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International Experience with Distribution Ownership Options in Developing Countries

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Designed by Umesh Kumar

International Experience with Distribution Ownership Options in Developing Countries

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Abbreviations

ANEEL	Agencia Nacional de Energia Eléctrica (Brazil)
CAMMESA	Argentine Wholesale Electricity Market Clearing Company
CDE	Energy Development Account (Brazil)
Discoms	Electricity distribution companies (India)
EMRA	Energy Market Regulatory Authority (Turkey)
ENRE	Ente Nacional Regulador de la Electricidad (Argentina)
EPIRA	Electric Power Industry Reform Act (the Philippines)
EPRA	Energy and Petroleum Regulatory Authority (Kenya)
ERA	Electricity Regulatory Authority (Uganda)
ERC	Energy Regulatory Commission (the Philippines)
EÜAŞ	Electricity Generation Company (Turkey)
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
IPTL	Independent Power Tanzania Limited
KenGen	Kenya Electricity Generating Company
KETRACO	Kenya Electricity Transmission Company Limited
KPLC	Kenya Power and Lighting Company
MERALCO	Manila Electric Company
NERSA	National Electricity Regulator of South Africa
NGCP	National Grid Corporation of the Philippines
PPA	Power Purchase Agreement
PSALM	Power Sector Assets and Liabilities Management Corporation (the Philippines)
RCOA	Retail Competition and Open Access
TANESCO	Tanzania Electric Supply Company Limited
TEİAŞ	Turkish Electricity Transmission Corporation
TEİAŞ	Turkish Electricity Transmission Corporation
TETAŞ	Electricity Trading Company (Turkey)
UEDCL	Uganda Electricity Distribution Company Limited
UEDCL	Uganda Electricity Distribution Company Limited
UETCL	Uganda Electricity Transmission Company Limited

Abstract

India's electricity distribution companies are grappling with significant challenges, plagued by high losses and operational inefficiencies, resulting in poor financial health requiring frequent bailouts. Studying the strategies used by other countries facing similar challenges and their experiences can provide valuable insights and strategies for addressing the ongoing challenges faced by the Indian electricity distribution sector. This paper analyses the performance of the electricity distribution sector in developing countries under different ownership models. The rationale behind this study is to identify key lessons and effective strategies that could be applied to the Indian electricity distribution sector as well as those of other countries. The paper uses a case study approach, delving into the experiences of eight countries across Africa (Uganda, Tanzania, Kenya, and South Africa), Latin America (Brazil and Argentina), and Asia (the Philippines and Turkey). We find that the effectiveness of these ownership models is highly dependent on the specific context and regulatory framework of each country. However, the careful design of contracts, monitoring of market power, gradual introduction of competition in distribution, and taking a sector-wide approach can be useful in guiding policy and regulatory frameworks for the distribution sector in India and other countries.

Executive Summary

India's electricity distribution companies (or discoms) are grappling with significant challenges, plagued by high losses and operational inefficiencies, resulting in poor financial health requiring frequent bailouts. Most of India's discoms are under state-ownership. To enhance their efficiency, there have been policy changes encouraging private sector involvement. Other countries have encountered similar issues and have devised a variety of solutions. Studying these international experiences can provide valuable insights and strategies for addressing the ongoing challenges faced by the Indian electricity distribution sector as well as those in other countries.

This paper analyses the performance of the electricity distribution sector in developing countries under different ownership models. The rationale behind this study is to identify key lessons and effective strategies that could be applied to the Indian electricity distribution sector in addressing ongoing challenges such as inefficiencies, losses, and the need for significant sectoral reforms.

The countries chosen for this study are distributed across three geographical regions: four in Africa (Uganda, Tanzania, Kenya, and South Africa), and two each in Latin America (Brazil and Argentina), and Asia (Turkey and the Philippines). Our choice of case studies is guided by two key criteria: their ability to offer distinct ownership experiences and their relevance to India's context. The paper is distinctive not only for focusing on the experiences of developing countries but also for viewing them not as deviations from a standard model, but as models in themselves that can offer potential strategies and ideas.

The paper used a case study approach to analyse the performance of electricity distribution sectors in the selected countries involving a detailed examination of each country's specific context, ownership models, regulatory frameworks, and performance outcomes. This approach allows for a comprehensive understanding of the complexities and nuances associated with different approaches to managing electricity distribution. Publicly available information in the form of policy briefs and documents as well as secondary literature were used for the case studies.

The study examines four different ownership options: public ownership, management contracts, concessions, and private ownership. Public ownership typically involves government-run departments or state-owned companies. Management contracts are agreements where a private company manages the distribution for a period, under specific terms and conditions, but the assets remain with the government. Concessions are licences to operate the distribution business, with assets returning to the government at the end of the term. Private ownership entails complete control by a private entity, often resulting from the divestiture of state-owned assets.

We find that the motivation for reforms in the selected countries varied, often influenced by factors such as World Bank funding requirements or the need for investment. Participation in reform efforts also differs, with foreign companies often playing a substantial role. In the African case studies, for both privatisation and management contracts, it has mostly been foreign companies from outside Africa and/or South Africa's Eskom, which have participated and won contracts and concessions. Brazil and Argentina saw investment from several foreign firms as well as local firms. This is similar to the experience in the Philippines. In Turkey, however, it was primarily Turkish private companies that invested in the privatisation effort.

We found that in the African case studies, management contracts and concessions have generally been good at increasing collection efficiency and bringing down commercial losses. Incentives in the contracts and the government's support for loss reduction facilitated the meeting of these two objectives. In many countries, this was accompanied by the dismantling of cross-subsidies and an increase in tariffs to more cost-reflective tariffs. However, with few exceptions, the contractors and lessees were not able to improve the reliability of the grid or make sufficient investments into the grid to improve access.

Our analysis holds lessons for countries, such as India, looking to undertake reforms.

- **Contract Design:** The experience in Africa shows that it is possible to design contracts that reduce losses. However, these contracts must be designed so that the incentives are aligned with the targets. Government support and clear performance measurement parameters are also necessary.

- **Unbundling and Ownership Separation:** Stricter unbundling requirements promote competition and a level playing field among market players. In India, where unbundling of vertically integrated utilities has been a requirement, the result has often been unsatisfactory with the resulting entities behaving as divisions of the same company. To promote competition in the industry and ensure a level playing field, India could look at examples from Brazil and Argentina on implementing stricter unbundling requirements.

- **Energy Mix Diversification:** The study has also highlighted the importance of diversification of the energy mix for generating electricity. Avoiding overreliance on specific energy sources is crucial for resilience, as seen in cases of drought-related challenges in Africa and Latin America. Kenya has been successful in diversification by investing in geothermal energy and moving away from excessive reliance on hydropower.

- **Power Procurement Planning:** Long-term planning minimises risks associated with hastily contracted generation capacity. Kenya's use of a multi-stakeholder Least Cost Power Development Planning (LCPDP) since 2009 could provide a model for such planning exercises and the resulting benefits.

- **Electrification and Access:** Across our case studies, government-led programmes with sustained financing were key to increasing access, with private companies as potential partners.

- **Regulatory Independence:** Ensuring regulatory independence through legislative safeguards and financial autonomy enhances credibility. Brazil's Agencia Nacional de Energia Eléctrica (ANEEL) could serve as an example.

- **Independent Utility Boards:** Our findings suggest that creating independent boards can enhance transparency and operational autonomy, though challenges of political interference persist.

- **Competition in Distribution:** There has been a gradual introduction of competition in our case study countries, with a separation of wires and supply, and mandatory open access. This contrasts with India where, in the absence of legislation separating wires and supply, multiple electricity distribution licences are being contemplated, which could result in duplication of network assets.

- **Political Influence:** A sobering finding from these case studies was that none of the countries managed to isolate their electricity sector from politics. While the problems with such intertwining of politics and the electricity sector are well-known in India, we found that it also presents opportunities. When governments are committed to reforming the electricity sector, it is possible to address the problems of the sector comprehensively, including setting up institutions which are buffered from the government. For example, in the Philippines and Turkey, the governments backed the implementation of reforms leading to their successful implementation.

- **Comprehensive Sector Structure:** The most important finding from this study is the need to think of the structure of the entire sector before any changes are made. As the eight case studies illustrate, trying to reform a single segment of the electricity sector without addressing the weaknesses of the other segments is unlikely to lead to sustained improvement in the sector. This is particularly true for electricity distribution where the end-of-line entities, the distribution companies, are affected by the accumulated problems of the upstream segments.

1. Introduction

India's electricity distribution companies (or discoms) are grappling with significant challenges. These entities are responsible for the distribution of electricity to consumers across the country. However, they have been plagued by high losses and operational inefficiencies resulting in poor financial health requiring frequent bailouts. High losses, which include transmission losses and revenue leakage due to theft and inefficiencies, are a major concern. Furthermore, the discoms are often unable to recover the full cost of power from consumers. Tariffs set by regulatory commissions often do not reflect the true cost of supply, and there is a reluctance to increase tariffs for fear of political backlash. The government has had to repeatedly bail out the discoms to keep them afloat. There is a pressing need for comprehensive reforms in the sector to address these issues.

Most of India's discoms are under state-ownership. In an effort to enhance their efficiency, there has been a policy change seeking to encourage private sector involvement. This has been pursued either through complete privatisation, as seen in Delhi and Odisha, or via private distribution franchisees. Evaluations of these initiatives (Chitnis, 2024; Dubash et al., 2018; Prayas (Energy Group), 2018) reveal that in some instances these have proved to be a mixed bag, while in other cases they have not worked at all. India is not the only country struggling with inefficiencies in its electricity sector. Other countries have encountered similar issues and have devised a variety of solutions. Studying these international experiences can provide valuable insights and strategies for addressing the ongoing challenges faced by the Indian electricity distribution sector as well as those in other countries.

The 'textbook model' of electricity reforms of the late 1980s and 1990s, adopted by several developed countries (such as by the UK) and popularised by the World Bank, rested on four pillars: creation of an autonomous regulatory entity; unbundling and corporatisation of the electricity utility; private sector participation; fostering competition. However, as is now evident, these reforms were not universally applicable nor were all the reforms equally implemented across countries (Foster & Rana, 2020). For example, in their review of reforms in 17 non-OECD Asian countries, Sen et al. (2016) find that the most popular reforms were the introduction of independent power producers, the establishment of an electricity regulator (that may or may not be independent of the government) and unbundling and corporatisation of erstwhile state-owned electricity companies, while open access and distribution privatisation were less prevalent. Foster & Rana (2020), in their review of 25 years of reform experience, find that 'Good sector outcomes were achieved by countries adopting a variety of different institutional patterns of organisation for the sector' (p. 4).

In this paper, we analyse why and how select distribution reforms were implemented in developing countries, focusing on experiments with different ownership options. We examine the impact of the reforms on the performance of the country's electricity sector. This paper delves into the experiences of eight countries, four in Africa and two each in Latin America and Asia, with the objective of (1) understanding the performance under different ownership options, and (2) extracting lessons, if any. While it touches upon the reforms and innovations in other segments of the electricity value chain, the paper's primary aim is to understand the changes to and the performance of the electricity distribution segment. The paper is distinctive not only for focusing on the experiences of developing countries but also for viewing them not as deviations from a standard model, but as models in themselves that can offer potential strategies and ideas.

The paper used a case study approach to analyse the performance of electricity distribution sectors in the selected countries involving a detailed examination of each country's specific context, ownership models, regulatory frameworks, and performance outcomes. To do this, the author relied on publicly available information in the form of policy briefs and documents produced by the respective country governments, the relevant utilities and regulators, the World Bank, and other international organisations. It also makes use of secondary literature (books, journal articles, newspaper reports) for the case studies.

This working paper is part of a larger project that assesses different ownership models for distribution companies in India, including public ownership, private ownership, and distribution franchisees. In

addition to this paper, there are papers evaluating private and public ownership models, including one examining the regulatory framework of the sector (Singh, 2023) and another analysing the functioning of distribution franchisees in India (Chitnis, 2024). A final paper will consolidate the findings from these individual studies, drawing conclusions to guide broader policy and regulatory frameworks.

1.1 Selection of Case Studies

There is no one-size-fits-all approach to electricity distribution reforms in Indian states. Given the diverse challenges faced by different states, the selection of case studies aims to highlight these issues. As electricity falls under both State and Centre jurisdiction, resulting in varied state electricity sectors and centralised control over certain market aspects, our focus is on including case studies that can provide insights for both the state and central levels. For instance, the African countries in the case studies have grappled with energy access challenges and have engaged private players to enhance investments. Similarly, Brazil and Argentina represent examples of well-established and regulated electricity markets. Thus, our choice of case studies is guided by two key criteria: their ability to offer distinct ownership experiences and their relevance to India's context.

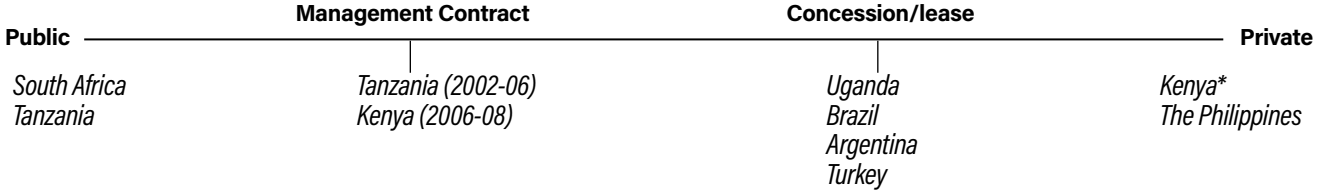
The decision to include four case studies from Africa was based on the diverse ownership modalities experimented with in these countries. Although Kenya, Tanzania, and Uganda achieved independence within a year of each other, they have distinct electricity histories, making them compelling case studies for analysing challenges in electricity distribution and the solutions that have been explored.

1.2 Types of Ownership Options

This paper engages with four different ownership options for the distribution sector, namely public ownership, management contracts, concessions, and private ownership. *Public ownership* signifies that electricity distribution is carried out by a government department or, as is the case in our case study countries, by a state-owned company or corporation. In such cases, the ownership of the assets is with the government department/company. *Management contracts* are short-term contracts signed between the public electricity distribution department/company and (usually) a private company wherein the private company takes over the management and operations of (the whole or specific parts of) electricity distribution for a specified period. The contracts contain terms and conditions and list out the responsibilities (such as payments) of both parties. In the case of management contracts, the assets ultimately rest with the government department/company. *Concessions* or leases are licences to operate the distribution business but with the distribution assets resting with the government at the end of the concession term. Finally, *private ownership* is the wholesale ownership of the distribution business by a private company, with the assets owned by the company as well. This can be a result of asset divestiture by a state-owned electricity company in favour of a private company. Figure 1 lists our case study countries based on the type of ownership option exercised in their electricity distribution sector, and Table 1 provides a snapshot of the electricity sectors in these countries.

This paper is organised as follows: Sections 2–9 describe the electricity sector reform journey of our case study countries in Africa, Latin America, and Asia, respectively. We conclude with our findings and lessons in Section 10.

Figure 1: Ownership Options in Case Study Countries



**Kenya Power and Lighting Company (KPLC) is a listed company on the Nairobi Securities Exchange, with the Government of Kenya as a controlling shareholder with 50.1% (with private investors at 49.9%). Kenya has been listed as private to separate it from the vertically integrated state-owned utilities.*

Table 1: A Snapshot of Key Details Across Our Case Study Countries

#	Country (electricity access)	Generation	Transmission	Distribution	Regulatory authority (year est.)	Regulated tariff	Open access	Regulator appointment & funding	Motivation for reforms
1	Uganda (42%)	IPPs and UEGCL (state-owned generation company)	UETCL (state-owned) transmission company), acts as a single buyer without generation assets.	UEDCL (state-owned distribution company is the largest, run by Umeme Ltd. under concession; private concessionaires in rural areas.	ERA (2000)	Yes; For Umeme, the tariffs have been cost-reflective	Single buyer without generation assets. Thus, n.a.	Members appointed by sector minister; only one reappointment; Members appoint CEO; funding through fee charged.	World Bank funding requirement; investment required.
2	Tanzania (40%)	IPPs and TANESCO (the vertically integrated state-owned utility)	TANESCO	TANESCO (briefly tried management contract)	EWURA (2008)	Yes	A single buyer with generation assets. Thus, n.a.	President appoints the chairperson; members appointed by sector minister.	World Bank funding requirement; investment required.
3	Kenya (71%)	IPPs and KenGen (70% with govt.)	KETRACO (state-owned transmission company)	KPCL (51% govt. owned) (briefly tried management contract)	EPRA (1998)	Yes	Single buyer without generation assets. Thus, n.a.	President appoints the chairperson; members appointed by sector minister; renewable once; Members appoint CEO; funding through fee charged.	World Bank funding requirement; investment required.
4	South Africa (84%)	IPPs and ESKOM (100% state-owned company)	ESKOM	ESKOM and 799 municipal distributors (small)	NERSA (2005)	Yes	A single buyer with generation assets. Thus, n.a.	Members and CEO appointed by sector minister; only one reappointment; funding through fee charged but budgetary approval from executive needed.	n.a.
5	Brazil (100%)	IPPs and national companies	Private and national companies	Private (concessions) and public discoms; partial retail competition.	ANEEL (1996)	Only for captive consumers*	Transmission and distribution	Appointment by President with senate approval; no renewal; Electric Energy Services Supervisory Tax set by the legislature is main source of revenue.	Hyperinflation and economic turmoil.
6	Argentina (100%)	IPPs and national companies	Private and national companies	Private (concessions) and public discoms; partial retail competition.	ENRE (1993)	Only for captive consumers*	Transmission and distribution	Members are appointed by the Secretary of Energy and by provincial govts. Funding comes from fees paid by wholesale market participants.	Hyperinflation and economic turmoil.
7	The Philippines (97%)	IPPs and national companies (PSALM)	NGCP, a private transmission concession holder; ownership with National Transmission Corporation	Open to private companies; Divided into distribution carriers and retail electricity suppliers.	ERC (2001)	Only for captive consumers*	Transmission and distribution	Members appointed by the President.	Inefficiencies; government push.
8	Turkey (100%)	IPPs and EÜAŞ, the state-owned generation company	TEİAŞ, a state-owned monopoly	Distribution assets owned by the state but private operations and management; companies with retail license can sell to consumers anywhere.	EMRA (2001)	Only for captive consumers*	Transmission and distribution	Members appointed by the President; reappointment allowed. Financial autonomy: budget funded by license fee, transmission surcharge, and other sources of revenue.	Inefficiencies; government push.

**In these countries, there are contestable consumers as well as captive consumers. The latter are supplied by the distribution company, a monopoly supplier in its license/concession area.*

Note: Information on regulators in Africa is from the Africa Energy Portal; electricity access figures are from the World Bank for 2020.

Source: Author's compilation.

2. Uganda

2.1 Background

Electricity came to Uganda with the construction of the Owen Falls Dam by the British colonial Government. Unlike in some newly independent countries, electricity was never framed as a citizenship right in Uganda, and even in the period following independence in 1962, electricity was used primarily for industrial growth and export, and access to electricity was limited.[1] The World Bank has been involved with the electricity sector in Uganda since the 1960s, providing loans for expanding transmission and distribution. The current President Museveni, who came to power in 1986 after two decades of civil conflict, initially was not in favour of reforms but relented in the 1990s, after the World Bank refused to provide funding in the absence of reforms (Gore et al., 2019). In the 1990s, the country began the divestment of public enterprises with the World Bank-funded Public Enterprise Reform and Divestiture Programme. Electricity reforms started with the World Bank making funding for a new hydroelectric plant conditional on reforms of the poorly performing Uganda Electricity Board (UEB). Uganda adopted most of the prescribed components of the standard reforms package for the electricity sector in the 1990s, and it did so at a faster pace than other African countries (such as Ghana and Tanzania) (Gore et al., 2019).

Uganda Electricity Sector Profile

- **Population:** 45.8 million
- **Per capita income (in current US$):** $637
- **Electricity Access:** Total (42.1%); Urban (69.9%); Rural (32.8%)
- **Transmission Losses:** 3.77%
- **Distribution Losses:** Umeme: 17.5%; Mini-grids: 43%
- **Umeme Consumer Mix:** Domestic (22%); Commercial (10%); Medium industry (14%); Large & XL Industrial (53%); Others (1%)
- **Annual Peak Demand:** 736.7 MW
- **Quality of Supply (2019):** SAIFI 49.80; SAIDI 61.70
- **Installed Generation Capacity:** 1,269 MW (grid + off grid), of which:
    - Hydro 79%
    - Thermal 8%
    - Solar PV 5%
    - Bagasse/CoGen and others 8%

Sources: ERA Electricity Supply Industry Performance Report 2020; World Bank Data (access and adjusted net national income per capita); SAIFI, SAIDI from the Power Market Database v2020.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

2.2 Reforms

As part of the liberalisation reforms of the 1990s, the national utility (UEB) was unbundled into three segments (Generation, Transmission, and Distribution) in 2001. The electricity sector functions under the Electricity Act 1999 (ERA, 2020).[2] A regulator, the Electricity Regulatory Agency (or ERA), was established under this Act in 2000. With these reforms, Uganda has a single buyer model with the national transmission company, the Uganda Electricity Transmission Company Limited (UETCL), buying the power from power producers, and the distribution companies purchasing power from UETCL. Private players are allowed in the generation and distribution segment, and Independent Power Producers (IPPs) account for 60% of current generation capacity (USAID, 2022).

2.3 In the Distribution Sector

The electricity distribution sector is open to private companies, and there are five distribution companies in Uganda, the state-owned Uganda Electricity Distribution Company Limited (UEDCL) being one of them, which operate on the grid. There are also six off-grid (mini-grid) distribution companies. All distribution companies (incl. Umeme, described below) purchase their power from UETCL, which purchases power from a variety of sources.

[1] According to Gore et al. (2019), 'Electricity access and provision have never figured centrally in national elections, even when the election coincided with some of the worst crises, like 2006 and 2011'. Multiparty elections began in Uganda in 2006.

[2] In the generation segment, the Kira and Nalubaale hydropower plants of the Uganda Electricity Generation Company Limited (UEGCL) were operated under a concession by Eskom Uganda, a subsidiary of Eskom South Africa, from 2002 till 2023.

Lease Agreement with Umeme: UEDCL commissioned off most of its territory (the urban and semi-urban areas) to a private operator—Umeme Limited, a consortium headed by Globeleq UK—under a 20-year Lease and Assignment Agreement (LAA) from 1 March 2005 (UEDCL, 2019) till 2025. Umeme is the largest operator on the National Grid, followed by UEDCL, the national distribution company (Mike Mbaziira, 2021). Thus, Umeme has a Distribution License and a Supply License from the ERA, and an LAA with UEDCL through which it operates, maintains, and invests in the distribution network (Omara-Ogwang, 2020); it purchases electricity from UETCL under a Power Sales Agreement, supplies power to the consumers, and collects the revenue from them based on tariff determined by the ERA. Additionally, Umeme has a Support Agreement with the Ugandan Government, under which, at the end of the concession, the Government pays Umeme 105% of the value of the undepreciated assets that Umeme has created through its investment (Umeme Limited, 2012).

Table 2: Umeme's Responsibilities and Protections

Responsibilities of Umeme	Returns and Protections
1. Operate, maintain, and invest in the distribution network.	20% return on investment in US$, but investment must be approved by the regulator.
2. Supply electricity and collect revenue based on tariffs set by the regulator, which are based on set tariff parameters. Not meeting tariff parameters will lead to a loss of revenue.	*Exceeding* tariff parameters is incentivised; if the tariff is not set based on the Supply License, can offset the shortfall using the Escrow Account.
3. Contract may be terminated by either party (Umeme or UEDCL).	Termination Payment: if Govt. terminates is 106% -120% of the undepreciated invested capital.
4. End of concession, hand back distribution assets to UEDCL.	Government to pay 105% for any undepreciated assets created through investment.
5. Lease rental payment to UEDCL, paid into an Escrow Account.	Can access Escrow Account for any shortfall in payments by third parties.

Source: Author's compilation.

Umeme is guaranteed a 20% return on investment (ROI) on capital invested in network development (in US dollar-denominated basis) in its Supply Licence. This investment, however, must be approved by the ERA.[3] The assets added by Umeme are reported to UEDCL, which then undertakes a joint verification exercise with ERA. The verification exercise results in the amount of assets that are recommended for earning the ROI. The verification process includes a desk verification of all submitted documents and then a field verification wherein 'the investment verification team sampled out particular investments based on the materiality of the investments to validate the works done in the field to confirm implementation and quality of works done' (Omara-Ogwang, 2020). As can be seen from Table 3, not all of the investment is recommended for the ROI.

In addition to the ROI, Umeme also has contractual obligations to meet four 'tariff parameters', i.e., distribution loss, uncollected debt, DOMC (operating costs), and working capital days lag. The retail tariff set by ERA reflects these targets. These targets are set for a specific period of years. The first set of targets for the initial seven years ended in 2012; the second set of targets for five years went on till 2017, etc. For example, Umeme had to bring down the distribution losses from 38% in 2005 to 25.8% in 2012. Failure to meet these targets affects the company's profitability. If these targets are exceeded, there are incentives put in place by the ERA that allow the company to earn extra profit (Umeme Limited, 2012). The tariff is set in January and adjusted quarterly for changes in the bulk supply rate, inflation, and foreign exchange variation.

There are various protections to mitigate the risk to Umeme. One of them is an Escrow Account, which Umeme can draw upon in case of default in payment by government entities or if government entities do not meet other obligations (Umeme Limited, 2012).

Around February 2020, the Government of Uganda began discussions within its departments for extending the lease. It was expected that the government would reduce the return on investment (ROI) that Umeme currently receives (20% under the current agreement). Given that the ROI has been an issue in the past, the Chairperson of Umeme expressed his company's willingness to revise it down. In 2021, it was reported that the Government was offering 10%

[3] The latest report for the same is available for 2014, with the verification done between April and June 2015.

Table 3: Umeme Network Addition from 2005–2014 (Total, Disallowed, and Recommended)

Period	Amount added to Distribution Network [UGX]	Amount Disallowed [UGX]	Amount Recommended to earn ROI [UGX]
Mar – Dec 2005	19,359,660,237	9,705,157,238	9,654,502,999
Jan – Dec 2006	8,491,835,423	1,627,355,370	6,864,480,053
Jan – Dec 2007	41,117,962,610	14,741,438,489	26,376,524,121
Jan – Dec 2008	53,472,067,991	11,035,728,584	42,436,339,407
Jan – Dec 2009	61,099,234,587	2,760,798,926	58,338,435,661
Jan – Dec 2010	40,588,723,230	2,502,697,746	38,086,025,484
Jan – Dec 2011	75,895,076,545	23,320,754,480	52,574,322,065
Jan – Dec 2012	101,452,719,528	43,856,935,932	57,595,783,595
Jan – Dec 2013	129,475,558,933	36,930,305,195	92,545,253,738
Jan – Dec 2014	257,213,195,654	129,651,549,566	127,561,646,088
Cumulative Total	**788,166,034,738**	**276,132,721,526**	**512,033,313,211**

Source: Reproduced from (Omara-Ogwang, 2020).

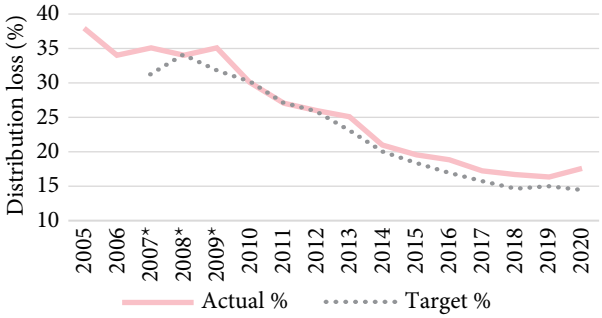
ROI in the new concession with a 15-year extension (Christine Kasemiire, 2021). However, in December 2022, the Government of Uganda decided not to extend Umeme's concession beyond 2025.

2.4 Performance

When Umeme took over the distribution segment, Uganda faced a severe drought which put further pressure on its electricity demand-supply mismatch. The Umeme concession was renegotiated in 2006, with the company receiving certain protections (Godinho & Eberhard, 2019b), including modified loss and collections targets (Umeme Limited, 2012). This 'Special Provision Period' ended in October 2009.

- **Distribution losses:** The distribution losses came down from 35% at takeover to around 16% in 2019, but the performance suffered during 2020. Distribution loss targets were met in 2010 and 2011 but have been consistently missed by Umeme since 2012 (see Figure 2).
- **Collection rate:** The concession required Umeme to increase the collection rate (or decrease the uncollected debt) from 75% to 92.5% in the first seven years. It exceeded the goal in 2009, and by 2013, the collection rate had hit 100%.
- **Electrification:** Umeme has increased electrification rates and added new consumers within its licence area (Castalia Advisory Group, 2015). The number of consumers with Umeme increased

Figure 2: Umeme Distribution Losses



Sources: Electricity Regulatory Authority Electricity Supply Industry Statistical Bulletins (various years); Umeme IPO.

Note: special provision period years are marked with.*

Table 4: History of Regulatory Tariff Increase for Umeme Limited

Date	Tariff Adjustment		Comments
	Proposed by Regulator	Applied by Utility	
2006	+41%	+41%	Needed to cover additional costs of EPPs during drought period
2006 (II)	+35%	+35%	
2009	0%	-10%	Made in response to Ministerial Commission of Inquiry into Umeme concession
2012	+46.0%	+46.0%	Made following commissioning of Bujagali
2013	+8.9%	+8.9%	Supplementary increase made to offset change in government policy on subsidies
2016	+18.0%	+18.0%	Routine regulatory tariff review
2001-16	+357.12%	+321.41%	

Source: Reproduced from (Godinho & Eberhard, 2019).

from 2,80,000 consumers in 2005 to 6,51,000 in 2015 to 1,506,920 consumers by 2020. However, access remains very low in Uganda and access targets were not part of Umeme's concession.

- **Quality of supply:** Despite the capital investment in the distribution network by Umeme, the quality of supply has remained poor (Twesigye, 2023), as can be seen from the SAIFI and SAIDI figures.
- **Tariff:** The tariff has been increased threefold by the ERA since the beginning of the concession with Umeme and has become more cost-reflective (Godinho & Eberhard, 2019b). However, this has meant an increase in the tariff paid by domestic consumers. Tariff increase has also taken place to account for the increase in cost of generation, as can be seen from Figure 4.

2.5 Problems

In 2012, following another drought, a government probe report (the Saleh report)[4] as well as a report by FESL—a London-based company—pointed out problems with Umeme's concession contract and its operational performance (high tariffs, not meeting targets), and asked for the termination of the concession before its expiry. However, the 'buyout clause' made that difficult.

- **Buyout:** As per at least one newspaper, *The Daily Monitor*, if the government had terminated the concession in 2012, it would have had to shell out US$1.77 billion as the buyout amount for Umeme's investment of US$80 million. 'Short of this, a 20% interest per annum on any outstanding amount would accrue.' (Musisi, 2023). If Umeme decided to terminate the concession, the buyout amount would be US$1.26 billion; if natural expiry was allowed, the buyout amount would be US$84 million.[5] The Ugandan Government also put a stop to new investments by Umeme recently. As per Godinho & Eberhard (2019b), the President's support and the improvement in Umeme's performance (albeit post-2011) also helped it survive this period.
- **Access remains low:** Despite the reforms, Uganda has one of the lowest levels of access and the highest per unit costs of electricity in Africa (Twesigye, 2023). As per the World Bank, 42% of Uganda's population has access to electricity, compared to 85.9% in Ghana, 71.4% in Kenya, 55.4% in Nigeria, and 46.6% in Rwanda.
- **Electricity generation:** Many of the problems with Umeme Limited are also the result of larger sector issues, such as overdependence on hydropower in the generation mix, which makes the country vulnerable to drought-related electricity shortages. The delay in the commissioning of the Bujagali hydropower project also had an effect on prices as well as supply security.
- **Renationalisation:** Uganda has plans to re-bundle its electricity companies into a new Uganda National Electricity Company (UNEC), to which the distribution network will pass post-2025 (Musisi, 2023). This is part of its Electricity (Amendment) Act passed in 2022.

Uganda's experience with a private distribution concession has been mixed. On the one hand, collection efficiency increased as did the number of consumers on the network. However, these targets were met with an increase in costs. Distribution loss levels came down but did not meet the targets set for Umeme. Similarly, the concession has provided Uganda with a self-sustaining power sector that does not require government subsidies and has cost-reflective tariffs (DBSA, 2019), one of the only countries in sub-Saharan Africa to achieve this (Godinho & Eberhard, 2019b). However, this has been achieved through a substantial increase in consumer tariffs.

[4] This was the second such investigation carried out by the Government, the first one followed the 2006 elections when there were questions raised around the 20% return and increasing tariffs (Godinho & Eberhard, 2019b).

[5] 'A Termination Payment ("TP") is due to Umeme in the event of termination of the Concession before 28 February 2025 or on natural termination on expiry of the Concession. In case of a Government default, the TP is set at between 106% and 120% of the un-depreciated invested capital ("IN"), while in the case of a Company default, the TP is set at between 80% and 94% of the IN amount. 'On natural termination on expiry of the Concession, the TP is set at 105% of the IN amount' (Umeme Limited, 2012, p. 102).

3. Tanzania

3.1 Background

Many countries in Africa, such as Tanzania, have experimented with management contracts for their electricity distribution sectors.[6] Management contracts are short-term (2–5 years) contracts given to (usually) a private company to manage some affairs of the distribution utility. There is no ownership transfer, the contractor has no assets and is paid a fee usually linked to the achievement of certain objectives (Economic Consulting Associates, 2016). These contracts are used either as an alternative to privatisation (to introduce private sector efficiency-improving practices without transfer of assets) or as an intermediate step towards privatisation. For Tanzania, it started off as the latter, but in the middle of the contract period, it transitioned to a means of using the private sector to improve commercial and technical performance without any plans for change in ownership (Ghanadan & Eberhard, 2007). Tanzania's contract lasted from 2002-2006, after which it was not renewed.

Tanzania was one of the first countries in Africa to nationalise its power sector, doing it within a few years of independence in 1961 (Gore et al., 2019). A socialist country post-independence, it took it as necessary that the government own and control the means of production, electricity being a major one (Gore et al., 2019). Plans of increasing electricity generation and improving access, especially to rural, non-industrial areas, never fully materialised due to a war with Uganda and a drought in the 1970s. Despite an economic crisis, the government refused to increase electricity tariffs. In the 1960s and 1970s, Tanzania Electric Supply Company Limited (TANESCO), the national electricity company, was considered to be in good financial strength, but its performance suffered in the following decades due to a lack of government subsidies because of the economic crisis, a fall in donor funds for technical improvements, a low tariff, and supply shortages due to droughts in the 1970s and 1980s (Ghanadan & Eberhard, 2007). Only after the World Bank refused to provide investment for infrastructure without electricity sector reforms did reforms come to Tanzania's electricity sector. However, the reforms cannot be called successful. In the generation segment reforms have been marked by corruption. In the distribution segment, the management contract, the subject of this chapter, was not renewed citing poor service quality. The mood in Tanzania, which was never in favour of full implementation of reforms, also shifted and in 2005 it was decided that TANESCO, the national electricity company, would not be privatised. Since then, however, there have been some wary steps taken (for example, an electricity regulator, EWURA, was set up in 2008)[7] but no real progress towards distribution reforms in the country. TANESCO remains a vertically integrated

Tanzania Electricity Sector Profile

- **Population:** 63.58 million
- **Per capita income (in current US$):** $917
- **Electricity Access:** Total (39.9%); Urban (72.9%); Rural (22%)
- **TANESCO Transmission Losses:** 5.89%
- **TANESCO Distribution Losses:** 9.27%
- **TANESCO Consumer Mix:** Domestic (31%); General (68%); Low Voltage (0.1%); High Voltage (0.03%)
- **Annual Peak Demand:** 1,201.02 MW
- **Quality of Supply (2019):** SAIFI 46.80; SAIDI 20.90
- **Installed Generation Capacity:** 1,609.35 MW (grid + off grid), of which:
    - Natural gas 60.55%
    - Hydro 39.12%
    - Liquid fuel & Biomass 0.33%

Sources: EWURA Electricity Sub-Sector Regulatory Performance Report for FY 2020–2021; World Bank Data (population, access, and adjusted net national income per capita); SAIFI, SAIDI from the Power Market Database v2020.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

[6] As per the Word Bank, there were 15 countries in Africa that had used management contracts till 2010 (Foster & Briceño-Garmendia, 2010). Between 2010 and 2016, two more countries (Liberia and Guinea) had management contracts. The private players involved in these contracts are not many, thus, the same names show up in different countries (Economic Consulting Associates, 2016).

[7] Note that during the management contract, there was no independent regulator and instead a SIDA Monitoring Consultant provided oversight (Ghanadan & Eberhard, 2007).

utility wholly owned by the Government of Tanzania 'operating in electricity generation, transmission, distribution, supply, and cross border electricity trading activities' (EWURA, 2023). In addition, there are some IPPs which generate power to sell to TANESCO, as well as some captive consumers.

3.2 Management Contract

NetGroup Solutions of South Africa entered into a management contract with the Government of Tanzania for TANESCO in 2002. The contract was funded through utility revenue (45% of funding by the end) and a grant from the Swedish International Development Corporation (SIDA) administered through the World Bank (55% of the funding). KPMG Cape Town conducted an audit before the handover of TANESCO, with data from 2000 as the baseline. The contract had a fixed fee as well as incentive payment ('success fee') for meeting certain performance metrics. Phase I of the contract covered the period from May 2002–July 2004 (27 months) and was focused on improving revenue collection. There was to be no investment, and more than 99% of the incentives were tied to the contractor increasing revenue (Ghanadan & Eberhard, 2007). Phase II sought to use the increased revenue to improve the technical performance of the utility. The contract was not extended and came to a close in December 2006.

The management contract was criticised in the media for its lack of transparency. In addition, TANESCO workers protested the move, even barricading the entrance to TANESCO buildings.[8] This resulted in a delay in the contract start date. As per Ghanadan & Eberhard (2007), the contract managers made relations with the workers a priority. By 2003, voluntary retrenchment was being carried out amicably, financed by TANESCO revenue, and 21% of the workforce was retrenched.

Upon taking over, NetGroup began to bring down their arrears and improve revenue collection. In Tanzania, public institutions had been the primary contributors to the utility's arrears. 'Upon assuming private management, TANESCO began carrying out high-profile service cut-offs of public institutions, including the national police, post-office, even the entire Island of Zanzibar.' (Ghanadan & Eberhard, 2007, p. 21). In this, NetGroup had the support of the highest offices of the government, and TANESCO was able to negotiate lump-sum paybacks of the arrears from public institutions.

TANESCO under NetGroup also expanded pre-payment technology to residential and light commercial consumers, which had so far been used only in mid- to high-paying areas of the capital Dar es Salaam.

Disconnections were also used for this segment of consumers with standard meters, with the scale of disconnections being around 2–3% of the consumer base each month. TANESCO started using court proceedings in 2005 for collection from this segment. Data collection and monitoring were also improved, and the utility also used advertisement campaigns to encourage payment during the contract period.

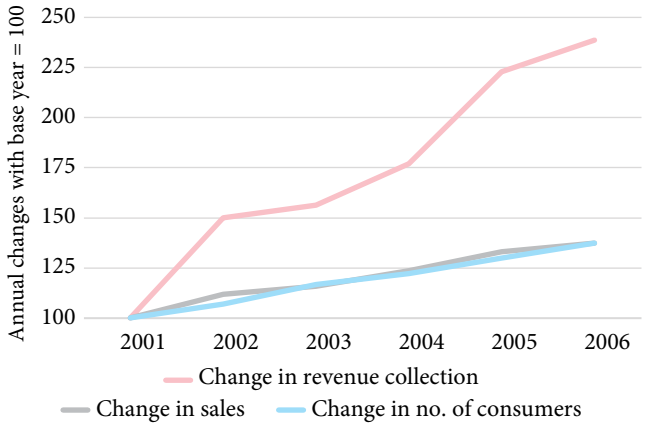
Table 5: Elements of the NetGroup Solutions Management Contract

Contract Period	Dates	Term	Contract Objective	Performance Elements	Total Award (US$)
Initial Contract, Phase I	May 2002–July 2004	27 months	Financial Turn-Around	Revenue and Costs; Power Losses; Quality of Supply; Utility Profits	10.7 million
Extension, Phase II	Aug 2004–Dec 2006	29 months	Technical Turn-Around	System Reliability; Electrification	7–8 million
TOTAL Contract	**May 2002–Dec 2006**	**56 months**	–	–	**18–19 million**

Source: Reproduced from (Ghanadan & Eberhard, 2007).

[8] The NetGroup managers finally managed to enter the utility premises under armed riot police escort five months after taking over.

Figure 3: NetGroup's Performance on Some Elements



Source: Reproduced from (Ghanadan & Eberhard, 2007).

Note: NetGroup took over in 2002. All changes have been calculated taking the 2001 values as 100.

3.3 Performance

- **Revenue collection:** TANESCO's revenues increased from 9.6 billion Tanzania Shillings per month (TSh/mo) in 2001 to 22.9 billion TSh/mo in 2006 during the management contract, an increase of 19% CAGR.[9] Collection rates increased markedly, increasing from 69% in 2001 to 95% in 2002 and stayed at that level throughout the contract. The success fee paid to the contractors was primarily related to their revenue performance (Ghanadan & Eberhard, 2007). Electricity sales increased during this period because of an increase in the number of consumers.

- **Tariff:** Tariff went up 28% from 2001–2006, with a 39% increase in tariff for residential and light commercial consumers and a decrease of 22–28% in the tariff for high-voltage industrial consumers. In addition to the undoing of cross-subsidy, the lifeline subsidy was also made more targeted. As per (Ghanadan & Eberhard, 2007), between 2000 and 2005, residential consumers consuming more than 50 units per month saw their electricity bills nearly triple.

- **Loss reduction:** The contract did not result in the expected reduction in losses, with the result that the contractors were penalised for the same in Phase I. However, loss reduction was not included in the contract extension, and thus, despite the increase in losses, the contractors did not earn a penalty for the same in Phase II. Transmission losses increased from 3.5% in 2002 to 4.8% in 2006; technical distribution losses increased from 10% to 14% during the same period (Ghanadan & Eberhard, 2007). This was attributed to the increase in sales without any improvement in the electricity system.

- **Quality of supply and service:** Because TANESCO under NetGroup met the target for quality of supply and service, the same performance elements were not included in the contract extension.

- **During Phase II:** During the extension, system reliability and electrification performance benchmarks were added to the contract. System reliability did not improve during the extension period. It was expected that utility revenues from Phase I would be used to invest and improve reliability. However, with drought conditions and depleting hydropower capacity, load-shedding and expensive generation eroded revenue gains. There was no plan as to how reliability investments were to be funded in the absence of revenue gains (Ghanadan & Eberhard, 2007). Similarly, electrification targets were not met in the extension period, with total consumers added falling short of targets by nearly half. The contractor earned penalties for not meeting the targets. Overall, there was no visible increase in the number of new connections during the management period, which reflects the inability to generate revenues for investment and backlogs in connections (Ghanadan & Eberhard, 2007).

3.4 Problems

As per Ghanadan & Eberhard (2007), the contract's success fee formula was more sensitive to elements such as increasing revenue but less to increase in reliability, which reduced incentives for the contractors to focus on the latter. In addition, the contractors were not able to sufficiently reduce system losses, which went up. There were conditions extraneous to the contract that contributed to reducing revenue surpluses and did not allow the financial and technical turnaround that was hoped for. The authors point to the following as reasons, some of which were outside the control of the contractors:

[9] The equivalent US$ figures were 11.2 million US$/month in 2001 to 18.3 million US$/month in 2006. To avoid exchange rate related issues, I have chosen to report the figures in TSh.

- Drought conditions and high cost of thermal generation that had to be paid to IPPs by TANESCO from 2005 and 2006 onward;[10,11]
- Load-shedding from February 2006 onward, when even IPPs could not meet the shortfall of hydropower capacity;
- Inadequate increase in tariff that did not cover the full cost of Songas and IPTL, two new thermal generators that came to be relied heavily upon during the drought period; this resulted in the tariffs being increased in 2005 by nearly 25% to cover costs, with more increases necessary in 2006; and
- A complicated model of lending from the Tanzanian Government, which had led to a build-up of debt on the utility's balance sheets (even before the contract began), but which were not restructured and moved off the balance sheets till 2006.

Ghanadan & Eberhard (2007) also suggest that customer service, though improved upon by the contractors, was never an explicit incentive in the contract, which resulted in an underemphasis on customer service and a non-technical distribution loss level of 8–9% throughout the contract period. Connection backlogs and informal dealings (bribes) around new connections, poor management of reconnections post-cut-offs, higher tariffs and their impact on low-income consumers all received less attention. Thus, a lack of reduction in losses and an inability to improve the quality of supply were given by the Government as reasons for not renewing the contract (Leigland, 2020).

3.5 The Electricity Sector Today

TANESCO's tariffs are no longer cost-reflective, and TANESCO relies on government subsidies. It has been operating at a loss since at least 2010 (Peng & Poudineh, 2016), with losses close to TSh 112.5 billion in June 2018 (Alex Nelson Malanga, 2021). There are cross-subsidies and a lifeline tariff in the country to improve access.

- **Power procurement planning:** Tanzania remains susceptible to droughts and drought-related hydropower generation curtailments. In 2023, the country was reeling from a shortage of power of around 400 MW as a result of drought-like conditions, and electricity rationing was introduced to manage the problem (Reuters, 2023). Like other countries in Africa, Tanzania has to deal with the twin challenges of improving access through electrification while also ensuring adequate power supply.
- **TANESCO's financial position:** To bring in power in a hurry, TANESCO signed some very expensive, long-term generation contracts which affected its financial viability. For example, Independent Power Tanzania Limited (IPTL), a private power generator, was contracted as emergency power in the mid-1990s due to drought conditions that affected hydropower production. It was revealed that IPTL was inflating costs, which led to court cases that delayed both IPTL and Songas, the other gas-based IPP.[12] Songas finally came online in 2004 with a 20-year contract; IPTL also came online but remained extremely expensive. The high cost of power generation has weakened the financial position of TANESCO. The recent discoveries of natural gas by Tanzania have seen some new gas-fired plants come online, such as the American firm Symbion's Ubungo power plant in 2015. However, the weak financial position of TANESCO means that it is unable to pay its bills to generators (The Economist, 2016).

Tanzania had a management contract in place from 2002–2006, which improved revenue collection for TANESCO. During the contract period, government support for the contractors as they undertook disconnections, especially for public institutions, and negotiated collection of arrears was crucial to the improvement of revenues. Ultimately, the contract was not extended since, as per the government, the contractors could not bring down losses or improve the quality of supply. However, Tanzania's experience holds lessons for what management contracts can achieve and the importance of government support.

[10] IPP charges to TANESCO were around US$13.0 million per month or 68% of utility revenues in 2005, and increased to US$17.5 million per month or more than 95% of utility revenues by 2006 (Ghanadan & Eberhard, 2007).
[11] Contractors were protected from the risk of increasing generation costs, and it did not affect their success fee.
[12] In 2020, the owners of IPTL were arrested in the corruption scandal involving the fraudulent payment of US$ 120 million to the Wcompany (AFP, 2020).

4. Kenya

4.1 Background

Unlike other African countries, Kenya did not nationalise industries post-independence in 1963. The East Africa Power and Lighting Company (EAP&L), the vertically integrated electricity company, was listed on the Nairobi stock exchange, ran on commercial principles, and developed technical capabilities and a strong corporate culture during this time (Godinho & Eberhard, 2019a). In 1970, the Government of Kenya acquired a majority stake in the company (51%). In 1983, EAP&L was renamed Kenya Power and Lighting Company (KPLC). Thus, KPLC was first a private company, which then became a listed company with majority government shareholding. KPLC was a vertically integrated company, with generation, transmission, and distribution assets.

By the 1990s, KPLC was a strong performer in the region. A decline in macroeconomic conditions (fall in trade, droughts, political instability) and a freeze on donor funding (aid embargo) to the power sectors between 1991 and 1996 led to pressure to accept donor conditions, which included power sector reforms. KPLC's performance also suffered during this period. The Kenyan Government was reluctant to reforms, and World Bank support for two independent power projects in 1996 with demanding conditions and high costs made some in the government even more wary (Godinho & Eberhard, 2019a). Finally, an agreement on the reforms was reached in 1996, which made World Bank funding conditional on unbundling the generation from the vertically integrated KPLC. Thus, all generation assets came to be vested in the Kenya Electricity Generation Company (KenGen) in 1997. However, the two companies kept behaving like a vertically integrated one. IPPs were allowed in the generation segment from 1997 onward. The Electricity Regulatory Board (ERB) was also established in 1997 but lacked autonomy (Godinho & Eberhard, 2019a). The journey towards a cost-reflective tariff started in 1992 and by 1997, it had reached 75% of long-run marginal cost. The government established the Kenya Electricity Transmission Company (KETRACO) and the Geothermal Development Corporation in 2007.

Kenya Electricity Sector Profile

- **Population:** 53 million
- **Per capita income (in current US$):** $1,797
- **Consumers:** 9,010,856
- **Electricity Access:** Total (71.4%); Urban (94%); Rural (62.7%)
- **System Losses:** 24.75%, of which technical losses are around 19%
- **Consumer Sales Mix:** Domestic (30%); Small Consumer (16%); Commercial & Industrial (53%); Street Lighting (1%)
- **Quality of Supply (2018):** SAIFI 6.9; SAIDI 12.00
- **Installed Generation Capacity:** 3,602 MW, of which:
    - Geothermal 28.04%
    - Hydro 25.5%
    - Thermal 20.67%
    - Wind 12.82%
    - Solar 7.83%
    - Bioenergy 2.69%
    - Waste Heat Recovery 2.45%

Sources: EPRA Bi-Annual Energy and Petroleum Statistics Report Financial Year 2022/2023; World Bank Data (population, access, and adjusted net national income per capita); SAIFI, SAIDI from the Power Market Database v2020.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

KPLC in financial stress: A drought in 1999 resulted in a decline in hydropower output, which caused KPLC to resort to load-shedding. This, as well as theft and non-payment, resulted in a loss of electricity sales. It had also signed a bulk supply agreement with KenGen which consisted of a favourable tariff for the generator; as KPLC suffered losses during this period, KenGen was turning a profit due to the favourable tariff. By 2002, KPLC owed KenGen US$140 million (Godinho & Eberhard, 2019a). Its inability to pay affected the ability of KenGen to pay its contractors for the partly World Bank-funded Olkaria II project. Finally, KPLC had to pay its debt to KenGen, but it did sour the relations between the two companies and, as per Godinho & Eberhard (2019a), showed that KenGen was operating as an independent entity.

4.2 The 2002 Change in Government and Reforms

The new government in 2002 was reform-minded and had the power sector in its sight. It was at this time that the management contract with Manitoba Hydro was put in motion. With the passing of the Energy Act 2006, a new phase of reforms began, with the privatisation of KenGen in 2006, the establishment of an independent Energy Regulatory Commission in 2007, and the establishment of the Kenya Electricity Transmission Company (KETRACO) in 2008.

- **Performance contracts:** KPLC was among 16 state corporations selected by the Government of Kenya to introduce 'performance contracts', which were aimed at improving the governance and performance of these corporations. It involved the Government and the company agreeing on set targets, and there were incentives for meeting these targets. Non-performing directors were to be removed. The first contract was from October 2004–June 2005, whereupon KPLC signed a new performance contract. Collection rates hit 100% during this period, and the system losses fell to 18%.

- **Management contract:** KPLC signed a management contract with Manitoba Hydro International in June 2006, following a competitive bidding process (Godinho & Eberhard, 2019a), which was supported by the World Bank. This was done to sever the close links between the government and the utility staff. Manitoba Hydro was to provide management services to KPLC for two years, which included providing three top managers: General Manager (GM) & CEO, Deputy GM for distribution and customer service, and Deputy GM for finance and corporate services. Manitoba's targets (and achievement) included (i) connection of 120,000 consumers each year (added 120,000 in the first and 150,000 in the second), (ii) reduction of system losses by 4% over two years (reduced losses from 19.6% to 17.6% in the first year), and (iii) improving operational efficiency (Economic Consulting Associates, 2016). The management contract was a condition for the release of funds by the World Bank and other lenders of the Energy Sector Recovery Project, and Manitoba was implementing the distribution system upgrade portion of the project as well as training staff and management.

Kenya Power and Lighting Company (KPLC)'s Board

KPLC has a board comprising of nine members, of which six are independent directors (including the Chairperson), one executive director who is the managing director, and two non-executive directors who are the Cabinet Secretary of the Treasury and the Permanent Secretary of the Ministry of Energy.

At least one-third of the board members resign and are eligible for re-election each year during the Annual General Meeting. The board maintains separate roles of the Chairman, Managing Director, and the General Manager & CEO. As a state corporation, a representative of State Corporations attends the board meetings. The Board has five committees to help it in its operations.

Any shareholder is free to nominate someone to fill a vacancy on the board and to participate in the voting. However, given its majority share, the Government decides who sits on the board. Minority shareholders (49%) have no representation on the Board (Jaindi Kisero, 2023). Some changes are being proposed to this system as of May 2023.

In November 2022, the new Kenyan President demanded the immediate removal of the board of KPLC, for unclear reasons; some newspapers reported it as a response to the falling profitability of KPLC and others as 'cleaning the slate' by the new government. At least one news source says that the outgoing board had begun conducting forensic audits into key operations of the company, which were not popular (Jaindi Kisero, 2023). This move of the government comes only two years after the entire board had been asked to resign amid allegations of corruption and poor management in the KPLC (Dokta Wanz, 2020).

KenGen (Kenya Electricity Generation Company) has a similar board with eleven members.

Sources: KPLC Annual Reports 2006 and 2021; KenGen Annual Report 2022.

As per Leigland (2020), the government and Manitoba disagreed over the targets met and the amount of success fee to be paid to be contractors. After they agreed on a compromise and a fee of US$412,015 was paid, the government did not renew the contract. There were many reasons

for this: the contract was not renewed because it was considered too expensive by the government, which would have to bear the cost of contract extension without help from donors, which was not available after the first two years (Economic Consulting Associates, 2016); there were lingering tensions between the Manitoba Hydro people and the local staff (Godinho & Eberhard, 2019a); and, as mentioned, disagreements over performance target achievement.

As per Godinho & Eberhard (2019a), the period 2003-2013 saw improvements in sector performance with capacity development in generation and transmission lines, including regional interconnections. The authors conclude that KPLC and KenGen both perform very well in comparison to their peers, though their financial performance has suffered recently due to the government's universal connection drive.

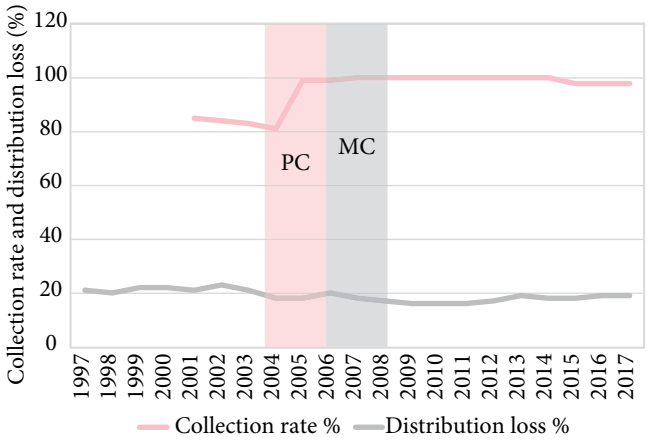
4.3 The Sector 2013 onwards

The new government of President Uhuru Kenyatta in 2013 promised to end power shortages, reduce tariffs, and provide universal access. It started the Last Mile Connectivity Project, and KPLC pushed resources into connecting people to the grid. Its investment reached US$481 million in 2016. However, this also meant that it was unable to finance its own investments. Additionally, as it began connecting consumers further and further away to the grid, billing and loss reduction performance began to suffer (Godinho & Eberhard, 2019a).

KPLC's prices are high and in response to public outcry over these prices, a Presidential Taskforce on the Review of Power Purchase Agreements was set up in 2021 to review the PPAs signed by KPLC; the cost of power purchase accounts for 66% of the distribution company's costs (Ngumi, 2021). The report recommended the reduction of electricity tariffs by 33% and a renegotiation of PPAs. The first phase of a 15% reduction in tariff took place in January 2022. This resulted in a revenue shortfall which was partially reimbursed by the government (KPLC, 2022). However, this same subsidy (and other subsidies on food and fuel) was removed by the newly elected President William Ruto in December 2022 to reduce state debt.

The Kenyan Government has also been under pressure to reform KPLC. The International Monetary Fund in 2021 had made the reform of KPLC and

Figure 4: KPLC Collection Rates and Distribution Loss %



Source: (Godinho & Eberhard, 2019a).

Note: PC refers to performance contract, and MC to management contract. Figures for collection rate not available for 1997-2000

Kenya Airways a condition for financing worth US$ 2.34 billion (Anyanzwa, 2022). As of 2023, the government has been considering reducing its share in KPLC to 15% from the current 50.1%. The government is also to reduce its share from 70% in KenGen.

In 2023, KPLC invited interest from private companies to supply electricity in nine slums in Nairobi (Ambani, 2023a). This would be in the form of a 'franchisee', such as used in India, wherein the private retailer will purchase power from KPLC, supply power, invest in the network, and collect revenue. Compensation for successful application could be either in the form of commission on energy sales, or purchase of power at a discounted bulk price (Ambani, 2023b).

4.4 Performance

- **Generation and power planning:** Kenya has been successful at attracting private investment into its generation segment and building generation capacity, such that 30% of installed capacity is with IPPs. KenGen (30% of shares listed) has been able to borrow from the market for its operations. Kenya has also been successful at diversifying its energy mix. The public sector has played an active role in the development of geothermal resources, which is now the dominant source of electricity in Kenya. The country is no longer dependent on hydropower alone. The addition of generation capacity has been in excess of demand, such that by 2018 Kenya had a 30% reserve margin, which has meant a reliable supply. Since 2006, the ERC

has engaged in a rolling Least Cost Power Development Plan (LCPDP), which is implemented through multi-stakeholder steering and technical committees. However, government interventions in the sector are frequent. This has been especially true in the generation segment where there is a possibility of excess capacity coming up since the government has been channelling resources to projects not in the LCPDP (Godinho & Eberhard, 2019a)

- **Access and affordability:** Kenya has been able to increase access to 75% and is looking towards universal access. This has been driven and financed by the government and aided by the technical capabilities of KPLC. It has used both grid and off-grid solutions, and Kenya has some of the highest solar home system penetration in sub-Saharan Africa, with around 21.5% of Kenyans with electricity access using such systems.
- **Tariff and affordability:** Kenya has cost-reflective tariffs, which are perceived as high. Despite the high cost of electricity, it has done well on affordability, with the cost of subsistence consumption of 30 kWh per month under 5% of the budget of the poorest 40%of households in 2018 (RISE, 2018).
- **Institutions:** KPLC and KenGen are ISO certified, follow international accounting standards, have been assigned a rating by international agencies, and borrow commercially. Their listing on the stock exchange has allowed the companies to 'raise capital from local investors, keeping the companies in domestic hands and facilitating interaction between government and shareholders.' (Godinho & Eberhard, 2019a, p. 42). The ERC has gained technical capacity and expertise and has become responsible for technical planning and data maintenance in the sector. However, the government has enormous sway over who gets to be on KPLC and KenGen boards. It also appoints the members of the ERC.

Kenya has created an unbundled electricity sector with private participation in generation and public sector companies that are listed on the stock exchange. Private sector participation in Kenya has taken the form of the listing of KPLC and KenGen on the stock exchange, which is unusual but has come with benefits, such as the adoption of better management practices by these companies.

5. South Africa

5.1 Background

Despite a plan in 1998 to unbundle and eventually privatise Eskom, the idea was abandoned in 2004, and Eskom has not been privatised. With near-universal access through the expansion of the grid, South Africa is an outlier in sub-Saharan Africa. It is also Africa's most industrialised country. However, the sheer size and scale of its operations make Eskom an important player in the continent's energy sector.

South Africa Electricity Sector Profile

- **Population:** 59.4 million
- **Per capita Income (in current US$):** $4,658
- **Electricity Access:** Total (84.4%); Urban (88.8%); Rural (75.3%)
- **Transmission Losses:** 2.31%
- **Distribution Losses:** 9.62%
- **Consumer Mix:** Residential (98%); Others (2%)
- Municipal distributors, which operate as intermediaries between Eskom and consumers, accounted for 42% of Eskom GWh sales in 2022.
- **Quality of Supply (2019):**
    - SAIFI 6.00;
    - SAIDI 30.50
- **Eskom Nominal Generation Capacity:** 47,145 MW, of which:
    - Coal 83.7%
    - Nuclear 3.9%
    - Gas & Liquid Fuel 5.1%
    - Hydro & Pumped Storage 7.1%
    - Wind Energy 0.2%

The total installed capacity is 51,866 MW, and the difference between installed and nominal capacity reflects auxiliary power consumption and reduced capacity caused by the age of the plant.

Sources: Eskom Integrated Annual Report 2022; World Bank Data for 2021 (population, access, and adjusted net national income per capita); SAIFI, SAIDI from the Power Market Database v2020.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

Eskom was corporatised in 2001, which made it a company and subject to the country's Companies Act. Eskom, as a public company, is legally separate from the government, but with the government as the sole shareholder (Irwin & Yamamoto, 2004). With corporatisation, Eskom has a corporate governance structure with a board of directors; the government (100% shareholder) decides its goals through shareholder compacts. It is a vertically integrated company, which generates and supplies electricity to almost 95% of South Africans and sells power to seven other countries (Bowman, 2020). While Eskom is the only transmission company, in the distribution segment Eskom, along with 799 municipal distributors, operate the distribution network and supply electricity. Tariffs are controlled by the National Electricity Regulator of South Africa (NERSA), which is appointed by the government, but has been established as independent and accountable to the Parliament (Irwin & Yamamoto, 2004).

5.2 Eskom and the Developmental State

Cheap electricity from Eskom was central to the energy-intensive industrialisation that was at the core of the South African apartheid and post-apartheid economy. South Africa's Mineral-Energy Complex was underpinned by Eskom's cheap electricity, which it produced using pit-head generation stations using low-grade coal. 'Eskom, correspondingly, remains dependent on a small number of major industrial consumers—now organised through the 30-member Energy Intensive Users Group (EIUG)—that account for around 40% of electricity sales. With coal-fired plants constituting over 80% of Eskom's nominal generation capacity, it also remains entwined with powerful coal industry interest groups' (Bowman, 2020, p. 404).

The African National Congress (ANC) government came into power in 1994 and saw the parastatals (state-owned companies) as the means to initiate social welfare programmes in a country emerging from apartheid. Eskom played its part, by promising to increase access to Black households and by providing electricity at very low costs (Bowman, 2020). Its earlier massive generation capacity addition (in the 1970s and 1980s) helped it during this period since its reserve margins were 40% in the early 1990s (Vagliasindi & Besant-Jones, 2013). The National Electrification Programme of the government launched in the 1990s saw access increase, and electrification rates were at 85% in 2019.

5.3 Cost Overruns

Mismanagement and corruption: A change in economic thinking in the ANC and the influence of reform efforts globally resulted in 2001 in a plan to privatise Eskom. In this spirit, the government froze all investment in generation by the utility in 2001.[13] At this time, tariffs were raised, and collection was increased aggressively, to ensure that future investors could see revenues. An increase in electricity consumption during this period stretched the generation capacity, such that by the time privatisation was cancelled and the investments resumed in 2005, the capacity had become constrained (Bowman, 2020). The coal supply crisis in 2008, along with huge delays and cost overruns (cost at almost three times that proposed) in the two coal-powered mega-projects of 4.5 GW (Medupi and Kusile projects), increased the costs of Eskom.[14] These and other Eskom contracts have been mired in corruption allegations, many with links to former President Jacob Zuma and state capture during his tenure[15] (The Economist, 2019). Corruption in Eskom contracts has been the subject of inquiries by Judge Raymond Zondo. The Zondo report has recommended charging the former Eskom board with corruption (Cocks, 2022), and a former CEO, Matshela Koko, was arrested on charges of corruption in generation contracts, from which his family benefitted (Givetash, 2022).

Ageing infrastructure: To meet supply, existing power plants were run without maintenance, especially during the World Cup of 2010, and the ageing generation infrastructure has made the nominal generation capacity 9% lower than the installed capacity. The median age of Eskom generation plants in 2022 was 40 years (Eskom, 2022). In addition, Eskom's workforce expanded rapidly, but with allegations that jobs were given to loyal cadre members.[16] 'The utility sells less electricity than it did in 2007 but spends three times as much on employees and five times as much on coal (though inflation accounts for some of this)' (The Economist, 2019) (See also Table 6).

[13] The 1998 plan envisaged unbundling Eskom and allowing private generation companies to participate.
[14] Planning for these projects started in the late 1990s to meet demand by 2007; projects began construction in 2006. The last unit of Medupi achieved commercial operation on 31 July 2021. All units of Kusile are yet to achieve commercial operation as of September 2022.
[15] Such as the infamous Gupta brothers who used their connections to get lucrative contracts and influenced cabinet appointments.
[16] An unauthorised Eskom workers' strike in 2022 ended with a 7% pay rise given by the government to the workers.

Table 6: Eskom Costs and Profits (1997 to 2017–2018)

Year	Primary energy costs c/kWh (real)	Labour costs c/kWh (real)	Net profit margin	Return on assets
1997 to 2006-2007 (avg)	8	8	12%	4%
2007-2008	15	9	0%	0%
2008-2009	19	11	-17%	-5%
2009-2010	20	10	5%	2%
2010-2011	23	11	9%	3%
2011-2012	29	12	12%	3%
2012-2013	37	14	4%	1%
2013-2014	40	15	5%	1%
2014-2015	45	14	2%	1%
2015-2016	44	15	3%	1%
2016-2017	41	16	1%	0%
2017-2018	40	14	-1%	0%

Source: Reproduced from (Bowman, 2020).

5.4 Increasing Prices and Falling Demand

Until 2008, South Africa had the cheapest electricity prices in the world, fuelled by its reliance on locally available, low-cost, abundant coal for 96% of its generation (Baker et al., 2014). Then in 2008 (and again in 2014 and 2018–2020), Eskom oversaw rolling blackouts, and the increase in its costs resulted in a 300% increase in tariffs in the decade 2008–2018. Given the prominence of energy-intensive industries in the economy, Eskom's patchy supply has also affected the country's GDP (The Economist, 2013), which has been growing at a slow rate since 2008. The country is expected to go into recession yet again in 2023. The increase in tariffs resulted in a decline in demand, which fell after 2011–2012, with industrial consumers looking at independent off-grid generation options. Municipal distributors also reduced their demand, and they began defaulting on payments to Eskom. Electricity consumption in 2014 was still below that in 2007 in the country. This above-inflation increase in tariffs by NERSA was still not enough to cover the increased costs of the utility, and bailouts by the state have been necessary to prevent Eskom's bankruptcy (Bowman, 2020). Eskom's debt rose from R40 billion in 2007, peaked at R640 billion in 2020, and came down to R400 billion in 2022 (of which around R46 billion is municipal arrears) (The Economist, 2022).

5.5 Renewable Energy

Renewable energy projects have emerged as a contentious issue in South Africa. More than 80% of South Africa's electricity comes from coal, but the South Africa Just Transition Financing worth US$8.5 billion was approved during COP26 in 2021. While there have been previous attempts to move towards renewable energy, given the country's wind and solar potential, there has been opposition from coal workers and unions who are concerned about job losses (Harding, 2023). Those in favour of renewable projects argue that a transition to cleaner energy is required since South African exports are likely to be affected by carbon taxes levied on products produced using 'dirty' power by countries in Europe. Those opposed to renewables, which includes some members of the ruling ANC, argue that the country is being rushed into transitioning away from coal. This issue has pitted the government and Eskom against each other, with the energy minister Gwede Mantashe, even blaming Eskom for allowing load-shedding/power cuts to push South Africa towards a transition (Harding, 2023).

5.6 Eskom Today

Eskom does not have enough electricity to meet demand. Rolling blackouts have become the norm, as Eskom tries to ration the electricity through load-shedding. Power stations accounting for 40% of generation capacity are broken down, which has been attributed by Eskom to age, years of lack of maintenance, running them at excess load factor, declining coal quality, and sabotage by criminal gangs. Medupi and Kusile mega-power plants have

Eskom's Independent Board

As per Eskom's Memorandum of Incorporation, Eskom's board may consist of 15 directors, of which the majority must be independent non-executive directors and there must be at least two executive directors. Non-executive directors are appointed for a period of three years and may not serve more than three consecutive terms. All the directors are appointed by the shareholder, with assistance from the People and Governance Committee, which is a committee consisting of three non-executive directors. There is a board evaluation done (almost) every year by an external service provider. The Board has constituted several committees through which it assists the operations of the board. All board committees comprise of and are chaired by independent non-executive directors. The People and Governance Committee recommends, and the Board appoints, people to the executive management positions, including the CEO.

In 2022, the board consisted of only eight directors, and it concluded that it was 'insufficiently constituted and lacked critical skills and experience based on the size and nature of Eskom, as well as the complexity of the operational and financial challenges that the organisation is facing' (p. 10). The board was restructured in September 2022, and 12 new directors were appointed by the shareholder. One non-executive director, the CEO and the CFO continued on. Thus, the board is now 15 directors, of which 13 are independent non-executive directors, and two are executive members (CEO and CFO).

Source: Eskom Integrated Annual Report 2022.

not delivered the promised benefits[17] and are suffering from design and construction defects. Eskom is currently US$23.6 billion in debt (Gbadamosi, 2023). It has been buying power generated by diesel turbines to supplement its supply. As per their CEO in 2023, 'Let me be very clear: we do not have any more money to spend on diesel. As a result, load-shedding is required at never-before-seen levels to protect the integrity of the system. This is not a policy decision, but a financial reality because of decisions of the past that we must deal with now.' (Eskom, 2022). Eskom is also asking for a cost-reflective tariffs, which would mean a 20% increase in tariffs.

The current President, Cyril Ramaphosa, announced the unbundling of Eskom in 2019. He has also made changes to the Eskom board several times (Gbadamosi, 2023). In 2021, the three divisions—generation, transmission, and distribution—were functionally separated, and they are supposed to become separate legal entities sometime in late 2023. In 2023, an attempt was made to poison the outgoing CEO, André de Ruyter, who favoured unbundling and decarbonisation. His resignation came amidst animosity between him and the government, where each blamed the other for the ongoing load-shedding in the country. Eskom has been unable to hold on to a CEO, having changed 12 CEOs in the last 12 years (Gbadamosi, 2023; Omarjee, 2019), with many resigning because of the unreasonable pressures of the job and others because of corruption charges.

South Africa's experience shows how a sector critical to the economy can get embroiled in mismanagement, corruption, and indebtedness. It remains to be seen whether unbundling, anti-corruption campaigns, and addressing supply-side issues through renewable energy projects will help the company and the country find their way back to a well-functioning electricity sector.

6. Brazil

6.1 Background

The largest electricity sector in Central and South America, reforms came to Brazil in phases. While reforms began in Latin America in the 1980s with Chile, Brazil's reforms began in the 1990s. Its electricity sector had been nationalised over the course of the 20th century, with generation and transmission with the Federal Government and distribution with state governments (Muller & Rego, 2021). Before the reforms in the 1990s, it was the Brazilian Government that set tariffs, and since 1974 it has set

[17] Kusile, which is yet to be fully commissioned, had a flue duct collapse which has affected its three units, which remove 2400 MW from the grid for at least six months in 2023. Medupi's Unit 4 is also out of service till August 2024 after it suffered generator explosion in August 2021.

Brazil Electricity Sector Profile

- **Population:** 214.3 million
- **Per capita income (in current US$):** $5,647
- **Electricity Access:** Total (100%); Urban (100%); Rural (100%)
- **Distribution Loss:** 14%, with 7.5% technical loss and 6.5% commercial loss.
- **Electricity Consumption by Consumers:** Residential 30%, Industrial 35%, Commercial 19%, Rural 6%, Public service 10%, Self-consumption 1%
- **Electricity Consumption by Market:** 66% in regulated market and 34% in the free market.
- **Quality of Supply (2020):** SAIFI 3.50; SAIDI 6.30
- **Installed Generation Capacity:** 190.57 GW, of which:
    - Hydro 57%
    - Bioenergy 8%
    - Fossil thermal 15%
    - Solar 7%
    - Wind 11%
    - Nuclear 1%

Sources: Sistema de Informações Energéticas (SIE Brazil); World Bank Data for 2021 (population, access, and adjusted net national income per capita); distribution loss figures from Muller & Rego, 2021; SAIFI, SAIDI from the Power Market Database v2020.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

equal tariffs across all regions of Brazil irrespective of a utility's cost structure. There was also an Earnings Compensation Account which was used to guarantee a return of 10%–12% to utilities (Filho, 2012),[18] a form of inter-utility cross-subsidy.

6.2 Motivation for Reforms

The first phase of reforms, from the mid-1990s onward, was triggered by hyperinflation and a slowing economy in the 1980s and 1990s. Several power projects had stalled due to a lack of investment leading up to this phase, and the financial performance of distribution companies was poor. The power sector assets were the most valuable and the Cardoso Government was keen to lower its debt (Brown, 2002). The second phase of reforms followed the drought of 2001–2002, which, coupled with an overdependence on hydropower, led to a massive power shortage in 2001. At the time of this energy crisis, the Brazilian Government took an Energy Sector Reform loan from the World Bank to stabilise the currency and restore the functioning of the power system (World Bank OED, 2003). The objectives of the loan included other reforms, which were subsequently implemented by the newly elected Lula Government.

6.3 Reforms Phase I (1993 onward)

In 1993, the equal tariffs and guaranteed return regime was eliminated, and a financial clean-up (reconciling the account between the concessionaires and the Government) was undertaken (Filho, 2012).[19] In 1995, independent power producers were introduced. The reforms also established open access to the distribution and transmission network and created 'free consumers', consumers with a demand of 10 MW or more,[20] who were allowed to contract their power from the wholesale market (Filho, 2012). The 1995 law also provided incentives for privatisation, including for State Government companies to sell off their distribution companies. The 1988 Constitution and subsequent laws had established the right of the government to provide public utility services (such as electricity), which they could undertake indirectly by giving concessions. The concessions, however, had to be given through competitive bidding and had to provide adequate service. 'More specifically, the electricity transmission and distribution concessions granted under this Law were assured the duration required to amortise investments, limited to 30 years as from the signature date of the necessary agreement, and open to extension for no more than a similar period, at the discretion of the Grantor Authority, under the conditions established in the agreement.' (Filho, 2012, p. 38). Since assets are allowed to be amortised, at the end of the concession period, the

[18] As per Filho (2012), utilities earning more than 12% would pay into this account and those with less than 10% return would draw from this account. This helped with the tariff equalisation process as well.

[19] Brazil also proceeded with reforms and privatisation without a regulatory regime and market rules in place, which led to a haphazard combination of institutions and entities in the early years of privatisation (Brown, 2002).

[20] This limit has been brought down several times and is at 500 kW currently.

ownership of the assets would be with the government (Schmidt, 2021).

From 1995–2000, Brazil's electricity distribution companies were privatised, and private sector participation in the distribution segment had increased to 60% by 1998 (Vagliasindi & Besant-Jones, 2013). In 1996, the Agencia Nacional de Energia Eléctrica (ANEEL), a federal agency tasked with overseeing the electricity sector, was established. In 1998, an independent transmission system operator (ONS) and commercial market operator were established. The same year the federal vertically integrated company, Eletrobras, was unbundled into six holding companies, 14 generation and transmission companies;[21] these generation companies were subsequently put up for privatisation (Vagliasindi & Besant-Jones, 2013).

6.4 Reforms Phase II (2003 onward)

As per (Vagliasindi & Besant-Jones, 2013), despite the reform effort, while electricity demand grew by 45% between 1990 and 1999, reflecting the stabilisation and growth in the economy, installed capacity increased by only 28%. 2001–2002 was one of the worst droughts on record for Brazil. With hydropower generation falling, the Federal Government implemented a rationing system and curbed electricity use. After the drought, the demand did not recover to the levels before the drought. In 2004, the newly elected Lula Government declared avoiding more rationing (through adequate capacity), protecting consumers from high tariffs and universal access to electricity as its priorities. The government implemented the 'New Model' of reforms, which kept most of the features of Phase I. For example, while no new distribution privatisation occurred between 2001 and 2016 (Muller & Rego, 2021), the privatisation contracts were maintained by the new government. The 'New Model' aimed at increasing private investment into the sector and incentivising more capacity addition. The new model required, amongst other things, that distribution companies purchase electricity for 100% of their load through least-cost auctions (Vagliasindi & Besant-Jones, 2013). It also established the Electric Power Commercialisation Chamber, overseen by ANEEL, which registers and processes all energy contracted in the wholesale power market. It also established the Power Sector Monitoring Committee to monitor service delivery (Vagliasindi & Besant-Jones, 2013).

The new model also brought strict unbundling and separation requirements. 'Power generation concessionaires connected to the national interconnected transmission system cannot either be associated with or controlled by electricity distribution companies. Electricity distribution concessionaires cannot develop any activity relating to power generation, transmission of energy or energy trading. In addition, they can only acquire energy through an auction based on the lowest price and sell energy to captive power consumers under the tariff set by ANEEL.' (Schmidt, 2021).

6.5 The Brazilian Electricity Sector Today

In all three segments of the Brazilian power sector, there are private as well as public (federal and/or state-owned) players. This shows that the government was able to provide credible commitments to the private sector. The Ministry of Mines and Energy is responsible for planning Brazil's power sector, and it is provided research services by the Energy Research Enterprise, which is a public company linked to the ministry. Brazil has centralised dispatch which relies on transmission lines that carry power from generation stations in different parts of the country.[22] Today, in addition to IPPs, there are also private transmission lines which are operated by the ONS and regulated by ANEEL. Transmission projects, designed by government agencies, are put up for auction; the lowest bidder wins the concession to develop, operate and maintain the project for 30 years (OECD, 2021).

Electricity supply remains a public service and thus, the responsibility of the government. The government can give concessions to supply the public service, which it does through ANEEL-organised auctions for electricity distribution. The successful bidder is then party to a concession agreement that has the conditions of electricity supply that must be met (Filho, 2012; Schmidt, 2021). The distribution companies are monopoly suppliers in their concession areas.

[21] Eletrobras retained control of the transmission assets, the Brazilian component of the Itaipu dam and hydrostation, the nuclear plants, and the research and development activity undertaken through the Centro de Pesquisas de Energia Elétrica (Vagliasindi & Besant-Jones, 2013).

[22] In addition to this National Interconnected System, there are standalone systems in north Brazil (near the Amazon) where laying lines is harder.

Currently, around 53 distribution concessions operate in Brazil. Four large foreign players own many of the distribution companies, as well as Brazilian private players. State-owned distribution companies also exist, but many are partially privatised with the government as the controlling shareholder (Muller & Rego, 2021). There are also 51 distribution cooperatives operating in Brazil. As per one report, performance improvements were not limited to the privatised distribution companies, even public distribution companies improved their performances in the period post-privatisation (ESMAP, 2015). However, (Muller & Rego, 2021) find that private distribution companies in Brazil are better performing than state-owned ones, although the partially state-owned companies are closer in performance to the private companies.

The six distribution companies that could not be privatised because of their poor performance were in 1997 handed over to Eletrobras, Brazil's largest electric power utility. In 2018, the government privatised these remaining distribution companies (Schmidt, 2021). Foreign companies can participate in any segment of the sector but need to set up a Special Purpose Vehicle in Brazil to do the same. Eletrobras was privatised in June 2022; the Brazilian Government had owned a 72% stake in the company, which it reduced to 45% with this sale.

The regulator ANEEL has management autonomy 'with no administrative recourse to the Ministry of Mines and Energy' (Filho, 2012). The Brazilian President appoints, and the Senate approves the appointments of its five board members, who are appointed for four-year non-coincident (appointed in different years) fixed terms; they can be reappointed only once.

***Market structure*:** The Brazilian electricity supply sector is made up of two markets (see Table 7).

- The first is the market composed of distribution companies and 'captive consumers', and this market is fully regulated by ANEEL. Distribution companies have an obligation to have 100% of their five-year forecasted requirement contracted (Filho, 2012). Power purchase by distribution companies takes place through least-cost public auctions that ANEEL regulates, and the distribution companies sign bilateral contracts with the seller (which can be a trader or a generator). ANEEL fixes the electricity tariff at which the distribution companies sell to 'captive consumers' and free consumers yet to migrate. Captive consumers consist of most of the electricity consumers in Brazil, with residential consumers being the largest chunk.
- The second is the 'free market', wherein large consumers (demand requirement has been reduced over the years and currently stands at 500kW or more), generators, and traders operate. The quantity of power, delivery conditions, and prices are open to negotiation between these agents (Schmidt, 2021). The agents sign a bilateral contract based on the negotiations. This is the market for 'free consumers', which comprises mainly of industrial and commercial consumers. In this market, too, there is a requirement for the consumers to have contracts for 100% of their load. Generators can sell in either/both markets.

Table 7: Electricity Consumption by Different Consumers in Brazil in 2019 (in GWh)

	Captive Market	Free Market	Total Consumption	Share in Total Consumption
Residential	142,777	4	142,781	30%
Industrial	29,136	138,548	167,684	35%
Commercial	72,371	19,703	92,075	19%
Rural	27,600	1,270	28,870	6%
Public services, public power, and street lighting	44,294	3,266	47,560	10%
Self-consumption	3,114	143	3,257	1%
Total	**319,292**	**162,934**	**482,227**	**100%**

Source: (OECD, 2021).

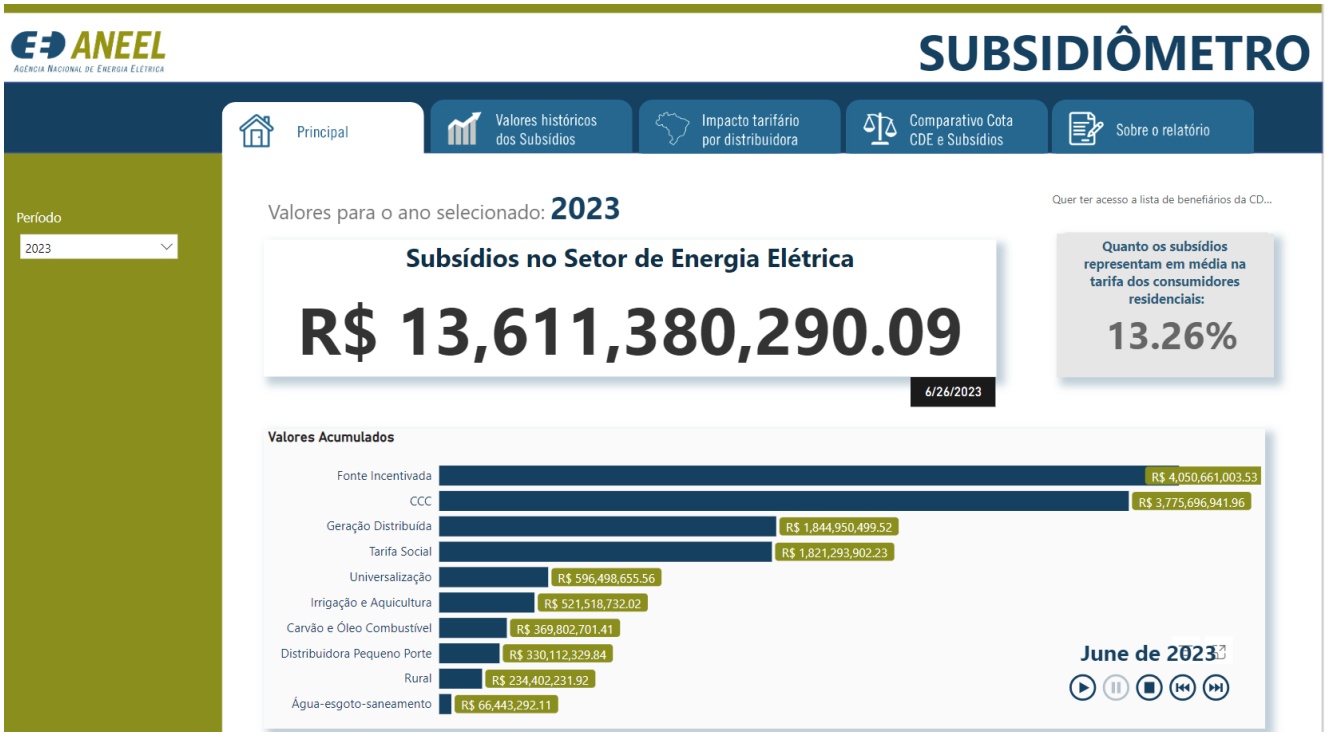
- Under Brazilian law, insolvency of an electricity concessionaire results in either (i) intervention by ANEEL and a recovery plan, or (ii) termination of the concession. 'Therefore, a concessionaire of public services cannot avail itself of the usual regime of judicial recovery and reorganisation under the insolvency regime.' (Schmidt, 2021).

***Generation mix*:** Despite steadily diversifying its generation mix, Brazil remains dependent on hydropower for more than half its electricity. This makes it particularly vulnerable to drought-related energy shortages and price volatility. For example, in 2014, still heavily dependent on hydropower for nearly 80% of electricity, a sweltering summer (the hottest on record till then) led to an increase in demand which could not be adequately met. A transmission line failure resulted in a blackout that impacted six million people in 11 states (J.P., 2014). Again in 2021, one of the worst droughts on record led to very low reservoir levels and a 40% jump in spot market prices for electricity, raising prices especially for 'free consumers' (Reuters Staff, 2021).

***Access*:** Access to electricity is high in Brazil, and it has increased from 87.5% of the population in 1990 to 100% by 2020. In 2003, the Lula Government launched the *Luz Para Todos* (Light for all) programme to provide access to rural unconnected households, with a focus on residents in areas with low human development index. The programme has connected 3.4 million households till 2018 (OECD, 2021). The programme is funded through a mix of Federal Government, State Government, and distribution government funding. The Federal Government funding in part came from the Energy Development Account (CDE), which has its budget approved by ANEEL each year and is funded through the electricity tariffs paid by consumers. The CDE is used to provide subsidies in the electricity sector.

***Cost of electricity*:** Electricity prices in Brazil are higher than those in other Latin American countries and higher than in other countries with a significant amount of hydropower, such as Canada (OECD, 2021). Higher and multiple taxes are usually blamed (The Economist, 2011). In 2010, there were 28 different taxes on the electricity sector, and they together accounted for 45% of the average electricity bill (H.J., 2012).[23] For 2021, PwC and Instituto Acende Brasil calculated that the combined burden gross

Figure 5: ANEEL's Subsidiometer



Source: ANEEL.

[23] Brazil's complex taxation system (along with other obstacles to business) are referred to as the *custo Brasil* or the Brazil cost (H.J., 2012).

Table 8: Market Structure and Market Share in Brazil

	Distribution	Transmission	Generation
Market structure	53 distribution companies + 51 distribution cooperatives	242 transmission companies	8,054 generation plants
Market share of the 10 biggest companies	61.89%	69.33%	37.95%

Source: (OECD, 2021).

of taxes and sector charges accounted for 46% of the operating revenue of their sample of energy sector companies (Adriano Correia et al., 2022).

***Distribution subsidies*:** The CDE is used to provide subsidies in the electricity sector. In 2022, the sector regulator ANEEL launched a *Subsidiometer*, which allows anyone to see the subsidy budget and the payments made each year (see Figure 5). As per the data, R$ 13 billion (Brazilian reais) was the budget for the CDE for 2023. The subsidies represent 13.26% of the tariff paid by the electricity consumers. This subsidy amount was used to pay (from top to bottom in Figure 5) incentivised renewable generation (*Fonte Incentivada*), distributed generation (*Geração Distribuída*), social tariff (*Tarifa Social*, paid to poor households), universal access (*Universalização*), for Irrigation and Agriculture (*Irrigação e Aquicultura*), coal and fuel oil in isolated areas (*Carvão e Óleo Combustível*), small distributors (*Distribuidora Pequeno Porte*), rural consumers, water–sewage–sanitation (*Água–esgoto–saneamento*).

Brazil's reforms have been successful in bringing in multiple players (public, private, and international) and investment to its electricity sector. However, issues such as high tariffs and a need to diversify generation sources remain. One of the more interesting aspects of the reforms is the unbundling and strict separation of unbundled entities, such that electricity distribution companies are not allowed to engage in power generation, transmission, or electricity trading. This has brought down the market share of state-owned companies like Eletrobras while increasing competition, particularly in the generation segment (see Table 6).

7. Argentina

7.1 Background

In 1983, Argentina emerged from a long military dictatorship when democracy was restored with the election of President Raúl Alfonsín. Till 1989, the electricity sector was in the hands of the public sector. The hyperinflation and GDP contraction throughout the 1980s (which reached a head in 1989) combined with the high government debt burden and the poor performance of existing utilities were the motivations behind privatisation[24] (Bouille et al., 2002). Reforms in the electricity sector began in 1989 and aimed at unbundling the sector and bringing in market discipline.[25] The new government under President Carlos Menem committed itself to reducing the role of the public sector, increasing private sector investment, and showcasing this commitment to international lenders. The reforms were conceived and implemented by a small group of policymakers and technocrats, with the need to fix the economic crisis used as a reason to not hold consultations (Bouille et al., 2002). The reforms were considered the most comprehensive of their time. 154 state companies (including energy and gas) were privatised and close to US$20 billion were raised, which substantially brought down the losses of state-owned companies and reduced government debt in the 1990s (Pollitt, 2008). In an attempt to contain the hyperinflation, the Menem Government also initiated the Convertibility Plan, which pegged the Argentine peso one-to-one to the US dollar (from 1991 to 2002), to increase confidence in the local currency and encourage foreign investment (Pollitt, 2008).

[24] The economic crisis was marked by hyperinflation reaching 3000% which substantially affected living standards.
[25] The World Bank and the Inter-American Development Bank provided loans to Argentina for its reforms process (Bouille et al., 2002).

Argentina Electricity Sector Profile

- **Population**: 45.8 million
- **Per capita income (in current US$):** $7,212
- **Electricity Access:** Total (100%); Urban (100%); Rural (100%)
- **Distribution Loss:** 13.9%, with 4.9% technical loss and 8.4% commercial loss
- **Electricity Demand by Consumers:** Residential 46%, Industrial 27%, Commercial 28%
- **Quality of Supply (2019):**
  - SAIFI 14.4
  - SAIDI 4.5
- **Installed Capacity in the Wholesale Market:** 41.9 GW, of which:
  - Thermal 60.5% (mostly gas)
  - Pumped Storage 2.3%
  - Nuclear 4.2%
  - Renewables (including hydro ≤ 50 MW) 33%

Sources: World Bank Data for 2021 (population, access, and adjusted net national income per capita); distribution loss figures, SAIFI, SAIDI from the Power Market Database v2020; all other information from CAMMESA Annual Summary 2022.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

7.2 The 1990s Reforms

The Electricity Regulation Law of 1992 was a major milestone in the electricity reform process. It unbundled state power companies and created three distinct sectors in the power sector—generation, transmission, and distribution. It provided the legal architecture for an independent sector regulator and set up a wholesale electricity market (WEM). In addition to unbundling, restrictions on cross-ownership were set up for the electricity sector. For example, in transmission, the law mandated open access and disallowed transmission companies from generating or distributing power. Competition was introduced in the generation segment and IPPs were allowed to operate. Transmission and distribution segments are considered public services and are regulated monopolies; the government gives long-term concessions for transmission (Federal Government) and distribution (Federal and Provincial). The privatisation in the early 1990s saw a lot of foreign investment, with most of the electricity companies being taken over by foreign companies.

- **Regulator:** The National Regulatory Commission for Electricity (Ente Nacional Regulador de la Electricidad or ENRE) was set up in 1993. ENRE is the independent regulator for the electricity sector for generation, transmission, and federal distribution companies. It is managed by a Board of Directors which has five members. Three of these directors are appointed by the Secretary of Energy, and the last two directors are appointed by the Provincial Governments. They are appointed for five years, which can be renewed for more terms. ENRE's budget is financed entirely by fees paid by the participants in the wholesale electricity market (WEM). Transmission tariffs are set by ENRE, as are the distribution tariffs for the federal-level distribution companies. ENRE has also been made responsible for developing regulations for a large number of activities in the electricity sector, such as security and quality of supply, safety, tariff determination, and the basis for awarding concessions (Pollitt, 2008). 'Between 1992 and 2001 ENRE issued no less than 131 resolutions concerning the regulation of the electricity sector. In 2003 ENRE seemed well resourced with 158 staff, of which 87 were professional (15 were economists)" (Pollitt, 2008). ENRE must conduct public hearings for a number of its functions: 'to resolve issues concerning expansion works of transmission and distribution facilities; consolidation or merger of transmission or distribution companies; electricity companies' behaviour which may entail unfair competition or abuse of a prevailing position in the market; electricity companies' requests for tariffs modification; individuals' complaints about unfair distribution or transmission tariffs; denunciations of law-breaking acts committed by generators, transmitters, distributors, or users' (ENRE, n.d.).
- **Distribution:** In the distribution segment, the distribution companies are monopolies with a universal service obligation. Their privatisation was undertaken in 1993, and by 2000 around 25% had been privatised. The push towards reforming the provincial distribution segment came from the Federal Government which made the transfer of federal funding conditional on these reforms (Bouille et al., 2002). Provincial Governments have established their regulators, based on ENRE

guidelines, at the provincial levels which grant and regulate the electricity distribution concessions in their areas (Siboldi & Fanelli, 2020). Edenor and Edesur are the two distribution companies that operate at the federal level and are regulated by ENRE; they are two of the largest distribution companies in the country, supplying power to the north and south respectively of the city of Buenos Aires and the larger Buenos Aires metropolitan area.[26] Their concessions are for 95 years. They are currently controlled by the Italian firm Edel (Edesur) and the Argentine group Vila-Manzano (Edenor) (TIMES/AFP/NA, 2023). There are distribution companies in each of the provinces which are regulated by provincial regulators, and there are also small cooperatives within municipalities (Siboldi & Fanelli, 2020). Distribution tariffs are set by ENRE for the two distribution companies operating at the federal level, and by the provincial regulators for the distribution companies in their jurisdiction; distribution tariffs vary by consumer category and voltage level.

- **Managing trade unions:** While trade unions have a long history in Argentina, not many opposed the move towards privatisation. Bouille et al., (2002) suggest that this was because employees of the privatised enterprises were given 10% of the equity of the newly privatised company, which allowed them to benefit from the move. In addition, the unions were associated with the party in power, the Peronists, who were behind the reforms.

- **Market structure:** Distribution companies purchase their electricity through the wholesale market (WEM), as do consumers with demand over 30 kW (like in Brazil). Power purchase agreements are signed based on WEM negotiations. The wholesale electricity market (WEM) is administered by CAMMESA, which is a not-for-profit corporation that has the Government of Argentina and four associations representing generation, transmission, distribution, and large consumers each holding 20% of shares. Its ten-member board has two members appointed by each of the associations, the final two members are the Secretary of Energy (who has a veto) and another member appointed through assent of the associations. In addition to managing and clearing WEM transactions, CAMMESA is also the national operator of the interconnected system, in charge of the economic dispatch of electricity to match supply with demand (the WEM operates on marginal cost pricing, with the cheapest generator being dispatched first), and performs the transactions for the import and export of electricity. Its operating costs are funded by mandatory contributions by participants of the WEM (Siboldi & Fanelli, 2020).

- **Distribution tariffs:** Distribution tariffs for regulated consumers (i.e., those served by distribution concessions and include residential, small industrial and commercial consumers) are set by ENRE or provincial regulators and are subject to revisions every five years. The distribution tariff is broadly composed of the cost of energy (including transmission)[27] plus the added value of the distribution (i.e., costs related to the distribution business such as the cost of network, operations, and maintenance, etc.) (ENRE, n.d.). These distribution tariffs are the maximum tariff for each period, such that the company's profitability depends on its efficiency (ENRE, n.d.). The tariff is adjusted every few months to account for the seasonal energy price as calculated by CAMMESA.

7.3 Performance Till 2002

Reforms resulted in an increase in investment between 1992 and 2002 (11 years) that saw generation capacity expand by 4.9% per year, transmission line length expand by 2.7% per year, and the total number of connected consumers increased to 9.83 million in 2001, with the companies showing strong financial performances (Pollitt, 2008). Wholesale prices in WEM fell, which led to a fall in electricity prices. However, this fall was not uniformly distributed; prices fell for industrial consumers but, importantly, did not fall for the poorest consumers (Bouille et al., 2002). Transmission and distribution losses (technical and non-technical) fell from around 27% in 1992 to close to 10% by 1997 (Bouille et al., 2002). Since the distribution companies did not ask for a tariff revision in 1997, the next tariff revision was set to happen in 2002. However, because of the macroeconomic crisis, it never took place.

***Connecting Poor Consumers*:** The Federal Government started a plan to connect shanty towns in the Greater Buenos Aires area in 1994. The plan involved

[26] The Buenos Aires Metropolitan Area has one-third of the country's population and generates half of the country's GDP.
[27] The cost of energy is the capacity charge, the seasonal energy charge, and the added value of transmission (Pollitt, 2008).

the government paying off past debts of such households and giving subsidies to the electricity companies to connect them; it resulted in the addition of 650,000 consumers by the end of 1998. Local government would pay for the poorest consumers by having a municipal meter, which recorded the total consumption of around 1,000 households and was funded by an electricity tax on household electricity consumption (Pollitt, 2008). However, the government's plan to connect far-flung rural areas during this time was less successful, and some rural areas are still to be connected.

7.4 Macroeconomic Crisis of 2001–2002 and an Interventionist Government

Despite reforms, a worsening macroeconomic situation led to a sovereign debt default by Argentina on US$100 billion of external loans. It also led to the abandonment of the Convertibility Plan in 2002; prices were now in pesos, while the loans were still in dollars (Pollitt, 2008). With the currency allowed to float, the value of the Argentine peso fell to 30%, and the country defaulted on its external debt; GDP fell by 15% between 2000 and 2002. The crisis led to the resignation of the elected President at the time. The economy did recover over the period from 2002–2007 due to an increase in exports helped by the devaluation. However, the crisis dented investor confidence. The crisis also changed the management of the energy sector in the country. To curb inflation, the government froze regulated residential gas and electricity tariffs in 2002, which increased energy subsidies. The tariff freeze remained in place, with infrequent tariff increases, till 2016, and energy subsidies increased from 0.4% of GDP in 2005 to 3.5% in 2014 (Giuliano et al., 2020).

Regulated electricity tariffs had been pegged to the US dollar till 2002. Electricity companies had their financing arranged in US$ and found it difficult to pay back interest. This led to a reduction in investment in the sector as a whole, and many foreign firms exited the Argentine electricity sector. Low prices led to an increase in electricity demand, which, combined with no new investment, led to an erosion of reserve capacity and periodic supply shortages since 2004 (Pollitt, 2008).[28] The government also began renegotiations of the privatised utility concessions (in several sectors, including electricity), which led to a belated increase in electricity tariffs in 2007. As per Pollitt (2008), the government failed to provide a pathway back to normal operations of the sector post-crisis and weakened the regulatory institution (ENRE) through its interventions. The two Kirchner governments (2003–2015) created several government programmes for expanding generation capacity and periodically tweaked how the WEM was run to meet demand and maintain price stability. Even as the economy began to recover, the government's role became interventionist in the period that followed the crisis (Burke, 2007).

7.5 The Macri Government and the 2018 Economic Crisis

The new government of President Mauricio Macri, elected in 2015, wanted to reduce the fiscal deficit and increase foreign investor confidence in the government. In this direction, the government negotiated a settlement with bondholders (from the US$100 billion debt default by the country in 2002), which lifted the '15-year debt blockade' on the country. The government also lifted the foreign currency control measures put in place in 2011, allowing the currency to float again. It decided to roll back energy subsidies and sought to increase investment in the shale gas reserves (especially in Vaca Muerta) of the country. From 2016, gas and electricity tariffs were hiked to reduce the energy subsidy. Consumer electricity tariffs were expected to increase between 60–90%, based on consumption (Cohen, 2017). A social tariff structure was also created for both electricity and gas with subsidised prices for specific types of consumers. Tariff increases resulted in protests in many cities. Energy prices increased by 377% between December 2016 to November 2019 (Giuliano et al., 2020). However, the economic situation continued to worsen, with inflation remaining high, and in 2018, a further currency depreciation led to an IMF bailout for Argentina.

7.6 The Electricity Sector in Argentina Today

In 2019, the Macri Government lost, and the newly elected Peronist Government of President Alberto Fernández once again froze electricity prices in a bid to contain inflation and put in currency controls (Newbery, 2019). However, prices were allowed to increase by 9% in the Buenos Aires metropolitan

[28] For example, maximum demand in the wholesale market increased by 4400 MW from December 2002 to December 2006, and the new capacity that came online during this time period was 1200 MW (Pollitt, 2008).

region in 2021. Despite this, Edenor and Edesur, the two largest distribution companies, reported losses and have asked for a cash injection of US$1 billion in 2022 (BNamericas, 2022). The two utilities have been borrowing from CAMMESA to purchase power for supplying to consumers. High inflation continues to be a problem in Argentina, and in July 2023 it hit 114%, one of the highest in the world (Otaola, 2023). In 2021, Argentina spent US$11 billion to keep energy prices flat in the face of soaring inflation (Gillespie, 2022). The country signed an agreement with the International Monetary Fund for US$44 billion in 2022 (IMF Communications Department, 2022), the condition for which was to reduce the fiscal deficit. The government has had to continue cutting energy subsidies in 2022. Having defaulted on its sovereign debt nine times, the country cannot borrow internationally and is running a high fiscal deficit (The Economist, 2023), which has been a long-running problem. Presidential elections are due in October 2023.

Argentina privatised its electricity sector in the 1990s based on what it saw as best practices coming from Chile and the United Kingdom. However, frequent, and long macroeconomic turmoil and a political system that swings between left-leaning populists and centre-right economic liberals has resulted in inconsistent energy policy and has, according to some (Makholm, 2020), reverted the country's electricity sector back to state-run.

8. The Philippines

8.1 Background

In 1972, the President of the Philippines, Ferdinand Marcos, declared martial law. The same year, Marcos passed Presidential Decree 40, which nationalised private generation and transmission assets and vested them with the state-owned National Power Company (NPC). Distribution, however, remained with the private distribution companies, cooperatives, and local government entities. Thus, Manila Electric Company (MERALCO), which had been a vertically integrated private company serving Manila, became a private distribution company subject to regulation (Bacon, 2019). Marcos's agenda included full electrification of the country and a reduction in dependence on imported oil. By the time of his departure from office in 1986, 45.6% of households had an electricity supply, and the dependence on oil imports from the Middle East had fallen from 92% in 1973 to 57% in 1984 (Bacon, 2019). However, the post-nationalisation performance of NPC was weak.

Marcos's rule ended in 1986, and the next regular elections in the Philippines took place in 1991. The reform process began in the interim period. Power shortages in the 1980s led to the government allowing IPPs to meet the supply gap. Schemes introduced by the Aquino administration (1987–92) to incentivise private generation, however, did not yield many results. In the general elections of 1991, Fidel Ramos won the Presidency with a broad reform agenda. In

The Philippines Electricity Sector Profile

- **Population:** 115.5 million
- **Per capita income (in current USD):** $3,127
- **Electricity Access:** Total (97.5%)
  Urban (98.6%) Rural (96.5%)
- **Distribution loss (2019):** 9%, with 5.5% technical loss and 3.5% non-technical loss
- **Electricity demand by major islands:** Luzon (incl. Manila) 75%; Visaya 13%; Mindanao 12%

  Decentralised grid, with Visaya and Mindanao interconnected via submarine HVDC link since 1997. Small islands have their own isolated energy grids.
- **Quality of supply (2020):**
  - SAIFI 2.20;
  - SAIDI 3.60
- **Installed generation capacity (2017):** 23.82 GW, of which
  - Coal 50%
  - Natural Gas 22%
  - Geothermal 11%
  - Hydro 10%
  - Oil 4%
  - Renewables 3%

Sources: World Bank Data for 2021 (population, access, and adjusted net national income per capita); SAIFI & SAIDI & distribution loss from the Power Market Database v2020. Installed generation capacity from (Rudnick and Velasquez, 2019).

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

1992, the Emergency Power Crisis Act was passed by Congress, which gave emergency powers to the newly elected President for one year to solve the power crisis. To encourage IPPs, the government implemented take-or-pay provisions, took on fuel risk (i.e., off-taker to provide fuel or assume fuel price risk), foreign exchange risk, provided a sovereign guarantee, and provided tax exemptions (Bacon, 2019).

The package passed was very successful at bringing in investment and adding generation capacity; US$6 billion in investment and 4,800 MW capacity addition (or an increase of 70% in capacity) took place between 1992 and 1998 (Mouton, 2015). However, this capacity addition was done to meet the supply gap in a hurry and was undertaken by foreign companies under take-or-pay provisions. Thus, generation costs were high. For example, the average cost of power generation from private plants in 1996 was US$76/MWh compared with US$57/MWh of NPC (Santiago & Roxas, 2010). The take-or-pay provision became more of a problem during the Asian financial crisis, which slowed down demand. Since most of this investment was in foreign currencies, and the Philippine peso had been devalued (many times between 1988 and 2005), electricity prices were very high, and there was a large oversupply of power.

***Distribution sector before 2001*:** Before the 2001 reforms, described below, the distribution utilities had a licence (called a franchise) for a particular distribution area. There were 16 private distribution utilities, eight local government-owned ones, and 119 electric cooperatives. Large consumers, like industries, connected directly to the transmission network and were not supplied by the distribution companies. The Energy Regulatory Board set tariffs following a judicial process (Bacon, 2019).

8.2 The EPIRA Reforms

Motivation for reforms: There was a power crisis in the country from the 1980s till the early 1990s; electricity shortages had impacted 1.5% of GDP in 1992 (Mouton, 2015). Securing adequate electricity supply and reducing tariffs were the main motivations behind the reform process, but the poor performance of NPC also resulted in a push for privatisation and private investment. Additionally, the prevalent global paradigm favouring privatisation over state-owned enterprises had considerable sway in the Philippines. World Bank loans in the 1980s, and especially the Asian Development Bank loan in 1998, made the passing of the reforms bill a requirement for the disbursement of loans (Mouton, 2015).

***Reforms (2001 onward)*:** After much delay (it was proposed in 1995), the Electric Power Industry Reform Act (or EPIRA) was signed into law in June 2001. EPIRA envisaged an electricity sector composed of four segments, namely, generation, transmission, distribution, and supply. NPC, which had been in control of all transmission, much of the generation, and planning, was unbundled; EPIRA created the Power Sector Assets and Liabilities Management Corporation (PSALM) to take over and privatise NPC's assets. EPIRA carved out transmission assets of NPC into a National Transmission Corporation, which was then owned by PSALM and to be privatised. NPC's generation assets and contracts with IPPs were also vested in PSALM to be privatised. EPIRA also created the Energy Regulatory Commission (ERC) as an independent regulator for the sector in 2001 to replace the Energy Regulatory Board. The ERC regulates the distribution and transmission wires business, issues licences for generation and retail supply, and oversees the competition in the power market (Rudnick & Velasquez, 2019).

- **Generation and the electricity market:** Generation was opened up (requires no licence), even to foreign investors, who could own 100% of power plants ('except those that utilised natural resources which had to remain under the control of Filipinos' (Bacon, 2019)). Electricity would be traded without price regulation on the Wholesale Electricity Spot Market (the competitive market), but the price would be set by the ERC for the captive market. The Wholesale Electricity Spot Market began commercial operation in 2006 (Bacon, 2019). By 2016, PSALM had privatised 73% of its 11,190 MW generation portfolio.

- **Transmission segment:** The transmission company is a regulated common carrier business monopoly, providing non-discriminatory open access to all industry participants. Transmission wheeling charges are determined by the ERC. By 2016, PSALM had privatised all of its transmission assets via concession. Thus, while the National Transmission Corporation, a government company, owns all transmission assets, the National Grid Corporation of the Philippines, a private consortium, operates the assets.

- **Distribution segment:** The distribution segment was split into distribution and supply, and distri-

bution utilities were mandated to unbundle their regulated wires business from their unregulated supply business (Manabat Sanagustin & Co., 2013). Distribution was now a carrier business which required one to get a national licence (a national franchise) and provide non-discriminatory open access to all. Distribution wheeling charges are determined by the ERC. Retail electricity suppliers (RES) were introduced that require a licence from the ERC to operate. The RES compete with the distribution utilities to supply the contestable consumers using open access.[29] Tariffs in the non-contestable segment (i.e., captive consumers or those with the electricity utility) are regulated by the ERC, and those in the contestable segment are not. The threshold for contestable consumers was to be brought down to 1 MW initially and eventually to the household level. EPIRA had put forward some pre-conditions for declaring the retail competition and open access (RCOA) regime for 1 MW and over. The preconditions included setting separate wheeling charges for distribution and transmission businesses, operationalising the wholesale electricity spot market, and privatising 70% of the NPC's generation assets (Bacon, 2019), such that no generation company can own, operate, or control more than 30% of the installed generation capacity of the grid (Manabat Sanagustin & Co., 2013). The transition period to RCOA began in 2012, with consumers with a demand of 1 MW or above having to begin finding supply from RESs. This Retail Competition and Open Access (RCOA) is allowed for consumers with a demand of 750 kW and above, but only in Luzon and Visaya.[30]

- **Bulk consumers:** These are connected directly to the transmission grid and can opt for buying from the market pool or have bilateral contracts.

- **Cross-subsidies:** Section 74 of the EPIRA mandates the elimination of cross-subsidy. As per (Santiago & Roxas, 2010), all electric cooperatives and 14 of 18 private utilities had removed these.[31]

- **Wholesale Electricity Spot Market (WESM):** Generation companies, distribution utilities, bulk consumers, RESs, and contestable consumers all participate in the power market. There are no contracting or forward procurement obligations on distribution utilities, but their agreed-upon contracts are subject to regulatory approval (Rudnick & Velasquez, 2019). Thus, bilateral contracts signed by the distribution companies are regulated by the ERC under a cost-plus approach, but their purchases from the WESM are market-based. Distribution utilities are expected to competitively sign PPAs for their captive market requirement two years before the expiry of their existing PPA (Department of Energy, 2023). The Philippines Electricity Market Corporation (PEMC) serves as the market operator for the country's power market.

8.3 Reform Performance

PSALM's privatisation efforts resulted in raising nearly US$20 billion by 2016, which it used in part to bring down its debt obligations from US$24.8 billion in 2003 to US$10.1 billion in 2016. As per Bacon (2019), one of the key reasons for the success of reforms in the country was the consistent support for the reforms by the government. Despite this, there was much delay in implementing the EPIRA reforms.

- **Transmission privatisation:** Four attempts were made to privatise the transmission business before it finally took place. In the first three attempts, there weren't enough bidders to proceed with the process. ESMAP (2015) attributes this failure to the short track record of the ERC and the uncertainty around the performance-based regulation with the revenue cap approach that the ERC was using for the transmission segment. The establishment of the regulatory asset base by the fourth round of bidding was important in attracting private investors. Finally, a 25-year concession was won in 2009 by the National Grid Corporation of the Philippines, which is a consortium of local and international companies, for US$3.95 billion (ESMAP, 2015). In May 2023, it was reported that the President of the Philippines

29 For example, under this system, MERALCO has MPower as its local RES, supplying to contestable consumers in its franchise area of Metro Manila and adjoining areas. It has Vantage Energy as the RES for contestable consumers in Luzon and Visayas.

30 The WESM became operational in Mindanao in 2017, and RCOA is as yet not operational there.

31 Prior to EPIRA, there were three kinds of cross-subsidies—between industrial or commercial consumers and residential consumers, between wholesale consumers of NPC in Luzon, and between the three major grids.

was looking into the possibility of retaking ownership of the transmission assets, which are run by the National Grid Corporation of the Philippines (Venzon, 2023). This consortium is 40% owned by the State Grid Corporation of China and 60% by Filipino tycoons.

- **Market power:** The first annual report of the market operator had reported a high Herfindahl–Hirschman index,[32] which Santiago & Roxas (2010) suggest was because of the ownership of generation by NPC in the public sector and by MERALCO in the private sector. MERALCO is the distribution utility for Metro Manila and nearby provinces, serving 38 cities and 73 municipalities, and is the largest distribution utility in the country with 7.6 million customers (Meralco, 2023). MERALCO also runs electricity generation plants and has retail electricity supply arms. There has been a lot written about the market power exercised by MERALCO; there was even a proposal to split it up, but it was never implemented. In the WESM, four players account for 62% of the capacity (Rudnick & Velasquez, 2019). While market concentration has reduced, Rudnick & Velasquez (2019) suggest that the power market remains concentrated, and cross-ownership of generation/distribution/retail also leads to more market power for certain players.
- **Operation of the wholesale market:** The WESM has been successful in providing market signals based on supply and demand, and spot market prices fell 38% between 2006 and 2015 (Rudnick & Velasquez, 2019). However, distribution companies and retail suppliers continue to sign bilateral contracts, which are regulated in the case of distribution companies or settled privately in the case of retail suppliers, generation companies, and contestable consumers.

Prices: Electricity rates in the Philippines are some of the highest in Asia, which has been attributed to cost-reflective tariffs, lack of cross-subsidies or government subsidies, but also to continuing inefficiencies. In 2014, the Supreme Court halted a tariff increase by MERALCO since it was being investigated for colluding with power producers to keep prices high (Mouton, 2015). Again in 2022, MERALCO and the generator South Premiere were prevented by the ERC from raising tariffs, since the contract had fixed prices in it. South Premiere then went on to annul its contract with MERALCO (Cruz, 2022). The recently elected President Marcos has promised lower rates.

Access and affordability: Lifeline rate subsidies and senior citizen subsidies continue to be paid by consumers in the Philippines. There is also a Universal Charge paid by consumers that covers the cost of stranded government contracts with IPPs from the 1990s as well as subsidises electrification activities (Asian Development Bank, 2018). For example, MERALCO's Lifeline Rate Programme, wherein low-income households will pay discounted rates, has the following discounts: monthly consumption of 0–20 kWh will get a 100% discount, 21–50 kWh a 50% discount, etc. (CNN Philippines Staff, 2023).

The Philippines has introduced private players in its generation and distribution segments and introduced competition through the creation of successful wholesale and retail electricity markets. The support of the government for the reforms was essential to its implementation and success. However, challenges remain in terms of the concentration of market power and high electricity prices.

[32] The Herfindahl–Hirschman Index (or HHI) is a measure of the concentration of market power.

9. Turkey

9.1 Background

Till 1970, the Turkish electricity system was fragmented, with many different entities owning and operating different parts of the electricity sector. The state-owned Turkish Electricity Authority (TEK) was created in 1970, and all electrical activity was consolidated under it, turning it into a vertically integrated monopoly provider of electricity. Electrification of the country and the creation of an interconnected grid were TEK's priorities; it soon also took on the distribution of electricity (Bhatia & Angelou, 2015). Reforms to move away from a public sector-controlled electricity sector began in the early 1980s.[33]

The Turkish Electricity Sector Profile

- **Population:** 85 million
- **Per capita income (in current US$):** $7,164
- **Electricity Access:** Total (100%); Urban (100%); Rural (100%)
- **Electricity Losses:** 15.3%, with 5.5% technical and 9.8 % commercial loss
- **Consumption Mix:** Industry (43%); Services (25.5%); Household (24%); Irrigation (5.3%); Lighting (2.2%)
- **Quality of Supply (2018):** SAIFI 19.5; SAIDI 44.7
- **Installed Generation Capacity:** 104 GW, of which:
    - Renewables 54% (including Hydro 30.4%)
    - Thermal 46% (including Natural Gas 25% & Coal 20%)

Sources: World Bank Data for 2021 (population, access, and adjusted net national income per capita); SAIFI, SAIDI from the Power Market Database v2020; installed generation capacity and consumption mix are from EMRA Energy Market Sector Report 2022.

Note: SAIDI is the System Average Interruption Duration Index, calculated as hours per customer per year. SAIFI is System Average Interruption Frequency Index, in times per customer per year.

9.2 First Phase of Reforms (1984–2001)

During the first phase, the public monopoly over electricity was done away with, and private sector investment was allowed into the electricity sector. This included the restructuring of TEK, first into an enterprise and then, in 1993, into two state-owned companies: The Turkish Electricity Generation and Transmission Company (TEAŞ) and the Turkish Electricity Distribution Company (TEDAŞ). IPPs were allowed in the generation segment, either being built and operated by private companies (the BOT model) or the operation of state-owned power plants being transferred to private companies (the TOOR model). These operated under concession contracts, at the end of which the ownership of the plant passed to the public sector. Captive power plants were allowed for industries. TEAŞ operated as the single buyer and seller of electricity from the IPPs under long-term PPAs. Around 11,000 MW of generation capacity addition took place during this period, but this was not satisfactory since the increase in demand was higher (Bhatia & Angelou, 2015). By 2001, 26% of generation capacity was in the hands of private companies. However, the contracts between private investors and the government put all the risk upon the government, which had to provide guarantees.[34]

In the distribution segment, two models were used to incentivise private participation. In the first model, TEAŞ assumed all risk and guaranteed a predetermined return on equity to the distribution company. In the second and more widely used model, tenders for the operation of the distribution assets (which remained state-owned) were put up, and the winning company would be the monopoly electricity distributor for the region for a given period (like a concession). In 1996, all the regions were auctioned off, but the authorisations were cancelled by the nation's highest administrative court (Bhatia & Angelou, 2015). Thus, only the two regions under the first model were privatised during this period.

9.3 The Second Phase of Reforms (2001–2013)

The 2001 reforms began with loans from the IMF and the World Bank. The second phase of reforms was motivated also by ongoing talks for Turkey's accession

[33] The 1970s was a time of great political turmoil and violence in Turkey, and it culminated in the 1980 military coup. Elections were allowed again from 1983.

[34] The end of the first phase also saw the introduction of the concept of 'mobile plants', which were plants of 25 MW (and later much larger) capacity that were hired by the government on five-year contracts. Around 795 MW of 'mobile plant' capacity came up between 1999 and 2003 (Bhatia & Angelou, 2015).

to the EU.[35] In 1997, the Turkish Government, with World Bank funding, undertook studies to prepare the framework for creating a competitive electricity market in line with the European Union's Electricity Directive of 1996. The economic crisis of 2000–01 in Turkey prompted reforms in many sectors, including electricity. The crisis also resulted in a fall in electricity demand, which meant that there was a sufficiently high reserve margin from 2001–2003 (Bhatia & Angelou, 2015). The Electricity Market Law 2001 set the legal framework for the reforms. The following changes were made to the industry structure:

- Establishment of the Energy Market Regulatory Authority (EMRA) as an independent regulator of the market, which also sets distribution tariffs.
- Legal separation required of generation and supply from transmission and trading.
- Regulated and non-discriminatory open access to transmission and distribution network.
- The Turkish Electricity Generation and Transmission Company (TEAŞ) was split into three companies, one each for generation (EÜAŞ), transmission (TEİAŞ), and trading (TETAŞ).[36]
- Turkish Electricity Distribution Company (TEDAŞ) was restructured into 20 regional distribution companies and privatised between 2008–2013.
- Creation of a wholesale market, where prices are not regulated.
- Creation of the category of contestable consumers, set at a consumption threshold of 9 GWh per year and reduced over time, which can purchase electricity directly from the wholesale market.

9.4 Distribution Privatisation: The Second Attempt

The first Electricity Market Strategy Paper by the High Planning Council was issued in 2004, and it envisaged beginning the privatisation of state electricity assets with the distribution segment, since (i) as the end-of-line entity, it would be purchasing from generation companies, and (ii) because the investment was needed to set up a metering and billing infrastructure. The purpose of the distribution reforms was to improve the performance of the distribution companies, as well as provide the basis for reforms upstream. While the privatisation process was supposed to happen during 2005–2006, the government delayed the process till 2008. By 2008, the World Bank was also providing loan assistance to TEDAŞ to make investments in the distribution system to make it more attractive to private investors.[37]

- TEDAŞ's licence area had 20 regions, and a separate distribution company was established in each region.
- The government took measures to attract private investors. In 2008, it undertook three tariff increases to reach cost-recovery levels, and this increased residential tariffs by more than 50%; it introduced cost-based pricing with an automatic quarterly adjustment; and it cleared municipal arrears for street lighting of US$3.5 billion in 2005 (World Bank, 2013).
- Tenders were invited for distribution privatisation through the 'TOOR backed share-sale model', wherein the investors would be the owner (shareholder) of the distribution company, but the distribution assets would continue to be owned by TEDAŞ. The investors, however, would have the right to operate the distribution assets under the TOOR agreement for 30 years, as well as an obligation to replace and expand network assets. The ownership of the new assets created by this investment would also remain with TEDAŞ (World Bank, 2013). The private distribution companies would also be the monopoly distribution companies in their region under their licence from EMRA.
- The winner of the bid was the one offering the highest price. The government initially put up 18 regional distribution companies and raised US$12.75 billion from the privatisation process.

[35] The accession talks have been at a standstill since 2016.
[36] TETAŞ merged with EÜAŞ in 2018 and is now known only as EÜAŞ (Somay et al., 2021).
[37] As per the World Bank (2013), 'At project appraisal in 2006, the electricity distribution network in Turkey was in poor condition and system reliability was declining. Due to government fiscal constraints, more than 50% of the investment needs for upgrading and rehabilitating existing distribution capacities were not met during 1994–2003'.

9.5 The Sector 2013 Onward

A new Electricity Market Law was introduced in 2013, which led to the legal separation of carriage and content in the distribution sector and the establishment of EPİAŞ as a market operator. In 2018, a capacity market mechanism was introduced, wherein monthly capacity payments are made to certain eligible power plants to ensure supply security and give priority to generation plants using domestic fuel (Somay et al., 2021). The following is the make-up of the Turkish electricity sector today:

- **Generation sector:** Generation can be undertaken by public or private sector companies by obtaining a generation licence from EMRA. EÜAŞ is a state-owned company established to carry out electricity generation activities and owns around 24% of installed generation capacity; Independent power producers own around 73% (Somay et al., 2021).

- **Transmission sector:** TEİAŞ was the monopoly state-owned transmission company and owns all transmission assets. However, from 2013 onward, EPİAŞ (the market operator, a company jointly owned by TEİAŞ, Borsa Istanbul, and private entities) has also been given a transmission licence. EMRA determines the transmission tariff.[38]

- **Balancing and settlement:** EPİAŞ is responsible for operating the day-ahead market, the intraday market, and the YEK-G market.[39] TEİAŞ operates the balancing power market and the ancillary services market (Somay et al., 2021).

- **Distribution sector:** All 21 regional distribution companies are operated by private entities, though transmission assets are owned by TEDAŞ. EMRA determines the distribution wheeling tariff. In 2013, distribution companies and supply companies were legally unbundled.[40] Contestable consumers (called 'eligible' consumers) are allowed to choose their supplier, while those below the limit ('non-eligible') are supplied by their incumbent supply company with their tariff set by EMRA. The threshold to be eligible has been lowered consistently and has declined from 9,000 kWh of annual consumption in 2003 to 1,000 kWh in 2023 (PwC, 2023; Somay et al., 2021). EMRA licences expire upon the insolvency of the licence holder.

9.6 Performance

Improvements: As per the World Bank's ESMAP (2015), the distribution companies made the necessary technological improvements (SCADA and GIS, improved metering, billing, and maintenance systems) to improve operations and meet the loss reduction targets and service quality standards set by the regulator. Electricity theft was reduced, payment collection rates increased to 95%, and supply interruptions were reduced. In the wholesale electricity market, the number of participants has been increasing throughout. In the generation sector, 74% of the new capacity addition between 2002 and 2015 came from the private sector (Bhatia & Angelou, 2015).

Participation: One of the interesting aspects of the reforms in the Turkish electricity sector is the role of the domestic private sector in it. While foreign firms have invested in the Turkish electricity sector, the bulk of the investment has come from Turkish private companies and their Turkish financiers. Bhatia & Angelou (2015) in their review of Turkey's reforms, refer to the three-way collaboration between the government, the state-owned energy companies, and Turkish investors as the 'secret' of the success of the reforms in Turkey.

Competition and choice: From 2009 onward, there was a surge in eligible consumers exercising their choice and purchasing electricity directly from private suppliers, peaking in November 2017, with 4.7 million consumers participating. However, from 2018 onward, several of these bilateral contracts had to be cancelled since the suppliers could not meet their obligations faced with increasing electricity prices (PwC, 2023).

Supply security and prices: Turkey remains dependent on imports of natural gas and oil (although the recent discovery of Black Sea gas could lower this dependence). Regulated retail electricity prices were suppressed by EMRA in 2021 to curb inflation in the country. However, the prices were allowed to rise in

[38] Turkey also has interconnections with all its neighbouring countries (Georgia, Armenia, Azerbaijan, Iran, Iraq, Syria, Bulgaria, and Greece) since the 1970s (Bhatia & Angelou, 2015).
[39] The YEK-G market is for electronic certificates for electricity generated through renewable sources.
[40] The distribution companies separated their carriage function (now to be carried out by the distribution company) from their content function (now to be carried out by the incumbent supply company).

2022, and they increased substantially. Electricity and gas prices were raised by EMRA in September 2022 by 20% for households and 50% for industries (Reuters Staff, 2022). In March 2023, ahead of the Presidential elections, the incumbent President Erdoğan announced price cuts in electricity and natural gas for households.[41]

Turkey has successfully privatised its electricity generation and distribution segments, with much of the interest coming from national private players. However, it remains susceptible to international fuel price movements (and shocks, such as those following the Russia–Ukraine conflict).

10. Findings and Lessons

In this paper, we analyse the implementation of distribution reforms in developing countries, focusing on different ownership options. Our examination of the case study countries' experiences leads to the following findings:

- **Motivation:** The World Bank and similar donor organisations have been the primary drivers of reforms in the electricity sector in our case study countries in Africa, with many reform efforts tied to investments/funds, which were required by the countries. It was hoped that the poor performance of utilities in Africa—especially concerning the need to increase access, reduce losses, and improve quality—would be addressed through reforms. In Brazil and Argentina, access levels were high (at 87.5% and 92%, respectively, in 1990) by the time reforms were implemented. Macroeconomic crises were the triggers for reforms in these two countries. The two Asian case studies offer motivations that are similar to each other but different from the other regions in our case studies. While both the Philippines and Turkey were emerging from economic crises, there was an added governmental push to introduce electricity reforms in the country.

- **Participation:** In the African case studies, for both privatisation and management contracts, it has mostly been foreign companies from outside Africa and/or Eskom—the South African government-owned company—that have participated and won contracts and concessions. Brazil and Argentina saw investment from several foreign firms as well as local firms. This is similar to the experience in the Philippines. In Turkey, however, it was Turkish private companies that invested in the privatisation effort.

- **Implementation:** In the case study countries in Africa, reforms have focused on allowing private players in the generation segment, unbundling (in some cases) the state-owned integrated utility, and different modalities for operating the distribution business. The model followed by Latin American countries has seen far-reaching reforms. In particular, a focus on creating a functioning wholesale market and creating contestable consumers (without opening the market to full retail competition right away), and strict separation of ownership. However, political turmoil and economic crises mean that these reforms can be changed, tweaked, or undermined by different governments. In the Asian case studies, the two countries have gone for different models of privatisation. While in Turkey, ownership of assets remains with the government, private players have long concessions to operate and manage the assets. In the Philippines, this model has been used for the transmission sector, but full privatisation exists for both generation and distribution.

- **Performance:** In the African case studies, management contracts and concessions have generally been very good at increasing collection efficiency and bringing down commercial losses. Contract incentives and government support for loss reduction have seemingly allowed for these two objectives to be met, usually in good time. In many countries, this was accompanied by the dismantling of cross-subsidies and an increase in tariffs to move towards cost-reflective tariffs. However, with few exceptions, the contractors and lessees are not able to improve the reliability of the grid or make sufficient investments into the grid to improve access. In Tanzania and Uganda, this was also a function of the contract design, which did not give grid reliability sufficient weight. These problems, however, stem not just from the distribution segment but find their source in the upstream generation and transmission segments, too (for example, an overreliance on hydropower has left countries exposed

[41] The President announced free natural gas for households of 25 cubic metres monthly for a year from the newly discovered Black Sea gas reserves, estimated to be around US$500 billion (Gavin, 2023).

to drought). Thus, service quality and technical losses have been slow to improve.

- **Renewal of contract:** In most cases, the contract not being renewed is as much about the political situation in the country as it is about the actual performance of the contractor/lessee. Opposition parties bring up issues of lack of transparency in contract negotiation as well as the contract payments, which are seen as too high. In Kenya, tensions between the board and staff led to the management contract with Manitoba Hydro not being renewed. Thus, the performance of the private players needs to be seen individually but also within the larger macroeconomic situation in many of the countries (drought, currency depreciation, loan repayment, etc. need to be considered).

The analysis of different ownership models across our eight case study countries shows that the effectiveness of these models is highly dependent on the specific context and regulatory framework of each country. Therefore, it is crucial for India to consider its unique circumstances and challenges when devising strategies for reforming its electricity distribution sector. However, our analysis holds lessons for countries looking to undertake reforms, such as India.

1. **Contract Design:** The use of management contracts and concessions in Africa shows that it is possible to design contracts that can increase collection efficiency and bring down commercial losses. It is important to design the contracts in such a way that the incentives align with the targets. In addition, contractors require government support to perform, as was seen in the case of Uganda, Tanzania, and Kenya. However, it is equally important in the design of the contract that the parameters used to measure performance are well understood and accepted so that any disagreements between base figures and performance/achievement can be avoided. In India, this can be seen in the new privatisation contracts designed by the Odisha State Government and Tata Power (A separate study by CSEP on Odisha is forthcoming with details).

2. **Unbundling and Ownership Separation:** Stricter unbundling requirements promote competition and a level playing field among market players. While most of the vertically-integrated state-owned utilities have been unbundled in India, the unbundling has been a functional unbundling, wherein firms have created different units or companies for handling different segments of the electricity value chain—generation, transmission, and distribution—under the same ownership. This also holds true for private electricity companies in India. Vertical integration has led to concerns regarding market power in countries like the Philippines. In order to promote competition in the industry as well as ensure a level playing field for all players, especially concerning essential transmission facilities, India could look at examples from Brazil and Argentina on implementing stricter unbundling requirements.

3. **Importance of Diversification of the Energy Mix:** Avoiding over-reliance on any one resource for electricity supply is important, and the experience with hydropower and drought in countries in Africa and Latin America offers a clear example of this problem. This becomes even more important when one considers climate change–induced uncertainties. Kenya has been successful at doing this, having invested in geothermal energy, and diversified away from hydropower.

4. **Power Procurement Planning:** Taking a long-term perspective and planning power procurement is an important lesson that comes out from many of our case studies. In many cases, unreasonably priced generation capacity had been contracted (with allegations of graft) in a hurry, such as in Tanzania, but also the Philippines. When done properly, it can result in the optimal amount of generation capacity addition, which can meet the energy demand. Kenya, where the Energy Regulatory Commission has undertaken a multi-stakeholder LCPDP exercise since 2009, could be one possible model.

5. **Electrification and Access:** In all our case study countries, increasing access has come about through dedicated government programmes with sustained financing and set targets. Distribution companies, especially private companies, are not incentivised through their regular business practices to connect consumers in poor or far-flung areas, but can be useful partners in government programmes looking to do the same.

6. **Regulatory Independence:** Ensuring regulatory independence through legislative safeguards and

financial autonomy enhances credibility. While the electricity regulators in our case study countries are appointed by the government, there are many countries where the legislature also needs to sign off on the appointments. Similarly, staggered appointments (as in the case of Brazil's ANEEL), such that all the regulators are not appointed by the same government, as well as limited reappointments, are used to limit government involvement in the regulatory authority. Finally, the design of the regulatory institutions looks for funding sources beyond the government budget such that there is some financial autonomy of the regulatory institution.

7. **Independent Utility Boards:** Our findings suggest that creating independent boards can enhance transparency and operational autonomy, though challenges of political interference persist. In countries with a single state-owned distribution company, independent boards are seen as a means of bringing in the transparency of functioning as well as providing a buffer from the government. For example, Kenya and South Africa have put in place boards with a majority of independent non-executive members. This has been done to put some distance between the government and its goals and the operations of the state-owned enterprise. However, the experience with them has been mixed, since guaranteeing actual independence of the board in its functioning has been difficult. Political interference is frequent, even in cases where the government is not the sole shareholder, such as in Kenya. Corruption allegations against board members also come up from time to time, with each new government overhauling the boards—ostensibly to show their commitment to rooting out graft.

8. **Competition in Electricity Distribution:** Our case study countries in Latin America and Asia introduced competition in electricity distribution in a step-by-step manner, wherein the distribution company became a common carrier business providing open access to various electricity supply companies, but also served as the supplier for consumers below a certain electricity demand (referred to as 'captive consumers') at the regulated tariff. Consumers above the set demand level could choose their electricity supplier (these consumers are referred to as 'contestable consumers' or 'free consumers'). Contestable consumers could choose to not exercise their rights and instead stay with their local distribution company. The demand limit in these countries has been consistently decreased, allowing more consumers to become contestable. This system not only protects small consumers from negotiating electricity rates with suppliers, as they get supplied at regulated tariffs, but also provides other consumers the choice to find rates and suppliers that work best for them. This contrasts with India where, in the absence of legislation separating wires and supply, multiple electricity distribution licences are being contemplated, which could result in duplication of network assets.

9. **Not Exempt from Politics:** None of the countries in our case studies have managed to isolate their electricity sector from politics. This phenomenon, however, both opens and closes certain possibilities. When governments are committed to reforming the electricity sector, it is possible to address the problems of the sector comprehensively, including setting up institutions that are buffered from the government. In both the Philippines and Turkey, the governments backed the implementation of reforms, which made the reform effort successful. In our African case studies, government support allowed the regulatory commissions to increase tariffs to move towards more cost-reflective tariffs.

10. **Thinking About the Whole Sector Structure:** Finally, before any changes are made, it is important to consider the structure of the sector that we want. As several of our case studies show, trying to reform a single segment of the electricity sector without addressing the weaknesses of other segments is unlikely to lead to sustained, desired outcomes. This is especially true in the case of electricity distribution, since these are the end-of-line entities, which are affected by the problems of all other upstream segments.

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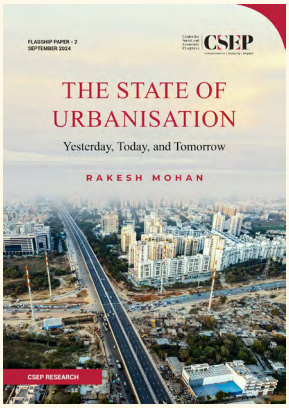
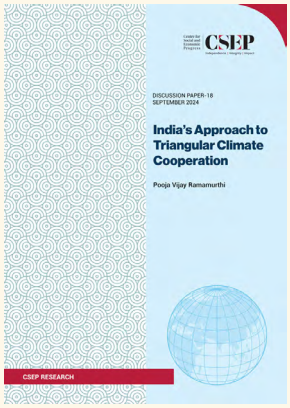
About the author

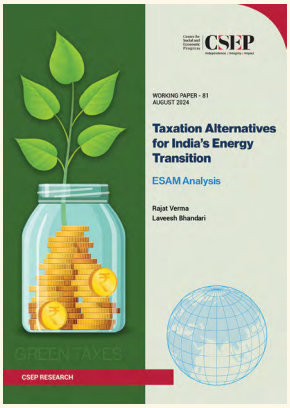
Saumya Vaishnava is a PhD student at the Pennsylvania State University where she studies the Indian energy sector. Her dissertation project examines the governance and operation of the electricity sector in Mumbai, analysing the political economy of electricity supply in the city and examining the role of infrastructure, private capital and state institutions in the sector.

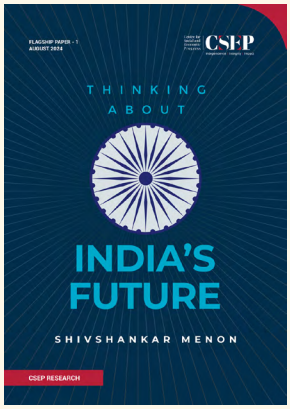
Saumya was a Visiting Fellow at CSEP in the summer of 2023. She has previously worked as a research analyst with Prayas (Energy Group) in Pune and PRS Legislative Research in New Delhi. She has a masters in Economics and Public Policy from Sciences Po, Paris, and a bachelor's degree in Economics from Saint Xavier's College, Mumbai.

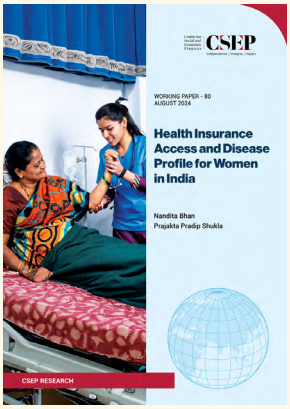
Other publications

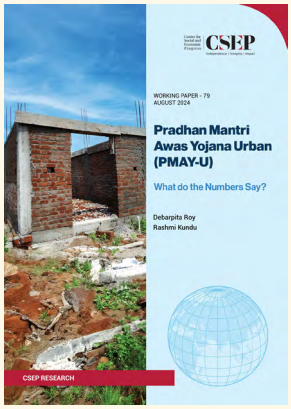


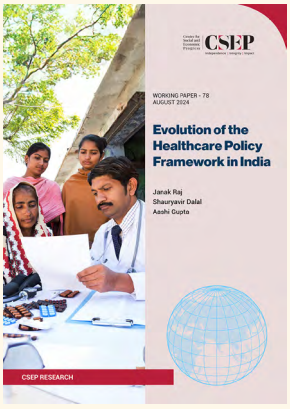


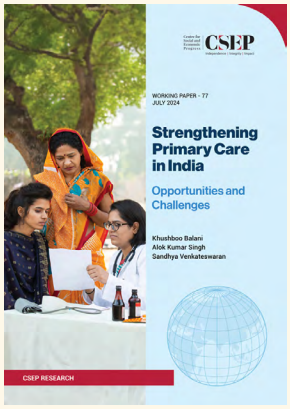


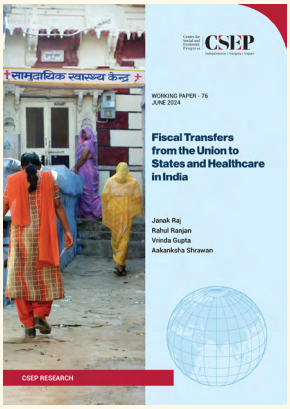


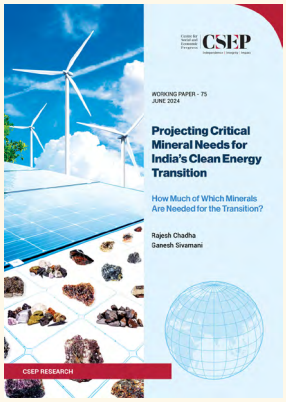


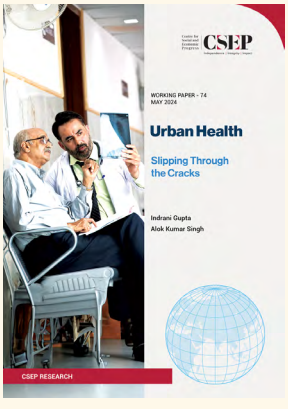


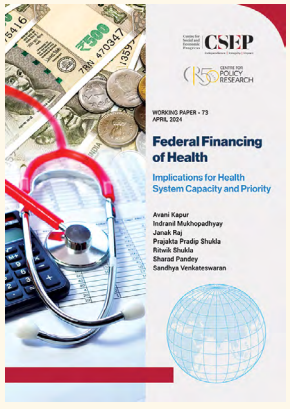


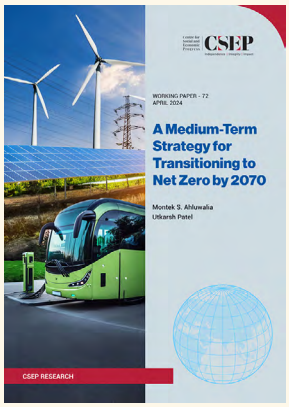


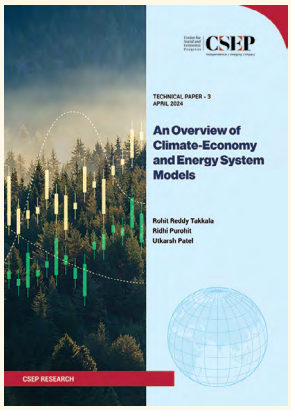


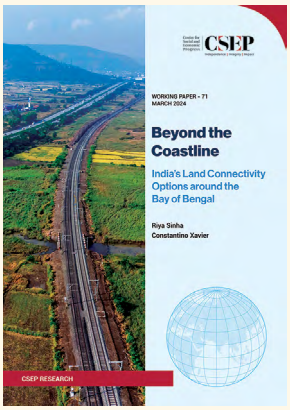


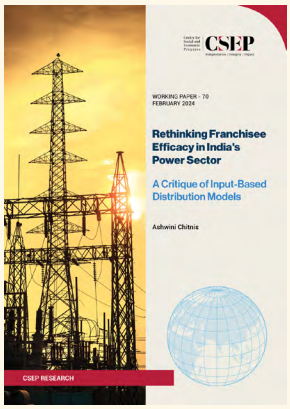












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