that guide decision-making and implementation processes. Harsh [43] describes formal governance as comprising state policies, laws, and regulatory procedures that constitute a framework for directing activities. These mechanisms are officially sanctioned and enforced through recognised channels, ensuring

transparency, accountability, and consistency.

Informal governance, in contrast, involves non-codified, non-institutional mechanisms driven by social relationships, personal networks, and unwritten norms. Helme and Levitsky [44] define informal institutions as a key characteristic of informal governance, such as socially shared rules, usually unwritten, that operate outside officially sanctioned channels. Informal governance can manifest in various forms, such as personal networks, clientelism, corruption, clans, mafias, and traditional cultural practices [45–49].

The relationship between formal and informal governance is complex and often interdependent. Merkel and Croissant [50] suggest that in well-functioning democracies, informal arrangements complement formal institutions, enhancing flexibility and responsiveness. However, in defective democracies, informal governance can undermine formal institutions, potentially leading to a displacement of legitimate authority. Also, the manifestations of informal governance vary significantly between the Global North and South. In the North, informal governance often emerges in the context of supranational bodies like the European Union, where decision-making is influenced by personal relationships and unwritten routines [42]. In the Global South, informal governance is frequently observed at local levels. For instance, Roever [51] discusses informal governance in the context of street vendors, where local government authorities engage in unregulated practices that deviate from official norms. AnanthPur [52] examines informal governance in India, where decision-making often occurs through non-governmental mechanisms at local levels, such as villages, tribes, or castes. These informal arrangements exist alongside formal state structures, sometimes filling gaps left by inadequate formal institutions. This scenario exemplifies how informal governance can emerge in response to specific socio-economic challenges.

Amankwaa & Gough [53] examine how in urban Ghana, informal governance of electricity access involves unregulated practices by both state and non-state actors, contributing to increased marginality of some while empowering those with decision-making power. [53] This case illustrates the dual nature of informal governance, both as a coping strategy and as a potential source of inequity. In line with this, High et al. [54], argue that many governance studies fail to adequately address informal cooperation, learning, and negotiation, viewing informal institutions as problems rather than resources. This perspective highlights the importance of recognising the potential benefits of informal governance structures in fostering effective decision-making and social cohesion.

In this paper, we examine decision-making and implementation processes through the lenses of formal and informal governance. Specifically, we explore how informal governance shapes discom's interactions with local consumers and influences electricity service delivery, assessing whether its impact is beneficial or detrimental. Rather than viewing informality as a separate or opposing force to formal regulation, we adopt a more nuanced perspective— one that recognises governance as a continuum where informal practices emerge in response to gaps between regulatory provisions and real-world implementation. Through this lens, we argue that informality is not merely an absence of regulation but a dynamic process that operates alongside formal structures, shaping governance outcomes in significant ways.

3. Actors in formal and informal governance in India's electricity distribution

India's Electricity Supply Act, 1948, authorised State Electricity Boards (SEBs) to operate as the extended arms of the state energy departments. With both service provisioning as well as regulatory powers vested in SEBs, it led to a conflict of interest, resulting in poor service quality and weak financial health of the SEBs [55]. In the late 1990s, several reforms were initiated to address these concerns, followed by the introduction of the Indian Electricity Act, 2003 (hereafter the Act), a landmark reform aimed at transforming India's electricity sector by unbundling SEBs into separate generation, transmission, and distribution entities to improve operational efficiency and accountability [7,55,56]. The Act also sought to bring private competition and transparency in the sector, promote consumer interests, and mandate the states to set up the SERCs [25,56,57]. Critics have argued that the reforms to unbundle the utilities and setup regulatory institutions were significantly influenced by international agencies, such as the World Bank, which applied a 'one-size-fits-all' model rather than a strategy tailored to India's needs, creating implementation hurdles [7,41,58,59].

The political economy underlying the reforms reflects both domestic imperatives and external financial influences. Several researchers have observed that the availability of funding from international institutions drove many of the early reform efforts, suggesting that external incentives, rather than a domestic conviction in reform, were pivotal in reshaping India's power sector [7,58,60,61]. A perspective on the domestic situation suggests that amid the sector's financial crisis, a vacuum of strong central guidance allowed international consultants and global best practices to take precedence [62]. This approach underscored the need for regulatory and operational independence, but overlooked the localised challenges and practical feasibility, limiting the reforms' effectiveness in diverse Indian contexts.

The reforms mainly intended to achieve the three policy goals, which are the focus of this study—universal electricity access, reliable supply quality, and improved discom finances. Achieving these objectives has mainly been a challenge in rural areas [10,12], and the central government has introduced various policies and programmes to address these. Over the years, with changes in political regimes, several policy programmes have been renamed or subsumed within larger programmes to achieve the same goals. Appendix A provides a detailed enumeration of laws/schemes/policies/programmes introduced in the last two decades, with a summary of their provisions.

Universal village electrification was accomplished under the two main schemes of the *Rajiv Gandhi Grameen Vidyutikaran Yojana* (*RGGVY*), 2005, and the *Deendayal Upadhyaya Gram Jyoti Yojana* (*DDUGJY*), 2014. Both schemes also focussed on household electrification. In 2017, a new scheme was introduced for household electrification—*Pradhan Mantri Sahaj Bijli Har Ghar Yojana* (*Saubhagya*). In the last decade, there was an emphasis on improving the quality of supply both under the *24 × 7 Power for All* scheme and the *DDUGJY*. The Government of India (GoI) also devised schemes such as the *Financial Restructuring Plan* (*2012*), and the *Ujwal Discom Assurance Yojana* (*UDAY*), 2015, for the distribution sector's financial stability. In 2021, GoI launched the *Revamped Distribution Sector Scheme* (RDSS) to improve discoms' financial sustainability through smart metering, infrastructure upgrades and loss reduction measures [63]. Further, to improve supply quality, the Electricity Act 2003 mandates all SERCs to formulate the Standards of Performance (SoP) regulations, which discoms must adhere to. These regulations define performance indicators for supply quality and service delivery, set specific targets, outline broader benchmarks, and specify compensation mechanisms for non-compliance [64].

The broader political economy of states and the political risks/rewards have significantly impacted the implementation of institutional reforms [23]. Several states failed to ensure cost-reflective tariffs successfully due to political and social factors. According to Cheng et al. [18], the most prominent obstacles were opposition from labour unions and agricultural lobbies, which feared job losses and increased electricity costs. In many states, farmers benefit from heavily subsidised electricity for irrigation, making them resistant to tariff hikes or privatisation efforts. Populism has played a key role, especially during election periods, when politicians promise free or subsidised electricity to secure votes [11,18]. Besides, studies report that the SERCs' role has remained limited to tariff determination exercises, with issues around service quality and discoms' revenue recovery largely ignored [65]. A review of SoP regulations compliance in seven Indian states shows that discoms in only two states—Delhi and Maharashtra—submit their

compliance reports regularly [65].[1] Studies attribute the lack of compliance to the limited autonomy of SERCs (both financial and tenurial), constrained staff capacity with high dependence on consultants and deputed staff from utilities, and poor accountability to consumers [25,65]. The limited focus of discom management on enforcing SoPs also contributes to poor compliance.

The provisions of the Act echo what has been argued by the contributions in the ERSS special issue (Volume 41, 2018), that the national-scale energy policies reinforce the social and political frameworks that sustain particular forms of political economy [26]. The Act allows state governments to intervene in the regulatory process, such as by issuing directions to SERCs in the public interest. Various state governments have (mis)used this route to hinder tariff revisions to secure votes [21,25]. The Act provides for a selection committee with state and central government nominees headed by a high court judge to make recommendations to fill vacancies in the SERCs. The state governments have the final say in these appointments, creating avenues for political interference in regulatory functioning [25,66]. Besides, barring a few SERCs, most are primarily dependent on the state budgetary support for operational needs and are thereby not independent [25,67]. Further, discoms are mostly state-owned across the country, and the state governments often wield greater authority over them than the regulator [22,25].

The discoms and their management are also accountable to their board of directors. Pargal and Mayer [25] highlight several gaps in the composition and working of the boards across the discoms, such as the state domination of the boards, with fewer independent candidates; limited decision-making authority with boards; and limited information-driven processes and performance monitoring systems. Besides these issues, the average tenure of Indian Administrative Service (IAS) officers heading the discoms as chairpersons and managing directors is only 2.24 years, which affects their ability to oversee the implementation of their vision and develop expertise in the sector [25,68]. These issues have a bearing on the accountability of the discoms' staff.

Besides the macro-analysis of the political economy factors, the literature also points to local actors' influence on governance outcomes. Chatterjee [69], Golden and Min [70] and Mahadevan [34] discuss the role of state-level and local politicians in influencing electricity supply, tariff revisions, encouraging lower revenue collection by discoms in their constituencies, and influencing the billing agents to manipulate consumer bills. Further, Sharma et al. [35] highlight the role of discom employees and union leaders in promoting electricity theft. Gulati and Rao [71] discuss how discom employees often exercise discretion in providing electricity connections, delaying replacement of defective consumer meters and feeder metering to prevent accurate billing.

Despite the above studies, a substantial gap remains in understanding the specific factors that enable local actors to exert informal influence, thereby shaping governance and deviating policy outcomes. Additionally, there has been limited comprehensive analysis of the on-ground implementation of national-scale policies, leaving a critical need for insights into how these policies function in practice. The implementation of any scheme/policy/programme generates an entire ecosystem of actors on the ground, yet discussions around how these actors engage and interact with one another have been largely absent from the literature.

4. Governance of electricity distribution in Uttar Pradesh

The state-owned UP State Electricity Board (UPSEB) was established in 1959 with an objective to expand access to electricity at affordable prices [72]. However, the UPSEB's persistent losses led to its restructuring, and unbundling of the distribution business into five discoms in the early 2000s, along with a parent holding company—the UP Power Corporation Limited (UPPCL). Since then, the UPPCL has continued to enjoy control over the discoms [11,17]. In 1999, the UP Electricity Regulatory Commission (UPERC) was established to regulate the state's power sector. However, operational inefficiencies have persisted even two decades after the institutional reforms.

As per a pan-India survey, 6.8 % of the households in UP remained unelectrified in March 2020 [10], despite the GoI declaring the previous year, 2019, that all willing households had been electrified under the *Saubhagya* scheme [73]. The survey also highlights that UP faced the longest power outages in the country, with households receiving only 17 h of average daily supply. The gaps in service quality are even wider in rural areas—consumers in rural UP encountered average daily outages of 8 h compared to 4 h in urban areas [10].

The finances of UP state discoms remain troubled, and aggregate technical and commercial (AT&C) losses have consistently remained above 22 % [13–15], which is still above the target range under the GoI's RDSS Scheme [63] (ref. Appendix A). These figures surpass the global average AT&C losses of 8 % recorded in 2019 [74]. Factors such as poor billing frequency to consumers, low trust in utility among consumers, poor enforcement of penal provisions against theft, and delayed consumer payments have contributed to a high payment default rate [19]. As of September 2020, out of UP's 28.3 million consumers, 10.9 million had never made a bill payment, with rural consumers accounting for approximately 96 % of these defaulters [75].

Several such issues are embedded in the political economy of the state. Competitive politics has led to direct state government's intervention through the energy department, influencing the regulatory processes, and in restraining the UPERC from undertaking tariff hikes, especially in the lead-up to elections [11,76]. Min and Golden [77] further highlight a strong correlation between the increase in electricity theft in UP and electoral cycles.

The UPPCL has emerged as a politically influential body, with the state energy secretary serving as its chairman. It continues to make decisions on tariffs, staffing, and power purchases for all the discoms that were unbundled to operate as independent commercial entities. The discom heads continue to report to the politically appointed UPPCL chairman [76]. Balls [11] highlights an instance where the UPPCL bypassed the regulator to provide a subsidy to power loom weavers in 2017. As per the Corporate Index prepared by Srivastava and Kathuria [20], two out of the five discoms in UP—Pashchimanchal Vidyut Vitran Nigam Limited (PVVNL) and Purvanchal Vidyut Vitran Nigam Limited (PuVVNL)—scored zeroes, indicating poor accountability to their board of directors, consumers, and shareholders.[2]

The above studies shed light on how different actors influence the electricity sector's governance in UP. However, there has been limited focus on the interactions between actors involved in formal and informal governance, and their implications on policy outcomes. These studies have been devoid of a comprehensive qualitative assessment of consumer experiences, viewpoints of local actors, and place-based socio-economic factors.

Literature also views discoms as homogenous entities, overlooking the power dynamics between actors and the role of officials, engineers, local contractual agents (such as linesmen, meter readers) and other personnel deployed temporarily (for programme implementation), in influencing the governance dynamics in a local setting. Taking references from the literature and the gaps therein, this study builds on the role of distinct actors involved in electricity distribution in influencing governance outcomes.

[1] The seven states include Maharashtra, Madhya Pradesh, Andhra Pradesh, Rajasthan, Delhi, Uttar Pradesh and Bihar.

[2] The Corporate Governance Index by Srivastava & Kathuria (2020) measures the quality of internal governance in the utility, and is broadly based on parameters under the following three categories: 1) Reporting commitment, 2) Service quality commitment, 3) Alignment to commercial objective to three stakeholders—board of directors, consumers, and shareholders of the utility.

5. IAD framework

The Institutional Analysis and Development (IAD) framework, a conceptual and analytical tool developed by Elinor and Vincent Ostrom, has emerged as a cornerstone in the study of governance systems and policy analysis [38,78]. This framework offers a comprehensive and multidisciplinary approach to understanding the dynamics of institutions, their impact on human behaviour, and their role in shaping policy outcomes [39]. However, the framework itself has evolved over many years [37].

Crawford and Ostrom's [79] definition of institutions—as widely understood rules, norms, or strategies that create incentives for behaviour in repetitive situations—forms the foundational concept of the IAD framework. The analysis of these institutions and their interactions with the actors is the core focus of this study. The IAD framework is not an explanatory theory aimed at defining assumed causal relationships between variables. Instead, it serves as a meta-theoretical tool, enabling researchers to examine the institutional environment in which decisions are made [80].

The key components of the IAD framework (see Fig. 1) include:

- **Inputs:** These encompass the contextual factors that shape the environment in which an action situation occurs, including attributes of the community, the nature of the resource or service, biophysical conditions, and the rules in use. Together, these factors set the social, cultural, institutional, and physical context for the action situation.
- **Action situation:** This is the core component of the IAD Framework, in which individuals (acting on their own or as agents of organisations) observe information, select actions, engage in patterns of interaction, and realise outcomes from the interaction [37].
- **Outcomes:** These result from both the outputs generated within the action situation, and external or contextual factors. Outcomes reflect how the decisions made in the action situation translate into real-world impacts.
- **Evaluation by participants:** Actors assess actions, outputs, and outcomes, providing a mechanism for ongoing reflection and assessment. These evaluations can inform and influence the process at any stage, affecting how actors engage with the action situation, and shape future interactions.

The action situation is characterised by actors who are part of the situation, their roles in the institutional hierarchy and their implications (positive or negative) resulting from the interaction among actors. Actors are also characterised by their preferences and interests, information base, basis of decisions and implications [81]. The key aspects of the action situation (see Fig. 2) include:

- **Actors:** Individuals or groups involved in the situation.
- **Positions:** The roles participants assume, influencing their decisions.
- **Actions:** The range of actions available to each position.
- **Information:** The knowledge and information each participant possesses, shaping their decisions.
- **Outcomes:** The possible results generated from different actions.

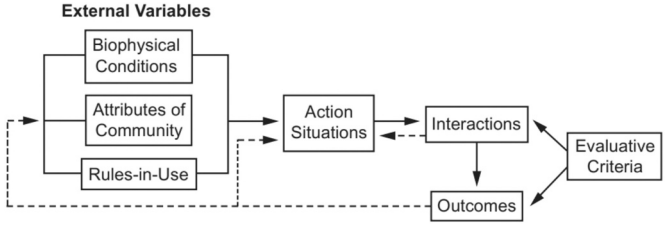

Fig. 1. Key elements in institutional analysis.
Source: Ostrom [38].

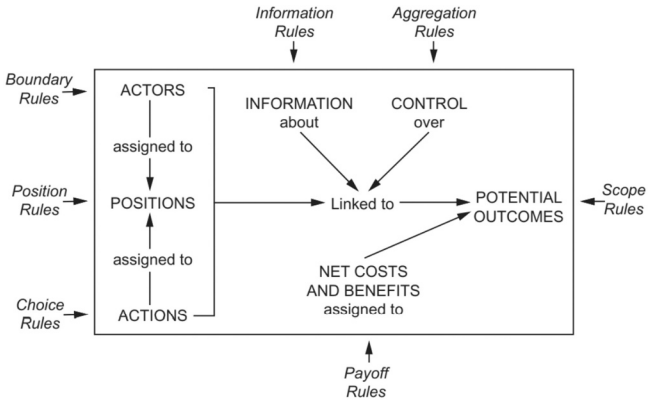

Fig. 2. The internal structure of an action situation.
Source: Ostrom [38].

- **Costs and benefits:** The relative costs and benefits associated with each action and outcome.

The 'rules of the game' or institutional conditions further specify how these components within the action situations function. The rules offer an explanation for the actors to perform their actions and order their relationships within an action situation, as shown in Fig. 2 [38]. These include:

- **Position rules:** Define roles, each with specific resources, responsibilities, and authority.
- **Boundary rules:** Specify how participants enter or exit roles.
- **Choice rules:** Assign actions to positions.
- **Aggregation rules:** Determine how individual actions translate into outcomes.
- **Scope rules:** Set the boundaries and range of possible outcomes.
- **Information rules:** Control the information accessible to each position.
- **Payoff rules:** Outline the distribution of costs and benefits for different actions and outcomes.

When applied to analyse the state of electricity distribution in Malihabad, the IAD framework unveils the intricate web of actors and their interactions at different hierarchical positions with the institutional conditions, resulting in deviant policy outcomes.

6. Research methods

This study centres on the nuanced exploration of policy implementation at the grassroots level, aiming to unravel the disparity between policy goals and their tangible impact. Our chosen locale for this investigation is a cluster of villages in the Malihabad electricity distribution area, served by UP's Madhyanchal Vidyut Vitran Nigam Limited (MVVNL) discom, and connecting approximately 35,000 consumers. In this section, we provide an in-depth overview of the methodology employed for the qualitative case study.

6.1. Sample selection

Situated primarily within the Malihabad administrative sub-district of UP, which is renowned for its mango plantations, the electricity sub-division is located approximately 20 km away from Lucknow, the capital of UP. Malihabad was chosen as the study area due to its alignment with the study's objectives, offering an apt setting to assess gaps in the implementation of national policies.

As a partially electrified region with frequent supply interruptions, inadequate services, and high electricity losses, Malihabad exemplifies

the challenges in achieving policy goals on the ground. Despite its proximity to the utility headquarters in Lucknow, significant gaps in electricity governance persist, raising questions about the factors contributing to such oversight failures. This made Malihabad particularly interesting to our study, as it allowed us to explore how local governance dynamics shape policy implementation even in areas that should, in theory, receive greater administrative attention. The pilot interviews, in neighbouring village panchayats,[3] suggested that such supply issues were not isolated but prevalent across villages of the sub-district with similar infrastructure limitations. Additionally, Malihabad's demographic profile—characterised by lower literacy levels, economic marginalisation, and a distinct caste and religious composition—reflects the broader patterns of rural UP but with greater socio-economic vulnerabilities (see Appendix C and Section 7.1). Literature suggests that these factors significantly influence electricity theft, supply quality, and the discom's energy losses [19,82]. During the pilot interviews, we also observed that electrification outcomes could vary substantially even between adjacent villages, influenced by several local factors. This raised intriguing questions about the roles of local social dynamics and institutional arrangements, motivating a deeper investigation into these differences. Furthermore, Malihabad's proximity to Lucknow facilitated research logistics, as its local Hindi dialect closely resembles that of the state capital, ensuring ease of communication for the research team while allowing for daily travel to the study site.

For the study, we meticulously designed the sampling frame. Fig. 3 illustrates the hierarchical distribution of electricity within a discom network, segmented into zones, circles, divisions, sub-divisions, and feeder regions. Each level represents a distinct voltage tier in the supply chain, moving from the generating source down to end-users. Within the Malihabad electricity sub-division, multiple feeders (11 kV lines) branch out into distribution transformers (DTs) supplying electricity to villages. We sampled five distribution feeders and selected two panchayats in each feeder—one near the local discom offices and one far away—allowing us to assess whether proximity is a defining factor in service delivery.

Additionally, for every panchayat with multiple villages, we sampled both a larger village with a religion and caste-based majority and a smaller village/hamlet with a minority population (wherever applicable). This approach allowed us to examine how socio-economic and socio-political dynamics influence electricity distribution governance. In total, 5 feeders, 10 panchayats and 15 villages were sampled (see Fig. 3). The unit of analysis for our study is the local electricity governance system in these villages.

6.2. Data collection

To conduct the study effectively and safely, we sought support from the discom, which acted as a gatekeeper by facilitating access and permissions through its local staff. We obtained formal authorisation from the MVVNL head office to ensure smoother community engagement and the safety of the research team in areas that were highly theft-prone and potentially unsafe. With the assistance of the discom staff, especially the linesmen, we were introduced to village heads and community leaders, who helped mobilise participants for focus group discussions (FGDs).

We employed a combination of FGDs, participant observation, and structured and semi-structured interviews to collect qualitative and quantitative data from November 2019 to January 2020. A total of 154 participants were involved in the study, which included 130 consumer participants from 10 FGDs, 10 structured interviews with panchayat heads, five structured interviews with key informants (teachers and other members of the panchayat) in minority villages, and nine semi-structured interviews with discom staff and agents. Moreover, we have supplemented the study with secondary data to enrich our findings. Division-level administrative data on billing and revenue collection provided valuable insights into the discom's financial operations. Additionally, our analysis also integrates recent regulatory orders, circulars from the UPPCL, and materials from the Ministry of Power's websites along with insights from our recent project experiences, to provide a comprehensive perspective.

Each FGD had 12 to 15 consumer participants and delved into their perceptions of the electrification process, the quality of the power supply, responsiveness of the discoms to supply restoration, billing concerns, payment modes, and the efficiency of the grievance redressal mechanism. To ensure the inclusion of diverse perspectives, we sought support from *gram pradhaans* (political representatives from the village council) in assembling representatives from various religions and caste groups.

The structured interviews with panchayat heads and community leaders in hamlets focussed on aspects like electrification progress, frequency and reasons for supply disruption, support provided by linesmen and discom engineers, metering, billing, and bill payment mechanisms. We conducted nine semi-structured interviews with four linesmen in-charge of the feeders, a meter reader, and four discom staff (junior engineer, sub-divisional officer, and senior officials), to understand the monitoring mechanisms deployed by the discom and operational challenges in policy implementation.

Recognising the importance of a well-prepared team, we conducted a month-long training session for the two recruited field coordinators responsible for facilitating the FGDs and interviews. This training aimed to familiarise them with commonly faced issues by electricity consumers in rural areas, and legal provisions related to electrification, supply quality, metering, billing and collection under the Electricity Act, 2003, and the UP Electricity Supply Code, 2005, along with an in-depth understanding of the research objectives. Hindi was used as the language of communication for the interviews and FGDs. We recorded and transcribed the interviews with the consent of the participants.

6.3. Limitations and strengths of the methods

We have used a case study approach to understand the factors and local dynamics that influence policy outcomes. The study findings are based on narratives depicting participant experiences, providing rich contextual insights for future quantitative research. While the study's results are specific to Malihabad and do not provide a statistically generalisable picture of UP or India, prior research we have conducted in other parts of UP and North India reveals governance gaps similar to those observed in Malihabad [16,19,82,83]. Thus, while not exhaustive, the findings contribute to a broader discourse on the informal governance of electricity services and offer valuable reference material for similar contexts. A key strength lies in the novelty of this qualitative study, leveraging diverse stakeholder experiences to analyse the institutional and socio-economic factors influencing electricity service governance, using the IAD framework.

Another limitation was the lack of proportional representation of socio-economic groups in the FGDs. Our field coordinators visited various localities in the villages to mobilise diverse participation, but consumers from minority communities showed reluctance to participate in the FGDs in some villages, hesitating to share their views openly alongside majority community members, with some opting not to join the discussions at all. For instance, in Mahdoia, Kharata, Bhatoia, and Bhadwana villages, we sought but found no representation from the minority communities. We tried to overcome this limitation by asking the available FGD participants to share information about other community groups, and by holding in-depth key informant interviews with representatives of the minority population in the hamlets. Also, the research team visited the households to encourage greater female participation in the FGDs. However, many women were hesitant to engage in discussions with older men or were preoccupied with household chores. As a result, only about 15 women participated cumulatively

[3] A panchayat is a village council.

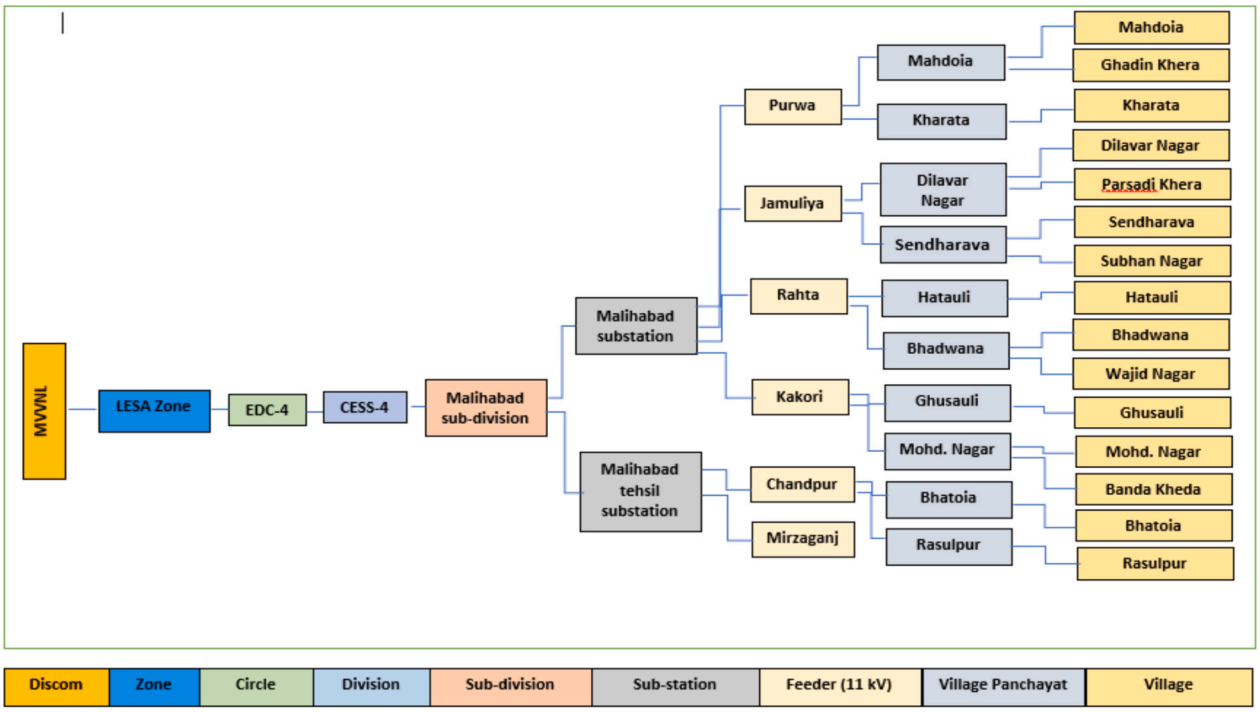

Fig. 3. Sampling of villages in Malihabad.

across all FGDs, but their contributions remained limited despite efforts to encourage discussion. Additionally, they were not open to one-on-one interviews either.

6.4. Data analysis

First, to analyse the key gaps in service quality and factors influencing the governance of electricity distribution on the ground, we used the Framework method for qualitative analysis developed by Jane Ritchie and Liz Spencer in the late 1980s [84]. This is a matrix-based analytic method that uses the pre-identified themes to organise the data [85]. Using this method, we organised the data from FGDs and interviews based on pre-identified themes. Themes were identified based on the FGD and interview questionnaires, which were refined in multiple rounds after pilot interviews with community leaders in neighbouring villages.

Themes included socio-economic aspects, community engagement practices, the community's trust in the discom, status of unelectrified households, incomplete connections, supply quality, unscheduled outages, faulty metering and billing, complaint mechanisms, consumer awareness, and suggestions for improvement. In the matrix, villages/hamlets were first grouped by feeder areas to accommodate feeder-specific insights, particularly from interviews with linesmen responsible for each feeder area. Each village/hamlet within a feeder was allocated a unique row within the matrix. Themes were then organised into separate columns to capture the detailed responses. This helped ensure consistency across village-level data and allowed for a structured feeder-level comparison. We organised interviews with other discom agents and staff separately and analysed them against the same thematic structure. This approach allowed for a clear understanding of issues from both the community and the discom perspectives.

Second, the components within the IAD framework assisted us in unwrapping the complexities in the electricity distribution of Malihabad, and their implications on the policy outcomes. Adapting these steps from the IAD, we developed a customised approach for analysing our data. We have analysed three key action situations—governance of the universal electrification programme, governance of supply quality improvements, and governance of discom revenue recovery.

Our analysis begins by assessing the socio-economic characteristics of the Malihabad community and the bio-physical attributes of electricity as a service, which influences the action situation. Within each action situation, we first examine the outcomes of governance to highlight where policy results diverge from intended policy goals. We then examine the roles of various actors within the institutional hierarchical framework, analysing how their positions influence governance in each action situation. This is followed by an exploration of how the actors' actions—shaped by their control, access to information, and available incentives—contribute to outcomes that diverge from intended policy goals. In the following section, we investigate the 'rules of the game' (institutional conditions) and how they determine the actions of various actors. This analysis provides insight into how these interactions shape action situations that ultimately reflect policy deviations from desired goals.

7. Findings and analysis

7.1. Contextual elements

Within the IAD framework, the external variables influencing the action situation are denoted as contextual elements that encapsulate various dimensions of the social, cultural, institutional, and physical environment. This section provides a foundational understanding of the context in which the people of Malihabad live, offering readers a clearer perspective on the socio-economic setting and the nature of the electricity service provided, around which the actions unfold.

To provide context, we have compared the key demographics of the sampled panchayats of Malihabad against those of the sub-district and state of UP as a whole (see Appendix B). The comparison reveals that the sampled panchayats were more dependent on agriculture, had a higher share of the population that was illiterate, and a higher proportion of the population that belonged to marginalised or minority communities (Census 2011). The lower literacy rates (56 %) in sampled panchayats show potential challenges in comprehending electricity bills and understanding their legal entitlements as consumers. The literacy rate in

sampled panchayats is the same as that in the sub-district (56 %), and lower than UP's 68 % [86]. The majority of the population in the sampled panchayats, including cultivators (38 %) and agricultural labourers (26 %) [86], might have found it difficult to interpret complex billing information and engage with electricity consumer rights. A significant proportion of agricultural labourers in the sampled panchayats indicate seasonal income patterns, making regular bill payments challenging, particularly during the agricultural off-seasons when household incomes are low. In terms of energy demand, most electrified households only used small loads such as light bulbs, fans, and TVs, as reported by FGD participants, indicating modest standards of living.

In terms of religion, Hinduism is the dominant faith in UP, practised by 80 % of the population. Our sampled panchayats had a higher share of the population practising Islam (27 %), as compared to the figures for UP (19 %) and the sub-district (15 %) [86]. The demographic composition adds a layer of diversity that might influence how different cultural and religious groups may have distinct information dissemination channels or varying levels of access to resources that could impact their knowledge about electricity-related procedures. Appendix C provides the distribution of household population for all the sampled villages along religious and caste lines.

Caste category-wise, General and Other Backward Classes (OBC) are prevalent in all areas, with the weighted average being 64 % in sampled panchayats, 58 % in Malihabad, and 79 % in UP. Scheduled Castes (SCs), historically the most socio-economically deprived caste group, show higher representation in the Malihabad sub-district (42 %) and sampled panchayats (36 %) compared to UP (21 %) [86]. The higher representation of SCs in Malihabad, historically associated with socio-economic deprivation, raises considerations about equitable access to information and resources related to electricity connections and billing.

The socio-economic characteristics of the community, coupled with the socio-political nature of electricity as a service in India, especially in UP, contribute to low compliance levels among both consumers and discom staff [19]. While electricity service is theoretically a commodity and thus excludable, consumer perceptions in Malihabad suggest it is treated as a public good. In Malihabad, most households received electricity connections free of cost under the GoI's *Saubhagya* scheme, leading to a widespread assumption that electricity consumption itself was also free. Additionally, the rural and agricultural electricity in UP is highly subsidised, and the sector remains deeply politicised, often leveraged as a tool for electoral gains [11]. Consequently, consumers develop expectations of free or highly subsidised services, while discoms face persistent financial losses. This politicisation of electricity distribution reduces it's excludability and subtractability, encouraging free-rider behaviour and, at times, collusion between last-mile service providers and consumers.

7.2. Action situation 1: governance of universal electrification scheme

7.2.1. Outcomes of the action situation

In April 2018, all inhabited villages of India were declared electrified by the Union power ministry [87]. In Malihabad, the big villages in panchayats were reported to be electrified at least two decades ago, whereas most smaller villages/hamlets were only electrified in the last decade (see Fig. 4). Since the census data does not distinguish between the electrification status of larger and smaller villages/hamlets (which are not classified as census villages), we gathered this information directly from the village headmen.

The FGD participants reported around 90 % of households in the sampled villages as electrified. A majority of them obtained connections under the GoI's *Saubhagya* scheme, indicating largely successful scheme implementation. However, a few villages were only partially electrified, with some willing households not given connections until November 2019, during the time of this study. The situation indicates deviation from the government declaration of 100 % electrification of all willing households in UP in March 2019 [88]. For instance, in Gaddin Khera, less than half of the households had access to electricity, while in Parsaadi Khera, the figure was less than one-fifth.

Our analysis of the action arena, which includes the implementation of the *Saubhagya* scheme, highlights the roles of myriad actors who interact in the local rural setting and define the electrification outcomes.

7.2.2. Actors and their positions

Various key stakeholders played pivotal roles in implementing the *Saubhagya* scheme. Understanding their distinct functions and interactions is crucial for comprehending the dynamics of achieving universal household electrification.

First and foremost is the Union Ministry of Power (MoP), which spearheaded the initiative with the primary goal of achieving universal household electrification. The MoP set the guidelines, monitored progress, and institutionalised quality assurance mechanisms, playing a critical role in the overall governance and oversight of the electrification initiative.

As per the MoP's *Saubhagya* Guidelines 2017, the implementing agencies were to conduct a foot survey to identify the scheme's beneficiaries, and the discoms were advised to submit a cost estimate to the Rural Electrification Corporation (REC) after fully identifying the additional infrastructure requirements [89]. These implementing agencies essentially included private contracting agencies that deployed the electricity connections. Their tasks ranged from installing DTs to installing poles, deploying meters, and addressing challenges that may arise during the implementation process.

The discoms were responsible for releasing electricity connections, supervising implementing agencies, and ensuring the appropriate implementation of the scheme. Linesmen played an important role on the field, in connecting households to electricity poles, and managing the intricate distribution network. Each distribution feeder (11 kV level)

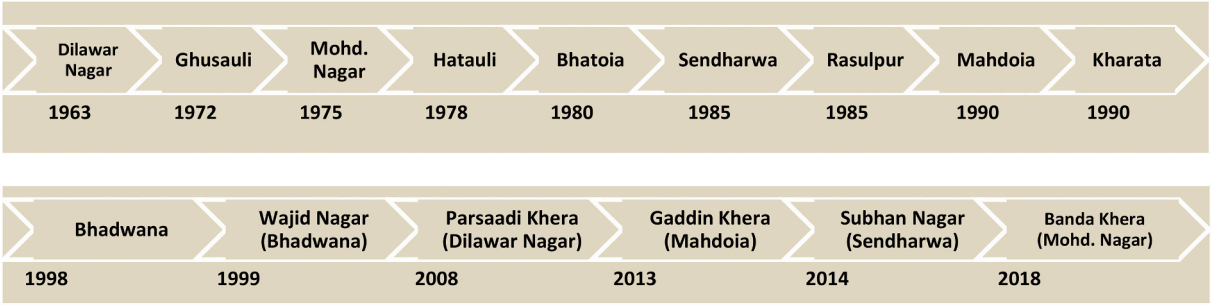

Fig. 4. Timeline for electrification of sampled villages in Malihabad.
Note: Text in parenthesis denotes the panchayats where the small villages/hamlets are located.
Source: Authors' compilation based on interview responses.

is managed by a linesman and his contracted workers. The junior engineers of the discom, who oversee a sub-station area, were responsible for keeping track of connections deployed, activated and stopped.

Further, the REC had appointed a national committee to monitor the progress of the *Saubhagya* scheme. It also institutionalised a two-tier quality assurance mechanism by discoms, and third-party quality monitors for random inspections of villages.

In the rural setting, *gram pradhaans*/village heads disseminated the information about electrification camps being organised in the villages. They influenced how information transfer or communication between villages and government authorities would take place. Consumers, as end-users of electrification, face challenges such as connection denials or metering issues that significantly impact their experience with the electrification process.

In Fig. 5, we present the institutional framework consisting of all actors, how their authority is delegated formally (positions), and their roles that influence the formal and informal governance of electrification processes. We find that formal responsibilities are delineated for each actor, yet local actors (in this case the junior engineer, sub-divisional officer, village administration, and the tendered agency) wield discretionary powers beyond their designated roles.

7.2.3. *Actions resulting in potential outcomes*

Our study uncovered several key issues contributing to electrification gaps on the ground, as reported during the FGDs and interviews. Firstly, inadequate DTs and poles hindered the extension of the distribution network, resulting in the denial of connections for some households. This indicates gaps in discoms' and contractual agencies' assessment of the infrastructure requirement, and lack of resources to deploy connections. Information asymmetry, compounded by social tensions in some villages, emerged as another issue. For instance, in a village with less than 50 % household electrification, residents reported not receiving timely information about electrification campaigns from the village heads and panchayat members, blaming religious discrimination. When we shared these findings with the SDO and executive engineer of the discom, they expressed surprise at the extent of this exclusion. Besides, some participants reported not opting for connections due to their limited ability to pay bills.

Incomplete installations also emerged as an issue, with some villages experiencing careless handling of meter sealing and installation by

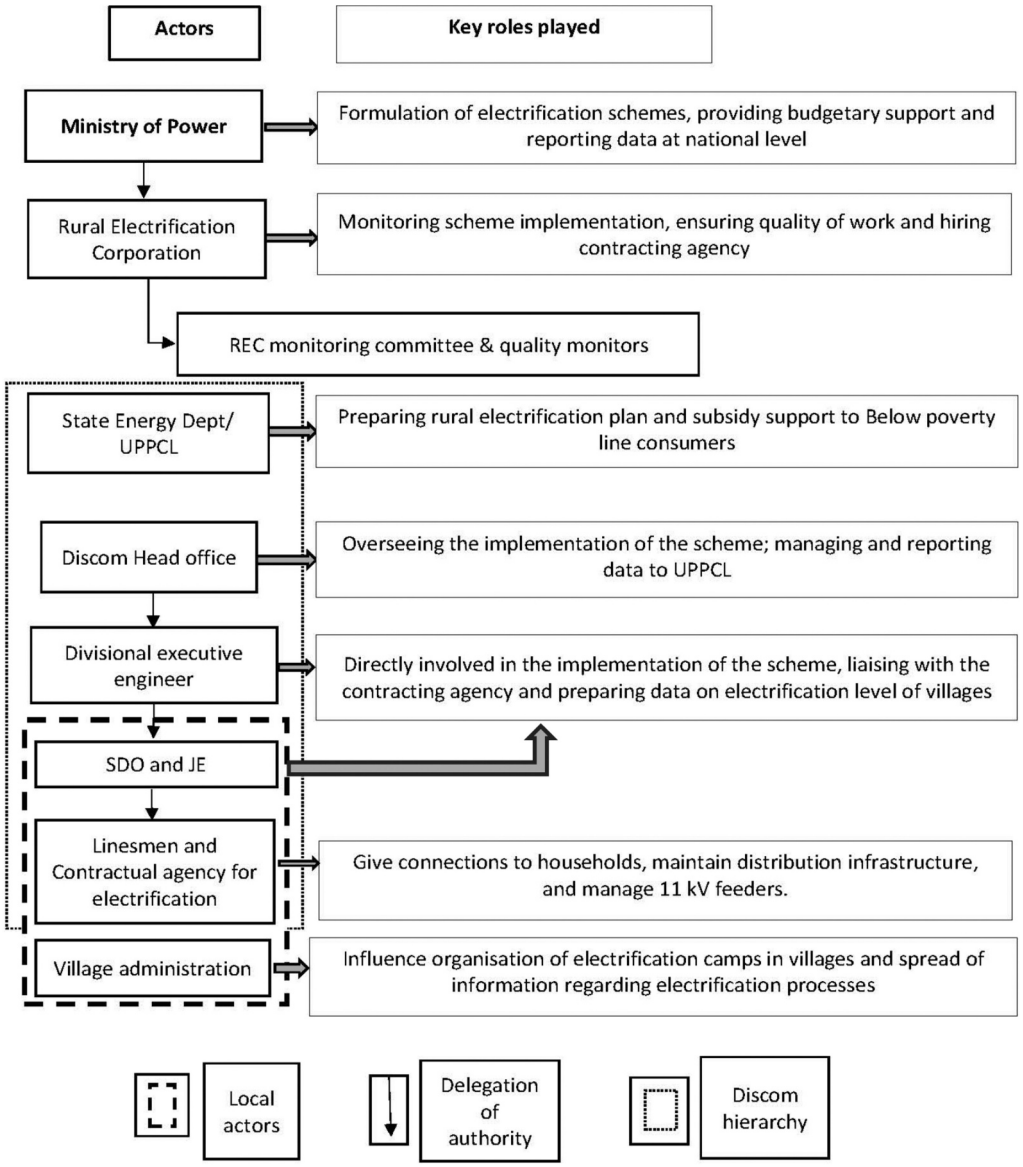

Fig. 5. Actors and their roles in the governance of *Saubhagya* scheme.
Source: Authors' analysis.

contractual agencies. In certain instances, consumers were simply handed over meters and wires by the agency without proper installations, highlighting the challenges arising from rapid electrification drives conducted without due diligence.

Consumers also reported being inappropriately charged for connections under the *Saubhagya* scheme, which were to be given free of cost to households who matched the deprivation criteria as per the Socio-Economic Caste Census [90]. However, respondents in our FGDs reported being charged INR 100–1000 as a facilitation fee for meter installations. Some participants also reported being charged INR 500 (to be paid in 10 monthly installments in their electricity bills) as meter fee. This contradicted the *Saubhagya* scheme's mandate, and underscored the need for greater transparency and accountability in electrification initiatives, to ensure equitable electricity access to all.

At the macro level, the actions of monitoring agencies also played a crucial role in determining the electrification outcomes. The MoP stated that the discom shall be solely responsible for assuring the quality of electrification works under the Guidelines for *Saubhagya* scheme [91]. However, our findings revealed that local discom officials were not actively involved in monitoring electrification processes, mainly due to work overload and lack of ownership in the scheme's implementation, as noted by a discom official. Additionally, the minutes of REC's Monitoring Committee meetings hint at significant gaps in the oversight of the electrification process, as monitoring agencies had inspected less than half the number of stipulated villages [92]. The Electricity Act (2003) and the Rural Electrification Policy (2006) mandate the establishment of district-level committees to monitor the electrification progress, but no such committees have ever been constituted in Uttar Pradesh. The absence of these mechanisms further weakens the monitoring framework. Furthermore, information on household electrification at the village level remains unverifiable, as the *Saubhagya* Dashboard only provides aggregate district-level data, preventing a detailed understanding of progress at the village/hamlet level. The above actions/in-actions suggest that the monitoring of the *Saubhagya* Scheme might not have been as rigorous as intended, potentially compromising the quality and effectiveness of electrification efforts.

7.3. Action situation 2: governance for quality of supply

7.3.1. Outcomes of the action situation

The UP government's commitment to uninterrupted power supply to all households under *24 × 7 Power for All* and *DDUGJY* programmes has ensured improvement in supply hours to rural consumers. Most FGD participants expressed satisfaction with the power supply situation, citing Malihabad consumers received an average daily supply of 20–22 h, which is better than the median 12 h of supply experienced by rural households in UP, as reported in an independent survey [10].

However, respondents raised concerns about unscheduled outages and voltage fluctuations during summer. These concerns were higher in 7 villages (out of 15) which had longer-length electricity feeders with scattered consumer loads that impacted the local discom officials' ability to timely redress consumer grievances.

Further, respondents in four villages reported frequent outages due to DT burnouts, predominantly during the summer months, due surge in electricity demand for cooling needs. These observations underscore the challenges of maintaining a consistent and reliable power supply in the region.

7.3.2. Actors and their positions

The *National Tariff Policy*, 2016, mandates the SERC's role in devising a trajectory for 24 × 7 power for all by 2021–22 [93]. As per the Electricity Act, 2003, SERCs are responsible for monitoring the SoP compliance reports of discoms every quarter (ref. Section 3). However, the UPERC hasn't devised any trajectory for supply quality, and no compliance report by UP discoms available in the public domain [94]. The UPERC has also not issued any directives to discoms in the past to enforce SoP compliance [95]. This highlights a significant gap in regulatory oversight and the resulting non-compliance by discoms.

Discoms hold the central responsibility for electricity distribution and SoP compliance. Our study found multiple challenges discoms face, including delays in repair works, issues with DTs, uneven load capacity distribution in the DT network, and shortcomings in infrastructure planning. Addressing these supply-side challenges significantly depends on the effectiveness of discom staff.

On the ground, the discom's JEs and the sub-station staff play crucial roles in outage management. However, we found that many were unaware of supply restoration timelines, as outlined in the Supply Code and SoP regulations. Linesmen, both permanent and contractual staff, are responsible for fixing line faults and ensuring last-mile service delivery. Challenges such as low remuneration, inadequate safety gear, and high workloads often impede their efficiency, potentially leading to delays, and requests for facilitation fee from consumers for fixing line faults.

Consumers also play a critical role of holding service providers accountable. However, the study participants were unaware about their right to claim compensation for disruptions beyond allowable durations, as provided in the SoP regulations. Further, local discom offices lacked display of information about consumers' rights and grievance redressal mechanisms, in violation of SoP regulations [96]. As a result, consumers in sampled villages typically reported supply related issues to village heads/community leaders, who would then communicate these complaints to the linesmen on their behalf.

In Fig. 6, we present the hierarchical roles of various actors concerning electricity supply and distribution.

7.3.3. Actions resulting in potential outcomes

Our exploration revealed three key reasons behind these supply gaps. First, inadequate guarding of wires led to frequent faults due to falling branches and bird hits, especially during rainy season and along high-tension (HT) lines passing through mango plantations. Second, improper infrastructure planning and sporadic network inspection led to network over loading, resulting in supply disruptions in some villages.

Third, consumer behaviour also played a role. Discom staff shared how rising air conditioning usage against low sanctioned load capacity, and electricity theft during summers, result sin overloading and even burnout of DTs. Fourth, procurement of poor-quality DTs, and delays in repair and maintenance by the discom's field staff, exacerbated these concerns.

It must be noted that local linesmen, who play a crucial role fixing the line faults for the entire feeder area, and ensuring supply quality, are often constrained in terms of capacity or incentives, resulting in delays in fixing the faults. In our study area, a linesman (permanent discom staff) with a team of two contractual linesmen was responsible for a feeder covering around 30 villages, with the contracted staff receiving low remuneration. Additionally, the linesmen in three villages were reported to be accepting facilitation payments from consumers to fix line faults.

In terms of the discom ground staff's accountability to the higher authorities, we found that the data on supply disruptions at the 11 kV feeder was manually recorded in a logbook every day by the sub-station officer. This data is neither reported to the higher authorities nor digitised, as there are no modems connected to the feeder's meters to automatically report interruptions on the discom's server. Further, the data on faults occurring downstream of the feeder, such as at the low-tension line or DT level, were not recorded at all, as there were no meters deployed at that level.

Our findings highlighted multiple systemic deficiencies in infrastructure planning, maintenance, and consumer education, emphasising the need for comprehensive reforms to ensure reliable and equitable electricity supply in the study region.

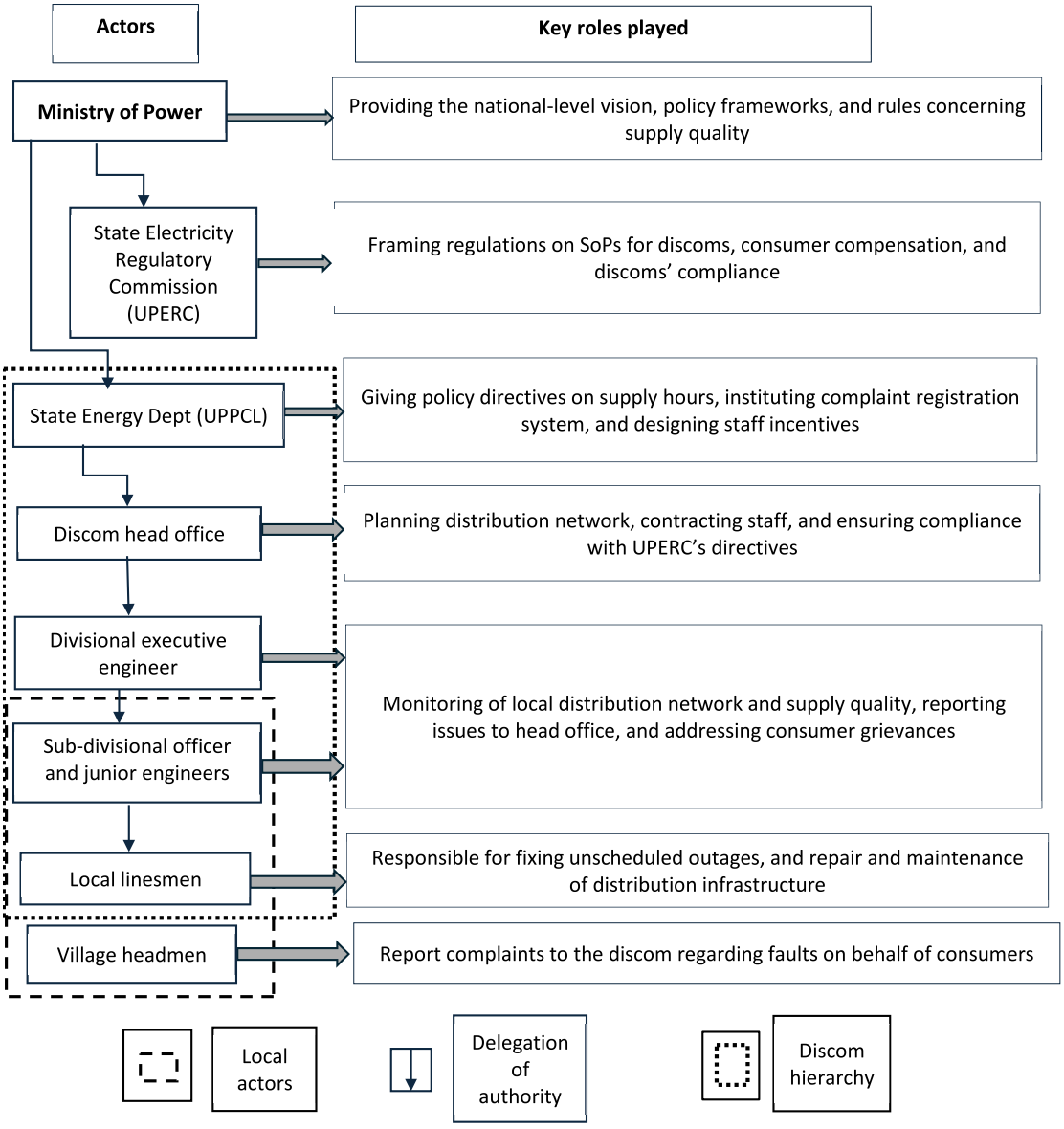

Fig. 6. Actors involved in supply quality governance.
Source: Authors' analysis.

7.4. Action situation 3: governance of discom's revenue recovery operations

7.4.1. Outcomes of the action situation

According to the UPPCL's administrative data for October 2019, only 10 % of the rural consumers in UP had paid their monthly bills [97]. In Malihabad's parent electricity division (CESS-4, see Fig. 3), this share was relatively better at 23 %, but still very low [98]. In 8 out of 15 villages, participants claimed that more than half the consumers in their villages had pending dues for more than six months.

Timely bill payment is directly linked with receiving accurate and timely bills [19]. As of October 2019, the discom's administrative data reported that 15 % of domestic consumers in CESS-4 were billed based on estimated average consumption, as meter readers were unable to record their actual meter readings [98].

7.4.2. Actors and their positions

A variety of key actors contribute to the governance of metering, billing, and payment collection. The MoP sets the state-level and discom-level targets for loss reduction, as was done under the *UDAY* scheme. Discoms are to comply with loss-reduction targets, and the state regulators are mandated to ensure compliance with targets by the discoms.

The state regulator, the UPERC, sets the SoPs for metering, billing, and collection practices. The UP Supply Code, 2005, provides the standards and regulations around mechanisms for billing, such as bill generation through spot-billing by meter-readers using a hand-held device, and trust billing through self-reporting of meter readings by consumers if the bill is not provided by a meter reader. The UPERC is also authorised to ask discoms to submit the annual financial performance reports, along with their tariff petitions.

The discom's head office performs monthly monitoring of commercial losses of all sub-divisions, and the managing director along with the director (commercial) seeks financial performance reports from all sub-divisions, along with reasons for slow progress.

Within the discoms, SDOs, JEs, and other local staff operate at the sub-divisional level, overseeing critical operations, including billing, meter reading, and addressing concerns of household consumers.

The contracted agencies, involved in the deployment of connections under the *Saubhagya* scheme, wield influence over the infrastructure and processes related to billing. These agents were responsible for giving

sealing certificates to consumers after deploying meters. These certificates contained information on consumers' new electricity connections, based on which their first bill could be generated. Not handing over the sealing certificate meant no electricity bill was ever received by consumers. Also, metering agencies are integral to the installation and certification of meters. Challenges related to incomplete installations, demands for facilitation fees by metering agencies, and instances of meter-burning underscore the critical role played by these entities in ensuring the accuracy and integrity of the metering process.

Meter readers employed by contractual agencies form another essential component of the system. Charged with the responsibility of conducting meter readings and generating bills, these individuals play a fundamental role in ensuring accurate billing and fostering consumer interaction.

The role of linesmen is crucial in revenue recovery, and they were found to often collude with consumers in certain villages, especially the payment defaulters, and exploit gaps in the system to resort to illegal reconnection after the consumer's supply was disconnected due to long-term payment defaulting.

Consumers, positioned as end-users, play a pivotal role in the dynamics of billing processes. Malihabad consumers complained of their distrust in billing accuracy, and the challenges faced in receiving bills. Beyond being recipients of services, consumers actively participate in reporting issues, seeking redress, and complying with billing requirements, thereby influencing the effectiveness of the overall system.

In Fig. 7, we illustrate the hierarchical roles of various actors within the institutional structure, highlighting both formal and informal governance dynamics around the discom's revenue recovery operations. The figure delineates how different actors, ranging from high-level officials to local influencers, interact with each other and with consumers on the ground.

7.4.3. Actions resulting in potential outcomes

The challenges highlighted on the field underscore issues in metering, billing, and revenue recovery operations, linked to gaps in monitoring and enforcement.

During the FGDs, consumers voiced a multitude of concerns regarding the inefficiencies in metering and unfair billing practices by the discom. Several consumers across villages did not have meters installed and failed to formally report faulty meters, leading to inaction by the discom in addressing these crucial concerns. Consumers expressed suspicion that their meters were running fast and generating inflated bills. Despite numerous complaints to the discom office regarding faulty meters, the redressal process was often prolonged, exacerbating consumer frustration. Moreover, consumers in some newly electrified households reported not receiving meter sealing, rendering them ineligible for bill issuance.

On the billing front, meter readers had never visited three of the sampled villages. In seven villages, consumers were billed less frequently than once in two months. Discoms' staff blamed these gaps on

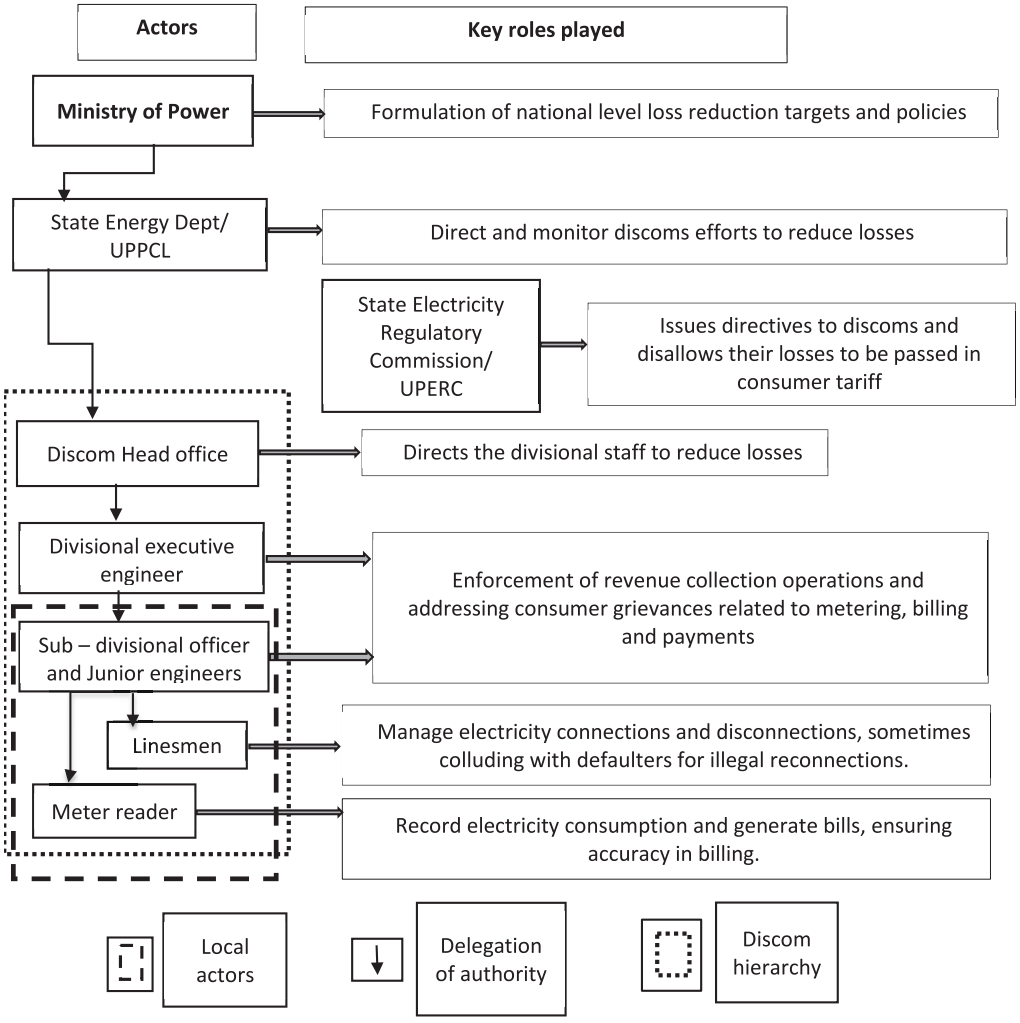

Fig. 7. Actors in the governance of discom's revenue recovery operations.
Source: Authors' analysis.

factors such as huge workload, inadequate incentives, and high attrition among meter readers. For instance, meter readers in Malihabad reportedly earned a monthly remuneration of only INR 6000, including travel allowances.

Some consumers reported that their complaints to the discom field staff went unheard; they had to traverse long distances to the sub-division office for bill generation. On not receiving bills, consumers were unaware of their billed arrears, and found it difficult to make payments when the discom staff suddenly asked them to pay, after they had accumulated arrears for several months. One notable challenge highlighted by consumers was the failure to receive SMS-based bills. On reviewing the discom's consumer directory, we found that outdated phone numbers in the database were a key reason for consumers not receiving SMS-based bills.

In eight villages, consumers who received bills spoke of their distrust in the meter readings and various additional charges in their bills. For instance, in Kharata, a few consumers complained of disproportionately high bills compared to their consumption. Consumers from five villages complained that the meter readers generated bills without even reading the meters, partly because some meters are inaccessible (installed too high on walls). As a result, consumers spoke about refraining from bill payments. Also, a few consumers in Rasulpur admitted to paying facilitation fees to the meter readers to get their bills reduced.

Access to convenient payment modes was another major obstacle. Six of the villages did not have a Common Service Centre (CSC), which is the access point for accessing e-services related to government departments. None of the FGD respondents in these villages were aware of CSCs in nearby villages. Consumers mostly visited the collection counter at the sub-divisional office, the distance to which ranged from five to 15 km from their villages. In the remaining villages, where CSCs were present, respondents did not trust making payments at the CSCs, and doubted whether the payment had been made correctly, as they obtained no receipts after the payments were made.

Furthermore, they highlighted the lack of effective deterrence measures against non-payment and electricity theft, with infrequent disconnection drives and rampant illegal reconnections observed in several villages. Disconnection drives against non-payment are conducted less frequently than once a year. Linesmen and consumers admitted that illegal reconnection (through hooking of wires and meter-bypass) after disconnection was prevalent in at least six villages. In seven villages, live wires (without cabling) were present at the time of data collection, allowing easy access to wire hooking. Raids by the discom along with vigilance team were rare, allowing consumers a greater leeway. Reportedly, some consumers even colluded with the linesmen for prior information about the discom's planned raids.

Consumers also mentioned the annual announcements of one-time settlement (OTS) schemes, where consumers could pay their long pending bills. In eight of the villages, consumers reported paying their pending bills at the annual OTS camps organised in their villages for the past four or five years. Consumers await the announcement of OTS every year as their interest surcharge is waived, and hence, they avoid making payments regularly. In Gaddin Khera, consumers complained that they had never been informed of the OTS by panchayat heads due to socio-political conflicts between their community and panchayat leaders.

At the discom end, operational constraints, including limited staff capacity, heavy workloads, and an inadequately rewarding system, hamper the revenue recovery operations. With only two JEs and an SDO managing approximately 35,000 consumers in the Malihabad sub-division, tasks ranging from supply maintenance to consumer grievance redressal, organising collection camps, and undertaking disconnections for defaulters became overwhelming for them.

In terms of monitoring, significant gaps persisted despite the UPERC's directives. For instance, agricultural unmetered consumption experienced a significant surge in the state, indicative of challenges in enforcing regulatory measures [99–101]. In FY 2018–19, the UPERC directed discoms to submit a collection efficiency improvement trajectory, but subsequent years witnessed no submission from discoms, revealing gaps in compliance [101]. In terms of ensuring compliance, the role of the UPERC is somewhat restricted to data collection from discoms on distribution losses during tariff determination, deciding on pass-through of allowable discom losses in consumer tariffs, and directing discoms to ensure 100 % metering. Also, the UPPCL has annually introduced OTS for domestic consumers, regardless of the UPERC precluding the launch of such schemes, as they discourage regular payments [102–104]. While the UPPCL conducts internal performance monitoring for divisions and sub-divisions, the UPERC plays a limited role in decentralised monitoring of performance targets.

Frequent bureaucratic changes further exacerbate these monitoring and compliance challenges. For instance, four managing directors were transferred in the three years leading up to the data collection phase, which weakened the effectiveness of revenue recovery and loss reduction strategies. This sheds light on the organisational instability affecting operational efficiency.

Overall, these findings underscored the urgent need for reforms in billing and revenue collection practices, grievance redressal mechanisms, and consumer education, to ensure fair and efficient revenue recovery by the discom in the Malihabad region.

7.5. Role of the 'rules of the game' (institutional conditions)

As discussed in the previous sections, there are myriad actors operating in action situations, and the interplay among them creates a set of rules or institutional conditions that determine the policy outcomes vis-à-vis electrification, quality of supply, and revenue recovery. These rules, derived from the IAD framework, had an enabling or disabling influence on the expected outcomes in different action situations. Table 1 illustrates these seven types of rules prevalent in Malihabad and how we have studied them in this paper. The cumulative effect of these rules affects the seven elements of an action situation [38,80].

7.5.1. Boundary rules

The boundary rules governing electricity distribution in Malihabad specify which actors are involved in both formal and informal decision-making processes related to electrification, supply, and revenue management. Key actors include the discom staff (JE, SDO), who hold the formal authority over electrification initiatives, while informal governance involves actors such as linesmen, meter readers, contractual agents from schemes like *Saubhagya*, and local community leaders, including *gram pradhaans*.

Formal boundary rules allow the JE and SDO to make official decisions, like determining who qualifies for legal connections, meter installations, and payment collection. However, local linesmen and meter readers also exert influence by selectively providing illegal connections,

Table 1
Rules-in-use in Malihabad's Action Situation.

Rules-in-use/institutional conditions	Description
Boundary rules	Specify the actors managing the governance of electricity distribution in Malihabad, and how they join and leave the decision-making process
Position rules	Specify the positions of actors involved in the governance of electricity distribution in Malihabad
Choice rules	Specify the set of actions available with actors at any point of time
Information rules	Specify the type and amount of information available with the actors and its usage
Aggregation rules	Specify how actions by actors aggregate into outcomes
Payoff rules	Specify the costs and benefits derived from particular acts
Scope rules	Specify the possible outcomes and whether they are interim or final

Source: Authors' analysis.

reporting—or not reporting—meter issues, and deciding who receives accurate bills. Additionally, contracted agents (under *Saubhagya*) facilitate connections and meter installations, sometimes charging a bribe or facilitation fees.

The role of *gram pradhaans* reflects a nuanced boundary: they do not directly facilitate illegal connections, but are often aware of them, and choose not to report them. They also determine which villages are informed of government schemes, and where electrification camps are organised. This layered structure of actors, each with unique, overlapping roles, demonstrates how formal and informal governance mechanisms combine, affecting the implementation quality and inclusivity of electricity services.

7.5.2. Position rules

Position rules in Malihabad define the authority each actor holds in decision-making processes within electricity distribution. The national and state policies and regulations, alongside the discom's internal bylaws, establish formal roles for actors, specifying duties for staff members such as the JE and the SDO. However, these formal position rules are not always clear in practice. For instance, discom staff, including the JE and the SDO, often lacked full awareness of their regulatory responsibilities, revealing gaps between official policies and on-the-ground practices.

In reality, local actors exert significant discretionary authority, often beyond their official roles. The informal position rules are heavily shaped by village social hierarchies, with local figures, like *gram praadhans* and linesmen, playing central roles in addressing community grievances. Many consumers, with limited access to discom agents and limited awareness of formal responsibilities, turn to them for support, reinforcing the authority of these informal actors in governance processes.

Moreover, our interviews and FGDs revealed that decision-making in Malihabad can often be majoritarian, influenced by local power dynamics and biased toward certain community groups. This has led to disparities in scheme benefits, as some socio-economic groups remain uninformed of opportunities, leaving them marginalised in programmes like *Saubhagya*. Resource constraints also play a role. For instance, tendered agencies depend on the discom for essential equipment like DTs and poles, restricting network expansion, and excluding some households from connections.

7.5.3. Choice rules

Choice rules in Malihabad's electricity governance define the range of actions available to each actor, especially in a technical field where formal processes are mandated by regulatory institutions. However, certain local actors, such as contractual staff and community leaders, exercise choices beyond these regulations, creating gaps in adherence and accountability. For instance, contractual agencies, who are not directly bound by discom regulations, frequently left installations incomplete, with poor handling of meter sealing and installation. In some cases, they simply handed over meters and wires to consumers without proper installation, undermining the quality of rapid electrification initiatives.

The discretion exercised by various actors due to inadequate monitoring and supervision further complicates governance. The discom's top management often fails to enforce SoP regulations effectively at the local level, with limited oversight on compliance. The REC monitoring agencies often neglected effective oversight, and discoms, in turn, failed to submit compliance reports regularly, with no demands from the UPERC to ensure these reports are completed. The discom's choice to inadequately plan infrastructure and forego regular network inspections exacerbates supply issues, resulting in uneven disruptions where some villages experience long outages, while nearby areas remain unaffected. Further compounding these issues are delays in repairs and maintenance, extended restoration times after infrastructure failures, and ineffective deterrence against electricity theft and non-payment. Disconnection drives, for example, are conducted irregularly and infrequently, typically less than once a year, leading to persistent illegal connections and reconnections in many villages.

Local actors also have notable discretionary power in their choice rules. For example, *gram pradhaans* can choose not to allow electrification camps in specific hamlets, and meter readers sometimes opt not to record readings, thereby impacting billing and payment compliance. Similarly, tendered agencies may skip essential installation steps, further weakening the integrity of electrification efforts.

7.5.4. Information rules

In Malihabad, information rules play a crucial role in determining the access and flow of knowledge among actors involved in the electricity distribution system, impacting both governance and service quality. Electricity, being a highly technical field, restricts detailed operational knowledge to a limited set of official actors, primarily the discom staff, and to a degree, contractual agents. This limited access has implications for both accountability and service delivery, as inaccurate data on consumers connected, supply hours, faults, and energy losses hinder the discom's capacity to identify and target necessary interventions effectively.

Most consumers remain largely uninformed about the sector's technical workings, including essential processes such as billing, metering, and the importance of timely payments. This gap in consumer knowledge has led to several issues. For example, many consumers lack clarity on how bills are generated, the grievance redressal process, and even the need to pay for their electricity consumption. As a result, some consumers mistakenly assume that electricity is free, while others are uncertain about where or how to settle outstanding payments. This lack of clarity has also led to consumers paying for *Saubhagya* scheme connections that should have been free, reflecting lapses in oversight and information dissemination during implementation. Another critical gap is that consumers are largely unaware of their entitlements under SoP regulations, such as their right to claim compensation for extended service disruptions. Instead, they often resort to paying facilitation fees to linesmen for basic services, such as fixing line faults.

In terms of oversight and reporting, significant information deficits exist within the discom's operational structure and in data management. For instance, the *Saubhagya* portal, intended to track electrified connections provided under the scheme, lacks adequate data for verification of households electrified.

In terms of the quality of supply, supply disruptions at the 11 kV feeder level are recorded daily by sub-station officers. This information is kept only in manual logbooks, without being digitised or reported to higher authorities. Additionally, faults at downstream levels, such as low-tension lines or DTs, are not recorded at all, as there are no meters or automated systems in place at these points. When the SDO and executive engineer of the discom were presented with these findings, they were surprised by the extent of exclusion and information deficits. Consequently, these gaps in data reporting and lack of accessible records lead to unresolved service issues, and complicate efforts to track the frequency and causes of interruptions.

7.5.5. Aggregation rules

Aggregation rules in Malihabad's electricity governance context illustrate how the actions of multiple actors, from state authorities to local staff and community members, combine to shape overall outcomes in service delivery, responsiveness, and operational efficiency. In India's electricity sector, central and state governments influence policy, yet the distribution sector falls primarily under state jurisdiction. This layered governance model means that overarching decisions—such as supply rostering, billing cycles, and payment methods—are shaped at the top by senior management of the discom, in consultation with the state government, with field-level discretion largely delegated to discom field staff.

While discom field staff handle frontline responsibilities, such as bill correction, grievance redressal, and local vigilance, their actions are

often subject to constraints imposed by local socio-political dynamics. For example, local actors like the *gram pradhaans* and linesmen can influence how disconnecting illegal connections is managed. They often act as intermediaries, who balance community interests with discom requirements. Field staff also rely heavily on input from other ground-level actors, which affects service quality and responsiveness in areas like grievance handling and vigilance.

At the same time, accountability within this system is fragmented, particularly for contractual staff employed by tendered agencies. These staff members operate under contracts with limited direct accountability to discom protocols, as the terms are primarily defined by agreements between the discom and the contracting agencies, not with the field agents themselves. This lack of accountability creates gaps in the system, as contractual staff are primarily motivated by their employment security with the agency, rather than by compliance with discom policies.

Community-level dynamics also play a critical role in shaping outcomes. In villages like Mahdoia, Sendharwa and Bhadwana, as stated during the FGDs, weak collective action and a lack of trust in leadership limit residents' willingness to pursue grievances actively. This lack of collective engagement creates operational challenges, as it reduces the likelihood of widespread complaints, or demands for service improvements. Consequently, community grievances are less likely to reach discom representatives or political leaders, which negatively impacts the responsiveness of the discom to local issues.

7.5.6. Payoff rules

Our analysis reveals that cost structures and incentive misalignments within the electricity governance system can foster malpractices, creating a cycle of inefficiency and distrust. For instance, the challenges of serving a dispersed population, combined with insufficient financial incentives, encourage practices like 'table billing'—creation of bills without actual meter readings—which compromises billing accuracy. Also, the undercompensated meter readers may choose to manipulate readings in exchange for facilitation fees from consumers seeking lower bills, while linesmen, facing similarly low compensation, may supplement their income by charging facilitation fees to reconnect permanently disconnected consumers.

The lack of adequate incentives also affect discom staff's motivation for timely repairs and maintenance. Overextended and under-resourced, discom personnel may deprioritise network upkeep, particularly when handling issues like transformer faults, uneven load distribution, or other infrastructure weaknesses. These maintenance gaps not only reduce service reliability, but also deepen consumer dissatisfaction, with repair delays becoming a recurring issue in many villages. Also, the discom staff have not displayed consumer rights and grievance redressal mechanisms at their local offices, despite the SoP regulations, as doing so would invite scrutiny, and hold staff accountable.

Political dynamics further complicate these incentive structures. For instance, field staff may encounter resistance or be discouraged from disconnecting non-paying consumers, especially in cases where political intervention favours specific groups. This politicisation of electricity distribution adds another layer of operational complexity, as staff must navigate local pressures, which can incur both time and social costs.

7.5.7. Scope rules

In the context of electricity supply, two primary outcomes are possible: reliable and high-quality, or erratic and unreliable. Each outcome initiates a feedback loop, influencing consumer satisfaction and payment patterns. However, our case study reveals that interim outcomes can significantly impact these primary outcomes. Discrepancies in interim outcomes, such as electrification processes, timely billing and payment collection, and grievance resolution, create a vicious cycle. This cycle often results in a poor-quality electricity supply, further exacerbating the challenges associated with achieving the desired primary outcomes.

8. Discussions and conclusion

In the electricity sector in India, there is an ongoing debate on whether electricity should be regarded as a commodity or a public good [105]. While Polski and Ostrom classify metered energy, water, telecom, sanitation, and arterial roads as toll goods, which have high excludability and low subtractability [36,38,39], the socio-political nature of electricity services in India gives it low excludability and subtractability, with the presence of free riders, and instances of collusion between service providers and consumers.

The Electricity Act, 2003, together with different policies and regulations, govern India's electricity distribution sector. While the Act provides an institutional framework for governing the sector based on commercial principles, it also tries to balance the need for providing affordable electricity to all, given the socio-economic realities. For instance, while the Act mentions having cost-reflective tariffs, there are enabling provisions for subsidising and cross-subsidising consumers with low purchasing power.

Over the past two decades, various policies—such as *RGGVY*, *DDUGJY*, the *Integrated Power Development Scheme* (*IPDS*), *Saubhagya*, *UDAY*, and more—have been introduced to further electricity access through last-mile electrification, ensure 24 $\times$ 7 power supply, and enhance the financial health of discoms. Despite these efforts, significant gaps remain in achieving these objectives, particularly in UP. Ostrom's IAD framework offers a valuable lens on how the interplay between the action situation and the external context variables creates both formal and informal governance dynamics, leading to the divergent policy outcomes observed in our case study of Malihabad, conducted between November 2019 and January 2020. The action situation is governed by the role of various actors, their positions, and the rules of the game (institutional conditions) that interact with one another to inform the governance outcomes.

Notwithstanding tremendous progress on the electrification front, we found several households in Malihabad without connections, or with incomplete installations. Several factors contribute to the gaps in electrification. Discrepancies in sharing information about electrification camps, often due to socio-political reasons at the village level, hindered the process. Contracted agents frequently rushed electrification efforts, leading to incomplete or substandard installations. Inadequate infrastructure to connect all households also emerged as a challenge, linked, in turn to gaps in planning and assessment. Some gaps can be directly attributed to the limited ability of households to afford electricity use. These challenges were particularly pronounced in villages farther from the discom's local offices, making it difficult for staff and agents to reach these areas. Moreover, our discovery that many willing households were not provided electricity took local discom officials by surprise, highlighting the extent of the problem.

This research uniquely highlights the constraints and opportunities that act as the rules of the game for the discom and contracted agencies to take decisions around the implementation of the universal electrification scheme. Although the GoI declared 100 % electrification of all willing households by 2019, approximately 1.5 million households were electrified between 2019 and 2021 [73], underscoring the persistent challenges brought to light by our study.

On supply quality, respondents reported several gaps with unscheduled outages and voltage fluctuations. These issues were due to the absence of guarding cables, leading to frequent faults on high-tension lines, overloading of DTs, linesmen providing illegal connections to conniving consumers, inadequate planning before rolling out the distribution network, and delays in repair and maintenance.

Gaps in revenue recovery were also linked to myriad factors. These included the presence of faulty meters or unmetered consumers, irregular or incorrect billing of consumers by the meter readers, limited accessible avenues for consumers to make bill payments, low deterrence against non-payment of electricity bills or theft, and the annual exercise of announcing OTS (interest waiver scheme) for payment of pending

dues.

In Malihabad, the discom's institutional limitations (informed by the rules) for implementing the policies have a strong bearing on the sector's service delivery. The discom's ground staff face capacity constraints, with an inadequate staff-to-consumer ratio. Both the operation and maintenance and commercial tasks (including vigilance) are assigned to a single SDO, who manages around 35,000 consumers. At the same time, the inadequate remuneration for field staff, including linesmen and meter readers, and poor monitoring of their operations give them reason to indulge in underhanded practices and connive with the consumers. Uttar Pradesh has among the highest loss-making discoms, which leaves little financial space to invest in institutional building, including human resources.

We also observed gaps in the role of the state regulator in the oversight of the schemes' implementation. As argued by Pargal and Mayer [25], the role of the UPERC is also largely restricted to tariff determination, while measures such as monitoring of SoP compliance take a back seat. While there is a constant breach of SoP regulations by the discom, strict actions are not taken by the UPERC, likely due to the state ownership of the discoms, and regulators themselves being appointed by the state government.

Our analysis of the socio-economic reality surrounding the action arena highlights that in Malihabad, more than 60 % of consumers are either cultivators or engaged in agricultural labour with seasonal income patterns. These consumers do not have sufficient disposable income to pay for monthly electricity bills. Besides, as Ostrom mentions, community beliefs and attributes also have a major implication on a policy situation. Low literacy levels (56 %) of consumers in Malihabad would make it difficult for them to comprehend the complicated information in electricity bills, or enforce the discom's accountability under state-level regulations. Limited consumer awareness further strengthens beliefs they already hold.

There is also a general lack of trust among UP consumers in the discom staff and its agents [19,105]. Consumers consider the discom as corrupt, and the utility looks at the community members as free riders. Additionally, what we observed is both linesmen and meter readers generally hailed from the same community as consumers and, therefore, tended to avoid confrontation. As part of the community, they were wont to take into consideration their existing societal bonds and community rules. The SDO and JE, who have transferrable jobs, avoid going against the diktat of local political leaders, to avoid any punitive action or transfers. The political economy around electricity supply, therefore, creates incentives for the community representatives to intervene in the local utility operations. All this leads to a scenario where informal rules enforced through local actors run counter to the formally mandated rules and policy objectives.

The analysis of Malihabad's electricity sector reveals how the interaction of institutional conditions—referred to as the 'rules of the game'—significantly impacts policy outcomes. For example, boundary rules, in the form of eligibility for electrification schemes, were inconsistently applied, with certain households excluded due to misinformation and socio-political dynamics. Position rules also shaped interactions, as local staff such as linesmen and meter readers, who hail from the same community as consumers, often avoided enforcing disconnection protocols, prioritising social relationships over official mandates. Choice rules, governing the discretion of local staff in their duties, allowed for widespread leniency in enforcing payment or disconnection deadlines, undermining formal policies. Scope rules regarding the extent of service delivery often fell short in more remote villages, where infrastructure could not keep pace with demand, limiting the reach of electrification programmes. Furthermore, information rules guiding the inadequate communication about electrification camps and the complexities of billing left many consumers unaware of their responsibilities. Finally, payoff rules created incentives for local actors to overlook regulatory non-compliance in exchange for social or financial benefits, such as informal payments or avoiding local political backlash. These rules together contribute to the persistent gaps between policy goals and real-world outcomes, highlighting the need for a more nuanced understanding of institutional conditions in the sector's governance.

Overall, the interaction of the physical and material state of the action situation with the actors and rules has led to suboptimal governance outcomes for both the discom and the consumer. While the discom is unable to recover the complete cost of electricity supply, the consumer receives poor quality supply, with frequent interruptions and low voltage scenarios.

This study is a microcosm of the state of affairs of the electricity sector in UP, particularly in rural areas. Similar gaps in policy outcomes have been observed and reported from geographies served by the other discoms of UP [19], with potentially similar institutional conditions leading to sub-optimal governance outcomes in rural areas. However, previous studies have not effectively engaged with how the interplay of place-based context, socio-economic realities, and the rules governing the actors' motivations result in such governance outcomes.

To ensure effective governance of a dynamically evolving power sector, policies need to account for the motivations of the key local actors by studying their interests, and the rules governing their actions. This study reflects how, in rural areas, cohesive local relationships and socio-economic factors like low literacy, income, and consumer awareness enable discretionary power beyond formal rules. Policies for rural electricity governance need to recognise these realities rather than adopt a purely reductive, technocratic approach. Recognising the strong bonds between linesmen and consumers, there is an opportunity to harness these relationships positively to redirect sectoral outcomes. Many governance studies overlook the importance of informal cooperation, learning, and negotiation, which are crucial parts of networks and relationships. Instead of viewing informal governance as a problem to be solved, we echo that it should be seen as a valuable resource to be harnessed [54].

To constructively leverage the influence of informal local actors, local village leaders and linesmen can serve as intermediaries to enhance trust between discoms and the community. Iterative feedback mechanisms can be established in the governance system to incorporate local insights into improvement in policy and implementation mechanisms. Additionally, targeted incentives can be designed to align the actions of local actors with desired sectoral outcomes, fostering accountability and proactive engagement. However, not every such action will necessarily yield the desired results; in certain conditions, they may introduce distortions or unintended consequences, warranting further empirical research, pilot studies, and adaptive policymaking to refine governance models for local electricity distribution.

CRediT authorship contribution statement

Kanika Balani: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Bharat Sharma:** Writing – review & editing, Writing – original draft, Visualization, Formal analysis. **Shalu Agrawal:** Writing – review & editing, Validation, Resources, Methodology, Conceptualization.

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Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Chat GPT in order to improve the language and readability of a few sentences. After using this tool/service, the author(s) reviewed and edited the content as

needed and take(s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Kanika Balani reports financial support was provided by Shakti Sustainable Energy Foundation. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Legal and policy framework institutionalised by the central government for universal electrification, improved quality of supply, and improving discoms' revenue recovery

Law/policy/programme	Provisions/objectives
1. Ensuring Universal electricity access to all	
***Kutir Jyoti Yojana*, 1988**	• For providing single point light to below-poverty-line (BPL) families
***Remote Villages Electrification Programme*, 2002**	• For electrifying remote villages through off-grid renewable solutions
***Accelerated Rural Electrification Programme*, 2003**	• To provide concessional loans to states to provide electrification infrastructure
***Electricity Act*, 2003** Sections 5, 6, 43, and 166(5)	• Joint responsibility of the central and state government to formulate policies on rural electrification, and manage local distribution in rural areas • Constitution of district committees to review and coordinate extension of electrification • Discom to provide electricity supply to consumers within one month of receiving application, with exemptions for villages with no supply. Discoms liable to be penalised if they fail to meet the stipulated timeline
***National Electricity Policy*, 2005** Sections 5.1.1 and 5.1.3	• Special attention to household electrification to Dalit bastis (settlements), tribal areas, and settlements inhabited by other marginal sections
***Rural Electrification Policy*, 2006**	• State governments to prepare the rural electrification plan with electrification delivery mechanisms • Ministry of Power to constitute a coordination mechanism between agencies to ensure village selection is in line with policy objectives
***RGGVY*, 2005 (later converted to *DDUGJY*, 2014)**	• Free-of-cost service connections to all BPL families • Constitution of a district-level committee, having public representatives from the district as members, to monitor programme implementation
***Decentralised Distributed Generation Scheme*, 2009**	• To electrify villages through mini-grids
***Saubhagya*, 2017**	• To achieve universal household electrification by providing electricity connections to remaining unelectrified, willing households by 31 March 2019
2. Quality of supply	
***Electricity Act*, 2003** Sections 24, 50, 57(1), 57(2), 79 and 86	• SERC is authorised to specify standards of performance for licencees, including the electricity supply code, with timelines for electricity supply restoration, maintenance of electric lines, and other equipment, including meters • SERC is authorised to suspend the discom's licence, in case it fails to conform to the electricity supply standards
***National Electricity Policy*, 2005** Section 5.4.6	• SERC to specify standards for reliability and quality of supply, in line with international practices
***National Tariff Policy*, 2016** Sections 8 and 8.3 (5)	• SERCs to devise a trajectory for 24 × 7 uninterrupted power supply to all consumers by 2021–22 or earlier • Management of local distribution network by discoms through franchises, with involvement of panchayat institutions, user associations, etc.
***24 × 7 Power for All*, 2018**	• Strengthening of transmission and distribution networks to improve supply quality • Reliable 24 × 7 supply to all consumers by 2019 • Multi-tier monitoring framework to be constituted at central government, state government and departmental levels, and a project monitoring unit (under an external independent agency) to monitor works undertaken
***DDUGJY*, 2014 (erstwhile *RGGVY*, 2005)**	• District-level committee to review quality of power supply and consumer satisfaction, with public representatives as members
***Electricity (Rights of Consumers) Rules*, 2020**	• SERCs to notify regulations to establish automatic compensation mechanism for consumers against monitorable standards of performance
3. Improving discoms' revenue recovery	
***Electricity Act*, 2003** Sections 50, 55(1), 56, 126, 127 and 153	• All consumers to be metered by discoms within two years, except when SERC provides relaxation • SERC to specify electricity supply code for recovery of electricity charges, and defining billing intervals, supply disconnection on non-payment, and preventing electricity theft, etc. • Discom is authorised to disconnect supply, after prior notice, in case consumer defaults on payments • Discom is empowered to investigate unauthorised use of electricity or its theft, and penalise the consumers • Setting up of special trial courts for theft
***National Electricity Policy*, 2005** Sections 5.4.6, 5.4.9, 5.4.10 and 5.8.10	• State government and SERC to draw a time-bound programme for loss reduction • Improved enforcement, incentives for employees and consumers, and community participation required for loss reduction. Centre to provide performance-based incentives to states in line with amount of loss reduction achieved. • SERC may obtain, approve, and monitor the metering plans of the discom, and should set up third-party meter-testing arrangements. • Implementation of modern technology for theft detection, and correct billing and collection, with special emphasis on consumer indexing and mapping in a time-bound manner
***National Tariff Policy*, 2016** Sections 8.1 (1), 8.2 (1) and 8.4 (3)	• SERCs to incentivise loss reduction by linking returns with specified trajectory • SERCs can also introduce local-level incentives for staff to achieve desirable loss reduction • SERCs may provide incentives to encourage metering and billing based on metered tariffs, and widely publicise such incentives.
***DDUGJY*, 2014**	• Discoms to ensure reduction in aggregate technical and commercial (AT&C) losses, as per trajectory set by the Centre after consultation with states. • Discoms to ensure metering across the sub-transmission and distribution network • Monitoring to be undertaken by a high-level committee under the chairmanship of Secretary (Power), and representatives from REC and other ministries.

(*continued on next page*)

(*continued*)

Law/policy/programme	Provisions/objectives
***UDAY*, 2015**	• Reduction in AT&C losses to 15 % by 2018–19, as per the trajectory decided by Ministry of Power and states • States and discoms to ensure compulsory metering of feeder and distribution transformers, consumer indexing, and GIS mapping of losses; Information, Education and Communication (IEC) campaign to reduce theft; and increased supply in areas with reduction in AT&C losses • Three-tier review structure: Monthly reviews at central, state and discom levels; one-to-one review meetings with states; and quarterly ranking of states and discoms. Dedicated *UDAY* cell under REC for regular monitoring.
***Electricity* (*Rights of Consumers*) *Rules*, 2020**	• No connection shall be given without a meter, and discom should ensure that the meter is tested and sealed. • Meter should be read at least once in every billing cycle. • The discom should prepare the bill for every billing cycle, based on actual meter reading. • The discom shall not generate more than two provisional bills for a consumer during one financial year. In case of provisional billing for more than two billing cycles, consumer may refuse to pay dues till the bill is raised on actual meter reading. • Consumer should have the option of both online and offline payment, with discom providing sufficient collection centres or drop boxes.
Revamped Distribution Sector Scheme* (*RDSS*), *2021	• Aims to improve discoms' operational efficiency and financial sustainability by 2025 through ○ Reduction in pan India AT&C losses to 12–15 % ○ Reducing Average Cost of Supply and Average revenue realised gap to zero • Scheme subsumes DDUGJY and IPDS and has three major components: ○ Installation of 250 million smart prepaid meters by 2026 ○ Support for distribution infrastructure works for loss reduction and infrastructure upgradation. ○ Training and capacity building of discom staff • RDSS has an outlay of INR ~3 lakh crore with a gross budgetary support of INR 97,631 crore. • Financial assistance to discoms for infrastructure strengthening (except smart metering) is dependent on meeting pre-qualifying criteria and achieving certain benchmarks.

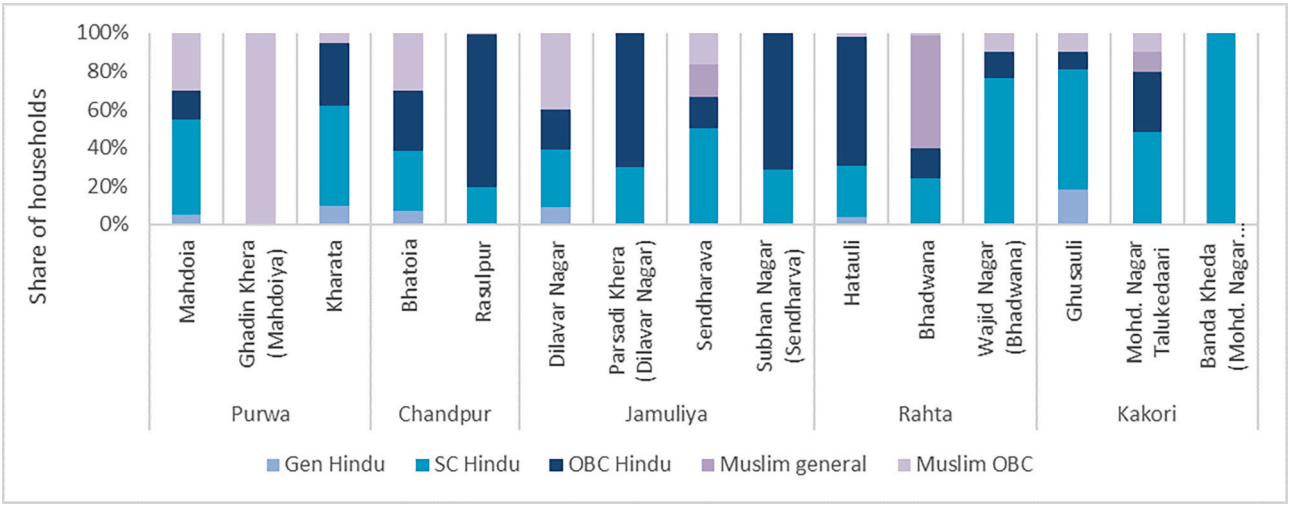
Source: Authors' collation from Indian Electricity Act, 2003; National Tariff Policy, 2016; National Electricity Policy, 2005; Electricity (Rights of Consumers) Rules, 2020; DDUGJY, Saubhagya, 24 × 7 Power for All, UDAY and RDSS programme documents.

Appendix B. Distribution of population in sampled villages and Uttar Pradesh, across socio-economic parameters

		Uttar Pradesh	Malihabad sub-district	Sampled panchayats (weighted average)
Religion	Hindu	80 %	84 %	73 %
	Muslim	19 %	15 %	27 %
	Others (Sikh, Christian, Jain, etc.)	1 %	1 %	0 %
Caste	General and other backward classes (OBC)	79 %	58 %	64 %
	Scheduled Castes	21 %	42 %	36 %
Literacy rate		68 %	56 %	56 %
Occupation category based on work type	Cultivators	29 %	31 %	38 %
	Agricultural labourers	30 %	37 %	26 %
	Household industry workers	6 %	8 %	8 %
	Other workers	35 %	24 %	28 %

Source: Authors' collation from Census (2011)

Appendix C. Religion and caste profile of villages/hamlets in Malihabad



Source: Authors' analysis based on data collected from panchayat headmen.

Data availability

Data will be made available on request.

References

[1] J. Urpelainen, J. Yang, Global patterns of power sector reform, 1982–2013, Energ. Strat. Rev. 23 (2019) 152–162, https://doi.org/10.1016/j.esr.2018.12.001.

[2] A. Sen, Divergent Paths to a Common Goal?, Oxford, United Kingdom, 2014, https://doi.org/10.26889/9781784670023.

[3] V. Foster, A. Rana, Rethinking Power Sector Reform in the Developing World, 2020.

[4] N.K. Dubash, D.N. Rao, Regulatory practice and politics: lessons from independent regulation in Indian electricity, Util, Policy 16 (2008) 321–331, https://doi.org/10.1016/j.jup.2007.11.008.

[5] A.D. Lee, Z. Usman, Taking Stock of the Political Economy of Power Sector Reforms in Developing Countries: A Literature Review, 2018.

[6] T. Jamasb, R. Nepal, G.R. Tmilsina, A quarter century effort yet to come of age: a survey of electricity sector reform in developing countries, Energy J. 38 (2017) 195–234, https://doi.org/10.5547/01956574.38.3.tjam.

[7] H.L. Bajaj, D. Sharma, Power sector reforms in India, in: 2006 International Conference on Power Electronic, Drives and Energy Systems, IEEE, 2006, pp. 1–5, https://doi.org/10.1109/PEDES.2006.344320.

[8] K.N. Gratwick, A. Eberhard, Demise of the standard model for power sector reform and the emergence of hybrid power markets, Energy Policy 36 (2008) 3948–3960, https://doi.org/10.1016/j.enpol.2008.07.021.

[9] V. Chaturvedi, A. Ghosh, A. Garg, V. Avashia, S.S. Vishwanathan, D. Gupta, N. K. Sinha, C. Bhushan, S. Banerjee, D. Datt, J. Bansal, M. Pathak, S. Dhar, A. K. Singh, N. Khan, R.R. Rashmi, S. Agrawal, D. Agarwal, A. Singh, T.N. C, S. S. Saxena, V. Vishal, U. Singh, D.S. Mallapragada, R.K. Chaturvedi, A.V. Pillai, V. Garg, S. Singh, K. Hari, N. Janardhanan, E. Zusman, D. Mahapatra, S. Raha, T. Gupta, S. Prasad, India's pathway to net zero by 2070: status, challenges, and way forward, Environ. Res. Lett. 19 (2024) 112501, https://doi.org/10.1088/1748-9326/ad7749.

[10] S. Agrawal, S. Mani, A. Jain, K. Ganesan, State of Electricity Access in India: Insights From the India Residential Energy Survey (IRES) 2020, 2020.

[11] J. Balls, Stalled reform in the face of electoral fears: Uttar Pradesh's electricity distribution sector, in: N.K. Dubash, S.S. Kale, R. Bharvirkar (Eds.), Mapping Power: The Political Economy of Electricity in India's States, Oxford University Press, New Delhi, 2018, pp. 274–295.

[12] A. Gupta, An anthropology of electricity from the global south, Cult. Anthropol. 30 (2015) 555–568, https://doi.org/10.14506/ca30.4.04.

[13] PFC, Report on Performance of Power Utilities 2022–23, 2024.

[14] PFC, Report on Performance of Power Utilities 2020–21, 2022.

[15] PFC, Report on the Performance of Power Utilities(2018–19), 2020.

[16] K. Balani, B. Sharma, S. Agrawal, Improving Discoms' Revenue Recovery During and After the Pandemic: A case study of MVVNL discom in Uttar Pradesh. https://www.ceew.in/publications/improving-discoms-revenue-and-economic-recovery-during-and-after-pandemic, 2020.

[17] N.K. Maurya, Power sector reforms and performance assessment of power sector utilities of Uttar Pradesh, Indian Journal of Public Administration 66 (2020) 77–96, https://doi.org/10.1177/0019556120906073.

[18] C. Cheng, Y.J. Lee, G. Murray, Y. Noh, J. Urpelainen, J. Van Horn, Vested interests: examining the political obstacles to power sector reform in twenty Indian states, Energy Res. Soc. Sci. 70 (2020) 101766, https://doi.org/10.1016/j.erss.2020.101766.

[19] K. Ganesan, K. Bharadwaj, K. Balani, Electricity Consumers and Compliance Trust, Reciprocity, and Socio-economic Factors in Uttar Pradesh. https://www.ceew.in/publications/electricity-consumers-and-compliance, 2019.

[20] G. Srivastava, V. Kathuria, Impact of corporate governance norms on the performance of Indian utilities, Energy Policy 140 (2020) n.d, https://doi.org/10.1016/j.enpol.2020.111414.

[21] B. Bhatt, A. Singh, Stakeholders' role in distribution loss reduction technology adoption in the Indian electricity sector: an actor-oriented approach, Energy Policy 137 (2020), https://doi.org/10.1016/j.enpol.2019.111064 n.d.

[22] S. Pargal, S. Ghosh Banerjee, More Power to India: The Challenge of Electricity Distribution, The World Bank, Washington, D.C., 2014, https://doi.org/10.1596/978-1-4648-0233-1.

[23] S.S. Kale, N.K. Dubash, R. Bharvirkar, 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, New, 2018, pp. 1–27.

[24] S. Kumar, Diffusion agents and institutional change: the variable influence of independent regulatory agencies across sectors in India, Util Policy 64 (2020) n.d, https://doi.org/10.1016/j.jup.2020.101041.

[25] S. Pargal, K. Mayer, Governance of Indian State Power Utilities: An Ongoing Journey, The World Bank, Washington, D.C., 2014, https://doi.org/10.1596/978-1-4648-0303-1.

[26] G. Bridge, B. Özkaynak, E. Turhan, Energy infrastructure and the fate of the nation: introduction to special issue, Energy Res Soc Sci 41 (2018) 1–11, https://doi.org/10.1016/j.erss.2018.04.029.

[27] S. Erensü, Powering neoliberalization: energy and politics in the making of a new Turkey, Energy Res Soc Sci 41 (2018) 148–157, https://doi.org/10.1016/j.erss.2018.04.037.

[28] B. Arifi, P. Späth, Sleeping on coal: trajectories of promoting and opposing a lignite-fired power plant in Kosovo, Energy Res Soc Sci 41 (2018) 118–127, https://doi.org/10.1016/j.erss.2018.04.012.

[29] T.F. Purcell, E. Martinez, Post-neoliberal energy modernity and the political economy of the landlord state in Ecuador, Energy Res Soc Sci 41 (2018) 12–21, https://doi.org/10.1016/j.erss.2018.04.003.

[30] R. de Bercegol, J. Monstadt, The Kenya Slum Electrification Program. Local politics of electricity networks in Kibera, Energy Res Soc Sci 41 (2018) 249–258, https://doi.org/10.1016/j.erss.2018.04.007.

[31] B. Sergi, M. Babcock, N.J. Williams, J. Thornburg, A. Loew, R.E. Ciez, Institutional influence on power sector investments: a case study of on- and off-grid energy in Kenya and Tanzania, Energy Res Soc. Sci. 41 (2018) 59–70, https://doi.org/10.1016/j.erss.2018.04.011.

[32] B. Larkin, The politics and poetics of infrastructure, Ann. Rev. Anthropol. 42 (2013) 327–343, https://doi.org/10.1146/annurev-anthro-092412-155522.

[33] S.L. Star, The ethnography of infrastructure, Am. Behav. Sci. 43 (1999) 377–391, https://doi.org/10.1177/00027649921955326.

[34] M. Mahadevan, Working Paper on the Price of Power: Costs of Political Corruption in Indian Electricity, Michigan, 2019.

[35] T. Sharma, K.K. Pandey, D.K. Punia, J. Rao, Of pilferers and poachers: combating electricity theft in India, Energy Res Soc. Sci. 11 (2016) 40–52, https://doi.org/10.1016/j.erss.2015.08.006.

[36] M.M. Polski, E. Ostrom, An institutional framework for policy analysis and design, in: D.H. Cole, M.D. McGinnis (Eds.), Elinor Ostrom and the Bloomington School of Political Economy: Volume 3, A Framework for Policy Analysis, 2017.

[37] M.D. McGinnis, An introduction to IAD and the language of the Ostrom workshop: a simple guide to a complex framework, Policy Stud. J. 39 (2011) 169–183, https://doi.org/10.1111/j.1541-0072.2010.00401.x.

[38] E. Ostrom, Background on the institutional analysis and development framework, Policy Stud. J. 39 (2011) 7–27.

[39] E. Ostrom, M.M. Polski, Institutional analysis and policy design, in: D.H. Cole, M. D. McGinnis (Eds.), Elinor Ostrom and the Bloomington School of Political Economy: Volume 3, A Framework for Policy Analysis, Lexington Books, 1999, pp. 13–47.

[40] B. Enserink, P. Bots, E. van Daalen, L. Hermans, J. Koppenjan, R. Kortmann, J. Kwakkel, J. Slinger, T. Ruijgh van der Ploeg, W. Thissen, Policy Analysis of Multi-Actor Systems, TU Delft Open, 2022, https://doi.org/10.5074/T.2022.004.

[41] N. Dubash, Working Paper on Regulation Through the Back Door: Understanding the Implications of Institutional Transplant, Jerusalem, 91905, Israel, http://regulation.huji.ac.il, 2012 (accessed June 9, 2021).

[42] T. Christiansen, S. Piattoni, International Handbook on Informal Governance, Edward Elgar Publishing, 2003.

[43] M. Harsh, Formal and informal governance of agricultural biotechnology in Kenya: participation and accountability in controversy surrounding the draft biosafety bill, J. Int. Dev. 17 (2005) 661–677, https://doi.org/10.1002/jid.1230.

[44] G. Helmke, S. Levitsky, Informal institutions and comparative politics: a research agenda, in: International Handbook on Informal Governance, Edward Elgar Publishing, 2012, https://doi.org/10.4337/9781781001219.00011.

[45] G. O'Donnell, Another Institutionalization: Latin America and Elsewhere, 1996.

[46] H. Lauth, Informal institutions and democracy, Democratization 7 (2000) 21–50, https://doi.org/10.1080/13510340008403683.

[47] K. Collins, The political role of clans in Central Asia, Comp. Polit. 35 (2003) 171, https://doi.org/10.2307/4150150.

[48] K. Darden, The integrity of corrupt states: graft as an informal state institution, Polit. Soc. 36 (2008) 35–59, https://doi.org/10.1177/0032329207312183.

[49] J. Böröcz, Informality Rules, East European Politics and Societies: And Cultures 14, 2000, pp. 348–380, https://doi.org/10.1177/0888325400014002006.

[50] W. Merkel, A. Croissant, Defective democracies: concept and causes, Central European Political Science Review 1 (2000).

[51] S. Roever, Informal trade meets informal governance: street vendors and legal reform in India, South Africa, and Peru, Cityscape 18 (2016).

[52] K. AnanthPur, Rivalry or synergy?, in: Formal and Informal Local Governance in Rural India, 2004.

[53] E.F. Amankwaa, K.V. Gough, Everyday contours and politics of infrastructure: informal governance of electricity access in urban Ghana, Urban Stud. 59 (2022) 2468–2488, https://doi.org/10.1177/00420980211030155.

[54] C. High, R. Slater, S. Rengasamy, Chapter 18: are shadows dark? Governance, informal institutions and corruption in rural India, in: L. Cheshire, V. Higgins, G. Lawrence (Eds.), Rural Governance, Routledge, 2006, https://doi.org/10.4324/9780203968178.

[55] N.K. Dubash, S.C. Rajan, Power politics: process of power sector reform in India, Econ. Pol. Wkly 36 (2001) 3367–3387.

[56] A. Singh, Power sector reform in India: current issues and prospects, Energy Policy 34 (2006) 2480–2490, https://doi.org/10.1016/j.enpol.2004.08.013.

[57] S. Mahalingam, B. Jairaj, S. Naryanan, K. Chandrasekhar, M.T. Reddy, S. Kumar, R. Kumar, S. Dixit, N.K. Dubash, S. Nakhooda, Electricity Sector Governance in India: An Analysis of Institutions and Practice, New Delhi, 2006.

[58] S. Kale, Current reforms: the politics of policy change in India's electricity sector, Pac. Aff. 77 (2004) 467–491.

[59] M. Godbole, Electricity Act, 2003: questionable wisdom, Econ. Pol. Wkly 38 (2003).

[60] S. Mukherjee, T. Dhingra, A. Sengupta, Status of Electricity Act, 2003: a systematic review of literature, Energy Policy 102 (2017) 237–248, https://doi.org/10.1016/j.enpol.2016.12.001.
[61] N.K. Dubash, B. Morgan, Understanding the rise of the regulatory state of the South, Regul Gov 6 (2012) 261–281, https://doi.org/10.1111/j.1748-5991.2012.01146.x.
[62] R. Tongia, The political economy of Indian power sector reforms, in: D.G. Victor, T.C. Heller (Eds.), The Political Economy of Power Sector Reform, Cambridge University Press, Cambridge, 2009, pp. 109–174, https://doi.org/10.1017/cbo9780511493287.005.
[63] Ministry of Power, Guidelines Revamped Distribution Sector Scheme Reforms-Based and Results-Linked, 2021.
[64] Prayas (Energy Group), Five stitches in time: Regulatory and policy actions to ensure effective electricity service. https://www.prayaspune.org/peg/publications/item/418-five-stitches-in-time-regulatory-and-policy-actions-to-ensure-effective-electricity-service.html, 2019 (accessed January 12, 2021).
[65] Prayas (Energy Group), Five Stitches in Time: Regulatory and Policy Actions to Ensure Effective Electricity Service, 2019.
[66] Ministry of Power, Indian Electricity Act, Government of India, 2003.
[67] V. Bhaskar, Challenges faced by independent regulatory agencies in India, Indian Journal of Public Administration 64 (2018) 404–426.
[68] N. Murtaza, Governing the State: The Erosion of Bureaucratic Capacity Under Party Competition in India, 2022.
[69] E. Chatterjee, The politics of electricity reform: evidence from West Bengal, India, World Dev. 104 (2018) 128–139, https://doi.org/10.1016/j.worlddev.2017.11.003.
[70] M. Golden, B. Min, Working Paper on Theft and Loss of Electricity in an Indian State, California, 2012.
[71] M. Gulati, M.Y. Rao, Corruption in the electricity sector: a pervasive scourge, in: J.E. Campos, S. Pradhan (Eds.), The Many Faces of Corruption, World Bank Group, Washington, D.C., 2007, pp. 115–158.
[72] A. Gurtoo, R. Pandey, Power sector in Uttar Pradesh: past problems and initial phase of reforms, Econ. Pol. Wkly 36 (2001) 2943–2953.
[73] Ministry of Power, SAUBHAGYA ELECTRIFICATION SCHEME - A Total 2.86 Crore Households Have Been Electrified – Union Power & NRE Minister Shri R. K. Singh, PIB Delhi 16th March 2023, 2023.
[74] P.V. Regy, R. Sarwal, C. Stranger, G. Fitzgerald, J. Ningthoujam, A. Gupta, N. Singh, Turning Around the Power Distribution Sector: Learnings and Best Practices from Reforms, 2021, https://doi.org/10.31219/osf.io/xd2he.
[75] UPPCL, Pending Dues of Consumers Towards the Discoms in UP as of September 2020, 2020.
[76] IISD, GSI, Electricity Sector Reform in Uttar Pradesh: Analysis of Tariff Adjustments and the Ujwal Discom Assurance Yojana Plan (UDAY). www.iisd.org/gsi, 2018.
[77] B. Min, M. Golden, Electoral cycles in electricity losses in India, Energy Policy 65 (2013) 619–625, https://doi.org/10.1016/j.enpol.2013.09.060.
[78] E. Ostrom, Reflections on “some unsettled problems of irrigation”, Am. Econ. Rev. 101 (2011) 49–63, https://doi.org/10.1257/aer.101.1.49.
[79] S.E.S. Crawford, E. Ostrom, A grammar of institutions, Am. Polit. Sci. Rev. 89 (1995) 582–600, https://doi.org/10.2307/2082975.
[80] I. Lammers, T. Hoppe, Watt rules? Assessing decision-making practices on smart energy systems in Dutch city districts, Energy Res Soc Sci 47 (2019) 233–246, https://doi.org/10.1016/j.erss.2018.10.003.
[81] P.D. Aligica, Institutional and stakeholder mapping: frameworks for policy analysis and institutional change, Public Organization Review 6 (2006) 79–90, https://doi.org/10.1007/s11115-006-6833-0.
[82] J.C.Y. Wong, B. Blankenship, J. Urpelainen, K. Ganesan, K. Bharadwaj, K. Balani, Perceptions and acceptability of electricity theft: towards better public service provision, World Dev. 140 (2021) 105301, https://doi.org/10.1016/j.worlddev.2020.105301.
[83] B. Sharma, K. Balani, S. Agrawal, P. Bhattarai, R. Singh, Improving Discoms’ Financial Viability: Learnings from Uttar Haryana Bijli Vitran Nigam, 2023.
[84] J. Ritchie, J. Lewis, McNaughton Carol, Rachel Nicholls, Ormston, Qualitative Research Practice: A Guide for Social Science Students and Researchers, 2nd ed., SAGE Publications, 2014.
[85] J. Ritchie, J. Lewis, Qualitative Research Practice: A Guide for Social Science Students and Researchers 2003, SAGE, 2003.
[86] Census, Uttar Pradesh: District Census Handbook (Pratapgarh), Government of Uttar Pradesh, 2011 (accessed June 9, 2021).
[87] M. of P. Government of India, Electrification of Villages, Press Information Bureau, 2019.
[88] M. of P. Government of India, Hundred Percent Household Electrification Achieved in 25 States, Press Information Bureau, 2018.
[89] Ministry of Power, Guidelines for Pradhan Mantri Sahaj Har Ghar Yojana (Saubhagya), 2017.
[90] Ministry of Power, Frequently Asked Questions on Saubhagya-“Pradhanmantri Sahaj Bijli Har Ghar Yojana” Q-1. What is Saubhagya Scheme?, 2019.
[91] Ministry of Power, Guidelines for Pradhan Mantri Sahaj Har Ghar Yojana (Saubhagya). https://www.saubhagya.gov.in/assets//download/Guidelines_of_SAUBHAGYA.pdf, 2017 (accessed May 8, 2021).
[92] Rural Electrification Corporation, Minutes of the 7th Meeting of the Monitoring Committee of Saubhagya held on 16th March 2020, 2020.
[93] Ministry of Power, National Tariff Policy 2016, n.d. https://wberc.gov.in/sites/default/files/tariff-policy-28.01.2016.pdf (accessed November 12, 2024).
[94] UPERC, Standard of Performance & Compensation paid by the Distribution Companies as on January 2023, UPERC Website. https://www.uperc.org/showfile.aspx?frmid=Others, 2023 (accessed January 25, 2023).
[95] UPERC, Approval of Business Plan, Determination of Multi Year Aggregate Revenue Requirement (ARR) and Tariff for the First Control Period (Financial Year 2017-18 to Financial Year 2019-20) and True-Up of ARR and Revenue for FY 2014-15 for MVVNL, PVVNL, PuVVNL, D, 2017.
[96] UPERC, UP Electricity (Supply Code), 2005 Upto 12th Amendment, 2018.
[97] UPPCL, Substation Wise 311 Report, UPPCL, 2020. https://upenergy.in/uppcl/en/page/monthly-progress-report (accessed January 21, 2022).
[98] MVVNL, CESS-4 Division’s Performance Data, 2019.
[99] UPERC, Tariff Order dated 22/01/19 on Suo-Moto Proceedings on truing Up of Tariff for FY 2015–16 and FY 2016–17, Annual Performance Review (APR) for FY 2017–18 and Tariff for FY 2018–19 for the State DISCOMs (DVVNL, MVVNL, PVVNL, PuVVNL, KESCO), 2019.
[100] UPERC, Order dated 11/11/20 Truing up of Tariff for FY 2018–19, Annual Performance Review (APR) for FY 2019–20 and Approval of Aggregate Revenue Requirement and Tariff for FY 2020–21 for State Owned DISCOMS (Petition No - 1594, 1595, 1596, 1597, 1598), 2020.
[101] UPERC, Order dated 03/09/19 for Petition No. 1448/2019, 1449/2019, 1450/2019, 1451/2019, 1452/2019 - Truing Up of Tariff for FY 2017–18, APR for FY 2018–19 and approval of ARR and Tariff for FY 2019–20 for DVVNL, MVVNL, PVVNL, PuVVNL and KESCO, 2019.
[102] UPPCL, One Time-Settlement Scheme for LMV-1 Consumers (Upto 4 KW), 2019.
[103] UPPCL, One Time Settlement Scheme for 2018–19, 2019.
[104] UPPCL, One-Time Settlement Scheme for LMV-1 and LMV-5 Consumers, 2021.
[105] B. Blankenship, J. Urpelainen, J.C.Y. Wong, Rural Electricity Supply: Commodity or Entitlement?. https://www.energypolicy.columbia.edu/wp-content/uploads/2019/06/Rural-Electricty-Supply_CGEP_Commentary_112222.pdf, 2019.