



RESEARCH REPORT

PRIVATIZATION OF PAKISTAN'S POWER UTILITY SECTOR:

OPPORTUNITIES AND THE LESSONS LEARNT

AUGUST 2024

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RESEARCH REPORT

Privatization of Pakistan's Power
Utility Sector: Opportunities and
the Lessons Learnt

August 2024



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Along with an extensive desk review, the study also drives its recommendations from key informant interviews conducted with subject experts from:

- National Electric Power Regulatory Authority (NEPRA)
- Private Power and Infrastructure Board (PPIB), Ministry of Energy (Power Division)
- National Transmission and Despatch Company (NTDC)
- Central Power Purchasing Authority (CPPA-G).
- K-Electric
- Pakistan's distribution companies (DISCOs)
- Competition commission of Pakistan
- Pakistan Renewable Energy Coalition (PREC)
- The World Bank Group.
- International Monetary Fund (IMF)

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Abstract

The privatization of Pakistan’s power utility sector represents a critical juncture in addressing the country’s ongoing energy crisis, marked by inefficiencies, financial losses, and escalating circular debt. This report explores the opportunities and challenges associated with privatizing Pakistan’s power distribution companies, with a focus on lessons learned from previous privatization efforts, particularly the case of K-Electric. The study underscores the potential benefits of privatization, including enhanced operational efficiency, improved service delivery, and increased investment in infrastructure and technology. Effective privatization could stimulate economic growth by reducing circular debt, fostering competition, and modernizing the power sector. Key findings highlight that privatization, if executed with a strategic and well-regulated approach, can address Pakistan’s 3-E crisis—energy, economy, and environment. The report identifies several critical factors for success: establishing a robust regulatory framework, ensuring fair competition, and implementing phased transitions. Insights from K-Electric’s post-privatization performance indicate improvements in operational efficiency and service quality, although challenges such as tariff management and consumer protection remain. The report also emphasizes the importance of aligning privatization with broader economic and environmental goals, including compliance with the Carbon Border Adjustment Mechanism (CBAM) and supporting green supply chains. Policy recommendations include developing a comprehensive regulatory framework, fostering public-private partnerships, and addressing power theft through stringent protocols. Additionally, the report advocates for phased privatization to allow for adjustments based on early experiences and stresses the need for transparent consumer protection mechanisms. In conclusion, the privatization of Pakistan’s power sector offers significant opportunities for reform and growth but requires careful planning and implementation to achieve sustainable and equitable outcomes.

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9239212

WATTHOUR METER kWh

0 0 0 5 3
1000 100 10 1 0.1

15(45)A

TYPE	IPG	1 PHASE 2-WIRE
CLASS	2.0	DATE 2020
230V	50Hz	400rev/kWh

SECTION-I:

Introduction

1.1. Background

In the era we live in, electricity provision is a cornerstone of economic development for any country, making the efficiency, affordability, and reliability of a power system indispensable for sustainable growth. Globally, power sector reforms, particularly through privatization, have been massively pursued to enhance operational efficiency and create market-driven systems.

Privatization in the power sector has profound macroeconomic implications, potentially reshaping the economic landscape. If implemented effectively, privatization can lead to significant improvements in efficiency and productivity of the organization (Chiamaka and Samper, 2024). This can result in better resource allocation, modern infrastructure investment, and the adoption of advanced technologies, thereby boosting economic growth and service delivery. Improved efficiency and reliability can, in turn, stimulate industrial and agricultural productivity, contributing to GDP growth. Moreover, privatization can foster market competition, leading to better services and lower prices for consumers, which encourages continuous improvement among service providers. However, without a robust regulatory framework, there is a risk of creating private monopolies that could engage in anti-competitive practices, negating the benefits of competition (Oguegbe, Okeke, and Oguegbe, 2024).

In Pakistan, the power sector's persistent issues have significantly contributed to the country's economic challenges, with circular debt nearing PKR 2.9 trillion and financial losses of over PKR 500 billion in FY 2023-24 due to inefficiencies of government owned power distribution companies and power theft (Profit Pakistan Today, 2024).

The government-owned power distribution companies reportedly have a significant share in burgeoning power sector's circular debt due to their inefficiencies and lack of appropriate governance framework. However, despite numerous discussions, the privatization of power distribution companies in Pakistan has seen limited action, except for the privatization of K-Electric in 2005 (Sustainable Development Policy Institute, 2014). As of late 2023 and mid-2024, the inefficiencies and losses in the government-owned power distribution sector have massively escalated, prompting renewed focus on privatization, including recommendations from the International Monetary Fund (IMF). Privatization is anticipated to address systemic inefficiencies, increase competition, and introduce new capital and expertise, ultimately enhancing consumer services (Dawn, 2024; CADTM, 2023).

For Pakistan, currently facing a severe fiscal crunch, privatization of power distribution companies may offer significant fiscal relief by alleviating circular

debt and reducing financial losses. The fiscal space generated could be redirected towards other development activities, supporting broader economic stability and growth.

Given the opportunities and challenges, a comprehensive evaluation of potential privatization in Pakistan’s power sector and its readiness is necessary to set the direction right. This includes analyzing K-Electric’s post-privatization performance to assess improvements in operations and innovation, helping to identify best practices and mitigate potential risks in future privatization efforts.

1.2. Global Examples of Privatization in the Power Sector

The concept of privatization was coined around the 1980s, before which the process was mainly recognized as ‘denationalization’. However, over the years, this has been identified as one of the critical reform measures to address issues ranging from management, legal, as well as economic (Campos et al., 2020). Not only the government, but many development finance Institutions (DFIs) such as the World Bank Group and International Monetary Fund (IMF) have identified it to be means of addressing the economic challenges posed to the power sector of under-developed or developing countries.

The basic theory behind privatization has been the increased efficiency in resource allocation and production. While the state-owned enterprises (SOEs) also have other goals such as financial, political, or even cultural stability. The private sector model is generally more productive with profitability being the central and key determinant of the development, demand energy efficient technology. This approach also boosts the economy, thus leading to socio-economic and in some cases environmental benefits for the community. For the power sector, the key targeted reform priorities that are aimed through privatization are depicted in Figure 1.

Social	Economic	Technical	Other
<ul style="list-style-type: none"> • Better energy access • Improved power reliability • Consumer satisfaction • Better job creation 	<ul style="list-style-type: none"> • Cost minimization • Investment attraction • Fiscal Relief • Economic Growth 	<ul style="list-style-type: none"> • Operational efficiency • Technological Growth • Regulatory Improvements • Innovation and Growth 	<ul style="list-style-type: none"> • Better Governance • Accountability • Environmental Aspects

Figure 1 | The enabling factors for privatization of power sector [Source: figure designed by authors based on data collected from (Campos et al., 2020; Manjo, 2024; Esan et al., 2024)]

Globally however, while the aim of privatization and liberalization of power sector is known, it has not always led to the desired outcomes in different economies. The case is entirely subjective, with country or regional dynamics and regulatory, financial, and political landscape playing a key role. A comprehensive study conducted by Nagayama from data collected from 78 countries between 1985-2003 provides varying results (Nagayama, 2009). The results from many countries indicated that despite the expectation of reduction in electricity prices after market liberalization, electricity prices increased. Along with tariff increase, this change also impacted different sectors of the economy, leading to unfavorable economic conditions for the country. The study conducted on the impacts of liberalization reforms in Japan revealed that despite initial predictions of technological improvements in the power sector, the reduction in efficiency was observed in the power distribution sector, mainly owing to the cross-subsidization measures by the companies between a regulated and an unregulated market. Another study conducted by Kundu (2011) for Orissa (India) revealed that after the electricity sector privatization, the price for electricity was increased for rural consumers, driven by the withdrawal of subsidies and the increase in transaction costs (Kundu and Mishra, 2011). The withdrawal of subsidies for protected consumers was also observed as a challenge in this case.

On the other hand, there have been various proven cases where privatization and liberalization measures have led to positive outcomes. Such as in the case of Chile – the first of countries that initiated the privatization as early as 1980 – where this led to increased investments in the sector, improved efficiency, and reliability of energy supplies (Bauer, 2009). Similarly, the transition of UK in late 90s also led to significant gains, especially the reduction in power prices, efficiency improvements, and mobilization of new investments for technological growth. Then there also has been another class of countries such as Mexico and Philippines where a mixed outcome was observed (Surrey, 2013). While the sector did observe efficiency improvements, the challenges around regulations and prices remained consistent.

Privatization of the power sector has been a significant driver of efficiency and investment across the globe, yet its outcomes have varied widely depending on regional contexts and regulatory frameworks. In the European Union, market liberalization and competition efforts have largely been driven by the unbundling of generation, transmission, and distribution. According to a study by Serena, the EU's electricity sector has seen improvements in efficiency and service quality, with an average increase in efficiency by 15%. However, the impact on prices has been mixed; some member states experienced price reductions of up to 20%, while others saw increases by 5-10% due to varying market dynamics and regulatory frameworks (Serena, 2014).

In the United Kingdom, the privatization and subsequent liberalization of the electricity market, underpinned by robust regulation from Ofgem, have been instrumental in ensuring transparency, market stability, and consumer

protection. Between 1990 and 2000, the UK's power prices for industrial consumers dropped by 25%, while residential prices decreased by 20%. Efficiency improvements were significant, with a 30% increase in operational efficiency across the sector. Ofgem's regulatory oversight has been crucial in maintaining a balance between fostering competition and protecting consumers from potential market abuses (ibid).

Germany's Energiewende policy showcases the critical role of substantial infrastructure investments in successful privatization. This policy has driven investments exceeding €200 billion in grid infrastructure, supporting the integration of renewable energy sources and enhancing system reliability. By 2020, renewable energy sources accounted for 46% of Germany's electricity mix, up from 20% in 2010. This shift not only improved energy reliability but also aligned with Germany's ambitious sustainability goals, reducing carbon emissions by 35% from 1990 levels (Wollmann et al., 2010).

In China, the privatization and reform of the electricity sector included significant incentives for private sector investment, leading to a remarkable increase in renewable energy capacity and market efficiency. By 2020, China had installed over 250 GW of solar and 280 GW of wind capacity, making it the largest producer of solar and wind energy globally. The engagement of the private sector has been pivotal, with renewable energy investments surpassing \$100 billion annually. These reforms have significantly improved market efficiency, with energy production costs decreasing by 15% over the past decade (Chen et al., 2022).

The liberalization of the electricity market in Scandinavia, facilitated by the Nord Pool market, highlights the importance of inclusive stakeholder engagement in privatization processes. Nord Pool's establishment as the first multinational exchange for trading electric power has enabled efficient cross-border electricity trading, increasing market transparency and competition (Greve and Mörth, 2010). The market has seen a 25% reduction in wholesale electricity prices and a 20% improvement in grid reliability since its inception. Inclusive stakeholder engagement has ensured broad support and smoother implementation of market reforms, aligning operations with diverse stakeholder interests and maintaining a fair and efficient market.

California's experience with electricity market liberalization underscores the risks associated with inadequate regulatory oversight during privatization (Basu et al., 2015). The early 2000s crisis, marked by market manipulation leading to shortages and high prices, demonstrated the necessity of strict anti-monopoly regulations. The establishment of the California Independent System Operator (CAISO) and subsequent regulatory reforms restored market stability, with wholesale electricity prices decreasing by 30% and grid reliability improving by 15%. California's case highlights the importance of robust regulatory frameworks in preventing market abuses and ensuring reliable electricity supply (Besant-Jones and Tenenbaum, 2001) .

In Brazil, the challenges of inadequate regulatory oversight during market liberalization led to significant supply issues and blackouts. Strengthening regulatory bodies like the Brazilian Electricity Regulatory Agency (ANEEL) has been essential in addressing these challenges. Since enhancing regulatory oversight, Brazil has seen a 20% improvement in grid reliability and a 10% increase in market efficiency. ANEEL's role has been crucial in ensuring market stability and reliability, demonstrating that effective regulation is vital for the success of privatization and liberalization efforts (Campos et al., 2020).

In summary, the impact has varied across the countries, influenced by various factors ranging from political landscape to community empowerments. Figure 2 summarizes the key determinants of success and challenges observed in a generic overview of the privatization of the electricity sector.



Determinants of Postiive Impacts

- Strong Regulatory Frameworks.
- Economic Stability.
- Prior Sector Reforms and Preparation.
- Government Commitment and Political Will.



Determinants of Postiive Impacts

- Weak Regulatory Framework
- Economic Instability
- Inadequate Infrastructure and Investments in the area
- Regulatory Capture and Corruption
- Lack of Consumer Protection

Figure 2 | *Determinants of Success & Failures for Privatization of Power Sector*

1.3. Scope and Objectives of the Study

In the backdrop of examples, opportunities and challenges of Privatization of power sector globally highlighted above, it necessitates a holistic analysis in Pakistan's context. A comprehensive evaluation is needed that must consider not only the potential benefits, but also the pitfalls and limitations observed in similar initiatives around the world. Such assessment would help identify best practices and potential risks, ensuring that future privatization efforts are strategically planned and effectively implemented to achieve sustainable improvements in the power sector of Pakistan. While analyzing the case of Pakistan, it also puts a focus on conducting an analysis of K-Electric's post privatization period and if it has led to improvements in its operations and innovation.

Key objectives of the paper include:

- To assess the outcomes of privatization of K-Electric as a case study, focusing on key performance indicators such as operational efficiency, financial health, and service delivery improvements.
- To determine the critical factors that have contributed to the positive aspects of K-Electric's privatization, including management practices, investment strategies, and regulatory support.

- Analyze the existing policy and regulatory environment governing Pakistan's power sector and recommend necessary adjustments to facilitate successful privatization efforts to bring competition in the power market.
- To formulate evidence-based recommendations for policymakers and stakeholders to guide the privatization/liberalization process of other power distribution companies in Pakistan, ensuring it is beneficial, sustainable, and inclusive.



SECTION-II:

Status quo and the landscape of privatization in Pakistan

2.1. History of Privatization in Pakistan's Power Sector

The involvement of the private sector in Pakistan's power sector was initiated back in 1980s when the country was facing the significant challenges of demand-supply gap. Through involvement of the world bank group and other development partners, privatization was always envisioned to be a key reform priority for sustained growth. HUBCO was the first private power company that was incorporated back in 1991 for the development of 1292 MW of oil-based power generation project. In 1991, the privatization commission of Pakistan was also established with an aim of privatizing the state-owned companies (Asian Development Bank (ADB), 2007). In 1992, when Pakistan's Water and Power Development Authority (WAPDA) was the leading entity, the government of Pakistan approved its plan for privatizing the power sector, aiming for improved efficiency, and better flow of the investments. In 1994, a power policy was also formulated, enabling the private sector to come and invest in the country. Through this policy, over 19 Independent Power Producers (IPPs) were established to generate about 3050 MW of power. The IPPs were to bring capacity on-line and to determine the power purchase price (Sustainable Development Policy Institute, 2014).

The results of this privatization policy and the involvement of private sector have however, remained under discussion throughout, especially in the early 2020s when the energy sector came under the vicious circle of economic crisis, resulting from constantly increasing circular debt. High tariffs, dollar indexation, high reliance on fossil fuels, their locations far from the load centers and especially the nature of contracts were some of the key reasons that led to condition where the national exchequer has been drained over the years. The absence of a designated regulatory authority in the early years after policy remained as significant gap, which was however later addressed through the formulation of Pakistan's National Electric Power Regulatory Authority (NEPRA) in 1997.

Being a regulatory authority, NEPRA was given various responsibilities, especially preserving the interest of consumers. Later in 1998, the WAPDA Amendment Act was introduced that led to formulation of PEPCO, eight distribution companies (DISCOs), three GENCOs, and Pakistan's National Transmission and the Dispatch Company (NTDC). It was then when it was also decided by the government that it plans to privatize the Karachi Electric Supply Company (KESC).

2.2. Historical Landscape of KE and the need for its privatization

In 1913, KESC was incorporated as a private limited company, at the time of partition its generation capacity was around 35 MW. In 1952, The Government of Pakistan nationalized KE in order to facilitate the rapid increase in power demand following a surge in the population of Karachi. In 2005, KE was privatized, with the government retaining a minority stake and the majority stakes of the company were sold to consortium of international partners. During 2013-2014, as part of the company's 100-year celebrations, KESC was rebranded to K-Electric Limited.

The privatization of KESC was driven by various reasons that provides a clear narrative driven by deteriorating financial conditions, operational and management issues as highlighted below ((Sustainable Development Policy Institute, 2014):

- The financial portfolio of KESC kept on deteriorating as it could not generate sufficient finance to meet the constantly increasing demand). This posed significant challenges including but not limited to debt-service obligations, capital, and operational expenses.
- The operational subsidies provided to KESC during the time had to be increased in effort to keep the operations afloat. Further driven by limited investments, the line losses further increased providing an environment which couldn't attract any new investments.
- Low efficiency plants in the fleet Rcould not meet Karachi's increasing demand for power supply.
- Lastly, various parameters indicated that the performance challenges for KESC were also driven by politicization along with over staffing. Lack of coherent organizational strategy also couldn't effectively contribute to addressing the increasing issue of the overdue balance and customer management.

2.3. Post-Privatization period of K-Electric: A Comparative Assessment

Over the past two decades (since 2005), the power sector of Pakistan has evolved along various aspects, ranging from massive expansion in the country power generation capacity (reaching around 43,000 MW) to the increase in the number of consumers (Indicative Generation Capacity Expansion Plan 2024). However, despite these developments, the challenges persisted, even becoming more severe over time. With very limited investments going in the transmission and distribution sector, the challenges around the loss-making DISCOs remained a key issue for the policy makers to address.

Given this context, this section provides a comparative assessment of Pakistan's state-owned DISCOs with KE, critically analyzing the areas where the entity went through positive developments in the post-privatization period.

Since privatization, there have been significant developments at KESC (also known as K-Electric post 2014). This section analyzes them under two different segments: i) Technical and ii) Non-technical aspects. Figure 3 highlights the period of transformation of KE since privatization, highlighting the increase in its customer base, supply capacity, power consumption, and distribution infrastructure.

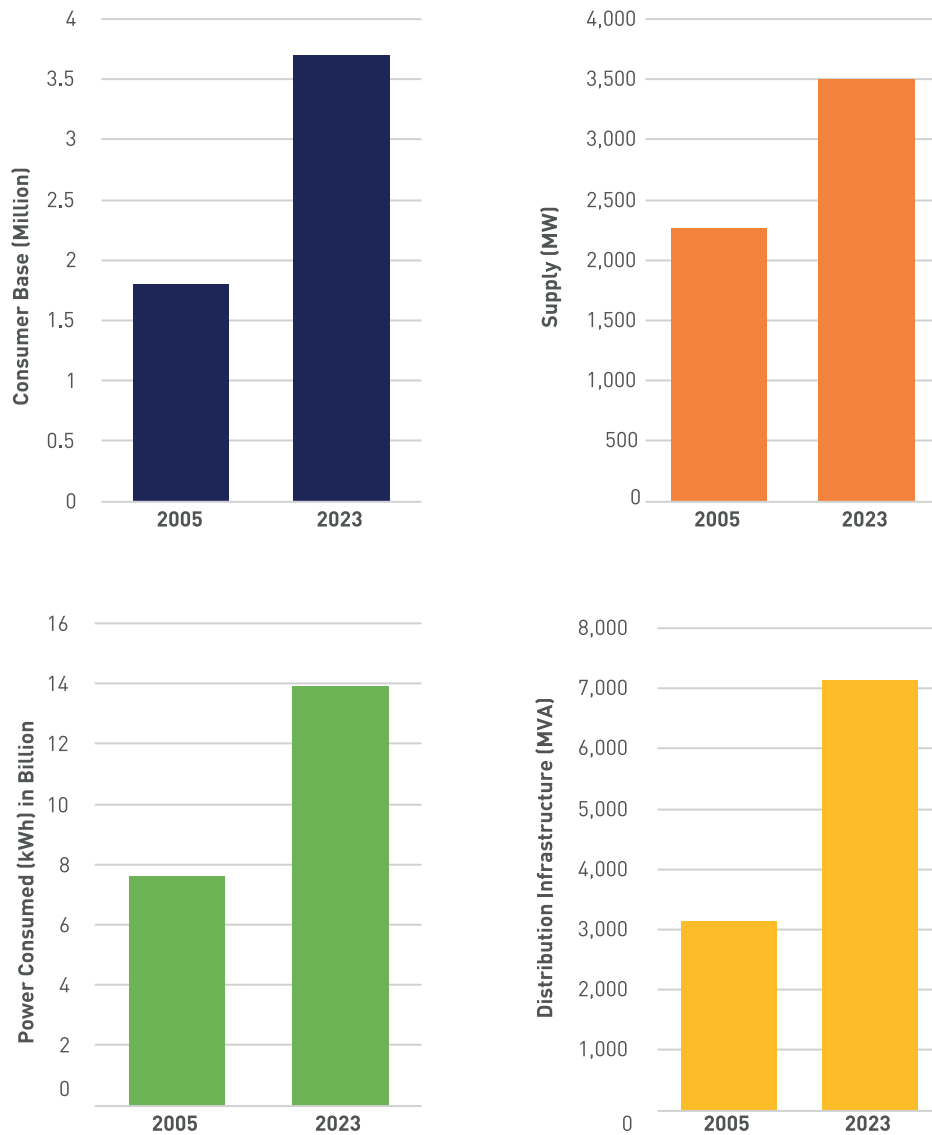


Figure 3 | Transformation of K-Electric post privatization [Source: Figure designed by authors through data collected from (Karachi Electric (KE), 2023)]

While these numbers highlight the growth, to comprehensively evaluate the impact of K-Electric's privatization, it is crucial to analyze whether these advancements have resulted in tangible benefits for consumers and improvements in its technical and management operations. To evaluate, a comparative assessment with other state-owned DISCOs in Pakistan will provide a clearer picture of K-Electric's relative development. By examining these aspects, the aim is to determine if privatization has effectively addressed the longstanding issues that plagued power sector and if K-Electric's progress offers a viable model for other DISCOs in the country.

2.3.1. Technical Parameters

Transmission and Distribution Losses

Transmission and Distribution (T&D) losses represent a critical challenge for Pakistan's power utility sector, leading to substantial financial losses. High T&D losses indicate inefficiencies, leading to increased costs and reduced revenue for power utilities. Reducing these losses is vital for improving financial health, ensuring a reliable power supply, and enhancing customer service. Examining the data from FY 2010-11 to FY 2022-23 reveals the extent of progress made over the past few years by K-Electric viz-a-viz other DISCOs

At the start of 2011, the DISCOs were operating at different levels, ranging from T&D losses as high as 36.9% in the case of PESCO and as low as almost 9.7% in the case of IESCO. KE in 2011 had transmission & distribution losses hovering around 32.2%. Over the years, these values in some cases have substantially improved, mild in others, and even worsened in some cases. PESCO and QESCO for instance have shown a negative trend, with losses further increasing to 37.4% and 26.72% respectively in 2023. Absolute losses of all DISCOs are indicated in Figure 4, which further indicates that the highest improvements of T&D losses were observed in the case of KE where the value reduced from 32.2% to around 15.27% in 2023 improving beyond NEPRA's benchmark. This indicates a percentage change of 52.6%, the highest among all DISCOs. Apart from these end-year numbers, KE witnessed a continuous reduction in T&D losses, decreasing to 25.3% in FY 2013-14, 23.69% in FY 2014-15, and further down to 19.9% by FY 2018-19. This marks a success in operational efficiency, driven by strategic investments and better management practices.

It is pertinent to mention that law and order situation in different regions significantly affects the T&D loss ratio and despite Karachi's challenging law and order situation, T&D loss in KE's territory is the most improved.

Along with other parameters, this can also be attributed to strategic investments in infrastructure, including the implementation of Advanced Metering Infrastructure (AMI), upgrading of transmission lines, and modernization of grid management systems by K-Electric. These investments not only helped in reducing technical losses but also in curbing power theft, a significant contributor to non-technical losses.

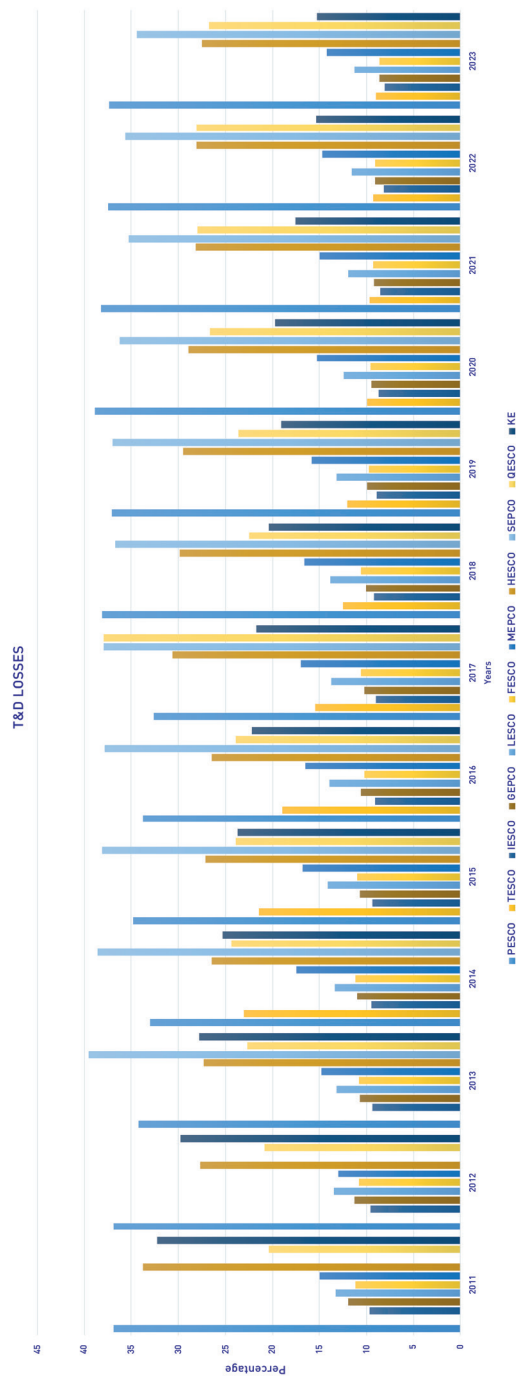


Figure 4 | Transmission and Distribution Losses (%) from 2011 to 2023 [Source: Figure designed by authors through data collected from NEPRA State of Industry Reports]

Recovery Ratios

The recovery ratios are a measure of the financial health of power distribution companies reflecting the percentage of billed amounts successfully collected. Effective recovery management is crucial for maintaining financial stability and operational efficiency, as it directly impacts the company's ability to invest in infrastructure and improve service quality. Figure 5 highlights the trend of recoveries of different DISCOs from 2012-23.

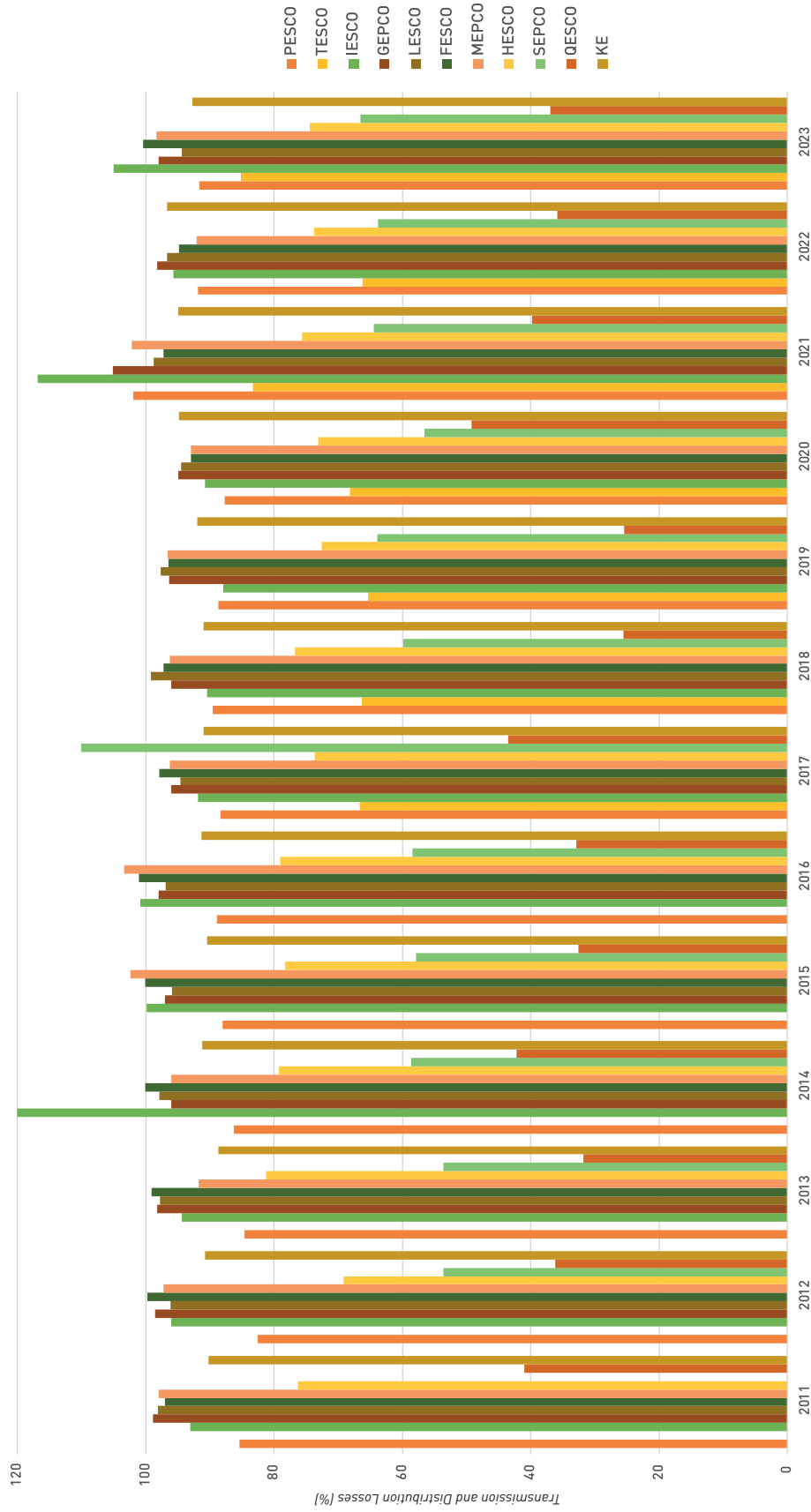


Figure 5 | Trend of Recovery Ratios of DISCOs and KE from 2011-23 [Source: Figure designed by authors through data collected from NEPRA State of Industry Reports]

Figure 5 indicates the ongoing challenges across various DISCOs, indicating the progress in billing and collection systems. In FY 2011-12, five state owned DISCOs and KE were operating at above 90% recovery levels (GEPCO with highest value of 98.8% and QESCO with the lowest value of around 41%). KE at that time had a recovery value of 90.17%. Over the years, most of the DISCOs have maintained similar status, with QESCO being the only entity where the recovery ratio was further reduced (despite having a very low recovery in 2012).. KE during this the given period maintained a stable recovery ratio going as high as around 97% in 2022 with slightly reduction to 92.76% by 2023 mainly on account of unprecedented inflationary pressure and successive upward revisions in the consumer tariff by the Government, consequentially impacting the consumers' propensity to pay.

However, the recovery numbers as highlighted above do not necessarily indicate the level of improvements and innovations put in by the respective entities. Recovery ratios can vary significantly between regions, with larger and more densely populated areas facing more challenges compared to smaller or more manageable regions. For instance, in the case of QESCO, the recovery ratio is very low given the operational limitations and financial challenges of QESCO, political instability, billing inefficiencies, and weak enforcement measures. Similarly, in expansive areas like Karachi, the complexities of managing a vast customer base with unplanned mushroom growth, contributing towards power theft, and addressing diverse billing issues can make achieving high recovery ratios more difficult. This disparity highlights the impact of regional characteristics on revenue collection performance and underscores the need for tailored strategies to address recovery challenges in different contexts.

Predominantly stable recovery numbers of KE can be attributed to several strategic initiatives. The implementation of automated billing systems significantly reduced errors and improved efficiency in bill processing. KE also invested heavily in customer service improvements, making it easier for customers to understand and pay their bills, and implementing more effective follow-up procedures for overdue accounts. Additionally, KE introduced stringent collection practices, including better tracking of payments and more robust methods to address non-payment issues. Moreover, K-Electric has continued to establish customer facilitation camps, establish an alliance with almost all leading payment partners to facilitate its consumers and enhance its recovery.

System Average Interruption Frequency Index (SAIFI)

The System Average Interruption Frequency Index (SAIFI) is a critical measure of the reliability of electricity supply, indicating the average number of interruptions that a customer would experience. High SAIFI values reflect frequent outages and poor service reliability. By analyzing SAIFI, utilities identify areas needing improvement, enhance maintenance practices, and implement strategies to reduce interruptions. Table 1 highlights the trend of SAIFI from 2011-23.

Table 1 | Overview of SAIFI values from 2011-23 [Source: Table developed by authors through data collected from DISCOs performance Evaluation Reports]

Year	IESCO	PESCO	GEPCO	FESCO	LESCO	MEPCO	QESCO	SEPCO	HESCO	K-Electric
2011	0.41	238.8	25.29	38.63	39.29	185.52	164.98	0	1501.6	34.9
2012	0.6	323	27.77	59.4	29.4	185.3	156.08	341.4	770.3	33
2013	0.62	341.5	27.14	56.8	50.57	149.7	153.8	4177.7	730.37	31.3
2014	0.05	316.5	10.52	35.4	78.04	201.5	144.95	251.5	229.9	24.71
2015	0.036	315.4	10.41	46.54	52.49	177.61	112.58	227.96	202.3	22.21
2016	0.03	261.65	35.44	32.41	45.79	203	107	216.71	184	20.52
2017	0.029	160.6	3.26	39.99	37.44	235	96.92	601.37	188.4	19.6
2018	0.04	170	30.97	38.87	32.92	316.22	95.18	568.59	180.74	17.55
2019	0.05	189.01	27.13	36.86	30.19	369.159	97.98	516.37	170.86	28.95
2020	0.06	187.93	25.64	35.65	33.03	375.98	99.12	478	162.85	27.56
2021	0.05	193.07	24.78	35.33	34.66	471	97.96	441.04	137.1	28
2022	20.56	188.92	23.02	35.2	32.86	43.94	97.11	410.7	134.05	25.95
2023	17.98	162.08	18.35	31.49	29.13	28.92	86.39	98.55	114.37	25.35
Avg.	3.1	234.5	22.3	40.2	40.4	226.4	116.2	640.8	362.1	26.1

In 2011, the SAIFI values across the DISCOs varied substantially with IESCO undergoing the least interruptions of around 0.41 and HESCO with highest value of around 1501. The average value trend over the years has depicted a similar state with IESCO observing lowest average interruptions during this period (3.1) and SEPCO and HESCO with values of 640.8 and 362.1 respectively. After IESCO and GEPCO, KE has maintained the most stable state with an average value of 26.1.

System Average Interruption Duration Index (SAIDI)

The System Average Interruption Duration Index (SAIDI) measures the total duration of interruptions for an average customer during a given period, reflecting the average outage time. High SAIDI values indicate prolonged outages and poor service quality. Table 2 highlights the varying SAIDI values for the distribution utilities.

Table 2 | Overview of SAIDI values from 2011-23 [Source: Table developed by authors through data collected from DISCOs performance Evaluation Reports]

Year	IESCO	PESCO	GEPCO	FESCO	LESCO	MEPCO	QESCO	SEPCO	HESCO	K-Electric
2011	22.6	19535.0	317.1	21241.0	3469.4	15896.0	13419.0	0.0	1035.6	2191.0
2012	37.5	28189.0	291.6	1321.0	2610.8	0.0	12810.0	18233.0	23990.0	1858.0
2013	34.8	29570.0	263.2	1250.0	4615.7	12813.9	12635.0	4799.9	21204.0	1790.4
2014	1.7	27946.0	13.1	1137.0	11868.1	17704.6	11868.1	2442.7	16678.0	1495.3
2015	1.0	27934.9	13.2	2682.6	3010.3	15677.6	7506.8	2141.4	10642.7	1330.3
2016	0.8	24927.1	59.5	1714.0	2926.3	17592.0	7290.0	1879.4	12623.0	1210.0
2017	0.8	14643.0	55.0	1532.0	5595.6	20411.3	8310.4	5666.0	12799.1	1142.5
2018	0.7	16222.8	53.7	1951.4	4338.2	26822.4	8287.7	4397.4	12292.6	1451.4
2019	1.3	16696.5	45.2	1628.0	3538.9	31419.3	8402.4	4403.5	10937.7	2950.2
2020	1.4	14924.4	42.4	1331.1	3593.7	31920.9	8375.9	4095.0	9751.0	2655.0
2021	1.4	14821.0	40.3	1252.7	3821.8	39733.0	8176.2	3893.3	7852.2	2564.7
2022	1027.0	14518.0	39.0	1243.2	3747.9	2794.0	8015.2	3593.3	7558.0	1963.3
2023	1006.3	12265.5	32.2	1031.6	3550.1	3633.7	7020.5	1319.2	6270.8	1911.7
Avg.	164	21168	97.3	3024	4360	18186	9393	4374	11818	1885

The high SAIDI values severely impact residential, industrial and commercial activities, causing significant inconvenience and economic losses. Over the years, PESCO has witnessed the highest SAIDI values, followed by MEPCO and HESCO. The lowest values are observed in the case of GEPCO, followed by IESCO and KE.

2.3.2. Health & Safety Performance

In the power sector, health and safety performance remains one of the critical factors to analyze when it comes to evaluating the overall effectiveness and sustainability of a company's operations. This performance indicator not only reflects the organization's commitment to protecting its stakeholders but also influences operational reliability, regulatory compliance, and public trust.

In this arena as well, K-Electric has significantly improved its performance. As per the recent report by NEPRA "HSE Performance Report 2024", K-Electric has maintained outstanding performance in all its segments including transmission, generation and distribution.

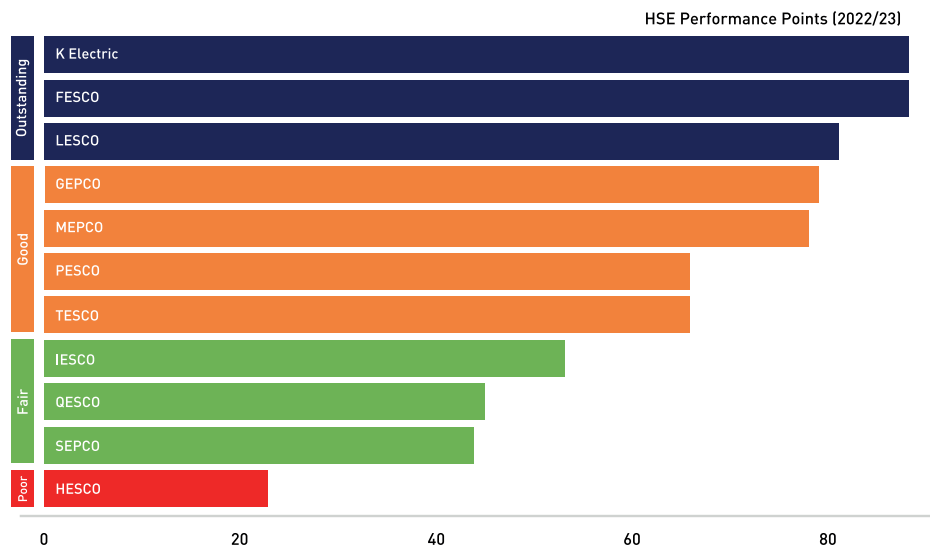


Figure 6 | HSE Score of Distribution companies [Source: HSE Performance Report of NEPRA]

Figure 6 showcases that K-Electric has secured the highest ranking in terms of distribution safety followed by FESCO, and LESCO. While GEPCO, MEPCO, FESCO, and TESCO has managed to receive good rating from the regulator followed by IESCO, QESCO, and SEPCO which have received fair rating. HESCO on the other hand, received poor rating on its health and safety performance.

2.4. Quality of Service Parameters: Innovation, Digitalization, and Decarbonization

As the power sector landscape in transmission, distribution and generation services evolves, quality of service parameters is increasingly influenced by advancements in innovation, digitalization, and the imperative drive towards decarbonization. The growing demand for reliable, efficient, and sustainable energy solutions has intensified the focus on these areas. Innovations such as smart grids and advanced metering infrastructure (AMI) are transforming power distribution, enhancing service delivery and operational efficiency. Digitalization further streamlines processes, from billing to maintenance, enabling utilities to better manage energy distribution and improve customer engagement. These advancements are crucial for adapting to the increasing complexity of modern energy systems and meeting rising consumer expectations, especially for a country like Pakistan.

The drive towards decarbonization is also reshaping the energy sector, with a strong emphasis on reducing carbon emissions and transitioning to cleaner energy sources. Initiatives like the Carbon Border Adjustment Mechanism (CBAM) underscore the importance of integrating decarbonization into energy policies and practices. This shift involves not only adopting renewable energy and improving energy efficiency but also leveraging digital technologies to

monitor and manage environmental impacts. As decarbonization becomes central to climate strategies, its impact on quality-of-service parameters will grow, driving the need for utilities to align their operations with regulatory requirements and sustainability goals.

Despite the significance and importance as highlighted above, the developments around innovation and digitalization in the T&D sector have been limited and uneven with few initiatives taken over the years, driven by the challenges highlighted in Figure 7.

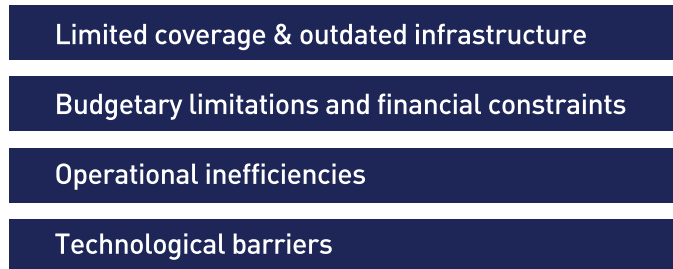


Figure 7 | Underlying challenges behind limited progress in service delivery for power distribution across Pakistan

Nonetheless, some efforts have been made in the sector such as:

- IESCOs work on the upgradation of metering systems to smart meters, with aim of reduction in human error and smart billing. Online bill payments and customer service platforms have also been introduced by many DISCOs.
- FESCO has undertaken initiatives to automate its grid operations, improving reliability and operational efficiency. Different digital solutions for customer service and complaint management, enhancing response time have been introduced.
- LESCO has been working on deploying AMI systems to enable real-time data collection and better management of electricity distribution.

However, among these efforts, the leading role and efforts have been played by K-Electric, which has undergone a significant digital transformation, making it a leading example of successful privatization case in Pakistan's power distribution sector. Since its privatization, KE has implemented numerous initiatives to enhance operational efficiencies and customer experience. The digital growth of KE is highlighted in Figure 8.

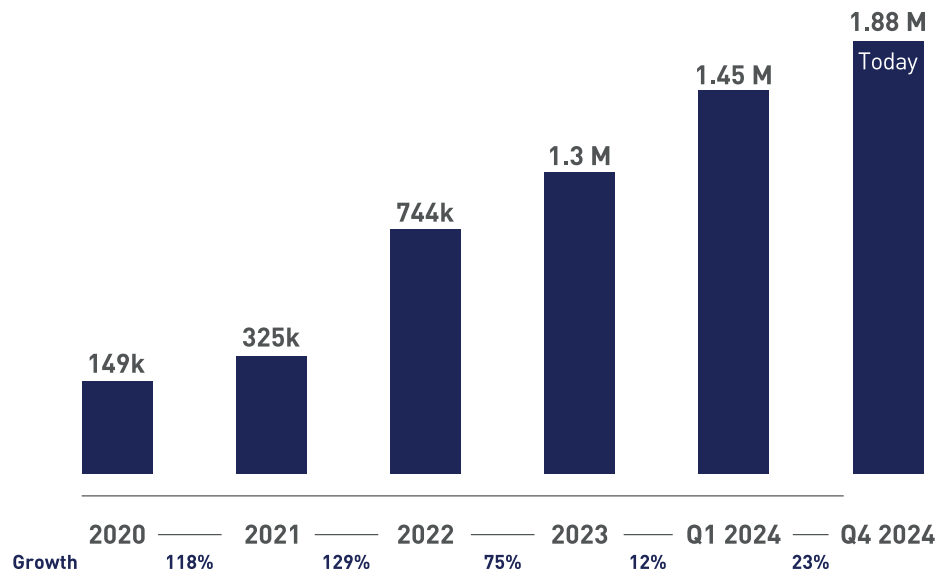


Figure 8 | Number of Consumers Interacting through Digital Platforms in KE since 2020

For further improvements in its operation and customer experience, leading initiatives by KE include:

- Implementation of smart meters across all PMTs (Pole-Mounted Transformers) and feeders.
- The integration of Geographic Information Systems (GIS) to digitize its entire high-tension network, facilitating faster fault detection and resolution.
- The implementation of the Advanced Distribution Management System (ADMS) to optimize the distribution network, resulting in fewer interruptions and enhanced capacity
- Roll-out of various Process Automation initiatives to increase operational efficiency and reduce the scope for human error.

2.4.1. Improvements in Customer Engagement through digital platforms

Customer engagement has also been revolutionized through digital platforms such as the KE Live app, which provides real-time updates on billing, power outages, and other services. This app, alongside a bilingual WhatsApp service, has improved accessibility for over 1.5 million active users. These platforms offer convenient and instant access to essential services, enhancing customer satisfaction and engagement. The shift to digital payments has seen remarkable growth, with 65% of collections in 2023 conducted through digital channels, compared to 30% in 2018.

K-Electric has partnered with various financial institutions to facilitate easy and secure digital transactions. The adoption of QR payments, installment options, and real-time payment systems has further promoted digital payment methods. Notably, K-Electric's digital payment collection grew from 30% in 2018 to 65% in 2023, illustrating a significant shift towards digital financial interactions. Payment partnerships with Visa, Alfa QR, JS Bank, and others offer cashback incentives, with 153,000 consumers availing discounts totaling PKR 136 million (KE Digital Highlights).

K-Electric's commitment to environmental sustainability is evident in its move towards paperless billing and digital receipts, which have reduced the environmental footprint. The adoption of these digital practices aligns with global sustainability goals, promoting energy efficiency and reducing paper usage. The introduction of renewable energy projects is a testament to this commitment. K-Electric plans to add 1,282 MW of renewable energy, comprising 332 MW of wind, 868 MW of solar, and 82 MW of hydel projects. These renewable energy inductions, along with base load import from the national grid, will enable the retirement of expensive technologies such as aging thermal power plants, which are costly to operate and maintain. This transition to renewable energy and efficient base load imports will significantly lower the overall cost of electricity production, thereby paving the way for more affordable supply to consumers. This strategy not only supports environmental sustainability but also ensures a more economically viable energy supply model for the future. Similarly, several other initiatives have been taken to improve customer service as highlighted in Figure 9.

CSR Activities	Customer Outreach	Treasury Digitalization
<ul style="list-style-type: none"> • Roshni Baji Program • Health and Welfare initiatives. • ESG Developments 	<ul style="list-style-type: none"> • 15 Integrated Operational Workshops • 30 customer facilitation centres • Intorduction of real-time payment systems. • KE live App and whatsApp system 	<ul style="list-style-type: none"> • Digital receipts and online payments. • Treasury & Risk Management (TRM) module (SAP4HANA). • Branchless banking and E-wallets

Figure 9 | Digitalization and Service Delivery efforts of KE

K-Electric's Privatization Saved Rs 900 billion for Consumers and Government, led to significant improvements: World Bank.

In its recent report Pakistan Federal Public Expenditure Review 2023, the World Bank Group has endorsed KE's privatization has led to savings of PKR 900 billion for consumer and the government through significant improvements in performance. The report further states that with an investment of USD 4.4 billion across its value chain, KE has achieved significant improvements in generation efficiency and a reduction in transmission and distribution losses.



SECTION-III:

Key Enablers, Developments, and the Way Forward for Privatization in Pakistan

3.1. Development Priorities

Energy security is the heart of modern development, especially in the wake of the recent geo-political crisis that has rendered countries susceptible to the impacts of changes in the energy supply chain. The center of the global recovery, especially for developing countries such as Pakistan would remain the access to affordable, reliable, and clean energy. Over the years, the energy sector of Pakistan has remained under the vicious circle of economic crisis driven by the inefficiencies in the system planning, governance, management, infrastructure developments, and the technological growth. High losses driven by outdated infrastructure and practices, power theft and limited recoveries of the power distribution sector have continued to contribute towards the circular debt and been considered as the key economic challenge.

In response to these challenges, the privatization is on the upfront agenda for the government of Pakistan as it presents a transformative opportunity to address this interlinkage of the 3-E crisis (Energy, Economy, and Environment). As the nation grapples with energy shortages, environmental degradation, and economic constraints, the strategic involvement of the private sector can play a pivotal role in driving sustainable growth and modernization.

However, the privatization of Pakistan's power sector must be approached carefully and under a well-defined strategic framework to ensure its success and sustainability. Without clear regulations, transparent processes, and strong oversight, privatization could lead to unintended consequences such as increased tariffs, unequal access to services, or reduced accountability. It is also essential to balance the profit motives of private entities with broader public interest and social equity. A comprehensive strategy that includes stakeholder consultation, phased implementation, and robust regulatory mechanisms is crucial to mitigate these risks and achieve the desired outcomes of privatization.

Along with various aspects highlighted in previous sections, the privatization reforms must be aligned with key development priorities are highlighted in Figure 10.

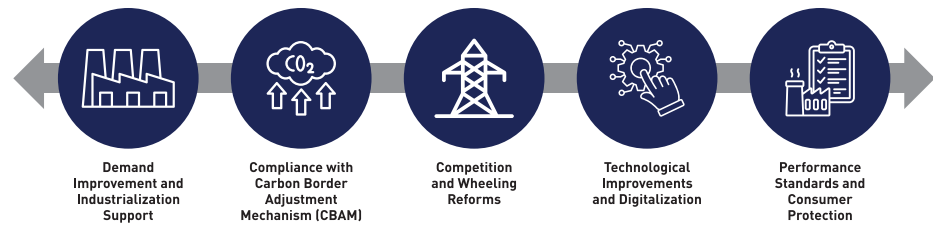


Figure 10 | Development Priorities for Privatization Reforms

Demand Improvement and Industrialization Support: An increasing challenge on Pakistan's energy sector has been its over-capacity issues resulting from a limited demand and industrial growth over the years. Especially since 2022, the industrial sector has declined or shifted away from the national grid owing to unreliable and high-cost grid-based power. The privatization measures could lead to gradual improvements in energy distribution infrastructure by addressing the system losses and service improvements. This in turn would not only add to productivity of the industries, but also contribute to macro-economic growth by contributing to GDP, better job creation, and mitigation of the high-capacity charges.

Green Supply Chains and compliance with CBAM: While the DISCOs of Pakistan are without generation in their portfolios (other than KE), integrating and balancing a high share of Renewable energy in their mix needs to be among the development priorities. Especially in the light of the Carbon Border Adjustment Mechanism (CBAM) that is lined up for the export-oriented industrial sector. Currently, the national grid of Pakistan is more carbon-intensive as compared to European Union (EU), and with CBAM in place, the export-oriented sector of Pakistan, especially the textile industry would have to pay a carbon fee for their exported products as per the EU compliance mechanism. Further on the same lines, there is a constantly increasing demand for greening of the supply chains to support low-carbon development. Thus, keeping industries on the national grid would require provision of high share of clean energy generated through RE.

Increased Market Competition: As of 2024, KE has been the only private sector company in Pakistan. The data shown in previous section highlights that while it faced challenges during the first 5 years (pre-2010), the entity has demonstrated positive trends while managing a challenging demography. While this already makes a positive case for privatization of other DISCOs, it will further foster a competitive environment that drives continuous improvement and efficiency. Economically, this would lead to lower electricity prices, improved service quality, and increased consumer choice, all of which contribute to higher consumer welfare and economic productivity.

Effective Wheeling Reforms: The wheeling regulations (especially since the introduction of Competitive Trading Bilateral Contracts Market (CTBCM) in Pakistan) has been a key demand from Pakistan's Industrial Sector. While

wheeling has been previously done by the industrial sector, the challenges around “use of system charges” or “wheeling rate” has proved a major hurdle for the industrial sector to offtake affordable and clean energy. Wheeling reforms are also a key enabler of higher uptake of RE for the industries. Now while on one hand privatization can attract investment needed to upgrade and expand the transmission and distribution networks, which are essential for effective power wheeling, they bring in more efficient management practices, which can help optimize the operation of the grid to accommodate power wheeling. This would also further to higher uptake of corporate PPAs aligned with RE uptake.

Digitalization and Technological Improvements: The developments under KE as described in the previous session are a testament of the positive impact privatization can bring on innovation, digitalization and technological improvements. Innovation is a driving force behind successful privatization. Encouraging private entities to invest in advanced technologies and innovative solutions can lead to significant improvements in service delivery and operational efficiency. This encompasses implementing digital solutions for real-time monitoring and management of the power grid, enhancing customer interaction through digital platforms, and facilitating the integration of renewable energy sources through advanced grid management systems. On one hand where it can significantly enhance economic efficiency by reducing technical and non-technical losses, optimizing resource allocation, and improving service delivery, it also provides an enabling environment for the foreign direct investment (FDI) in the power sector, spurring economic growth. These developments, however, require mobilization of transition finance. With limited fiscal space in the public-sector development program, the private sector can bridge this finance. Public-private partnerships can attract both foreign and domestic investments, fostering economic development.

Consumer Protection: Consumer perception and tariff management are critical for the success of privatization. Transparent and fair tariff structures, combined with effective communication strategies, can build consumer trust and support. In many countries such as the UK, for instance, Ofgem's transparent tariff structures and consumer protection mechanisms have maintained high levels of consumer satisfaction post-privatization. Macroeconomically, transparent tariffs can prevent social unrest and ensure that electricity remains affordable for all income groups. However, as previously highlighted in Box 1, the reform measure to support this would go beyond just the private sector reforms to also bringing consistency in policy decisions and planning processes.

Externalities in Privatization of Pakistan's power sector

The privatization in Pakistan has several externalities that needs to be highlighted to provide a balanced debate on privatization. As highlighted previously, market liberalization is not conducted solely for price reduction; promoting competition also attracts significant private capital injection, creates jobs, and increases market volume, which fosters the development of a local ecosystem of market players. This growth can trickle down to benefit indigenous communities. However, another key factor that eventually contributes to the price reduction is when government policies align with market principles and objectives. In Pakistan, excessive and unequal taxation leads to inflated energy bills. Furthermore, inefficient planning has resulted in substantial debt commitments that must be serviced.

Reducing these taxes and creating incentives for efficiency could lead to lower bills due to increased consumption. The tariff slabs has remained under debate for not being consumer friendly, which deters consumers from consuming more electricity to bring capacity charges down, consequently hurting investor profitability. The rent-seeking model, where higher slab consumers subsidize low end consumers, combined with government funding through additional subsidies, creates inefficiencies that need to be addressed before privatization. The uniform tariff system should be highlighted as a significant issue that needs resolution. Eliminating this could enhance efficiency and competition among private sector players, thereby making a stronger case for DISCO privatization. Some DISCOs are forced to charge higher amounts due to these inefficiencies, which not only hurts their consumer base but also discourages investor interest in supplementary products like internet services that could generate additional revenue and create job opportunities. The subsidy model needs to be eliminated because, once privatized, sovereign guarantees dissolve, requiring investors to be compensated with higher returns to manage risks independently while maintaining profitability.

A privatized DISCO could invest in micro-grids with dedicated assets within its territory. These micro-grids, managed by separate boards, would function like mini-DISCOs, enabling small and medium-scale investors to invest and share the risk. This would also encourage local market player participation, fostering a culture of localization. Local participation can enhance dispute resolution mechanisms and improve theft control, creating a more reliable and efficient power distribution system.

3.2. Policy Recommendations and Strategic Actions

The privatization of Pakistan's power sector presents significant opportunities for efficiency gains, investment, and innovation. However, it requires a comprehensive and well-regulated approach to ensure sustainable and inclusive benefits.

- **Development of a Regulatory Framework:** Ministry of Energy in collaboration with NEPRA must establish a regulatory framework that governs the privatization of DISCOs including a clear and cost reflective tariff-setting mechanisms, service quality standards, and consumer protection measures, ensuring that private investors are held accountable for meeting these standards while maintaining transparency in tariff adjustments.
- **Phased Transition:** The privatization of DISCOs should go in a phased manner to allow for analyzing the regulatory framework and identifying the potential bottlenecks, and making necessary adjustments before scaling up the privatization process to other DISCOs. This plan should begin with the most financially viable DISCOs and gradually include others, ensuring that the process is manageable and that lessons from earlier phases are applied to subsequent ones.
- **Fair Competition as Part of CTBCM Model:** Under the CTBCM model, both existing DISCOs and new suppliers must be allowed to compete to fully realize the benefits of privatization. Without fair competition, the purpose of privatizing DISCOs—including those already privatized, like K-Electric—would be undermined. If these companies are not given a chance to thrive in a competitive environment, they risk losing consumers as the Supplier of Last Resort (SOLR), which would stifle their business growth and diminish the overall effectiveness of the privatization effort. Therefore, fostering a competitive market is essential for ensuring that all players, new and established, can operate successfully and deliver better services to consumers.
- **Develop a Public-Private Partnership (PPP) model:** MoE in collaboration with other line departments to develop and implement a PPP model that attracts private sector investment while retaining public oversight. The model must highlight the capital and expertise that the private sector must bring.
- **Demand growth:** The privatization measures and plan needs to come up with a clear policy target of increasing energy demand through productive sectors, particularly the industrial sector.
- **Addressing power theft:** Privatization reforms should establish stringent protocols for issuing detection bills and enforcing higher penalties for electricity theft. Increased penalties along with an enabling legal framework such as lodging of FIRs in case of power theft should be enforced to deter

theft, ensuring that the benefits of privatization include improved revenue recovery and reduced losses.

- **Consumer Protection Mechanism:** NEPRA in support from Civil Society Organizations (CSOs) needs to establish a consumer protection mechanism within 12 months. This mechanism should include a clear grievance redressal system and enforce strict penalties for private entities that fail to meet service standards or engage in unfair practices.
- **Establishing Performance targets:** Establish performance targets for privatized DISCOs based on quality-of-service metrics to ensure improvements in reliability and customer satisfaction.



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