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Structural Reforms to Improve Regulation of Indian Electricity Distribution Companies

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

ACS	Average Cost of Supply
APTEL	Appellate Tribunal for Electricity
ARR	Average Revenue Requirement
AT&C	Aggregate Technical & Commercial
BESCOM	Bangalore Electricity Supply Company Limited
BRPL	BSES Rajdhani Power Limited
BYPL	BSES Yamuna Power Limited
CCGAA	Crown Corporations Governance and Accountability Act
CERC	Central Electricity Regulation Commission
DGVCL	Dakshin Gujarat Vij Company Limited
DER	Distributed energy resources
DNO	Distribution Network Operators
EAB	Electricity (Amendment) Bill
EAct	Electricity Act
ERC	Electricity Regulation Commission
ESA	The Electrical Safety Authority
EV	Electric Vehicle
FRP	Financial Restructuring Plan
GHG	Green-house Gas
GLC	Government Linked Company
ICAS	Investment Climate Advisory Service
IESO	The Independent Electricity System Operator
IPP	Independent Power Producer
JERC	Joint Electricity Regulatory Commission
KPLC	Kenya Power and Lighting Company
KSEB	Kerala State Electricity Board
kWh	kilowatt-hour
MH	Manitoba Hydro
MOI	Memorandum of Incorporation
MoP	Ministry of Power
MPMKVVCL	Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MSETCL	Maharashtra State Electricity Transmission Company Limited
MSPGCL	Maharashtra State Power Generation Company Limited
NVE	Norwegian Water Resources and Energy Directorate
OEB	Ontario Energy Board
OPG	Ontario Power Generation
OSEB	Odisha State Electricity Board
PLF	Plant load factor
PMA	Federal Power Marketing Agency
PSPCL	Punjab State Power Corporation Ltd
PUB	Public Utilities Board
RoE	Return on Equity
SCE	Standing Committee on Energy
SERC	State Electricity Regulatory Commission
SOE	State Owned Enterprise
TPDDL	Tata Power Delhi Distribution Limited
UDAY	Ujwal DISCOM Assurance Yojana

Abstract

This paper examines the regulatory framework of the Indian power sector, often criticised for contributing to the financial strain of electricity distribution companies. This criticism arises primarily because tariffs are frequently set too low, preventing these companies from fully recovering their costs.

While other scholars have proposed reforms centred on the selection process for regulators, oversight mechanisms, and regulator training, this paper takes a different approach. It delves into the structural reasons behind the issues in the current regulatory framework, addressing questions such as: Does the ownership structure of the distribution company influence the effectiveness of regulation? Are incentives aligned within the institutional and organisational structure to encourage good financial performance by distribution companies? What changes could enhance the organisational structure or governance of distribution companies to enable more effective regulation?

Regulation becomes necessary when there is a need to balance competing interests, typically those of the utility versus the consumers' or the public interest. Given that government ownership of distribution companies is expected to sufficiently protect the public interest, regulation is mostly associated with privately-owned utilities. However, in India, as in other developing countries, state-owned companies are also subject to regulation.

Regulation is generally more effective with private distribution companies due to their strict budgets, creating an inherent incentive for better financial performance. This claim is supported by experience in India and other developing countries, where private utilities tend to perform better, and regulation is more effective.

While effective regulation may be best achieved with privately-owned distribution companies, there is often political resistance to privatisation, as seen in India. In cases of strong resistance, drawing on the Canadian experience of successfully regulating publicly-owned utilities, the governance of state-owned distribution companies can be modified so that they emulate the behaviour of privately-owned companies. This can be achieved by professionalising government ownership; developing more effective, stronger, and independent boards; and enhancing the commercial orientation of the distribution companies. However, these changes will be challenging for the government to implement, and therefore, privatisation should be given priority, and improving governance of state-owned distribution companies should be pursued only when absolutely necessary.

Reforming the regulatory framework is crucial for improving the Indian power sector. Nevertheless, expectations from regulation must be realistic, and challenges to reform must be recognised. The paper highlights that in many cases, regulation is transformed by the governance culture and processes in a country, rather than the other way around. The paper concludes by noting the complexities of regulating politically sensitive sectors like power.

Executive Summary

The poor financial health of electricity distribution companies has long impeded progress in India's power sector. The tariffs set by State Electricity Regulatory Commissions (SERCs) for distribution companies are often too low, preventing the companies from fully recovering their costs. The regulatory framework and regulators are frequently blamed for this poor financial state, and thus reforming the regulatory framework is seen as crucial for successfully reforming the overall sector.

Considerable work on suggestions for improving the regulatory framework has already been undertaken by researchers, the Union Government, and others. Some examples of suggested reforms include changing the selection process for regulators, introducing mechanisms to provide oversight and monitoring of regulators, and implementing training programmes for regulatory staff. In contrast, this paper takes a different approach by examining the structural underpinnings of the problems within the regulatory framework. Among the questions we ask are: Does a distribution company's ownership impact the effectiveness of regulation? Are the incentives in the institutional and organisational structure compatible with good financial performance by the distribution companies? What changes in the sector's organisational structure or in the governance of distribution companies are likely to facilitate more effective regulation?

To answer these questions, we first look at the reasons for introducing regulation in the electricity sector. While there are various explanations for why regulation is needed and why it exists, a common theme among them is that regulation is required when there is a need to balance competing interests. For example, regulators balance the interests of the utility (sufficient revenue, financial stability) against those of the consumers (reasonable prices for electricity, good quality of service). Another consideration is balancing efficiency against fairness and equity.

With government ownership of distribution companies, such balancing of interests by a regulatory agency should ideally not be required because government ownership and oversight are thought to be sufficient protection of the public interest. Government ownership is often viewed as another means of regulating utilities.

Experience in developed countries is consistent with this finding. Until the 1980s, in almost all countries except the US, the electricity sector was a publicly-owned monopoly. Regulation was introduced in developed countries when they transitioned from the provision of electricity services by publicly-owned utilities to provision by private entities.

However, in India, as in other developing countries, government-owned distribution companies are subject to regulation. In the 1990s, when power sector reforms were introduced, they followed a model of reforms comprising several key steps: corporatisation and unbundling of state-owned electric utilities; privatisation of the unbundled companies; introduction of independent power producers (IPPs); establishment of independent regulatory agencies; and the enactment of legislation to liberalise the sector. The Electricity Act (EAct), passed by the Indian Parliament in 2003, was designed as an enabling framework for this standard model of reforms. Privatisation of distribution companies was anticipated. However, only Delhi and Odisha have privatised their distribution companies, and both did so prior to the enactment of the EAct. Distribution companies in Mumbai, Ahmedabad, Surat, and Kolkata have been privately-owned from their inception and remain so.

Regulating publicly-owned utilities presents distinct challenges as opposed to regulating private companies. One reason is that private companies are singularly focused on profit maximisation, subject to regulatory oversight. In contrast, publicly-owned utilities often grapple with multiple, vaguely defined objectives that can conflict, some of which are tied to social welfare and equity. Moreover, private companies operate under hard budget constraints,[1] facing the threat of bankruptcy if their performance is poor. On the other hand, publicly-owned utilities have soft budget constraints and do not need to pay the same attention to financial performance.

Studies bear out these conclusions. For example, a study by the World Bank that evaluated power sector reforms in developing countries found that regulators

[1] Janos Kornai coined the term "soft budget constraint." Normally, for a firm, expenditure must be met by revenue generated. If that relationship is relaxed and excess expenditure is expected to be covered by some other entity, typically the State, then this is referred to as a soft budget constraint. Kornai states that the higher the probability of the excess expenditure being covered by another entity, the softer the budget constraint (Kornai, 1986). A hard budget constraint exists when there is no other entity to cover the excess expenditure.

exhibited a higher adherence to laws, rules and regulations when overseeing private utilities. In contrast, their authority over tariff setting was notably less pronounced when regulating publicly-owned utilities. The study also highlighted that privately-owned utilities generally demonstrated stronger corporate governance, especially in areas such as human resources management and financial discipline.

In India too, there is a marked difference between the performance of privately-owned and state-owned distribution companies. Table ES.1 illustrates this contrast. At the end of March 2020, state-owned distribution companies had accrued a deficit of Rs 5.63 per kWh of energy sold in FY 2019-20,[2] whereas privately-owned distribution companies had a cumulative surplus of Rs 2.48 per kWh. For the year 2019-20, the state-owned companies earned revenue that was less than their expenses, creating a revenue gap of Rs 0.53 per kWh. In contrast, the privately-owned companies had a revenue surplus of Rs 0.34 per kWh. Furthermore, the aggregate technical and commercial (AT&C) losses[3] were only 8.00% for privately-owned companies, significantly lower than the 21.29% recorded for state-owned companies. However, the superior financial performance of privately-owned companies has a notable drawback—the creation of a substantially greater amount of accumulated deferred revenues, shown as regulatory assets, a topic we will delve into later in this executive summary.

Two main requirements emerge for the effective regulation of distribution companies: a hard budget constraint for the distribution company, and an organisational structure in which the incentives of the involved organisations are properly aligned. A hard budget constraint is necessary because regulation utilises financial incentives to modify the behaviour of companies, and these incentives are effective only when there is a hard budget constraint. The primary reason why many state-owned distribution companies in India continue to incur revenue deficits is that they have a soft budget constraint. In contrast, private companies, constantly under the looming threat of bankruptcy, inherently possess a hard budget constraint.

For regulation to be effective, it is also important that incentives for key organisations within the regulatory framework align with the overall goals of the framework. Each organisation should inherently find it in its interest to contribute to the sector's overall welfare. Otherwise, significant resources and energy would be required to compel these individual organisations to act against their own interests and to persuade them to prioritise the public interest instead.

The need for aligned incentives in the regulatory framework becomes apparent when examining various bailout schemes initiated by the Union Government for state-owned distribution companies. One reason for the failure of these bailouts and several schemes aimed at improving the operating performance of state-owned distribution companies is that, for these entities, such initiatives are not top priorities. In contrast, privately-owned distribution companies, driven by a focus on maximising profits, inherently have an incentive to improve performance.

Table ES.1. Comparison of Performance of Indian State-Owned and Privately-Owned Distribution Companies

Based on data for 2019-20, per kWh of energy sold in that year

	Accumulated Surplus (Rs/kWh)	Annual Revenue Gap (Rs/kWh)	Regulatory Assets (Rs/kWh)	AT&C Losses (%)
State-Owned Discoms	-5.63	0.53	0.43	21.29%
Privately-Owned Discoms	2.48	-0.34	4.93	8.00%

Source: Power Finance Corporation of India. (2023, May). Report on Performance of Power Utilities: 2021-22.

[2] We have chosen to use data for 2019-20 because the pandemic affected the performance in 2020-21 and 2021-22, resulting in performance measures that were not representative. In addition, we present the financial surpluses and deficits and other quantities per kWh of energy sold in that financial year to normalise for the differences in load served by state-owned and privately-owned distribution companies.

[3] AT&C losses include technical losses, billing losses including those from theft of electricity, and collection losses.

The difference in incentives is best illustrated by the performance of the Delhi distribution companies after privatisation. Around the same time as the first bailout package by the Union Government in 2001, the Delhi Government privatised distribution in 2002 and took over the losses of the state-owned erstwhile Delhi Vidyut Board (DVB), thus providing the newly created three private distribution companies with a clean slate. Over 2002-2022, the three private companies cut losses from 48.1%, 57.2%, and 48.1% to 9.70%, 9.41%, and 7.39%, respectively. Service quality also improved dramatically. It is instructive to compare the plans for improvement by the three private companies in 2002 with the most recent scheme of the Union Government, the Revamped Distribution Sector Scheme (RDSS). All the plans, those of the three private distribution companies and under RDSS, are quite similar, with a focus on three aspects: metering, billing, and collection; upgradation of the distribution network; and training and capacity building. Twenty years ago, the three private distribution companies did what RDSS is planning to do now. Furthermore, the private companies have succeeded in accomplishing their goals without much financial support from, or oversight by, the Union Government. On the other hand, for the state-owned distribution companies in the country, there have been three bailouts and four schemes for loss reduction and improving performance, with very poor results. The stark difference in the performance, over twenty years, of the private companies in Delhi and the state-owned distribution companies in the rest of the country highlights the importance of a framework where incentives are aligned.

Privatisation will not automatically solve all problems in the distribution segment. However, with additional action, we expect better outcomes for privately-owned companies compared to state-owned ones. For example, we find that even with privately-owned distribution companies, the thorny issue of tariffs being too low remains. However, the problem is handled differently for private and state-owned companies. Generally, in the case of state-owned distribution companies, the distribution company suffers a financial loss, worsening its financial health. In contrast, for privately-owned companies, revenue recovery is often deferred through the creation of a regulatory asset. While the creation of regulatory assets is far from a perfect solution because it can create cash flow problems for the distribution companies, it maintains the distribution company's financial health and affords the distribution company the possibility of recovering the revenue in the future. The private distribution companies in Delhi are using the judicial system to assert their claim on the deferred revenue.

The issue of deferred revenues and regulatory assets highlight the need to temper expectations from regulation. It is tempting to view independent regulation as a cure-all for problems in the distribution segment. Though appealing, the notion of independent regulation as a silver bullet for governance and distribution sector woes needs tempering. The overall governance of a country determines how the practice of regulation evolves within it. We also need to remember that the more electorally sensitive a sector is, as is the case with the power sector, the more difficult it will be for the regulation of that sector to be apolitical.

Clearly, regulation is more effective with privatised distribution companies. However, there is often political resistance to privatisation, and this is the case in India. Under such circumstances, it may be possible to achieve the benefits of privatisation by modifying the governance of state-owned distribution companies so that they emulate the behaviour of privately-owned companies. Such modification should have two broad objectives: (1) to create a separation between the state-owned distribution company and the state government so that day-to-day political interference is avoided; (2) to incentivise a state-owned distribution company to behave more like a privately-owned company and to be subject to the same financial discipline.

The Canadian experience with successfully regulating publicly-owned utilities could provide valuable lessons for modifying the governance of state-owned distribution companies. While Canada is a much more affluent country than India, there are several interesting similarities between them, and in the power sector of the two countries—both are large countries with a federal structure; in both countries, provincially or state-owned utilities play a large role in the power sector; and both countries use their electric utilities to promote public goals.

Significant features of the governance of utilities in Canada can be used to achieve the two objectives of the modification of the governance of state-owned distribution companies outlined earlier. As in Canada, an independent board can be established that oversees the distribution company and its manage-

ment and that would be accountable to the state government. The day-to-day management of the distribution company would be the responsibility of the CEO and the management team, while the board would be responsible for the distribution company's strategic direction, protecting its resources, monitoring its performance, and reporting to the state government. Such a structure will avoid day-to-day interference by the state government in the management of the distribution company, while allowing the state government to provide directions to the company to fulfil policy goals of the government.

Three categories of measures would enable the successful transition to the modified governance structure outlined above: (1) professionalising government ownership; (2) developing more effective, stronger, and independent boards; and (3) enhancing the commercial orientation of the distribution companies.

While modifying state-owned company governance merits pursuing, success requires a strong state government commitment. With such a commitment, reforms have succeeded, as in Malaysia's state-owned enterprise reforms. However, in the case of electric utilities in South Africa and Kenya, where such reforms were not backed by true intent, there was widespread corruption and very poor performance, even though on paper, the governance structure had all the desirable features listed earlier. Given that improving the governance of distribution companies along the lines discussed here involves many changes that will be challenging for the government to implement, we believe that privatisation should be given priority, and improving governance of state-owned distribution companies should be pursued only when absolutely necessary.

In summary, regulation is more effective with private distribution companies. Therefore, the paper recommends that the privatisation of distribution be prioritised. Where privatisation is difficult due to political opposition, the governance of state-owned distribution companies should be improved so they have similar incentives as private companies to improve their financial and operational performance. If such modification of the governance fails to bring about significant improvements, then there should be renewed effort to privatise the distribution companies.

1. Introduction

There is broad agreement on the need for reform of India's power sector, particularly in the distribution segment. Tariffs of many distribution companies are set too low and do not allow the companies to fully recover their costs.[4] This happens even though tariffs for large commercial and industrial (C&I) consumers are set high and are used to cross-subsidise smaller, mostly residential and agricultural consumers. The enduring under-recoveries of revenue by distribution companies have led to a serious decline in the financial health of these companies, rendering the distribution sub-sector the Achilles' heel of the power sector.

The regulatory framework and regulators receive much of the blame for these problems. Kumar and Chatterjee (2012) say that State Electricity Regulatory Commissions (SERCs) chose to "ignore many crucial provisions" of government policies and are responsible for the slow pace of reforms of the tariff-setting framework and the "consequent disastrous decline in the financial viability of the whole sector."

Since 2014, the Union Government has presented several drafts of an Electricity (Amendment) Bill (EAB) covering proposed reforms across many areas of the power sector. A consistent feature of all these draft bills is provisions intended to enhance the regulatory framework. In its report on the Electricity (Amendment) Bill (EAB) 2014, the Standing Committee on Energy (SCE) concurred that certain amendments to fortify the regulatory framework were necessary because of the issues with "… the State Commission not allowing the tariff to cover the cost and expenses and creating regulatory assets" (SCE, 2015; page 96). The most recent draft of the EAB was tabled in the Lok Sabha in August 2022 and is currently under review by the SCE.

This disappointment with the performance of SERCs is echoed in more recent commentary. For example, Banga (2020) describes SERCs as "toothless bodies" that have "faltered on umpteen occasions under political and public pressure." He notes that despite independence given to them in the EAct, they have failed to: (1) revise tariffs and instead some have created large regulatory assets; (2) reduce cross-subsidy charges thus preventing the introduction of competition through open access; and (3) paid inadequate attention to quality of service. Devguptapu and Tongia (2023) highlight the magnitude of the gap between the revenue distribution companies collect and their costs. For the year 2020-21, they estimate this revenue gap to be Rs 1.14 per kWh of electricity sold, including amounts of about Rs 0.08 per kWh whose collection has been deferred by the respective SERCs.

Considerable work has already been undertaken by researchers, the Union Government, and others suggesting changes in different aspects of the regulatory framework. For example, suggestions have been made to change the selection process of regulators; introduce mechanisms to provide oversight and monitoring of regulators; and improve the training of regulatory staff. This paper adopts a different approach, examining the structural underpinnings of the issues within the regulatory framework. Key questions we explore include: Does a distribution company's ownership impact regulatory effectiveness? Are the incentives in the institutional and organisational structure compatible with good financial performance by the distribution companies? What changes in the sector's organisational structure or governance of distribution companies are likely to facilitate more effective regulation?

The paper is divided into four parts. Part I provides the background on why regulation[5] emerged, its spread globally and to developing nations, and its adoption in India. In Part II, we describe the experience in India with the regulation of distribution companies. In Part III, we use the information in Parts I and II and analyse several issues related to the current problems with the regulatory framework in India. We cover the experience with regulating publicly owned utilities versus privately-owned utilities in both developed and developing countries; independence of regulators; and the need for alignment of incentives in a regulatory framework. We end with our conclusions and recommendations in Part IV.

[4] Electricity tariffs are set by State Electricity Regulatory Commissions (SERCs). The tariffs are supposed to cover all the reasonable costs of the distribution companies and allow a return on the equity investment in the company.

[5] In this paper, when we discuss regulation, we mean economic regulation. Economic regulation refers to measures taken to control prices, limit entry, and control other economic behaviour of firms and includes financial incentives and penalties to incentivise firms to behave in a way that is consistent with social or environmental policy (Decker, 2015). It excludes other kinds of regulation that are designed to influence outcomes such as health or safety.

PART I. BACKGROUND

2. Reasons for Regulating Electric Utilities

Before the 1980s, the electricity sector was a public monopoly in almost every country except the US. Regulation was introduced in these countries only after the private sector entered the electricity sector. In contrast, electric utilities in the US have been mostly privately-owned from the beginning and have been regulated. Therefore, much of the early literature tends to be based on the American experience (Morgan and Yeung, 2007).

There are two broad categories of theories of regulation—public interest-based theories and private interest-based theories (Hertog, 2010). Public interest theories assume that legislators, regulators, and others responsible for the design and implementation of regulation have a desire to promote the welfare of the community (Morgan and Yeung, 2007). In addition, these theories assume that regulators have the information and the power to enforce the promotion of the public interest (Hertog, 2010). In contrast, private interest theories are sceptical of the interest among legislators and regulators to promote public welfare and focus on evidence that regulation often benefits certain groups and not necessarily those it was intended to benefit (Morgan & Yeung, 2007).

2.1 Public Interest-Based Theories of Regulation

Public interest theories have two main sub-categories. Initially, public interest theories focused on economic goals, which essentially dealt with correcting market failures caused by the monopolistic nature of the sector. The second sub-category of theories dealt with socio-political goals and the need to prevent the exploitation of consumers by electric utilities (Phillips, 1993; Decker, 2015).

2.1.1 Economic Welfare Linked Reasons for Regulation

Originally, electric utilities were vertically integrated—handling generation, transmission, and distribution. The earliest reasons given for regulation were based on the understanding that such vertically integrated utilities were natural monopolies.

For maximal economic welfare, utilities were granted exclusive regional service rights, blocking new entrants. This was intended to avoid duplication of assets such as wires and poles that would have otherwise led to higher fixed costs for consumers. It was also thought that restricting the entry of other utility companies would avoid destructive competition (Decker, 2015). It was thought that having multiple companies in a service territory would lead to cycles of surplus and deficit of capacity which would, in turn, lead to instability in prices for consumers and profits for the companies. In addition, if a competitor entered the service territory of an existing utility, it would seek out the most lucrative category of consumers. Such cream-skimming could lead to significant revenue deficits for the incumbent utility, necessitating an increase in tariffs for the remaining consumers.

Once it was agreed that electricity service was a natural monopoly and a company given exclusive service rights in its territory, regulation became necessary. The earlier rationale for the regulation of these monopolies was based on the need to avoid a non-optimal price. Assuming firms set prices for their products to maximise profits, under competitive conditions firms would be expected to set prices at the point where marginal revenue equalled marginal cost. However, monopolies can maximise their profits by reducing their output and charging a higher price (Decker, 2015). Earlier rationales for regulation were based on the need to prevent a monopoly from restricting output and increasing prices in this way. This explanation is not often discussed these days.

2.1.2 Socio-Political Reasons for Regulation

Other reasons for regulating monopolies have gained prominence, many of which stem from preventing consumer exploitation. Phillips (1993) contends that, in contrast to the economic welfare reasons, proponents of these reasons do not advocate intervention in the market because markets are inefficient; rather, intervention is necessary to protect consumers from the "unimpeded operation of market forces." These approaches emphasise socio-political goals over economic goals—valuing equity and fairness instead of economic efficiency (Phillips, 1993). Decker (2015) outlines several such rationales. With regional monopolies, regulation prevents excessively high prices beyond costs. There is also concern that without regulation, the distribution company will let the quality of service (QoS) degrade to save the

additional capital expenditure that would be required to maintain or improve the QoS (Decker, 2015). A related but even more important concern raised by Decker (2015) is that monopolist distribution companies may not have sufficient incentives to increase efficiency and improve the economic welfare of their consumers. This contrasts with competitive markets where companies have a natural incentive to innovate to gain a competitive advantage over their rivals.

Another view is that vital utility sectors like electricity require regulation given their economic significance. In India, we often hear that the poor quality of electricity service degrades the ease of doing business in the country. Given this importance, it is argued that the pricing and distribution of these services cannot be left to the market. A related explanation for why regulation is needed is that these services such as the distribution of electricity should be accessible and affordable for all citizens. These distributional issues, including equity, fairness, and the protection of vulnerable populations, require decisions to be made by a regulatory agency and not be left to the market. Of course, there is a counterargument that says that regulators should focus on efficiency and let the government decide on distributional issues through its policies.

Another reason for regulation that Decker (2015) mentions, and that has become very important, is that of addressing externalities. In the power sector, the most common externality is that of increased emissions of greenhouse gases (GHGs) and air pollution due to electricity generation using fossil fuels. Regulation can help address these externalities by allowing the regulated utility to internalise the cost of reducing pollution through higher tariffs.

2.2 Private Interest Reasons for Regulation

The preceding rationales aimed to enhance socio-economic welfare. However, several alternative explanations are not based on arguments of welfare. These explanations do not form a coherent set; in fact, some of the explanations are inconsistent with each other. In this section, we outline these explanations to give an idea of the variety of them that have been put forth.

2.2.1 Interest Group Theories

Interest group theories posit regulation serves specific groups, not the public interest. One such set of theories suggests that regulation is introduced because utilities themselves want to be regulated because it restricts entry of rival companies; makes subsidies available; and restricts substitute products. *Prima facie*, utilities would not want the prices they charge and hence their profits to be controlled by a regulating agency. However, there does not seem to be evidence that regulated prices are necessarily lower than what utilities would charge. Nor does it appear that regulation protects consumers from exploitation. Interest group theories are not generally sector-specific, and it is not clear whether, and to what extent, these theories would apply to the electricity sector.

Interest group theories naturally lead to a discussion of the capture of regulation by certain interest groups. Stigler (1971) argues that organised groups, usually small in size, and who have a substantial stake in the outcome will have more success in capturing the regulatory agency. His arguments support the general idea that regulation seems to favour incumbents. A regulator attempts to please all stakeholders as much as possible by trying to arrive at a "politically optimum distribution of wealth" (Decker, 2015:30). Decker (2015) reminds us of critiques of both the economic welfare and interest group theories, pointing out that both are generalisations that have not been empirically tested.

2.2.2 Regulation as an Approach to Manage a Long-Term Contract

An alternate view sees regulation as managing the long-term utility-customer relationship. Decker (2015:32) points out that a long-term contractual arrangement between a utility and its customers is challenging given the high level of uncertainty (due to fuel prices, load growth, new technologies, etc.). The difficulty is exacerbated by the fact that both the utility and its customers must make long-term and immovable investments based on their relationship. Under these circumstances, it is almost impossible to have a complete contract. Regulation provides a reasonable substitute. Decker argues that under these conditions, formal processes of determination of revenue requirements and the setting of tariffs can be seen as a form of dispute resolution. Further, Decker points out that there are "informal alternatives" to the formal process. One of those informal alternatives is the settlement of rate cases between parties without the intervention of the regulatory agency, used in the US. However, in the US, once an agreement is reached between the parties, it has to be submitted to the regulatory agency for approval.

2.3 Summary of Reasons for Regulation

Clearly, diverse explanations exist for the need and purpose of regulation. As Decker (2015) points out, each of these explanations helps us understand some aspect or aspects of regulation. However, these explanations do not form a coherent set; in fact, some of them may be contradictory. For example, a singular focus on economic efficiency may conflict with the requirements for universal access, affordability, and the need for cross-subsidisation. Consequently, there is no comprehensive and internally consistent explanation for all aspects of regulation. However, this somewhat incoherent set of explanations can help us understand why the job of regulators can be difficult. There is no clear singular objective that they are required to pursue, and they may often be required to balance these conflicting requirements.

From the discussion earlier, it is important to notice that regulation is required when there is a need to balance competing interests. For example, regulators balance the interests of the utility (sufficient revenue, financial stability) and against those of the consumers (reasonable prices for electricity, good quality of service). Another example is the balancing of efficiency considerations against those of fairness and equity. Interestingly, in the case of state ownership of utilities, such a balancing is not required, and therefore, regulation by an independent agency should not be necessary. Decker (2015) treats state ownership as another method of regulating utilities. The reason he gives is that publicly owned utilities "will not be motivated by private gain and can be directed to act in a socially desirable way" (Decker, 2015). This is the reason that many states in the US do not regulate municipally owned electric utilities. We discuss this issue in much greater detail later in Section 6 of this paper.

3. Growth of the Regulatory State Around the World

The role of the state has been changing in the more affluent countries since the 1980s. Before the 1980s, states played an expansive role designing, financing, managing, and providing public services (Jarvis, 2012). From the 1980s, there was privatisation of state-owned assets and a shift to private provision of services for citizens, with the state playing a regulatory role. Researchers describe this process as 'the death of the "interventionist" state and the rise of the "regulatory state."' (Jarvis, 2012). We recognise that the US did not fit this pattern. It had private provision of services, such as electricity and telephony, along with regulation much earlier (Levi-Faur, 2005). The reasons for the rise of the regulatory state in more affluent countries were a mix of the following factors: fiscal constraints, perceived inefficiencies in the delivery of services by the state, political resistance to increased taxes, and an ideological preference for markets (Jarvis, 2012). In addition, because of technological changes, competition became feasible in these services.

Notions of the regulatory state diffused to developing nations. Regulation also aligned well with the emphasis by multilateral development agencies on privatisation and markets. The provision of public services by the private sector necessitated regulation. Good regulation came to be seen as allowing more "entrepreneurship and investment" and thus improving "the conditions for economic activity" and "a country's quality of social life" (ICAS, 2010).

Before moving on to discuss the experience of developing countries with regulation, we outline some discussion on the components of good regulatory practice. Majone (1997) cautions that independent agencies in governance are not always better than traditional bureaucracy. He asserts that independent agencies are appropriate in limited arenas where "expertise and reputation are the key to greater effectiveness." To support this assertion, Majone identifies two major advantages of independent agencies: "expertise and the possibility of making credible policy commitments." This is because policy continuity for problems that require long-term solutions becomes difficult in a democracy where elections at relatively short intervals create incentives for politicians to focus on short-term solutions (Majone, 1997).

Dividing governance issues into two categories—one related to efficiency and the other related to redistribution of resources, Majone contends that to ensure the legitimacy of independent regulators, they should focus solely on issues related to efficiency. Furthermore, they should employ a "problem-solving" instead of "a bargaining style of decision-making." Acknowledging that regulatory policies often have redistributive effects, he advises that regulators should treat these redistributive effects as "policy constraints rather than policy objectives."

Majone (1997) contends elected officials alone should decide issues involving major resource redistribution. He reasons that the delegation of "important

policymaking powers" to independent regulators is democratically justified only on issues related to efficiency, where expertise and a problem-solving decision-making style are more important than "direct political accountability."

Majone (1997) does not address the question of what happens if the government directs the regulator to address an issue related to redistribution. One possibility, as discussed in Section 7, could be to require that any such directive from the government be explicit and in writing. In addition, the government should be required to directly compensate the regulated entity (the distribution company in our case) for the additional cost caused by the deviation from the economically efficient case.

Independent regulators are not directly accountable to voters. However, their political legitimacy can be established and enhanced by several procedural features, including: (1) the agencies are established under democratically passed acts which delineate the agencies' objectives and their legal authority; (2) regulators are appointed by elected officials; (3) there are clear and formal rules for decision-making by the agencies, including public participation; (4) the agencies justify their decisions through reasoned orders that are open to review by the judiciary, thus ensuring transparency and accountability (Majone, 1997).

3.1 Difficulties with Transplanting the Regulatory State to Developing Countries

Transitioning to a regulatory state came to be seen as a panacea that would lead to better governance (Jarvis, 2012). As mentioned earlier, regulation was considered a superior approach to governance because it relied on a combination of expertise and independence of the regulatory body. While the transition has been smooth and successful in developed countries, that is not case in developing countries. To understand this discrepancy, it is important to note that the objectives of the regulatory state go beyond governance. The regulatory state involves a major policy shift where markets play a much bigger role.

This encapsulation of the idea of a greater role for markets within the regulatory state can be seen in a paper by the Investment Climate Advisory Service (ICAS) of the World Bank Group on improving regulatory governance in developing countries. Listing the goals of regulatory reform in developing countries, ICAS gives the first two (of five) goals as: (1) sectoral liberalisation; and (2) increased market entry and competition (ICAS, 2010: 9). In addition, it posits that the recommended regulatory reforms could "mitigate important constraints on economic development" through: (1) making public policy more efficient by efficient allocation of resources; (2) reducing barriers to market entry and increasing investment; and (3) reducing risks for market players (ICAS, 2010:13).

Jarvis (2010) lists three features of the regulatory framework which affect the quality of regulation: (1) regulatory design (rules); (2) regulatory tools (incentives); and (3) regulatory institutions (Jarvis, 2010). We add a fourth feature—the quality of human capital in regulatory agencies. Serious shortcomings in any of these four features can lead to a loss of regulatory credibility. While considerable attention has been devoted to regulatory design and tools, Jarvis (2010) contends that in the transplantation of a regulatory framework, regulatory institutions have been assumed, neglecting issues of institutional capacity and the political and social environment that exists in the recipient country. Therefore, transplanting regulatory models and systems to developing countries generates different outcomes from those in developed countries (Jarvis, 2010). He describes the various attempts to restructure the electricity sector in Thailand and Indonesia, and the consequent failures, as examples of the challenges in transplanting regulatory models and systems to developing countries.

Jarvis (2010) offers recommendations on instituting regulatory reforms in developing nations. First, the introduction of regulatory reforms should be cognizant of the institutional limitations of the recipient country and should be introduced in a calibrated manner according to the institutional endowment of that country. Second, the challenge of building new institutions should be recognised. Major policy changes that transform existing institutions and create new ones can be significant burdens for new entities because of a new institutional terrain and the need to build trusting relationships between stakeholders. Third, roles and responsibilities in the new framework should be clearly specified. Fourth, the extent to which a regulator's role isn't solely administration and oversight but also policy development should be clearly specified.

4. History and Rationale for Introducing Regulation in India

As part of the global move away from the "interventionist state" with public-sector provision of services to the "regulatory state" with private provision of services, regulated as necessary by the state, the electricity sector around the world also saw the introduction of reforms. These reforms were based on the "standard textbook model" consisting of the following steps: corporatisation and unbundling of state-owned electric utilities; privatisation of the unbundled companies; introduction of independent power producers (IPPs); establishment of independent regulatory agencies; and enactment of legislation liberalising the sector (Jamasb et al., 2015).

By the 1990s, India's problems in the power sector spurred interest in reform across states. The World Bank, using the "standard textbook model," was a key funder of India's reforms (Sharma, 2002). The first state to implement these reforms in its power sector was Odisha. The vertically integrated utility in the state was the Odisha[6] State Electricity Board (OSEB). OSEB had been experiencing high transmission and distribution losses, inadequate metering and collection, and low plant load factors (PLFs) of its power plants (Sreekumar, 2002). Consequently, it was finding it difficult to raise funds for the required investment in generation, transmission, and distribution. The state government too was finding it difficult to provide financial support to OSEB (Sreekumar, 2002).

In November 1993, the Government of Odisha and the World Bank signed an agreement on power sector reforms. In addition to setting up a regulatory commission, the agreement included plans to unbundle and corporatise power generation, transmission and distribution segments, privatisation of distribution, the introduction of the Reform Act, and reform of the tariff process (Sreekumar, 2002). The Odisha Electricity Regulatory Commission (OERC) was established in June 1996 (Sreekumar, 2002). The experience with reforms in Odisha has been tumultuous with two rounds of privatisation of the distribution segment. However, because that experience is beyond the scope of this paper, we do not discuss it any further here.

Another impetus for setting up electricity regulatory commissions arrived with the introduction of independent power producers (IPPs). The SEBs in most states were in poor financial health and there were significant shortages of generation capacity in almost all parts of the country. Independent power producers (IPPs) were allowed to boost the generation capacity in the country. It was thought that setting up electricity regulatory commissions (ERCs) would provide private investors with a level playing field (Dhaul, 2019). With the presence of ERCs, investors could expect to be treated fairly on issues of payments and operational procedures (Dhaul, 2019).

In parallel with the reform efforts in Odisha, efforts were being made at the central level too for changes in the national legislation to reform the power sector. Recognising the gravity of the power sector, in 1993, the National Development Council set up a committee known as the "Power Committee," with Sharad Pawar, then Chief Minister (CM) of Maharashtra, to investigate the health of distribution companies. The Power Committee recommended the formation of Tariff Boards at the national and regional levels to regulate the tariff policies of utilities (Kumar and Chatterjee, 2012). Following up on these recommendations, at the Chief Ministers' Conference in 1996, a consensus emerged that if regulation of tariffs remained with the government, "political compulsions" would make rationalisation of tariffs impossible (Kumar and Chatterjee, 2012). Emphasising that the financial survival of distribution companies was essential to fulfilling the goal of universal access for the country, it was agreed to introduce independent regulatory commissions (Kumar and Chatterjee, 2012). This led to the drafting of the Electricity Regulatory Commissions Bill.

Even though there was some resistance from the states, the Union Government introduced an ordinance in 1998 regarding the establishment of regulatory commissions. The ordinance established the Central Electricity Regulatory Commission (CERC) and required each state to establish a State Electricity Regulatory Commission (SERC) within six months. In the Parliament, there was opposition from some of the states which led to a weakening of two crucial features of the ordinance when it was converted into the ERC Act of 1998. First, instead of a mandate

[6] At the time of these reforms, the state was known as "Orissa." The name of the state was changed to "Odisha" in 2011. For the sake of convenience and to avoid confusion, we refer to the state as "Odisha" throughout this paper.

to establish a SERC within six months, a state government could, "if it deemed fit," establish a SERC (Kumar and Chatterjee, 2012). Second, a requirement that a state government pay the promised subsidy within 90 days was watered down by removing any time limit for payment of subsidy (Kumar and Chatterjee, 2012).

As noted, Odisha had already formed OERC when the ERC Act passed in 1998. Haryana and Andhra Pradesh too had enacted their electricity reform acts and had established SERCs. Several states set up SERCs after the act was passed. In 2003, the Electricity Act (EAct) was passed, and it required every state to set up a SERC within six months, and now all states have SERCs.

PART II. THE INDIAN EXPERIENCE WITH REGULATION

5. Experience with Regulation of Distribution Companies in India

The Electricity Act (EAct) of 2003 was developed as a comprehensive package of reforms of the power sector to address problems in all three segments—generation, transmission, and distribution—and to promote competition in the sector (Kumar & Chatterjee, 2012). One aspect of these reforms was the unbundling of the erstwhile state electricity boards (SEBs) into separate entities for generation, transmission, and distribution. The thought was that these companies would be privatised starting with distribution (Prayas, 2017). It was expected that the corporatised distribution companies would operate on a commercial basis at arm's length from the state government (Prayas, 2017). States were initially given a year to carry out the unbundling, but extensions were sought and given. Even now, three states have not completely unbundled. Punjab and Tamil Nadu have separated the transmission segment in the state but continue to have generation and distribution bundled together in one company in the state. Kerala continues with the vertically integrated Kerala State Electricity Board (KSEB).

In many states, the unbundled segments operate more as divisions of the same company than as independent entities. For example, in Maharashtra, the erstwhile Maharashtra State Electricity Board (MSEB) was unbundled into the Maharashtra State Electricity Distribution Company Limited (MSEDCL), Maharashtra State Power Generation Company Limited (MSPGCL), and Maharashtra State Electricity Transmission Company Limited (MSETCL). All three—MSEDCL, MSEGCL, and MSETCL—are subsidiaries of the MSEB Holding Company Limited. The Minister for Energy in the Maharashtra State Government is the Chairman of the Holding Company.[7] Furthermore, in most states, the distribution companies in the state buy almost all the electricity generated by the respective state-owned generation company.

Other aspects show these "corporatised" distribution companies do not act independently of the respective state governments. Distribution companies are often headed by the state's energy secretary or the chairperson of the state transmission company (Prayas, 2017:170). Furthermore, even in states with multiple distribution companies (for example, Uttar Pradesh (UP), Madhya Pradesh (MP), and Gujarat), most important decisions, for example, power procurement, are made at the state level, defeating the reason for having multiple distribution companies (Prayas, 2017:170). In addition, the tenure of the heads of the distribution companies, often IAS officers, is short, preventing the executives from developing knowledge and expertise in the sector (Prayas, 2017: 170).

5.1 Operational Performance of Distribution Companies

One of the main objectives of power sector reform was to improve the financial health of distribution companies. But unfortunately, that objective has not been achieved. Instead, the financial losses of distribution companies have increased. The Power Finance Corporation (PFC) reports that as on March 31, 2022, the accumulated losses for distribution companies were Rs 5,52,507 crore (PFC, 2023: Annexure 1.6).

The losses stem from various factors:

- High aggregate technical and commercial (AT&C) losses.
- Persistent gap between the cost of service and the revenue earned by the distribution companies. This is often discussed in terms of the difference between the Average Cost

[7] Even if these companies were separate companies and not under one holding company, there would still be problems because the ownership would still be with the state government, and they would be unlikely to act as independent companies on a commercial basis.

of Supply (ACS) and the Average Revenue Requirement (ARR) on a per kWh basis. The ARR is what the distribution company petitions the SERC for, or what the SERC grants.

- Deficits in the subsidy provided by the state government. This deficit is the difference between the subsidy that was promised, and the subsidy amount received.
- High cost of power due to poor planning practices. Generation costs make up 70-80% of the cost that is paid by consumers. So higher generation costs than appropriate leads to a very significant increase in the tariffs for consumers.

Tyagi and Tongia (2023) and Devaguptapu and Tongia (2023) carefully quantified each component's contribution. Tyagi and Tongia (2023) have shown that often, while the tariffs that are set at the start of the respective year (the ex-ante calculation) seem to provide the required revenue that compensates the distribution company fully for its costs, the ex-post calculation done while truing up the revenues shows a significant deficit of revenue. For FY 2018-19, they show this difference between the ex-ante and ex-post calculations, averaged over all distribution companies, resulted in a revenue deficit of Rs 1.64 per kWh. They show that the components directly under the control of the distribution company--network losses higher than the limit set by the SERCs, and non-collection of revenue from consumers—contributed only about 25% of the revenue deficit. In addition, the shortfalls in the subsidy promised by the state governments contributed another 8% of the overall revenue deficit. Differences, between the ex-ante and ex-post calculations, in power purchase costs and other costs contributed a much larger fraction, 64%, of the revenue deficit.

Devaguptapu and Tongia (2023) have undertaken a similar calculation for all the years from 2006-07 to 2020-21, and for state-owned distribution companies only. This quantification, in both studies, of the contribution from each of the components to the total losses is valuable because it can help target efforts to reduce losses. For example, most of the efforts at reducing losses in the various loss reduction schemes which we discuss in the following subsections, have focused on the components under the direct control of the distribution company such as reduction of network losses and uncollected revenue from consumers. But as these two studies show, other components such as under-estimation of power purchase and other costs also add significantly to the deficits in revenue for distribution companies. Effort needs to be directed to reducing these sources of losses also.

In earlier work, Prayas (2017) also identified the contribution of poor estimation of power purchase costs to ongoing revenue deficits. Prayas stated that the ACS-ARR gap comes about mainly because the demand forecast is greatly overstated. There are several potential sources of these overstated forecasts. Sometimes, the distribution company projects future growth based on past trends, ignoring changes such as an increase in load that migrates to self-generation or a competitive supplier using the open access provisions in the EAct (Prayas, 2017). On the other hand, the distribution company may deliberately overstate the future load because it wants to keep tariffs low. A third reason could be that the SERC overstates the future load in its order to keep tariffs low.

Cumulative revenue deficits are dealt with in one of two ways: either they accumulate as regulatory assets (explained in the next paragraph), or the distribution company covers them through short-term borrowing in the form of increased working capital requirements. We look at each of these approaches.

Regulatory assets are created when the SERC defers the recovery of revenue deficits. Usually, distribution companies receive a carrying cost for these deferrals of revenue recovery. Regulatory assets are created mainly when the distribution company is privately owned. Some states do create regulatory assets for state-owned distribution companies, but these are relatively small.

Many state-owned distribution companies have been using short-term borrowings to cover the revenue deficits. These short-term borrowings have been increasing rapidly. As an example, Josey (2020) reports that for Rajasthan, working capital borrowing had reached 43% of the annual revenue requirement (ARR) in 2015-16. This dropped to 14% the next year because the Rajasthan state government took over the debt of the distribution companies under UDAY. Subsequently, they have started rising again and were estimated to reach 21% of ARR in 2018-19.

Prayas (2017:214) finds the easy availability of funds with little accountability "dangerous" because it removes the incentive to improve the financial health of the distribution companies. Prayas notes that banks

(mostly nationalised banks from whom these companies borrow) provide loans without much due diligence. This allows distribution companies to ignore issues of financial health until the levels of outstanding liabilities become critically high, necessitating a bailout. This is the problem of a "soft budget constraint" that we discuss later.

5.1.1 Comparison of the Performance of State-Owned and Privately-Owned Distribution Companies

There are significant differences between the performance of state-owned and privately-owned distribution companies. Table 1 shows the difference for some of the most important measures of performance based on data for 2019-20. We have chosen 2019-20 because the pandemic affected the performance in 2020-21 and 2021-22 resulting in performance measures that were not representative.

As Table 1 shows, the financial and operational performance of privately owned distribution companies is much better than that of state-owned companies. By the end of March 2020, the state-owned distribution companies had accumulated a deficit of Rs 5.63 per kWh while the privately- owned distribution companies had a cumulative surplus of Rs 2.48 per kWh. Furthermore, for the year 2019-20, the state-owned companies earned revenue that was less than their expenses, leaving a revenue gap of Rs 0.53 per kWh. In contrast, the privately owned-companies earned surplus revenue of Rs 0.34 per kWh over their expenses. Table 1 also shows that privately-owned distribution companies have much lower AT&C losses than state-owned companies, highlighting far superior operational performance on loss reduction by privately-owned companies.

An important caveat to keep in mind when comparing the performance of state-owned distribution companies and privately owned ones is that private distribution companies generally cover urban areas while state-owned companies cover both urban and rural areas. Rural areas generally have higher loss levels, are more expensive to serve on a per kWh basis, and it can be more difficult to raise tariffs in those areas. Nonetheless, these factors do not explain the wide difference in performance between state-owned and privately owned distribution companies. Moreover, as we discuss in Section 9.1, we do have the example of Delhi where privatisation of distribution companies that were previously state-owned led to a marked improvement in performance. Unfortunately, we do not have other examples yet. Odisha has had a second round of privatisation of distribution companies but it is too early to have any conclusive results.

As Table 1 shows, the superior financial performance of privately-owned companies has a notable drawback—the creation of a substantially greater amount of accumulated deferred revenues, shown as regulatory assets. However, it is important to note the difference in overall outcomes for the public and private companies. The state-owned distribution companies incur losses, but the privately-owned distribution

Table 1. Comparison of Performance of State-Owned and Privately Owned Distribution Companies

Based on data for 2019-20, per kWh of energy sold in that year

	Accumulated Surplus (Rs/kWh)	Annual Revenue Gap (Rs/kWh)	Regulatory Assets (Rs/kWh)	AT&C Losses (%)
State-Owned Discoms	-5.63	0.53	0.43	21.29%
Privately-Owned Discoms	2.48	-0.34	4.93	8.00%

Notes:

(1) The revenue gap is calculated by subtracting from total expenses, the total revenue of the companies which includes revenue from operations, tariff subsidy received, and all revenue grants. We exclude in the calculation of revenue, any regulatory income (additional revenue that the regulator agrees the distribution company is entitled to, but is to be collected in the future).

(2) For the privately owned distribution companies, we have excluded data for the four distribution companies in Odisha because they had not been privatised then and were managed by an administrator appointed by OERC.

Source: Power Finance Corporation of India. (2023, May). Report on Performance of Power Utilities: 2021-22.

companies get a promise of future payments to compensate for the deficit in the revenue. Of course, regulatory assets cannot keep growing because that will create problems in cash-flow for the companies. Distribution companies can petition the courts to recover the deferred revenue that has accumulated as regulatory assets. The three privately-owned distribution companies in Delhi, which together had 35% of the total regulatory assets for all distribution companies and 89% of the regulatory assets of private distribution companies at the end of FY 2019-20 (PFC, 2021), have been approaching the courts for liquidating their regulatory assets.

Thus, we see that in India, regulation of privately-owned distribution companies, while not perfect, has led not only to better financial health but also better operational performance as compared with state-owned distribution companies.

5.2 Bailout Packages

Given the rising levels of revenue deficits and the resultant financial liabilities for distribution companies, there have been three successive schemes to bail out the distribution companies and incentivise them to improve their operations. Table 2 gives the main features of the three packages.

All three schemes have a similar basic structure. The state government takes over the liabilities of the distribution companies by issuing long-term bonds (Prayas, 2017:218). Banks and other financial institutions buy these bonds. While participation in the schemes by states was voluntary, there were conditions for loss-reduction and improving performance for participation.

5.3 Loss Reduction Programs

The schemes listed in Table 2 were intended to improve the financial health of the distribution companies. In addition to these schemes, there were also four programs, shown in Table 3, to improve the operational performance of the distribution companies that were introduced by the Union Government. The focus was mostly on the reduction of AT&C losses.

Table 2. Past Bailout Schemes

Period	Name of scheme	Scheme magnitude
2001	2001 scheme for repayment of SEB Dues	Rs 41,473 crore
2012	Financial Restructuring Plans (FRP)	About Rs 1.19 lakh crore
2015	Ujwal Discom Assurance Yojana (UDAY)	About Rs 2.32 lakh crore as on December 31, 2020, based on data for 16 states.

Source: Prayas (2017); Planning Commission (2001); MoP (2012); MoP (2015); IBEF (2023).

Table 3. Programs to Reduce Losses of Distribution Companies

Name of Program	Period	Eligible Areas	Budget Allocated (Rs Cr)	Funds Released (Rs Cr)
Accelerated Power Development Program (APDP)	2000-02	63 dist. circles	1,042	547
Accelerated Power Development and Reforms Programme (APDRP)	2003-08	Selected Urban Circles	6,991	3,426
Restructured Power Development and Reforms Programme (R-APDRP)	2008-14	Urban areas with popln > 30,000	28,424	8,175
Integrated Power Development Scheme (IPDS)	2014-2022	All urban areas	25,354	Not Available

Source: Prayas (2017), MoP (2022).

The Union Government provided funds for investments by distribution companies in the augmentation and upgradation of their respective networks (Prayas, 2017:208). These programs were very similar to each other and had names that indicated that the following ones were successors of earlier ones.

In 2022, the Union Government introduced an additional program called the Revamped Distribution Sector Scheme (RDSS) – A Reforms and Results-Linked Scheme (MoP, 2022), in addition to the previous four programs. The objective of the scheme is to bring AT&C losses down to 12-15% and reduce the ACS-ARR gap to zero, both by 2024-25 (MoP, 2022). This is to be achieved through grants and loans. The distribution company has to prepare an action plan which is then vetted by the Centre before the release of funds. Further funds are released only if the distribution company makes satisfactory progress.

5.4 Benefits of Regulation for the Indian Power Sector

Although the introduction of regulation in the Indian power sector has not solved the sector's underlying problems, it would be inaccurate to assume there have been no benefits from implementing regulation. One of the most significant benefits has been substantially increased transparency regarding utility operations. Regulatory filings by power utilities have provided abundant information on utility operations, including electricity service costs; company performance and technical/financial losses; utility efficiency in service provision; capital expenditures; and quality of service including the extent of load shedding. Similarly, the orders of SERCs have provided insight into the tariff-setting process. Before the introduction of regulation, the working of the power sector was opaque. With the increased transparency brought by regulatory processes, stakeholders now have a much better understanding of the sector and the problems with its functioning. Such a clear understanding of the problems is a prerequisite for thinking of solutions to improve the functioning of the sector.

PART III. ANALYSIS OF KEY ISSUES

6. Regulation of Publicly Owned Utilities

Regulation of publicly owned utilities poses challenges when compared to regulation of private companies, because of several differences between private and public sector companies. First, there are differences in objectives. A private company is focused on a single objective—maximisation of profits, subject, of course, to regulation. In contrast, publicly owned utilities have multiple, often poorly defined objectives which could sometimes conflict with each other (Pardina and Schiro, 2018). Some of these objectives are related to distributional issues. Private companies face hard budget constraints because there is a threat of bankruptcy if financial performance is poor. On the other hand, publicly owned utilities have soft budget constraints and do not need to pay the same attention to financial performance.

Second, private firms have much more freedom in employment. Hiring and promotion tend to be related to merit and performance. For publicly owned utilities, there are greater constraints on hiring to account for equity and fairness. In addition, seniority plays a major role in promotions.

Third, there is a significant difference in the level of accountability for private firms vis-a-vis publicly-owned utilities. Private firms are accountable to their shareholders who, because of their financial interest in the firm, monitor the performance of the management much more closely. Publicly owned utilities are accountable to politicians and civil servants. Their incentives to monitor the performance of the management could be "marginal" because good performance may not be closely associated with their objectives (Decker, 2015:46). It is expected that the foremost objective for a politician would be to get re-elected in the next election cycle. Decker argues that this is a relatively short-term objective and the longer-term objective of improving the performance of publicly owned utilities may fade in importance. This statement echoes Majone (1997) who, while arguing for the need for independent regulatory agencies, had asserted that in a democracy, politicians have an incentive to focus on the short-term.

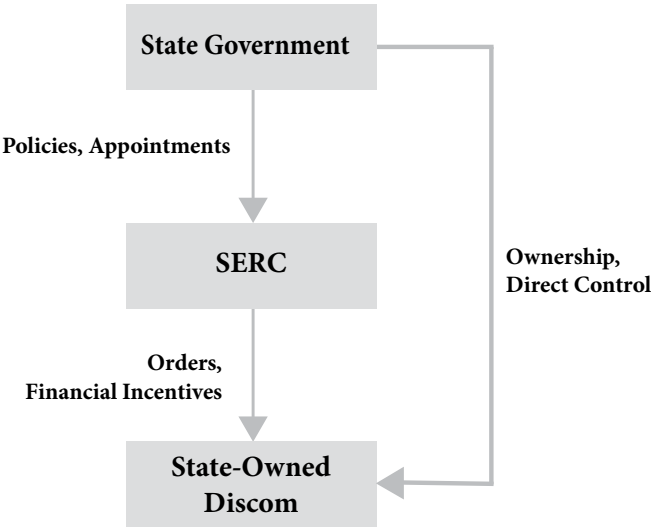
Due to the aforementioned differences between private firms and publicly owned utilities, the latter tend not to be as responsive to regulatory incentives. A study of 24 Ukrainian electricity distribution companies from 1998-2002 supports this assertion. Berg et al. (2005) found that private distribution companies in Ukraine responded much more aggressively to incentives to reduce technical and commercial losses because they added to their net cash flows. However, they caution that the private distribution companies also responded more aggressively to cost-plus regula-

tion by inflating costs so that the companies' profits increased. They explain the difference in behaviour by the managers of private distribution companies versus state-owned distribution companies as the latter having weak internal incentives for loss reduction—low salaries that discourage better performance, and political pressure may reduce managers' interest in reducing losses (Berg et al., 2005). Some of the differences, not just in Ukraine but more broadly, may also be explained by more effective incentives under private ownership for innovation and the adoption of new technologies (Decker, 2015:47).

Decker (2015:47) points out a potential issue in regulating publicly owned utilities. They may receive conflicting signals from the regulator and its owner, the Government. A publicly owned utility could find itself working "for two masters." In the case of India, this issue is very relevant and more complicated. As shown in Figure 1, a state-owned distribution company is accountable to both the SERC and the State Government. Interestingly, the State Government controls both the distribution company and the SERC, albeit the control over the distribution company is much more direct, while the control over the SERC is only through policies and appointments. However, the consequence of this intertwined organisational structure is that a state-owned distribution company is likely to give much greater priority to the directions of the state government relative to those from the SERC. We see this played out in the level and timing of petitions for tariff increases by the state distribution company as discussed earlier. Often, tariffs are not raised close to an election.

To address the problem of the state-owned distribution company working for two masters, the roles and responsibilities of Government and the regulator must be clearly defined. We now review the experience with the regulation of publicly-owned utilities, first in developed countries and then in developing countries. The intent is to cull lessons from the international experience that may apply to the regulation of state-owned distribution companies in India.

Figure 1. Relationships and Control in the Distribution Sub-Sector in India



Source: Singh (2022).

6.1 Experience from Developed Countries with Regulation of Publicly Owned Utilities

As we mentioned earlier, most developed countries that moved from public ownership to private ownership introduced independent regulation at that time. However, there are at least two developed countries where publicly owned utilities are regulated by an independent agency.[8] Public ownership is common in Canada. In most of the large provinces, the publicly owned utilities have regulated tariffs, but capital expenditures are not regulated. In Norway, publicly owned distribution companies are regulated. However, because Norway has a wholesale and retail market, only the wires business is regulated. Canada is particularly relevant for this paper because there are some interesting similarities with India. Except for Alberta and Ontario, utilities in the larger provinces are vertically integrated and provincially owned. Moreover, as a vast, sparsely populated country, Canada's provincial governments utilise utilities to advance social objectives like affordable access. Because of the learning that is likely from the Canadian experience,

[8] We have not conducted a comprehensive survey of all countries and how their power sectors are regulated. There may be other developed countries where publicly owned utilities are regulated by an independent agency.

we look at the regulation of the power sector in Canada in considerable detail in Section 6.1.2. However, before we review the experience in Canada and Norway, we review the experience in the US where public ownership coexists with private ownership of utilities.

6.1.1 USA

While the US has had a long history of private ownership of utilities, there is a small but significant proportion of public ownership of utilities. Public ownership comes in three forms: (1) utilities owned by a city or municipality, commonly known as munis; (2) public utility districts; and (3) cooperatives, mostly in rural areas, that were formed after the Great Depression to facilitate access to electricity in remote areas which private utilities were reluctant to serve (RAP, 2011). In this discussion, we exclude Federal Power Marketing Agencies[9] (PMAs) which were set up to sell power generated at federal dams at the wholesale level to local utilities and are not regulated (RAP, 2011). While the bulk of the electricity to end customers in the US is sold by investor-owned utilities (IOUs) and power marketers, about 15% of the electricity is sold by publicly owned utilities (APPA, 2021a).[10]

While most municipal utilities serve small towns, larger cities like Los Angeles, Orlando, San Antonio, and Seattle also have publicly owned utilities (Lexology, 2018). Munis are governed either by a city council or an independent board often appointed by the mayor of the city (Lexology, 2018). Smaller munis are usually governed by the city council while the larger cities tend to be governed by an independent board (APPA, 2021b). For example, Los Angeles is serviced by the Los Angeles Department of Water and Power (LADWP) which is governed by a five-member Los Angeles Board of Water and Power Commissioners. The board oversees and sets policy for the utility and is appointed by the Mayor of Los Angeles (LADWP, 2023).

The advantages of municipal utilities versus investor-owned utilities (IOUs), as seen by the munis themselves, are several (KMU, 2023):

- There is more local control and more local people are employed by the utility.
- Munis focus on service rather than profit, operating in the public interest versus the interest of shareholders of distant corporations.

Municipal utilities are frequently exempt from regulation by state commissions[11] (EPA, 2010; Greer, 2012). The reason for exempting municipal utilities from regulation is that oversight by the local government is expected to provide adequate protection of the public interest (Meyer, 1983; Bull, 2002).

It would be natural at this point to ask how the performance of municipal utilities has compared with the performance of utilities regulated by state commissions. *Prima facie*, publicly owned utilities perform better. In 2019, the average rate paid by a publicly owned utility was about 11% lower than the rate paid by customers of IOUs. However, several complicating factors make it difficult to come to a definite conclusion. First, municipal utilities do not generally pay any taxes, but they do make payments to the state in lieu of taxes (Greer, 2012). Second, municipal utilities have access to tax-free financing and can borrow at a lower cost (Greer, 2012). Third, munis do not seek a profit, thus reducing the required tariffs even further. These factors may contribute to lower rates charged by municipal utilities.

6.1.2 Canada

As mentioned earlier, there are many interesting similarities between Canada and India. Both are large countries and in both, the state or provincial government plays a large role in the electricity sector. Since India's independence, the electricity sector has been viewed as an engine of growth and development. A key priority has been expanding electricity access, as demonstrated by the Saubhagya scheme for last-mile connectivity to provide power to all unelectrified households nationwide. Similarly, in Canada, the provincial governments have used their electric utilities to further social goals such as ensuring affordable access to electricity for all their respective

[9] The federal PMAs include Bonneville Power Administration, Southeastern Power Administration, Southwestern Power Administration, and Western Area Power Administration. We also exclude the Tennessee Valley Authority (TVA) which operates also like a PMA but is not technically one. (RAP, 2011)

[10] For this working paper, we use data given in the report by American Public Power Association (APPA) for 2021 which is based on data for 2019, even though a report for 2022 is also available. Due to a change in the reporting requirements by the US Electricity Information Administration (EIA), from 2020, data for smaller public power utilities is not available and therefore is not included in the 2022 APPA report (APPA, 2022). Therefore, we think that the data in the 2021 report is more representative and is used here.

[11] However, there are exceptions. For example, in Wisconsin, the Public Service Commission (PSC) regulates all electric utilities-both IOUs and municipal utilities (WPSC, 2023).

populations. These similarities may help explain why both countries continue to rely on public ownership for a significant percentage of their electricity supply.

Canada consists of ten provinces which mostly stretch across its southern border with the US, and three territories that cover the northern part of the country. More than 90% of its population lives within 150 miles of the border with the US with a large part of its territory further north sparsely populated wilderness (Berglee, 2016).

Each province controls generation, intra-province transmission, and distribution within its territory. Except for the provinces of Alberta and Ontario where some unbundling has happened, electricity in most of the larger provinces is provided by a vertically integrated publicly owned utility (Christian & Shipley, 2023). These utilities are Crown corporations, which are described and discussed in greater detail in the next subsection.

6.1.2.1 Crown Corporations

Crown corporations, commonly called "Crowns," are wholly owned by the federal or provincial governments yet structured similar to private companies (Tupper and Smyth, 2021). Compared to government departments, they have far more freedom from political control. Stastna (2012) refers to them as "peculiar hybrid entities – somewhere between a government body and a private enterprise." Crown corporations were established to provide essential services in "a vast, sparsely populated nation" that the private sector was "unable or unwilling to provide" (Tupper and Smyth, 2021). Crown corporations were created to shield the government's commercial activities from political interference (Tupper and Smyth, 2021).

While many provincial Crown corporations are profitable and are good candidates for privatisation, the provincial governments have decided to keep them because they have an important fiscal or social role (Bernier et al., 2018). Hydropower-based electric utilities form one important category of them. Hydropower in Canada is low-cost and can compete effectively with electricity in the US generated from other sources (Bernier et al., 2018). The fact that electricity use peaks in winter in Canada while in the US it does so in the summer makes exports to the US much easier. These exports of surplus power generate additional revenue for the Canadian utilities and ultimately for the respective provincial government (Bernier et al., 2018).

Given the much greater relevance of provincial Crowns for this paper, we look in greater detail at one province and its electricity sector. Further, because we want to draw lessons for India, we wanted to select a province that has retained public ownership of its electric utilities and where the total price paid by consumers for electricity was regulated. We selected Manitoba for a more detailed look. The main utility, Manitoba Hydro is a provincially owned vertically integrated utility, and the regulatory agency sets tariffs for the total supply of electricity. In addition, a wealth of information on the regulation and governance of the electricity sector in Manitoba was easily available.

6.1.2.2 Governance of Manitoba Hydro

Manitoba Hydro is the main electric utility in Manitoba. The Board of Manitoba Hydro oversees the business and affairs of Manitoba Hydro. The Board consists of between 6-10 members who are appointed by the provincial government. The President and CEO of Manitoba Hydro is an ex-officio but non-voting member of the Board. A member of the Legislative Assembly of Manitoba can be a member of the Board, but a member of the Executive Council (Cabinet) cannot be a member. The Board is accountable to the Minister responsible for Manitoba Hydro with the Chairperson of the Board being the primary contact.

The governance of Manitoba's Crown corporations such as Manitoba Hydro (MH) is outlined in The Crown Corporations Governance and Accountability Act (CCGAA) enacted by the Legislative Assembly of Manitoba. Responding to concerns about Crown corporations' lack of clear definition of roles and responsibilities, CCGAA requires that within three months of becoming a Crown corporation, an entity must develop a description of roles and responsibilities that is developed collaboratively by the corporation and the responsible minister (Manitoba Laws, 2022a).

In addition, the responsible minister may prepare a mandate letter for the Crown corporation that sets, for the period of the letter, the provincial government's goals for the corporation and the outcomes to be achieved by the corporation over the period of the letter (Manitoba Laws, 2022a). The mandate letter is also expected to specify the performance measures that will be used to determine the level of success in achieving the outcomes. In addition to these requirements, a Crown corporation is required to submit an annual business plan and an annual report.

CGCAA permits the responsible minister to issue directives to a Manitoban Crown covering the following issues and actions:

- On issues of policy, requiring the corporation to conduct an organisational review as given in the directive. Also, requiring the Crown to do something in accordance with its annual business plan or prohibiting it from doing something inconsistent with the plan.
- Directing action by the corporation to ensure that its practices are consistent with one or more of the other Crowns.
- Directing action to ensure that the Crown acts in concert with one or more other Crowns or other government departments or agencies to enhance efficiency and effectiveness.

Both the mandate letter and other directives must be made public.

Tariffs for electricity are set by the PUB as we describe in the next sub-section. An interesting twist in the process for tariff increases is that the maximum overall rate increase in any year has to be capped at the lower of two numbers: (1) 5%; or (2) the increase in the CPI for the previous fiscal year on a percentage basis (Manitoba Laws, 2022b). This cap is not present in the law governing the PUB but comes from the law governing Manitoba Hydro. This possibly means that MH cannot petition for a rate increase higher than the cap. This is particularly interesting because it shows how political considerations such as limiting the tariff increase for electricity play a role even in a developed country like Canada. This is not an issue only in developing countries like India.

6.1.2.3 Regulation of Manitoba Hydro

The Public Utilities Board of Manitoba (PUB) sets the tariffs for electricity service provided by MH to its customers. The PUB is "an independent, quasi-judicial administrative tribunal" (PUB, 2023). PUB must have a minimum of three members; currently, it has 12. In contrast to the US, there are no fixed terms for the members.

It is important to note that the PUB does not approve MH's capital expenditures, including those on dams and transmission lines and also does not approve MH's external contracts. This is undertaken by the responsible Minister through a review of MH's business plans. However, the Minister may, at the request of the PUB, authorise the PUB to review and make recommendations regarding MH's operations, capital investments, and expenditures (Manitoba Laws, 2022b). The PUB also does not regulate the daily operations of MH; nor does it regulate electricity service extensions or disconnections. In this way, the regulation of MH by the PUB is limited and quite different from regulation in the US where regulation is much more comprehensive and capital expenditures by utilities are scrutinised by the regulating commissions.

Tariffs are determined based on a cost-of-service model. Two features of the tariff-setting process help maintain low rates. First, Crown corporations are exempt from taxes. Second, Crowns do not seek to make profits; they seek only to break even (PUB, 2023). In several places on its website, the PUB mentions that in setting tariffs it balances the financial

sustainability of the utility and the impact on customers. For example, in one place it states, "While the Board is sensitive to customer reaction to increases, it must consider the sustainability of the utility" (PUB, 2023).

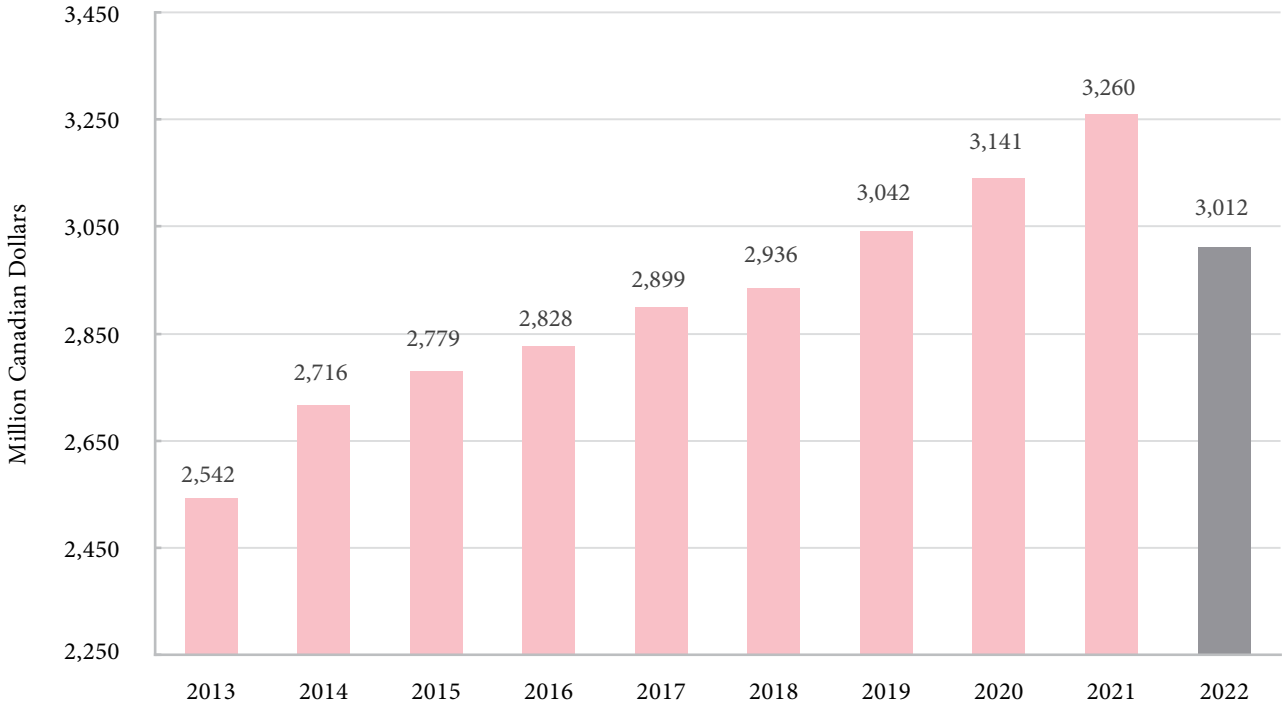
Tariffs are calculated using projected future costs. In case of an over-recovery of costs, MH keeps the surplus; and correspondingly if there is an under-recovery, MH absorbs the deficit. Figure 2 based on data from the Annual Report for MH for the year 2021-22 provides an example of how this happens. MH retained earnings grew steadily from CD$ 2,542 million in 2013 to CD$ 3,260 million in 2021. In 2022, MH incurred a loss of CD$ 248 million that it covered using retained earnings. Consequently, retained earnings fell to CD$ 3,012 (MH Board, 2022).

6.1.3 Norway

Norway is another country where public ownership of distribution seems to work well with regulation. Norway is made up of eleven counties which are further divided into 356 municipalities.

About 90% of the electricity generation capacity in Norway is publicly owned by governments at the national, county, or municipal level (NVE, 2016). Many of the generation companies have several owners and there is a significant level of cross-ownership (NVE, 2016). The national government has direct ownership of about a third of generation capacity through the company Statkraft, and more through

Figure 2. Retained Earnings of Manitoba Hydro



Source: Manitoba Hydro-Electric Board 71st Annual Report, for the Year Ended March 31, 2022.

indirect ownership (NVE, 2016). Statnett, another company owned by the national government, owns transmission assets and is the transmission system operator (NVE, 2016). In the distribution segment, as of 2014, there were 122 distribution companies, a majority owned by local municipalities or groups of municipalities (NVE, 2016:4).

Before 1991, locally owned companies having both generation and distribution assets were run as non-profit companies. These companies provided electricity and thus contributed to industrial development

in the local area as well as to the welfare of the local inhabitants (NVE, 2016). Payments by end-users covered the transmission and generation costs, distribution network costs, and any additional power purchase costs (NVE,2016).

In the late 1980s, the electricity demand reduced. Winters were both milder and wetter. The increased precipitation created a surplus of supply because most of Norway's electricity is generated by hydropower. The milder winters reduced demand even further.

Together, these factors led to supply being much greater than demand, leading to financial stress for the companies. This led to unbundling of the sector in 1991. However, the unbundling did not affect public ownership of the companies. (NVE, 2016).

As part of the unbundling, a national wholesale and retail market for electricity was established. Because distribution is seen as a natural monopoly, the tariffs of the unbundled distribution companies were regulated using a revenue cap along with monitoring of service quality. Since 1997, the Norwegian Water Resources and Energy Directorate (NVE), a federal-level regulatory agency, has been using incentive-based regulation for tariff setting (Tobiasson et al., 2021). A revenue cap is set for each distribution company. The revenue cap is a weighted average of the costs of the respective distribution company (with weight of 40%) and a normalised cost of an efficient distribution company based on the performance of all the distribution companies regulated by NVE (with weight of 60%) (Tobiasson et al. 2021). Having a higher weightage for the normalised cost provides a greater incentive for distribution companies to be more efficient and reduce their costs. Customer bills now consist of two components: energy costs and network costs.

There has been considerable cooperation between the Scandinavian countries through cross-border trade in electricity. NVE (2016) states that most of the hydropower is located in Norway and Northern Sweden, while the rest of Scandinavia has coal and nuclear plants. Each country is self-sufficient in generation capacity; cross-border trades allow short-term and medium-term optimisation with

hydropower providing flexibility and balancing and thermal plants providing support in dry years (NVE, 2016).

As we said at the beginning of this section, Norway is an unusual case where a large majority of the distribution companies are publicly owned (by municipal councils) and seem to function well under regulation. Naturally, we ask what is it that makes the Norway distribution system different from that in other countries. We find that the answer lies in the history of Norway.

Municipal autonomy goes a long way back in Norway's history. By the year 1900, it was well established (NVE, 2016). Starting from the 1870s, several small hydropower plants came up, some that were owned by municipalities and others that were privately owned. With concern about ensuring national control of waterfalls, a legal framework was created whereby publicly owned companies got licenses for perpetuity, while private companies got licenses for 60 years (NVE, 2016). At the end of the license period, generation assets were transferred without costs to the state.

Many urban areas and some rural areas had strong financial and technical capabilities, enabling the development of decentralised electricity systems based on hydropower (NVE, 2016). These decentralised utilities were established to supply local industries and local households. These utilities enjoyed two benefits. First, tariffs for electricity were cost-reflective from early on. Second, they had very low levels of commercial loss in the form of theft (NVE, 2016).

6.2 Experience with Publicly Owned Utilities in Developing Countries

The World Bank carried out a study to assess the impact of and re-evaluate, power sector reforms in developing countries (Foster & Rana, 2020). The overall study was based on an in-depth assessment of reforms in 15 countries. India was one of the countries in the study and provided three state-level case studies (Andhra Pradesh, Odisha, and Rajasthan). The authors used the country case studies for qualitative insights and pooled them to get cross-country data patterns. While they conceded that a sample of 15 countries was too small to be considered representative from a statistical viewpoint, they thought that given "the range of geographies, income groups, political systems, and power sector conditions" studied, the cross-country comparisons were illustrative of the impact of power sector reforms on outcomes.

One of the aspects of reforms that the study looked at was the quality of regulation. To assess the quality of regulation, Foster and Rana (2020) developed a Regulatory Performance Index that evaluated the extent to which each country followed good regulatory practices. The index was based on a survey in which participants were asked questions on two major aspects of regulation—regulatory governance and regulatory substance. Regulatory governance covered the degree of autonomy and accountability of the regulatory agency. Regulatory substance covered the quality of regulation of three activities: (1) tariff-setting; (2) quality of service; and (3) market entry (covering licenses, PPAs, etc.) To assess the quality of regulation both as designed and as practised, the study

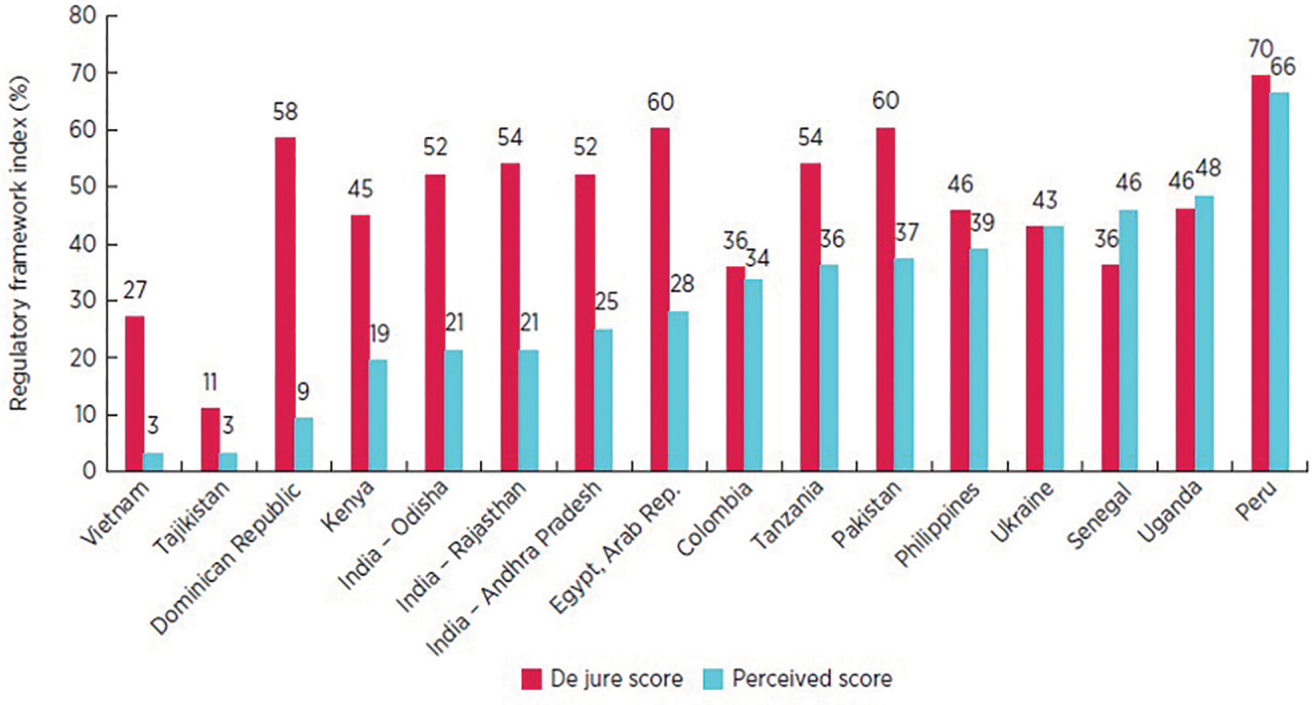
developed two versions of the index for each country. The first score for the index covered the country's "de jure" regulatory framework based on laws and regulations. The second score called the "perceived" score was based on how regulation was practised based on the answers of local experts. The difference between the de jure score and the perceived score for a country captured the difference between regulation as on the books and regulation as practised.

Figure 3 shows the divergence between regulation on paper and regulation in practice. The study found that although almost all countries adopted regulatory frameworks on paper, implementation had "fallen far short of design," particularly for state-owned utilities. As can be seen from the figure, the three Indian states (Odisha, Rajasthan, and Andhra Pradesh) that were included in the study all showed a large difference between regulatory rules on the books and the way regulation was practised.

On the difference between publicly owned and privately-owned utilities, Foster and Rana (2020) made several observations:

- The presence of private entities resulted in much greater adherence to the laws, rules and regulations by regulators. The authors speculated that the reason was that when private entities were involved, it was much more difficult for the government to deviate from enacted regulations (Foster & Rana, 2020:16).

Figure 3. Divergence between Regulation on Paper versus Regulation in Practice by Country



Source: Foster, V. and Rana, A. (2020). Rethinking Power Sector Reform in the Developing World. Sustainable Infrastructure Series. World Bank, Washington DC. doi:10.1596/978-1-4648-1442-6. License: Creative Commons Attribution CC BY 3.0 IGO.

- Consistent with the experience in India, the authors observed that when the utility was publicly owned, the regulator seemed to display less authority over tariff-setting. There were also more cases of there being a soft budget constraint. While there was almost a full recovery of operating costs, full capital cost recovery was difficult. Again, highlighting the differences between private and public utilities, Foster & Rana (2020) noted that full capital cost recovery happened "almost exclusively" for privately-owned utilities.
- The authors found that privately-owned utilities were more likely to have good corporate practices, particularly regarding human resources and financial discipline (Foster & Rana, 2020:3).
- The study also found that full cost recovery was generally difficult to achieve and sustain and that whatever limited success was achieved was due more to efficiency improvements rather than tariff hikes (Foster & Rana, 2020:4).

6.3 Key Findings from International Experience with Regulating Publicly Owned Utilities

The most important finding from the international experience with regulating both publicly owned and privately-owned utilities that we have reviewed in this section is that irrespective of ownership, regulation seems reasonably successful if the regulatory framework imposes a hard budget constraint on the utility. This imposition of a hard budget constraint could be for economic, political, or social reasons. The World Bank study of power sector reforms in developing countries found that regulation is more effective and full cost recovery more likely when privately owned utilities are involved.

In our review of the experience in developed countries, regulation in all three countries seemed effective. Most states in the US take the approach that we would expect—that there is no need for regulation with publicly-owned utilities because government ownership and oversight provide sufficient protection of the public interest. The experience in Canada and Norway may seem to belie the rationality of the US approach and may lead one to conclude that regulation

of publicly owned utilities should be carried out just as for privately-owned ones. However, it is important to remember that certain conditions in Canada and Norway make them special cases, and without these conditions, regulation may turn out to be difficult.

In Canada, the publicly owned utilities are provincial Crowns that face hard budget constraints just as a privately-owned utility would. This means that they cannot expect the provincial government to bail them out if their expenses exceed their revenue. Furthermore, both the other institutions in the utility eco-system—PUB and the provincial government—emphasise financial stability for the utilities. For example, the Manitoba PUB explicitly states that while it is sensitive to customer needs for reasonable tariffs, "it **must** consider the sustainability of the utility" (emphasis added). Consequently, the utility must restrain increases in its costs and operate efficiently. Perhaps the most important reason for the provincial government's interest in maintaining the financial health of Manitoba Hydro is that it is a revenue generator and generates additional revenues for the provincial government through sales of electricity to the US.

In the case of Norway, it is important to remember that even though the utilities are publicly owned (by the municipalities), the regulatory agency has been set up by the national government. So, there are competing interests—the national government versus the municipal government—that need to be balanced. Therefore, a regulatory agency is required to balance these competing interests. Good financial performance is aided by the tradition in Norway of full-cost recovery. In addition, the form of regulation for the distribution network operators (DNOs) which uses a 40:60 weightage of the DNO's own costs (40%) and the normalised cost of an efficient DNO, based on the performance of all DNOs (60%) leads to greater competition between DNOs to improve their respective performances.

7. Deeper Corporatisation to Improve Governance of State-Owned Distribution Companies

As we have seen, state-owned distribution companies in many developing countries, as in India too, have performed, and continue to perform poorly. Tariffs often do not cover all the costs of providing electricity to consumers resulting in the poor financial health of the distribution companies, which, in turn, leads to insufficient funds for investments to maintain the distribution system. Consequently, the quality of service suffers. In contrast to profit-seeking shareholders of private firms, state governments in their role as owners, do not pressure state-owned distribution companies to reduce costs and increase revenues (Irwin and Yamamoto, 2004). Instead, state governments pursue other political goals by keeping tariffs low. State ownership affects the performance of distribution companies in other ways too. The absence of the threat of bankruptcy reduces the incentive for the management of these companies to operate efficiently (Irwin and Yamamoto, 2004).

We agree with Irwin and Yamamoto (2004) that privatisation is the best way to reduce some of the problems with distribution because there will be less interference by politicians and because privately-owned distribution companies have a built-in hard budget constraint. However, just as in other countries, in India too, there is great resistance to privatisation. Therefore, we may need to explore alternative approaches when privatisation is not possible for political reasons. One option is to modify the governance of state-owned distribution companies so that they emulate the behaviour of privately-owned companies.

Any modification along these lines of the organisational structure of the distribution segment must accomplish two objectives. First, it must create a separation between the state-owned distribution company and the state government, so that interference by the government in the day-to-day working of the distribution company is avoided while allowing the government to give broad policy direction to the company. Second, the modified structure should make the state-owned company behave more like a privately-owned company and be subject to the same financial discipline.

Given the Canadian experience where publicly owned distribution companies are regulated and perform well, we think that it will be worthwhile to examine how significant features of the governance of utilities in Canada can be used to achieve these two objectives. Some of these features of governance would be to have an independent board that oversees the distribution company and its management, and that is accountable to the state government through the relevant minister. The day-to-day management of the distribution company would be the responsibility of the CEO and the rest of the management team. The board would be responsible for the distribution company's strategic direction; protecting its resources;

monitoring its performance; and reporting to the state government (Holburn & Fremeth, 2019).

As discussed in Section 5, in almost all states in India, the formerly integrated state electricity boards (SEBs) have been unbundled into separate companies for generation, transmission, and distribution.

However, the corporatisation of the power sector in India exists mostly on paper, and the companies do not function as truly independent entities. We see something similar happening with the boards of directors of the distribution companies. Currently in India, the senior management of state-owned distribution companies has direct interactions with the state government usually through the relevant minister. Most state-owned distribution companies do have a board of directors, but these are populated mostly with members of the senior management. For example, Table 4 shows the composition of the board for four distribution companies in four different states. There is a very significant overlap between the members of the board and members of the staff of the distribution company or its parent or sister companies on these boards. In addition, there is sizeable representation of the respective state government on the board of each of the distribution companies. In the case of BESCOM, the energy minister of the state is the Chairman of the Board. Even though three of the companies have two independent directors each, and the remaining one, BESCOM, has two representatives from the unions, essentially, these boards are not independent of the management of the distribution company nor of the state government.

Under the proposed modified governance structure, the relevant Minister in the state government would retain the authority to provide direction to the distribution company and hold the board accountable.

Table 4. Composition of Board of Directors in Four Distribution Companies in India

Discom	State	Number of Directors	Composition of Board
BESCOM	Karnataka	10	• Chairman (Energy Minister in State Govt) • MD • 2 Executives from BESCOM • 1 from KPTCL (sister company) • 1 from PCKL (sister company) • 2 from State Govt • 2 from Unions
MSEDCL	Maharashtra	9	• Chairman & MD combined • 5 Executives from MSEDCL – Finance, Operations, Projects, Commercial, HR • 1 from State Govt - Principal Sec (Energy) • 2 Independent Directors
DGVCL	Gujarat	8	• Chairman • MD • 1 from State Govt • 3 Executives from GUVNL (parent company) • 2 Independent Directors
MPMKVVCL	Madhya Pradesh	9	• Chairman • MD • 3 from State Govt (IAS) • 2 Executives from MPMKVVCL • 2 Independent Directors

Source: BESCOM (2023); MSEDCL (2023); DGVCL (2023); MPMKVVCL (2023).

Additionally, the Minister could issue policy directives to align the distribution company's strategy with the state government's policies. However, the proposed structure would limit the Minister's day-to-day interference in the company's management. When state-owned distribution companies begin to behave more like private companies, the need for regulation will increase to balance the competing interests of the companies and consumers. Regulatory commissions generally see less turnover of personnel compared to ministries, and therefore, they provide a better venue, relative to government departments, for building technical capacity that will be necessary for balancing these interests.

We now discuss in some more detail the modified governance structure for distribution companies that we are proposing.

7.1 Principles for Governance of State-Owned Distribution Companies

We have developed our suggestions for improving the governance of state-owned distribution companies in India by drawing mainly from four sources. The first source is Holburn and Fremeth (2019) who developed principles of best practice for Crown corporations in Canada. The second source is OECD (2015) which developed guidelines on corporate governance of state-owned enterprises. The third source is a paper by Wong (2018) for the International Finance Corporation (IFC) on strengthening the governance of state-owned companies. The fourth source is a much earlier paper from the World Bank by Irwin and Yamamoto (2004) on options for improving the governance of state-owned electric utilities.

Following the categorisation by Wong (2018), we divide the suggested improvements in the governance of state-owned distribution companies into three

categories: (1) professionalising government ownership; (2) developing more effective, stronger, and independent boards; and (3) enhancing the commercial orientation of the companies.

7.1.1 Professionalising Government Ownership

The state government plays a dual role in the distribution segment—the owner of the distribution company and the entity responsible for public policy in the power sector. As company's owner, the government is responsible for the financial health of the company, while as the public policymaker, the government is responsible for the fulfilment of various socio-economic goals for the entire sector. These two roles must be kept separate because one is focused on a single company while the other is focused on the entire sector.

7.1.1.1 Reasons for State Ownership

The first step in developing guidelines for the governance of state-owned distribution companies should be to articulate the purpose of the distribution company, and the reasons why state ownership is the best way to achieve that purpose (OECD, 2015). There could be a variety of reasons such as: to increase access; make electricity affordable for less affluent sections of society; promote industry in the state; or something else.

Clearly stated reasons for state ownership help in setting high-level direction for a state-owned distribution company. OECD (2015) recommends that the ownership policy should be disclosed to the public. In addition, the ownership policy should be reviewed periodically, as is the case for state-owned enterprises (SOEs) in countries such as Finland, New Zealand, Norway, and Sweden (Wong, 2018).

7.1.1.2 Clear Statement of Expectations from Distribution Company

The state government should articulate its expectations for the distribution company in discussions with the Chairperson of the Board (Holburn & Fremeth, 2019). This could be achieved through regular mandate letters (every one or more years), like the Manitoba government issues for Manitoba Hydro, or through a memorandum of understanding.

7.1.2 Strengthening Boards and Making Them Independent

The board of governors are expected to be the centre of governance of distribution companies. The Board mediates between the relevant minister in the state government and the management of the distribution company. It is expected to be accountable to the relevant minister while also being responsible for the oversight of the distribution company's business and acting in its best interests (Holburn & Fremeth, 2019).

7.1.2.1 Responsibilities of the Board

The Board should hold ultimate responsibility for the performance of the distribution company (OECD,

2015). The relevant Minister should issue broad mandates and define high-level objectives for the distribution company on behalf of the state government. The Board should set the strategy and supervise management for fulfilling these mandates and objectives (OECD, 2015). This should also include the identification of key risks and the development and oversight of effective strategies to manage those risks (Wong, 2018). However, while holding the management accountable, the Board should not interfere in the day-to-day management of the distribution company (Holburn & Fremeth, 2019).

7.1.2.2 Composition of Board and Appointment of Members

The appointment of board members should be open, transparent and based on merit. The size of the Board and the skills of its members should be such that collectively, the Board can fulfil its responsibilities. Remuneration should be sufficient to attract well-qualified individuals. Furthermore, Board Members should be independent of the management of the distribution company. (Holburn & Fremeth, 2019)

Wong (2018) cites a trend in many countries to limit the number of politicians and civil servants and increase the number of independent members on the boards of SOEs. Following this trend will be particularly helpful in addressing problems with distribution companies subjected to political interference in India. The World Bank (2014) says that often politicians or other representatives of the government on SOE boards are unsuited for the position because of their lack of commercial or financial knowledge. While they may get the SOE to focus on political or policy goals, they may do so at the expense of the financial health of the distribution company. Wong (2019) adds that senior politicians on boards may not attend all the meetings or come unprepared. In addition, they may harm board dynamics because other board members may "defer excessively" to them.

Independent board members help with good decision-making by the board. Depending on their relative strength in the Board, they enable the board to maintain distance from both the government and the management of the distribution company, and allow "unbiased judgement" (World Bank, 2014). They alter the discourse within the board for a more open discussion, opening an opportunity for dissenting voices or minority views (World Bank, 2014). Currently, in India, every listed company should have at least one-third of the number of directors as independent directors, and the Central Government may prescribe the minimum number of independent directors for other classes of public companies (Section 149(4) of the Companies Act of 2013). For state-owned distribution companies, the Government can start by requiring a small number of independent directors and ratchet that number up to match the requirements for listed companies.

The positions of Board Chairperson and CEO should not be combined. The Board should select and appoint the CEO. Our suggestion differs from Manitoba, Canada, where the provincial government appoints the CEO, as discussed earlier. Given concerns about political interference in Indian distribution companies, it is important the state government does not appoint the CEO, to maintain separation from company management. Our suggestion would make the CEO and the day-to-day functioning of the distribution company less susceptible to political interference.

7.1.2.3 Functioning of the Board

The work of the board of a state-owned distribution company is likely to be much more challenging than that of the board of a privately-owned company because it must meet both public policy and commercial objectives (Holburn & Fremeth, 2019). Therefore, the role of the Chairperson of the board is crucial for the success of the distribution company. The Chairperson will be responsible for setting the agenda for the meetings of the board and must be able to manage meetings, facilitate consensus, and communicate persuasively with colleagues on the board, the management of the distribution company, the state government, and the public (Holburn & Fremeth, 2019).

To help the board with its functioning, it should set up committees of directors. Adapting the recommendations in Holburn and Fremeth (2019), we suggest that at a minimum, the following three committees be set up:

- **Audit Committee.** The audit committee would oversee the financial aspects of the distribution company to safeguard the resources of the distribution company. Some of its responsibilities would be (Holburn & Fremeth, 2019):

  - Reviewing the internal audit of the distribution company, which assesses the organisation's structure, budget, adequacy of resources, and control processes to ensure efficient objective fulfilment.
  - Appointing and assessing the work of the external auditor.
  - Reviewing financial statements of the distribution company.
- **Strategy Committee.** The strategy committee would identify future risks and opportunities for the distribution company and suggest a strategy to respond to them. The committee's suggestions should be taken up by the board for discussion with the distribution company management to develop a strategy for the distribution company.
- **Nomination and Skill Development Committee.** This committee would develop a list of the required skills for the board to collectively ensure its ability to fulfil its objectives. It would then compare this list with the skills currently held by the board's directors. Subsequently, the committee would recommend additional skill development for existing board members or propose suitable candidates for appointment to the board.

7.1.2.4 Monitoring and Reporting

The board of any state-owned distribution company should be mandated to publish and publicise an annual report each year, detailing the performance of the distribution company. This annual report must contain information on the distribution company's mandate and objectives, its strategy to fulfil those mandates and objectives, its financial plans, and the outcomes and achievements of distribution company (Holburn & Fremeth, 2019).

7.1.3 Promoting a More Commercial Orientation for Distribution Companies

Irwin and Yamamoto (2004) provide several options for changes in governance to promote a more commercial orientation for state-owned distribution companies. We list the ones most relevant for Indian distribution companies.

7.1.3.1 Apply Private Company Laws to State-Owned Distribution Companies

In India, most electricity distribution entities are structured as companies, with three exceptions. In Kerala, the sector has not been unbundled, and Punjab and Tamil Nadu have not separated distribution and supply. For all the state-owned distribution companies, it would be beneficial to go beyond the current level of corporatisation. One approach is to apply the same laws governing private companies to state-owned distribution companies. For example, as discussed earlier in Section 7.1.2.2, state-owned distribution companies should be subject to the requirement that a minimum number of directors on the board be independent directors.

7.1.3.2 Additional Legislation for State-Owned Distribution Companies

Irwin and Yamamoto (2004) recommend that some additional rules may be necessary for state-owned distribution companies due to the link between the government and these entities. They provide examples of such additional rules.

Unlike private companies, which are typically focused solely on efficiency and profit maximisation, state-owned distribution companies can have multiple, sometimes conflicting objectives. Therefore, Irwin and Yamamoto suggest that state-owned companies be tasked with the objective of operating as profitably as possible. They cite the example of New Zealand, which has a State-Owned Enterprises Act requiring state-owned businesses to be as "profitable and efficient" as comparable non-state-owned businesses.

Another recommendation from Irwin and Yamamoto is to establish legislation that limits how the state government can influence the company when negotiating contracts. A third suggestion is to mandate that the state government covers the costs of any non-commercial goals it wants the company the company to pursue. For example, such legislation could prohibit cross-subsidies, instead requiring the government to provide subsidies to targeted consumers through direct benefit transfers.

7.1.3.3 Listing of Minority Shares

One interesting and potentially very useful suggestion from Irwin and Yamamoto (2004) is to sell a minority of shares in the distribution company and to provide

representation on the board for minority shareholders. These minority shareholders could exert additional pressure in two ways on the distribution company to adopt a more commercial orientation.

First, as Irwin and Yamamoto argue, the value of the minority shareholders' investment will depend much more on the performance of the distribution company compared to that of the lenders. This is because shareholders' claims on the assets of the company are subordinate to the lenders' claims. Therefore, minority shareholders will monitor the distribution company performance at least as diligently, if not more, than lenders.

The second way in which the presence of minority shareholders would help is that there would be greater pressure from them for comprehensive and timely financial reporting. This could moderate any political interference.

7.1.3.4 Additional Steps to Encourage a Commercial Orientation

- Require additional public reporting, particularly on policies and other directives issued by state governments.
- Instil a commercial culture, for example, by appointing independent directors who have experience in successfully managing businesses.
- Mandate borrowing from private sources without a state government guarantee to promote greater financial discipline within these distribution companies.

7.2 Experience with Corporatisation

Irwin and Yamamoto (2004) express scepticism about the success of the proposed measures, citing the challenge of establishing a truly independent relationship between the government and a state-owned distribution company. In this section, we examine the experiences of other countries with corporate governance reforms similar to those suggested here. Detailed information on corporate reforms, particularly in developing countries and the electricity sector, is limited. Therefore, this section reviews reforms implemented in SOEs across various sectors before delving into the specific experiences within the electricity sector.

7.2.1 Malaysia

Malaysia provides an example of the success of corporate governance reforms of SOEs suggested in this paper. In 2004, the government initiated a reform program—Transformation Programme for Government Linked Companies (GLCs) (Kim and Ali, 2017). Under the program, the government upgraded the legal and operational framework and corporatised the SOEs. It changed the composition of the boards and senior management of the SOEs by bringing in individuals from both the private sector and the public sector. The management was given a mandate to improve SOE performance within a stipulated time. Contracts and compensation for the management were linked to their performance. Kim and Ali (2017) report that the profitability of the SOEs increased. Over the decade 2004-14, the SOEs tripled their market capitalisation and generated a return on equity compared to listed companies. Additionally, the SOEs grew by 11% over the same period.

7.2.2 China

The experience with corporate reforms for SOEs has been more mixed in China. Since the late 1970s, economic reforms in China have tried to balance considerations of economic efficiency against political stability (Zhang and Freestone, 2013). It has long been recognised that SOEs are inefficient and need reform. However, consistent with a balanced approach, reforms of SOEs have been "evolutionary, not revolutionary" (Zhang and Freestone, 2013). In 2003, the Chinese government established the State-Owned Assets Supervision and Administration Commission (SASAC) (Kim & Ali, 2017). One of the features of the reforms undertaken by the SASAC is to establish a "modern enterprise system" (Zhang and Freestone, 2013). This has led to many SOEs adopting a corporate structure with a board of directors who supervise the management of the business. The SOEs' ownership structure has non-state firms, both private and foreign-owned, as minority or majority shareholders, and the government is not involved in the day-to-day management (Zhang and Freestone, 2013).

Following these reforms, as Zhang and Freestone (2013) report, the SOEs turned around financially from being on the brink of loss-making in the late 1990s to becoming profitable. They report that the RoE of SOEs increased from 2% in 1998 to more than 15% in 2007. However, they caution that this

was due less to the SOE reforms and more to "policy favouritism." They cite government subsidies, low tax rates, low dividend pay-outs, and almost no royalties on resource extraction, which they assert "artificially propped up" the SOEs' profitability. They point to a Government-SOE nexus whereby the government influences the SOEs through appointments of directors and CEOs, and the SOEs influence policy.

7.2.3 Africa

We now look at the experience with attempts at reform of the governance of electric utilities in two African countries—South Africa and Kenya. Both countries have put in place boards with a majority of independent directors. As we discussed earlier, independent directors enable the board to maintain distance from both the government and the management. They should also facilitate good decision-making by the boards, allow unbiased judgement, and open up space for open discussion and voicing of dissenting views. Despite these good intentions in setting up the boards this way, the experience has been rather disappointing in both countries (Vaishnava, 2023). There have been allegations of corruption. There is frequent political interference with each successive government overhauling the boards, supposedly to remove corruption.

We first look at the case of Eskom, a government-owned vertically integrated electric utility[12] that supplies more than 90% of the electricity in South Africa (Eskom, 2022). The corporate governance framework of Eskom follows almost all the principles of good governance of government-owned distribution companies outlined earlier in this paper. According to the Memorandum of Incorporation (MoI) for Eskom, the government is the sole shareholder. The Board can have between 3 and 15 directors. The MoI requires that the majority of the directors be non-executive directors and at least 2 be employees of the Company—the CEO and CFO (Eskom, 2016). The current Board has 15 directors of which 13 are independent non-executive directors. Clearly, this is an independent board. The purpose of the Board, including its roles and responsibilities, is clearly stated—providing strategic direction, assessing risks and preparing appropriate responses, and overseeing and monitoring management. The Board has set up various committees which support it in its functioning.

Despite having a model corporate governance framework for an SOE on paper, Eskom has performed poorly and experienced major governance failures. The Eskom Chief Executive described 2022 as an extremely challenging year, with generation plant performance and load shedding reaching record lows (Eskom, 2022). He attributed this poor performance to declining generation plant performance and inadequate planning (Eskom, 2022). However, underlying the poor performance were lapses in governance associated with alleged state capture[13] (Eskom, 2022). Chief Justice Raymond Zondo headed the Judicial Commission of Inquiry into Allegations of State Capture set up in August 2018 (Eskom, 2022). Related to its investigation of Eskom, the Zondo Commission uncovered "serious cases of fraud and corruption perpetrated by former executives, former Board members, suppliers and their associates" (Eskom, 2022). The new Board has laid out plans to eliminate fraud and corruption.

One possible explanation for this high level of corruption at Eskom in the past, despite a good corporate governance framework, is that the government, as the sole shareholder in Eskom, appoints the directors on the Board. So, the success of the governance framework depends to a great extent on the government and its ability, and intent, to appoint competent and honest people to the Board. This relationship between the success of such institutions and governance frameworks and the capacity and intent of the government points to an inherent fragility of such institutions and frameworks.

Kenya Power and Lighting Company (KPLC) owns and operates most of the transmission and distribution system in Kenya. The Government owns 50.1% of the shares and the remaining 49.9% are held by private investors. Just as with Eskom, on paper, the governance framework of KPLC has most of the desirable features. The current board has a total of nine directors—six independent directors including the Chairman, two non-executive directors representing the Government, and the Managing Director (KPLC, 2022). There are five committees—strategy and innovation; corporate governance, finance and

[12] Efforts are ongoing for the unbundling of Eskom into separate companies for generation, transmission, and distribution, but the process has not been completed.

[13] State capture is a form of corruption where companies or powerful individuals dominate policymaking and shape it to their own interest and not the national interest.

risk, audit, and technical issues—that support the board in its functioning. However, the government exercises considerable control over the company. While according to the rules, any shareholder can nominate someone to sit on the board, the Government with its majority share actually decides who sits on the board. There is no minority representation on the board despite 49.9% shareholding by minority shareholders.

In July 2020, President Uhuru Kenyatta asked the entire board to resign. There had been concerns about falling profitability and allegations of corruption and bad management (Wanz, 2020). In late 2022, shortly after the new President, William Ruto was elected, almost the entire board of KPLC was removed once again (Kisero, 2023). A news report says that the board had become unpopular because it had started forensic audits of key operations of the company (Kisero, 2023). The same news report contends that the Government, as the majority stakeholder, through this change in the board, was able to tilt the power balance in the board away from public-spirited people to powerful cartels who have captured KPLC's supply chain.

We see in the example of KPLC, once again a governance structure that "ticks all the boxes" of desirable features, but performs poorly with low profitability and experiences widespread corruption.

7.3 Conclusions about Deepening Corporatisation

Like Irwin and Yamamoto, Vagliasindi (2008) is skeptical about corporatisation without privatisation, arguing it is necessary but insufficient to shield publicly owned utilities from political pressure. Given the mixed evidence on corporatisation, we concur with the caution expressed but believe these measures could still prove beneficial in states committed to enhancing distribution company performance yet facing political barriers to privatisation. Additionally, deeper corporatisation may facilitate later privatisation if state-owned companies continue to underperform.

8. Need for a Realistic View of Regulation

When regulation of the electricity sector was introduced in India and other developing countries, it was expected that it would transform the governance of the sector. Furthermore, it was assumed that the independence of regulators would greatly enhance the chances of the success of regulation, and that such independence could be easily achieved by simply mandating it through legislation. Based on the experience not only in developing countries but also in developed countries, we think this view needs to be tempered.

8.1 Regulation is Political

In theory, regulatory commissions are supposed to be independent, but we must remember that they operate in an environment that includes the executive, legislative and judicial branches of the government. The commissions are created by the executive and legislative branches and are dependent on all three branches of government. Furthermore, because it is closely connected to government policies, regulation is an inherently political activity. (Phillips, 1993:148).

Regulators need to walk a tightrope between being independent of political interference and yet being responsive to the political climate. Complete isolation from the political atmosphere would alienate them from their source of political strength, reducing the effectiveness of regulation (Phillips, 1993).

An example illustrating the political nature of regulation and challenges for Commissioner independence is the demotion of Neil Chatterjee as Chairman of the Federal Energy Regulatory Commission (FERC) by then-President Donald Trump. Chatterjee believed he was demoted due to his independent stance on climate change issues, which contradicted Trump's position (Washington Post, 2020).

In addition to the political nature of regulation, it is important to recognise that sectors with greater electoral sensitivity will be less amenable to independent regulation. One reason for the difficulty for regulators in India to raise electricity tariffs sufficiently is that electricity prices have become a prominent electoral issue. To further illustrate this point, it would be very difficult for any state government in India to hand over the pricing of onions to an independent regulator, no matter what economic reasons may exist for independent regulation. This is because onions are an important ingredient in the Indian diet, and prices of onions can quickly become an electorally important issue. The same could be said for tomatoes based on the recent experience with the increase in their prices. The government intervened quickly and sold tomatoes at lower prices to keep the prices of tomatoes in check. It is very unlikely that the pricing of tomatoes would be handed over to an independent regulatory agency.

The US has had a long history of regulation, and the political nature of regulation is well-recognised. Eleven states elect the commissioners who are members of the regulatory agency, often known as a Public Utility Commission or Public Service Commission. In many of the other states where regulators are nominated and not elected, statutes limit the maximum number of Commissioners that can be from one political party to the lowest number that will give that party a majority.[14] This is to prevent the Governor from packing the Commission with people from his party only. For example, if there are five members in the Commission, not more than three can be from one party. This was designed to limit partisanship in the Commission and promote the independence of the Commission. However, at the same time, it is a

recognition of the political nature of regulation. It should also be noted that in many states where the Governor nominates the Commissioners, they serve at his pleasure, and he has the authority to terminate them. Again, this feature recognises the political nature of regulation.

We see the effect of political sensitivity in several countries during the energy crisis triggered by the war in Ukraine. Regulators in UK and Australia imposed caps on the price of electricity that suppliers could charge their customers. Our educated guess is that this was issued on the initiative of the respective Governments. In the UK, the Government continues to mull over its options to limit the financial losses to the utilities while not burdening consumers with high energy bills.

8.2 Influence of Overall Governance on Regulation

As mentioned earlier, there was initially great optimism that regulation would transform the governance of the electricity sector in the country where it was introduced. Unfortunately, the opposite has happened. Instead of regulation transforming governance, overall governance in a country has transformed regulation. We examined regulation in three countries—US, UK, and India—and found that in each country, regulation takes on the hue of overall governance in that country.

8.2.1 USA

The political system in the US is based on checks and balances. The Congress, the US Presidency, and the Supreme Court are separate institutions but can limit each other's power. Congress can pass a law, but the President can veto it. Congress can override the veto with a two-thirds majority in both houses. The President can nominate senior positions in his cabinet and judicial appointments, but they must be confirmed by the Senate (Heywood, 2019:344). This system of checks and balances also applies to appointments of regulatory commissioners. As discussed earlier, in many states, regulations limit the number of members from any one political party to the minimum number needed for a majority. This provision is included to prevent the concentration of power with just one party in the regulatory Commission.

Another feature of the US political system is the central role lawyers play in federal and state governments. Despite lawyers constituting only about 1% of the population, they occupy one-third of the seats in the House of Representatives and half in the Senate (Bagley, 2019; Klein, 2023). Five of the last ten Presidents were lawyers (Klein, 2023). In the state governments, one-third of the top officials (Governor, Lieutenant Governor, and Secretary of State) are lawyers (Klein, 2023). So, it should be no surprise that lawyers dominate regulatory commissions. As Table 5 shows, about 40% of Commissioners are lawyers. This number grows to 45% if we consider only those Commissioners who are nominated by the Governor and exclude the ones who are elected. Of course, this is just a snapshot, and the numbers may vary somewhat as new administrations take the reins of state governments and the composition of commissions change.

Not only do lawyers dominate the mix of people who are commissioners, but the US also follows a very legalistic approach to regulation. The regulatory process is very similar to that in a court. The utility files a petition. Other organisations, such as the State Consumer Advocate, and other civil society organisations request to be parties to the process. There is a discovery process where the parties to the proceeding ask questions and seek data and information related to the utility's petition. There are hearings where evidence is presented, and witnesses

[14] Appendix I provides a detailed look at the regulatory commissions in the US. It provides state-wise information about the composition of the commissions and who makes decisions to nominate or terminate Commissioners.

Table 5. Presence of Lawyers as Commissioners in the US

	All Commissioners	Lawyers as Commissioners
Appointed by Governors	155	71
Elected by voters	37	4
Elected by General Assembly (South Carolina and Virginia)	10	5
TOTAL	202	80

Source: Websites of The States' Regulatory Commissions.

are cross-examined. There is direct testimony, rebuttal testimony, and sometimes sur-rebuttal testimony. Each of the parties files a brief, and the Commission takes a decision, and that decision along with the Commission's reasoning is made public.

8.2.2 United Kingdom (UK)

The Office of Electricity Regulator (Offer) was established at the time of privatisation of the electricity sector in 1989. In 2000, Offer merged with Ofgas (Office of Gas Supply) and became Ofgem (Office of Gas and Electricity Markets). The Gas and Electricity Markets Authority (GEMA) governs Ofgem and determines its strategy and policy priorities. GEMA also makes decisions on various regulatory issues, including price controls (Ofgem, 2023). Table 6 lists the qualifications and professional experience of current and past Chairpersons of GEMA. Table 7 provides this information for past and current CEOs of Offer and Ofgem. These individuals fall into one or more of the following categories: economists; scientists or engineers; and experts in the sector. In contrast to the US, the UK seems to place much greater emphasis on expertise for regulators in the electricity sector.

The UK also follows a much more consultative and deliberative approach in its regulatory proceedings compared to the US, which follows a more adversarial process. For example, in most states in the US, the state consumer advocate is treated as a party to a tariff case and argues its viewpoint during the legalistic proceeding which is adversarial in nature. The UK approach to consumer participation and support is quite different.

Since 2007, Ofgem has had a program called *Consumer First* to better understand energy consumers and their views, behaviour, and needs (Khanna et al., 2015). Consumer First consists of three activities. First, the Consumer First Panel meets regularly with 80 diverse residential consumers to get their views on current and challenging issues. Second, there is a Consumer Challenge Group consisting of consumer experts who provide the consumer perspective during regulatory proceedings. This group is seen as a "critical friend" of Ofgem. Third, Consumer First carries out research studies or commissions such studies to better assess consumer satisfaction.

Table 6. Qualifications and Professional Experience of Current and Past Chairpersons of GEMA

Name	Tenure	Title	Qualifications	Prior professional experience
Callum McCarthy Source: https://en.wikipedia.org/wiki/Callum_McCarthy	October 1998 – 2003	Chairperson GEMA and Chief Executive of Ofgem	BA History Merton College Oxford, PhD Economics Stirling University, MS GSB Stanford	Economics researcher, principal private secretary to secretaries of state, director of banks
Sir John Mogg (Baron Mogg) Source: https://en.wikipedia.org/wiki/John_Mogg,_Baron_Mogg	October 2003 – 2013	Chairperson of GEMA	–	Civil servant dealing with industry and European issues, served with the European Commission, Chair of the Board of Governors of Brighton College
David Gray Source: https://www.tokamakenergy.co.uk/area-item/david-gray-cbe/	October 2013 – September 2018	Chairperson of GEMA	MA in Natural Sciences -Physics from St. Johns College, University of Cambridge	Involved privatisation of British Gas in 1986 and the electricity industry in England, senior positions at HSBC as global head of energy and utilities investment banking
Martin Cave Source: https://www.gov.uk/government/people/martin-cave https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1353/135307.htm	Since September 2018	Chairperson of GEMA	BA & BPhil in Economics from University of Oxford, DPhil from Nuffield College University of Oxford	An economist specialising in competition issues and the regulation of network industries, professor at Warwick Business School and London School of Economics, advised governments and regulators worldwide

Table 7. Qualifications and Professional Experience of Current and Past CEOs of Offer/Ofgem

Name	Tenure	Title	Qualifications	Prior professional experience
Stephen Charles Littlechild Source: https://prabook.com/web/stephen_charles.littlechild/587999	September 1989 – 1998	Director General of OFFER	Bachelor of Commerce University Birmingham, 1964. Doctor of Philosophy (Business Administration, Computer Science, Mathematics), University Texas, 1969.	Professor in economics, director general of electricity supply Office of Electricity Regulation Birmingham, Member of Mono and Mergers Commission, 1983-1989. Member advisory committee on energy research and development, Secretary of State, 1987-1989
Alistair Buchanan CBE Source: https://storegga.earth/news/2021/news/appointment-of-alistair-buchanan-cbe-as-non-executive-chairman	October 2003 – 2013	Chief Executive Officer of Ofgem	University of Durham, trained as a CA at KPMG	Award-winning energy sector analyst and head of research for banks in New York and London.
Andrew Wright, interim CEO Source: https://uk.linkedin.com/in/andrew-wright-41693b69	June 2013 – March 2014	Chief Executive Officer of Ofgem	PhD Cranfield University, BSc. Physics Durham University	Over 25 years-experience in the Gas and Electricity sector, senior equity research analyst at UBS, previously Cazenove & Co and Merill Lynch, RA at Energy Research Group at Cambridge University
Dermot Nolan Source: https://www.ofgem.gov.uk/publications/ofgem-appoints-dermot-nolan-chief-executive	March 2014 – February 2020	Chief Executive Officer of Ofgem	PhD and MA in economics from Yale University	Commissioner at the Commission for Energy Regulation (CER) in Ireland then Chair, Manager of the Mergers Division in the Irish Competition Authority,
Jonathan Brearley Source: https://en.wikipedia.org/wiki/Jonathan_Brearley https://www.ofgem.gov.uk/publications/ofgem-appoints-dermot-nolan-chief-executive	Since February 2020	Chief Executive Officer of Ofgem	BSc in Maths and Physics from University of Glasgow, MPhil in Economics from University of Cambridge	Currently (as of 2023) CEO of UK Regulator's Network. Worked as a civil servant first, member of PM Blair's strategy unit, Department for Environment, Food and Rural Affairs and Department of Energy and Climate Change. Director at Brearley Economics.

8.2.3 India

In India, most states have a three-member Commission, comprising a chairperson and two members. The two members are required to possess a technical, legal or finance background. Technical members are often engineers from the state electric utility, legal members are typically drawn from the state's judicial services, and chairpersons are frequently ex-bureaucrats or ex-judges. As shown in Table 8, when considering all members of the 27 regulatory commissions in the country, there are a total of 70 positions for members and chairpersons. Presently,[15] out of these 70 seats, 60 are occupied by ex-government employees. There are only six seats that are occupied by non-government persons. Four seats are unaccounted because information on them is not available. Interestingly, ex-bureaucrats hold the majority of the chairperson seats, with 18 out of the 27 commissions being occupied by ex-bureaucrats, while five are held by ex-members of the judicial services. Ex-government engineers and non-government individuals each occupy only one seat. Information about the chairpersons of two commissions is not available. Thus, we observe that most SERC members in India are ex-government officials. This heavy reliance on ex-government officials is aligned with India's overall governance structure.

8.3 Key Findings on A Realistic View of Regulation

- Regulation alone cannot transform governance in a sector or resolve all issues.
- We must recognise that regulation has political impacts. The more electorally sensitive an issue is, the more challenging it will be to remove political interference.
- From a quick review of regulation in the US, UK, and India, we observe that regulation takes on the colour of overall governance in the country—in the US, relying on legalistic procedures and lawyers; in the UK, relying on experts and a consultative and deliberative approach; and in India, relying on ex-government officials. Thus, rather than regulation transforming governance in a sector, existing governance structures in a sector transform the regulatory framework.

9. Need for a Framework with Better-Aligned Incentives

From the earlier discussion, we see that regulation is much more suitable for privately-owned utilities compared to publicly owned utilities. For publicly owned utilities, ownership and oversight by the respective government are generally expected to provide sufficient protection of the public interest. For any institutional arrangement, incentives for the key institutions or organisations must align with the overall interest of the sector. In other words, each major institution in the structure should find it in its interest to further the overall interest of the sector. Otherwise, considerable resources and energy would have to be expended to compel the individual institutions or organisations to prevent them from acting in their respective interests and to persuade them to act instead in the public interest. Such institutional arrangements are unlikely to be successful and will certainly be much less efficient.

We observe this misalignment of incentives in the current regulatory framework with state-owned distribution companies. The Indian regulatory framework for electricity in India is very similar to that in

Table 8. Combined Composition of Electricity Regulatory Commissions in India

(26 SERCs and CERC, as of August 2023)

Total Number of Seats	Ex-Bureaucrats	Ex- State or National Judicial Services	Ex-Govt Engineers	Non-Govt Persons	Unaccounted Seats
70	24	20	16	6	4

Note: 4 seats are unaccounted because: (1) One seat on the Delhi Electricity Regulatory Commission is vacant; (2) Information about one member of the Punjab State Electricity Regulation Commission is not available; (3) No information is available about the single member in Nagaland's Commission; and (4) No information is available about one member of the Jharkhand Commission.

Source: Websites of the states' electricity regulatory commissions.

[15] This review of the composition of the regulatory commissions was carried out in August 2023. There could be some minor changes in the composition over time.

the US. In both countries, the process for a tariff increase is initiated when the utility files a petition with the regulatory agency requesting a tariff increase. Subsequently, proceedings take place where the request is evaluated for its reasonableness, and finally, the regulatory agency issues its order where it lays out its reasons for the size of the tariff increase it will allow. Interestingly, much of the effort of the Commission and its staff, particularly in the US, is to establish the appropriateness of the requested level of tariff increase, and often the allowed tariff increase is a pared-down amount from that requested by the utility. Such a process is logical because it is the utility that would, in its interest, file a petition for a tariff increase when required, and the Commission, as a protector of the public interest, should limit the increase to a reasonable level.

However, as discussed by Dubash (2017), in India, this process can sometimes be turned on its head. In 2011, the Ministry of Power (MoP) wrote to the Chairperson of the Appellate Tribunal for Electricity (APTEL) complaining that some state-owned distribution companies were not filing annual petitions for tariff increases, leading to the poor financial health of the distribution companies (APTEL, 2011). MoP requested APTEL to issue an order requiring state commissions to initiate proceedings to increase the tariff, *suo moto*, in case a distribution company did not file a petition in time. After deliberations on the issues, APTEL issued such an order (APTEL, 2011). There are good reasons for MoP's interest in promoting cost-reflective tariffs. However, this incident and the order by APTEL illustrate the extent of misalignment of incentives—a distribution company does not want to raise tariffs (most likely jeopardising its own financial health), but the Commission initiates a proceeding to increase tariffs. In such cases, the Commission seems much more concerned about the financial health of the distribution company than the company itself!

It is unlikely that such a *suo-moto* proceeding by the Commission will be required for a privately-owned distribution company because private distribution companies face hard budget constraints and cannot afford to not ask for a tariff increase when required. In the next sub-section, we provide another example related to efforts to improve performance that illustrates how incentives are much better aligned for privately-owned distribution companies.

9.1 A Tale of Two Approaches to Bailouts

As discussed earlier in Sections 5.2 and 5.3, over the last 20 years or so, the Union Government has provided three bailout packages for state-owned distribution companies to help improve their financial health. These packages have included conditions for reducing the (ACS-ARR) gap and losses. Additionally, there have been four schemes aimed at reducing losses and strengthening and upgrading distribution infrastructure. Despite these efforts by the Union Government, there has been little improvement in the performance of state-owned distribution companies; in fact, some of the performance of some of these companies may have worsened.

In contrast to this disappointing performance of state-owned distribution companies, the privately-owned distribution companies in Delhi have demonstrated stellar performance since their creation in 2002. Just before privatisation, the Delhi Government took over all long-term liabilities that could not be serviced through reasonable tariff increases and loss reductions (Singh et al., 2006). Once these liabilities amounting to about Rs 19,000 crore were taken over, the private distribution companies had a clean slate. From 2002 to 2022, aggregate technical and commercial (AT&C) losses[16] have decreased significantly: from 48.1% to 9.70% for BSES Rajdhani Power Limited (BRPL), from 57.2% to 9.41% for BSES Yamuna Power Limited (BYPL), and from 48.1% to 7.39% for Tata Power Delhi Distribution Limited[17] (TPDDL) (Singh et al., 2006; PFC,2022). In addition, the quality of service for customers has been top-notch. The one area of disappointment is the large amount of deferred revenues accumulated as regulatory assets, reflecting more on the quality of tariff-setting than necessarily the performance of the distribution companies.

It is also informative to compare the improvement plans that the three distribution companies had developed soon after 2002 with the plans in the RDSS scheme—the most recent scheme from the Union Government to help improve the performance of state-owned distribution companies, as mentioned

[16] Aggregate technical and commercial (AT&C) losses include technical losses in the distribution network and commercial losses due to poor metering, billing, and collection, and due to theft of electricity.

[17] In 2002 soon after privatisation, Tata Power Delhi Distribution Limited (TPDDL) was known as North Delhi Power Limited (NDPL). We use the name TPDDL for the company throughout for consistency and in order to avoid confusion.

in Section 5.3. Table 9 shows the plan of BRPL and BYPL developed in 2002 to reduce losses and improve operations, and Table 10 shows the plan for TPDDL. Table 11 shows the components of RDSS introduced by the MoP in 2022. The 2002 plans for the private distribution companies in Delhi and the components of RDSS are quite similar. Essentially, the focus is on three aspects: metering, billing, and collection; upgradation of the distribution network; and training and capacity building. Twenty years ago, the three private distribution companies executed what RDSS is currently planning to undertake. Furthermore, the private companies have succeeded in accomplishing their goals without much financial support from, or oversight by, the Union Government. On the other hand, for state-owned distribution companies in the country, there have been three bailouts and four schemes for loss reduction and improving performance, with very poor results.

The stark contrast in performance over twenty years between Delhi's private companies and state-owned distribution companies in the country highlights the importance of aligning incentives within a regulatory and governance framework. The private distribution companies saw loss reduction and improved operational performance as in their interest and pursued these goals diligently. In contrast, many state-owned distributors do not respond well to financial incentives, and loss reduction and improved operational performance are not top priorities for them. Consequently, success is very limited, despite the efforts and financial support from the Union Government.

Table 9. Plans of BRPL and BYPL for Improving Operations and Reducing Losses in 2002

Planned Actions	
Loss Reduction	
	Installing meters on all 66/33 kV and 11 kV feeders
	Consumer Indexation
	Data Collection - Amounts billed and collected
	Computing AT&C losses monthly
	Streamlining and Improving billing system
	Streamlining and Improving payment system
	Electrifying and metering jhuggi-jhopri clusters and unauthorized colonies.
	Installing capacitor banks
	Replacing overloaded or defective cables and upgrading lines
	Replacing switch gear
	Introducing LT-less distribution system where feasible
Improving Quality of Service	
	Improving complaint handling
	Giving mobile phones, pagers, and mopeds to service personnel to reduce time to respond

Source: Singh and Sinha (2004).

Table 10. Plans of TPDDL for Improving Operations and Reducing Losses in 2002

Planned Actions	
Loss Reduction	
	Replacement of meters
	Improvement of meter reading and energy auditing
	Use of high voltage distribution system (HVDS) in unauthorized colonies
Reliability Enhancement	
	Primary side protection of transformers
	Hiring single company to do cable joints
	Addition of capacitor banks
	Addition of substations
Improving Customer Service	
	Improvement of customer care centres
	District level billing
	Customer bills on website
	Breakdown vans and mobile phones to field staff
	Call centre
	Outage announcements on FM radio
Training Employees	
	Training programmes for in-house and external personnel
	Exchange programme with Baltimore Gas & Electric, USA

Source: Singh and Sinha (2004).

Table 11. Components of RDSS to Improve Operational Efficiency and Financial Sustainability

Components of RDSS	
Metering, Billing & Collection	
	Installation of prepaid smart meters for all consumers
	Installation of communicable meters for DTs and Feeders
	ICT including AI and machine learning solutions for power sector
	Unified billing and collection system
Distribution Infrastructure Works	
	Strengthening and modernizing distribution system
	Measures for loss reduction
	Separation of agricultural feeders to enable KUSUM scheme
	Installation of aerial bunched cables and HVDS for loss reduction
	Replacement of HT/LT lines as required
	Addition or upgradation of substations
	SCADA and DMS system
Training and Capacity Building	
	Upgradation of skills of personnel
	Process improvements
	Augmentation of Smart Grid Knowledge Centre
	Training and capacity building of people involved in the exectution of scheme

Source: MoP (2022).

PART IV. RESULTS

10. Findings, Conclusions, and Recommendations

- **Regulation is required for balancing competing interests.** An independent regulatory agency is required when there is a need to balance competing interests. For example, regulators are tasked with balancing the interests of the utility (ensuring sufficient revenue, financial stability) and the interests of the consumers (maintaining reasonable prices for electricity and a good quality of service). In the case of state-owned utilities, such balancing is not required because state-owned utilities are not motivated by private profit and can be directed to act in a socially desirable way. Thus, government ownership provides sufficient protection of the public interest and the interests of consumers. In fact, state ownership can be considered another method of regulating utilities.

  Experience in the richer countries supports this finding. In most of these countries, regulation was introduced when state-owned assets in the electricity sector were privatised, and electricity service began to be provided by private entities. Another challenge with regulating state-owned utilities is that they may find themselves working for two masters—the government and the regulator—potentially receiving conflicting directives from them. In India, state-owned distribution companies often give greater priority to directives from their respective state governments.

- **There are two requirements for regulation to be effective—a hard budget constraint, and an institutional structure where incentives are aligned.**

  - Hard budget constraint. Regulation utilises financial incentives to modify the behaviour of companies effectively. However, these financial incentives are only effective when there is a hard budget constraint. The main reason why state-owned distribution companies continue to bear revenue deficits is because they have a soft budget constraint, unlike private companies that operate with the constant threat of bankruptcy, creating an inherent hard budget constraint.

  - Alignment of incentives. It is important that incentives for key institutions or organisations in the power sector align with the overall goals of the sector. Each major institution within the structure should have an interest in actions that further the overall interest of the sector. Otherwise, it would require significant resources and energy to persuade individual institutions or organisations to act in the public interest rather their own. Such institutional arrangements are unlikely to be successful and will certainly be much less efficient.

    A hard budget constraint greatly facilitates the alignment of incentives. We find that one reason for the failure of several bailouts by the Union Government and several schemes to improve the operating performance of state-owned distribution companies is that, for these companies, these initiatives are not top priorities. In contrast, privately-owned distribution companies, focused on maximising profits, possess an inherent incentive to improve performance. The post-privatisation performance of the Delhi distribution serves as an example of such behaviour.

- **Prioritise privatisation for effective regulation.** As discussed above, privately owned distribution companies naturally fulfil the two requirements for effective regulation; therefore, regulation is more effective with privately-owned companies. This finding is supported by the experience in developing countries, which points to greater effectiveness of regulation with privately-owned utilities. Studies indicate that with privately-owned utilities: (1) there is generally less deviation from enacted rules and regulations; (2) full cost recovery is more likely; and (3) corporate governance is better, particularly regarding human resource issues and financial discipline.

  In India, too, the experience supports this finding. As discussed in Section 5.1.1, the regulation of privately-owned distribution companies has led not only to better financial health but also much better operational performance compared to state-owned distribution companies.

- **Post-privatisation, additional action will be needed to fully reform the distribution segment.** Privatisation alone will not solve all problems. As discussed in Section 5.1.1, the issue of excessively low tariffs persists even with privately-owned distribution companies. However, the problem is addressed differently for private and state-owned companies, and the outcomes are likely to be more favourable for privately-owned companies.

  Generally, in the case of a state-owned distribution company, the company incurs a financial loss, worsening its financial health. In contrast, for a privately-owned company, revenue recovery is often deferred through the creation of a regulatory asset. While the creation of regulatory assets is far from a perfect solution, it maintains the distribution company's financial health and also provides the company with the possibility of recovering the revenue in the future. The private distribution companies in Delhi are using the judicial system to seek liquidation of the regulatory assets.

  The issue of deferred revenues and regulatory assets highlights the need to temper expectations from regulation. A realistic perspective on regulation is necessary. It is tempting to see independent regulation as a cure-all for problems in the distribution segment. However, we need to remember that rather than regulation transforming governance of the electricity sector, the overall governance of the sector is much more likely to transform regulation. Regulation takes on the colour of the existing governance practices and culture in a country.

  In addition, while discussing the independence of regulators, it is important to remember that regulation is inherently political, and the more politically or electorally sensitive a sector is, the more difficult it is for regulation to be apolitical. In any case, regulation needs to be responsive to the political circumstances in the country.

- **For situations where privatisation is politically difficult, the performance of state-owned distribution companies can be improved by modifying their governance structure.**

  While the privatisation of distribution companies should be pursued as the best option, this move often faces political opposition. In circumstances where such opposition is very strong, the governance structure of distribution companies should be improved. The modification of the governance structure should have two key objectives: (1) create a separation between the state-owned distribution company and the state government; and (2) incentivise state-owned distribution companies to emulate privately-owned ones, especially regarding financial discipline.

  Drawing inspiration from the Canadian experience in regulating publicly-owned utilities, one way to achieve these two objectives would be to establish an independent board overseeing the distribution company and its management. This board would be accountable to the state government through the relevant minister. The day-to-day management of the distribution company would be left to the CEO and the management team, thereby freeing it from day-to-day political interference. In such a structure, the board would monitor the distribution company's performance and be responsible for the company's strategic direction. Additionally, the board would report to the state government. Section 7.1 of this paper provides additional details on three categories of measures that would help make this structure successful: (1) professionalising government ownership; (2) developing more effective, stronger, and independent boards; and (3) enhancing the commercial orientation of the distribution companies.

- **Summary.** For effective regulation, it is important to prioritise the privatisation of distribution companies. Where privatisation is not feasible due to political opposition, the governance of state-owned distribution companies should be improved. This improvement is necessary to provide these companies with similar incentives as private companies, encouraging them to enhance their financial and operational performance. However, these changes can be challenging for the government to implement. If modifications to the governance fail to bring significant improvements, renewed efforts should be made to privatise the distribution companies.

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Appendix I. State-Wise Details of US Regulatory Commissions

State	Composition		No. of Lawyers	Selection to office	Removal from office
	No. of Commis-sioners	Restrictions on party affiliation			
1. Alabama	3	None	None	2 Elected by votes 1 selected by the governor	Supreme Court
2. Alaska	5	None	None	Appointed by the governor	Governor
3. Arizona	5	None	None	Elected by voters	Grand jury as per impeach-ment process in Arizona State Code Title 38
4. Arkansas	3	None	3	Appointed by the governor	Governor
5. California	5	None	None	Appointed by the governor	Legislature
6. Colorado	3	No more than 2 members of same political party	None	Appointed by the governor	Governor
7. Connecticut	3	None	None	Appointed by the governor	Governor directs Attorney General to file complaint followed by judgment of the Supreme Court
8. Delaware	5	None	None	Appointed by the governor	Governor
9. Florida	5	None	None	Appointed by the governor – 4 Elected by voters – 1	Governor
10. Georgia	5	None	None	Elected by voters – 2 Governor – 2	Governor
11. Hawaii	3	None	2	Appointed by the governor	Not available
12. Idaho	3	No more than 2 members of the same political party	1	Appointed by the governor	Governor
13. Illinois	5	No more than 3 members of same political party	1	Appointed by the governor	By a legal procedure authorised by the governor
14. Indiana	5	No more than 3 members of public utilities commission shall be affiliated to the same political party	1	Appointed by the governor	Governor

State	Composition		No. of Lawyers	Selection to office	Removal from office
	No. of Commis-sioners	Restrictions on party affiliation			
15. Iowa	3	No more than 2 members of the same political party	None	Appointed by the governor	Governor
16. Kansas	3	No more than 2 members of the same political party	1	Appointed by the governor	Governor
17. Kentucky	3	None	1	Appointed by the governor	Governor
18. Louisiana	5	None	2	Elected by voters	Governor
19. Maine	3	None	1	Appointed by the governor	Governor
20. Maryland	5	None	2	Appointed by the governor – 3 Voters – 2	Governor
21. Massachusetts	3	No more than 2 members of the same political party	3	Appointed by the governor	Governor
22. Michigan	3	No more than 2 members of the same political party	1	Appointed by the governor	Governor
23. Minnesota	5	No more than 3 members of the same political party	3	Appointed by the governor	Governor
24. Mississippi	3	None	None	Elected by voters	Not available
25. Missouri	5	None	None	Appointed by the governor	Governor
26. Montana	5	None	None	Elected by voters in each of 5 regional districts	Governor
27. Nebraska	5	None	None	Elected by voters – 4 Appointed by the Governor – 1	Governor
28. Nevada	3	No more than 2 members of the same political party	2	Appointed by the governor	Governor
29. New Hamp-shire	3	None	None	Appointed by the governor	Governor
30. New Jersey	5	No more than 3 members of the same political party	None	Appointed by the governor	Governor
31. New Mexico	5	None	None	Elected by voters	Governor
32. New York	5	No more than 3 members of the same political party	1	Appointed by the governor	Governor
33. North Carolina	7	None	5	Appointed by the governor	Judges of the General Court of Justice

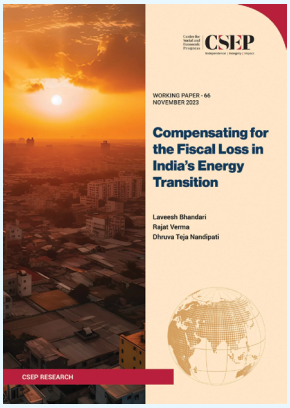
State	Composition		No. of Lawyers	Selection to office	Removal from office
	No. of Commis-sioners	Restrictions on party affiliation			
34. North Dakota	3	None	None	Elected by Votes – 1 Appointed by the Governor – 2	Governor
35. Ohio	5	No more than 3 members of the same political party	1	Appointed by the governor	Governor
36. Oklahoma	3	None	None	Elected by voters	Governor
37. Oregon	3	No more than 2 members of the same political party	2	Appointed by the governor	Governor
38. Pennsylvania	5	None	1	Appointed by the governor	Governor
39. Rhode Island	3	None	2	Appointed by the governor	Governor
40. South Carolina	7	None	2	Elected by a joint session of South Carolina General Assembly	Not available
41. South Dakota	3	None	None	Elected by voters	Governor
42. Tennessee	7	None	2	Appointed: 2 – Governor 2 – Speaker of the senate 2 – speaker of the house of representative 1 – Jointly by governor, speaker of the senate and speaker of the house of the representatives	Not available
43. Texas	4	None	None	Appointed by the governor.	Governor
44. Utah	3	No more than 2 members of the same political party	2	Appointed by the governor	Governor
45. Vermont	3	None	1	Appointed by the governor	Governor
46. Virginia	3	None	None	Virginia General Assembly	Governor
47. Washington	3	No more than 2 members of public utilities commission shall be affiliated to the same political party	2	Appointed by the governor	Governor
48. West Virginia	3	No more than 2 members of the same political party	1	Appointed by the governor	Governor
49. Wisconsin	3	None	3	Appointed by the governor	Governor
50. Wyoming	3	No more than 2 members of the same political party	3	Appointed by the governor	Governor

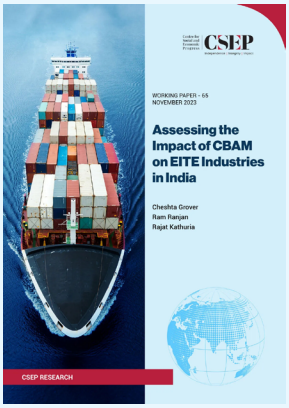
Source: Websites of the Regulatory Commissions and Relevant Statutes in the States.

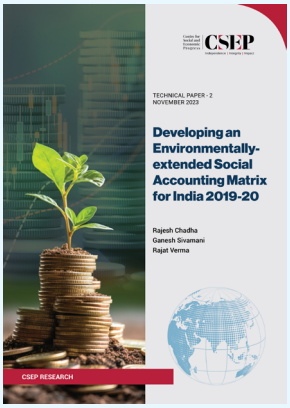
About the author

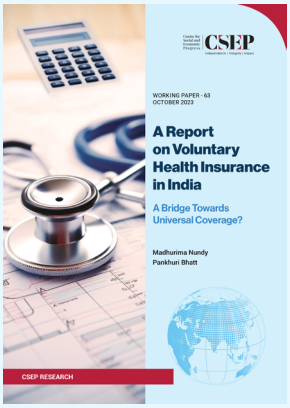
Daljit Singh is a Fellow at the Centre for Social and Economic Progress (CSEP), and has many years of experience in the energy sector in India and USA. He has extensive experience in reforms and regulation of the Indian power sector, covering almost all aspects of the sector, and has also done work on the coal and gas sectors. In addition, he has in-depth experience of regulation of US electric utilities both as an intervenor on behalf of consumer and environmental advocates, and as staff of a regulatory commission.

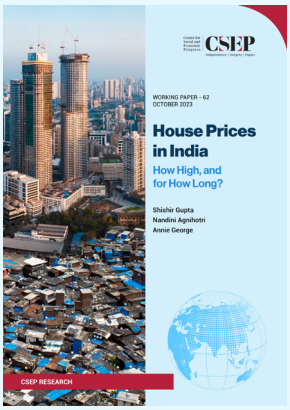
Other publications

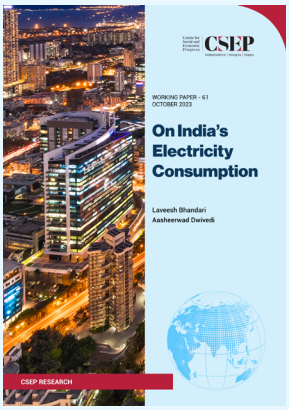


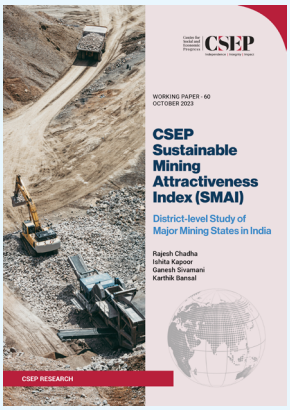


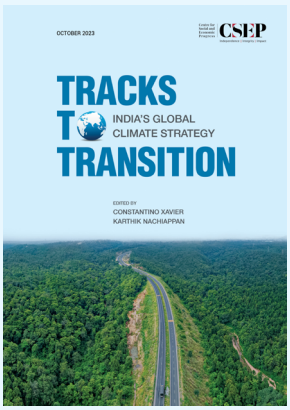


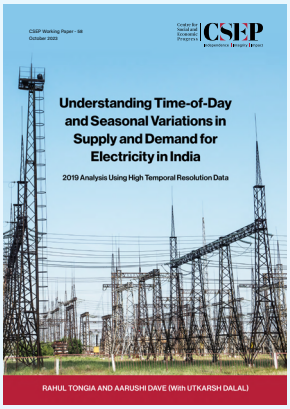


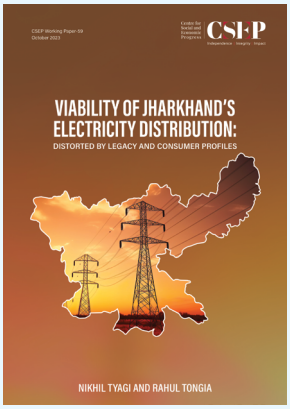


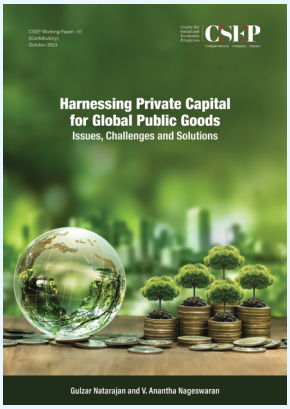


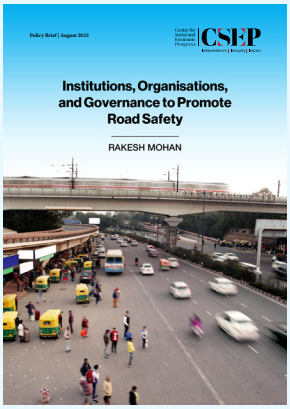


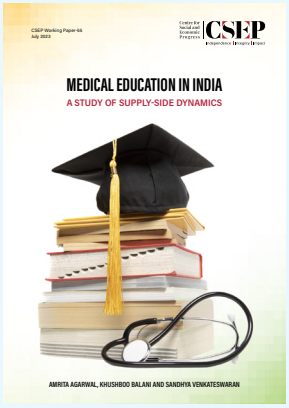


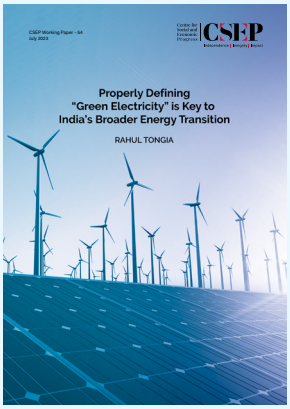












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