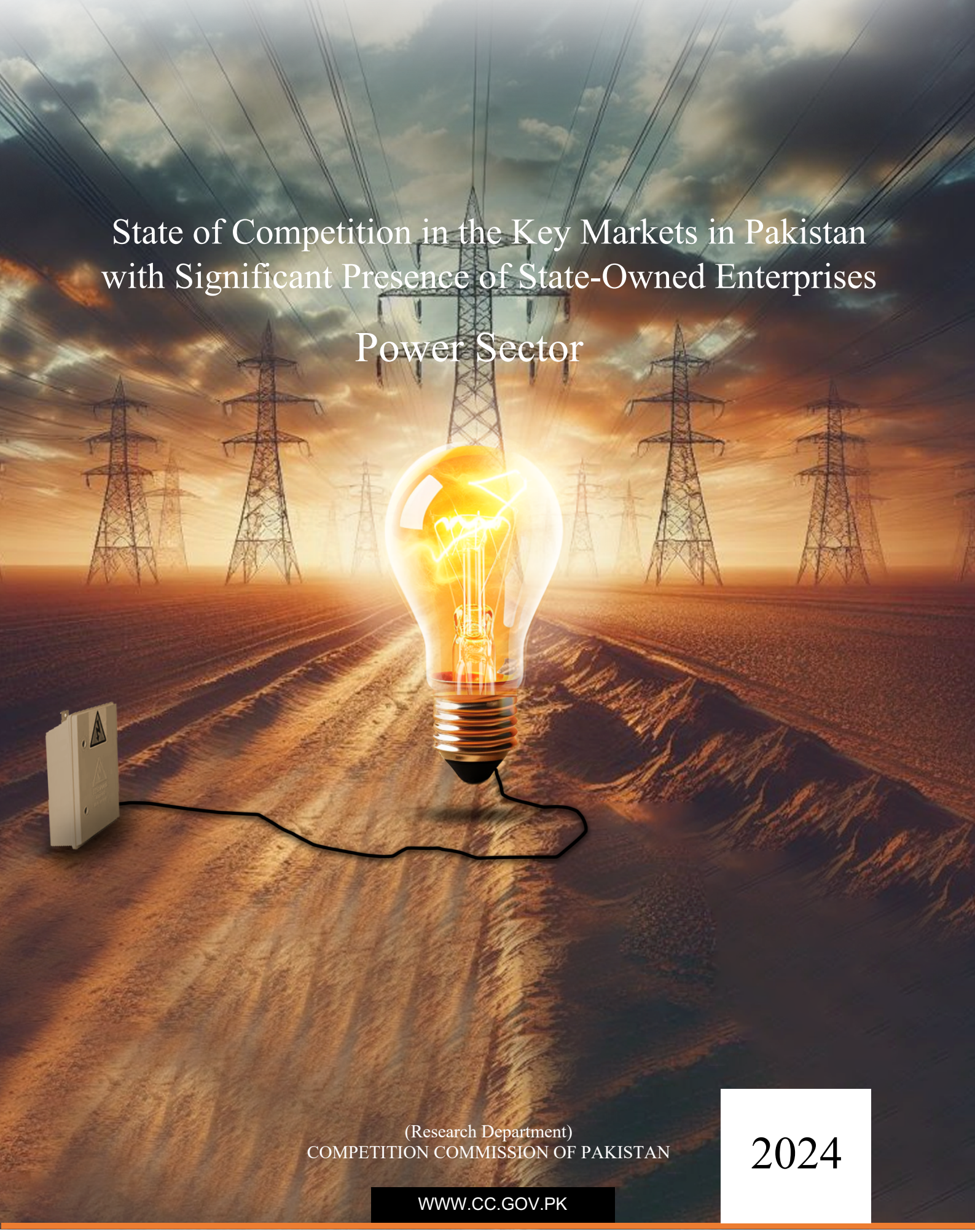
State of Competition in the Key Markets in Pakistan with Significant Presence of State-Owned Enterprises

Power Sector



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Foreword

The power sector is core to Pakistan's economic stability and growth, directly impacting the country's ability to meet its energy demands at affordable level. Despite its critical importance, the sector has to address a series of competition issues that are presently undermining its efficiency and effectiveness. This Competition Assessment Report delves into the complexities of Pakistan's power sector, highlighting the structural, regulatory, and strategic challenges that have stifled competition and perpetuated inefficiencies.

This Report also draws on the World Bank Group's Market and Competition Policy Assessment Toolkit (MCPAT). This framework provides for a review of the market characteristics and regulatory frameworks and their effectiveness in promoting functioning markets that could deliver competitive outcomes and a more efficient resource allocation in Pakistan. Our in-depth analysis reveals the predominant role of State-Owned Enterprises (SOEs) in the power distribution and transmission landscape, compounded by certain preferential treatment that exacerbates the competitive imbalance for the sector historically. These SOEs dominate the market, creating formidable barriers to entry for private sector participants, who face stringent regulatory requirements and an environment fraught with systemic and sectoral challenges too.

The sector is currently in a state of disarray, characterized by substantial losses, mounting circular debt, and pervasive inefficiencies. These issues not only impede the sector's ability to function optimally but also threaten the broader economic stability of Pakistan. Addressing these challenges requires a concerted effort to implement regulatory reforms that promote a fair and competitive market environment in the sector. Globally, it is an established fact that competition brings efficiencies that are beneficial for consumers, government and investment climate.

This report underscores the urgent need for structural reforms to dismantle the existing barriers and create an equitable platform for all market players at the wholesale and retail level of power supply. By fostering a competitive and efficient power sector, we can ensure reliable energy supply and reduce inefficiencies.

We hope this report serves as a catalyst for meaningful dialogue and actionable reforms for having an open competitive power sector. Policymakers, industry stakeholders, and regulatory bodies must collaborate in this endeavour to implement these changes, ensuring that Pakistan's power sector supports the national growth agenda, besides having affordable energy for consumers under an open competitive environment.

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Chairman
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Table of Contents

List of Tables

List of Figures

List of Acronyms

AEDB	Alternative Energy Development Board
BPC(s)	Bulk Power Consumer(s)
CCoE	Cabinet Committee on Energy
CEGB	Central Electricity Generating Board
CERC	Central Electricity Regulatory Commission
CPEC	China-Pakistan Economic Corridor
CPPA-G	Central Power Purchasing Agency
CPPs	Captive Power Producers
CTBCM	Competitive Trading Bilateral Contracts Market
DISCOs	Distribution Companies
DNOs	Distribution Network Operators
FESCO	Faisalabad Electric Supply Company
GENCOs	Generation Companies
GEPCO	Gujranwala Electric Power Company
HESCO	Hyderabad Electric Supply Company
HVDC	High-Voltage Direct Current
IESCO	Islamabad Electric Supply Company
IGCs	Independent Generation Companies
IPPs	Independent Power Producers
LESCO	Lahore Electric Supply Company
MCC	Market Commercial Code
MEPCO	Multan Electric Power Company
MIRADs	Market Implementation and Regulatory Affairs Departments
MPPs	Major Power Producers
N-CPPs	New Captive Power Producers
NEPRA	National Electric Power Regulatory Authority
NGC	National Grid Company
NTDC	National Transmission & Despatch Company
OFGEM	Office of Gas and Electricity Markets
PESCO	Peshawar Electric Supply Company
PGCs	Provincial Grid Companies
POWERGRID	Power Grid Corporation of India Limited and
PPIB	Private Power and Infrastructure Board (PPIB)
PPMC	Power Planning and Monitoring Company
QESCO	Quetta Electric Supply Company
REBs	Regional Electricity Boards
SEPCO	Sukkur Electric Power Company
SERC	State Electricity Regulatory Commission
SOEs	State Owned Enterprises
SPPs	Small Power Producers
TDS	Tariff Differential Subsidy
TESCO	Tribal Areas Electricity Supply Company
TRS	Tariff Rationalizing Surcharge
WAPDA	Water and Power Development Authority

Executive Summary

The power sector is crucial for the economy as it provides the necessary energy to drive industrial, commercial, and residential activities. Reliable and efficient power supply is essential for the smooth functioning of businesses, which in turn boosts economic productivity and growth. The development of the power sector attracts investments, creates jobs, and fosters technological advancements. Nevertheless, mere availability of electricity is not sufficient to reap its benefits for social and economic uplift of the country unless it is affordable and within the economic reach of different segments of society.

The International Monetary Fund (IMF's) '*Public Investment Management Assessment (PIMA) Report',* 2023 *inter alia*, recommends implementing the *state Owned Enterprises (SOEs) Triage: Reforms and Way Forward" Report*, 2021, which was prepared under an extensive collaboration and consultative work among the *Ministry of Finance, IMF, the World Bank and the Asian Development Bank (ADB).* The SOEs Triage Report refers to a comprehensive review of existing SOEs' portfolio for the purpose of their categorization for retention, privatization and liquidation initiated in November 2019, as a part of the IMF Extended Fund Facility 2019-22 structural benchmark. IMFs PIMA Report recommends preparing reports on the state of competition in the key markets with significant SOEs presence in Pakistan. These markets include the Power Sector in Pakistan. Accordingly, this Report examines the state of competition in Pakistan's Power Sector, characterized by a significant presence of the SOEs. The analysis covers the regulatory framework, market structure, and the barriers to competition, offering strategic recommendations to foster a more competitive environment in the industry.

Pakistan's power sector comprises of four main components: generation, transmission, distribution and supply. Electricity is produced through various methods such as thermal, hydro, nuclear, and renewable sources, with both public and private sectors involved in its generation. NTDC oversees the transmission of electricity through high-voltage networks, whereas DISCOs are distributing and supplying electricity to end consumers. Prior to restructuring, WAPDA managed all aspects of power generation, transmission, and distribution. However, reforms implemented in the 1990s led to the unbundling of WAPDA, resulting in the creation of separate entities for generation, transmission, distribution and supply. Additionally, the establishment of the National Electric Power Regulatory Authority (NEPRA) in 1997 aimed to regulate the entire power sector.

As of June 30, 2023, the installed capacity of the power sector was 45,885 (MW) with thermal energy being the dominant source that accounts for 62.79% followed by hydel 23.18%, nuclear 7.89%, and renewable sources make up 6.14%, respectively. Household consumption is the highest (44%), followed by the industrial sector (26%), agricultural (8%), and commercial sector (7%). Within the sector, there are fourteen active SOEs, including ten Distribution Companies (DISCOs), three Generation Companies (GENCOs), and one Transmission Company. The power generation is dominated by the Independent Power Producers (IPPs). The transmission and distribution systems are under the government control except for K-Electric that supplies electricity to Karachi city.

The power generation in Pakistan has been opened to the private sector through the Power Policy of 1994.[1] Whereas in the policies of 2002 and 2015 further incentives were provided.

[1] As per comments from NEPRA, HUBCO and KAPCO were granted license prior to Power Policy, 1994.

Though, policies exist to open the transmission and distribution segments, yet the pace of development is slow. The absence of competitive bidding or reverse auction for tariff determination has resulted into high power cost.[2]

The Pro-competition Initiative - Competitive Trading Bilateral Contract Market Model: To have a competitive market for power sector under the NEPRA Act, initially, a timeline was given by NEPRA till 2012. However, Competitive Trading Bilateral Contract Market (CTBCM) model was approved in 2020, a roadmap for opening the Wholesale Electricity Market of Pakistan, aiming to provide choice to the bulk power consumers (with 1MW or above load) to purchase electric power from the DISCOs or a competitive supplier of their choice. NEPRA took initiatives in 2018 including amendments to the Regulation of Generation, Transmission, and Distribution of Electric Power Act, 1997 to incorporate the CTBCM model. These efforts sought to open the market for new players, aligning with the principles of the Competition Act, 2010. However, the role of SOEs in fostering competition attained attention, with concerns raised about the potential restrictions on competition, innovation limitations, and market inefficiencies.

Barriers to Competition facing the power sector in Pakistan:

Competition and the efficiency of the sector is affected by the following barriers:

High initial capital requirement. This is a major the barrier to market entry for generation, transmission, and distribution infrastructure.

Monopolistic Market Structure. The power transmission and distribution are dominated by state-owned entities like the National Transmission and Despatch Company (NTDC) and regional distribution companies (DISCOs). At the transmission level, NTDC, licensed as the National Grid Company, dominates the transmission segment despite efforts to engage the private sector under the 2015 Transmission Line Policy. Further, the Provincial Grid Companies (PGCs) established to improve power transmission, have progressed slowly. The dominance of NTDC has resulted in insufficient capacity during peak demand periods. The infrastructure is unable to meet the high demand. Moreover, it is a single buyer model wherein CPPA-G is the sole buyer of electricity from the power producers, which further sells electricity to DISCOs. This model acts as a monopoly in the market, and limits competition.

Infrastructure Constraints. Much of the existing power generation, transmission, and distribution infrastructure is outdated, ageing and in need of upgrades and maintenance. For an open market, existence of an infrastructure is crucial for its success. Without proper infrastructure, an efficient market cannot be established.

Predominance of State owned Distribution companies (Transmission and Distribution Losses). There is predominance of state owned companies in the distribution with average losses above 17.6 percent. DISCOs face operational inefficiencies, high losses, and load-shedding practice that affect paying customers. Also, the circular debt is increasing, among others, due to unaddressed inefficiencies and inadequate infrastructure investment to control losses. Inefficiencies in system act as a barrier for new entrants.

[2] Though, the Renewable Energy Policy 2006 provided for some competition in the sector.

Tariff Differential Subsidy. The imposition of a uniform tariff and compensation for tariff differentials through Tariff Differential Subsidy (TDS) further exacerbates competition barriers by indirectly supporting less efficient DISCOs over more efficient ones. This undermines the goals of competitive market models, impeding market development and equitable pricing.

Unreasonable System/Wheeling Charges. The delayed determination of Use of System Charges (UoSC) essential for launching the CTBCM poses risk to market competitiveness and investment. It is crucial that any such charged be reasonable, otherwise the overall objective of opening of the wholesale market will not be achieved.

Geographical Challenges. Providing reliable electricity to remote rural areas is challenging due to mountainous terrain in the northern and western regions, and the high cost of extending the grid. Implementing off-grid solution in these areas is essential to ensure that they receive electricity.

Distance from Power Sources. Long distances between power generation facilities and load demand centers (e.g., major cities) results in significant transmission losses and higher costs. It calls for proper planning function complemented by effective policy function.

Socio-Economic Barriers. This includes urban vs. rural population density. This makes sparsely populated rural areas economically unviable for grid extension. Whereas, urban areas have significant demand for electricity. The disparities in electricity distribution lead to load shedding in less prioritized areas, impacting economic activities.

Recommendations for a Competition-based Power Sector. To address the above-mentioned barriers to competition, a multi-faceted approach is required. This Report offers the following recommendations:

i. **Timely operationalization of the CTBCM model.** The regulatory improvements include streamlining regulations and policy stability. The CTBCM Model was approved in 2020 and outlined in the NEPRA Act, National Electricity Policy 2021 and National Electricity Plan 2023-27. CTBCM paves the way for a competitive wholesale electricity market, enhancing efficiency and cost-effectiveness by allowing power generators to supply electricity directly to bulk consumers through bilateral contracts. This first step will be a major milestone having a competitive market even at retail level.

ii. **There is a need to strength Market and Regulatory Affairs Department (MIRAD)** within the DISCOs, as endorsed in the CTBCM model. This will improve business planning considering a long term vision of the CTBCM.

iii. **Rationalizing the use of System/Wheeling Charges** for the transmission and distribution is necessary for the effective execution of the CTBCM. The charges must be fair, transparent, and reflect actual costs to foster competition.

Recommendations to improve competition in various segments

<u>Generation</u>

i. **Phasing Out of Inefficient Public Sector Generation Plants:** Strategically decommissioning the outdated and inefficient state-owned power generation plants to

reduce the financial burden of capacity payments. This approach will ensure that the efficient plants remain operational, leading to improved overall system performance and cost-effectiveness in electricity generation.

ii. **Off-grid solutions** under the provincial or local government supervision, with the help of private sector or through public-private partnerships, can address electricity issues at the base level. These projects can either transmit electricity to the national grid or sell directly to consumers. These will reduce the burden on the Federal Government, alleviate financial pressure from loss-making SOEs and circular debt, much in line with the PIMA framework.

iii. **Induction of Low-Cost Generation Projects through Competitive Bidding.** Despite the fact that Pakistan has excess generation capacity, still there are generation projects in progress. Therefore, a long term policy vision needs to target reducing the overall power generation cost. One of the effective ways to achieve this is induction of low-cost generation projects through competitive bidding. This will ensure cost-effectiveness, efficiency, and transparency in the sector that ultimately leads to lower tariff for end consumers.

Transmission

i. **Improving the transmission capacity** through Private Sector participation and Provincial Grid Companies (PGCs). Fully implementing the Transmission Line Policy 2015, which encourages private sector participation via the BOOT model, is important. Operational PGCs will ensure efficient energy transmission, promote competition in the transmission segment, and support the CTBCM model.

Distribution

i. **Change in the business model of DISCOs.** Full privatization of the existing DISCOs may be carried out or the DISCOs may be operated under the public-private partnerships to address high distribution losses and to open the market.

ii. **Revising the Tariff Differential Subsidies** to discourage uniform tariff system, which applies the same electricity price nationwide and results in cost of inefficiencies of underperforming DISCOs borne by paying consumers of better performing DISCOs.

iii. **Gradually introducing retail competition** within the power sector needs to be the ultimate target. As the market matures, NEPRA should lower the threshold of 1 MW, enabling end-consumers to choose their suppliers. The retail competition should be supported by the use of smart metering or prepaid metering. The strategy will enable consumers to select their preferred electricity provider, promoting a competitive market and improving consumer choice. Although, this transition will require time to actualize.

iv. **Infrastructure Investment**. Infrastructure is fundamental to the power sector, however it is not up to mark to address the fulfilment of required transmission and distribution network. Therefore, it is crucial to invest in the up-gradation and expansion of the infrastructure.

v. **Consumer Education**. Raising awareness about the importance of paying bills and the consequences of electricity theft can improve payment discipline.

Chapter 1 - Introduction and Background to the Power Sector

1.1 Overview of the Power Sector in Pakistan

1. The power sector is vital to the socio-economic development of the country. Access to electricity is essential for industrial growth, creating employment opportunities, improving healthcare and education, promoting agricultural development, ensuring environmental sustainability, and helping to achieve broader development goals such as alleviating poverty. However, the mere availability of electricity is insufficient to harness its potential for socio-economic betterment of the nation unless it is affordable and accessible to various segments of society.

2. The power sector in Pakistan is classified into four verticals i.e., generation, transmission distribution, and distribution, as explained below.

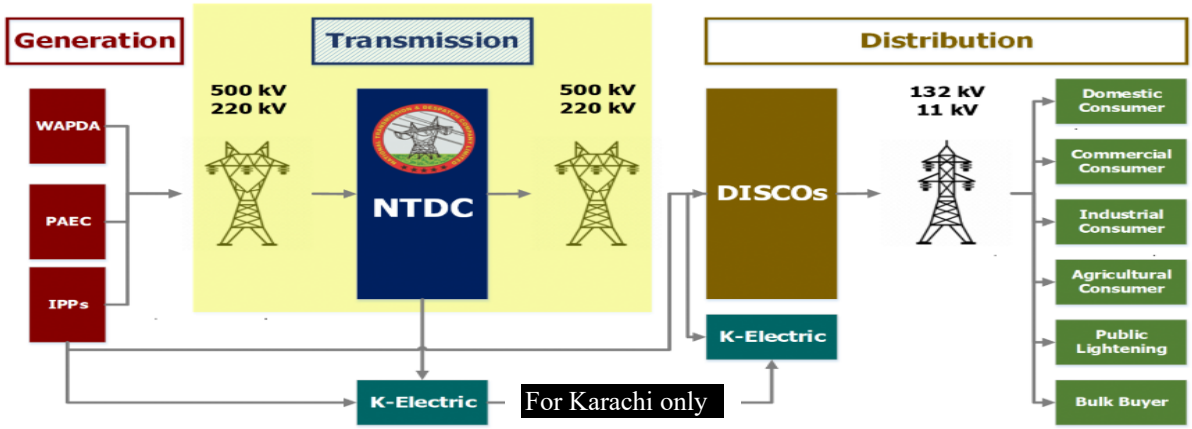
   a. **Generation**, electricity is produced through thermal power plants, hydroelectric power, nuclear plants and renewable energy sources.[3]

   b. **Transmission**, the National Transmission & Despatch Company Limited (NTDC) manages and operates the high-voltage transmission system in Pakistan being the National Grid Company.[4]

   c. **Electricity distribution** is managed by the distribution companies (DISCOs) to deliver electricity from the national grid to residential, commercial, industrial, and agricultural consumers. DISCOs also manage transmission but at 132KV level only.

   d. **Supply**. After the amendments in NEPRA Act in 2018, it bifurcated the distribution and supply functions at the DISCOs. Electricity supply will function for commercial contracts and billing businesses for future bilateral competitive power business. Figure 1 explains the above-mentioned verticals of the power sector in Pakistan.

Figure 1: Electricity Generation, Transmission, and Distribution Mechanism in Pakistan



Source: https://www.ppib.gov.pk/pakistans-power-sector-overview/

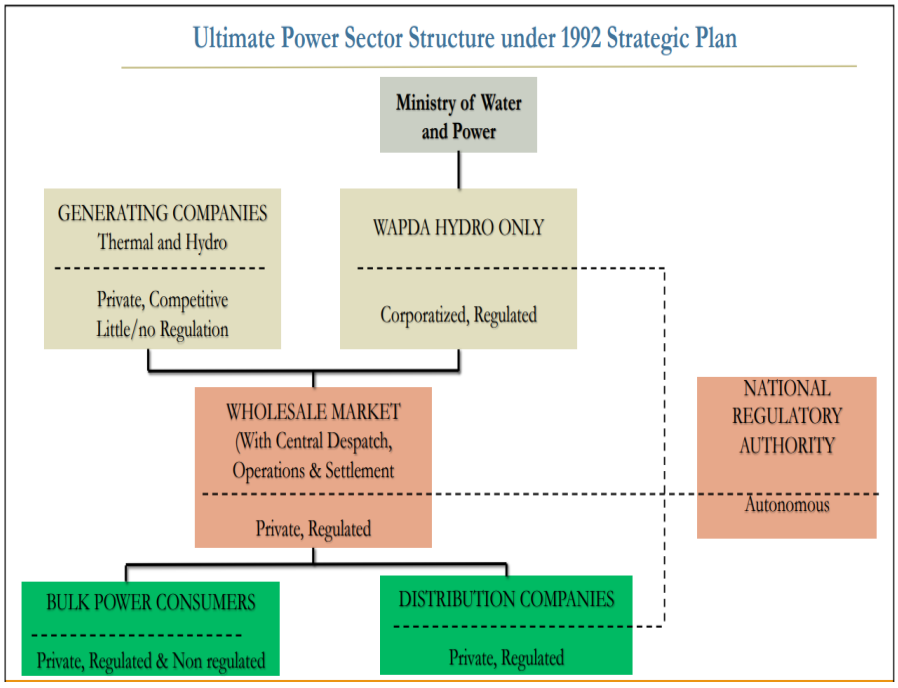
[3] The Power Sector of Pakistan; A Brief Review, (2021), Fareeha Noor & Marwa Ashfaq. Online accessible at https://ieec.neduet.edu.pk/2021/papers_2021/IEEC_2021_41.pdf

[4] NTDC official website. Online accessible at https://ntdc.gov.pk/the-company
NEPRA has also granted Provincial Grid Company (PGC) licenses for the provinces of Sindh, Punjab and Khyber Pakhtunkhwa.

1.2 Power Sector in a Historical Perspective

3. Before the unbundling process in 1998, the power sector was controlled by the two government-owned utilities: Water and Power Development Authority (WAPDA) and K-Electric formerly Karachi Electric Supply Company (KESC). Subsequently, WAPDA's Power Wing was separated into distinct entities, each focused on a specific aspect of power i.e., generation, transmission, or distribution. WAPDA's role in the power sector was redefined to focus only on hydel power generation, and the operation and maintenance of powerhouses. The regulator, National Electric Power Regulatory Authority (NEPRA) was established in 1997 for regulating the electricity generation, transmission, and distribution.

Figure 2: Post-Restructuring Landscape of Pakistan's Power Sector



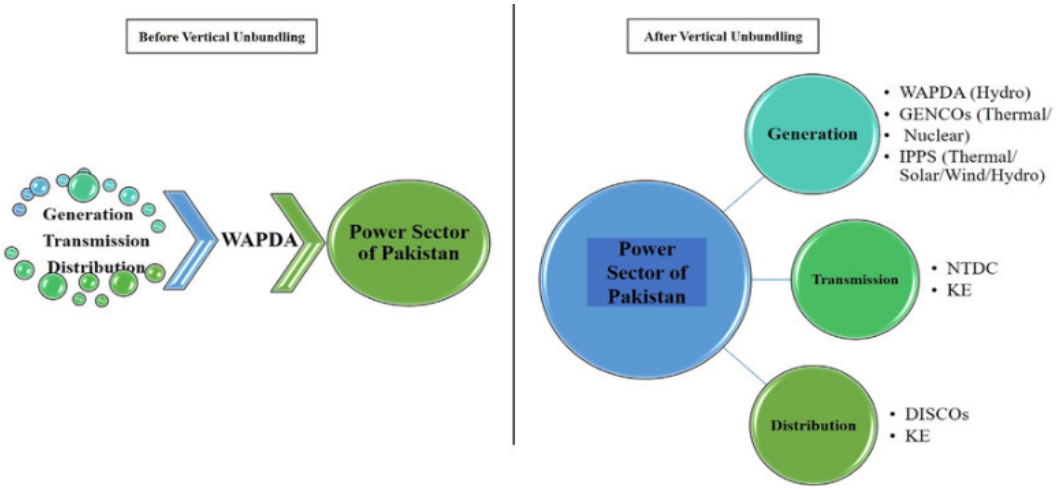
4. The restructuring resulted into the following:

   a. **Generation Companies (GENCOs)** were established for operating and maintaining power generation facilities using thermal, and other sources.
   b. **National Transmission & Despatch Company (NTDC)** manages the transmission of electricity across the national grid. It is responsible for the operation and maintenance of high-voltage transmission lines and substations.
   c. **Distribution Companies (DISCOs).** The Distribution Wing of WAPDA was divided into multiple distribution companies, each responsible for supplying electricity to specific geographic regions. Also, the DISCOs were responsible for managing the distribution networks, metering, billing, and customer services within their respective areas.[5]

[5] Marching towards a wholesale electricity market in Pakistan. (2022 Kabraji & Talibuddin https://www.lexology.com/library/detail.aspx?g=b0f90fdd-5543-4a54-adda-dc332db82ba2

5. The restructuring of the power sector created the above-mentioned entities, encapsulated in Figure 3 i.e., the landscape before and after the unbundling of WAPDA in 1998.

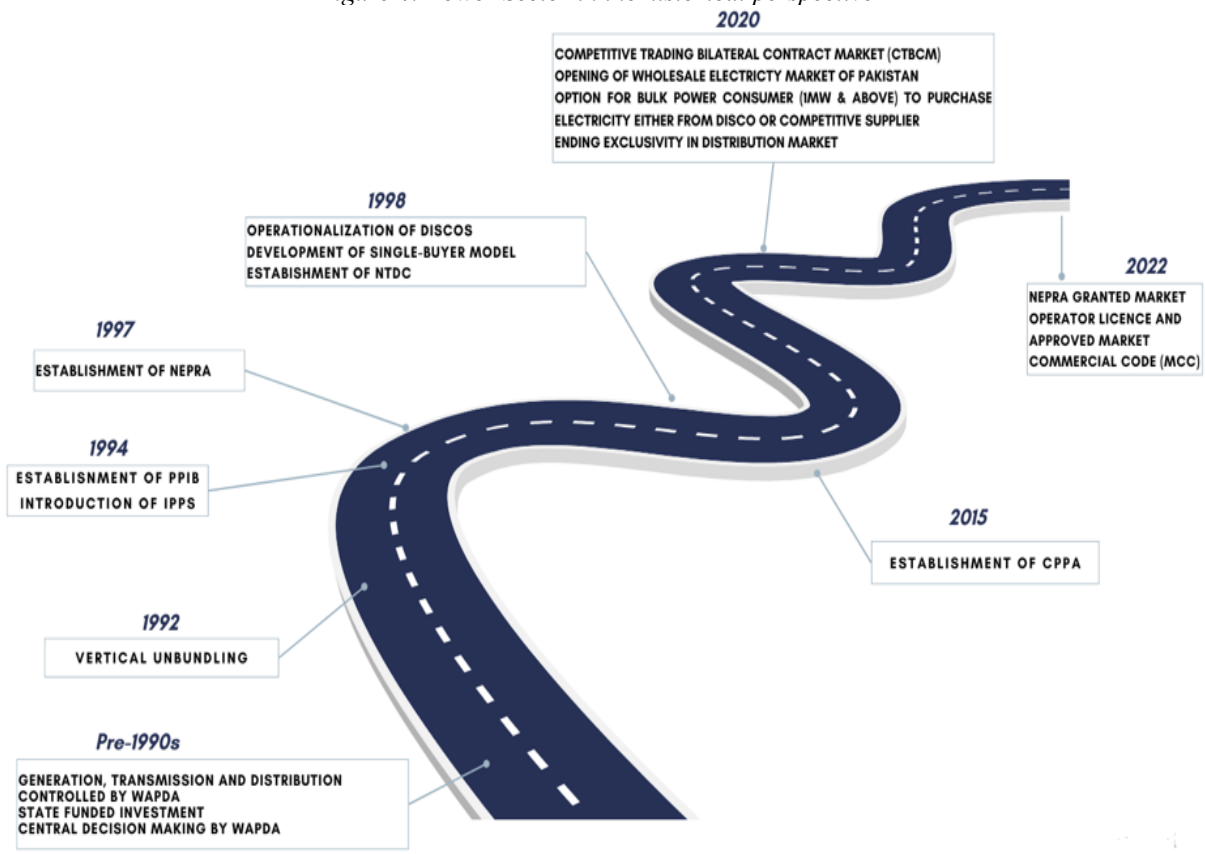
Figure 3: Before and After the Unbundling of WAPDA in 1998



Source: https://www.researchgate.net/figure/Pre-and-post-unbundling-of-power-sector_fig2_326030537

6. Further, the figure 4 presents the historical evolution of the power sector in Pakistan.[6]

Figure 4: Power Sector in the historical perspective



Source: Derived by the Author

[6] For details see: Annex-V.

1.3 Current Landscape - Capacity, Generation, & Consumption

7. Pakistan generates power from a diverse array of sources: hydropower, thermal, nuclear, and renewable energy i.e., wind, solar, and bagasse/biomass. In the remote areas of Baluchistan province, Pakistan supplements its electricity supply by importing power from Iran for areas close to Iranian border. The diversified energy mix is essential for ensuring a stable and reliable power supply to meet the nation's energy demands.

8. As of June 30, 2023 Pakistan's installed capacity was 45,885 MW. The detailed breakdown of the capacity according to energy sources and systems is presented in Table 1: Installed Capacity and Generation of Electricity . The distribution of production sources is as follows: thermal accounts for 62.79 percent, hydel constitutes 23.18 percent, nuclear contributes 7.89 percent, and renewable sources make up 6.14 percent.

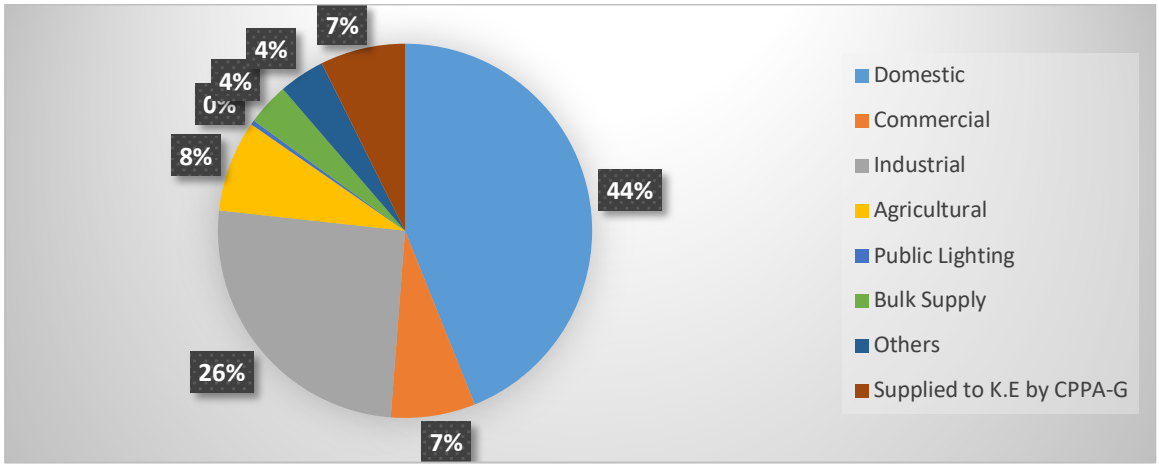
9. On the generation side, the total generation in Central Power Purchasing Agency (CPPA-G) area remained 128,623.87 GWh which is 93% of the total generation. This comprises of 35,273.62 GWh from hydro, 63,272.41 GWh from thermal sources, 24,054.56 GWh from nuclear, 6,023.28 GWh from renewable and 478.62 GWh import from Iran.

Table 1: Installed Capacity and Generation of Electricity as of June 30, 2023

Source	Installed Capacity		Generation	
	MW	Share (%)	GWh	Share (%)
Hydel	10,635	23.18	35,273	25.56
Thermal (GENCOs, IPPs, and SPPs)	28,811	62.79	63,272	52.09
Nuclear	3,620	7.89	24,054	17.43
Renewable (Wind, Solar, Bagasse)	2,617	6.14	6,023	4.58
Total (CPPA-G)	42,362		128,623	
Source: NEPRA State of the Industry Report 2023				

10. Figure 5 shows the market share of electricity consumption in GWh across various categories. Accordingly, the households account for the largest share at 44%, followed by the industrial sector at 26%. The agricultural activities account for 8%, whereas the commercial sector uses 7%. Bulk supply and other categories make up to 4% respectively. This distribution highlights the dominance of the household and industrial consumption in the energy market.

Figure 5: Sectoral share in electricity consumption 2022-23



Source: NEPRA, State of Industry Report FY-2023

1.4 Rational of the Study

11. The International Monetary Fund's (IMF) 'Public Investment Management Assessment (PIMA) Report', 2023 *inter alia*, recommends implementing the State-Owned Enterprises (SOEs) Triage: Reforms and Way Forward" Report, 2021, which was prepared under an extensive collaboration and consultative work among the Ministry of Finance, IMF, the World Bank and the Asian Development Bank. The SOEs Triage Report refers to a comprehensive review of the existing SOEs portfolio for the purpose of their categorization for retention, privatization and liquidation initiated in November 2019 as a part of IMF Extended Fund Facility 2019-22 structural benchmark. The IMF's PIMA Report recommends to conduct studies on the state of competition in key markets with significant SOEs' presence in Pakistan. The Ministry of Finance referred this task to the CCP, to conduct studies on the key markets that include: Insurance, Road Construction, Power Sector and LNG Industry. This Report covers the state of competition in the Power Sector of Pakistan, with specific emphasis on the SOEs.

1.5 Objective of the Study

12. The main objective of this study is to evaluate the level of competition in Pakistan's power sector, paying special attention to the function and impact of the SOEs. To conduct this analysis, the current regulatory framework will be examined to identify any competition concerns, barriers, or business practices that may prevent market competition. The study offers recommendations for legislative changes and regulatory reforms for a more open and competitive power market. The recommendations aim to streamline market entry, mitigate monopolistic tendencies, and harmonize Pakistan's power sector with the global best practices. Hence, improving the sector's efficiency and positive economic impact on the country, much in line with the objectives of the PIMA Report.

13. The power sector plays a key role in the economic development of the country. However, Pakistan's power sector is facing a multitude of issues. In this context, it is imperative to examine and identify any anti-competitive practices and the key barriers to competition faced by the sector. Given the above, the objectives of this study are:

    i. To present a profile of the sector in Pakistan, and to review the market dynamics while focusing on the SOEs and their potential impact on competition;

    ii. Review the regulatory framework governing the sector;

    iii. Review power sector's performance and policies in other jurisdictions;

    iv. Examination and identification of the barriers to competition, and

    v. Provide recommendations to promote competition in Pakistan's power sector.

Research Design

14. The World Bank Group's Markets and Competition Policy Assessment Tool (MCPAT) helps identify reform areas that need attention to promote competition. To better understand the competition dynamics within Pakistan's power sector, this study places special emphasis on the functioning and the impact of SOEs on competition. The research design follows a blend of qualitative and doctrinal research. The qualitative research used several techniques, including interviews, focus group discussions, and observations. Interviews

were based on unstructured, open-ended customized questions for various stakeholders. For doctrinal legal research methodology, the study focused on the relevant laws and regulations. Using these methodologies, this research has attempted to compose a descriptive and detailed analysis of the regulatory framework and market structure, for an assessment of the competitive environment.

Data Collection

15. *Documentary Research:* The secondary research has been conducted by reviewing the literature, including publications, official websites and annual reports of various governmental bodies such as NEPRA, CPPA, NTDC, Ministry of Energy (Power Division), and Pakistan Economic Survey. The data was also extracted from the news reports, research articles, and international reports on power sector. Available literature on the best practices in other jurisdictions form an integral part of the analysis.

16. *Interaction with the Stakeholders:* The primary research was conducted through consultative sessions and discussions with the all stakeholders, including from the NEPRA, Ministry of Energy (Power Division), Privatization Commission, Central Power Purchasing Authority (CPPA-G), Gujranwala Electric Power Company/ MIRAD. Meeting was also held to deliberate upon the state of competition and the role of SOEs, with the officials from the Central Monitoring Unit, working under the Finance Division. Furthermore, in-depth interviews of independent industry experts were also conducted. Besides the above, the Finance Division formed a Working Group, which held periodic meetings to review and give comments on the Report at its various stages (Annex-I). In all the meetings, consultative sessions and discussions, customized un-structured open ended questionnaires were used. The primary research aimed to gather mainly the undocumented information about the regulatory and competition concerns facing the power sector in Pakistan.

Ethical Considerations

17. The principle of confidentiality was applied to every interview and questionnaires sent to the stakeholders. This confidentiality provided the necessary confidence to the stakeholders to share the practical issues more openly.

Limitations

18. This research analyzes the competition landscape of the power sector, identify barriers to competition, assess the conduct of the SOEs, and review the regulatory framework to chalk out recommendations. In this context, the scope of the research was limited to examining the presence of the SOEs within the sector. Therefore, the role of the private sector e.g. independent power producers has not been covered. Additionally, there was absence of prior studies to reference on the competition in the power sector. Though, several industry stakeholders were consulted but no on-site observations were taken due to limited resources and time constraint.

Scheme of the Report

19. The study takes a comprehensive approach, structured as follows: Chapter One provides an introduction, a historical overview, and an analysis of the current landscape of the power sector. Chapter Two explores the international perspective on privatization within the power sector. Chapter Three offers a detailed overview of state-owned enterprises in power sector. Chapter Four examines the regulatory framework, market functioning, and the roles of ministries, regulators, and other key institutions. Chapter Five analyzes pro-competitive

measures within the sector. Chapter Six reviews market contestability and identifies barriers to competition. Finally, Chapter Seven presents conclusions and recommendations.

Chapter 2 - Regulatory Reforms in the Power Sector: International Case Studies

20. Privatization in the power sector has been a part of the world trend, which placed greater reliance on market forces and less dependence on government in the allocation of resources. The main drivers for this reform were: a) the underperformance of state-run electricity utilities, marked by high costs, limited access to electricity, and unreliable supply; b) the incapacity of the state sector to finance essential investments and maintenance; c) the necessity to eliminate subsidies, reallocating resources for other public expenditures; and d) the aim to generate immediate revenue for the government by selling assets from the sector.[7] The following Table provides an overview of the privatization initiatives and key features of the electricity market in various countries, while introducing more competition. However, the extent and outcomes of privatization efforts vary significantly depending on each country's regulatory framework, market structure, and political context.

India

21. Historically, the Indian Electricity sector was dominated by vertically integrated state-owned utilities in control for all aspects of electricity supply. However, reforms introduced in the 1990s led to the unbundling of these functions to promote competition and efficiency. Electricity generation in India is diverse, comprising thermal (coal, gas, oil), hydroelectric, renewable (solar, wind, biomass), and nuclear sources. The country has a mix of public and private generators. Similarly, transmission infrastructure is managed by Power Grid Corporation of India Limited, a state-owned company responsible for the interstate transmission of electricity. Electricity distribution is control by state-owned distribution companies at the state level. However, there is participation of private players in the distribution through various models like franchise agreements and privatization initiatives.[8]

22. The electricity sector in India is regulated by central and state regulatory commissions, such as the Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs). CERC is responsible for regulating the tariffs of generating companies supplying electricity to multiple states and for inter-state transmission. It issues licenses to transmission licensees and electricity traders for inter-state operations and determines tariffs for central sector generating companies and inter-state transmission systems. CERC administers power exchanges, fair trading practices, and sets standards for grid operation, including the national grid code at the inter-state level.[9]

23. On the other hand, SERCs regulate tariffs for generating companies within a state and for intra-state transmission and distribution. SERCs issue licenses for electricity distribution and intra-state trading, determine tariffs for intra-state generating stations, transmission, and distribution licensees, address consumer grievances, and enforce performance standards for utilities within the state.[10] The CERC and SERCs share several common

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7 https://documents1.worldbank.org/curated/en/226491468780869282/pdf/280850Global0electric0power0EMS0no-02.pdf

8 https://csis-website-prod.s3.amazonaws.com/s3fs-public/2024-01/240122_Rossow_India_Discoms.pdf?VersionId=cE.2T3pP7uAisSGv1ofQrksvFjeOoXG4

9 https://www.cercind.gov.in/Function.html

10 https://cercind.gov.in/serc.html

functions. Both are involved in the regulation of tariffs for electricity generation, transmission, and distribution within their respective jurisdictions. They promote competition, efficiency, and economy in the electricity industry to provide electricity at reasonable prices. Both bodies monitor licensee performance and ensure compliance with regulatory norms and standards. They implement national and state policies, aligning regulations with broader governmental objectives, and engage in capacity building and training programs to enhance operational efficiency and regulatory compliance.

24. Moreover, for a competitive market, the Power Exchange India Limited (PXIL) serves as a marketplace where buyers and sellers of electricity engage in transactions. PXIL enables participants to trade power through various market segments, including Day-Ahead Market (DAM), Term-Ahead Market (TAM), and Renewable Energy Certificates (RECs). The exchange provides a transparent mechanism for trading, which has improved trust and participation in the market. PXIL operates under the regulatory oversight of the CERC.[11] Despite progress, privatization efforts in India's electricity markets face challenges relating to regulations and financial distress among distribution companies.

United Kingdom

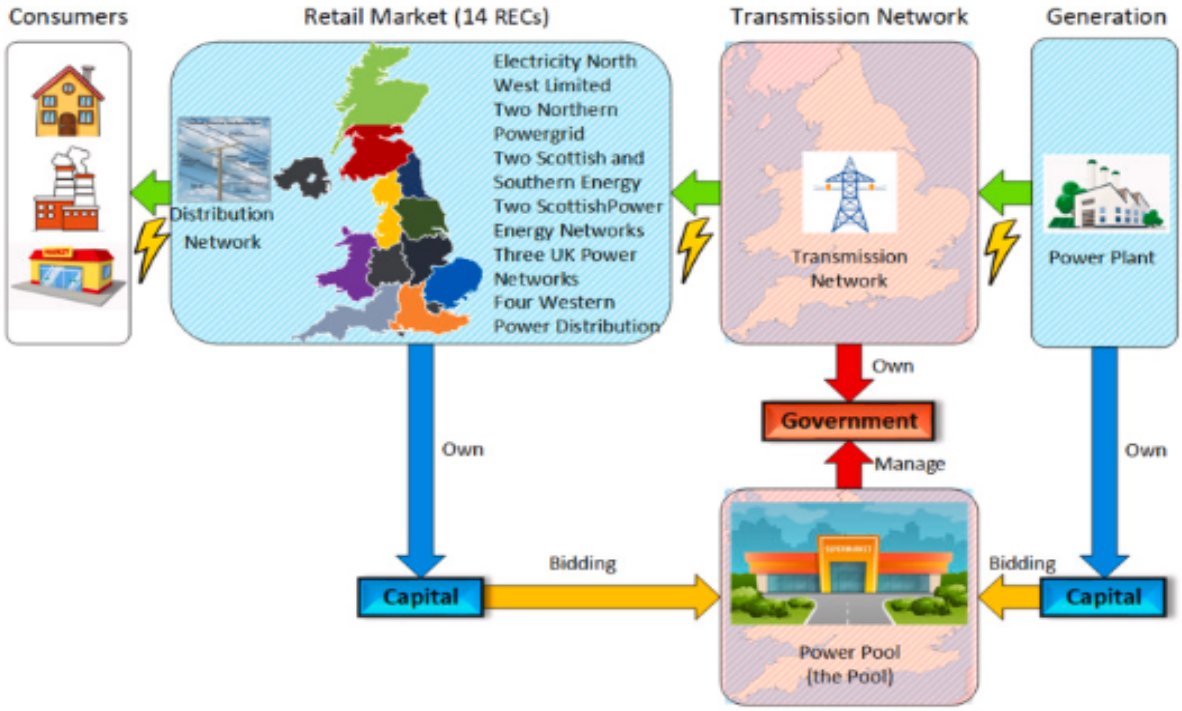
25. The UK's electricity market experienced a transformation in the 1990s, transitioning from a state-dominated system to a competitive, privatized model. Before Privatization, the Central Electricity Generating Board (CEGB) dominated electricity generation and transmission, while Regional Electricity Boards (REBs) managed distribution. Following reforms, CEGB was split into separate generation companies and a national grid operator, the National Grid Company (NGC). REBs were privatized into distribution network operators (DNOs), introducing competition in generation and supply, with generation companies (GENCOs) competing in wholesale markets and DNOs maintaining distribution networks.

26. The government established the Office of Gas and Electricity Markets (OFGEM) as an independent regulator to oversee the market, fair competition and consumer protection. Wholesale electricity prices determined by a market mechanism, reflecting supply and demand. Retail prices are still subject to some regulation, with a cap set by OFGEM to protect consumers.[12]

27. Privatization has catalyzed competition in the electricity sector through the implementation of the Pooling and Settlement Agreement (PSA). The Pool serves as a mandatory electricity market, requiring all large generators, with exceptions for plants under 50 MW, to sell and purchase electricity within its framework. Consequently, the Pool establishes the market trading rules for the electricity wholesale market and sets bidding regulations that generators must adhere to. The PSA has legally facilitated the inflow of capital into both the generation and distribution sectors, allowing local suppliers to become owners. Despite this, the government retains ownership of the transmission network and oversees the trading and operation of the electricity market through the Pool.[13] Privatization has brought increased competition, innovation, and investment to the UK electricity market, driving

[11] Accessed from https://powerexindia.in/Pages/Discover.html/
[12] https://www.ofgem.gov.uk/sites/default/files/2024-03/Future%20Price%20Protection%20Discussion%20Paper.pdf
[13] Evolution and reform of UK electricity market, 2022, https://sciencedirect.com/science/article/pii/S1364032122002313

improvements in efficiency, reliability, and sustainability. Since 2001, the number of major power producers (MPPs) has steadily increased as new generators came online, reaching a peak in 2020 of 58.[14]



28. Few other countries case studies regarding privatization in the power sector are discussed in the table below.

Table 2: International experiences of Privatization in Power sector

Country	Privatization Initiatives	Privatization Model	Key Features of Introducing Competition	Impact/Outcome
United Kingdom	Initiated in the 1990s through the Electricity Act 1989	Full Privatization and Market Liberalization	Vertical unbundling of generation, transmission, and distribution. Introduction of competitive wholesale and retail markets. Privatization of state-owned utilities such as British Energy and regional distribution companies.	- Increased efficiency and lower prices. - Improved service quality and innovation. - Emergence of multiple suppliers offering diverse products. - Enhanced consumer choice.
United States	Deregulation efforts began in the 1990s, varying by state	Partial Privatization and Deregulation	Competitive wholesale markets in some regions Retail competition in several states Independent system operators (ISOs) manage transmission grids and wholesale markets	Mixed outcomes: successful in states like Texas with competitive prices and innovation. Challenges in states like California with price volatility and reliability issues (e.g., 2000 crisis).
Australia	Introduced reforms in the 1990s through the National Electricity Market (NEM	Full Privatization and Market Liberalization	National Electricity Market facilitates wholesale electricity trading Privatization of state-owned utilities Retail competition in some states	Efficient market operation with competitive pricing. Improved reliability and service quality. Significant investment in renewable energy.

14 https://assets.publishing.service.gov.uk/media/6154611dd3bf7f55fa9268bc/Competition_in_UK_Electricity_Markets_2020.pdf

Country	Privatization Initiatives	Privatization Model	Key Features of Introducing Competition	Impact/Outcome
				Consumer benefits from choice.
New Zealand	Began in the 1980s with electricity sector reforms	Full Privatization and Market Liberalization	Unbundling: Separation of generation, transmission, and distribution Establishment of a competitive wholesale spot market Privatization of state-owned generation and distribution assets	Retail Competition increased with multiple retailers. Independent regulatory bodies to ensure fair competition. Increased private investment in the generation and retail sectors. Multiple regional distributers Increased efficiency in generation and distribution. Significant private investment in infrastructure and renewable energy. Competitive pricing. Introduction of innovative products. Improved reliability and service quality
Brazil	Started privatization in the late 1990s and early 2000s	Market Liberalization	Privatization of state-owned utilities Establishment of competitive wholesale market Retail competition in some regions	Increased private investment in the sector. Improved reliability and expanded access. Competitive pricing in wholesale markets. Challenges with regulatory enforcement.
India	Privatization efforts ongoing, with mixed progress across states	Partial Privatization and Market Reform	Partial privatization of generation and distribution utilities Competitive wholesale market in some regions Retail competition emerging in select states	Increased generation capacity. Improved efficiency in some states. Persistent challenges with distribution losses and financial health of distribution companies. Mixed consumer experience.
Pakistan	Unbundling started in the 1990s	Partial Privatization and Deregulation	Privatization of DISCOs. Introduction of competitive bidding for new generation projects. Creation of an independent regulator (NEPRA).	Limited improvements in efficiency and service quality. Persistent issues with circular debt and financial viability of DISCOs. Limited consumer choice and competition in retail.
Germany	Liberalization process started in 1996	Market Liberalization	Unbundling of generation, transmission, and distribution. - Creation of the EEX (European Energy Exchange). Strong regulatory framework (BNetzA).	High level of renewable energy integration. Competitive market with multiple suppliers. Stable prices and reliable supply. Increased consumer engagement.
Mexico	Liberalization started in 1990s and in 2013	Market Liberalization and Reform	Energy reform to open generation and retail markets to private competition. Creation of a wholesale electricity market. Independent regulatory body (CRE).	Increased foreign investment in generation. Improved efficiency and infrastructure. Challenges in fully realizing retail competition and managing market transition.
Source: Authors' working based on various countries' websites				

Country	Privatization Initiatives	Privatization Model	Key Features of Introducing Competition	Impact/Outcome
Notes: **Unbundling**: Separation of generation, transmission, and distribution functions to promote competition and efficiency. **Regulators**: Establishment of independent regulatory bodies to oversee the market and ensure fair competition. **Wholesale and Retail Markets**: Creation of competitive markets where multiple suppliers can compete to sell electricity to consumers. **Consumer Choice**: Enabling consumers to choose their electricity providers, leading to better service and pricing options.				

29. The above exercise of reviewing country experiences aimed to draw lessons for Pakistan to improve its power sector through introduction of more competition in various segments. By learning from these international experiences and implementing tailored reforms, Pakistan can address its power sector's challenges and move towards a more efficient, reliable, and competitive market by gradually enhancing the participation of private sector. The following Table summarizes the actions that Pakistan may consider.

Table 3: Lessons for Pakistan

Lesson from	Lesson	Action	Application in Pakistan	Benefit
UK and New Zealand	Unbundling and Market Liberalization	**Unbundling**: Separate generation, transmission, and distribution functions to promote transparency and competition. **Market Liberalization**: Establish competitive wholesale and retail markets to enhance efficiency and consumer choice.	Implement clear policies for unbundling state-owned entities and creating a competitive market structure.	Improved efficiency, reduced costs, and increased private sector participation.
UK and Germany	Regulatory Independence and Effectiveness	**Independent Regulators:** Strong and independent regulatory bodies like Ofgem (UK) and BNetzA (Germany) ensure fair competition and protect consumer interests.	Strengthen the independence and capacity of NEPRA (National Electric Power Regulatory Authority).	Enhanced regulatory oversight, transparent decision-making, and increased investor confidence.
Germany and Australia	Incentives for Renewable Energy	**Supportive Policies**: Implement policies like feed-in tariffs, renewable energy certificates, and competitive auctions to promote renewable energy. **Long-term Planning**: Develop a clear and consistent renewable energy policy framework.	Establish stable and attractive incentives for renewable energy investments and integrate them into long-term energy planning.	Diversified energy mix, reduced dependency on fossil fuels, and environmental sustainability.
India and Brazil:	Addressing Financial Health	**Tariff Reforms**: Implement cost-reflective tariffs and reduce subsidies gradually to ensure the financial viability of power companies. **Debt Management**: Address issues related to circular debt through comprehensive financial restructuring.	Reform tariff structures, reduce transmission and distribution losses, and improve bill collection efficiency.	Financial stability of the power sector, attracting more private investment.
The US and Mexico	Encouraging Private Sector Participation	**Private Investment**: Encourage private sector participation in generation and distribution through	Create transparent and competitive processes for private sector	Increased investment, improved infrastructure,

Lesson from	Lesson	Action	Application in Pakistan	Benefit
		clear policies and competitive bidding processes. **PPP Models**: Use public-private partnership (PPP) models to leverage private investment for infrastructure development.	participation and develop PPP frameworks.	and innovation in the power sector.
New Zealand and Australia:	Consumer Empowerment and Protection	**Consumer Choice**: Implement policies that allow consumers to choose their electricity providers, fostering competition and better service. **Consumer Protection**: Establish strong consumer protection frameworks to ensure fair practices and dispute resolution.	Develop a framework for retail competition and strengthen consumer protection laws and mechanisms.	Empowered consumers, improved service quality, and competitive pricing.
the US and Germany	Technological Innovation and Smart Grids/ Metering	**Smart Grids**: Invest in smart grid technologies to improve efficiency, reliability, and integration of renewable energy sources. **Advanced Smart Metering**: Deploy advanced smart metering infrastructure and introduce pre-paid system for better demand management and transparency.	Promote investment in smart grid technologies and advanced metering infrastructure.	Enhanced grid management, reduced losses, and better integration of renewable energy.
The UK and Australia	Long-Term Strategic Planning	**Integrated Planning**: Develop and implement long-term, integrated energy plans that consider demand forecasts, resource availability, and environmental impacts. **Stakeholder Engagement**: Involve stakeholders, including consumers, industry, and policymakers, in the planning process.	Create and regularly update a comprehensive national energy strategy with input from all relevant stakeholders.	Coherent and sustainable energy policy, aligned with national development goals.
The US (Texas) and Germany	Resilience and Sustainability	**Climate Resilience**: Design infrastructure to withstand extreme weather events and climate change impacts. **Sustainable Practices**: Emphasize energy efficiency and sustainable practices in all aspects of the power sector.	Invest in resilient infrastructure and promote energy efficiency measures.	Reduced vulnerability to climate impacts and more sustainable energy consumption patterns.
Source: Authors' working based on various countries' websites				

Chapter 3 - State-Owned Enterprises in the Power Sector of Pakistan

30. Currently, there are 15 SOEs active in the power sector. There are four GENCOs, ten DISCOs, and one Transmission Company. Most of the SOEs in the sector are public sector companies registered under the Companies Act, 2017. This Chapter provides an overview of the SOEs.

3.1 Generation Companies (GENCOs)

31. GENCOs are responsible for the generation of electricity. These companies own and operate power plants that produce electricity from various sources such as thermal (coal, gas, oil), hydroelectric, and renewable energy (solar, wind). GENCOs play a key role in the power sector by meeting the country's electricity demand and contributing to the power grid. They also collaborate with other players in the power sector, such as NTDC and DISCOs. The brief overview of state-owned GENCOs is provided at Annex-II.

Table 4: GENCOs in Pakistan

Sr. No	Name	Source of Generation
1	GENCO-I: Jamshoro Power Company Limited	Thermal
2	GENCO-II: Central Power Generation Company Limited , Thermal Power Station, Guddo	Thermal
3	GENCO-III: Northern Power Generation Company Limited, Thermal Power Station, Muzaffargarh	Thermal
Source: Source: NEPRA State of the Industry Report 2023		

3.2 Transmission of Electricity; National Transmission and Dispatch Company Limited

32. NTDC was incorporated on 6 November 1998 to plan, design, build, operate and maintain extra high-voltage electric power transmission system in Pakistan, and began its commercial operation on 1 March 1999. NEPRA granted Transmission License to NTDC vide No. T.L/01/2002 on 31 December 2002, with the mandate to engage in the exclusive transmission business for a term of thirty years, pursuant to Section 17 of the *Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997*.[15]

3.3 Distribution Companies (DISCOs)

33. The distribution of electric power is a licensed activity under section 20 of the NEPRA Act of 1997. Initially the scope of electricity distribution included both the physical infrastructure and the sale of electricity to end-consumers. However, the sale of electricity was separated from the distribution function through amendments in NEPRA Act 1997 in 2018. They oversee the installation of meters at consumer premises to measure electricity usage and subsequently generate bills and collect payments. DISCOs maintain and upgrade distribution network infrastructure like poles, transformers, cables, and substations to ensure reliable electricity supply. The name of state owned distribution companies are listed in table 5 however, brief overview of all the DISCOs are given at Annex-III.

[15] NTDC, The Company, https://ntdc.gov.pk/the-company

34. NEPRA has renewed separate licenses of the Suppliers of Last Resort (SoLR) to seven electricity distribution companies (DISCOs) for 20 years with retrospective effect from 27 April 2023. The licenses are valid until 26 April 2043. Supplier licenses have been issued to Faisalabad Electric Supply Company (FESCO), Gujranwala Electric Power Company (GEPCO), Lahore Electric Supply Company (LESCO), Multan Electric Power Company (MEPCO), Hyderabad Electric Supply Company (HESCO), Peshawar Electric Supply Company (PESCO) and Quetta Electric Supply Company (QESCO).

Table 5: DISCOs in Pakistan

Sr. No.	Name of DISCOs
1	Peshawar Electric Supply Company (PESCO)
2	Islamabad Electric Supply Company (IESCO)
3	Gujranwala Electric Power Company (GEPCO)
4	Sukkur Electric Power Company SEPCO)
5	Lahore Electric Supply Company (LESCO)
6	Faisalabad Electric Supply Company (FESCO)
7	Multan Electric Power Company (MEPCO)
8	Hyderabad Electric Supply Company (HESCO)
9	Quetta Electric Supply Company (QESCO)
10	Tribal Areas Electricity Supply Company (TESCO)

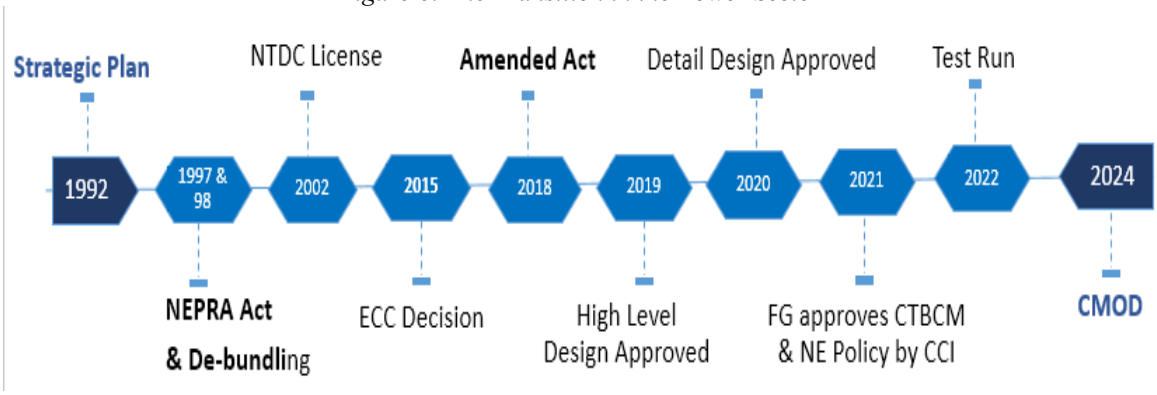
Chapter 4 - Market Functioning and Regulatory Framework of the Power Sector in Pakistan

This Chapter reviews the legal and regulatory framework of the power sector in detail, applicable on the three sub-sectors i.e., generation, transmission and distribution. These cover the NEPRA Act and power sector policies. It also describes the major functions of the relevant ministry, the regulator and the management companies.

4.1 Legal Framework Governing the Power Sector

35. The Electricity Act, 1910 (the Electricity Act) was amongst the legacy laws that Pakistan retained after its independence in 1947. Government introduced a series of legislations on the subject.

Figure 6: The Transition in the Power Sector



36. Figure 6 shows that a Strategic Plan was prepared in the 1992. Until 1995, the operating laws were the WAPDA Act and the Electricity Act, which regulated provision of electric power services in the areas of generation, supply of power and its usage by consumers. In 1997, however, the Regulation of Generation, Transmission and Distribution of Electric Power Act of 1997 (REPA) replaced provisions relating to regulation of generation and supply.[16]

Table 6: Hierarchy of Legislation

NEPRA Act	Provide legal basis to start competitive market
Rules	Eligibility criteria for license applicant Criteria and manner for registration applicant
Regulations	Specify and enforce enforcement standards Form and manner of application for license Duties and responsibilities of licensees Specify Accounting standards and uniform system of accounts
Codes	Provide governing framework/code of conduct for the market operations, system operations, agency, transmission and distribution businesses
Guidelines	Carry out the purposes of the Act and the rules and regulations

[16] https://cc.gov.pk/assets/images/Downloads/assessment_studies/energy_sector_report.pdf

37. National Electric Power Regulatory Authority (NEPRA), established under the NEPRA Act, regulates the regulation of generation, transmission and distribution of electric power, as provided under Section 7 of the NEPRA Act:

*"7. Powers and functions of the Authority.—(1) The Authority shall be **exclusively** responsible for regulating the provision of electric power services."* Till date NEPRA has provided licenses to the following categories under all three sub-sectors:

Table 7: Licenses granted to Generation, Transmission and Distribution in Pakistan

GENERATION LICENCES	TRANSMISSION LICENCES	DISTRIBUTION LICENCES	SUPPLY LICENCES
1. Generation Companies **("GENCOs")** 2. **K-Electric** Limited (formerly known as Karachi Electric Supply Company Limited) 3. Independent Power Producers **("IPPs")** 4. **Net Metering** 5. Independent Generation Companies **("IGCs")** 6. Small Power Producers **("SPPs")** 7. Captive Power Producers **("CPPs")** 8. New Captive Power Producers **("N-CPPs")** 9. Nuclear Power Plants **("NPPs")** 10. **WAPDA Hydel** (Water and Power Development Authority for its Hydel Power Stations) 11. **Distributed Generation**	1. National Transmission and Dispatch Company **("NTDC")** 2. **Khyber Pakhtunkhwa** Transmission and Grid System Company (Private) Limited 3. **K-Electric** Limited (formerly known as Karachi Electric Supply Company Limited) 4. Fatima Transmission Company Limited **("FTCL")** 5. Special Purpose Transmission Line - **Pak Matiari** Lahore Transmission Company (Private) Limited 6. Punjab Grid Company Limited **("PGCL")** 7. Sindh Transmission & Dispatch Company (Pvt.) Limited **("ST&DCPL")** 8. Sindh Transmission & Dispatch Company (Pvt.) Limited **("ST&DCPL")** to act as Provincial Grid Company	1. Ex-WAPDA Distribution Companies **("XW-DISCOs")** 2. **K-Electric** Limited (formerly known as Karachi Electric Supply Company Limited) 3. **Housing Colonies** 4. **Industrial Estates** 5. Captive Power Producers **("CPPs")** 6. Small Power Producers **("SPPs")**	1. IESCO 2. FESCO 3. GEPCO 4. LESCO 5. MEPCO 6. HESCO 7. PESCO 8. QESCO 9. K-Electric

38. For ease of reference, the regulatory framework applicable on all three sub-sectors i.e. generation, transmission and distribution. Specifically, given below are the legal provisions distinctively applicable upon all three segments i.e. generation, transmission and distribution:

a) A company is granted a generation licence under Section 14B (previously 15), (inclusive of Section 25 for K-Electric), of the NEPRA Act and the term of licence is determined under Rule 5 of National Electric Power Regulatory Authority Licensing

(Generation) Rules, 2000. Then, under Rule 5 of NEPRA Performance Standards (Generation) Rules, 2009, the undertaking has to follow the reporting requirement.

b) An undertaking is granted a transmission licence under Section 16, of the NEPRA Act and the grid code is prepared and revised by NTDC under Section 23G of the NEPRA Act. Then, under Rule 9 of NEPRA Performance Standards (Transmission) Rules, 2005, the undertaking has to follow the reporting of performance levels.

c) An undertaking is granted a distribution licence under Section 20 of the NEPRA Act, and the term of licence is determined under Rule 5 of NEPRA Licensing (Distribution) Rules, 1999. Then, under Rule 7 of NEPRA Performance Standards (Distribution) Rules, 2005, the undertaking has to provide the annual performance reports. Also, the distribution code is prepared by the concerned XW-DISCO under Section 35 of the NEPRA Act and Rule 15 of the Distribution Rules.

4.2 State Owned Enterprises (Governance and Operations) Act, 2023

39. SOEs Act 2023 was promulgated in February 2023. The Act seeks to enhance transparency, accountability, and efficiency in the management of SOEs, ensuring they contribute effectively to the national economy. The Act obligates federal government to prepare and issue a policy on the ownership and management of SOEs, every five year. Under the Act, the SOEs are required to undertake their operations according to the criteria of sound and prudent management. It establishes a comprehensive governance framework for SOEs, including the creation of performance evaluation mechanisms and the implementation of modern corporate governance practices. SOEs are provided with greater operational autonomy to make business decisions independently. The Act mandates regular reporting and accountability of SOEs to the government and other relevant authorities, including financial disclosures and performance reports. It outlines a framework for identifying and implementing necessary reforms in underperforming SOEs, including the possibility of privatization or restructuring to improve their performance. The Central Monitoring Unit has been entrusted with the responsibility to monitor the implementation of the above mentioned Act. Though, it is at the nascent stage of its functioning.

4.3 The Competition Act, 2010

40. The mandate of the Competition Act, 2010 (the Act) is:

> "*an Act to provide for free competition in all spheres of commercial and economic activity to enhance economic efficiency and to protect consumers from anti-competitive behavior.*"

41. The Competition Commission of Pakistan (CCP) is an autonomous regulatory body established under the Competition Act of 2010, so the businesses can operate on a level playing field. The CCP has a critical role in promoting competition and regulating anti-competitive practices in all sectors of the economy including the power sector. See Annex-IV for anti-competitive cases dealt by CCP. The relevant functions of the CCP are described in the paragraphs to follow.

42. **Market Studies and Competition Assessment:** Under Section 28(1)(b) of the Act, the CCP is mandated to conduct market studies to promote competition. This enables the CCP to assess competition dynamics and identify anti-competitive practices, entry barriers, and areas needing corrective measures.

43. **Regulatory Oversight for prohibiting anti-competitive practices:** The CCPs oversight function is crucial in monitoring compliance with the Act. This includes investigating and penalizing anti-competitive practices such as abuse of dominant positions and anti-competitive agreements, under Sections 3 and 4 of the Act, respectively (see Annex-III for detail of cases). Section 10 of the Act prohibits deceptive marketing practices, it provides protection to consumers from false and misleading information. Section 11 allows the CCP to assess the impact of mergers, acquisitions or joint ventures on competition.

44. **Competition Advocacy and Review of Policies:** Section 29 of the Act, mandates the CCP to advise the Federal government on the competition implications of economic policies, including those affecting the power sector. The CCP therefore recommends pro-competition amendments to the policies, rules and regulations.

4.4 Policy Framework covering Power Generation, Transmission and Distribution

45. **Energy Policy 1994** was the first energy policy initiated in 1994 that enhanced the facilities and incentives, focusing on thermal energy. It incentivized private sector's engagement through a series of attractive measures. Among these were guaranteed power purchase agreements (PPAs) with fixed returns, tax exemptions, and sovereign guarantees against purchaser defaults. The policy was instrumental in the introduction of Independent Power Producers (IPPs), allowing private entities to establish and operate power plants with the obligation to supply electricity to the national grid. The policy succeeded in drawing substantial foreign and local investment to increase generation capacity.[17]

46. **Energy Policy of 1998** provided for open bids denominated in Pakistani currency. It was mandatory for the bidders to quote the price in two parts: a) "Capacity Purchase Price"; and b) "Energy Purchase Price". The Policy exempted certain taxes and duties, and restored the protection against natural disaster. IPPs could raise finance in both local and foreign currencies. Hydel power projects were to be implemented on Build-Own-Operate-Transfer (BOOT) basis, and after the concession period these projects were to be transferred to the province. The thermal projects were to be implemented on a Build-Own-Operate (BOO) basis. The Federal Government was the sole guarantor of these agreements.[18]

47. **The Power Policy 2002** aimed to attract private sector investment in power generation by offering incentives and creating a favorable environment for IPPs, providing clear guidelines to facilitate market entry. To promote competition, it supported the unbundling of the WAPDA into separate entities for generation, transmission, and distribution, thereby reducing monopolistic control. It also advocated for implementing competitive bidding processes, supporting market-based pricing, strengthening regulatory oversight by NEPRA, and promoting the development of IPPs and renewable energy projects in a competitive environment.[19]

48. **The National Power Policy 2013** was formulated to address the energy crisis and provide planned direction for the energy sector's development. It intended to eliminate the electricity demand-supply gap by enhancing generation capacity and ensuring the timely completion of projects. To achieve the long-term vision of the power sector and address its challenges, the policy has set nine strategic goals: (1) build a power generation capacity that meets the country's energy needs sustainably, (2) create a culture of energy

[17] https://www.ppib.gov.pk/wp-content/uploads/2023/08/Power-Policy-1994.pdf
[18] https://pu.edu.pk/images/journal/politicsAndInternational/PDF/1_v6_2_2020.pdf
[19] https://power.gov.pk/SiteImage/Policy/Power%20Policy%202002.pdf

conservation and responsibility, (3) ensure the generation of inexpensive and affordable electricity for domestic, commercial, and industrial use by utilizing indigenous resources such as Thar coal and hydropower, (4) minimize pilferage and adulteration in fuel supply, (5) promote world-class efficiency in power generation, (6) create a cutting-edge transmission network, (7) minimize inefficiencies in the distribution system, (8) reduce financial losses across the system, and (9) align the ministries involved in the energy sector while improving the governance of all related federal and provincial departments and regulators.[20]

49. **The Power Generation Policy of 2015** intended to address the energy challenges by increasing power generation capacity, diversifying the energy mix to include renewable sources alongside conventional fuels, and encouraging private sector participation through public-private partnerships. The policy strengthened regulatory oversight by enhancing the role of NEPRA. Financial incentives such as tax exemptions and cost-reflective tariffs were provided to attract investment while protecting consumer interests. The policy emphasized infrastructure development, including the up gradation and expansion of transmission and distribution networks, and promoted smart grid technologies for improved efficiency and reliability. Competitive bidding processes were introduced to ensure transparency and cost-effectiveness in awarding power generation projects, and international standards were adopted to attract foreign investment. The policy also included contingency plans and emergency measures for effective crisis management and implemented load management strategies to minimize the impact of power outages.[21]

50. The core objective of the **Transmission Line Policy 2015** was to facilitate the development and expansion of the national transmission network. The policy aimed to encourage private sector investment in transmission infrastructure to enhance reliability and efficiency. It sought to facilitate the construction of new transmission lines to connect remote and underserved areas to the national grid. Additionally, the policy focused on improving the overall stability and reliability of the national electricity grid through modernization and expansion. It established regulatory frameworks and guidelines to ensure adherence to safety, environmental, and technical standards in transmission line development.

51. **The Renewable Energy Policies 2006 & 2019.** Pakistan's first Renewable Energy Policy was introduced in 2006 to diversify the energy mix and reduce dependence on fossil fuels. The policy aimed to promote renewable energy sources such as wind, solar, hydro, and biomass. Key initiatives included offering incentives like feed-in tariffs and tax breaks to attract investment in renewable energy projects. The option and process of competitive bidding were provided in the policy. It established the Alternative Energy Development Board (AEDB) to facilitate projects and streamline regulatory procedures. However, implementation faced challenges due to regulatory gaps, inadequate infrastructure, and limited financial incentives.[22] In 2019, the updated Renewable Energy Policy adopted to accelerate the deployment of renewable energy technologies. The policy targeted 20% renewable energy capacity by 2025 and 30% by 2030 to enhance energy security and sustainability. It introduced competitive bidding mechanisms and updated tariff structures to encourage cost-effective renewable energy projects. The policy also focused on

[20] https://nepra.org.pk/Policies/National%20Power%20Policy%202013.pdf
[21] https://www.ppib.gov.pk/wp-content/uploads/2023/08/Power-Generation-Policy-2015-small.pdf
[22] Policy for Development of Renewable Energy for Power Generation 2006, https://nepra.org.pk/Policies/RE%20Policy%20for%20Development%20of%20Power%20Generation%202006.pdf

improving grid connectivity and addressing barriers to investment through regulatory reforms and institutional capacity building.[23]

52. **National Electricity Policy of 2021** proposes a three-pronged goal for the power sector, namely access to affordable energy, energy security (uninterrupted supply) and sustainable energy. The policy emphasizes keeping electricity affordable for consumers while maintaining the financial stability of the power sector, and it focuses on enhancing efficiency in generating, transmitting, and distributing electricity. Additionally, the policy emphasis on sustainability by advocating for cleaner energy technologies and reducing environmental impacts. It strives to attract investments, improve infrastructure, bolster regulatory frameworks, and strengthen institutional capabilities within the energy sector.[24]

53. **The National Electricity Plan 2023-27** is a forward-looking plan that seeks to build a resilient, sustainable, and competitive power sector in Pakistan. The Plan emphasizes on increasing renewable energy in the energy mix to reduce reliance on fossil fuels and lower greenhouse gas emissions. It promotes a competitive electricity market through the Competitive Trading Bilateral Contract Market (CTBCM) model, enabling bulk power consumers to choose their suppliers. Moreover, the plan prioritizes upgrading transmission and distribution infrastructure, implementing regulatory reforms to separate distribution networks from retail supply, and affordability through targeted subsidies. Public-private partnerships are encouraged to attract investment, with a focus on environmental sustainability and consumer protection, including the adoption of smart technologies and increased energy conservation awareness.[25]

4.5 Role of Cabinet Committee on Energy, Ministry, and the Regulatory Authority

54. The Cabinet Committee on Energy serves as the apex body. Whereas, Ministry of Energy (Power Division) and National Electric Power Regulatory Authority (NEPRA) operate in tandem, each fulfilling distinctive but interconnected responsibilities to ensure electricity provision. Ministry is responsible for formulation of national energy policies, establishing objectives for the power sector, however, NEPRA functions autonomously, supervising the entire electricity market to safeguard fair competition and protect consumers' rights. The role of various governing organizations is explained in the paragraphs to follow.

4.5.1 Cabinet Committee on Energy (CCoE)

55. The Cabinet Committee on Energy (CCoE) is a high-level committee headed by Prime Minister established by Cabinet to oversee and make decisions regarding the country's energy sector. It functions under the Prime Minister[26]and brings together key stakeholders to address critical energy issues. The Terms of Reference (ToRs) of the Committee are;

    a. Ensuring smooth implementation of ongoing and planned energy projects, particularly those under the China-Pakistan Economic Corridor framework.

[23] Alternative and Renewable Energy Policy 2019, https://data.sbfnetwork.org/sites/default/files/Alternative-and-Renewable-Energy-Policy-2019_Pakistan.pdf
[24] National Electricity Policy 2021, https://nepra.org.pk/Policies/National%20Electricity%20Policy%202021.pdf
[25] National Electricity Plan 2023-27 https://power.gov.pk/SiteImage/Policy/National%20Electricity%20Plan%202023-27.pdf
[26] https://profit.pakistantoday.com.pk/2024/03/23/prime-minister-to-personally-head-cabinet-committee-on-energy/

b. Identify and address bottlenecks hindering the timely completion of energy projects.

c. Review and reform the existing legal and institutional framework governing the energy sector.

d. Analyze and address weaknesses in current energy policies.

e. Foster inter-ministerial coordination on energy matters.

f. Develop efficient energy markets through deregulation within limits allowed by regulators; and

g. Reduce theft losses in energy sector and to pass on benefits to consumer

h. Overall, the CCoE serves as a central platform for collaboration and decision-making among various government entities involved in energy sector.[27]

4.5.2 Ministry of Energy (Power Division)

56. Power Division (Ministry of Energy) was formed in August 2017 after bifurcating the Ministry of Water and Power. The Power Division focuses on electricity matters along with formulating policies related to the sector. Currently, it oversees 22 public sector companies and 2 statutory bodies. It comprises of several wings with specific responsibilities:

- Power Finance Wing handles power finance, circular debt, CPPA-G, NEPRA, and fuel price adjustment.
- The Transmission Wing manages matters related to GENCOs, NTDC, public sector power projects, and agreements.
- The Entities and DISCOs Wing oversees distribution companies, entities like AEDB and PPIB, and PPMC.
- The Development Wing is responsible for PSDP and special projects, including those related to DISCOs, and manages donor-related matters.
- The Tariff & Subsidy Wing deals with subsidies, tariff management, and NEPRA tariff and subsidy issues.[28]

4.5.3 National Electric Power Regulatory Authority (NEPRA)

57. The National Electric Power Regulatory Authority (NEPRA) was established in 1997 as the primary regulatory body overseeing the power sector in the country. The fundamental objective is to regulate the generation, transmission, distribution, and sale of electric power and to safeguard the interests of consumers and stakeholders within the electricity market. NEPRA establishes and enforces standards for service quality, safety, and reliability to ensure compliance with regulations. It determines electricity tariffs, ensuring fairness and transparency by conducting tariff hearings, assessing costs, and approving tariff

[27] https://cabinet.gov.pk/SiteImage/Misc/files/Federal%20Cabinet/Cabinet%20Committees/Committees%202024/CCOE-24.pdf

[28] https://www.power.gov.pk/Detail/OWNkZGYyYjEtNTVjNi00NzJiLThjNTEtNWJmZjc1ODdkMTZk

adjustments as necessary. Moreover, NEPRA grants licenses to entities involved in power generation, transmission, and distribution, ensuring adherence to specified criteria and regulatory requirements. NEPRA also acts as a mediator, resolves disputes within the electricity sector, addressing issues related to tariffs, service quality, and contractual obligations. Furthermore, NEPRA monitors the electricity market to promote competition, prevent anti-competitive behavior, and ensure efficient operation by monitoring market prices, performance indicators, and regulatory compliance.[29]

4.5.4 Private Power and Infrastructure Board (PPIB)

58. PPIB was created in 1994 as a "One-Window Facilitator" on behalf of the Government of Pakistan to promote private investments in power sector. In 2012, PPIB was made a statutory organization through *Private Power and Infrastructure Board Act, 2012*. The role of PPIB had been further expanded by the GoP by allowing it to facilitate public sector power and related infrastructure projects in IPP mode, for which PPIBs Act has been amended in November 2015. To create synergy in power sector, AEDB with similar mandate has been merged into PPIB on 31 May 2023.

59. PPIB monitors and assists Independent Power Producers (IPPs) in executing Power Purchase Agreements (PPA) and Water Usage Licenses (WUL). Additionally, PPIB offers technical, financial, and legal support to the Ministry of Energy (Power Division), provincial governments, and Azad Jammu & Kashmir (AJ&K). It coordinates with local and multilateral development finance institutions and assists in the development of transmission, distribution, and generation of conventional, alternative, and renewable energy and related infrastructure.[30]

4.5.5 Central Power Purchase Agency (Guarantee) Limited (CPPA-G)

60. Central Power Purchasing Agency (CPPA-G) was established in 2015. It purchases electricity in bulk from various power generation companies on behalf of the distribution companies throughout the country. By negotiating with power generation companies, CPPA-G aims to secure a stable and cost-effective supply of electricity. CPPA manages the financial settlement of electricity transactions between power producers and distribution companies as per contractual obligations. CPPAs ERP financial and customized Purchase of Power module also ensures that transactions are settled quickly and accurately. The CPPA-G also have a market operator licence facilitating the power market transition from the current single buyer to competitive market and to design and operate the wholesale electricity market for the power sector of Pakistan.[31]

4.6 Management Companies

61. Besides the above, there are three management companies in the public sector, as described below.

4.6.1 GENCO Holding Company Limited (GHCL)

62. GHCL is a public limited company incorporated in Pakistan on 9th February, 2012. The main objects of the Company is to improve performance of the public sector Thermal Generation Companies, which were created and incorporated through unbundling of Water

[29] https://nepra.org.pk/About.php
[30] Accessed on https://www.ppib.gov.pk/about/
[31] https://www.cppa.gov.pk/central-power-purchasing-agency-cppa-g

and Power Development Authority (WAPDA) in 1999 referred as GENCOs. By consolidating control of GENCOs under a single entity, GHCL, the aim is to achieve better corporate management, improved financial oversight, and forward thinking business planning within the GENCOs.[32]

4.6.2 Power Planning and Monitoring Company (PPMC)

63. PPMC is working under the administrative oversight of the Ministry of Energy, assisting in the monitoring and supervision of DISCOs. It tracks key performance indicators such as line losses, recoveries, and theft control to reduce line losses. PPMC compiles reports on the performance of DISCOs, both collectively and individually, based on the data it collects from them. As a management company with a supervisory role, PPMC is not involved in commercial revenue generation.[33]

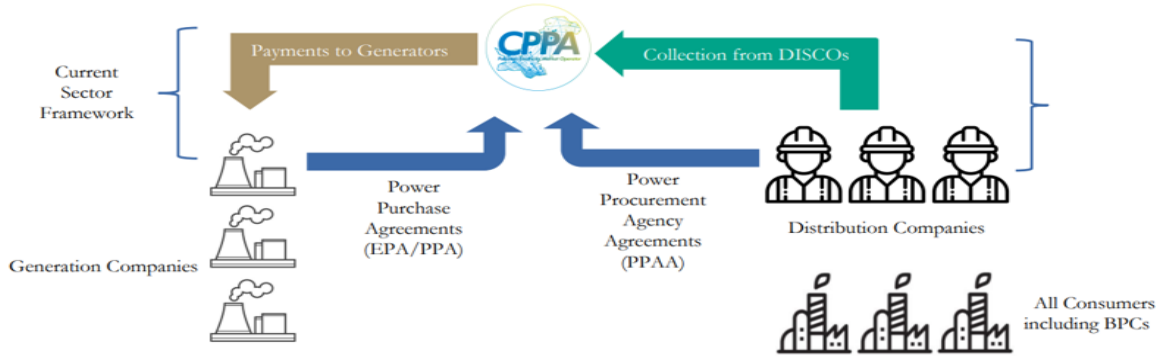
4.6.3 Power Holding Limited

64. Power Holding Company was incorporated in 2009 as a private limited company under the then-Companies Ordinance, 1984 (now, Companies Act 2017). The mandate of the company is to reduce liabilities in the power sector by borrowing from financial institutions.[34] It was established under the administrative control of Ministry of Energy (Power Division) and is wholly owned by Government of Pakistan. The status of the company was converted from private limited to public limited in 2019.

4.7 Power Sector Market Structure: An Exhibit of Regulatory and Operational Components

65. Currently, the power sector of Pakistan is predominantly arranged as Single Buyer with CPPA-G acting as agent of DISCOs and KE as per the terms and conditions of the Power Procurement Agency Agreements (PPAA) signed with all of them. As established in these agreements, the CPPA-G procures power on behalf of them by signing new contracts and administering legacy contracts signed by CPPA of NTDC and WAPDA. Besides CPPA-G, KE has been operating as vertically integrated utility serving the city of Karachi and its surrounding areas.

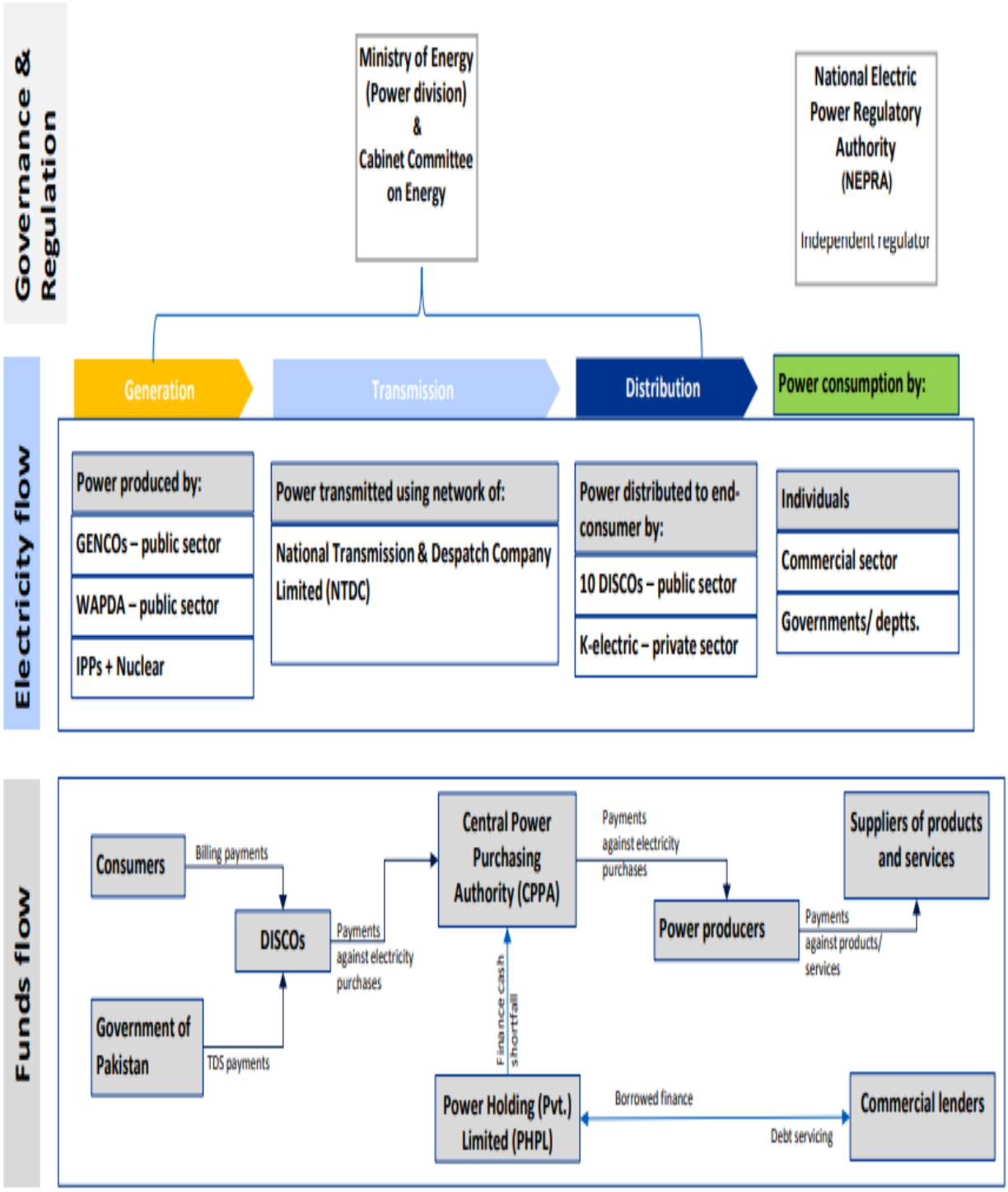
Figure 7: Understanding the single buyer model



Source: CPPA-G

[32] Accessed on https://ghcl.gov.pk/SiteImage/Publication/Annual%20Report%20FY%202022%2023.pdf
[33] http://pepco.gov.pk/pepco/
[34] https://power.gov.pk/SiteImage/Publication/YearBook2022-23.pdf

Figure 8: Regulatory and Operational Structure of Power Sector



DISCO = distribution company, GENCO = generation company, IPP = independent power producer, TDS = tariff differential subsidies, WAPDA = (Pakistan) Water & Power Development Authority.

Source: https://www.adb.org/sites/default/files/linked-documents/53165-002-ld-03.pdf

Chapter 5 - Pro-Competitive Developments in the Power Sector: The Competitive Trading Bilateral Contract Market ("CTBCM") Model

66. For restructuring of the prevailing traditional market structure and regulatory framework, NEPRA has already taken initiatives towards a competitive electricity market at the wholesale level. In 2018, several amendments have been made in the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 **(NEPRA Act, 1997)**.

Table 8: Amendments in NEPRA Act for opening up the power market

1. Provincial Grid Company (Section 18A)
2. Market Operator (Section 23A)
3. System Operator (Section 23G)
4. Electric Power Trader (Section 23D)
5. Electric Power Supplier (Section 23E)

67. In November 2020, NEPRA approved a Competitive Trading Bilateral Contract Market ("**CTBCM**") model that provided a roadmap for opening the Wholesale Electricity Market of Pakistan, aiming to provide choice to the bulk power consumers (BPCs) with 1MW or above load, to purchase electric power from the DISCOs or a competitive supplier of their choice. As per NEPRA, CTBCM will improve the governance of wholesale market through institutional reforms, restructuring and automation of business processes and intense capacity building of professionals. The institutional reforms include the creation of Market Implementation and Regulatory Affairs Departments (MIRADs) in all distribution companies. By requiring DISCOs to actively plan, procure and enter into power procurement contracts bilaterally, the DISCOs are expected to improve their discipline, capacity and bankability thus ultimately doing away with sovereign guarantees for procurement.

68. NEPRA directed its licensees on 31 May 2022 to start the market on trial basis for six months. This transition towards CTBCM will help achieve benefits of de-bundling the power sector that will enable the bulk power consumers to have choice in supply of electric power (competitive suppliers) at negotiated rates and also translate into low costs and reliable power for all consumers. As a safeguard, the competitive suppliers are not allowed to charge higher tariff than the tariff of regulated suppliers of last resort.

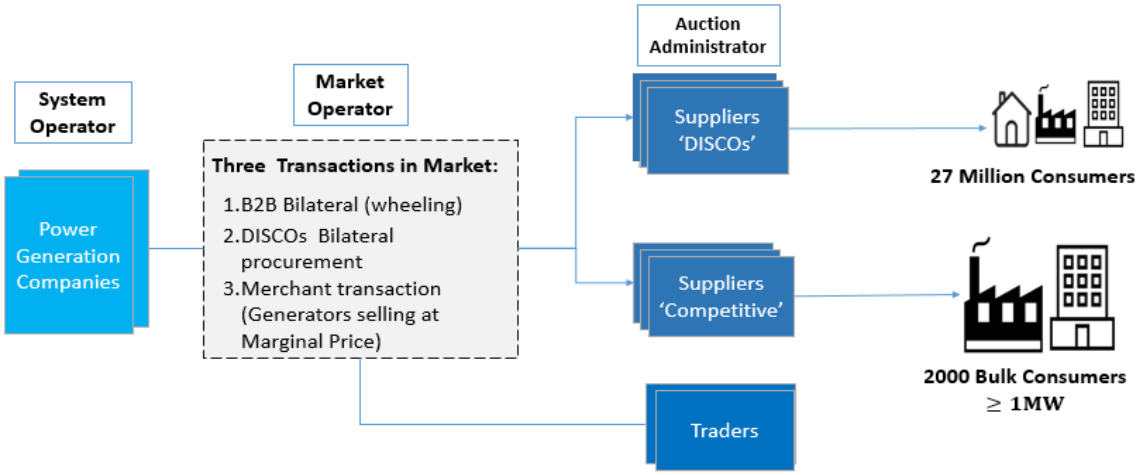
69. In May 2022, the Authority granted market operator license and approved market commercial code (MCC). As per the approved MCC; (a) the single buyer regime will end and DISCOs will be procuring power through centrally organized auctions run through the Independent Auction Administrator (IAA), (b) bulk power consumers (more than 1 MW load) will be given choice to procure power either from distribution company (DISCO) or a competitive supplier and (c) market sales on merchant basis will also be allowed to interested generation plants including those retiring from legacy generation fleet or connected with the national grid as captive generating plants. On 30th July 2024, public hearing was held at NEPRA headquarters on final test run report of CTBCM submitted by

CPPA-G. During the hearing, representative of CPPA-G and NTDC gave the presentation on various issues that had arisen in the previous hearing.

70. In order to provide an enabling regulatory framework for successful commercial operations of CTBCM, NEPRA has also formulated changes in regulatory framework and promulgated new laws in the NEPRA Act in 2018. Key changes which would have impact on the opening of electricity market, ending the monopoly of existing DISCOs and to bring new players to the electricity market are;

    a. DISCOs shall **not have any exclusivity** for the provision of Distribution and/or Electric Power Supply services and the Authority shall reserve its right to issue other licenses in its Service/Concessional Territories;
    b. The provisions of Article-7 of the Distribution License pertaining to the "Exclusivity", will not be applicable anymore as Section-21 of the amended NEPRA Act does not allow the same;
    c. As per Section-22 of the NEPRA Act, DISCOs are obligated to allow BPCs to obtain electricity from not only generators but also from other suppliers.
    d. DISCOs will be obligated to allow use of its system to any third party for supplying/wheeling of electric power to any BPC in terms of Article 9 of its Distribution License.

Figure 9: Competitive Wholesale Market Design



Source: Central Power Purchasing Agency

71. CTBCM, if implemented effectively will promote competition in the power sector of Pakistan. However, currently it is in the initial phase of implementation i.e., at the test-run stage.

Chapter 6 - Market Contestability and Competition in the Power Sector

72. Introducing competition in Pakistan's electricity market is the logical way forward. How to go ahead with this, requires a thorough analysis of the current state of competition and market contestability. A market that has no entry and exit barriers for firms and has limited sunk costs, is known to be a contestable market. Market contestability analysis is critical for economic regulation and competition policy.[35] To assess the level of competition in the power sector, this chapter identifies and evaluates the entry barriers and market contestability. These barriers restrict new competitors from entering the market, and at the same time protect the interests of the incumbent players by maintaining or increasing their market share, profitability, and revenues. These barriers are: (a) structural/natural barriers, (b) regulatory barriers, and (c) barriers resulting from the anti-competitive conduct of the market players.

73. Pakistan's power sector is a remorseful example of government intervention – the government plans, the government devises policy, and then implements and executes the policy through its own entities. With the exception of power generation, mostly the SOEs manage the power sector. Concomitantly, the sector is in a chaotic state of affairs due to mounting circular debt, high transmission and distribution losses, regulatory and policy inconsistencies, aging/inadequate infrastructure, and dependency on expensive imported fuels. As far as the competition is concerned, the arguments against the SOEs include that these might restrict competition, limit innovation, and lead to inefficiencies in a relevant market. These manifestations of lack of competition are glaring in the power sector of Pakistan, for instance, to mention a few, among others include: high circular debt, huge transmission and distribution losses, regulatory and policy inconsistencies, aging/inadequate infrastructure, and dependency on imported fuels. This situation calls for a thorough analysis of the barriers to competition in the power sector.

6.1 Structural/ Natural Barriers

6.1.1 High Capital Cost for Generation, Transmission, and Distribution

74. The power sector faces significant initial capital and sunk costs, which act as a barrier to entry. Developing infrastructure for generation, transmission, and distribution requires substantial upfront investments in the power plants, transmission lines, and distribution networks. The financial challenge discourages potential new entrants, and limited affordability means only a few companies can participate, potentially leading to a monopolistic or oligopolistic market structure. Once infrastructure is in place, the sunk capital cannot be easily recovered. [36] Moreover, raising capital for power projects in Pakistan is challenging due to high country risk and ongoing circular debt issues. These factors make it difficult to secure both equity and debt financing. Investors are wary of the economic instability, which exacerbates financing hurdles. The circular debt problem further complicates the financial landscape, deterring potential funding. Consequently, power projects could not attract necessary investment from the private sector.

[35] https://documents1.worldbank.org/curated/en/628321468766160320/pdf/multi-page.pdf
[36] https://www.aemc.gov.au/sites/default/files/content/d36e31ee-0cfc-4ab8-be12-b673cf0d8a79/CEG-Report.PDF

6.1.2 Monopolistic Market Structure - Single Entity Dominance

75. The electricity transmission network has the characteristics of a natural monopoly because it is a network industry, meaning its value increases with the number of connections. Duplication of transmission networks may lead to unnecessary infrastructure, higher costs, and potential reliability issues. Under Section 17 of the NEPRA Act, the NTDC has been granted a transmission license. NTDC is primarily responsible for the efficient transmission of electric power, operating at voltage levels of 220 kV and above. As per the provisions of the NEPRA Act, a single entity, known as the National Grid Company ("NGC"), is permitted to operate at the national level at any given point in time. Presently, the NTDC holds the status of NGC, therefore, it has a central role in the flow of electricity across the National Grid. Moreover, it is a single buyer model wherein CPPA-G is the sole buyer of electricity from power producers, and sells it to the DISCOs. This business model is monopolistic[37] in nature.

6.1.3 Infrastructure Challenges in Transmission

76. The maximum total demand is about 31,000 MW, whereas the transmission and distribution capacity is stalled at about 22,000 MW i.e. a deficit of about 9,000 MW. This additional requirement cannot be transmitted, even though the peak demand is well below the installed capacity of 41,000 MW. The Transmission Line Policy, 2015 introduced provisions for private sector involvement through the BOOT model, yet efforts to enhance capacity did not yield the desired results.

77. However, a limited private sector participation is there in the transmission segment through the PPIB. A significant milestone was achieved when Pak Matiari-Lahore Transmission Company (Pvt.) Limited completed the Lahore-Matiari Transmission Line Project – Pakistan's first HVDC transmission initiative by the private sector.

78. Under Section 19 of the NEPRA Act, Special Purpose Transmission Licenses were granted to two other entities, namely: Fatima Transmission Company Limited and Sindh Transmission and Dispatch Company (Pvt.) Limited. Section 18-A of the NEPRA Act enables Provincial Governments to establish Provincial Grid Companies (PGCs), authorized to engage in power transmission within the provincial boundaries. The NEPRA Act stipulates only one PGC is permitted within a given province at any given time. So far, NEPRA has granted PGC licenses for the provinces of Sindh, Punjab and Khyber Pakhtunkhwa. However, the physical progress of PGCs to whom license have been granted is not yet visible.[38] For an open market, existence of necessary infrastructure is core to its success. Without proper infrastructure, an efficient and open market cannot be established.

79. Further, the natural barriers include:
    - **Difficult topology**: The northern and western regions of Pakistan are characterized by rugged mountainous terrain, making it difficult and expensive to build and maintain transmission lines and other infrastructure.

[37] As per comments from NEPRA, the large companies are directly purchasing power from generation companies, which means the existing regime is single-buyer-plus regime to some extent.
[38] State of Industry Report 2022-23, NEPRA. https://www.nepra.org.pk/publications/State%20of%20Industry%20Reports/State%20of%20Industry%20Report%202023.pdf

- **Distance from Power Sources and Transmission Losses**: Long distances between power generation facilities (often located in specific regions) and demand centers (e.g., major cities) result in significant transmission losses and higher costs.
- **Seasonal factors:** High temperatures, especially in southern regions, increase the demand for electricity for cooling and strain the power grid. Whereas heavy rains and flooding during the monsoon season damage infrastructure, disrupt supply, and create logistical challenges for repairs and maintenance, deterring private sectors initiatives.
- **Hydropower Dependency:** About 25 per cent of Pakistan's electricity is generated from hydropower. Water scarcity due to droughts or reduced river flows limit hydropower generation capacity, especially during the dry season.
- **Urban vs. rural population density:** This makes the sparsely populated rural areas economically unviable for grid extension. Whereas, urban areas have significant demand for electricity. The disparities in the electricity distribution lead to load shedding in less prioritized areas.

6.2 Regulatory Barriers relating to Policy and Planning

80. There are challenges, impacting the efficiency, reliability, and competition in the power sector. Following are some specific examples illustrating these challenges:

81. **The Unresolved Circular Debt Issue** The delays and complexities in setting cost-reflective tariffs due to political and social considerations has caused circular debt. Also, the accumulation of unpaid bills between various entities in the power supply chain creates a financial bottleneck. The impact include financial instability due to circular debt that hampers the ability of power companies to operate efficiently and invest in infrastructure. The financial health of the sector is a major deterrent for both domestic and foreign investors. Despite numerous steps to address it, the problem continues to plague the sector.[39]

82. **Inconsistent Tariff Adjustments** Delays and inconsistencies in adjusting electricity tariffs to reflect the actual cost of generation and distribution exacerbate the financial health of the power sector entities. It also results into inadequate revenue for infrastructure investment.

83. **Lack of Transparency on Capacity payments to GENCOs** There is lack of transparency in the regulatory processes and decision-making relating to capacity payments. The transparency undermines consumer and investors' trust in the regulatory system. No independent audit reports are available in this regard. Transparency is crucial for competition as it ensures fair play and improves market efficiency.

84. **Load Shedding Management** NEPRA has reported that almost all the DISCOs are involved in load shedding based on Aggregate Technical and Commercial (**AT&C**) loss-based formula in violation of NEPRA's Performance Standards (Distribution) Rules, 2005 (PSDR 2005). DISCOs inefficiency in conducting load-shedding based on AT&C losses negatively affects even those consumers, who pay their bills in time. DISCOs were directed

[39] The major causes behind the mounting circular debt include unreleased subsidies, delayed payments leading to high-interest charges, non-payment of dues by K-Electric, and operational inefficiencies in DISCOs. This debt severely affects the entire energy supply chain, from fuel procurement to infrastructure maintenance, posing significant risks to the energy sector's sustainability. Addressing these issues requires comprehensive reforms, including timely payment of subsidies, improving DISCOs' efficiency, and ensuring prompt payments to IPPs.

to focus on addressing inefficiencies leading to high AT&C losses rather than relying solely on load-shedding. There are two main issues: firstly, Unpredictable and inconsistent load shedding schedules across different regions disrupt economic activities. Despite policies aimed at reducing load shedding, implementation often falls short. Secondly, there are reports of discriminatory treatment in load shedding management. Consequently, certain regions or sectors receive uninterrupted power at the expense of others, this undermines policy credibility and equity.

6.2.1 Project Approvals and Delays

85. New projects face delays. The lengthy approval processes for new power projects, discourage investment. There are projects delay due to changing regulations and lack of coordination among regulatory bodies. Also, projects initiated under one government often face hurdles or are re-evaluated when a new government comes to power, leading to delays and increased costs. The lengthy and complex processes for obtaining licenses and approvals discourage private investment, and hence competition.

6.2.2 Complex Regulatory Environment

86. The power sector in Pakistan is characterized by a complex regulatory environment, which impacts its efficiency, overall performance, investment attractiveness, and any possibility of introducing competition in the market. This complexity arises from multiple factors. Here is an in-depth look at the factors contributing to the complexity of the regulatory environment in Pakistan's power sector, which ultimately restricts competition. The overlapping responsibilities between NEPRA, the Ministry of Energy (Power Division), CPPA-G and NTDC often lead to conflicts, delays in decision-making, and regulatory inefficiencies. These are explained below:

    a. **Overlapping Functions relating to Policy and Regulatory Oversight:** Both the Ministry of Energy and NEPRA are involved in the regulatory oversight, which can lead to conflicts in policy implementation and regulatory enforcement. For instance, the NEPRA sets tariffs and enforces regulations, while the Ministry of Energy influences policy directions, sometimes resulting in policy-regulation misalignment. This results into the following issues:

        - **Conflicting Directions**: Potential for conflicts between policy directions from the Ministry of Energy and regulatory decisions by NEPRA.
        - **Delayed Implementation**: Overlapping oversight can cause delays both in the implementation of policies and regulatory decisions.
        - **Transmission System Planning and Operation:** NTDC is responsible for the planning and operation of the transmission system, but the Ministry of Energy also has a role in approving major transmission projects. On the other hand, NEPRA regulates the transmission sector, setting standards and tariffs, which the NTDC must comply with.
        - The Tariff Setting and Consumer Protection: NEPRA sets tariffs for the entire power sector, while the Ministry of Energy can influence tariff policies through subsidies and other financial measures. Both NEPRA and the Ministry are involved in consumer protection, but with different focuses. This results into tariff conflicts and discrepancies between NEPRA's cost-reflective tariff setting and the ministry's subsidized tariff policies.

The examples of the policy inconsistencies have been mentioned above. The impact on competition include: a) policy inconsistencies deter investment in the sector, particularly where long-term stability is crucial; b) sudden policy shifts lead to operational challenges for companies, affecting their planning and execution.

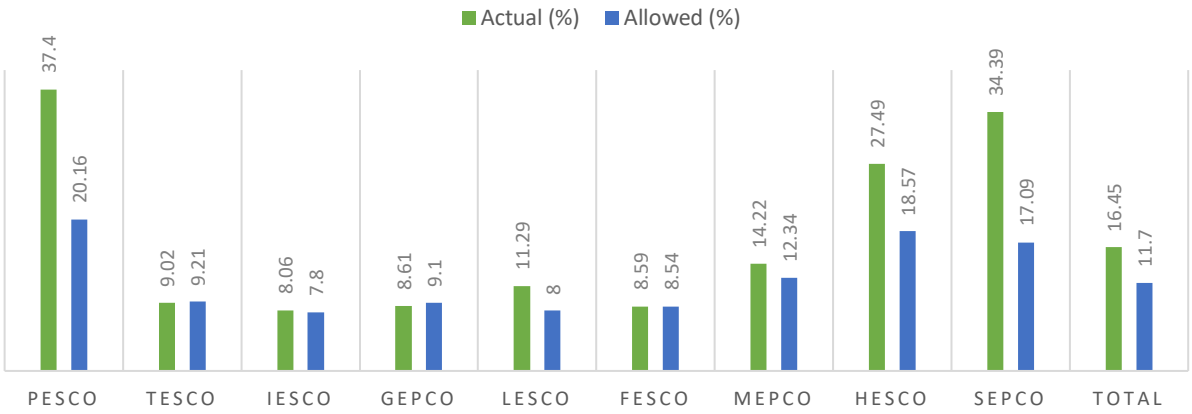
6.2.3 Predominance of Government-Owned Distribution Companies

87. According to NEPRA's State of Industry Report, the total number of electricity consumers nationwide increased to 38 million in FY 2022-23, comprising 34.6 million for the ten DISCOs and 3.5 million for KE. This increase includes 1.6 million new consumers, with 1.4 million connected to the DISCOs network and 160,469 to the KE system. Despite this approximately 5% rise in new connections, an unexpected decline in sales figures has been noted for both the DISCOs and the KE system. This drop in electricity sales indicates further under-utilization of the existing 'Take or Pay' generation capacity. The reasons may be genuine decline in demand after an increase in the tariff, less demand consequent to de-industrialization or an increased tendency of electricity theft.

88. However, in the process of tariff determination for electric power by DISCOs, the NEPRA establishes specific targets for T&D losses for each individual DISCO. These losses are unique to each DISCO and are determined after taking into account various factors. The issue of losses and inadequate collections is problematic in most of electricity distribution companies, which had average losses of 17.56 percent in 2022-23, with three companies reporting losses of over 25 percent.40 The failure to recover outstanding dues from consumers who continue to use electricity is an indication of the DISCOs inability to fulfill their responsibilities.

89. The T&D losses incurred by a DISCO beyond the target set by NEPRA cannot be passed on to the consumers. Instead, these excess losses are reflected in the financial statements of the respective DISCO, contributing to the escalation of circular debt. A detailed breakdown of the actual T&D losses for each DISCO against the NEPRA's allowed T&D loss levels, is presented in the following graph.

Figure 10: T&D Losses during 2022-23



40 https://www.nepra.org.pk/publications/State%20of%20Industry%20Reports/State%20of%20Industry%20Report%202023.pdf

90. Despite the above facts, the DISCOs hinder competition in the power sector through their monopolistic control over designated service areas, inefficiencies, and high technical and commercial losses due to outdated infrastructure, theft, and poor management. The delayed payments and circular debt issues strain the financial system, deterring investment and exacerbating liquidity problems.

6.2.4 The Dilemma of Cross-Subsidies to DISCOs: A Barrier to Competition

91. Government subsidies intended to make electricity affordable often benefited a broader population than intended, including affluent consumers. Subsidies are per se anti-competitive, particularly in Pakistan, these have been proved to be non-targeted and inefficient for the last several decades. Subsidies have distorted market dynamics and have placed a heavy burden on the state budget. There have been abrupt changes in subsidy policies, such as sudden reductions or removals without adequate safety nets for vulnerable populations, create social and economic disruptions.

92. The government administers the effective uniform tariff that companies charge their consumers and compensates the DISCOs for the difference, commonly known as Tariff Differential Subsidy (TDS). Companies with tariffs lower than the regulated rates are not permitted to pass on the benefits to their consumers. Instead, they impose a Tariff Rationalizing Surcharge (TRS) on their consumers to reconcile the difference. Consequently, consumers served by more efficient DISCOs indirectly subsidize those served by less efficient ones. This practice of cross-subsidization hampers efficiency and inadvertently encourages inefficiencies.41 The legal basis for a uniform tariff is provided through the amendment to the NEPRA Act in 2021, and National Electricity Policy 2021 also affirms the continuation of the uniform tariff.

93. The budget allocation for the Inter-DISCOs tariff differential in 2023-24 is PKR 150 billion, a decrease from the PKR 225 billion allocated in the previous fiscal year 2022-23.42 Since FY 2007, the government has paid over Rs 3.4 trillion as subsidies. Out of which, about 81 percent are for the policy to maintain the same tariff across the country. Due to fiscal constraints, the government had most of the time delayed this payment, thus, adding to the circular debt. Apart from the financial burden, this equity move by the government is counterproductive. It leaves no attraction for efficient DISCOs to further improve or remain efficient and offers no incentive for the poor and loss-making DISCOs to reduce losses and become efficient.

94. The objective of any competitive market model is to generate competition among market players to ultimately benefit consumers in terms of service quality and pricing. There will be no competition or market development, when accounts of inefficient and efficient DISCOs are treated equally, and the uniform tariff is continued to be charged.[43]

6.2.5 The Mismatch between Power Sector Tariff and Cost structure

95. The mismatch between power sector tariff structure (90% volumetric variable and 10% capacity-based fixed) and its cost structure (20% volumetric variable and 80% capacity-

[41] https://nepra.org.pk/Admission%20Notices/2021/07%20July/Policy%20guidelines%20of%20MoE.PDF
[42] https://www.finance.gov.pk/budget/Budget_2023_24/Budget_in_Brief.pdf
[43] https://file.pide.org.pk/uploads/pip-0444-legal-basis-for-uniform-electricity-tariff.pdf?_gl=1*6bnpp3*_ga*ODQxNzIwODE4LjE2OTgyMTU2MTA.*_ga_T5TLWHEVW9*MTcxNTA4MTk5NS4xNS4xLjE3MTUwODIzNjIuNjAuMC4xOTc5ODgxNTQw

based fixed) creates financial challenge for the sector. The current tariff structure, where 90% of the revenue is collected based on volumetric consumption, does not align with the cost structure, where 80% of the costs are fixed. The disparity has lead to financial strain on power companies, as their costs are largely fixed, but their revenue is highly dependent on variable consumption and it results in under-recovery of costs, accumulation of circular debt, and financial instability within the sector.

6.3 Strategic Barriers

96. Anticompetitive conduct of market players results into strategic barriers to competition. These are discussed in the paragraphs to follow.

6.3.1 Irrational Use of System/Wheeling Charges: Potential Barrier for Implementing CTBCM

97. The determination of Use of System Charges (UoSC) is of paramount importance for the commencement of the CTBCM. The requirement is outlined in the NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022. The charges are imposed on electricity generators or consumers/BPC for utilizing the transmission and distribution infrastructure to transport electricity from a generator to an end-user located in another area. In accordance with regulatory provisions, DISCOs submitted petitions for the determination of UoSC, all of which were reviewed by the NEPRA. With the rebasing of tariffs effective from July 2023, it became necessary to re-assess the previously submitted UoSC petitions. As a result, DISCOs were directed to submit revised UoSC tariff petitions, and a hearing was held in November 2023.[44] However, the final determination has not yet been made. This step is integral to the launch of the wholesale competitive electricity market.

98. Besides the above, the export industry has also urged the government to lower wheeling charges for using the national grids power transmission and distribution infrastructure. Otherwise, the manufactured exports would remain to be internationally uncompetitive.[45] High system/wheeling charges will increase the cost of electricity transmission and distribution, making it less economically viable for market participants to engage in bilateral trading. Consequently, it may reduce the attractiveness of CTBCM as a platform for competitive pricing and electricity trading.

6.3.2 Consumer Behavior - Low Payment Discipline

99. High rates of electricity theft and non-payment of bills by consumers exacerbate financial difficulties for the distribution companies. Consumers' behaviour plays an important role in shaping competition in the markets. However, in the case of Pakistan's power sector, it contributes negatively to the competition.

6.3.3 Institutional Capacity Issues Impacting Competition

100. Institutional inertia and resistance to adopting new technologies and practices has slowed down modernization and efficiency improvements. Poor governance, lack of

[44] Petition for Determination of Use of System Charges, 2023-24, https://nepra.org.pk/Admission%20Notices/2023/11%20Nov/XWDISCOs%20Wheeling/UoSC%20Public%20Hearing%20Issues%2028112023%20-%20V08%20(Final).pdf
[45] Wheeling charges: do or die, 2023, https://www.brecorder.com/news/40275261

accountability, and corruption within some state-owned utilities companies has led to mismanagement and inefficiencies. The poor service quality often results in customer dissatisfaction, protests, and attacks on grid stations, which discourage domestic and international investment, thus limiting competition.

6.3.4 Linking Skilled Workforce with Competition

101. Skilled professionals ensure that the power plants and networks operate efficiently. A shortage leads to the following issues:

- System Inefficiencies: Frequent breakdowns, higher maintenance costs, and inefficient use of resources. The inefficiencies increase operational costs and reduce the reliability of power supply, making it difficult for new entrants to compete with the established players who may have slightly better resources.

- Technological Adoption and Innovation: A lack of skilled workforce hinders the adoption of new technologies, which can make the sector less attractive to innovative companies and investors looking to enter the market. The reason being that the power sector is increasingly adopting advanced technologies such as smart grids, renewable energy integration, and digital metering systems. Skilled professionals are required to implement and maintain these technologies.

- Research and Development (R&D): Continuous R&D is essential for innovation and improving efficiency in the power sector. Skilled researchers and engineers drive this innovation. Without a skilled workforce, the power sector may lag in R&D, resulting in outdated technologies and processes, thereby reducing competitiveness.

Chapter 7 - Conclusion and Recommendations

102. This Report presents an in-depth analysis behind the lack of competition in the power sector and its various manifestations that have contributed towards worsening of competitive landscape. Pakistan's power sector is an example of intense government interventions – the government plans and devises policy, it implements and executes the policy through its own entities. The SOEs are engaged across all sub-sectors, particularly in the transmission and distribution, leaving hardly any space for the participation of the private sector.

103. It has been observed that the regulatory reforms in the power sector have remained a trend world over, Pakistan being no exception. However, Pakistan could not achieve the desired benefits like other countries. The main reason being the lack of competition and a failure to provide necessary space to the private sector to participate in various market segments.

104. The sector is marred with numerous issues that limit market contestability. The barriers perpetuate lack of competition and often reinforce the factors that distort competition. These barriers restrict new competitors from entering the market, and at the same time protect the interests of the incumbent players. These barriers are: (a) structural/natural barriers, (b) regulatory barriers, and (c) barriers resulting from the anti-competitive conduct of the market players.

105. The structural/natural barriers are:

- The power sector faces significant initial capital and sunk costs, which act as a barrier to entry. Developing infrastructure for generation, transmission, and distribution requires substantial upfront investments in the power plants, transmission lines, and distribution networks. The financial challenge discourages potential new entrants.
- The electricity transmission network has the characteristics of a natural monopoly because it is a network industry.
- Pakistan has a difficult topology, especially in the northern and western regions having rugged mountainous terrain, making it difficult and expensive to build infrastructure.
- Long distances between power generation facilities and demand centers result in significant transmission losses and higher costs. Also, the sparsely populated rural areas remain economically unviable for grid extension.

106. There is a long list of regulatory barriers i.e., policy and planning issues identified in the report, which include the following:

- Lack of timely implementation of policies lead to operational challenges for companies, affecting their planning and execution.
- Regulatory and financial discrepancies, which include the unresolved circular debt issues, inconsistent tariff adjustments, non-targeted subsidies, and policy shifts on subsidies.
- Implementation and enforcement gaps, for instance the management of load shedding having inconsistent schedules across different regions, and discriminatory treatment amongst various regions or sectors that undermines policy credibility and equity.

- The lack of integrated energy planning creates an imbalance between generation capacity and transmission infrastructure leading to exorbitant capacity payments and reactive decision-making. Thus failing to anticipate future needs.
- The power sector is characterized by a complex regulatory environment, which impacts its efficiency, overall performance, investment attractiveness, and possibility of introducing competition at a faster pace.
- The delays and complexities in setting cost-reflective tariffs due to political and social considerations adds to circular debt. The financial health of the sector is a major deterrent for both domestic and foreign investors.
- There are issues in the legal and institutional framework, which does not align well with the modern technology and market needs. The pace of technological upgradation e.g. smart grid/ metering solutions is slow. The cross-subsidies to DISCOs is a challenging barrier to competition, as the government administers the effective uniform tariff. The tariff differential subsidy leaves no attraction for efficient DISCOs to further improve or remain efficient, and offers no incentive for the poor and loss-making DISCOs to reduce losses and become efficient. There will be no competition or market development, when accounts of inefficient and efficient DISCOs are treated equally, and the uniform tariff is continued to be charged.

107. The strategic barriers include the following:

- Predominance of government-owned distribution companies hinders competition in the power sector through their monopolistic control over designated service areas, inefficiencies, and high technical and commercial losses, electricity theft, and poor management.
- The dominance of state-owned entities in the transmission, and distribution, leaves little room for private sector's participation. This limits competition and innovation, leading to inefficiencies and higher costs.
- The Single Buyer Model, where the Central Power Purchasing Agency (CPPA-G) acts as the sole buyer of electricity from generators and sells it to distribution companies, creating a bottleneck in the market. The reason being that it restricts market dynamics and prevents the emergence of a competitive market structure, where multiple buyers and sellers can operate. Though, the CTBCM addresses such issues but its implementation is rather slow as compared to the urgency to address the issues.
- Delayed determination of use of system/wheeling charges is restricting competition at the wholesale electricity market level.
- Consumers' behaviour plays an important role in shaping competition in the markets. However, in the case of Pakistan's power sector, there is low payment discipline, and high rates of electricity theft, which exacerbate financial difficulties for the distribution companies.
- The institutional inertia and resistance to adopting new technologies and practices has slowed down modernization and efficiency improvements. Issues in governance, lack of accountability, and corruption within some state-owned utilities has led to mismanagement and inefficiencies. A shortage of skilled professionals trained in modern energy technologies and management practices hinder the sector's development and competition.

7.1 Recommendations for the Regulatory Improvements

108. Addressing the barriers to competition is essential for developing a more competitive power sector. On a positive hind side, the NEPRA has already initiated opening of the wholesale market through the CTBCM model. In any case, competitive neutrality is crucial to ensure that multiple players are active in all sub-sectors to enhance competition, without discriminatory treatment. See Annex-VI for entry points for reform of the power sector. To develop an open and competitive market at generation, transmission and distribution level, this report highlights the following steps.

a) **Timely operationalization of the Competitive Trading Bilateral Contract Market (CTBCM)**. The CTBCM, approved in 2020 and envisioned in the National Electricity Policy 2021 and National Electricity Plan 2023-27, is a step towards a competitive wholesale electricity market. Under the CTBCM, power generators are granted with the opportunity to directly supply electricity to bulk power consumers through bilateral contracts. The shift will introduce a competitive landscape, allowing consumers to choose between DISCOs and the alternate competitive suppliers. The timely implementation of CTBCM framework will improve the competition, efficiency, and consumer choice within the power sector.

b) **Fully functioning Market and Regulatory Affairs Departments (MIRAD).** The CTBCM model needs fully operationalized MIRAD in each DISCO for transformation of the power sector. MIRADs will ensure compliance with SoPs governing various aspects of the power sector, such as business planning, performance monitoring, demand forecasting, transmission planning, contract and procurement management, regulatory/ legal affairs, and medium-term planning. During the Test Run, it was observed that the MIRADs are not working at their full sanctioned and approved strength. They lack clear Service Rules, consequently, the staff is being assigned with the tasks outside of MIRAD's scope. This undermines the focus required on the tasks for which MIRADs were created for. Therefore, it is recommended that the DISCOs may complete competitive hiring process and functionalize MIRADs as envisaged for a successful CTBCM implementation.[46]

c) **Rationalization of the Use of System/Wheeling Charges for effective CTBCM Execution.** Rationalizing system charges both at the transmission and distribution levels is of paramount importance for the CTBCM model in Pakistan. The charges must be equitable, transparent, and accurately reflect real costs to promote fair competition. Well-defined and reasonable system charges can attract domestic and international investments, as investors prefer transparent and predictable cost frameworks. Standardizing the charges will reduce cost related disagreements among market participants, ensuring long-term sustainability of the CTBCM model. The CCP will also have to be watchful regarding any abuse of dominance while setting wheeling charges by the transmission and distribution companies.

7.2 Other Recommendations to improve competition in the sector

<u>Generation</u>

a) **Phasing Out Inefficient Public Sector Generation Plants:** There is a need to decommissioning of the outdated and inefficient state-owned generation companies to

[46] Comments from an CPPA

reduce the financial burden of capacity payments. This will not only improve the overall system performance and cost-effectiveness in electricity generation but will also enhance market competition. Efficient plants operating at lower cost will encourage competitive pricing, invite private investment, and drive innovation within the sector.

b) **Encouraging off-grid generation solution and private sector's involvement** through small projects under the supervision of provincial or local governments for remote areas. These projects can transmit electricity to the national grid or can sell directly to the domestic consumers in remote areas. The approach will address electricity issues at the grassroots level and reduce the burden on the Federal Government, which currently bears a heavy financial burden of loss-making SOEs and rising circular debt.

c) **Induction of Low-Cost Generation Projects through Competitive Bidding.** To reduce the overall cost of power generation, it is essential to induct low-cost generation projects into the power sector. One of the effective ways to achieve is through competitive bidding that ensures cost-effectiveness, efficiency, and transparency in the power sector. Competitive bidding can drives down the cost of power generation by encouraging more bidders to offer their most competitive prices which indirectly results in lower electricity tariffs for end consumers.

Transmission

a) **Enhancement of Transmission Capacity by Private Sector's Participation and Provincial Grid Companies (PGCs).** The generation capacity exceeds the demand, and the transmission network is not capable of distributing the generated electricity. It is recommended to fully implement the Transmission Line Policy, 2015 and National Electricity Plan, 2023-27, which promotes private sector's participation, investment in infrastructure modernization and grid expansion efforts to manage the natural monopoly in the transmission. The activation of PGCs is also important for enabling the CTBCM in Pakistan, as operative PGCs will facilitate the decentralized management of electricity transmission, and improve grid reliability. Functioning PGCs will enable the provinces to ensure energy transmission and promote a competitive market environment in transmission segment, thereby support the implementation of CTBCM model.

Distribution

a) **Privatization of the existing DISCOs, explore Public-Private Partnerships, and breaking up DISCOs into smaller units.** DISCOs have been a significant concern for successive governments, facing issues such as high distribution losses, revenue leakages, low bill recovery rates, widespread electricity theft, and supply constraints. To address these challenges, privatization of existing DISCOs or exploring public-private partnerships (PPPs) is recommended. The relevant regulatory framework is now open for DISCOs as exclusivity clause has been removed in the amended NEPRA Act. Breaking up the current DISCOs into smaller units and dividing their territories into more manageable regions would increase the number of players in the distribution sector, localized management, improvements and competition.

b) **Revamping the present tariff differential subsidy to the DISCOs is crucial**. The current uniform tariff system in Pakistan, where the same electricity price applies across the country regardless of location or efficiency of the DISCOs, hinders competition and

creates an uneven playing field. To promote a more competitive market, it is important to revise the uniform tariff and consider all inefficiencies. If the government intends to subsidize a particular area or consumer, it should be done through other channels, rather than as a part of the tariff design applicable to all.

c) **Gradual introduction of retail competition within the power sector.** While the initial focus of the CTBCM is on competition in the wholesale market, as market matures, there is a need to gradually reduce the threshold for retail market competition. This progression will eventually empower end-consumers with the freedom to select their preferred supplier. However, it is a long term goal.

d) **Up-gradation of Transmission and Distribution infrastructure**. Infrastructure is the basic and fundamental element for opening up of the wholesale electricity market in Pakistan. The state of competition cannot be expected to improve without an effort to invest in up-gradation and expansion of the transmission and distribution infrastructure to reduce losses and improve reliability. There is a need to allocate funds for expansion of the transmission and distribution networks to reduce technical and non-technical losses for the effective execution of CTBCM. Introduction of smart grid technologies to enhance the efficiency and reliability of the power system seems inevitable. Preferably, these tasks may be performed through encouraging private investment and public-private partnerships.

e) **Developing a mechanism for trading electricity as a commodity on exchange.** The development of electricity 'spot markets' would provide a mechanism for price discovery based on the principles of demand and supply. The mechanism would allow consumers to purchase electricity from sellers offering competitive rates. The introduction of spot markets would encourage producers to improve their operations and reduce inefficiencies, as their ability to sell electricity at favorable prices would depend on meeting market demands cost-effectively. However, developing these spot markets should be considered a long-term objective, with the USA model serving as the ultimate goal for Pakistan's power market.

f) **Addressing the Circular Debt issue**. There is a need to improve governance to resolve the circular debt issue[47] and improve the financials of power sector entities. The required actions include financial restructuring through development and implementation of a comprehensive plan to clear existing circular debt and prevent its recurrence. This could include mechanisms for timely payment of dues and financial settlements across the supply chain. Gradual implementation of cost-reflective tariffs while ensuring targeted subsidies for vulnerable consumers which will enhance the financial viability of power sector entities. Also, there is a need to have a transparent financial reporting system by power sector entities, especially in the distribution segment.

g) **Enhancement of Skills and Expertise in the Power Sector**. Pakistan needs to invest in training and development programs to build a skilled workforce capable of managing modern power sector technologies and practices. Development of specialized training programs in collaboration with educational institutions and industry experts to address skill gaps. Also, there is a need to strengthen partnerships between academic institutions

[47] At present, the circular debt stands at PKR. 2.3 trillion.

and the power industry to align educational programs with industry needs. This may be in the form of joint research and development initiatives

h) **Streamline the Regulatory Framework**[48]. Without further time loss, there is a need to create a regulatory environment that encourages competition. It is suggested to simplify the responsibilities of different regulatory bodies to avoid overlaps and gaps. This would require a regulatory review, as under:

    i) Regulatory Coordination: Create mechanisms for regular coordination and communication among regulatory bodies to ensure alignment and timely implementation of decisions.
    ii) Strengthen the independence of regulatory bodies, so as to ensure unbiased decision-making and accountability. High standard of governance needs to be achieved by implementation of performance evaluation mechanisms for regulatory bodies.

i) **Promoting Transparency and Information Sharing**. Availability of updated information is a pre-requisite to facilitate informed decision-making in a competitive market. Though much of the regulatory decisions, tariffs, and other relevant information is easily accessible. However, increased data transparency would add positively. This would require the power sector entities to regularly report on their performance, financial health, and compliance with regulations.

119. By implementing the above-mentioned recommendations for comprehensive reforms, Pakistan can enhance the efficiency of the sector and attract investment, which would ultimately lead to a more competitive power sector.

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[48] Entry points for reforms can be seen at Annex-V

Annex-I: Pima Working Group Members

No.	Name	Designation	Organization
Ministry of Finance Members			
1.	Mr. Qamar Sarwar Abbasi (Convener)	Additional Finance Secretary (CF)	Ministry of Finance
2.	Dr. Imranullah Khan	Joint Secretary, (CF-I)	Ministry of Finance
3.	Ms. Zakirah Akram (Moderator)	Deputy Secretary, (CF)	Ministry of Finance
Technical Working Group Members			
4.	Mr. Shahid Zia Cheema	Chief,	Planning Commission
5.	Mr. Adnan Riaz Mir	T&S, PPMC	Ministry of Energy (Power Division)
6.	Mr. Muhammad Talha	Director, E-Procurement	National Highway Authority
7.	Mr. Majid Soofi	Director General	Director General, SOE Triage, Central Monitoring Unit, Ministry of Finance
8.	Ms. Kishwar Khan,	Director General, Research	Competition Commission of Pakistan
9.	Mr. Noman Laiq	Director General, Exemptions	Competition Commission of Pakistan
10.	Ms. Maryam Zafar	Director, Research	Competition Commission of Pakistan

Annex-II: Brief Overview of GENCOs

GENCOs	Overview
Jamshoro Power Station (GENCO-I)	GENCO-I is a thermal power plant fueled by natural gas and fuel oil located in Jamshoro near Hyderabad, Sindh in Pakistan. It is operated by the Jamshoro Power Company. It was commissioned between 1989 and 1991. Jamshoro Power Company (GENCO-I) has two plants with a combined generation capacity of 1,024 MW. Central Power Generation Company (GENCO-II), with a total generation capacity of 2,437 MW, also has two generation plants.
Northern Power Generation Company Limited (NPGCL)	NPGCL consists of three Power Complexes- Thermal Power Station (TPS) Muzaffargarh, Gas Turbine Power Station (GTPS) Faisalabad and CCPP Nandipur.[49] Northern Power Generation Company (GENCO-III), with a capacity of 2,151 MW, includes four generation plants.
Central Power Generation Company Limited / GENCO-II	Guddu Thermal Power Station is the biggest Thermal Power Generation Complex of Pakistan in public sector and is located in the province of Sindh. A total number of 16 Units are installed at this Complex.
Lakhra Power Generation Company Limited / GENCO-IV:	The 150 MW FBC Power Plant, the sole Power Plant of Lakhra Power Generation Company, is under shutdown mode for want of GoP decision for Rehabilitation, since July 2017.[50]
National Power Parks Management Company (Private) Limited	National Power Parks Management Company (Private) Limited was incorporated as a private limited company under the Companies Ordinance 1984, now Companies Act, 2017, in 2015. It is a public sector company owned and controlled by Government of Pakistan through Pakistan Development Fund Limited. The principal activity of the company is carry on business of generation of electricity through two combined cycle power plants operating on Regassified Liquefied Natural Gas (RLNG) as primary fuel and High Speed Diesel as back up fuel, of 1230 MW at Haveli Bahadur Shah, District Jhang and 1223 MW at Balloki, District Kasur.
Water and Power Development Authority (WAPDA)	WAPDA established in 1958, entrusted with the development and oversight of water and hydropower resources in Pakistan. WAPDA is pivotal in Pakistan's hydropower sector, entrusted with the task of planning, designing, and executing hydropower projects nationwide. Following the unbundling of WAPDA into various entities, the WAPDA Power Wing is responsible for the operation and maintenance of Hydel Power Stations. The electricity generated from these stations is transmitted to the NTDCL Grid System, with billing managed by CPPA-G according to NEPRA-approved tariffs. Moreover, the Power Wing oversees the rehabilitation and refurbishment of aging Hydel Power Stations to improve reliability and prolong their operational life. Additionally, it monitors the design, erection, and commissioning of future hydroelectric power stations and related electrical and mechanical equipment.

[49] https://power.gov.pk/SiteImage/Publication/YearBook2022-23.pdf
[50] *Ibid*

Annex-III: Brief Overview of DISCOs

DISCOs	Overview
Peshawar Electric Supply Company (PESCO)	PESCO was established in 1998 following the unbundling of the Water and Power Development Authority (WAPDA), and headquartered in Peshawar. It extends electricity distribution services to more than 4.2 million consumers across all districts within the Khyber Pakhtunkhwa province, excluding Ex-FATA. PESCO ranked as the fourth-largest distribution company by consumer base and divided into eight circles, collectively covering approximately 1,204,621 hectares of land.
Islamabad Electric Supply Company (IESCO)	IESCO is public sector company which was incorporated in 1998 after unbundling of Water and Power Development Authority (WAPDA). It is headquartered in Islamabad and provides service of electricity distribution to over 3.2 million consumers in the area from Attock to Jhelum, and from the river Indus to River Neelum in Kashmir covering 06 circles. IESCO is the sixth largest distribution company in terms of consumers. IESCO has 108 Grid Stations having total capacity of 5,224 MVA and distributes the power through 951 Feeders
Gujranwala Electric Power Company (GESCO)	GEPCO is a public sector company which was incorporated in 1998 after unbundling of Water and Power Development Authority (WAPDA). It is headquartered in Gujranwala and provides service of electricity distribution to over 4.1 million consumers in the Gujranwala region in the province of Punjab. The jurisdiction of the company includes Sialkot, Gujranwala, Gujrat, Narowal and Mandi Bahauddin districts. GEPCO is the fifth largest distribution company in terms of consumers and is divided into 05 circles.
Lahore Electric Supply Company (LESCO)	LESCO is a public sector company which was incorporated in 1998. It is headquartered in Lahore that supplies electricity to 6.4 Million consumers in the districts of Lahore, Okara, Sheikhupura, Nankana and Kasur in the province of Punjab. LESCO is the second largest distribution company in terms of consumers.
Faisalabad Electric Supply Company (FESCO)	FESCO is a public sector company which was incorporated in 1998. It is headquartered in Faisalabad and provides service of electricity distribution to 5.1 million consumers in the districts of Faisalabad, Sargodha, Mianwali, Khushab, Jhang, Bhakkar, Toba Tek Singh, and Chiniot in the province of Punjab. FESCO is the third largest distribution company in terms of consumers. FESCO is one of the best electricity distribution company in Pakistan in terms of operational performance, as it has low degree of distribution losses and a high rate of bill collection.
Multan Electric Power Company (MESCO)	MEPCO is a public sector company which was incorporated in 1998. It is the largest distribution Company as it provides service of electricity distribution to 7.65 million consumers in the 13 districts of Multan, Vehari, Bhawal pur, Bhawal Nagar, Sahiwal, Khanewal, Rahim Yar Khan, Pak Pattan, Rajan Pur, Layyah, Lodhran, Muzaffar Garh, Dera Ghazi Khan. MEPCO is the largest distribution company in terms of consumers. Total service territory of the company is predominantly rural and its customer mix is heavily dominated by domestic users. MEPCO has 141 Grid Stations and distributes the power through 1692 Feeders.
Hyderabad Electric Supply Company (HESCO)	HESCO is a public sector company which was incorporated in 1998. It is headquartered in Hyderabad which supplies electricity to 1.2 Million Consumers. Hyderabad Electric Power Company (HESCO) is the seventh largest distribution company in terms of consumers. HESCO has administratively divided 12 districts of Sothern Sindh covering Hyderabad, Laar, Nawab shah, Mirpur Khas, excluding Karachi. HESCO is divided into 4 operation Circles, 15 operation Divisions and 69 operation Sub-divisions.
Quetta Electric Supply Company (QESCO)	QESCO is a public sector company which was incorporated in 1998. It is headquartered in Quetta which supplies electricity to 0.68 Million Consumers. QESCO second smallest utility company in terms of customers, but the largest utility in terms of area as it covers 43% geographical area of Pakistan. QESCO is responsible for distribution of Electric Power to the entire province of Baluchistan excluding Lasbela district. QESCO is divided into 6 operation Circles, 14 operation Divisions and 55 operation Sub-divisions.

Sukkur Electric Power Company SEPCO)	SEPCO is a public sector enterprise established in 2010, following the division of HESCO. Based in Sukkur, SEPCO serves approximately 0.82 million consumers across various districts, including Sukkur, Ghotki, Khairpur, Kashmore/Kandhkot, Rahimyar Khan, Jacobabad, Shikarpur, Larkana, Kamber/Shahdadkot, Dadu, Jamshoro, and Naushehro Feroze, along with parts of Shaheed Benazirabad. Among distribution companies, SEPCO ranks as the third smallest based on its consumer base.
Tribal Areas Electricity Supply Company (TESCO)	TESCO is a public sector company which was incorporated in 2004. It is headquartered in Peshawar which supplies electricity 0.44 million consumers in the area of FATA (present day Merged Tribal Districts). TESCO is the smallest distribution company in terms of its total number of consumers. TESCO is divided into 1 operation Circles and 06 operation Divisions.

Annex- IV: Anti-Competition Cases dealt by Competition Commission of Pakistan

Bid Rigging in Peshawar Electric Supply Company's (PESCO) Tender

- CCP on its own initiated an enquiry after reviewing the historical data related to PESCOs tenders, which raised suspicion of collusive bidding in a tender for the procurement of specific concrete poles. The inquiry concluded that four out of five companies namely: Nam International (Pvt.) Limited, Amin Brothers Engineering (Pvt.) Limited, Creative Engineering (Pvt.) Limited, M.R. Electric Concern (Pvt.) Limited, and Redco Pakistan Limited entered into a joint venture agreement to collectively bid for the tender, while the fifth submitted a cover bid to give the impression of competitive bidding. On the recommendation of the report, CCP issued show cause notices to the five companies.

- In its assessment, the Commission rejected the argument that determining a relevant market was necessary for addressing violations of Section 4 i.e., prohibited agreements. Instead, it asserted that in cases of collusive behavior, there is a presumption that all involved undertakings operate within the same market. The Commission further clarified that certain types of horizontal agreements, such as price fixing, market division, and output restrictions are inherently anti-competitive and may be deemed illegal without further examination of their effects. In this case, the Commission concluded that the joint venture aimed to allocate quantities among its members at a non-competitive price by setting a price floor.

- On the issue of cover bids, the Commission concluded that there was exchange of information about pricing, and the pricing strategy was a result of a coordinated move between the two companies to ensure that the JV would win while giving the impression of competitive bidding process. After hearing all the parties, CCP issued its decision that all five undertakings have violated Section 4 of the Act, 2010 by participating in a collusive bidding arrangement to secure PESCO tender in 2009. A penalty in the sum of PKR 10 M was imposed on five undertakings (PKR 2M each) involved in collusion. All the parties filed writ petition against the Order of the Commission before the Honorable Lahore High Court, Lahore. However, recently, in July 2024, the Competition Appellate Tribunal upheld the penalty imposed by the CCP.[51]

CCP's Order on Leniency Application filed by M/s Siemens Pakistan Engineering Company Ltd. regarding collusive bidding by Pakistan Electrical Power Equipment's Manufacturers Association (PEMA) and its members in procurement tenders of different DISCOs

- CCP disposed of Siemens (Pakistan) Engineering Co. Limited's leniency application under the Competition (Leniency) Regulations, 2007 and Section 39 of the Competition Act, 2010. The application sought leniency regarding Show Cause Notice No. 27/2011, alleging bid rigging/collusive activities in tenders by electric power distribution companies (DISCOs) for switchgear and transformers. As the first leniency application under the Commission, it underscored the importance and effectiveness of leniency.

[51] https://dailytimes.com.pk/1208407/cat-upholds-ccp-penalty-on-collusive-bidding/

The Commission identified four main benefits: deterrence, detection, cessation, and sanctioning, through immunity or reduced penalties.

- Regarding Regulations 3 and 4 of Leniency Regulations, the Commission differentiated them based on timing and information availability. Regulation 3 requires the Commission not to possess the provided information beforehand, offering full immunity if the undertaking comes forward before a show cause notice. Regulation 4 allows for reduced penalties if the undertaking provides corroborative evidence after the notice.

- Based on the oral and written submissions, the Commission determined that the Applicant's use of the leniency provision should be seen as a validation of the Commissions extensive efforts in tackling and overcoming challenges posed by influential lobbies and vested interests to deter, correct, and eliminate anticompetitive practices in Pakistan. While the Show Cause Notice did not allege price fixing in the switchgear market, the Applicant presented evidence of a separate violation, qualifying them for immunity. In the transformer market, although the Commission already had sufficient information, the additional evidence provided by the Applicant was deemed highly valuable. Consequently, the Applicant received 100% reduction in penalty.[52]

[52] See details at: https://cc.gov.pk/home/vieworders/47

Annex-V: Market Developments in Power Sector

Period	Market Developments
Pre-1990s	Generation, Transmission, and Distribution dominated by Water and Power Development Authority (WAPDA). Mostly state-funded investment, with limited private sector participation. Centralized decision-making by WAPDA, with little emphasis on long-term sustainability or efficiency.
Post-1992	Introduction of reforms leading to the unbundling of WAPDA (Water and Power Development Authority). WAPDA has been separated into a number of entities responsible for generation (generation companies), transmission (the National Transmission and Despatch Company) and distribution (distribution companies) Establishment of National Electric Power Regulatory Authority (NEPRA) to regulate the power sector. Incorporation of Power Holding Limited (PHL) to address power sector liabilities. Establishment of Central Power Purchasing Agency (CPPA-G) to facilitate bulk electricity purchases.
Post-2020	Competitive Trading Bilateral Contract Market (CTBCM) model that provided a roadmap for opening the Wholesale Electricity Market of Pakistan, aiming to provide choice to the bulk power consumers (with 1MW or above load) to purchase electric power from the DISCOs or a competitive supplier of their choice DISCOs will be procuring power through centrally organized auctions run through the Independent Auction Administrator (IAA) Transitions the power sector from a "single buyer" model to a "multi-buyer, multi-seller" framework Private generators and consumers to engage directly in buying and selling electricity

Annex-VI: Entry Points for Reform of the Power Sector

Recommendation	Responsibility	Priority
There is a need to prioritize the timely operationalization of the Competitive Bilateral Contract Market (CTBCM).	NEPRA, CPPA-G	High
Rationalize System/Wheeling Charges for effective CTBCM Execution.	NEPRA	High
There is a need to strengthen the MIRAD within the DISCOs by filling the vacant sanctioned posts through due hiring process	DISCOs, M/O Energy (Power Division)	High
Privatizing existing DISCOs or through public-private partnerships, is recommended. Splitting DISCOs into smaller units and territories will increase the number of players in the distribution sector and address current operational issues.	Ministry of Energy (Power Division),	Medium
Enhancement of Transmission Capacity by private sector participation and Provincial Grid Companies (PGCs).	NEPRA, Parliament	Medium
Revision of current tariff differential subsidy is necessary. Revising the NEPRA law to make the sector financially viable and the tariff structure more competitive, while addressing inefficiencies, is essential.	NEPRA, Parliament, Ministry of Energy (Power Division)	Medium
Commencement of small projects under the supervision of provincial or local government with the use of clean energy like hydel, solar, wind and biofuel with the help of private sector or under public private partnership.	Ministry of Energy (Power Division)	Medium
Phasing Out Inefficient Public Sector Generation Plants	Ministry of Energy (Power Division)	Medium
There is a need to facilitate the trading of electricity as a commodity on an exchange, it is necessary to establish a mechanism that includes the development of electricity spot markets.	NEPRA	Low
To consider gradually the introduction of retail competition within the power sector.	NEPRA, CPPA-G	Low

References

Energy Sector Reforms and Financial Sustainability Program, Subprogram 2, Islamic Republic of Pakistan: Energy Sector Reforms and Financial Sustainability, *Asian Development Bank*, 2021.

Bacon, R. W., & Besant-Jones, J. (2001). *Global electric power reform, privatization, and liberalization of the electric power industry in developing countries. Annual review of energy and the environment*, 26(1), 331-359.

BRK Energy. (n.d.). Our businesses: BHE US Transmission. Retrieved from https://www.brkenergy.com/our-businesses/bhe-us-transmission

Competition Commission of Pakistan. (n.d.). The Analysis of Competition and Economic Development in the Power Sector. Retrieved from https://cc.gov.pk/assets/images/Downloads/assessment_studies/energy_sector_report.pdf

CPPA-G. (n.d.). Central Power Purchasing Agency (CPPA-G). Retrieved [22-April-2024], from https://www.cppa.gov.pk/central-power-purchasing-agency-cppa-g

Kabraji & Talibuddin., Marching towards a wholesale electricity market in Pakistan, retrieved from https://www.lexology.com/library/detail.aspx?g=b0f90fdd-5543-4a54-adda-dc332db82ba2

Malik, A., *Legal basis for uniform electricity tariff*, https://file.pide.org.pk/uploads/pip-0444-legal-basis-for-uniform-electricity-tariff.pdf?_gl=1*6bnpp3*_ga*ODQxNzIwODE4LjE2OTgyMTU2MTA.*_ga_T5TLWHEVW9*MTcxNTA4MTk5NS4xNS4xLjE3MTUwODIzNjIuNjAuMC4xOTc5ODgxNTQw

Masroor, F., Ashfaq, M., Siddiqui, M., Hussain, M. M., Shahbaz, M. H., Sadeghi, M. K., & Saeed, G. A. B. (2021). The Power Sector of Pakistan: *A Brief Review*. *Syst. Total*, 121, 35735.

Mettrick, A., 2021, Competition in UK electricity markets, *Energy Trends collection,* https://assets.publishing.service.gov.uk/media/6154611dd3bf7f55fa9268bc/Competition_in_UK_Electricity_Markets_2020.pdf

Ministry of Energy (Power Division), Government of Pakistan. (2023). Yearbook 2022-23 [PDF]. Retrieved from https://power.gov.pk/SiteImage/Publication/YearBook2022-23.pdf

Ministry of Finance, Government of Pakistan. (2023). Budget in Brief [PDF]. Retrieved from https://www.finance.gov.pk/budget/Budget_2023_24/Budget_in_Brief.pdf

National Electric Power Regulatory Authority (NEPRA). (n.d.). About NEPRA. Retrieved from https://nepra.org.pk/About.php

National Electric Power Regulatory Authority. (2021, July). Policy guidelines of Ministry of Energy [PDF]. Retrieved from https://nepra.org.pk/Admission%20Notices/2021/07%20July/Policy%20guidelines%20of%20MoE.PDF

National Grid. (n.d.). About us. Retrieved from https://www.nationalgrid.com/about-us

National Transmission & Despatch Company Limited. (n.d.). The company. Retrieved from https://ntdc.gov.pk/the-company

Norton, D., 2024, Future of domestic price protection, *Office of Gas and Electricity Markets,* https://www.ofgem.gov.uk/sites/default/files/2024-03/Future%20Price%20Protection%20Discussion%20Paper.pdf

PEPCO. (n.d.). Retrieved from http://pepco.gov.pk/pepco/

Qazi, U., & Jahanzaib, M. (2018). An integrated sectoral framework for the development of sustainable power sector in Pakistan. *Energy Reports*, 4, 376-392.

Rossow, R & Akshat, S., 2024, India's Private Power Market, *Expanding Private Sector Electricity Distribution*, Center for Strategic and International Studies. https://csis-website-prod.s3.amazonaws.com/s3fs-public/2024-01/240122_Rossow_India_Discoms.pdf?VersionId=cE.2T3pP7uAisSGv1ofQrksvFjeOoXG4

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