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STATE OWNED ELECTRICITY DISTRIBUTION COMPANIES: A PERFORMANCE REVIEW

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Executive Summary

The successive governments have neglected the pervasive inefficiencies in the electricity distribution sector and shelved numerous recommendations of structural reforms. The short-term temporary fixes have forced the governments to raise power tariffs along with the addition of new taxes to curtail the circular debt. The ultimate burden of the inefficiencies was put on the consumers. The higher cost of electricity and power outages has disrupted the economic activities in the country, increased the operational cost of businesses, contributed to sluggish growth in GDP, and led to a decline in the competitiveness of the local industries in the international market, which has resulted in the stagnancy of the exports. The delays in the reform will only make the resolution of the crisis difficult; therefore, a concerted policy driven initiative is recommended to mitigate the situation.

This report presents a comparison of state-owned power distribution companies in Pakistan by highlighting their last five-year performance. It measured performance on parameters such as bill recovery, financial losses, transmission & distribution losses, public safety, load shedding, growth in new connections, and investment made. The report also puts forward recommendations on how losses incurred by the distribution companies can be reduced by improving policies and practices. The report covers the period FY16 to FY20 and the analysis is based on the data from NEPRA's publications on DISCOs. In addition, background interviews of focal persons from DISCOs, PIDE and COMSATS have also been conducted to further inform the analysis by capturing ground realities.

The solution to mitigate the crisis requires two-pronged strategies at the policy level and technical level. The policy reforms comprise privatization of the DISCOs, adoption of cost reflective and expeditious tariff determination mechanism, outsourcing the bill collection services to the private sector, and augmenting customer compliance through incentives like lower tariffs and power outages. The technical reforms should focus on digital mapping of the entire distribution infrastructure, GPS surveillance of loss creating segments of the infrastructure, automated meter reading to overcome human errors and augment factual reporting, installation of prepaid meters to ensure recovery of billed units and regular energy audits to highlight inefficiencies.

Key messages of this report are:

- Performance of state-owned DISCOs remains lackluster as they fail to meet NEPRA's targets for transmission & distribution (T&D) losses, bill recovery, investment, and public safety.
- The overall loss to the national exchequer from inefficiencies and bailouts in five years measures at Rs. 1355 billion.
  - In last five years, 2015-2020, financial loss of DISCOs amounts to Rs. 647 billion contributing to the circular debt.
  - PKR 708.4 billion subsidy received by DISCOs between 2016-2020 with MEPCO, PESCO and GEPCO receiving the highest subsidies.

- PESCO and QESCO T&D losses continue to rise over 4 years.
- Average daily load-shedding of more than 2 hours by QESCO, HESCO, GEPCO, PESCO, IESCO & LESCO.
- LESCO, GEPCO and FESCO received highest complaints during period under review depicting low customer satisfaction.
- DISCOs need to ensure higher safety standards given 680 fatalities in five years.
- Few penalties applied to DISCOs for poor performance – suggesting regulatory tolerance of poor performance.
- Tariff Differential Subsidy (TDS) received by MEPCO, PESCO and GEPCO is highest among the DISCOs.
- 23% of LESCO and 20% of FESCO new Connection applications were pending thus increasing burden of capacity payment on customers while only 0.1% of HESCO applications were delayed.
- 6/10 DISCOS invested less than NEPRA allowed limits with LESCO investing Rs.22.2 billion and IESCO Rs.11.5 billion less than allowed amount

- First and foremost important recommendation for government is to restructure or privatize state-owned distribution companies ensuring competition.
- GIS Mapping, Automated Meter Reading (AMR), Energy Audit and Accounting, Prepaid Metering System are technical solutions to the power sector issues.
- Resolving Power sector woes requires DISCO privatisation, cost-reflective and expeditious tariff determination mechanism, outsourcing the bill collection services to private sector, law enforcement support.

State Owned Electricity Distribution Companies: A Performance Review

Authors: Tuaha Adil[1] & Beenish Javed

Introduction

The distribution component of the electricity generation and consumption system holds the pivotal link to an efficient electricity market. In Pakistan, 10 state-owned distribution companies (DISCOs) were created as a result of unbundling of WAPDA in 1997. Karachi Electric Supply Corporation (now KE) was carved out as a vertically integrated private company and then subsequently privatized in 2005. In the interest of ensuring an equitable comparison against a consistent yardstick, K-Electric has been excluded from this research, as it comprises generation, transmission and distribution roles. While Pakistan has seen significant investment from private players in the generation sector over last 25 years, the transmission and distribution sectors have not received adequate attention from private investors, KE being an exception. During 2013-2018, Pakistan received a fresh wave of investment in the electricity generation though structural problems in the power sector were not effectively addressed. The result was an ever-growing circular debt, increasing tariffs and uncontrolled transmission and distribution losses. This calls for an exclusive focus on the distribution segment of Pakistan's electricity market. Therefore, this report aims to present an objective and informative comparison of power distribution companies in Pakistan by highlighting their last five-year performance.[2] The report also aims to put forward recommendations on how losses incurred by the distribution companies can be reduced by improving policies and practices. It is hoped that this report will serve to raise awareness in the public through media as well as policy makers and members of the parliament.

Power Distribution Program: A Capacity Building Initiative

Prior to discussing the last five-year performance of DISCOs, it is imperative to mention the developments that took place under the USAID's Power Distribution Program (PDP) 2010-15[3]. PDP's objective was to enhance the efficiency and performance of nine[4] state-owned DISCOs via improvements in technology, processes, procedures, trainings, and capacity building. Out of the nine government-owned DISCOs, MEPCO and PESCO received focused support throughout the program. Figure 1 depicts the measures undertaken to improve the efficiency of DISCOs under the Power Distribution Program 2010-15, whereas Box 1 highlights the achievements during the course of the programme.

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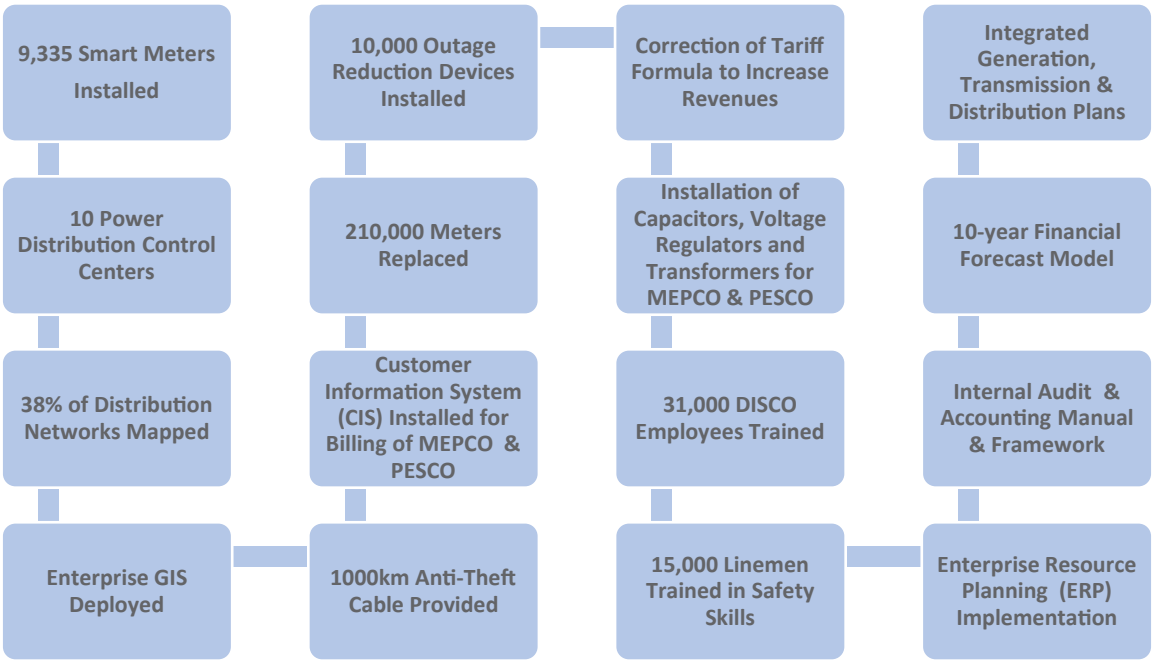
[2] The report covers the period FY16 to FY20 and the analysis is based on the data from NEPRA's publications on DISCOs. In addition, background interviews of focal persons from DISCOs, PIDE and COMSATS have also been conducted to further inform the analysis by capturing ground realities.

[3] Power Distribution program 2010-2015, USAID. Retrieved: https://www.usaid.gov/sites/default/files/documents/1865/Power%20Distribution%20Program%20Brochure.pdf

[4] Excluding TESCO. The program also focused on improving the performance of NEPRA however discussion on it is out of the scope of this report.

Figure 1: Initiatives for Upgrading DISCOs Performance under USAID PDP 2010-15



Source: Power Distribution Program 2010-2015, USAID

The GIS mapping and advanced metering techniques resulted in improved accuracy of meter readings and billings, enabling consumers to understand their bills better. Across all DISCOs, the cost of service study (COS) gave staff a better understanding of the cost of serving each consumer class. Though the achievements of PDP 2010-15 were encouraging (see Box 1), the results have not been sustainable. The performance of most state-owned DISCOs continues to be lackluster in various aspects and in some cases, retrogressive as explained in the subsequent sections.

Box 1: Achievements of USAID PDP 2010-15

- $180 million in annual damages to Pakistan's economy eliminated
- $62.3 million in revenue added for distribution companies
- 10% points reduction of AT&C losses at MEPCO in 2013–2015
- 128 MW of electricity saved by 89,000 capacitors installed on agricultural tube wells
- 12.5 MW saved by replacement of 1,539 inefficient industrial motors

Source: Power Distribution Program 2010-15, USAID

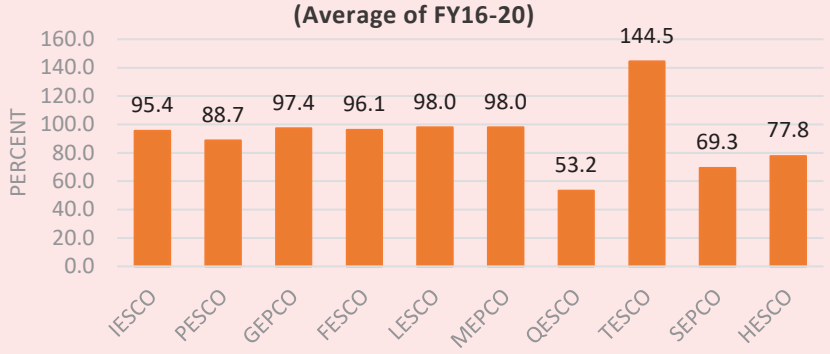
Analysis of DISCOs Performance

The last five-year performance of distribution companies can be gauged through set of key parameters[5] as under:

1. Bill Recovery:

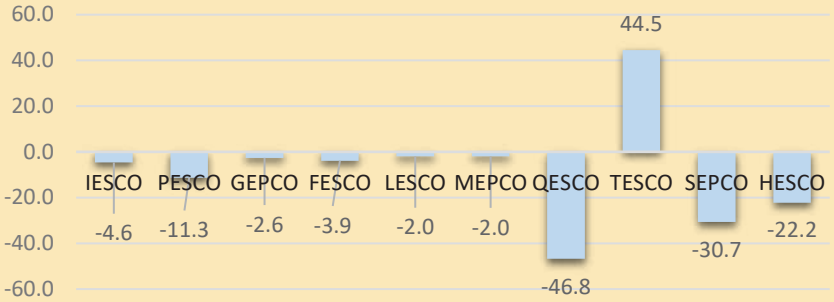
Recovery of bills is not only an essential indicator of DISCOs financial health and performance but is also pertinent for curtailing fiscal deficit. It is imperative to mention that the National Electric Power Regulatory Authority (NEPRA) assumes a recovery rate of 100% while setting the tariff for DISCOs, which is an unrealistic assumption, has been highlighted by IMF as one of the factors contributing to build up of circular debt and has been acknowledged in National Electricity Policy 2021. Five DISCOs namely IESCO, GEPCO, FESCO, LESCO and MEPCO have the highest recovery rates over the last five years. The weak performers in terms of bill recovery have been QESCO, TESCO[6], SEPCO and HESCO (see Figure 2-3). The recovery of bills depends on local dynamics such as behavior of consumers, number of consumers, and security situation. Although several initiatives have been taken to raise public awareness, yet there is still acceptance of non-compliance and power theft in the society. The larger the number of consumers, the larger will be the difficulty faced by

Figure 2: Bill Recovery as % of Total Billed Amount (Average of FY16-20)



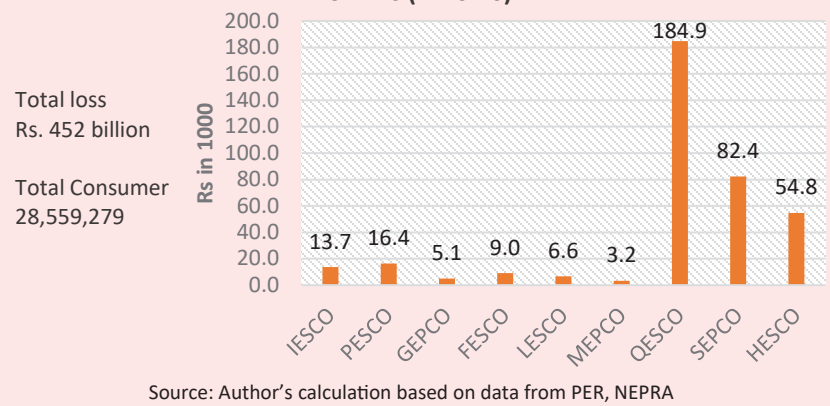
Source: Author's calculation based on data from PER and SOI, NEPRA

Figure 3: Breach from Target (Average of FY16-20)



Source: Author's calculation based on data from PER and SOI, NEPRA

Figure 4: Financial Loss per Consumer due to Non-Recovery of Bills (FY16-20)



Source: Author's calculation based on data from PER, NEPRA

[5] Data tables corresponding to the figures are included in the Appendix of report.

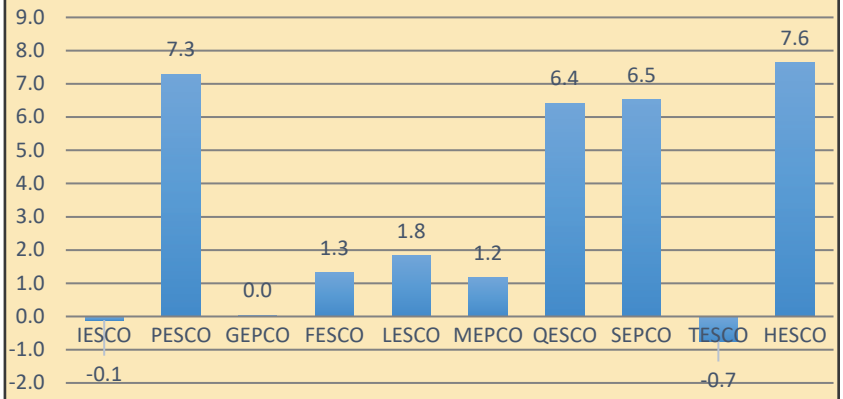
[6] TESCO's bill recovery for FY16 stands at 437%. This payment has been received against billing of private domestic TESCO consumers for Rs. 18,955.61 million in 2015-16 from federal government.

DISCOs to recover billed amount especially for MEPCO, LESCO and FESCO. The existence of undocumented population, high poverty levels, resistance from local population, and lack of cooperation from law enforcement agencies have contributed to higher losses in terms of recovery of bills. The last five-years' cumulative financial loss of DISCOs from breaching NEPRA's recovery target amounts to Rs.452 billion[7] (see Figure 4) and thus has been one of the main factors underlying the growing circular debt.

2. Transmission & Distribution Losses:

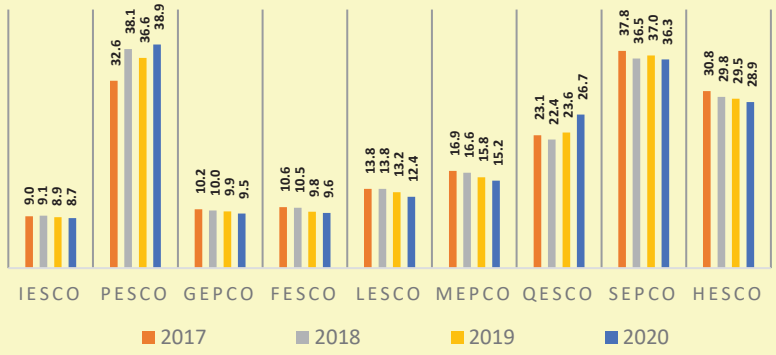
Transmission and Distribution (T&D) losses comprise technical and non-technical losses. The former are the losses that occur naturally owing to network infrastructure including length of T&D lines, inadequate size of conductors and installation of distribution transformers away from load centers etc. While the latter occur mainly due to power theft and non-payment by consumers. The last five-year T&D performance of DISCOs reveal major losses for PESCO, SEPCO, HESCO, and QESCO due to breach of NEPRA target. Some DISCOs were found to be excessive in breach of NEPRA targets such as HESCO, PESCO, SEPCO and QESCO (see Figure 5). DISCOs in particular LESCO, MEPCO, SEPCO and HESCO have minimized losses greater than 1 percent while PESCO and QESCO have experienced increase in the losses in the period under review (see Figure 6). The overall inefficiency of PESCO, SEPCO, QESCO and HESCO is high and needs attention on priority basis. Consequently, losses from T&D have accumulated to Rs.195 billion from 2016 to 2020.

Figure 5: Breach of T&D Losses (Average of FY16-20)



Source: Author's calculation based on data from PER& SOI, NEPRA

Figure 6: Transmission and Distribution Losses (%)

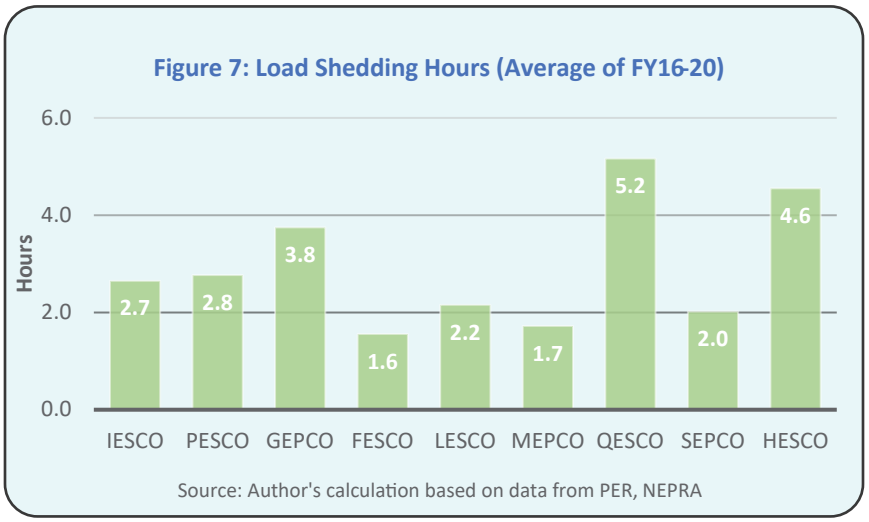


Source: Author's calculation based on data from PER, NEPRA

[7] Performance Evaluation Report FY16 to FY20, NEPRA

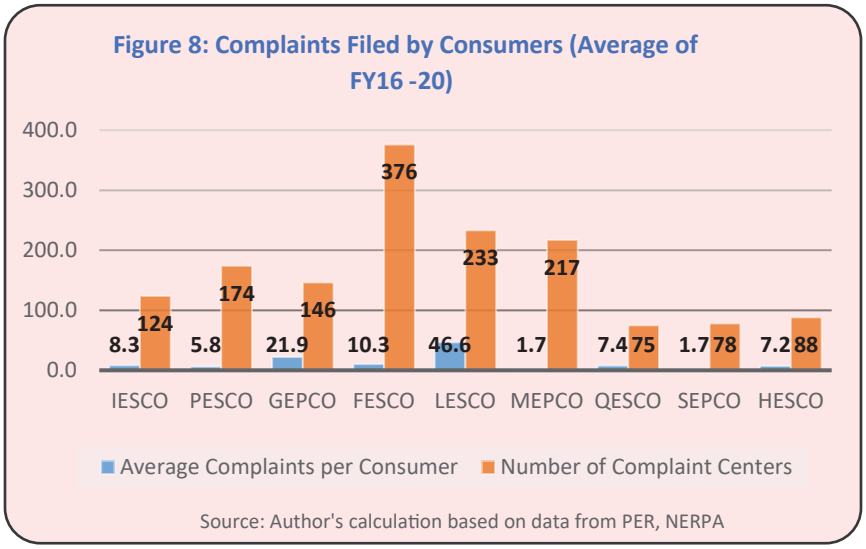
3. Load Shedding Hours:

As per NEPRA's report[8], DISCOs are carrying out load shedding based on Aggregate Technical and Commercial (AT&C) losses which is in accordance with the National Power Policy 2013 but supply is also encouraged to consumers who are paying bills on time according to the National Electricity Policy 2021. However DISCOs are responsible for curtailing the losses through upgradation of the infrastructure, minimizing theft and recovery of bills. Though the average daily load-shedding hours by FESCO and MEPCO has remained below 2 during the reviewed period, the same does not hold for other DISCOs[9]. The remaining DISCOs depict an average daily load-shedding of more than 2 hours (see Figure 7). It is pertinent to mention that there was no load-shedding in GEPCO and FESCO regions in 2020 which is unlikely and draws attention towards reliability of data reported by DISCOs; the issue of misreporting has been highlighted at various platforms. Notwithstanding the individual performance of DISCOs, overall load-shedding in the country has reduced over the years on account of generation capacity addition.



4. Customer Satisfaction:

The customer complaints received by DISCOs generally pertain to excessive billing, delay in provision of new connection, replacement of defective meters, low voltage problem, delay in augmentation of transformers, replacement of damaged transformers, non-receipt of electricity bills and excessive or un-scheduled load-shedding. The lower number of complaints and minimum time for disposal of the same are the actual indicators of customer satisfaction. However, it is relevant to mention that the data on time for disposal of complaints is not publicly available which limits the analysis on consumer satisfaction to the number of complaints received by the DISCOs. In this regard, Figure 8 depicts the customer complaints received by DISCOs over the last five years and complaint



[8] Performance Evaluation Report FY20, NEPRA

[9] TESCO is not included due to non-availability of data

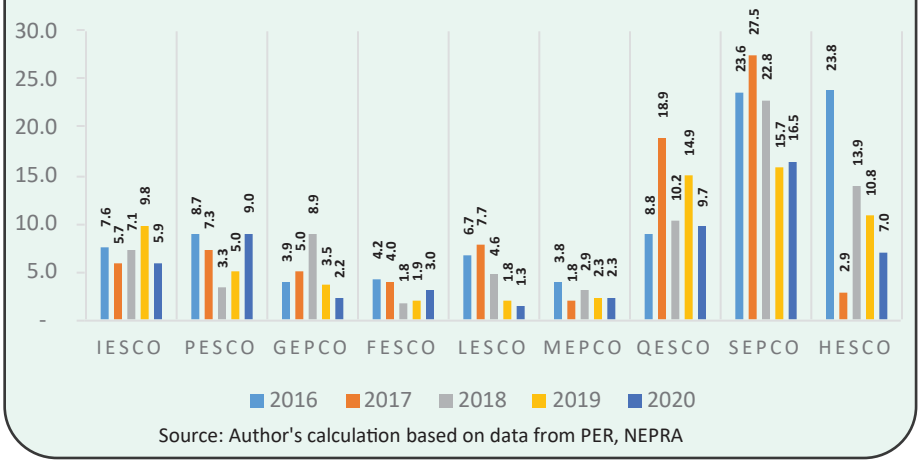
centers in the region. It is important to highlight that number of complaints depends upon the number of customers, available platforms for registering complaints, complaints actually registered by the authorities and time for disposal. MEPCO, LESCO and FESCO have the highest number of customers but complaints registered by IESCO was greater than FESCO and MEPCO and almost equal to LESCO in 2019 and 2020. However, if the complaints are not disposed of timely then complaints are filed again by the customers for the same problem. There are concerns shown by NEPRA with respect to data being shared by DISCOs. As reported by NEPRA in the Performance Evaluation Report: "Further, NEPRA has serious reservations over the data submitted by the distribution companies which shows that SEPCO did not receive any single complaint in a day in any of its complaint center. Similarly, PESCO, QESCO, FESCO, MEPCO and HESCO also received only 2 to 3 complaints per day in each of their complaint centers in FY 2019-20.

It is interesting to note that some DISCOs (such as QESCO, SEPCO and HESCO) with high load-shedding hours have minimal to zero customer complaints, thus suggesting some degree of under-reporting and non-filing of complaints by the respective companies (see Figure 7 vis-à-vis Figure 8). Alternately this may also imply that the forums or touchpoints available to customers for complaint resolution are extremely limited and customers are thus restricted from raising their complaints. LESCO is one of the few DISCOs that has created social media touchpoints for complaint resolution, while the remaining DISCOs continue to depend on under-resourced helplines. LESCO also has the highest number of complaints received among the DISCOs during FY18. Overall, LESCO, GEPCO and FESCO had received the most complaints during the period under review thus depicting low customer satisfaction with these three distribution companies.

5. Public Safety/Accidents:

Over the last five years, the number of accidents for both employees and public depicts a mixed trend across DISCOs (see Figure 9). The incidence of fatal accidents is contingent upon number of factors such as condition of infrastructure, population density, encroachments and planning of cities. Thus PESCO's relatively poorly planned service area correlates with its higher number of accidents. Islamabad, conversely, is a planned city for the most part and its similar number of accidents bear deeper examination.

Figure 9: Fatal Accidents per million Population (FY16 -20)



Source: Author's calculation based on data from PER, NEPRA

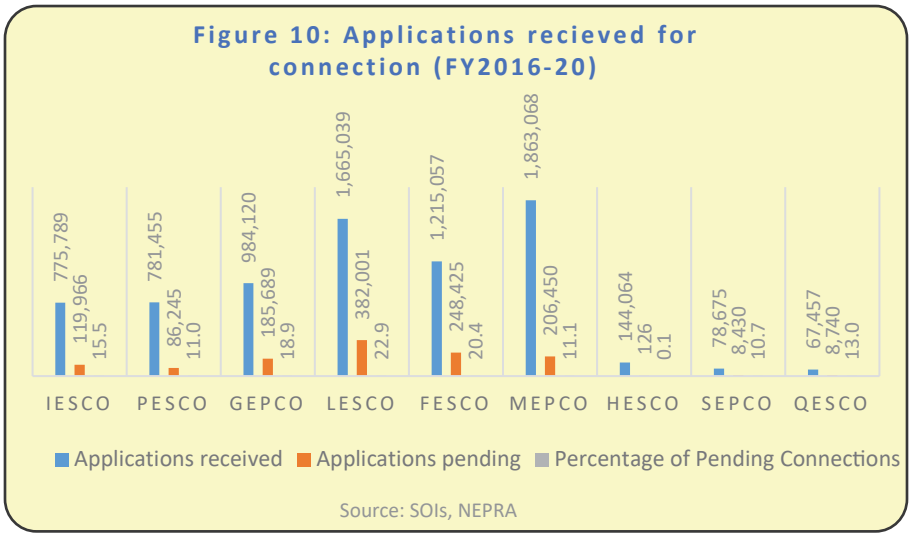
In terms of accidents per million population, mostly DISCOs have seen decline except for PESCO and QESCO while SEPCO, QESCO, HESCO and PESCO have the highest number of incidents in the period under review. It is noted that the number of fatal accidents in PESCO and LESCO are

highest in past 10 years with average 22 fatalities per year; whereas, number of fatalities in FESCO are 20 per year. These numbers flag an alarming situation and indicates that distribution companies have failed to adhere the safety practices where PESCO and LESCO are on top. With the exception of SEPCO, LESCO and HESCO, the DISCOs have not shown any distinguishable performance in terms of reducing the number of accidents during the reviewed period. The total number of fatalities in the last five years measure at 680, which is quite alarming. This indicates that the DISCOs have failed to implement safety standards as prescribed in Performance Standards and Distribution Code, and negligence of NEPRA to ensure the implementation of safety standards. NEPRA has imposed few penalties on DISCOs for poor performance – suggesting regulatory tolerance of poor performance. The distribution companies must abide by the safety requirements as set out in Power Safety Code, Distribution Code, Power Safety Manual, Performance Standards (Distribution) Rules -2005, Grid Code & other applicable documents. As per safety code stated by NEPRA, the DISCOs must promote a healthy & safe culture and provide all employees, contractors, and the people concerned and the public with a safe & healthy environment.

6. Pending Applications:

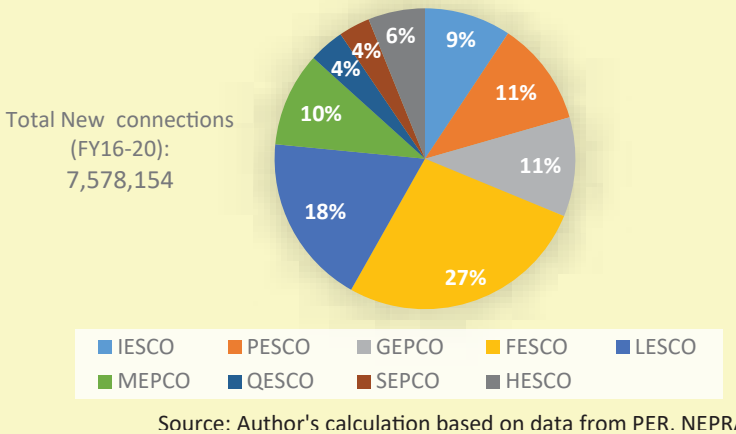
The expeditious provision of electricity connections represents efficiency and the delay implies inefficiency. There are several issues that have an impact in the delay in provision of connection such as completeness of required documents, stages in the process and approvals from concerned personnel. DISCOs like MEPCO, FESCO and LESCO having largest population in respective regions received maximum applications but MEPCOs pending applications stood at 11 percent compared to LESCO's 23 percent and FESCO's 20 percent (see Figure 10). In contrast SEPCO and QESCO having small customer bases had pending applications at 11 percent and 13 percent respectively. HESCO's pending applications stood at 0.1 percent. The overall growth in new connections by DISCOs in the five years is illustrated in figure 11.

Figure 10: Applications recieved for connection (FY2016-20)



Source: SOIs, NEPRA

Figure 11: Growth in New Connections (FY16-20)



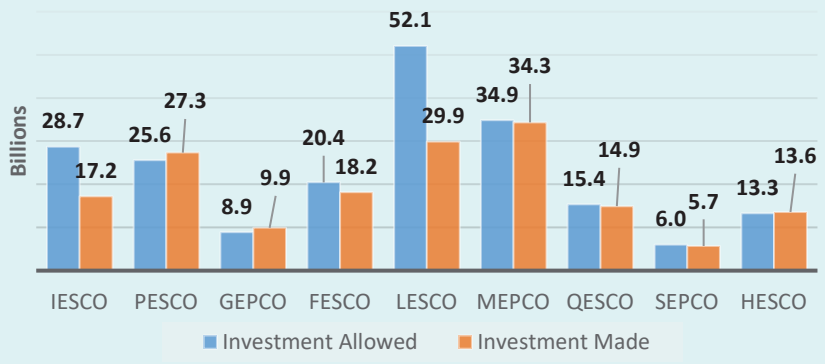
Source: Author's calculation based on data from PER, NEPRA

Though Pakistan has adequate generation capacity, the power demand has not increased in tandem with the generation capacity, resulting in exacerbation of the surplus capacity. In such an instance, non-provision of new connections to the consumers reflects mismanagement by DISCOs and irresponsible attitude towards revenue enhancement.

7. Investment Allowed/Made :

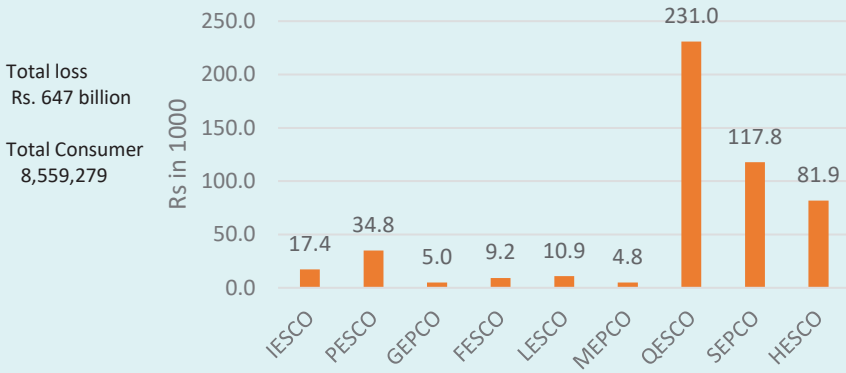
Within the tariff, NEPRA allows DISCOs to make investments in various projects such as (i) network improvement for improved reliability through removal of system constraints, reduction in length of feeders, preventive maintenance, (ii) technological advancements such as automated metering, (iii) loss reduction projects to reduce T&D losses and increase distribution efficiency Some DISCOs have made investment beyond the amount allowed by NEPRA; PESCO invested Rs.1.7 billion in abundance, GEPCO invested Rs.1 billion in abundance, and HESCO invested Rs.300 million in abundance. In contrast, LESCO invested Rs.22.2 billion less than the allowed amount, IESCO invested Rs.11.5 billion less than the allowed limit and rest were close to the allowed limit (see Figure 12).

Figure 12: Investment Position of DISCOs (FY16-18)



Source: SOI, NEPRA

Figure 13: Total Losses per Consumers (FY16-20)



Source: Author's calculation based on data from PER & SOI, NEPRA

8. Financial Efficiency :

The overall financial health of DISCOs is contingent upon efficient distribution of electricity. Unfortunately, the significant losses accrued on account of poor transmission and distribution of power as well as non-recovery of bills have significantly undermined the financial efficiency of DISCOs, resulting in huge losses. As evident from Figure 13, all DISCOs have accrued major losses[10] during the reviewed period. For most DISCOs, these losses are in fact increasing over the years. The least performers in terms of financial efficiency have been QESCO, SEPCO and HESCO. The total accumulated loss of DISCOs over the last five years amounts to Rs.647 billion[11]. This

[10] The financial efficiency is measured by total financial loss of each DISCO which has been calculated by summing the financial loss accrued on the back of its T&D losses and non-recovery of bills. Thus, the assumption is that, lower the total financial loss of a DISCO, higher is its financial efficiency and vice-versa.

[11] Author's calculation based on data from Performance Evaluation Report FY20, NEPRA.

remains a cause of concern as it is a burden on the national exchequer and is contributing to the buildup of circular debt.

9. Subsidy Received:

The government's Tariff Differential Subsidy (TDS) aims to protect the certain consumer segments from high cost of electricity. TDS is provided to cover the difference between the NEPRA approved tariff schedules, which can differ across DISCOs, and the uniform tariff schedule notified by the Ministry of Energy (Power Division). During the period under review, the TDS received by most DISCOs[12] registered an increasing trend (see Figure 14). This implies that the respective DISCOs have been somewhat successful in recovering most of their allocated subsidies from the government. Tariff Differential Subsidy (TDS) received by MEPCO, PESCO and GEPCO is highest among the DISCOs with total amount measuring Rs. 708.4 billion. In particular, the subsidies in FY20 increased on account of support package for industrial customers. Nonetheless, the delayed and incomplete TDS payment by the government to DISCOs has been a contributing factor in accumulation of circular debt.

Figure 14: Total Subsidy Received (FY16-19)

Source: Annual Financial Statements of DISCOs

Current Measures to Enhance DISCOs Performance

Successive governments focused on improving the generation capacity, but little attention was paid on reducing losses and upgrading transmission and distribution capacity. However, the incumbent government has decided to bring some reforms in the transmission and distribution system. In this regard, Table 2 presents the measures that have been undertaken to improve the performance of DISCOs.

Table 2: Current Measures to Improve DISCOs Performance

Sr. no	Measure	Remark
1.	In a current development, the Cabinet Committee on Privatization (CCoP) approved partial privatization of the state-owned DISCOs[13]. Funds were also approved for hiring of a financial advisory consortium (FAC), that will analyze each DISCO separately and provide recommendations.	Privatization of state-owned DISCOs is a necessary initiative that has been shelved for long and the national exchequer has been pouring in money to keep them operational. The initiative should be carried out on a priority basis to avoid unnecessary delays.

[12] Due to data constraint, some DISCOs have been excluded from the subsidy analysis.
[13] Government approves partial privatization of DISCOs. *The News.* Retrieved: https://www.thenews.com.pk/print/838100-government-approves-partial-privatisation-of-discos

2.	In October 2018, PTI-government revived the ADB-sponsored Advanced Metering Infrastructure (AMI) programme that envisaged smart metering for tackling power theft[14]. However, in a recent development the federal government is likely to cancel the Rs. 47 billion advanced metering infrastructure (AMI) project due to its complex design and high cost[15].	AMI has been in operation throughout the world to enhance operational efficiency and monitor line losses. Although the cost of installation is high, yet a necessary step should be taken to overcome inefficiencies in the power sector and preferred over-bearing losses every year.
3.	In FY2019, digitized plotting of the distribution network of DISCOs was carried for effective monitoring and timely submission of quarterly reports. As on June 2019, IESCO, GEPCO and HESCO have completed the task. However, PESCO, LESCO, SEPCO and QESCO failed to complete the task[16].	The effective monitoring of the transmission and distribution system requires digital plotting and surveillance through GIS to identify and highlight segments of the system where power consumption is high and recovery of bills is low.
4.	From 2018 to 2020, the government invested Rs39 billion to upgrade the infrastructure resulting in transmission of an additional 4,000 MW[17]. During this period, 1774 km of 132kV transmission lines, 3501 km of low tension lines, 58 (132 kV) grid stations, and 56,354 distribution transformers were added to distribution system by government DISCOs[18].	The upgradation of the transmission and distribution infrastructure should be done on regular basis to overcome inefficiencies. The government should allocate a definite portion of the power sector fund in the public sector development program (PSDP) for upgradation of infrastructure along with generation.
5.	In 2020, Standard Safety Manual was designed under Power Safety Code in consultation with Health Safety & Environment (HSE) experts and subsequently, a workshop was arranged for the training of the representatives of all DISCOs[19].	The safety of DISCOs' employees and public at large should be ensured through regular training and workshops of the concerned staff to minimize accidents and loss of lives.
6.	In 2020, the government of Pakistan with the $375 million financing from the World Bank started a project for grid reliability, installation of SCADA (supervisory control and data acquisition) system, aerial bundled cables, and pole mounted transformers to deploy single point solution[20].	This initiative is a positive development in upgradation of infrastructure, as it will improve the efficiency of the transmission and distribution lines and will curb line losses.

[14] Smart metering programme revived. *Dawn.* Retrieved: https://www.dawn.com/news/1442326

[15] Govt likely to shelve Rs47bn AMI project due to design, cost issues. *Profit.* Retrieved: https://profit.pakistantoday.com.pk/2021/06/19/govt-likely-to-shelve-rs47bn-ami-project-due-to-design-cost-issues/

[16] State of Industry Report 2020.

17 Circular debt — Myth and reality. The News. Retrieved: https://www.thenews.com.pk/print/841104-circular-debt-myth-and-reality

18 State of Industry Reports 2018-2020, NEPRA.

[19] State of Industry Report 2020.

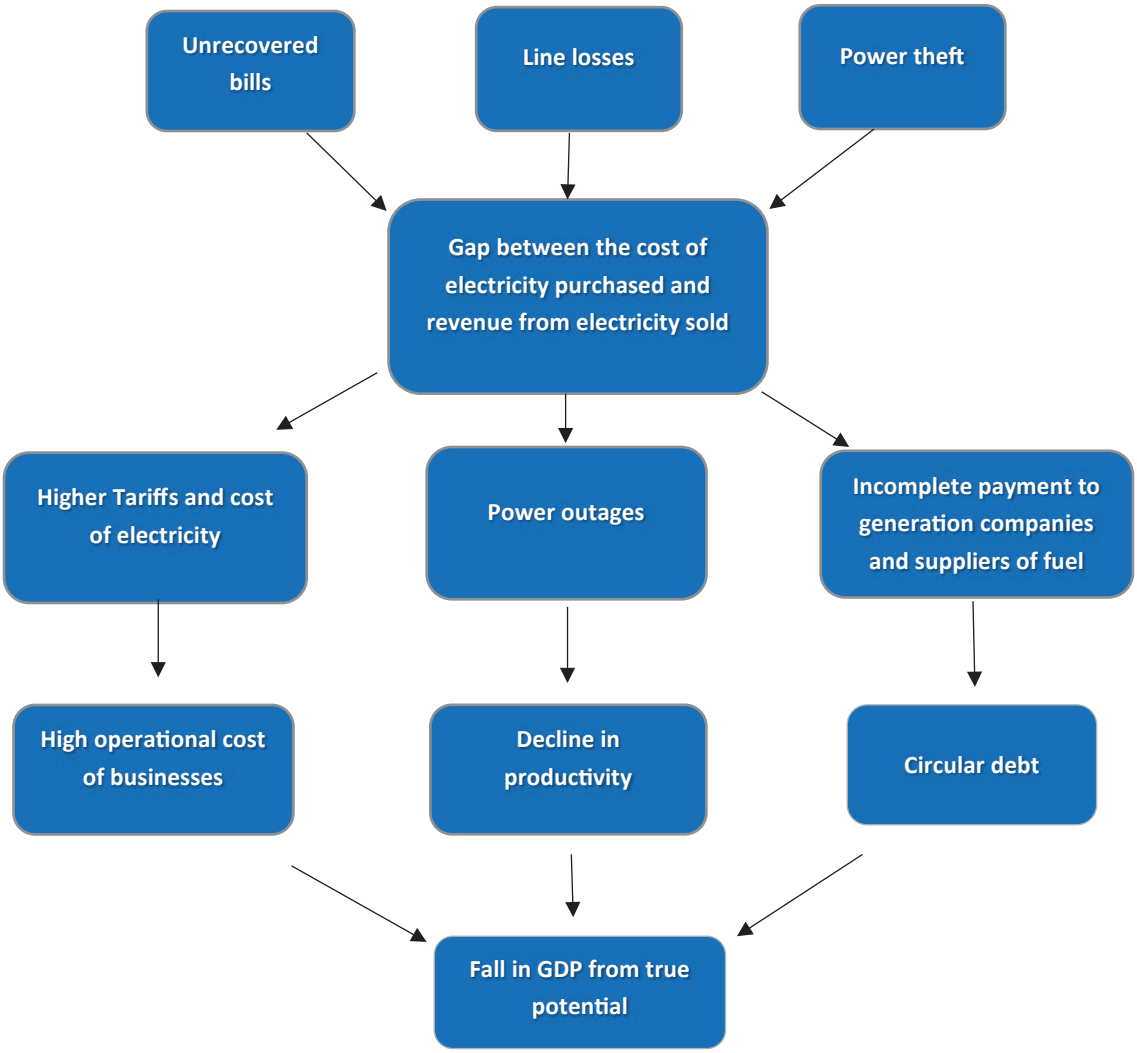
[20] The World Bank Electricity Distribution Efficiency Improvement Project (P170230).

Consequences of Inefficient Distribution System

The performance of DISCOs is vital for the efficiency of the power sector and has long-lasting implications on the economy. The insignificant attention paid to the distribution component of the power sector and a greater focus on the power generation have not only proved to be futile but contributed to the exacerbation of the crisis (see Figure 15). Some of the effects of inefficient power distribution include:

- Accumulation of circular debt, Rs.2.3 trillion till June 2021, and dependency on the subsidies from government
- Closure of small businesses from higher operational costs
- Lack of employment opportunities and subsequent unemployment
- Under or unutilized generation capacity resulting in high per unit capacity charges as long-term PPAs have been executed under a 'Take or Pay' regime, thus guaranteeing capacity payments to IPPs, regardless of power off-take
- Decline in competitive advantage in international markets
- Surge in the import of goods previously produced within the country and subsequent growing trade deficit

Figure 15: Repercussions of Poor Distribution System



Conclusion

The uninterrupted provision of electricity to the masses is the cardinal component of the business activities and economic ambiance of the country. Pakistan's worn-out transmission and distribution infrastructure, outdated technology, prevalence of mismanagement in government DISCOs, and regulatory short-sightedness have prompted inefficiencies in the power sector. The overall loss to the national exchequer from inefficiencies and bailouts in five years measures at Rs. 1355 billion. The provision of connections is delayed and remained pending in the regions of FESCO, LESCO and MEPCO. In the context of safety, the number of fatal accidents was high in IESCO, LESCO and PESCO regions. The overall performance of IESCO, GEPCO, FESCO, LESCO, and MEPCO is better than the rest, while performance of PESCO, QESCO, SEPCO and HESCO is not up to the satisfaction in majority of the parameters.

Although the country has a surplus generation capacity, yet power outages are prevalent due to insufficient attention paid to the transmission and distribution segment of the power sector and are a cause of concern for the policymakers. The policy of business as usual is threatening the sustainability of the entire power sector and subsequently, the economy of Pakistan. Any delay in the reforms will only exacerbate the inefficiencies and the burden on the national exchequer. It seems that well-intended international development organizations' funded projects have failed to transform the output of power sector due to ignored structural deficiencies. Therefore, a sustainable framework is needed for power sector reforms starting with privatization of state-owned entities, review of tariff regime to ensure financial sustainability, mechanism for recovery of costs due to advent of open access (stranded costs), recovery of bad debts, treatment of cross-subsidy in an open market scenario, better and integrated planning etc. Unfortunately, due to lack of planning, the surplus capacity on Take or Pay basis is actually one of the major contributing factors towards the growing circular debt in the power sector.

Table 3: Aggregate Performance of DISCOs

Indicator	FESCO	GEPCO	HESCO	IESCO	LESCO	MEPCO	PESCO	QESCO	SEPCO	TESCO
Bill Recovery as % of Total Billed Amount	96.10%	97.40%	77.80%	95.40%	98%	98%	88.70%	53.20%	69.30%	144.50%
Breach from Billed Amount Target	-3.90%	-2.60%	-22.20%	-4.60%	-2%	-2%	-11.30%	-46.80%	-30.70%	44.50%
Breach of T&D Losses	1.30%	0	7.60%	-0.10%	1.80%	1.20%	7.30%	6.40%	6.50%	-0.70%
Load Shedding Hours	1.6	3.8	4.6	2.7	2.2	1.7	2.8	5.2	2	-
Complaints as % of Total Consumers	10.50%	21.90%	7.20%	8.30%	45.70%	1.70%	5.70%	7.50%	1.60%	-
Fatal Accidents for both Employees & Public	12	15	12	20	18	15	20	7	16	-
Investments Made (Rs Billion)*	5.70	3.80	4.20	6.90	10.10	11.90	8.60	4.80	2.30	-
Share in Total Losses	5.00%	2.00%	12.00%	6.00%	7.00%	4.00%	18.00%	18.00%	12.00%	-
Total Subsidy Received (Rs Billions)	85.60	104.60	58.60	43.10	-	166.00	152.80	-	-	-

Note: (-) shows unavailability of data, (*) indicates that investment data is from 2016-2019.

Recommendations

The analysis of the performance of the government and private distribution companies has highlighted myriad issues pervasive in the power sector. The solution to mitigate the crisis requires two-pronged strategies at the policy level and technical level.

I. Policy Recommendations :

i. Safety Reviews and Reprimands: It is responsibility of the regulator to reprimand distribution companies for unsafe conditions such as improper guarding, defective material or equipment, hazardous arrangements, insufficient lighting, improper ventilation, unsafe clothing, operating without authority or warnings. NEPRA must regularly review initiatives taken by DISCOs regarding improvement in existing electrical protective equipment, engineering standards implementation, diagnosis of faults and its timely rectification and mete out penalties for non-compliance and poor performance. While NEPRA's role as power regulator is outside the purview of this research, it is important to mention, that despite the worrying number of accidents occurring across Pakistan, only in extremely rare cases have penalties been applied to state-owned DISCOs – indicating a disturbing tolerance and enablement of poor safety performance among DISCOs. Until safety is made priority, incidences like the recent one in Hyderabad where at least five have been killed in transformer blast and approximately 18 others injured in second HESCO-related explosion in two months, residents, communities and public are bound to suffer. Exemplary punishment must be given to distribution companies where deteriorating infrastructure is not upgraded, new infrastructure is compromised and rehabilitation of already installed equipment is not practiced.

ii. Privatization: The first and foremost important recommendation for government is to restructure or privatize state-owned distribution companies. At present, there is no incentive for them to improve their efficiency as government is present to bail them out and cover their losses. Currently, the SOEs are in losses and their assets are undervalued; therefore, potential value of assets may not be realized. The Government may initially consider transferring control to a private investor with gradual sale of ownership stake. As an example, initially a 10%-20% equity stake with management control may be offered with an offer to further increase in shareholding at the end of five years after reviewing performance. This would enable the Government to sell more equity stake as entities become more profitable, allowing for wealth creation, while also helping the Government to avoid any further issuance of sovereign guarantees.

iii. ***Decentralization of Distribution sector:*** Central planning has its flaws when the dynamics of the provision of services are different across the regions. This can be illustrated by the fact that distribution companies in different regions have different challenges and require different policy solutions better suited to the respective territory. Similarly, the identical setting of tariffs across the provinces, cities, and towns of government-run distribution companies is not a reasonable strategy, as territories with less unrecovered bills and power theft should be charged less tariff compared to the region of higher inefficiencies. Therefore, provincial governments are in a better position to identify the reasons behind higher inefficiencies in some areas and then determine tariffs best suited to those localities to augment efficiency and minimize losses. The role of the regulator should be to monitor the implementation of policies and provision of service.

iv. ***Mechanism for tariff Determination:*** Currently, tariffs are determined on the basis of NEPRA set targets of recovery, which are unrealistic in nature and not reflective of actual cost as acknowledged in the National Electricity Policy 2021. Therefore, recovery targets should be determined while considering ground realities with the inputs of DISCOs. Moreover, timely determination of tariffs is cardinal in the overall financial sustainability of the DISCOs, which is at present hindering cost recovery and adding to the burden. Furthermore, timely payment of government dues and TDS to the DISCOs is essential for the operational efficiencies and in case of delays, DISCOs should be compensated.

v. ***Division and Specialization of Roles:*** The efficiency of the distribution companies can be augmented by separating the distribution role and collection of utility bills role. The division of roles will enable the regulator to determine which component of the supply chain is inefficient and then policies could be designed. If government is not moving forward with the privatization policy, then the bill collection service should be outsourced to the private sector through competitive bidding so that mismanagement of the distribution companies in terms of bill recovery can be resolved. The regulator should circulate the policy to the distributors that delays in the submission of utility bills after 45 days of the due date will result in the termination of the connection irrespective of government or private entity.

vi. ***Customer Compliance through Incentives:*** The prevalence of the issue of power theft and unrecovered bills throughout the country is a manifestation of the acceptance of defiance in society. The public should be sensitized about the gravity of the situation and prompted to promote compliance through awareness programs and lowering tariffs in the areas where compliance is high. This will incite a sense of responsibility in the citizens to report theft and will encourage people to pay utility bills if the tariff in their territory is high as compared to the adjoining territories.

II. Technical Recommendations:

The distribution infrastructure is outdated and has been neglected by policymakers for decades; therefore, the overhaul of the transmission and distribution lines should be the cardinal priority of the government in the reform process. Other areas of attention are illustrated below:

i. ***GIS Indexing and Network Mapping:*** GIS is envisaged as a tool for the development of consumer and electrical network databases, used by various applications like customer information systems, asset management, billing system, customer services, energy audit, and load flow studies. This involves conducting a GPS survey of consumer households, connected electrical feeders, and distribution transformers. All the consumers are then indexed and given a unique electrical address, making it possible to segregate consumers for energy audit and accounting purposes.

ii. ***Automated Meter Reading (AMR):*** The amount of data read by electronic meters has increased manifold and AMR has become a necessity for effective energy management, to overcome the problems of manual readings. The preparation of electrical network database, consumer indexing and documentation is the first step for effective AMR and correct energy accounting.

iii. ***Energy Audit and Accounting:*** The AMR can be used to correctly identify the areas of low voltages, over-loading and causes of high energy losses. AMR contributes to accountability and operational efficiency.

iv. ***Prepaid Metering System:*** Prepaid metering system uses a smart card for a pre-set value of electricity that the consumers wish to consume. The amount paid along with other consumer information is encoded into the smart card. The consumer inserts the card in the prepaid meter, which reads the data and when the pre-paid energy is used up, the consumer can get the card recharged from the utility office. It eliminates problems related to meter reading, bill distribution, billing disputes and collection.

v. ***Human Resource Development:*** The performance of DISCOs is contingent upon the capability and efficiency of the staff. The focus on capacity building of the employees of government DISCOs and as well as regulator should be the utmost priority of the government, and therefore, training of the entire staff along with the mandatory workshops on the successful practices should be done on regular basis to keep them abreast of the developments in the technology, as mere adoption of modern technology and equipment is not sufficient rather its continuous upgradation is required.

Appendix

Table I: Bill Recovery as % of Total Billed Amount (Average of FY16-20)

68	95.4
PESCO	88.7
GEPCO	97.4
FESCO	96.1
LESCO	98.0
MEPCO	98.0
QESCO	53.2
TESCO	144.5
SEPCO	69.3
HESCO	77.8

Source: PER, NEPRA

Table II: Breach from Target (Average of FY16-20)

IESCO	-4.6
PESCO	-11.3
GEPCO	-2.6
FESCO	-3.9
LESCO	-2.0
MEPCO	-2.0
QESCO	-46.8
TESCO	44.5
SEPCO	-30.7
HESCO	-22.2

Source: PER, NEPRA

Table III: Share in Financial Loss due to Non-Recovery of Bills (FY16-20)

IESCO	-8%
PESCO	12%
GEPCO	3%
FESCO	7%
LESCO	6%
MEPCO	4%
QESCO	20%
SEPCO	11%
HESCO	11%

Source: PER, NEPRA

Table IV: Breach of T&D Losses (Average of FY16-20)

IESCO	-0.1
PESCO	7.3
GEPCO	0.0
FESCO	1.3
LESCO	1.8
MEPCO	1.2
QESCO	6.4
TESCO	-0.7
SEPCO	6.5
HESCO	7.6

Source: PER, NEPRA

Table V: Share in Total Financial Loss due to T&D Losses (FY16-20)

IESCO	5%
PESCO	28%
LESCO	10%
MEPCO	5%
QESCO	13%
SEPCO	12%
HESCO	14%

Source: PER, NEPRA

Table VI: Load Shedding Hours (Average of FY16-20)

IESCO	2.7
PESCO	2.8
GEPCO	3.8
FESCO	1.6
LESCO	2.2
MEPCO	1.7
QESCO	5.2
SEPCO	2.0
HESCO	4.6

Source: PER, NEPRA

Table VII: Share in Total Loss (FY16-20)

IESCO	6%
PESCO	18%
GEPCO	2%
FESCO	5%
LESCO	7%
MEPCO	4%
QESCO	18%
SEPCO	12%
HESCO	12%

Source: PER, NEPRA

Table VIII: Total Subsidy Received (FY16-19)

(Rs. Billion)	
IESCO	43.1
PESCO	152.8
GEPCO	104.6
FESCO	85.6
MEPCO	166
HESCO	58.6

Source: Annual Financial Statements of DISCOs

Table IX: Complaints as % of Total Consumers (Average of FY16-20)

IESCO	8.3
PESCO	5.7
GEPCO	21.9
FESCO	10.5
LESCO	45.7
MEPCO	1.7
QESCO	7.5
SEPCO	1.6
HESCO	7.2

Source: PER, NEPRA

Table X: Fatal Accidents for both Employees & Public (Average of FY16-20)

IESCO	20
PESCO	20
GEPCO	15
FESCO	12
LESCO	18
MEPCO	15
QESCO	7
SEPCO	16
HESCO	12

Source: PER, NEPRA

Table XI: Share in Pending Applications (Average of FY16-20)

DISCO	Domestic	Commercial	Industrial	Agriculture
IESCO	7.5%	10.8%	1.9%	0.9%
PESCO	5.2%	7.9%	4.1%	2.4%
GEPCO	10.1%	11.4%	17.1%	15.4%
FESCO	21.5%	20.2%	19.6%	22.1%
LESCO	22.6%	21.2%	31.8%	14.5%
MEPCO	30.3%	20.8%	19.4%	37.6%
QESCO	0.5%	2.4%	0.8%	3.8%
SEPCO	0.6%	1.0%	2.2%	0.3%
HESCO	1.6%	3.0%	2.7%	1.5%
TESCO	0.1%	1.3%	0.4%	1.6%

Source: NTDC