

NATIONAL ELECTRIC POWER
REGULATORY AUTHORITY

STATE OF INDUSTRY REPORT 2023







STATE OF INDUSTRY REPORT 2023



TABLE OF CONTENTS

FOREWORD
1 EXECUTIVE SUMMARY
2 OVERVIEW OF THE ELECTRIC POWER SECTOR
2.1 GENERATION SECTOR
2.1.1 Challenges of Surplus 'Take or Pay' Generation Capacity
2.1.2 Extension in Operation of Older Power Plants
2.1.3 Least Cost Generation
2.1.4 Fuel Procurement
2.1.5 Challenges and Opportunities for Coal-Based Power Plants
2.1.6 Compliance of Economic Merit Order
2.1.7 Payment of Partial Load Adjustment Charges
2.1.8 Payment on Account of Non-Project Missed Volume
2.1.9 Delay in Commissioning of Power Plants
2.1.10 Operation of Expensive Power Plants
2.1.11 Performance of Public Sector Thermal Power Generation Companies
2.1.12 Expensive Generation of K-Electric
2.1.13 Induction of Renewable Energy Power Plants
2.1.14 Challenges with Intermittent Power Sources
2.1.15 Micro and Mini Grids
2.1.16 Electricity Consumers with Net-Metering
2.1.17 Liquidated Damages
2.1.18 Shifting from Imported to Local Fuel
2.1.19 Hydropower Projects
2.1.20 Dependable Capacity Test
2.2 TRANSMISSION SECTOR
2.2.1 Transmission System Expansion Plan
2.2.2 Transmission Investment Plan
2.2.3 Interim Dispersal Arrangements for Power Plants
2.2.4 Licence for Provincial Grid Companies
2.2.5 System Constraints
2.2.6 Optimum Utilization of HVDC Transmission Line
2.2.7 Implementation of Supervisory Control and Data Acquisition System
2.2.8 Insufficient Interconnection between NTDC and KE
2.2.9 Power Purchase Agreement between CPPA-G and KE
2.2.10 Separation of System Operator Functions from NTDC
2.2.11 Separation of Market Operator Function from CPPA-G as Agent of DISCOs
2.2.12 Approval of New Grid Code
2.2.13 Blackout of System
2.2.14 Frequent Collapse of Towers
2.3 DISTRIBUTION SECTOR
2.3.1 Aggregate Technical and Commercial Loss-based Load-Shedding
2.3.2 Pending Connections
2.3.3 Safety Issues in DISCOs
2.3.4 Operation of DISCOs involving Private Sector
2.3.5 Investment Plan of DISCO's and KE
2.3.6 Advanced Metering Infrastructure in DISCO's and KE
2.3.7 Energy Charges vs. Capacity Charges
2.3.8 Summary of Consumer-end Tariff
2.3.9 Monthly Fuel Charges Adjustments

2.3.10 Quarterly Adjustments
2.3.11 Transmission and Distribution Losses of DISCOs
2.3.12 Circular Debt - Stock, Flow and Accumulation
2.3.13 Less Recoveries
2.3.14 Higher Receivables
2.3.15 Optimizing Commercial Electricity Consumption
2.3.16 Consumer-end Tariff of KE
2.3.17 Multi-Year Tariff for DISCOs
2.3.18 Cross Subsidization among DISCOs
2.3.19 Electricity Cost vis-à-vis Supplementary Charges in Electricity Bills
2.3.20 The Horizontal Re-structuring of DISCOs
2.3.21 CTBCM Regime
2.3.22 Cases Pending before Appellate Tribunal
2.4 KEY RECOMMENDATIONS
2.4.1 Generation
2.4.2 Transmission
2.4.3 Distribution
3 PERFORMANCE OF GENERATION SECTOR
3.1 INSTALLED CAPACITY
3.2 DEPENDABLE CAPACITY
3.3 ELECTRICITY GENERATION
3.4 SECTORAL SHARE
3.5 PAYABLE TO POWER GENERATION AND TRANSMISSION COMPANIES
4 PERFORMANCE OF TRANSMISSION SECTOR
4.1 GENERAL
4.2 NATIONAL GRID COMPANY
4.3 POWER BALANCES IN NTDC SYSTEM
4.4 UNDER-UTILIZATION OF TRANSMISSION SYSTEM OF NTDC
4.5 OVER-LOADING OF NTDC'S 500 KV AND 220 KV NETWORK
4.6 TRANSMISSION AND TRANSFORMATION LOSSES OF NTDC
4.7 INVESTMENT DETAILS OF NTDC
4.8 NEPRA PERFORMANCE STANDARDS (TRANSMISSION) RULES, 2005
4.9 TRANSMISSION NETWORK OF KE
4.10 POWER BALANCES IN KE SYSTEM
4.11 LOADING POSITION OF POWER TRANSFORMERS IN KE SYSTEM
4.12 TRANSMISSION LOSSES OF 660 KV HVDC LINE
4.13 TRANSMISSION INVOICE RAISED BY PMLTC
4.14 TRANSMISSION LOSSES OF STDC
4.15 DURATION OF TRANSMISSION LINE OUTAGES OF STDC
5 PERFORMANCE OF DISTRIBUTION/SUPPLY SECTOR
5.1 GENERAL
5.2 CONSUMER BASE OF DISCO'S AND KE
5.3 SALES OF DISCOS AND KE
5.4 TRANSMISSION AND DISTRIBUTION LOSSES OF DISCOS
5.5 RECOVERY RATIOS IN DISCOS SYSTEM
5.6 RECEIVABLES OF DISCOS
5.7 OVER-LOADING POSITIONS IN DISCOS SYSTEM
5.8 FATAL ACCIDENTS/POOR SAFETY ENVIRONMENT IN DISCOS AND KE
5.9 APPROVAL OF INVESTMENT PLAN OF DISCOS AND KE
5.10 STATUS OF NET-METERING
5.11 STATUS OF PENDING CONNECTIONS
5.12 TRANSMISSION AND DISTRIBUTION LOSSES IN KE
5.13 RECOVERY OF BILLED AMOUNT IN KE SYSTEM

5.14 OVER-LOADING POSITIONS IN KE SYSTEM
5.15 RECEIVABLES OF KE
6 MONITORING OF THE POWER SECTOR
6.1 GENERAL
6.2 MONITORING ACTIVITIES IN GENERATION SECTOR
6.2.1 Data Exchange Portal (Generation Module)
6.2.2 Performance Evaluation Reports of Thermal Power Plants
6.2.3 Under-Utilization of Efficient Power Plants/Non-Compliance of EMO
6.2.4 Inquiry/Investigation Initiated Against Generation Licensees
6.2.5 Legal Proceedings concluded during FY 2022-23
6.2.6 Legal Proceedings under Process
6.3 POWER SYSTEM STABILIZERS AT DIFFERENT POWER PLANTS
6.4 DIRECTIONS OF THE AUTHORITY IN THE MATTER OF POWER SYSTEM COLLAPSE
6.5 OPERATING PROCEDURES AND BLACK START FACILITY
6.6 MONITORING ACTIVITIES IN TRANSMISSION SECTOR
6.6.1 Data Exchange Portal (Transmission Module)
6.6.2 Legal Proceeding initiated Against Transmission Licensees
6.6.3 Review of Progress of Interconnection Arrangements and System Constraints
6.6.4 Inquiry Report (Partial Power Blackout in the Country)
6.6.5 Inquiry Report (Total Power System Collapse)
6.6.6 Tower Collapses
6.6.7 Theft of Braces on 500 kV/220 kV Transmission Line
6.7 MONITORING ACTIVITIES IN DISTRIBUTION SECTOR
6.7.1 Data Exchange Portal (Distribution Module)
6.7.2 Annual Performance Reports of DISCOs
6.7.3 Monitoring of Load-Shedding in the Country
6.7.4 Pending Ripe Connections in DISCOs
6.7.5 Earthing/Grounding of DISCOs
6.7.6 Advanced Metering Infrastructure/Automated Meter Reading in KE System
6.7.7 Advanced Metering Infrastructure/Automated Meter Reading in IESCO System
6.7.8 Interconnection Issues in respect of Small Renewable Projects
6.7.9 Maximum Demand Indicator Calculation NTDC v/s IESCO
7 MAJOR REGULATORY ACTIVITIES
7.1 COMPETITIVE TRADING BILATERAL CONTRACT MARKET
7.2 INDICATIVE GENERATION CAPACITY EXPANSION PLAN
7.3 LICENSING
7.4 TARIFF
7.5 CONSUMER AFFAIRS
7.6 NEPRA APPELLATE BOARD
7.7 CYBER SECURITY OF POWER SECTOR CRITICAL INFRASTRUCTURE
7.8 CORPORATE SOCIAL RESPONSIBILITY
7.9 HEALTH, SAFETY & ENVIRONMENT
7.10 LEGAL
8 INITIATIVES BY STAKEHOLDERS
8.1 GENERAL
8.2 PRIVATE POWER AND INFRASTRUCTURE BOARD
8.3 ALTERNATIVE ENERGY DEVELOPMENT BOARD
8.4 NATIONAL ENERGY EFFICIENCY AND CONSERVATION AUTHORITY
8.5 PUNJAB POWER DEVELOPMENT BOARD
8.6 PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION
8.7 ENERGY DEPARTMENT, GOVERNMENT OF SINDH
8.8 ENERGY DEPARTMENT, GOVERNMENT OF BALOCHISTAN

STATISTICAL DATA

Table 1 Primary Energy Supplies by Source (TOE)
Table 2 Final Energy Consumption by Source (TOE)
Table 3 Fuel Consumption for Thermal Power Generation (TOE)
Table 4 Installed Capacity by Type (MW)
Table 5 Plant-wise Installed Capacity (MW)
Table 6 Installed Capacity by Systems and by Sectors (MW)
Table 7 Electricity Generation by Type (GWh)
Table 8 Plant-wise Electricity Generation (GWh)
Table 9 Electricity Generation by Systems and by Sectors (GWh)
Table 10 Month-wise CPPA-G Electricity Generation Data (GWh)
Table 11 Monthly Source-wise Actual and Projected Generation (GWh)
Table 12 Monthly Source-wise Actual and Projected Energy Purchase (Rs. in Million)
Table 13 Month-wise KE Electricity Generation Data (GWh)
Table 14 Monthly Variation in Maximum Hydel Generating Capability (MW)
Table 15 Auxiliary Consumption and all Factors of Hydel Power Stations
Table 16 Month-wise WAPDA Hydroelectric Invoice for Capacity Charges and Cost Data
Table 17 Thermal Electricity Generation by Sector and by Fuel (GWh)
Table 18 Fuel Consumption and Cost of Generation Data of GENCOs (Net)
Table 19 Auxiliary Consumption and all Factors of GENCOs
Table 20 Heat Rate and Plant Efficiency Data of GENCOs
Table 21 Fuel Consumption and Cost of Generation Data of IPPs (Net)
Table 22 Auxiliary Consumption and all Factors of IPPs
Table 23 Heat Rate and Plant Efficiency Data of IPPs
Table 24 Monthly Source-wise Power Sent Out and Fuel Cost Data
Table 25 Electricity Statistics of K-Electric Limited
Table 26 Fuel Consumption and Cost of Generation Data of K-Electric and their IPPs (Net)
Table 27 Auxiliary Consumption all Factors of K-Electric and their IPPs
Table 28 Heat Rate and Plant Efficiency Data of K-Electric and their IPPs
Table 29 K-Electric (Source-wise Own Generation and Fuel Cost Adjustments)
Table 30 K-Electric (Source-wise Power Purchase and Fuel Costs)
Table 31 K-Electric (Fuel-wise Own Generation and Fuel Costs)
Table 32 K-Electric (Fuel-wise Power Purchase and Fuel Costs)
Table 33 Capacity and Energy Invoiced by Generators
Table 34 Energy Purchase Price and Capacity Purchase Price Data
Table 35 Merit Order for Power Generation Plants (PEPCO System)
Table 36 Monthly Utilization Factor of Power Plants
Table 37 Details of Liquidated Damages against Power Plants
Table 38 Claims Lodged by CPPA-G against Gas Supply Company
Table 39 Detail of Partial Load Adjustment Charges
Table 40 Details of Verified Amount of Non-Project Missed Volume
Table 41 Year-wise Details of the Circular Debt
Table 42 Investment Plan for Private Sector Power Generation Projects
Table 43 Investment Plan for Power Generation Projects (K-Electric)
Table 44 Status of Renewable Energy Projects
Table 45 Unit Received, Delivered and Transmission Losses in NTDC System
Table 46 Grid Stations, Power Transformers and Transmission Lines with NTDC
Table 47 Loading Position of Power Transformers and Transmission Lines with NTDC
Table 48 Grid Stations and Transmission Lines with K-Electric Limited

Table 49 Investment Details in Transmission System of K-Electric Limited
Table 50 Surplus/Deficit in Demand and Supply during NTDC's System Peak Hours
Table 51 Surplus/Deficit in Demand and Supply during K-Electric's System Peak Hours
Table 52 Overload (above 80% load) of 500 kV and 220 kV Power Transformers installed at 500 kV Grid Stations
Table 53 Overload (above 80% load) of 220 kV Power Transformers installed at 220 kV Grid Stations
Table 54 Outages of NTDC's 500 kV and 220 kV Network
Table 55 Main Electricity Statistics of the Country
Table 56 Hourly System Demand
Table 57 Monthly System Peak Load Demand
Table 58 Number of Circles, Divisions, Sub-Divisions, 11 kV Feeders and their Loading Positions
Table 59 Status of Distribution Lines
Table 60 Status of Grid Stations
Table 61 Category-wise Number of Consumers
Table 62 Category-wise Sanctioned Load
Table 63 Peak Demand of Distribution Companies
Table 64 Energy Volume Consumed by Demand
Table 65 Maximum Demand and Energy Data of all DISCOs
Table 66 Total Units Purchased, Sold and Losses
Table 67 Units Billed, Amount of Unites Billed and Amount Realized in all DISCOs
Table 68 Category-wise Electricity Sold
Table 69 Category-wise Energy Sales in CPPA-G and K-Electric System
Table 70 Category-wise Consumers and their Electricity Consumption
Table 71 Annual Growth Rate of Electricity Consumption
Table 72 Average Annual Electricity Consumption per Connection
Table 73 Distribution Losses (voltage category-wise)
Table 74 DISCOs' Billing, Collection and Percentage of Recovery against Computed Billing
Table 75 DISCOs' Technical and Commercial Losses
Table 76 Receivables of Distribution Companies including K-Electric Limited
Table 77 Province-wise Electricity Consumption by Economic Groups of the Country (GWh)
Table 78 Province-wise Electricity Consumption by Economic Groups of the Country (%)
Table 79 Safety (Number of Fatal Accidents for both Employees and Public)
Table 80 Applications of New Connections, Energized and Pending
Table 81 DISCOs' Number of Power Transformers, Capacities and their Loading Positions
Table 82 DISCOs' Number of Distribution Transformers, Capacities and their Loading Positions
Table 83 Feeders Outages Statistics of DISCOs
Table 84 Village Electrification in all Distribution Companies
Table 85 WAPDA Hydroelectric Tariff
Table 86 (A) Index/Adjusted Tariff of GENCOs on Quarterly Basis
(B) Index/Adjusted Tariff of Hydel Power Plants on Quarterly Basis
(C) Index/Adjusted Tariff of Gas Power Plants on Quarterly Basis
(D) Index/Adjusted Tariff of RFO Power Plants on Quarterly Basis
(E) Index/Adjusted Tariff of HSD Power Plants on Quarterly Basis
(F) Index/Adjusted Tariff of RLNG Power Plants on Quarterly Basis
(G) Index/Adjusted Tariff of Coal Fired Power Plants on Quarterly Basis
(H) Index/Adjusted Tariff of Wind Power Plants on Quarterly Basis
(I) Index/Adjusted Tariff of Solar Power Plants on Quarterly Basis
(J) Index/Adjusted Tariff of Bagasse-based Power Plants on Quarterly Basis
Table 87 Insurance Cost Component

Table 88	(A)	Use of Transmission System Charges
	(B)	Pak-Matiari Lahore Transmission Company (Pvt.) Limited
	(C)	Sindh Transmission and Dispatch Company (Pvt.) Limited
Table 89	(A)	Consumer End Applicable Tariff from November, 2021 and onwards CPPA-G System
	(B)	Consumer End Determined Tariff for K-Electric applicable for April – June 2022
Table 90		National Average Uniform Applicable Base Tariff
Table 91	(A)	Monthly Fuel Price Adjustments in respect of all DISCOs and K-Electric
	(B)	Detail of Quarterly Adjustment of DISCOs
Table 92		CPI (General/US), Exchange Rate, KIBOR and LIBOR
Table 93		CPPA-G Market Operator Fee
Table 94		Import by KE from CPPA-G Basket
Table 95		Technology-wise Daily Generation Capacity (MW), Daily Generation (GWh) and Plant Utilization
Table 96		Daily Generation Capacity (MW), Daily Generation (GWh) and Load Management
Table 97		Sector-wise Generation Capacity (MW), Daily Energy Generation (GWh) and Plant Utilization
Table 98		Summary of Generation Capacity (MW), Daily Energy Generation (GWh) and Plant Utilization

FOREWORD

The electricity sector plays pivotal role in country's socio-economic progress. Availability of electricity is essential for economic expansion, employment generation, healthcare improvement, education promotion, agriculture growth, ecological sustainability, poverty alleviation etc. 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.

Over the years, Pakistan power sector has grappled with challenges including increasing cost of electricity, inefficiencies in the generation, transmission, distribution and supply segments, fuel supply issues, transmission constraints, under-utilization of efficient plants, growing circular debt, governance and compliance etc. Most of these problems persisted during FY 2022-23 as well. However, during the reporting year, the liquidity situation for the electric power sector and the affordability of electricity for consumers aggravated due to unprecedented increase in cost of electricity. This price escalation emanated primarily due to increase in the prices of essential primary energy resources such as coal, oil, and gas in the international market and drastic devaluation of Pakistani Rupee which intensified the financial strain on the power sector and consumers.

High cost of electricity in Pakistan has emerged as a critical challenge affecting all segments of society, ranging from domestic consumers to industrial and agricultural sectors. Amid the historically highest inflation in the country, the extra ordinary increase in the price of electricity has badly disrupted the life of an ordinary man.

Besides domestic consumers, the high price of electricity has had a major impact on commercial, industrial, agriculture and services sector. This negative impact is manifest in lackluster economic growth of the country as the Gross Domestic Product (GDP) of Pakistan posted a growth of 0.29% in FY 2022-23.

While examining the reasons behind the higher cost of electricity in the country, we find a multitude of factors. These include, but not limited to, the increasing cost of fuel, rupee devaluation, increased capacity payments, circular debt, reduce electricity usage and negative sales growth, high aggregate transmission and distribution losses, theft, less recoveries, varying electricity demand pattern on daily and seasonal basis, litigation and poor governance in the overall electric power sector.

One of the primary drivers for the increase in electricity costs has been the impact of rupee devaluation. At the close of the FY 2021-22, the exchange rate was 1 US$ to 204.85 Pakistani Rupees, whereas by the end of the FY 2022-23, this rate had risen to 1 US$ equaling 287.50 Pakistani Rupees. Since most of the investment in power sector of Pakistan is denominated in foreign currency, therefore, when the rupee depreciates, it escalates the cost of servicing of these foreign debts, placing strain on the financial stability of power companies and affordability of the consumers.

Moreover, Pakistan heavily relies on imported energy resources such as coal, oil and gas. The devaluation of the rupee leads to higher import costs, directly influencing the pricing of electricity and resulting in increased tariffs for consumers. Moreover, the power sector is heavily dependent on imported equipment and technology. A devalued rupee further amplifies the cost of such imports, making it more expensive to maintain and upgrade power infrastructure.

Another significant factor contributing to the increased cost of electricity is the under-utilization of 'Take or Pay' generation capacity, presenting a dual challenge to the power sector. Under 'Take or Pay' agreements, power utilities are obliged to pay for contracted capacity, regardless of whether it is consumed or not. The unutilized capacity places a financial burden on electricity consumers, who end up paying for unused power. During FY 2022-23, the utilization factor of de-rated thermal electric power generation capacity remained 34.68%. Additionally, non-optimal utilization of capacity leads to inefficiencies in the power generation process. This not only results in economic losses for power companies but also diminishes the overall efficiency of the power sector. Use of less than available capacity, from power plants in-operation, warrants payment of Part Load Adjustment Charges (PLAC) to generation companies which further escalates the per unit cost of electricity. During FY 2022-23, the payment made to the power plants for PLAC, in Central Power Purchasing Agency (Guarantee) Limited (CPPA-G) system, amounted to Rs. 46.59 billion.

The rupee devaluation coupled with under-utilization of 'Take or Pay' capacity significantly contributed to the higher cost of electricity exacerbating the financial liquidity and instability within the power sector. Non-payment to the power generation companies in timely manner hampers their ability to make timely payments to fuel suppliers and other stakeholders, triggering a ripple effect throughout the industry. This precarious financial situation of power companies, compounded by the challenges of rupee devaluation and 'Take or Pay' obligations, may dissuade potential investors from participating in the power sector which could negative impact the power sector modernization and expansion.

While closely looking at the individual factors which contributed for high electricity cost, it becomes evident that most of them are controllable. For instance, the cost of fuel can be managed by diversifying the generation mix towards renewable energy sources. Similarly, the impact of increased capacity payments can be mitigated by boosting electricity sales. Issues like circular debt and others can be addressed through timely reforms, better planning and improved governance.

Now is a critical juncture to meticulously examine every factor contributing to the rise in electricity costs, from the planning phase to the delivery of electricity to end-consumers'. While all segments of Pakistan's power sector require thorough review for improved functionality, the integrated system, planning aspect necessitates an even more comprehensive assessment. The power sector of the country can no longer afford inefficiencies; which must be curbed through immediate policy, regulatory and institutional actions. To halt the deterioration of the power sector and recovery from its current run-down state, swift and innovative solutions are needed.

The goal to establish a sustainable and robust electric power sector in Pakistan demands a multi-faceted approach. Key priorities include strategic policy reforms, institutional and financial restructuring, optimal investments in modern infrastructure, least cost and competitive electric power procurement including commitment to renewable energy resources. Additionally, fostering a culture of efficiency, transparency, and financial discipline is necessary to overcome persistent challenges.

While navigating the intricate terrain of energy pricing, a balanced and pragmatic approach is needed. A balance need to be maintained essentially between affordability for consumers and financial viability for power companies. Through strategic policy measures, technological advancements, and a commitment to efficiency and fiscal responsibility, the country can address the challenges faced by the power sector, paving the way for a prosperous and resilient energy future for the nation.

The synergy of knowledge, expertise, and resources is necessarily required to catalyze the transformation of Pakistan's power sector into a dynamic forward-looking industry. A workforce equipped with the latest set of skills, use of technologies and best practices is essential for sustaining growth of the power sector. Therefore, continuous capacity building and skill development in the power sector must be given priority.

Revival of the power sector calls for strategic policy reforms, targeted investments, commitment to

transparency and accountability. Focusing on these areas is crucial for ensuring a sustainable, reliable, and affordable supply of electricity for the nation's economic growth and the well-being of its citizens.

Over the last few decades, substantial generation capacity has been added in the power system. However, while generation capacity has surged, the transmission and distribution networks face persistent constraints. These bottlenecks hinder the seamless flow of electricity necessitating concerted efforts towards development of transmission and distribution networks.

Pakistan's electric power transmission system is a vital organ of the nation's energy infrastructure meant for smooth flow of electricity from its generation sources to distribution networks. The introduction of the High Voltage Direct Current (HVDC) Matiari-Lahore Transmission Line has significantly enhanced the system's capacity, allowing it to efficiently and economically handle heavier loads over greater distances. However, its under-utilization (around 60.4%) places a substantial burden on the financial health of the power sector, consequently elevating electricity costs for end-consumers.

The high voltage 500 kV and 220 kV transmission system of NTDC grappled with severe challenges; network constraints hinder the smooth evacuation of power from several highly efficient power plants. The maintenance and upkeep of the existing system, in addition to concerns regarding work quality, safety, and security, necessitate immediate attention and intervention.

The electric power Distribution Companies (DISCOs) in Pakistan stand at a critical juncture, grappling with the pervasive issue of old infrastructure coupled with poor governance. This predicament has far-reaching consequences that reverberate throughout the power sector, impacting both the quality and accessibility of electricity for consumers. The alarming level of technical and commercial losses incurred during the transmission and distribution process is one of the glaring manifestations of this problem. Inefficient operations, outdated infrastructure, and a lack of investment in grid maintenance have resulted in significant leakages in the system. This not only causes financial losses for the DISCOs but also worsens the existing burden of the circular debt, further hindering the financial stability of the electric power sector in the country. In the presence of 'Take or Pay' and under-utilized generation capacity, the persisting prolonged and unjustified load-shedding by DISCOs, citing technical and commercial losses is highly undesirable. Unfortunately, most of the DISCOs have not made any significant improvement on this issue. The non-supply of electricity by DISCOs is resulting in the under-utilization of 'Take or Pay' power plants. Simultaneously, it is compelling consumers to resort to more expensive means of generating electricity, placing a heavier burden on the national exchequer in terms of foreign exchange.

The lack of oversight and accountability mechanisms within DISCOs leads to mismanagement and corruption, further eroding the sector's efficiency, viability and credibility. The performance-based robust human resource system is required to be developed and deployed in DISCOs to improve their performance.

The poor governance in electric power DISCOs need to be curbed imperatively for sustained growth and financial viability of Pakistan's power sector. Effective implementation of regulatory frameworks and robust oversight is crucial to improve governance in DISCOs. Investment in human resource development and encouraging a culture of accountability can be instrumental to bring a positive shift in the performance of these companies. By tackling the governance issues, Pakistan can pave the way for an efficient, transparent, and consumer-centric electric power sector, ultimately benefiting both the industry and the citizens alike.

A substantial portion of the country's population still does not have access to electricity. Regrettably, even for those with electric connections, continuous and reliable supply remains a challenge. The accessibility and affordability of electricity is particularly at lowest for marginalized communities both in rural areas and urban slums. The global commitment to achieving Sustainable Development Goal 7 (SDG7), which

targets universal access to sustainable and affordable energy by 2030 demands meticulous planning and concerted efforts.

In areas without reliable electricity access, people resort to costly alternatives like HSD, Petrol, RLNG, and Kerosene Oil. Further, the menace of electricity theft not only causes financial loss to DISCOs but also poses safety risk for the people. These adverse effects underscore the necessity for reliable provision of electricity to the people at an affordable cost.

The National Electric Power Regulatory Authority (NEPRA), established under the Regulation of Generation, Transmission, and Distribution of Electric Power Act, 1997, exclusively regulates the electric power services in Pakistan. NEPRA, through regulatory tools, endeavors to ensure fair competition, and transparency.

Preparation of State of Industry Report (SIR) on annual basis is a regulatory requirement providing a comprehensive overview of the power sector's performance during a financial year. It covers generation, transmission, system operations, distribution, and supply area activities, highlighting strengths, weaknesses, inefficiencies, and challenges. Recommendations for policy-making and collaboration with relevant government agencies are included in the report to address power sector challenges.

SIR-2023 focuses on critical issues like price hike, inefficiencies of state-owned entities, resource under-utilization, thermal power plant operational inefficiencies, system constraints and market development. The report also includes five years' statistical data on operational and financial aspects. This data is available online to assist stakeholders in future planning and research areas.

The report has been published for submission to the Council of Common Interests (CCI) and the Federal Government in accordance with the NEPRA Act. The Authority appreciates the cooperation of Licensees and stakeholders for providing timely data.

The data in SIR-2023 is as of June 30, 2023, some parameters are provisional and may be subject to revision. The report shall not be liable for any legal claims or disputes arising out of the regulatory observations and data presented in it.

EXECUTIVE SUMMARY

01

The SIR-2023 provides a comprehensive evaluation of the electric power industry's performance, accomplishments, and challenges throughout the FY 2022-23. It conducts an in-depth analysis of electric power Generation, Transmission, Distribution, and Supply during FY 2022-23, while also spotlighting key stakeholders' activities and identifying crucial areas for improvement. The report tries to adeptly address the challenges continuing over the years as well as new issues observed during FY 2022-23 having significant impact on the power sector performance.

This report has been prepared meticulously through rigorous data collection from authoritative sources including NEPRA licensees and government agencies. The report covers vital key parameters such as generation capacities, infrastructure, energy consumption, and financial performance. The compiled data forms the bedrock of the report, ensuring precision and relevance in its findings.

The data gathered on the performance of power sector during FY 2022-23 and subsequent analysis reveals that many of the challenges faced by Pakistan's power sector over several years have still not been dispensed with. The report takes into account both these ongoing issues and the new challenges observed during FY 2022-23. It is now imperative to delve into the highlighted concerns and devise viable solutions.

Overall, the power sector in the current financial year once again fell short of meeting consumers' expectations for affordable and reliable electricity. It remained under significant stress for several reasons, which will be discussed in following chapters.

Affordable electricity is not only important for a country's economic growth but also a vital and critical factor in propelling the GDP growth of the country. Social progress, too, hinges on affordable and reliable electricity. The high costs of electricity has affected all sectors domestic, commercial, industrial, and agriculture of the country. Unfortunately, the economic growth rate for FY 2022-23 has declined to a mere 0.29%, with high electricity costs emerging as one of the contributing factors. The power sector grappled with persistent issues, ranging from increasing capacity payments to over-reliance on imported fuel, under-utilization of power plants, circular debt, transmission constraints, operational inefficiencies, under-utilization of HVDC line etc. However, the primary driver of the power sector's stress is poor governance, spanning from planning to execution and subsequent operation, coupled with lack of accountability.

A critical concern is the continued operation of old fossil fuel power plants that have exceeded their initial licence lifespan and are less efficient. These plants are being operated mainly for the reason of their location and transmission limitations. Operation of such power plants reflects failure in medium and long-term planning. The addition of three Thar Coal-based power plants during FY 2022-23 is a positive development. However, the operation of 660 MW power plant of Lucky Electric Power on imported coal due to unavailability of Thar Coal is a serious issue that demands immediate attention. From an economic perspective, nuclear and Thar Coal-based plants stand as the most viable options for base load power, necessitating concerted efforts towards further developing Thar Coal mines and associated infrastructure such as railways.

The substantial PLAC, reported at Rs. 46.59 billion during FY 2022-23, is a wake-up call to curb unnecessary financial burden on the power sector. The PLAC could be substantially reduced through effective implementation of better load management planning and Time of Use (TOU) tariff.

The declining per capita electricity consumption in Pakistan underscores the pressing need for improved living standards and sustained economic growth, a critical gauge of a nation's well-being. It's worrying to note that despite an increase in total electricity consumers compared to FY 2021-22, there has been a decrease in electricity consumption and sales. In the backdrop of dominating Capacity Purchase Price (CPP) in electricity tariff, reduction in sales amid surplus 'Take or Pay' generation capacity has a negative impact on per unit cost of electricity.

While NEPRA does not acknowledge load-shedding based on Aggregate Technical and Commercial (AT&C) losses, not only the rural areas but even, numerous major cities continue to experience prolonged (even up to 12 hours or more) load-shedding and outages. In the wake of failure of DISCOs to rectify this situation, micro and mini grids powered by solar plants, with or without battery or with small generator, could present a viable solution. For this purpose, the private sector can be involved through incentives to contribute for provision of electricity to remote areas.

In conclusion, it is imperative that the longstanding issues highlighted in the SIRs are earnestly taken up and timely addressed for relief to the consumers and secure the financial viability of the power sector.

This SIR is structured into two Sections. Section 1, comprising eight chapters, conducts a comprehensive evaluation of the electric power industry's performance during the FY 2022-23.

Chapter 1 of this report is dedicated to providing an executive summary, offering a concise overview and analysis of the key findings, accomplishments, and challenges addressed in subsequent sections.

Chapter 2 offers an overview of the electric power sector, encompassing its capacity for generation, transmission, distribution, and supply. It addresses key issues faced in each segment during FY 2022-23 and provides recommendations for improvement.

Chapter 3 delves into the performance of the generation segment, providing details on installed and dependable generation capacities, capacity additions, expired generation capacity, and total electricity generation in the country.

Chapter 4 assesses the transmission sector, including expansion and improvements, the involvement of new players like provincial grid companies, asset utilization, and transmission losses. It also highlights investments made by transmission network operators and their adherence to performance standards.

Chapter 5 focuses on the distribution sector, offering insights into DISCOs' infrastructure, consumer categories, sales growth, losses, bill recovery, receivables, network loading, connection awards, safety records, TOU meters, and compliance with investment targets.

Chapter 6 provides crucial information about monitoring and enforcement activities conducted by the Authority during FY 2022-23. It covers actions taken against entities in cases of fatal incidents, compensation provided, and compliance with regulations.

Chapter 7 outlines major regulatory activities in FY 2022-23, including developments in the wholesale electricity market, licence grants, modifications, tariff determinations, complaint resolution, and initiatives in health, safety, environment, and corporate social responsibility.

Chapter 8 offers an overview of initiatives by key stakeholders in the power sector, both at the federal and provincial levels, highlighting their achievements and activities in line with their mandates during FY 2022-23.

Section 2 of SIR-2023 presents statistical data on the energy and electricity sector. This data aims to empower decision-makers, researchers, and developers for more informed policy-making and performance improvements.

The submission of SIR-2023 is in accordance with Section 42 (b) of the NEPRA Act.

OVERVIEW OF THE ELECTRIC POWER SECTOR

02

Electricity has central importance for economic development of a country. In today's world, the economic growth and social uplift of the people cannot be imagined without provision of adequate and affordable electricity. From life of an ordinary man to the commercial and industrial activities and public services, everything hinges on the seamless operation of electricity sector which is considered lifeblood for socio-economic development of any nation.

The outbreak of pandemic during the year 2020 slowed down the economic activities globally which affected Pakistan equally. The recovery phase after the pandemic was however complicated by the geopolitical tensions arising from the Russia-Ukraine war which led to increased fuel prices. Resultantly, the power sector of Pakistan, heavily relying on imported fuels, faced the issue of increase in cost of electricity generation. As a consequence, the consumers of electricity faced numerous challenges, including forced load-shedding carried out by DISCOs to mitigate the effect of higher generation costs and elevated fuel prices passed through monthly fuel price adjustments and quarterly capacity adjustments.

Energy security has emerged as a pressing concern, even for developed countries. Addressing this issue requires meticulous planning, shift towards market-based procurement, resilient Fuel Supply Agreements (FSA), and effective Demand Side Management (DSM). A comprehensive, integrated, and harmonized approach is essential, with a focus on enhancing efficiencies across all aspects of electric power services.

The power sector in the country exhibits a diversified generation mix, with a notable reliance on imported fuels such as Coal, Re-gasified Liquefied Natural Gas (RLNG), Residual Furnace Oil (RFO), Nuclear, and Cross-Border Electricity, pegged against the US$. Availability of indigenous resources, including Natural Gas, Hydro, Local Coal, Wind, Solar, and Bagasse, face challenges either due to declining production or slower development. During FY 2022-23, the thermal generation, including imported fuels (Coal, RLNG, RFO), accounted for around 62% of the total generation capacity. Generation cost, around 83%, is the predominant factor affecting per unit electricity price. Even a minor change in generation cost impacts the overall consumer-end tariff.

Besides increase in fuel cost, the generation cost surged during the reported period, mainly due to significant currency devaluation, increased Karachi Interbank Offered Rate (KIBOR), London Interbank Offered Rate (LIBOR), US CPI and Local CPI. In a bid to address the problem of increasing fuel cost, power plants were allowed to import coal from Afghanistan. However since the payments are made in US$, the Pak Rupee devaluation against US$ has offset the envisaged benefit of importing coal from Afghanistan. Therefore, minimizing reliance on imported fuel and augmenting the generation portfolio with indigenous resources is crucial for energy security.

A significant contributor to high electricity costs is the operation of old, less efficient plants in both the public and private sectors. Many public sector plants, built in the early 1980s, exhibit lower efficiency, as low as around 30% or less, and have become economically unviable and therefore need to be retired immediately. Such power plants could operate as merchant plants, or supply electricity directly to potential Bulk Power Consumers (BPCs) in the open power market under the Competitive Trading Bilateral Contract Market (CTBCM) regime.

A robust transmission system is vital for dispatching power plants efficiently. Timely completion of interconnections for generation facilities is crucial for access to the most cost-effective electricity available in the system. Transmission system needs to be built around Transmission System Expansion Plan (TSEP) and Transmission Investment Plan (TIP) for effective evacuation of electricity.

Under-utilization of efficient power plants persisted during FY 2022-23. This under-utilization of plants, particularly those operating on 'Take or Pay' basis, leads to capacity payments obligation even when plants are not dispatched and thus contribute to increased consumer-end tariffs. The transmission system constraints have been observed as one of the causes of under-utilization of efficient power plants having financial implications for the sector, thus needs to be addressed on priority.

Similarly, the System Operator's role in safe, reliable, and efficient system operation is of paramount importance. The System Operator must investigate the underlying causes and propose measures to enhance the transmission system in a way that guarantees dispatching power plants based solely on Economic Merit Order (EMO). Additionally, strategies should be developed to minimize the part load operation of power plants.

In the past few years, installed power generation capacity has markedly increased, but consumption hasn't followed the same trend, posing a serious liquidity threat to the power sector. The Pakistan Economic Survey 2022-23 indicates a mere 0.29% increase in GDP. This sharp decline reflects reduced industrial output, limited infrastructure investments, and decreased commercial activities. Energy purchased during FY 2022-23 decreased by 9.41% compared to FY 2021-22, attributable to higher unit costs and economic downturn.

The current state of the power sector demands immediate action across all segments of electric power services to ensure sustainability. Drastic steps are needed to reduce electricity costs, improve governance, and to address related challenges, guaranteeing access to affordable electricity for every citizen. Through policy reforms, financial management, improved governance and diversified energy sources, the country can establish a more resilient, stable, and sustainable power generation sector for fostered economic growth, energy security, and improved living standards. Federating units' roles must also be bolstered in resolving transmission and distribution sector issues.

Stakeholders unanimously agree that power sector woes necessitate timely reforms. However, these reforms hinge on a substantial improvement in DISCOs' performance. With an investment of Rs. 781 billion allowed for the ongoing Multi-Year Tariff (MYT) control period, DISCOs can make significant strides in reducing Transmission and Distribution (T&D) losses, improving recoveries, and forecasting demand scientifically. Introducing performance-linked incentives and penalties will compel DISCOs to rectify operational inefficiencies for ultimate benefit of consumers and the sector at large.

The subsequent paragraphs provide an overview of the performance of the Generation, Transmission, Distribution, and Supplier sectors, along with the challenges and remedial measures for improvement.

2.1 GENERATION SECTOR

In previous SIRs, the Authority consistently highlighted various issues undermining the performance of generation sector. These encompassed aspects such as the generation mix leaning heavily on imported fuels, assessment of additional generation capacity requirements, need for effective use of Available Generation Capacity, adherence to EMO, conduct of Annual Dependable Capacity (ADC) Tests, implementation of Supervisory Control and Data Acquisition (SCADA) systems, planning of Scheduled outages, operation of Combined Cycle Power Plants (CCPPs) in Open Cycle mode, integration of Renewable Energy (RE), and challenges specific to Hydroelectric Power Generation (including Seasonal Variations and Environmental Considerations). Further, the earlier reports covered topics like the availability of RLNG, issues with Gas Pressure, implications of Liquidated Damages (LDs), the impact of PLAC, and delayed payments to generation companies.

2.1.1 Challenges of Surplus 'Take or Pay' Generation Capacity:

The power sector in Pakistan is facing a significant challenge - an excess of 'Take or Pay' generation capacity. While surplus capacity may seem beneficial at first glance, it brings along a host of complications. Under contractual agreements with power producers under 'Take or Pay' arrangements, payment of capacity charges is guaranteed regardless of non-utilization of such power plants. This problem has placed a significant burden on power sector on one hand while on the other hand the electricity consumers' are paying for electric power generation capacity that remains unused, which results in higher electricity bills.

Moreover, this surplus capacity exacerbates the issue of circular debt in the power sector. The inability to fully utilize the generated power leads to a mismatch between revenue collection and expenditures. As a result, electric power distribution companies encounter a financial deficit, which hampers their ability to remit payments to the CPPA-G. Further, the financial shortfalls impede the ability of distribution companies to invest in system upgrades and maintain service quality. This vicious cycle further compounds the challenges faced by the sector.

Additionally, surplus 'Take or Pay' capacity also hinders the development of renewable energy sources. The availability of excess capacity discourages investment in more sustainable and cleaner energy alternatives. This, in turn, stalls progress towards a greener energy mix, hindering Pakistan's efforts to reduce its carbon footprint and mitigate the effects of climate change.

A comprehensive study is needed to address the issue of surplus 'Take or Pay' generation capacity. Aligning power generation capacity with real demand and encouraging a diversified energy mix can unlock Pakistan's potential for sustainable and reliable electricity generation.

2.1.2 Extension in Operation of Older Power Plants:

Extension of the operational life of aging power plants in Pakistan with lower efficiencies, even in the presence of more efficient surplus 'Take or Pay' capacity, is a matter of concern. The main argument floated in favor of extensions of such plants is their strategic location and the absence of the necessary grid and transmission infrastructure. Nevertheless, it is imperative to consider the ramifications of continuing operation of old in-efficient plants especially in light of the existing energy landscape.

The continuous reliance on aging power plants leads to diminishing efficiency and use of foreign exchange for importing fossil fuels for their operation. This, inevitably, results in an increase in electricity prices for consumers. The economic implications are compounded by the additional costs of maintenance and potential environmental impacts associated with continued fossil fuel use.

The compulsion to extend the licenses of these older power plants underscores a systemic shortfall in planning and infrastructure development. It highlights the critical need for proactive, forward-looking strategies in anticipating and meeting energy demands. Rather than perpetuating the operation of outdated facilities, investments should be channeled towards constructing a robust grid network and enhancing transmission infrastructure. This approach will not only guarantee a dependable power supply but will also lay down the groundwork for a more sustainable and diversified energy sector.

The burden of planning deficiencies should not befall the shoulders of consumers. While the strategic positioning of these aging power plants holds merit, it is incumbent upon authorities to furnish the required infrastructure to evacuate power from new power plants to harness the potential efficiently. Relying on extensions as a stopgap measure subsidies the larger, underlying issue, impeding the progress of a more resilient and modern energy sector in Pakistan. Striking a balance between immediate gains and long-term sustainability should be the focal point of decision-making in this important matter.

2.1.3 Least Cost Generation:

In accordance with the Planning Code of the Grid Code, the National Transmission and Despatch Company Limited (NTDC) prepared and submitted the IGCEP for the period 2022-31, which was

approved by the Authority on February 01, 2023. This plan envisions a progressive shift from an energy mix heavily reliant on imported fossil fuels like coal, furnace oil, and RLNG to indigenous energy sources, including hydel, Thar Coal, wind, and solar. According to IGCEP-2022, there will be no further induction of power plants based on imported fossil fuels. Existing fossil fuel-based plants, especially those using furnace oil, are anticipated to be phased out by 2031. The share of electricity generated from hydel, wind, and solar sources is envisaged to increase from 28%, 4%, and 1% respectively to 39%, 10%, and 10%, raising the total share of green electricity in the generation mix to approximately 59%.

The approved IGCEP incorporates six scenarios for sensitivity analysis, accounting for unforeseen events, alongside the base case. These scenarios address variations in electrical demand, early commissioning of projects like Diamer Bhasha Hydroelectric Power Plant and Chashma Nuclear Power Plant (CHASNUPP-5), inclusion of local coal power projects, and unconstrained addition of RE projects. The implementation of a competitive auction-based procurement regime, aiming for reduced regulatory oversight, is proposed to instill discipline, efficiency, and transparency in power procurement.

Integrating hydro, solar and wind power, though crucial for sustainability, presents challenges. Weather-dependent energy sources require advance grid management and storage solutions. The existing infrastructure needs to be upgraded for use of modern technologies for handling fluctuations in solar and wind energy production. The next iteration of IGCEP is due on part of NTDC. The annual review and timely submission of the IGCEP by the NTDC are critically important for developing a stable and efficient energy infrastructure. The assessment made in the IGCEP guides strategic decision-making anticipating future energy needs, optimizing resource allocation, and aligning investment with sustainability goals. NTDC's punctual submission will foster transparency, stakeholder's confidence, and synchronized planning. The iterative process adopted for IGCEP enables dynamic adjustments to evolving factors requiring sector's adaptability. In essence, the IGCEP's regular review is essential for a resilient, forward thinking power sector capable of meeting present needs while safeguarding the future.

2.1.4 Fuel Procurement:

The current energy generation mix in Pakistan heavily relies on imported fossil fuels. The most efficient and cost effective thermal power plants in the system are based on imported RLNG and coal. Thus, effective management of the primary fuel supply chain is crucial to ensure efficient and cost-effective power generation to meet the system's demand. There has been a recurrent issue of RLNG shortage throughout the year, resulting in instances where expensive power plants were utilized, or more economical ones were under-utilized in violation of EMO.

The responsibility for fuel supply primarily lies with power producers; however delayed payments from power purchaser often lead to liquidity challenges for power plants, hindering their ability to operate at optimal levels. This situation has given rise to contractual disputes, impacting the entire electricity supply chain. Addressing this challenge requires improved supply chain management, enhanced transmission and distribution infrastructure, the establishment of RLNG storage facilities, and governance improvements to ensure timely payments to Independent Power Producers (IPPs), thereby achieving optimal utilization of efficient power plants.

2.1.5 Challenges and Opportunities for Coal-Based Power Plants:

In the realm of coal-based power, there exist both challenges and opportunities. The installed capacity for imported coal-based power projects stands at 3,960 MW, while local coal, sourced from Block-I and Block-II of Thar Coal mines, contributes 2,640 MW. Currently, the imported coal operates as an unregulated commodity, lacking oversight in terms of price determination. Power plants have engaged in long-term contracts for coal procurement from South Africa and Indonesia, adhering to industry standards. However, there has been a substantial increase in price for imported coal. To counter this issue amid the ongoing global commodity super-cycle influenced by factors such as the Russia-Ukraine conflict and post-pandemic logistics disruptions, the Authority has recently introduced guidelines for spot procurement of coal.

To mitigate the impact of escalating imported coal prices and lessen pressure on foreign exchange reserves, the government has permitted coal imports from Afghanistan. It is worth mentioning that coal from Afghanistan is also priced in US$ per ton. In light of this development, the Authority has issued binding guidelines on power plants importing coal from Afghanistan. While progress has been made in conducting trials using coal from Afghanistan's spot market, challenges remain due to insufficient market capacity and a lack of established pricing indices.

Currently, the local coal-based power plants rely on coal from Block-I and Block-II of Thar Coal. The development of Block-II has progressed through its envisioned three phases, but financial closure for Phase-III is still pending. Notably, Lucky Electric Power's 660 MW project, primarily a Thar Coal based project, operates on a blend of Thar Coal and Imported Coal due to delayed Thar Coal supply. The current price of Thar Coal, determined by the Thar Coal Energy Development Board (TCEDB), is approximately US$ 44.30 per metric ton and is anticipated to decrease further upon Phase-III completion. With the increased availability of local coal in Thar, the 660 MW power plant, under construction in Jamshoro, is expected to incorporate a 20% blend of Thar Coal, which will help enhance operational cost-effectiveness. Every possible effort should be exerted to accelerate the mining operations and guarantee the availability of adequate transportation infrastructure for the smooth transport of Thar Coal to different parts of the country.

Additionally, there is an ongoing proposal to convert imported coal-based power plants to Thar Coal. The Private Power and Infrastructure Board (PPIB) is leading this initiative, engaging a foreign consultant to conduct a feasibility study for conversion. Preliminary findings suggest that imported coal power plants can incorporate up to a 20% blend of Thar Coal without requiring modifications. Promoting maximum local coal use is necessary to reduce reliance on imported fuel, mitigate burden on foreign exchange reserves, and ensure a secure supply. The PPIB and other stakeholders must expedite efforts to ensure the utilization of local coal for power generation as the success hinges on making timely decision and follow through with swift action.

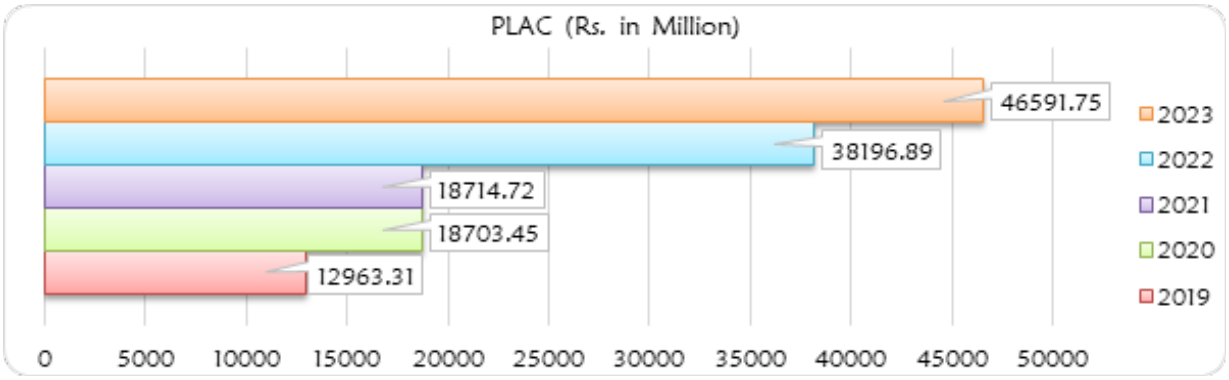
2.1.6 Compliance of Economic Merit Order (EMO):

The Authority has identified the under-utilization of efficient power plants as a critical issue, as highlighted in the previous SIR-2022. This issue has far-reaching implications for the end-consumers. From July, 2022 to June, 2023, the violation of EMO and resultant under-utilization of efficient plants, along with system constraints, was observed. This led to a financial impact of Rs. 20,262 million, comprising Rs. 20,203 million due to under-utilization of efficient plants and Rs. 59 million due to various system constraints. Given the ongoing violation, the Authority has withheld this amount from CPPA-G's monthly FPA claim. The Authority has already directed National Power Control Centre (NPCC) and CPPA-G to promptly inform it of any such EMO violations and their reasons, within 24 hours if they are unavoidable. Furthermore, the Authority has engaged a third-party consultant to assess NPCC's operations. This assessment is in an advanced stage and is expected to complete soon. Once the third-party recommendations are available, it is anticipated that they will form the basis for improvements in the EMO process, consequently reducing generation costs. The existing system constraints, either due to fuel shortage or the transmission constraints, is undermining the financial stability of the power sector. A holistic approach is needed, focusing on plant efficiency, fuel supply resilience, and grid capacity. These challenges need to be addressed to unlock the full potential of efficient power generation and fostering a sustainable and reliable energy landscape.

2.1.7 Payment of Part Load Adjustment Charges (PLAC):

PLAC are allowed to power plants under their respective Power Purchase Agreements (PPAs) if plants are operated below full load. It is crucial to note that operating base load power plants at Part load results in lower efficiency and higher generation costs in the monthly FPA, thus impacting end-consumers. During the period, an amount of Rs. 46.59 billion has been incurred on account of PLAC payments, compared to Rs. 38.20 billion paid during the previous year reporting period. In this context, efforts should be made towards operating coal and other efficient and cost-effective thermal plants with steam

turbines as base load. The power plants with flexible characteristics like gas turbines are better suited for part load operation, wherever necessary, to minimize generation costs and ensure an efficient and pragmatic approach to system operation. The cost incurred on PLAC can be significantly reduced by adotpting TOU tariff structures designed to flatten the demand curve. By implementing these measures, the cost of PLAC can be minimized, ultimately leading to the promotion of a more efficient and cost-effective energy system for all stakeholders involved. Striking a balance between grid stability and fair compensation for power plant operating at part loads is a complex challenge that requires careful policy considerations and innovative solutions in the energy sector.



2.1.8 Payment on Account of Non-Project Missed Volume (NPMV):

NPMV refers to the amount of potential energy that could have been harnessed but was not, due to reasons not attributable to the power producer. There could be various factors contributing to NPMV, such as grid constraints, schedule maintenance, and other potential issues. Understanding and mitigating NPMV is important for maximizing the efficiency and output of renewable energy power plants. By identifying and addressing factors resulting in NPMV, the System Operator can be optimizes. The RE projects are entitled for payment against NPMV which adversely effects the consumer-end price of electricity. The payment obligation on account of NPMV during FY 2022-23 remained Rs. 10.517 billion, compared to Rs 1.177 billion during FY 2021-22.

2.1.9 Delay in Commissioning of Power Plants:

(i) Punjab Thermal Power (Pvt.) Limited:

Punjab Thermal Power (Pvt.) Limited filed tariff petition to set up a 1,263.20 MW RLNG based CCPP at District Jhang with an impressive efficiency of above 61%. The tariff was determined by the Authority on December 26, 2017, which also included a provision for a bonus in the event of an early project commissioning. The very purpose for setting up the efficient RLNG based power plants was to replace expensive and less efficient power generation sources. The plant faced several challenges during its development and took longer period to achieve the commercial operation. However, following a concerted effort, the plant has now successfully attained COD and is supplying electricity to the Grid. The delay in commissioning of power plants beyond its planned time affects the power economics.

(ii) Suki Kinari Hydropower Project:

The EPC stage tariff for the 840 MW Suki Kinari Hydropower Project was determined on March 28, 2014. The initially stipulated construction period, as outlined in the tariff determination, was set at 72 months. However, as of June 30, 2023, the project has not yet commissioned.

This delay in commissioning of indigenous fuel power plants has a manifold financial impact: (a) it leads to the operation of more expensive power plants, incurring higher generation costs, (b) there is an additional expenditure on foreign exchange for the import of fuel, an expense that could have been avoided had the hydropower plant been commissioned on schedule, (c) the extended construction period leads to cost overruns for the project.

2.1.10 Operation of Expensive Power Plants:

The Authority's Power Purchase Price (PPP) forecast for DISCO(s) during FY 2022-23 did not account for the operation of plants using RFO or HSD, as there was ample capacity available using relatively cheaper fuels. However, power plants had to be operated on RFO/HSD due to system constraints or shortage of RLNG/Gas. This led to a cost of Rs. 164 billion for the power sector. This cost could have been minimized, if not entirely avoided, through improved operational practices, efficient planning, and better resource management by utilizing more efficient power projects instead of relying on RFO/HSD. The persistent system constraints are detrimentally impacting both the power sector and overall economic activity within the country, while also placing undue strain on end-consumers. It is necessary to address these issues promptly through effective solutions to ensure a sustainable and thriving energy ecosystem for all stakeholders involved.

2.1.11 Performance of Public Sector Thermal Power Generation Companies (GENCOs):

The performance of GENCOs power plants has deteriorated over time. Furthermore, due to low efficiency, the plant utilization factor of GENCOs have also come down to lower limits. The operational performance of public sector GENCOs has been discussed in the below paras:

(i) Jamshoro Power Company Limited (GENCO-I)

GENCO-I, consisting of four units, only utilized Unit-1 to supply nominal electricity during FY 2022-23. Unfortunately, the remaining three units drew electricity from the National Grid without contributing any power. Regrettably, Unit-1 of GENCO-I operates on RFO with notably low efficiency. Consequently, the plant utilization factor of this unit and that of GENCO-I as a whole remained at a mere 2.7% for FY 2022-23. Moreover, the average Energy Purchase Price (EPP) per unit from Unit-1 of GENCO-I during this period was recorded at Rs. 54.62/kWh.

(ii) Central Power Generation Company Limited (GENCO-II)

GENCO-II is unique among public sector companies for its access to cost-effective dedicated gas for its operations. However, it faced challenges in performance during FY 2022-23. Three out of four steam turbines, designed to work in conjunction with respective gas turbines, were out of operation. While, the performance of the fourth steam turbine was also not up to mark. As a result, the available gas turbines either couldn't operate, or when they did, they had to do so in open cycle mode. This significantly impacted the overall performance of the power sector, leading to substantial financial losses for electricity consumers nationwide. The utilization factors for its 5-10 units, 11-13 units, and 14-16 units were only 41.08%, 0.56%, and 40.63%, respectively.

(iii) Northern Power Generation Company Limited (GENCO-III)

Similarly, GENCO-III exhibited poor performance, further straining the power sector. The plant utilization factors for TPS Muzaffargarh and Nandipur were recorded at only 2.96% and 28.86%, respectively. The average EPP per unit from Muzaffargarh and Nandipur of GENCO-III during FY 2022-23 were recorded at Rs. 50.01/kWh and Rs. 28.86/kWh.

Unfortunately, the transition of these GENCOs from a 'Take or Pay' to a 'Take and Pay' arrangement, as decided by the Authority could not be implemented due to cases at different forums. The low efficiencies of GENCO's older power plants result in inefficient fuel consumption, leading to increased generation costs. The operation of these inefficient power plants continues to burden the country's power sector. Maintaining these outdated and inefficient power plants, with 'Take or Pay' condition, despite having sufficient capacity for efficient alternatives, is not advisable. NEPRA has emphasized the urgency of retiring these older power plants of GENCOs to alleviate the financial strain on the power sector and optimize the allocation of precious fuel to the most efficient power plants.

2.1.12 Expensive Generation of K-Electric:

During the FY 2022-23 as well, K-Electric Limited (KE) experienced a shortage of its own generation capacity to serve electricity demand in its service area. To meet its power system demand, KE relied

on CPPA-G and other resources, in addition to its own generation fleet. KE also extended agreements, second time, with legacy RFO-based IPPs established under the Power Policy of 1994 after the expiration of their initial and extended PPAs. Furthermore, KE entered into PPAs with Captive Power Plants (CPPs) to meet the power demand in its service area. KE's existing fleet primarily relies on imported fuel, which is of relatively lower efficiency, resulting in increased costs. KE continues to operate its older and less efficient BQPS-I complex, efficiency around 30%, leading to higher per unit costs compared to the more cost-effective power plants available on the National Grid system. To mitigate this, drawing more power from the National Grid could alleviate the issue of expensive generation in KE system.

Under the privatization agreements, KE was entrusted with the responsibility of establishing and maintaining its own efficient, cost-effective generation fleet to adequately meet the demands of its consumers. The agreement also allowed KE to procure electricity from the NTDC system based on marginal cost. Subsequently, it was decided that NTDC/CPPA-G would supply electricity to KE at a rate at par with DISCO for a specified MW capacity. Over time, this specified capacity has been increased. With the availability of surplus power generation capacity at CPPA-G, the limits for supplying electricity to KE have been further expanded. Given this situation, a formal agreement outlining the long-term generation plan for KE, duly approved by Authority, is imperative. Relying on ad-hoc planning and arrangements is detrimental to both the power sector and the national exchequer, and ultimately, it is the electricity consumers or the tax payer who bear the brunt of such inefficiencies.

2.1.13 Induction of Renewable Energy (RE) Power Plants:

The price of RE resources has drastically decreased in recent years due to technological advancements. This makes them an attractive choice for capacity addition or replacement of imported fuel projects based on the Levelized Cost of Energy (LCoE) principle. The integration of RE will not only displace fossil fuel-based energy but also conserve foreign exchange reserves, which have been under significant pressure due to recent challenges affecting key economic indicators. Furthermore, RE will introduce environment-friendly energy, aiding in the reduction of greenhouse gas emissions.

Despite the available potential for affordable and clean RE, the development of RE based power generation projects could not attain the desired pace to replace the expensive fuel based plants. While possessing generation licenses and tariffs from the regulator, the actualization of substantial RE power projects has faced several obstacles. Given the need to conserve foreign exchange used for import of fossil fuel and environmental sustainability, promotion of RE projects is necessary. Small distributed generation RE power plants could potentially offer the most cost-effective solution for the power sector. However, the integration of RE power should be executed after meticulous analysis, taking into account factors such as the costs associated with intermittency and potential under-utilization of generation and transmission facilities, among others.

2.1.14 Challenges with Intermittent Power Sources:

The total installed capacity of renewable energy sources, including hydropower, wind, solar, and bagasse/biomass, in Pakistan's power system exceeds 13,000 MW. While RE sources significantly contribute to clean electricity generation, they came with their own set of challenges that need to be addressed for their widespread integration into the grid.

One of the primary issues with intermittent power sources is their inherent variability. Unlike conventional power plants that can provide a constant output, the availability of energy from hydropower, wind, and solar depends on weather conditions and water flow. This variability can lead to fluctuations in energy supply, making it challenging to match supply with demand in real-time. As a result, grid operators need to implement sophisticated forecasting and balancing mechanisms to ensure a stable and reliable power supply.

Another significant concern is the issue of energy storage. Unlike traditional power plants, intermittent sources cannot provide a continuous output, which means that excess energy generated during periods

of high availability may go unused. Effective energy storage solutions are essential to capture and store surplus energy for later use, especially when demand is high and supply is low. Developing cost-effective and efficient energy storage technologies is crucial for maximizing the benefits of intermittent power sources.

Furthermore, the geographical location of these sources can pose logistical challenges. For instance, solar power is most abundant in regions with ample sunlight, while wind energy is more prevalent in specific geographic locations. This necessitates the development of extensive transmission infrastructure to transport the energy from where it is generated to where it is needed. Building a robust and interconnected grid is crucial for efficiently harnessing the potential of intermittent power sources.

In conclusion, intelligent tackling of the issues related to variability, energy storage, and transmission infrastructure will be key to realizing the full potential of hydropower, wind, and solar energy in pursuit of a sustainable energy future.

2.1.15 Micro and Mini Grids:

In the past, the country predominantly relied on large power plants and extensive transmission lines due to the geographical separation of generation resources like natural gas and water from load centers. Despite efforts, large areas in the provinces of Balochistan, Khyber Pakhtunkhwa, and Sindh accounting for approximately 26% of the country's population still lack access to the National Grid. With the decreasing costs of RE, decentralized energy generation has become increasingly viable to meet the demand of areas without access to the National Grid. Consequently, small-scale distributed generation units, organized within micro-grids, are being considered to electrify remote villages and fulfill energy requirements in such areas. Recognizing the potential of this approach, the Authority has prioritized micro-grid facilities by issuing Regulations in FY 2021-22 with the vision of providing electricity access to remote, underserved areas. These Regulations were formulated with the intention of enhancing the financial sustainability of the power sector, offering respite to the national exchequer from the burden of fuel imports, fostering active community participation to meet their own needs, and, perhaps most importantly, supporting Pakistan in its pursuit of the United Nations' sustainable development goals. These goals are crucial for advancing economic development, particularly in remote regions.

A comprehensive plan is imperative to pinpoint areas conducive for the establishment of solar-powered micro and mini grids, with active community involvement on a Built, Own, Operate (BOO) or Built, Own, Operate and Transfer (BOOT) basis. The exploration of the feasibility of micro and mini-grids, incorporating solar plants, with or without battery or small generator backup, holds promising potential as a viable solution. Engaging the private sector and extending tax exemptions could serve as powerful incentives, encouraging the initiation of these projects. This, in turn, has the potential to lead to substantial foreign exchange savings.

2.1.16 Electricity Consumers with Net-Metering:

Net-metering is a system that allows homeowners, agricultural operations, and businesses with distributed generation facilities like solar panels or other renewable energy systems to connect to the grid. This setup enables these generators not only to receive electricity but also to give back excess energy into the grid for others to use. While this arrangement offers numerous advantages, it does come with a few drawbacks.

One of the key benefits of a net-metering connection is the displacement of more expensive electricity, leading to savings in capital expenditure for the distribution system. Additionally, it results in savings from reduced T&D losses, improved voltage profiles in local area networks, and a decrease in emissions through the use of clean energy. Moreover, it lessens the necessity for substantial investments in expanding generation capacity at the utility scale. This, in turn, stimulates economic activity and introduces generation capacity without incurring any additional costs for DISCOs, the CPPA-G, and the national exchequer. It also enhances the liquidity of DISCOs against payments to net-metering consumers.

The main disadvantage of net-metering connections, especially in power sectors with surplus generation capacity, particularly on a 'Take or Pay' basis, is that other consumers may suffer due to underutilization of 'Take or Pay' capacity. However, as long as the EPP of the most expensive generator in the system remains higher than the purchase price of electricity from net-metering connections, it remains advantageous for all stakeholders. Therefore, it is crucial to consistently monitor that the net-metering rate does not exceed the EPP rate of the most expensive generator in the system.

As of June 30, 2023, the total number of net-metering consumers in the CPPA-G system was 56,427, compared to 37,769 as of June 30, 2022. Furthermore, the accumulated generation by net-metering connections during FY 2022-23 amounted to 481,863,365 kWh, in contrast to 150,669,148 kWh during FY 2021-22.

2.1.17 Liquidated Damages (LDs):

LDs are charges imposed on power producers if they fail to adhere to the provisions of their executed PPAs. In FY 2022-23, CPPA-G raised LDs amounting to Rs. 17,913 million against various power producers for violations of contractual arrangements, particularly in relation to ensuring the availability of compulsory fuel for plant operation as specified in the PPA. The recovery ratio of LDs imposed by CPPA-G is significantly low, primarily because licensees frequently resort to dispute resolution mechanisms at relevant forums.

2.1.18 Shifting from Imported to Local Fuel:

During FY 2022-23, different generation facilities using RFO and HSD were operated due to system constraints and the unavailability of RLNG/Gas. The Authority did not anticipate generation from these resources while determining the PPP and thus disallowed a cost of Rs. 5.2 billion to the System Operator. To address this, the National Grid Company (NGC)/NTDC made additional efforts to complete the transmission line for evacuating electric power from the generation plant in Thar Coal Block-I, which is a least-cost generation option. This counters the high cost of fuel-intensive power projects.

The proportion of imported coal in the generation mix declined in FY 2022-23 as compared to FY 2021-22, owing to the introduction of more plants utilizing locally sourced coal, including ThalNova Power Thar (Pvt.) Limited, Thar Energy Limited, and Thar Coal Block-I Power Generation Company (Pvt.) Limited, facilitated by Shanghai Electric. In the case of recently commissioned Thar Coal power plants, the availability of the transmission line was delayed. It is necessary for NTDC to take measures for timely availability of its transmission facilities, to prevent any potential financial setbacks.

2.1.19 Hydropower Projects (HPPs):

Hydropower stands out as an indigenous and environmentally clean source of electricity. Development of HPPs is crucial for sustainable and diversified energy supply provided it is economically viable. Pakistan, having abundant rivers and one of the largest canal networks, holds immense potential for hydropower generation. Therefore, the development of HPPs demands special attention from all stakeholders to prioritize to increase their share in the energy mix. However, while contemplating development of HPPs, it is crucial to carefully weigh the costs associated with intermittency as well as the capital expenditure for establishing the transmission line and its operational cost, especially in cases of prolonged under-utilization during periods of low hydrology.

While HPPs may incur higher initial costs due to specific factors, including an extended gestation period, their long-term competitiveness becomes evident in the majority of cases when evaluating the levelized Cost of Energy. Despite their higher initial cost, HPPs are generally considered more cost-effective for electricity generation due to their extended lifespan compared to other technologies. This makes them a viable and cost-effective source of electricity, provided the control period of tariff and debt recovery period is longer.

Hydropower generation depends on water availability. In times of decreased or no water flow due to factors like seasonal effects and drought, the need for backup generation capacity becomes imperative

to meet electricity demand. This adds an additional burden on consumers. Additionally, HPPs are often located in mountainous areas, distant from population centers, necessitating long transmission lines for power dispersal. The construction and operational costs of these transmission systems represent a significant portion of the overall infrastructure expenses.

Therefore, while developing HPPs, priority should be given to optimize sites that are most conducive for achieving LCoE. Further, the costs related to backup generation capacity, construction and operational costs of transmission systems, and accounting for transmission and distribution losses during power transportation from generation points to load centers should also be factored in while determining feasibility of HPPs. Further in case of strategic HPPs, only the comparable cost of least expensive generation option available within the system shall be transferred to electricity consumers. These considerations play a pivotal role in ensuring the economic viability of HPPs.

2.1.20 Dependable Capacity Test:

The tariff structure is composed of two primary elements: (i) Energy Charges, applicable only when the plant is operational, and (ii) Capacity Charges, which are incurred regardless of the plant's operational status. Electricity consumers are liable to pay for both energy and capacity charges.

Capacity Charges are determined based on the declared capacity established through Dependable Capacity tests, conducted in accordance with the specifications outlined in PPAs or EPAs of respective power plants. Therefore, it is important that Dependable Capacity tests be conducted within due period and in the manner stipulated in the EPAs/PPAs.

2.2 TRANSMISSION SECTOR

2.2.1 Transmission System Expansion Plan (TSEP):

The transmission network plays a pivotal role in delivering electricity from generation sources to end-users. An efficient transmission system serves as the backbone of the electricity supply chain and is essential for efficient generation resource utilization. If electricity generated from a state-of-the-art facility doesn't traverse a reliable network, consumers won't fully benefit. Thus, it's crucial to concurrently develop both generation and transmission infrastructure. Pursuant to Grid Code provisions, a robust TSEP is obligatory for development of adequate transmission system to evacuate power from project as outlined in the IGCEP. As per regulatory mandates (Planning Code of the Grid Code), NTDC is bound to submit the TSEP for Authority's approval in April each year. NTDC submitted Phase-I of the TSEP, covering a four-year period until FY 2025-26 to cater for generation projects included in IGCEP 2022-31 as committed projects. The Authority noted that the submitted TSEP lacked evacuation plans, transmission cost details for candidate projects in line with IGCEP 2022-31, revealing incomplete cost estimates and alignment issues with existing frameworks. Given this, the Authority directed NTDC to resubmit the TSEP, ensuring it is aligned comprehensively with IGCEP 2023-32, encompassing all parameters. TSEP is a long-awaited and indispensable planning document imperative for systematic growth of power sector. It has to serve as a strategic blueprint, outlining the necessary enhancements and expansion required to strengthen the transmission network, ensuring its efficiency, reliability, and capacity to meet energy demand of the nation. Here is an urgent need to enhance capacity of the concerned entities to efficiently develop planning documents that require regulatory approval. Delays in formulating these plans disrupt the entire power sector and have adverse effects.

2.2.2 Transmission Investment Plan (TIP):

To prevent costly power plant operations for system security, an adequate transmission network is imperative. Consequently, NTDC as NGC, is responsible to invest in transmission infrastructure under a TIP outlining the projects with timelines for their completion. In accordance with regulatory stipulations, NTDC must submit its TIP by September 1st annually. During FY 2022-23, NTDC submitted its Investment Plan for the Tariff Control Period from FY 2022-23 to FY 2024-25, based on DISCO(s) demand forecasts, coupled with system requirements for stability, reliability, and power evacuation from various generation facilities as detailed below:

S. No.	Project Category	Count of Projects	Total Investment Outlay FY 2023-25 (Million Rs.)
1	**Constraints Removal Projects**	**8**	**24,276**
2	**System Expansion Projects**	**29**	**133,520**
3	**Power Evacuation Projects**	**25**	**167,135**
4	**Projects for Special Economic Zones**	**5**	**23,590**
5	**Other Development Projects**	**11**	**20,700**
	Total	78	369,221

Source: NTDC

The submitted TIP was however devoid of supporting data, documentary evidence, or cost-benefit analysis. Therefore, NTDC was directed to furnish this information, which is still pending. Similar to TSEP, the TIP is also a long-awaited strategic blueprint essential for orchestrating the systematic investment needed in the transmission sector. There is an urgent requirement for capacity building within NTDC, either by attracting new talent or by enhancing the skills of existing professionals. This is essential for the timely development of vital documents, while maintaining a high standard of quality.

2.2.3 Interim Dispersal Arrangements for Power Plants:

Timely completion and availability of necessary infrastructure are crucial for power dispersal from future generation facilities. Under PPA(s)/EPA(s), power dispersal arrangements must be completed within agreed timelines (ranging from sixty to one hundred twenty days before the Scheduled Commercial Operation). Failure to do so not only violates PPA/EPA terms but also denies consumers access to cheaper electricity. In majority cases, NTDC failed to complete these dispersal arrangements with in due time and budget for different reasons. As a result, NTDC has relied on interim dispersal arrangements, a practice still ongoing.

Similarly, during the current reporting period, NTDC couldn't complete the transmission line for power evacuation from the newly commissioned 1,320 MW Thar Coal Block-I Power Generation Company project. NTDC opted for an interim arrangement which compelled curtailment of power from other, cheaper Thar Coal Block-II projects. The Authority intervened to monitor the transmission line construction for timely completion and disallowed costs due to non-utilization of cheaper energy from Block-II projects. Additionally, the NGC/NTDC was instructed to expedite the transmission line completion, which was eventually energized on May 09, 2023. Relying on interim approaches within the power sector can have disastrous consequences in long run, significantly undermining the sector's reliability and financial viability. Such short-term measures often lead to adverse effects, hampering the stability and sustainability of the industry. It is imperative for NTDC to adopt and act upon a comprehensive, forward-thinking strategy prioritizing long-term resilience and financial stability for thriving power sector.

2.2.4 Licence for Provincial Grid Companies (PGC):

The NEPRA Act underwent a transformative amendment in 2018, bringing about significant changes in the regulatory framework of the electricity power sector. This included the provision for a PGC in each province. The nation possesses diverse natural resources, with each of the provinces featuring distinctive resource advantages. To tap these indigenous resources, transmission licence was granted to PGCs for the development of transmission lines in the provinces of Khyber Pakhtunkhwa and Sindh. Punjab has also applied for a PGC licence, and the application is in advanced processing stages, expected to be finalized very soon. The physical progress of PGCs to whom licence has been granted is not so far visible. The provinces must step up and actively participate in the efforts to enhance the power sector.

2.2.5 System Constraints:

Technical constraints hinder the System Operator's ability to evacuate electricity from efficient power plants. During FY 2022-23, the system constraints resulted in a loss of Rs. 20.203 billion. NTDC and the System Operator couldn't sufficiently justify these technical constraints despite substantial investment

allocated to the company. Given the fact that the cost of transmission line expansion is significantly less as compared to the losses incurred due to non-evacuation, the Authority was constrained to disallow the amount due to technical constraints attributed to System Operator. The Authority recognizes that although the deduction of the amount prevents passing on such cost to consumers for the time being, it is not an ideal solution, as it contributes to the accumulation of circular debt. Since NTDC is a wholly public sector entity, ultimately, this burden falls on either the electricity consumers or the taxpayers. It is therefore imperative for NTDC to prioritize the resolution of such constraints promptly. Implementing a rigorous accountability system is crucial in effectively managing and rectifying these issues. NTDC along with NPCC and CPPA-G is required to conduct a comprehensive study to ascertain the losses incurred due to the utilization of comparatively higher cost power plant attributable to system constraints over the past 10-15 years. The critical assessment is to be conducted on monthly basis, emphasizing the urgency of addressing systemic inefficiencies.

2.2.6 Optimum Utilization of HVDC Transmission Line:

HVDC transmission line was established to efficiently transport electric power mainly from the southern region to the central and northern load centers. Constructed by Pak-Matiari Lahore Transmission Company Limited (PMLTC), it spans 886 km and has a capacity to transmit 4,000 MW of electric power. The project achieved COD on September 01, 2021. However, it has been observed that the transmission line is not being fully utilized. In FY 2022-23, the average utilization of this crucial infrastructure remained at approximately 1,584 MW, which is only 39.6% of its designed capacity of 4,000 MW. Due to the 'Take or Pay' contract, the company is entitled to receive payment for the full capacity, even though it is not being fully utilized. This situation is adversely affecting the power sector and placing an additional burden on electricity consumers. There are several contributing factors, including but not limited to inadequate AC systems at receiving end, negative sales growth etc. The significant gap between capacity payment obligation and practical usage of HVDC line requires a thorough reevaluation of the cost structure and operational efficiency of the line, ensuring a more judicious allocation of resources in future endeavors.

2.2.7 Implementation of Supervisory Control and Data Acquisition (SCADA) System:

As the country's electric grid system has expanded and diversified over the years, ensuring operational reliability has become more challenging. SCADA systems are essential for providing System Operators with real-time control and visibility over the electric network's information flow. While NTDC has been utilizing SCADA technology since 1992, many of its critical components are currently non-operational due to lack of necessary technical hardware and software updates. Operating this extensive transmission system, coupled with a large number of power generating plants across the country, without a SCADA system poses significant risks for system safety, security and reliability. Moreover, it hampers the ability to operate the system in the most cost-effective and efficient manner. Therefore, it is need of the hour to prioritize the implementation of a robust SCADA system for enhanced operational safety, security, and economic efficiency.

NTDC has initiated the SCADA-III project. This project aims to install the latest hardware and software tools, establishing a fully functional system for National Grid operations and monitoring, including real-time data metering from all power plants and important points of transmission network. Timely implementation of SCADA-III is crucial, especially considering the anticipated expansion of the power system and its operational requirements. SCADA will enable seamless data transfer from substations and generation complexes nationwide to the System Operator, facilitating effective decision-making regarding dispatch, operations, and supply-demand balancing for reliable National Grid operation.

2.2.8 Insufficient Interconnection between NTDC and KE:

The existing interconnection capacity between NTDC and KE, which relies heavily on supplies from the National Grid, is limited to about 1,100 MW. With the operationalization of new generation facilities like K2 and K3 (operating on nuclear fuel) and plants utilizing imported coal (Port Qasim Electric, China Power Hub Generation, and Lucky Electric Power), there is a need to enhance interconnection

capacity between the National Grid and KE. KE has submitted an investment plan proposing the establishment of two 500 kV grid stations at KKI and Dhabeji. Additionally, the augmentation of the 500 kV NKI grid station is recommended through the installation of an additional power transformer. Given the context of the privatization agreement and subsequent deliberations at different forums concerning the supply of electric power from CPPA-G to KE, it is crucial to institute a comprehensive, long-term formal agreement. A structured and formal agreement establishes the essential framework for a stable and sustainable energy ecosystem. This is necessitated in the wake of significant investment and extended timeframes involved in commissioning power generation plants and constructing the associated transmission infrastructure. Depending on ad-hoc or incidental approaches for development is not ideal, as it consistently leads to detrimental economic impacts.

2.2.9 Power Purchase Agreement (PPA) between CPPA-G and KE:

Following the Economic Coordination Committee's decision on August 26, 2008, NEPRA approved the basket rate for KE on September 29, 2008. NEPRA also directed KE to enter into a time-bound agreement with NTDC. This led to the signing of an Agreement between KE and NTDC on January 26, 2010, with a five-year term ending on January 25, 2015. Since then, NEPRA has persistently directing the parties involved to finalize a PPA. Legal proceedings were initiated against both parties in the past to push for this agreement. However, as of now, the PPA between NTDC and KE remains unsigned.

The Authority has consistently emphasized the importance of establishing distinct contractual arrangements between CPPA-G and KE. This step ensures transparency and accountability in the sale-purchase process, defines transaction terms, allocates risks effectively, guarantees regulatory compliance, and establishes a stable framework for both parties to operate within the electricity market. Engaging in billion-rupee transactions for the purchase and sale of a commodity necessitates an immediate formal agreement. This agreement is not only essential for proper financial transactions but also for the long-term development of the system, which demands substantial time and finances. A formal agreement ensures transparency and provides a clear roadmap for both existing and future power transactions between KE and CPPA-G. The PPA will serve as cornerstone for a well-organized and enduring energy partnership.

The privatization of a vertically integrated utility, which includes the distribution and supply of electricity, marked pioneering step in Pakistan's energy sector. Initially hailed as potential role model for future privatizations, it has encountered challenges from very beginning for reasons including but not limited to ad-hoc arrangements. These circumstances raise questions regarding the efficacy of the privatization endeavor. Regrettably, the anticipated benefits have not been fully realized, posing concerns for all stakeholders, including the national exchequer and the electricity consumers. A through reevaluation is imperative to ensure privatization aligned with its intended objectives and to provide substantial relief to all concerned parties.

2.2.10 Separation of System Operator Functions from NTDC:

The System Operator is responsible for maintaining the overall stability and reliability of the power system, ensuring that electricity generation matches demand in real-time. On the other hand, the Network Operator manages the physical infrastructure, including transmission and distribution networks. The separation of System Operator and Network Operator serves a crucial purpose. Having separate and independent entities for these functions prevent conflicts of interest and ensure that both operational and commercial interests are balanced. It fosters transparency, fair competition, and efficient grid management. This division of responsibilities is vital in preventing undue influence in grid operations and safeguarding the integrity of the power system, ultimately benefitting both the industry and end-user.

The amended NEPRA Act, 2018, envisions the development of policy and regulatory framework for the electricity wholesale market in the country. Separation of the System Operator from the transmission network company is a fundamental requirement for the development of this wholesale market. NEPRA

has therefore granted licence to NPCC to act as an independent System Operator. The timely functional and legal separation of the NPCC from NTDC, as outlined in System Operator licence, is essential to realize the benefits of an independent System Operator. This step ensures a level playing field for market competition, efficient grid operation, innovation, investment, and to uphold transparency and accountability in the electricity sector. Adhering to regulatory standards along with the timelines is paramount for ensuring a technically resilient and financially viable power sector.

2.2.11 Separation of Market Operator Function from CPPA-G as Agent of DISCOs:

CPPA-G, holds two distinct roles; first as the Market Operator and the second as Special Purpose Agent for centralized power procurement under the single buyer regime. Whereas the first one involves overseeing wholesale market settlements, the other one entails managing legacy contracts. The separation of these functions is deemed necessary for various reasons, including ensuring fairness and competition, enhancing transparency, avoiding concentration of power, mitigating conflicts of interest, ensuring regulatory compliance, fostering innovation and flexibility, and managing risks. The Authority has already issued licenses for the Market Operator and System Operator, establishing them as independent and distinct functions. Furthermore, the moratorium specified in the amended NEPRA Act, 2018 has been lifted by operation of law, rendering the above two licenses now effective, alongside the Market Commercial Code and Grid Code. For desired outcome of appointing independent Market Operator and System Operator, it is imperative for all stakeholders to adhere to regulatory decisions while upholding their intended purpose and spirit.

2.2.12 Approval of New Grid Code:

A Grid Code establishes parameters to guarantee the safe, secure, and smooth operation of the electric power system grid. It outlines the technical prerequisites for connecting to and utilizing the National Grid. As a dynamic document, it necessitates regular review and revision to accommodate developments, including technological advancements and changes in energy sources such as solar, wind, and renewable energy. After approval of the Grid Code in 2005, substantial changes have occurred in the power system over the past two decades, prompting the need for a new Grid Code. NTDC, with the aid of external consultants and internal resources, prepared a new Grid Code, which the Authority approved in January, 2023 after an extensive consultative process involving stakeholders, international experts, and professionals. The Grid Code 2023 is now in effect and applicable for future system grid operational planning and expansions, ensuring safe, secure, and reliable operations. Every stakeholder must adhere to the provisions outlined in the newly approved Grid Code, in letter and spirit.

2.2.13 Blackout of System:

Blackouts are detrimental to electric power system causing widespread disruptions, economic losses, and potential damage to critical infrastructure. The country has witnessed many blackouts in recent years with the most widespread black out occurring on January 23, 2023. The Authority took cognizance of the situation and held a stakeholder hearing to investigate the matter. An Inquiry Committee, comprising market experts, was constituted to provide findings and recommendations. The Committee evaluated existing operating procedures and conducted site visits to various generation facilities, culminating in a comprehensive report. The Authority, after careful consideration, identified significant operational issues within NTDC/NPCC, and various power plants. Consequently, legal proceedings were initiated against these entities, and their cases are under process.

2.2.14 Frequent Collapse of Towers:

The transmission network plays a critical role in delivering electricity over long distances to load centers. A concerning trend of frequent tower collapses has emerged in recent years, resulting in power outages, safety hazards, and disruptions to economic activities. In FY 2022-23, a total of thirty-eight incidents of tower collapses in the transmission network of 500 kV and 220 kV were reported. Out of these thirty eight incidents, twenty-five were in the south region, nine in the north region, and four in KE area. These incidents not only disrupt the transmission system but also pose hazards to human life and jeopardize the integrity of the entire network.

Recognizing the gravity of the issue, the Authority intervened and directed NTDC to prioritize regular inspection, maintenance, and review, as well as to upgrade its design parameters based on thorough investigation and independent study. NTDC was also instructed to establish a robust weather monitoring system, develop emergency response plans, invest in training and capacity-building of engineers and line staff, and collaborate with industry experts to adhere to best practices in transmission line design, construction, and maintenance, ensuring the reliability and safety of its network. NTDC and KE should jointly investigate the matter and cultivate a culture of accountability in situations of this nature.

2.3 DISTRIBUTION SECTOR

2.3.1 Aggregate Technical and Commercial (AT&C) Loss-based Load-Shedding:

The Authority has taken a serious stance on excessive load-shedding. An inquiry revealed that utilities were implementing load-shedding based on AT&C losses, in violation of the NEPRA Performance Standards (Distribution) Rules, 2005 (PSDR 2005). The Authority does not support this approach of DISCOs to load-shed on the pretext of AT&C losses considering it an invalid justification for load-shedding. The Authority conducted a hearing with DISCOs, directing them to clarify their position on load-shedding, especially when sufficient generation capacity was available in the country.

During the hearing, CEOs of PESCO, HESCO, SEPCO, and QESCO admitted that utilities were intentionally drawing less power despite sufficient quotas provided by the System Operator against their power demand, due to AT&C-based load-shedding in their areas. KE also admitted that AT&C-based load-shedding was being carried out in different areas due to low recovery and high losses. All DISCOs confirmed that there is no load-shedding in their area except on the basis of high AT&C.

The Authority expressed deep concerns about the matter and issued directives to the utilities, urging them to cease this practice and instead take effective measures to reduce losses and enhance bill recovery.

Furthermore, the Authority emphasized that DISCOs' inefficiency in conducting load-shedding based on AT&C losses negatively affects even those consumers who pay their bills on time. DISCOs were directed to focus on addressing inefficiencies leading to high AT&C losses rather than relying solely on load-shedding. The Authority issued an advisory to the Ministry of Energy, highlighting that the policy of AT&C-based load-shedding contradicts PSDR 2005. The Authority further emphasized that forced load-shedding on high loss feeders negatively impacts overall sales growth, even though generation capacity is available on a 'Take or Pay' basis, which inflates per unit cost of electricity. Hence, all efforts should be directed towards resolving the systemic issue of distribution segment load-shedding, rather than relying on arbitrary reductions. DISCOs should adhere to drawing power allocations aligned with their agreed-upon demand.

The issue of AT&C-based load-shedding extends beyond just rural or challenging feeders. Numerous urban feeders continue to experience load-shedding without noticeable improvement over the past several years. This situation underscores the need for accountability among the staff responsible for managing these feeders. The Ministry of Energy and each DISCO should initiate a forensic audit to pinpoint areas of concern and hold the responsible staff accountable for their actions. This will help ensure transparency and efficiency in the operations of the distribution network. Given that all DISCOs, except KE, are government-owned entities; imposing penalties may not effectively address the issue. Any penalties levied would ultimately be borne by electricity consumers and taxpayers. Therefore, the most appropriate course of action is to hold those responsible, accountable and impose penalties commensurate with their actions. Such a strategy to penalize the officials for their misconduct will help discourage recurrence of similar incidents.

2.3.2 Pending Connections:

DISCOs play a vital role as the first point of contact for both existing and potential consumers of electricity. PSDR 2005 specifies timeframes for providing new connections to eligible consumers, from application submission to payment of the Demand Notice and connection installation. The Authority observed that most DISCOs failed to provide new connections as outlined in PSDR 2005. Consequently,

the Authority decided to monitor the backlog of ripe connections on a monthly basis. During this period, it was noted that despite fulfilling all formalities, a significant number of connections were not provided to eligible consumers. This led to a substantial amount of load that could not be integrated into the National Grid. Had these connections been provided, there would have been sales growth and reduced, per unit, fixed costs, ultimately resulting in lower consumer-end tariffs. This situation warrants accountability of the responsible officials of DISCOs. Without a stringent system of accountability that includes both penalties for negligence and rewards for exemplary performance, the current situation is not expected to change. This means that while the inefficient staff remains unaccountable, it's the innocent electricity consumers who bear the brunt. It's imperative to establish a system where actions have consequences, ensuring that both staff performance and consumer interests are properly balanced. The main reason for pendency of connections noticed by NEPRA is non-availability of energy meters, distribution transformers and allied material. The DISCOs are required to ensure availability of material in their stock.

2.3.3 Safety Issues in DISCOs:

In FY 2022-23, there were a total of one hundred sixty-three (163) fatalities reported in all utilities/ DISCOs, including employees and other citizens/public. PESCO had the highest share followed by KE and IESCO. The Authority has taken serious note of safety issues in DISCOs and expressed deep concern about the significant rise in fatalities over the past three years. Comprehensive investigations were conducted against all DISCOs under Section 27-A of the NEPRA Act. Based on the investigation reports, all DISCOs were fined, and they were directed to provide compensation to the bereaved families of public individuals' equivalent to the amount given to their employees, besides providing a job to the next of kin. During investigations, it was revealed that some accidents occurred due to a lack of earthing/grounding of poles/structures in the distribution system of DISCOs. The Authority expressed its dissatisfaction in this regard and directed all DISCOs to submit details of poles/structures requiring grounding, along with a concrete plan to accomplish this. The Authority is closely monitoring the submitted plan to ensure that the infrastructure is safe. It's worth mentioning that in the past, the Authority undertook a similar exercise with KE, resulting in over 200,000 poles having been earthed on Authority's intervention. Positive impact of this exercise is manifest in zero casualty due to earthing issues, despite heavy rains in the city of Karachi and surrounding areas.

2.3.4 Operation of DISCOs involving Private Sector:

Currently, there are ten (10) DISCOs under the administrative purview of the Ministry of Energy (Power Division). The power sector has grappled with persistent challenges, including high T&D losses and inadequate bill recovery by these DISCOs. Governance issues have significantly contributed to the mounting circular debt, which has now reached a staggering Rs. 2.3 trillion (as of June 30, 2023), showing no signs of reduction. It's noteworthy that these entities operate across the country. The primary issues they face include low bill recovery and high losses due to theft.

It is believed that DISCOs' performance can significantly improve with the involvement of private sector. Therefore, concerted efforts are required in this direction.

2.3.5 Investment Plan of DISCO's and KE:

To serve both current and future consumers efficiently, it is crucial not only to maintain the existing system in good condition but also to make continuous investments to meet the future load demands. In compliance with Section 32 of the NEPRA Act and NEPRA Guidelines for determining Consumer-end Tariff (Methodology and Process), 2015, the Authority has sanctioned a five-year investment plan (from FY 2023-24 to FY 2027-28) amounting to Rs. 375 billion for IESCO, LESCO, and FESCO. In this approved plan, the T&D losses for IESCO, LESCO, and FESCO have been set at 7.26%, 7.50%, and 7.24% respectively for the last year of the MYT control period i.e. FY 2027-28, in contrast to the reference determined T&D loss levels of 7.8%, 8%, and 8.84% for the FY 2022-23.

The Authority is currently in the process of approving the investment plan for KE, which is in an advanced stage and is expected to be finalized soon.

2.3.6 Advanced Metering Infrastructure (AMI) in DISCO's and KE:

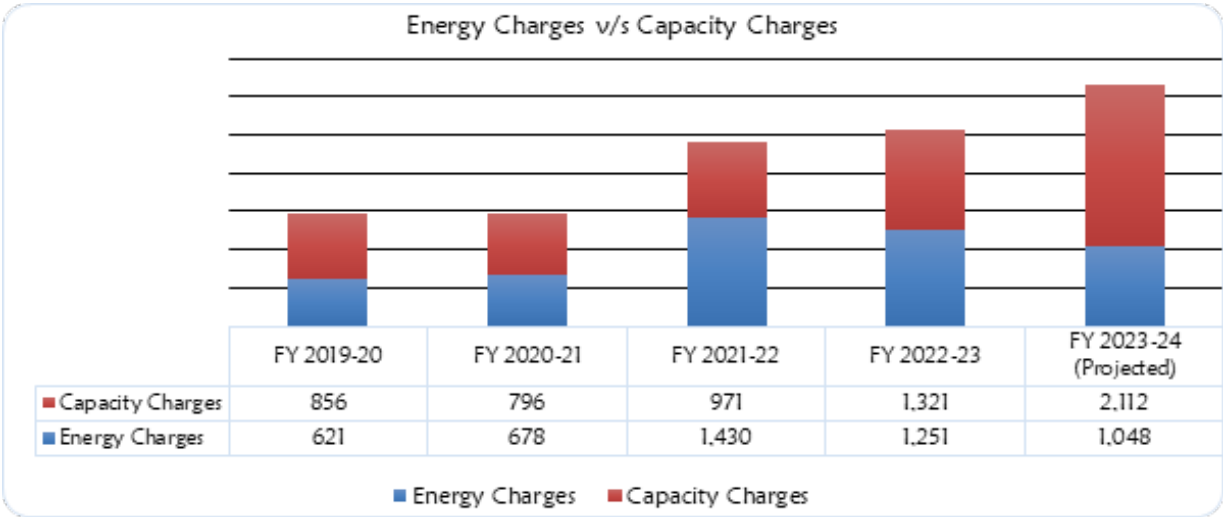
Recognizing the benefits of AMI, the Authority has consistently directed DISCOs to install AMI meters, with the costs incorporated into their respective investment plans. AMI systems enable real-time monitoring of power outages, allowing utilities to respond more swiftly and efficiently to address arising issues. Implementing a smart meter AMI system would significantly benefit the power grid by enabling better monitoring and enhanced efficiency.

Among all DISCOs, KE has successfully installed AMI/AMR in all PMTs along with 11 kV feeders. Similarly, IESCO is in the process of installing the AMI/AMR system. This installation will not only ensure real-time data but also bring transparency, data analysis capabilities, and improved decision-making for management to improve the system.

2.3.7 Energy Charges vs. Capacity Charges:

The consumer-end tariff comprises Energy Purchase Price (EPP), Capacity Purchase Price (CPP), the impact of T&D losses, Distribution & Supplier Margin, and Prior Year Adjustment. In FY 2022, EPP constituted around 60% of the tariff, while CPP accounted for about 40%. The percentage of CPP in the overall tariff is on increasing trend. During FY 2023, the percentage of EPP and CPP was around 50% each, while for FY 2024, it is projected to be around 67% and 33%, respectively. The increase in CPP percentage is due to the augmented capacity of power generation plants and the addition of the HVDC line in the system.

At present, fixed charges billed to electricity consumers range from approximately Rs. 200 to Rs. 500 per kW/month, determined by their Actual Maximum Demand (MDI) for the month or 50% of sanctioned load, whichever is higher. In contrast, capacity charges billed to DISCOs by CPPA-G remain consistently over Rs. 4,000 per kW/month. This highlights that only around 3% to 4% of the fixed costs is accounted for as fixed charges, while the rest is billed based on variable charges depending on energy consumption.



	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24 (Projected)
Capacity Charges	856	796	971	1,321	2,112
Energy Charges	621	678	1,430	1,251	1,048

To alleviate the impact of heightened capacity charges, it is crucial to boost the growth rate of electricity sales by implementing cost-reduction measures. Additionally, it is essential to retire generation capacity that has surpassed its initial licensed lifespan, along with low efficiency power plants of GENCOs and KE. Furthermore, the decision in respect of induction of new generation capacity shall be made only after a through consideration of all relevant factors and comprehensive analysis.

2.3.8 Summary of Consumer-end Tariff:

The summary of the National Average determined and Government of Pakistan (GOP) applicable base tariff, excluding quarterly and monthly adjustments, is as follows:

	NEPRA Determined (Rs./kWh)	Applicable Date for GOP Tariff	GOP Applicable (Rs./kWh)
Base Tariff	**13.35**	**22-03-2018**	**11.72**
Increase in Base Tariff – Decision dated 12-02-2021	3.34	01-01-2019 12-02-2021 01-11-2021	0.22 1.95 1.39
Increase in Base Tariff – Decision date 11-02-2022	0.22	July, 2022	0.20
Increase in Base Tariff – Decision date 22-07-2022	7.91	July, 2022 August-September, 2022 October, 2022 onward	3.50 0.91
Revised Base Tariff	**24.82**		**23.39**

Note: The above tariff does not included Quarterly Adjustment and FCAs.
Source: NEPRA

2.3.9 Monthly Fuel Charges Adjustments (FCAs):

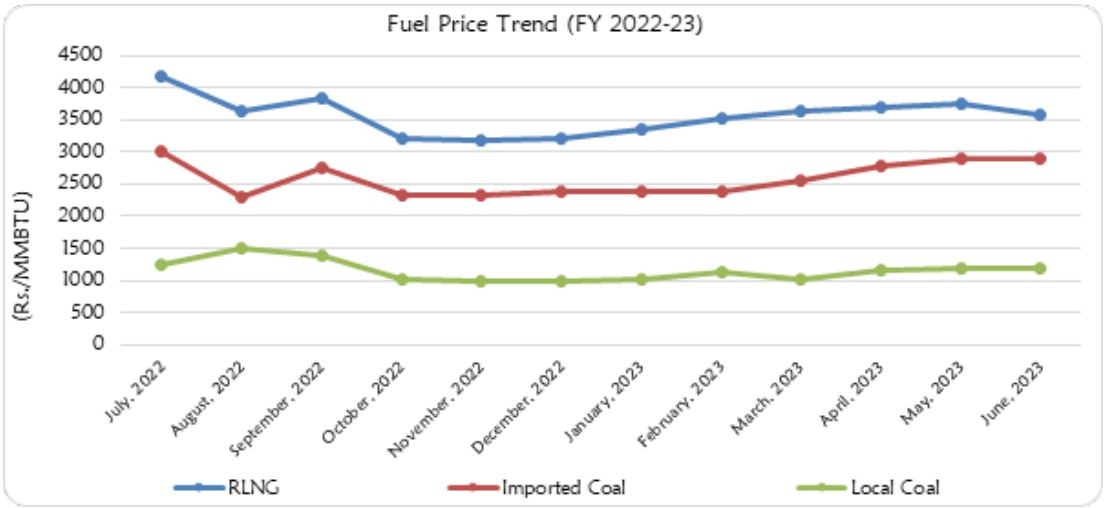
The Authority in terms of the provision of Section 31(7) (iv) of the NEPRA Act, 1997 is required to make adjustments in approved base tariff on account of fuel price variation within a period of seven days on a monthly basis. Pursuant to the above provision, monthly FCA is determined and charged/ passed on to the consumers in their monthly bills. Due to shifts in fuel prices and alterations in the generation mix, consumers may be subject to either a positive or negative FCA, which is reflected in their bills. Below is a detailed account of the FCAs applied to consumers of DISCOs:

Month	FCA (Rs./kWh)	Month	FCA (Rs./kWh)
July, 2022	4.34	January, 2023	0.48
August, 2022	0.19	February, 2023	(0.00)
September, 2022	0.09	March, 2023	0.79
October, 2022	(0.32)	April, 2023	1.61
November, 2022	0.19	May, 2023	1.90
December, 2022	(2.32)	June, 2023	1.81

Source: NEPRA

In May and June 2023, the Authority, while approving the FCA, incorporated bilateral contracts of DISCOs (CPPs, etc.) and net-metering generation into the individual basket of each DISCO. This led to varying FCAs for different DISCOs. To maintain a policy of uniform tariffs, a National Average FCA for May and June, 2023 was also determined, which was applied to consumers.

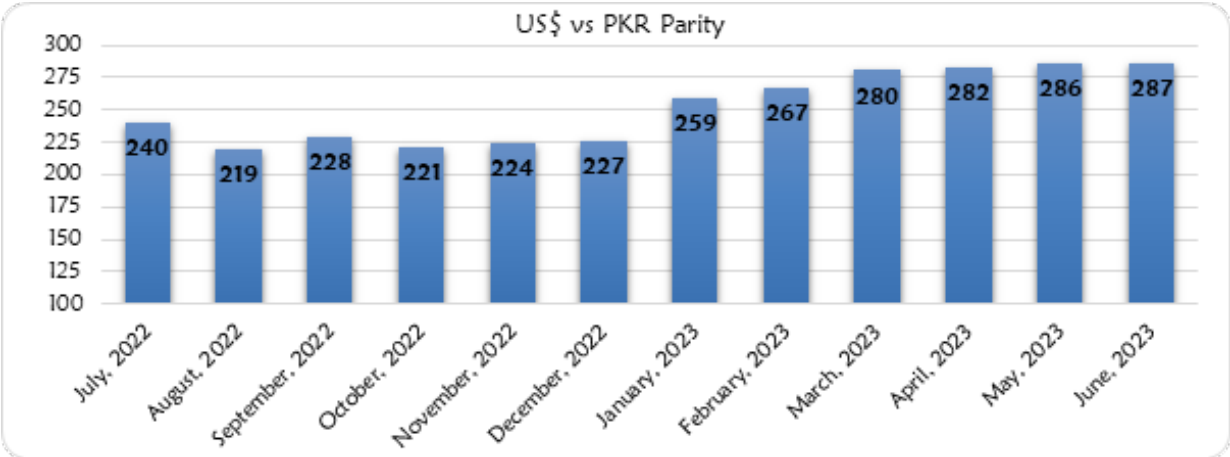
The surge in global fuel prices has significantly increased the generation cost from imported fuel-based power plants. The fuel price trend during FY 2022-23 is illustrated in the graph below:



Month (FY 2022-23)	RLNG	Imported Coal	Local Coal	Month (FY 2022-23)	RLNG	Imported Coal	Local Coal
July	4,168	3,007	1,243	January	3,365	2,380	1,006
August	3,646	2,290	1,489	February	3,528	2,375	1,127
September	3,841	2,760	1,379	March	3,644	2,548	1,008
October	3,203	2,327	1,012	April	3,702	2,770	1,158
November	3,179	2,322	991	May	3,737	2,896	1,176
December	3,208	2,376	994	June	3,569	2,896	1,176

Source: NEPRA

Exchange rate parity also affects the prices of imported fuel the trend of the same is reproduced below:



2.3.10 Quarterly Adjustments:

In terms of proviso (ii) to Section 31(7) of the Act, 1997, the Authority may, on a quarterly basis and not later than a period of fifteen days, make quarterly adjustments in the approved tariff on account of capacity and transmission charges, impact of transmission and distribution losses, variable operation and maintenance and, policy guidelines as the Federal Government may issue and, intimate the tariff so adjusted to the Federal Government prior to its notification in the Official Gazette.

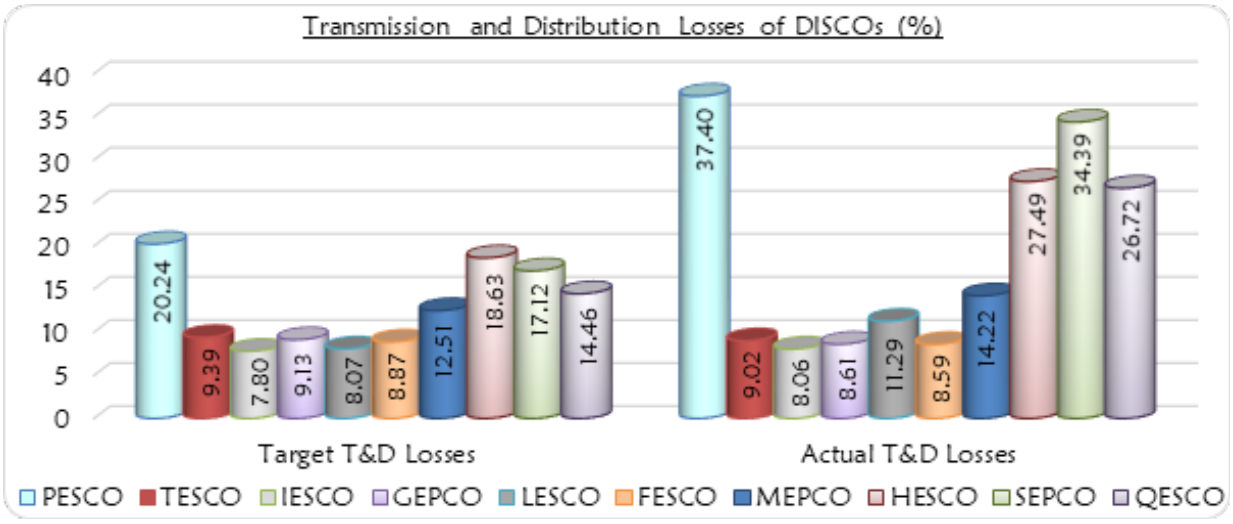
Pursuant to the above proviso, quarterly adjustments are determined and passed on to the consumers in their monthly bills. Detail of quarterly adjustments of DISCOs applicable during FY 2022-23 is given hereunder:

Quarterly Adjustments Period	Decision Dated	Allowed National Average (Rs./kWh)	Applicability Period (with effect from)
FY 2021-22 (1st Quarter)	09-05-2022	0.5715	June, 2022 to August, 2022
FY 2021-22 (2nd Quarter)	16-06-2022	1.5500	July, 2022 to September, 2022
FY 2021-22 (3rd Quarter)	29-07-2022	0.5087	September, 2022 to November, 2022
FY 2021-22 (4th Quarter)	14-10-2022	3.2971	October, 2022 to January, 2023
FY 2022-23 (1st Quarter)	17-01-2023	3.0805	February, 2023 to March, 2023
FY 2022-23 (2nd Quarter)	12-04-2023	0.4689	April, 2023 to June, 2023

Source: NEPRA

2.3.11 Transmission and Distribution Losses of DISCOs:

It's self-evident that DISCOs must enhance their performance to mitigate the financial impact of higher T&D losses and lower recoveries.



The above figure makes it evident that in FY 2022-23, most of the DISCOs fell short of meeting the T&D Loss targets set by the Authority. This resulted in an additional burden of Rs. 160.49 billion added to the Circular Debt. The table below provides a breakdown of T&D losses for FY 2022-23 and their corresponding impact on the Circular Debt.

DISCO	Units			Losses (%)			Implication	
	Purchases	Sold	Lost	Target	Actual	%	Units	Billion Rs.
PESCO	15,254.53	9,548.86	5,705.67	20.24	37.40	17.17	2,614.61	77.35
TESCO	1,719.83	1,564.66	155.18	9.39	9.02	-0.37	-6.48	-0.16
IESCO	11,723.84	10,778.52	945.32	7.80	8.06	0.26	30.13	0.28
GEPCO	11,440.06	10,454.80	985.26	9.13	8.61	-0.51	-60.02	-1.86
LESCO	26,032.44	23,092.37	2,940.07	8.07	11.29	3.22	832.69	21.79
FESCO	16,040.95	14,662.68	1,378.27	8.87	8.59	-0.28	-46.82	-1.45
MEPCO	19,505.56	16,732.37	2,773.19	12.51	14.22	1.71	323.33	7.94
HESCO	4,916.84	3,565.30	1,351.54	18.63	27.49	8.86	435.04	15.00
SEPCO	3,868.50	2,538.19	1,330.32	17.12	34.39	17.27	667.16	20.38
QESCO	6,004.55	4,399.85	1,604.70	14.46	26.72	12.27	735.98	21.21
Total	**116,507.11**	**97,337.60**	**19,169.51**	**11.81**	**16.45**	**4.64**	**5,525.63**	**160.49**

Source: DISCOs

2.3.12 Circular Debt - Stock, Flow, and Accumulation:

The Government is faced with a critical challenge to curb the growing circular debt impacting both investors and end-consumers, and hindering economic growth. As of June 30, 2023, the Circular Debt had risen to Rs. 2,309,997 million from Rs. 2,252,750 million in FY 2021-22, marking a year-on-year increase of Rs. 57,247 million. Current defaulters owed around Rs. 900,821 million, presenting a significant challenge as their billed amounts remain unpaid. Timely payment of subsidies from Federal/ Provincial Governments could partially alleviate the issue. Innovative options such as outsourcing meter reading and revenue collection in respect of a feeder or in high-loss areas may be explored to minimize losses. A permanent solution to this problem lies in establishment of an efficient and financially stable power sector. This can be achieved through measures like allowing open competition in the generation and supply segment, restructuring and reinforcing the transmission segment and System Operator, and privatizing the distribution segment. Additionally, adopting the latest equipment and technology can help minimize losses and improve recovery rates. The failure to recover outstanding dues from consumers who continue to use electricity from the DISCO is a clear indication of the DISCO's inability to fulfill their responsibilities. The outstanding payments of Rs. 900,821 million from running defaulters

should indeed be a significant concern for both the DISCO and their owner. It is imperative that the owner of these DISCOs conducts a comprehensive investigation into this matter.

2.3.13 Less Recoveries:

The Authority determines the consumer-end tariff for the DISCOs based on a 100% receivables basis and does not tolerate inefficiencies in this regard. The Authority has consistently emphasized this issue in previous SIRs and has been urging remedial actions. During FY 2022-23, it was observed that the recovery rate stood at around 92.4% compared to 92.31% in FY 2021-22. This resulted in an additional burden of Rs. 236 billion added to the circular debt. The Government, in its capacity as owner of the DISCOs, should consider diverse strategies, which may include outsourcing recovery tasks to the private sector. It is imperative to address the issue of low recoveries in order to curb the accumulation of circular debt. Efforts should be directed towards pinpointing areas with low recovery rates, rather than resorting to feeder shutdowns, which invariably result in revenue losses for the DISCOs. The pervasive low recovery rate in DISCOs is deeply rooted in a culture of mis-governance. A culture of accountability can indeed play a pivotal role in rectifying these issues of poor governance and bolstering recoveries at DISCOs. A multi-faceted approach is required involving training, technology, performance metrics, and a supportive organizational culture. When implemented effectively, such approach can lead to improved financial health and overall operational efficiency.

2.3.14 Higher Receivables:

The mounting receivables of the DISCOs have been a major concern highlighted by the Authority over the past several years through various determinations and SIRs. In FY 2022-23, receivables for DISCOs surged to approximately Rs. 1,727,104 million, compared to Rs. 1,530,500 million in FY 2021-22, indicating an increase of Rs. 196,605 million. A comprehensive analysis should be conducted to formulate a recovery strategy to reclaim this amount from defaulters.

There is a potential concern that certain billing may be artificially manipulated to demonstrate improved T&D losses. If such malpractice is identified, the staff responsible for managing the data should be held accountable. Investigations should be conducted into non-receivable billing to ensure accurate unit recording and billing there-for. The performance of officials in DISCO's sub-division should be evaluated in light of AT&C losses, and appropriate action be taken if improvement is not achieved or maintained. It is necessary to establish committees comprises of representatives from DISCOs and independent professionals to thoroughly examine whether the receivables are accurate or otherwise. Transparency is essential to ensure accuracy in billing and collections.

2.3.15 Optimizing Commercial Electricity Consumption:

Efficient commercial use of electricity is important for both economics and the environment. Business can save cost through practices like using efficient equipment/devices for lighting, cooling and other electrical loads. Demand-side management is also useful for reducing peak charges. Monitoring tools provides insights, enabling informed decisions and goal tracking. Optimized electricity consumption in the businesses can help boost profit.

2.3.16 Consumer-end Tariff of KE:

In the context of the MYT determination of KE, a framework exists for specific adjustments to be applied to the approved tariff on a monthly, quarterly, or annual basis. During FY 2022-23, the Authority deliberated on the monthly FCA requests submitted by KE for the period spanning from May, 2022 to April, 2023. The determined monthly FCAs (Rs./kWh) of KE for the months from May, 2022 to April, 2023 are as follows:

May, 2022	June, 2022	July, 2022	Aug., 2022	Sep., 2022	Oct., 2022	Nov., 2022	Dec., 2022	Jan., 2023	Feb., 2023	Mar., 2023	April, 2023
9.518	11.102	-4.117	-4.886	-5.126	-2.454	-7.431	-10.798	1.711	0.579	3.934	-0.047

Source: NEPRA

In addition, the Authority also decided the following quarterly/annual adjustment requests of KE as per its MYT determination mechanism:

Quarterly Adjustments Period	Decision Dated	Quarterly Adjustment (Rs./kWh)
January, 2022 to March, 2022	July 02, 2022	3.54
April, 2022 to June, 2022	October 24, 2022	12.68

Source: NEPRA

2.3.17 Multi-Year Tariff (MYT) for DISCOs:

Predictable tariffs play a pivotal role in attracting investments to specific regions. The MYT framework for DISCOs provides a platform for anticipating regulatory conditions, setting performance benchmarks, and maintaining operational stability. During this period, the Authority undertook process of rebasing of tariffs for various DISCOs, along with revising their tariff rates in line with regulatory targets. Additionally, the Authority granted annual indexations and adjustments for three DISCOs already under the MYT framework, namely IESCO, LESCO, and FESCO for both FY 2021-22 and FY 2022-23.

2.3.18 Cross Subsidization among DISCOs:

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 lower regulated tariffs than the notified ones are not permitted to pass on the benefits of the lower tariff to their consumers. Instead, they levy a Tariff Rationalizing Surcharge (TRS) on their consumers to align it. Consequently, consumers of relatively efficient DISCOs subsidize those of less efficient DISCOs. The practice of cross-subsidization, where consumers of efficient DISCOs bear the financial burden of underperforming counterparts, inadvertently undermines efficiency and unintentionally fosters inefficiencies. This dynamic calls for urgent rectification and must be discouraged.

2.3.19 Electricity Cost vis-à-vis Supplementary Charges in Electricity Bills:

The electricity bill served by DISCOs to consumers incorporates supplementary elements like taxes, duties, fees, and surcharges. These additional components can substantially inflate the total amount due. It's important to note that these elements, such as taxes, duties, and fees are not integral to the core electricity charges. NEPRA has proactively undertaken efforts to redesign the billing format. This updated format will clearly differentiate the electricity cost from these ancillary charges, encompassing surcharges, federal taxes, fees and duties.

2.3.20 The Horizontal Re-structuring of DISCOs:

The purpose of horizontal re-structuring of DISCOs is to enhance competition and efficiency within the electricity distribution sector. By breaking up a single monopoly into smaller, more manageable units, it encourages innovation, fosters accountability, and promotes customer-centric service delivery. Each regional DISCO can focus on addressing the unique challenges and opportunities within its designated area, leading to tailored solutions and improved performance.

Horizontal restructuring creates a more level playing field for market participants, facilitating a competitive market environment. It encourages private sector involvement and investment in distribution sector, which can lead to advancements in technology, infrastructure, and customer service. Additionally, by decentralized decision-making and operations, it allows for greater adaptability to local conditions and needs. This approach has successfully implemented in various countries and has proven to be an effective strategy for enhancing the overall performance and efficiency of distribution service in the power sector.

2.3.21 CTBCM Regime:

The unbundling, corporatization, and privatization of generation, distribution, and retail/supply of electric power services envisioned through the 1992 Strategic Plan of the GOP have experienced delays for various reasons. However it is encouraging that the competitive market is finally nearing

operationalization under CTBCM approved by the Authority. The Authority approved the competitive wholesale electricity market known as CTBCM, detailing its design and providing an implementation roadmap on December 5, 2019, and November 12, 2020, respectively. The Authority closely monitored the implementation progress through periodic review meetings with implementing entities i.e. DISCOs, KE, CPPA-G, NTDC, PPIB, and AEDB.

In accordance with Section 1(3) of the NEPRA Act, as amended through the NEPRA Amendment Act of 2018 (the Amended Act), Sections 23A, 23B, 23G, and 23H have come into effect after five years from the enactment of the NEPRA Amended Act. The Authority directed CPPA-G to submit the draft Agency Code along with the application for registration as a Special Purpose Agent.

2.3.22 Cases Pending before Appellate Tribunal:

Following the enactment of NEPRA Amendment Act in 2018, the Appellate Tribunal became functional since April, 2022. A total 250 cases have been presented before this forum, with 143 cases still awaiting resolution.

2.4 KEY RECOMMENDATIONS

In addition to the measures proposed under each of the aforementioned issues, several key recommendations have been identified for improvement in the areas of Generation, Transmission, and Distribution segments. These include:

2.4.1 Generation:

(a) **Implementation of Least-Cost Planning through IGCEP:** Implement the already approved IGCEP to ensure that power generation projects are selected based on their cost-effectiveness and alignment with long-term energy needs. The Plan also needs to be monitored and updated at regular interval to accommodate changes.

(b) **DISCOs Procurement Aligned with Power Acquisition Programs:** Align the procurement strategies of DISCOs with their established Power Acquisition Programs, ensuring a coordinated approach to meet demand while minimizing costs.

(c) **Retirement of Inefficient Public/Private Sector Generation Plants:** Strategically phase out outdated and inefficient generation facilities, both in the public and private sectors to minimize the burden of capacity payments and to ensure operation of efficient plant only.

(d) **Shifting Generation Mix towards Renewable and Indigenous Sources:** Emphasize the transition towards utilizing renewable energy sources and indigenous fuels, reducing dependence on imported energy and enhancing sustainability.

(e) **Optimize Capacity Utilization:** Maximize the utilization of existing efficient power generation capacities, ensuring that plants operate at their full potential to meet demand efficiently.

(f) **Effective Fuel Supply Chain Planning, Sourcing, and Management:** Develop robust plans for sourcing and managing fuel supplies to power plants, ensuring a reliable and consistent flow of fuel to support uninterrupted operations.

(g) **Timely Payments by CPPA-G to IPPs:** Ensure that payments to IPPs are made promptly by CPPA-G, maintaining financial stability and fostering investor confidence in the power sector. This is also necessary to avoid interest on late payment.

(h) **Prioritize Hydel Projects:** Give priority to the development of HPPs, provided it is cost-effective, and leveraging Pakistan's abundant water resources for sustainable and reliable electricity generation.

(i) **Solar Repowering of Expensive GENCOs:** Implement solar repowering initiatives for costly GENCOs such as Lakhra, Jamshoro, Muzaffargarh, Faisalabad, and Multan, to enhance efficiency and reduce operational expenses.

(j) **Off-Grid Solutions for Rural Electrification:** Introduce off-grid solutions to electrify remote rural areas, enabling access to reliable and sustainable electricity for underserved communities.

(k) **Promote Bilateral Trade through CTBCM Regime:** Facilitate bilateral trade agreements between power buyers and sellers through the CTBCM regime, enhancing market efficiency

and stability.

(l) **Foster Net-Metering and Distributed Energy Solutions:** Encourage the adoption of net-metering and decentralized energy solutions, enabling consumers to generate their own electricity and contribute to the grid, reducing overall demand.

(m) **Enhance Thar Coal Utilization (including conversion from imported to local coal):** Implement measures to optimize the utilization of Thar Coal, including transitioning from imported coal to locally sourced coal, reducing costs and enhancing energy security.

(n) **Efficient Power Plant Operation to Minimize PLAC:** Implement measures to enhance the operational efficiency of power plants, minimizing part load operation of power plant to minimize PLAC and maximize cost-effectiveness.

2.4.2 Transmission:

(a) **Implementation of Constraints Removal Schemes on a Fast Track Basis:** Expedite the execution of schemes aimed at removing constraints in the transmission system, ensuring a swift resolution of bottlenecks.

(b) **Develop a Comprehensive IGCEP/TSEP (Integrated System Planning):** Establish a robust and comprehensive IGCEP/TSEP to guide coordinated development and growth of both generation and transmission capacities.

(c) **Ensure Timely and Budget-Adherent Project Delivery as per Approved TIP:** Enforce strict adherence to approved TIPs, ensuring that projects are completed on schedule and within allocated budgets.

(d) **Enhance Short-Term and Medium-Term Forecasting for Efficient Dispatch by NPCC:** Strengthen forecasting capabilities for short-term and medium-term periods to facilitate more precise scheduling and dispatch of electricity, coordinated by the NPCC.

(e) **Augment Interconnection Capacity between KE and NTDC Systems for Unconstrained Power Flow and System Stability:** Increase the capacity for interconnection between KE and NTDC systems to facilitate seamless power transfer and ensure system stability.

(f) **Facilitate Active Participation and Engagement of Provincial Grid Companies:** Encourage and facilitate the involvement of PGCs in the planning and operation of the transmission system, fostering a collaborative approach to grid management.

(g) **Expand the Number of Regional Control Centers for Enhanced System Operation Control:** Increase the number of regional control centers to enhance oversight and control of system operations, allowing for more effective response to dynamic grid conditions.

(h) **Streamline Procurement Processes for Swift Project Completion:** Simplify and expedite the procurement procedures to prevent delays in the completion of transmission projects, ensuring a timely and efficient implementation.

(i) **Swift Implementation of SCADA and Other System Enhancement Tools:** Rapidly deploy SCADA systems and other advanced tools to improve real-time monitoring and control of the transmission network.

(j) **Secure Provincial Support for Right-of-Way (ROW) Issues:** Collaborate with provincial authorities to address ROW issues, ensuring unimpeded access for the construction and maintenance of transmission infrastructure.

(k) **Encourage Private Sector Participation in Investment through BOOT Arrangements:** Promote private sector investment in the transmission sector through BOOT arrangements, fostering innovation and efficiency in infrastructure development.

2.4.3 Distribution:

(a) **Privatization of DISCOs through Public-Private Partnerships (PPP):** Explore opportunities for private sector involvement in DISCOs through well-structured partnerships, which can lead to enhanced efficiency and service delivery.

(b) **Horizontal Restructuring of DISCOs into Smaller Units:** Consider dividing large DISCOs into smaller, more manageable units to increase operational efficiency and accountability.

(c) **Discontinuation of AT&C-based Load-Shedding through Technology Adoption:**

Replace traditional AT&C-based load-shedding with advanced technology solutions to ensure uninterrupted power supply.

(d) **Grant Autonomy to DISCOs for Improved Governance and Performance:** Provide DISCOs with greater autonomy to enhance their decision-making capabilities, thereby fostering improved governance and operational performance.

(e) **Customer-Centric Approach through Established Facilitation Centers:** Establish customer facilitation centers to ensure a seamless, customer-oriented approach, addressing queries and concerns promptly.

(f) **Timely Provision of Connections for Effective Capacity Utilization:** Expedite the process of providing new connections to fully utilize the installed capacity and improve overall system performance.

(g) **Timely Subsidy Payments by the Federal Government to Ensure Financial Stability:** Ensure prompt disbursement of subsidies by the Federal Government to maintain liquidity and financial stability in the power sector.

(h) **Technology Investment and Governance for Enhanced Recoveries and Loss Reduction:** Invest in advanced technology and strengthen overall governance to improve revenue recoveries and reduce losses.

(i) **Outsourcing of High Loss Feeders to the Private Sector:** Consider outsourcing the management of high loss feeders to the private sector to bring in specialized expertise and drive efficiency.

(j) **Pilot Projects for Outsourcing Meter Reading and Revenue Collection:** Initiate pilot projects to outsource meter reading and revenue collection processes, potentially increasing efficiency and accuracy.

(k) **Timely Deployment of AMI and AMR:** Implement AMI and AMR technologies at PMT level, along with the use of ABC cables, in alignment with investment plans.

(l) **Installation of Pre-paid Meters for Enhanced Revenue Collection and Theft Prevention:** Introduce pre-paid metering systems within DISCOs to enhance revenue collection and deter electricity theft.

(m) **Encourage Industries to Operate during Off-Peak Hours:** Promote industrial operations during off-peak hours to alleviate demand peaks and encourage industries with captive power to connect with the grid.

(n) **Capacity Building of DISCOs, Especially MIRAD Professionals, for Sustainability:** Prioritize capacity building within DISCOs, with special focus on professionals in Market Implementation & Regulatory Affairs Department (MIRAD), to ensure long-term sustainability.

(o) **Review and Modify Tariff Categories to Introduce Seasonal Tariffs for Optimal Capacity Utilization:** Evaluate tariff structures and introduce seasonal tariffs to encourage better utilization of installed capacity.

(p) **Facilitate Special Economic Zones (SEZs) to Boost Demand:** Provide necessary support to SEZs to spur economic activities and increase electricity demand.

(q) **Promote Solarization of Agricultural Tube-Wells:** Encourage the adoption of solar energy for powering agricultural tube-wells, reducing reliance on conventional grid-based power.

(r) **Introduce Demand Side Management for Efficient Peak Demand Handling:** Implement demand side management strategies to effectively manage peak electricity demands and reduce strain on the grid.

(s) **Enhance Planning Cycle, Demand Forecasting, and Investment Execution for DISCOs:** Strengthen the planning cycle, improve demand forecasting, and ensure timely execution of investment plans to support effective power acquisition and distribution.

These recommendations, if implemented, can lead to significant improvements in the Generation, Transmission and Distribution sector of Pakistan's electric power system, enhancing reliability, efficiency, and customer satisfaction. They address critical aspects of governance, technology adoption, customer-centricity, and financial stability.

PERFORMANCE OF GENERATION SECTOR

03

The power generation mix in Pakistan is characterized by a diverse array of sources, including hydropower, thermal, nuclear and RE plants such as wind, solar, and bagasse/biomass facilities. Additionally, in the remote areas of Balochistan province, Pakistan supplements its electricity supply by importing power from Iran. In a bid to address the demand-supply imbalance in Gwadar, the GOP has recently forged an agreement with Iran to construct a transmission line for the purpose of supplying electricity. This diversified mix of energy sources is essential for ensuring a stable and reliable power supply to meet nation's energy demands.

In addition to the power generation plants operated by the public sector, IPPs play a crucial role in augmenting the country's overall power generation capacity.

This chapter underscores the significance of understanding both installed and derated capacities. While installed capacity represents the maximum potential output, derated capacity accounts for operational limitations. This includes factors like aging equipment, maintenance schedules, and environmental conditions, which may temporarily restrict a power plant's performance.

By considering both installed and derated capacities, the country can better strategize for maintaining a robust and sustainable energy landscape, aligned with the country's economic and developmental goals. During the FY 2022-23 total 2,050 MW power generation capacity is added in the system.

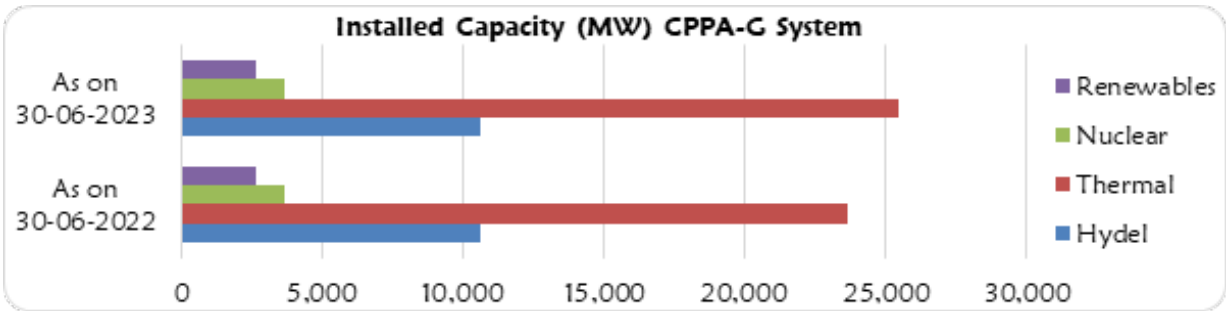
3.1 INSTALLED CAPACITY

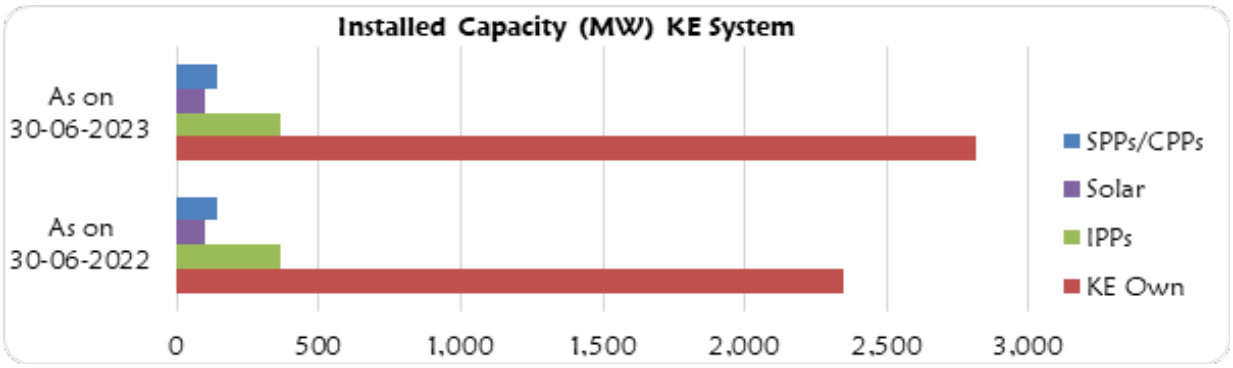
As of June 30, 2023 Pakistan's installed capacity stands at 45,885 MW. The detailed breakdown of this capacity according to energy sources and systems is provided in the following table:

	As on 30-06-2022	As on 30-06-2023	Variation (MW)	Variation (%)	Comments
A. CPPA-G SYSTEM					
WAPDA Hydel	9,389	9,389	0	0	**Additions:** (a) Thar Energy (b) Thar Coal Block-I (c) ThalNova Power **Licence Expired:** (a) Ramzan Sugar Mills (b) Al-Arabia Sugar Mills (c) Digri-Gen Sugar Mills (d) Shams Power
IPPs Hydel	1,246	1,246	0	0	
Total: Hydel	**10,635**	**10,635**	**0**	**0**	
GENCOs	4,731	4,587	-144	-3.04	
IPPs	18,750	20,563	1,813	9.67	
SPPs/CPPs	340	340	0	0	
Total: Thermal	**23,821**	**25,490**	**1,669**	**7.01**	
Nuclear	**3,620**	**3,620**	**0**	**0**	
Wind	1,838	1,838	0	0	
Solar	530	530	0	0	
Bagasse/Biomass	369	249	-120	-32.52	
Total RE	**2,737**	**2,617**	**-120**	**-4.38**	
Total: CPPA-G System	**40,813**	**42,362**	**1,549**	**3.80**	
B. KE SYSTEM					
KE Own	2,345	2,816	471	20.09	
IPPs	366	366	0	0	
SPPs/CPPs	151	139	-12	-7.95	
Solar	100	100	0	0	
Net-Metering Import	60	102	42	70.00	
Total: KE System	**3,022**	**3,523**	**501**	**16.58**	
Grand Total:	**43,835**	**45,885**	**2,050**	**4.68**	

Source: GENCOs/WAPDA/IPPs/DISCOs/KE

Below is the graphical representation depicting the installed capacity for the FYs 2022 and 2023:





The installed capacity within the CPPA-G system is currently at 42,362 MW. This capacity is distributed among various energy sources, with thermal generation (comprising GENCOs, IPPs, and SPPs) accounting for 25,490 MW, hydroelectric contributing 10,635 MW, wind power providing 1,838 MW, solar energy contributing 530 MW, biomass (bagasse) generating 249 MW, and nuclear power adding 3,620 MW.

Further, KE's own thermal generation capacity is 2,816 MW. This capacity of KE, falls short to meet the current demand of its system. To bridge this gap, KE procures electricity from external sources which include 366 MW from thermal IPPs, 100 MW from solar potential, 139 MW from SPPs/CPPs, and approximately 1,100 MW sourced from the CPPA-G System.

3.2 DEPENDABLE CAPACITY

As of June 30, 2023, the combined dependable generation capacity of Pakistan, encompassing both the CPPA-G and KE Systems, stood at 43,749 MW. This includes a substantial capacity of 40,628 MW within the CPPA-G System and 3,121 MW within the KE System.

This dependable capacity represents the maximum sustained level of electricity production that the country can rely on, taking into account factors like maintenance schedules, equipment reliability, and operational conditions. It serves as a crucial metric for ensuring a consistent and secure power supply to meet the country's energy demands. The detailed breakdown of this capacity according to energy sources and systems is provided in the following table:

FOREWORD	As on 30-6-2022	As on 30-6-2023	Variation	
			(MW)	(%)
A. CPPA-G SYSTEM				
WAPDA Hydel	9,443	9,349	-94	-1.00
IPPs Hydel	1,009	1,244	235	23.29
Total: Hydel	**10,452**	**10,593**	**141**	**1.35**
GENCOs	3,900	4,036	136	3.49
IPPs	17,258	19,648	2,390	13.85
SPPs/CPPs	257	257	0	0.00
Total: Thermal	**21,415**	**23,941**	**2,526**	**11.80**
Nuclear	**3,345**	**3,575**	**230**	**6.88**
Wind	1,838	1,828	-10	-0.54
Solar	530	438	-92	-17.36
Bagasse/Biomass	278	253	-25	-8.99
Total RE	**2,646**	**2,519**	**-127**	**-4.80**
Total: CPPA-G System	**37,858**	**40,628**	**2,770**	**7.32**
B. KE SYSTEM				
KE Own	2,135	2,594	459	21.50
IPPs	354	354	0	0.00
SPPs/CPPs	106	94	-12	-11.32
Solar	79	79	0	0.00
Total: KE System	**2,674**	**3,121**	**447**	**16.72**
Grand Total	**40,532**	**43,749**	**3,217**	**7.94**

Source: GENCOs/WAPDA/IPPs/DISCOs/KE

It is evident from the data that certain sources contribute significantly to the installed capacity. However, when it comes to actual generation, the picture is different, as factors like weather conditions and fuel availability have influenced the performance.

3.3 ELECTRICITY GENERATION

In the FY 2022-23, the total electricity generation in the country, which encompasses power plants within both the CPPA-G and KE Systems, amounted to 138,028.86 GWh which is notably less when compared to the electric power generation of 154,056.18 GWh in the previous FY 2021-22.

In addition to local generation, the country also imported 478.62 GWh of electricity from Iran during FY 2022-23. This import figure reflects a slight decrease from the 514.36 GWh imported during the preceding FY 2021-22.

The negative growth rate in electricity consumption can be attributed to several factors. Firstly, it reflects a decrease in economic activity and a slowdown in industrial and commercial operations. Secondly, this decline may also be indicative of a broader societal trend, potentially suggesting a reduction in social activities. Thirdly, it may be due to a lack of confidence in the national power supply system as more consumers are diverting towards distributed generation through roof-top solar plants. However, the primary issue seems to be the high cost of electricity coupled with unreliability of DISCOs supply.

Addressing these underlying issues and restoring confidence in the power supply system are inevitably needed for revitalizing electricity consumption and, consequently, stimulating economic growth. A multifaceted approach involving improvements in infrastructure, enhancing system efficiency, better governance across all sectors of the power system, regulatory measures, and strategies to adapt to evolving societal dynamics need to be adopted. Building trust in the power infrastructure is pivotal for encouraging increased consumption and bolstering economic growth.

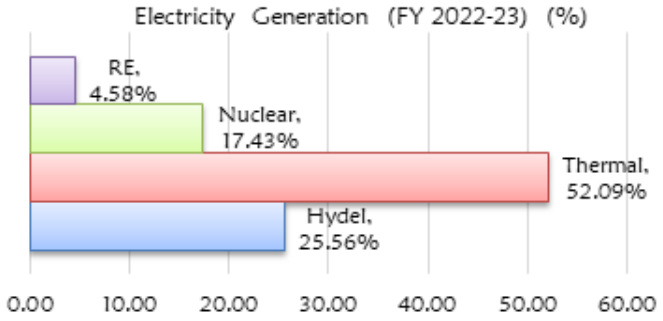
Data below highlights a variation in electricity production and import levels, suggesting potential shifts in factors affecting energy demand. A detailed analysis of these trends would be helpful in formulating strategies for ensuring a financially viable electric power sector in the country.

As on 30th June	FY 2021-22	FY 2022-23	Variation	
			(GWh)	(%)
A. CPPA-G SYSTEM				
WAPDA Hydel	32,522.88	30,410.47	-2,112.41	-6.50
IPPs Hydel	3,023.40	4,863.15	1,839.75	60.85
Total: Hydel	**35,546.28**	**35,273.62**	**-272.66**	**-0.77**
GENCOs	6,349.56	5,945.94	-403.62	-6.36
IPPs	76,280.90	56,697.83	-19,583.07	-25.67
SPPs/CPPs	136.31	150.02	13.71	10.06
Import From Iran	514.36	478.62	-35.74	-6.95
Total: Thermal	**83,281.13**	**63,272.41**	**-20,008.72**	**-24.03**
Nuclear	**18,293.55**	**24,054.56**	**5,761.01**	**31.49**
Wind	4,584.17	4,086.05	-498.12	-10.87
Solar	785.41	1,091.87	306.46	39.02
Bagasse/Biomass	826.06	845.36	19.30	2.34
Total RE	**6,195.64**	**6,023.28**	**-172.36**	**-2.78**
Total: CPPA-G System	**143,316.6**	**128,623.87**	**-14,692.73**	**-10.25**
B. KE SYSTEM				
KE Own	7,889.96	7,093.09	-796.87	-10.10
IPPs	2,130.46	1,606.81	-523.65	-24.58
SPPs/CPPs	482.94	406.9	-76.04	-15.75
Solar	236.22	298.19	61.97	26.23
Total: KE System	**10,739.58**	**9,404.99**	**-1,334.59**	**-12.43**
Grand Total:	**154,056.18**	**138,028.86**	**-16,027.32**	**-10.40**

Source: GENCOs/WAPDA/IPPs/DISCOs/KE/CPPA-G

The total generation in CPPA-G area remained 128,623.87 GWh which is 93% of total generation. This comprises of 35,273.62 GWh from hydro, 63,272.41 GWh from thermal sources (GENCOs, IPPs, SPPs), 24,054.56 GWh from nuclear, 6,023.28 GWh from renewable including wind, solar, bagasse and 478.62 GWh import from Iran.

Similarly, generation in KE area has been recorded as 9,404.99 GWh which constitutes 7% of total generation. Besides, 7,093.09 GWh from own resources, KE also imported power from IPPs, SPPs/CPPs and CPPA-G.



3.4 SECTORAL SHARE

In the FY 2022-23, power generation from public sector power plants, across the country, amounted to 80,596.73 GWh, representing 58.39% of the overall energy production. On the other hand, private sector power plants, including KE, contributed a total generation of 57,432.13 GWh, making up approximately 41.61% of the total power generated.

To provide a visual representation and facilitate a clearer understanding, graphical representations delineating the distribution of generation by technology for both public and private sectors have been included.

3.5 PAYABLE TO POWER GENERATION AND TRANSMISSION COMPANIES AT THE END OF FY 2022-23

The following table provides a breakdown of payables for various companies as on June 30, 2023:

Payables to Power Producers/NTDC by DISCOs through CPPA-G Circular Debt (Rs. in Million)					Breakup (EPP, CPP, Others and Interest) (Rs. in Million)			
Type	Opening Balance on 01-06-2023	IPPs & etc.- Billing During 06/2023	Payments During 06/2023	Balance on 30-06-2023	EPP	CPP	Others	Interest
GENCO-I	1,656.79	(1,025.98)	630.80	-	-	-	-	-
GENCO-II	51,706.12	15,079.17	16,700.00	50,085.29	50,085.29	-	-	-
GENCO-III	6,659.93	6,469.69	11,250.90	1,878.72	1,100.87	296.14	0.00	481.70
HUBCO	38,450.35	2,852.95	5,000.00	36,303.30	6,092.14	24,165.22	0.00	6,045.94
KAPCO	25,337.23	-	6,900.00	18,437.23	16,408.14	451.47	0.00	1,577.62
Pakgen Power	10,978.60	118.38	6,505.00	4,591.98	1,584.08	2,844.35	0.00	163.55
Lalpir Power	8,032.53	-	5,550.00	2,482.53	230.25	2,252.28	0.00	-
Kohinoor Energy	1,297.39	2,009.94	2,940.00	367.32	347.94	-	0.00	19.38
Saba Power	25.68	517.76	543.44	0.00	-	-	0.00	-
Liberty Deharki Power	7,327.14	3,531.42	4,700.00	6,158.56	4,638.91	811.89	0.00	707.75
Uch Power	101,193.40	(2,511.59)	37,811.44	60,870.36	47,024.56	4,755.85	0.00	9,089.96
Rousch Power	10,490.54	1,460.27	5,600.00	6,350.81	4,891.76	1,084.52	0.00	374.53
Fauji Kabirwala	2,481.42	364.10	1,950.00	895.52	629.26	236.87	0.00	29.40
Habibullah Coastal	6,097.23	-	15.00	6,082.23	1,420.33	1,896.83	-	2,765.07
Altern Energy	68.46	-	-	68.46	-	-	-	68.46
Davis Energen	60.76	(31.89)	-	28.87	-	6.73	0.77	21.38
Attock Gen. Power	13,344.86	1,148.99	6,720.00	7,773.85	5,736.96	1,362.67	0.00	674.22
Narowal Energy	13,376.21	979.98	6,740.00	7,616.19	4,787.67	2,149.74	0.00	678.78
Atlas Power	13,073.16	1,521.01	6,725.00	7,869.18	4,901.06	2,117.89	0.00	850.22
Nishat Power	12,564.94	76.03	5,405.00	7,235.97	4,695.61	2,200.41	0.00	339.96
Nishat Chunian	12,029.65	768.24	4,340.00	8,457.88	6,393.92	1,997.85	0.00	66.11
Liberty Power Tech.	12,642.11	654.49	5,435.00	7,861.60	5,772.02	1,668.52	0.00	421.06
Orient Power	9,555.94	2,342.26	4,725.00	7,173.19	6,304.01	597.68	0.00	271.51
Saif Power	10,346.63	2,886.89	5,650.00	7,583.52	6,556.24	532.81	0.00	494.46
Sapphire Electric	10,290.85	3,126.47	5,775.00	7,642.33	6,934.01	506.41	0.00	201.91
Halmore Power	7,374.80	3,024.02	4,225.00	6,173.83	4,807.76	919.85	0.00	446.22
Engro Powergen.	9,221.81	1,849.08	3,451.41	7,619.49	5,589.79	1,432.24	0.00	597.46
Foundation Power	11,869.15	1,962.87	4,875.00	8,957.02	6,615.94	1,621.64	0.00	719.43
Uch Power-II	82,384.52	5,277.75	14,100.00	73,562.27	50,667.82	8,604.68	0.00	14,289.77
PEDO	1,959.85	739.67	1,376.00	1,323.52	538.22	-	0.00	785.30
Laraib Energy	6,051.74	307.99	2,620.00	3,739.74	1,873.62	89.24	0.00	1,776.87
FFC Energy	2,059.40	593.42	500.00	2,152.83	1,982.47	60.15	0.00	110.20
Zorlu Enerji	2,090.13	178.48	300.00	1,968.61	1,224.48	-	0.00	744.13
JDW Sugar Mills (Unit-II)	783.44	189.90	250.00	723.34	665.31	-	0.00	58.03
JDW Sugar Mills (Unit-III)	906.09	217.79	400.00	723.88	667.89	-	0.00	55.99
Three Gorges First	3,176.18	540.09	1,225.00	2,491.27	1,003.68	-	-	1,487.59
Foundation Energy-I	4,225.39	584.58	2,290.00	2,519.97	1,175.70	23.44	-	1,320.83

Payables to Power Producers/NTDC by DISCOs through CPPA-G Circular Debt (Rs. in Million)					Breakup (EPP, CPP, Others and Interest) (Rs. in Million)			
Type	Opening Balance on 01-06-2023	IPPs & etc.- Billing During 06/2023	Payments During 06/2023	Balance on 30-06-2023	EPP	CPP	Others	Interest
Foundation Energy-II	4,215.62	537.42	2,290.00	2,463.03	1,103.80	23.91	-	1,335.32
RYK Mills	705.94	234.62	220.00	720.56	666.17	-	0.00	54.39
Quaid-e-Azam Solar	1,876.09	706.71	875.00	1,707.80	577.75	55.59	-	1,074.45
Sapphire Power	672.95	362.81	450.00	585.75	189.22	3.00	0.00	393.53
Chiniot Power	909.77	203.64	870.00	243.41	-	-	-	243.41
Apollo Solar	3,556.14	-	576.00	2,980.14	1,925.61	-	-	1,054.53
Best Green Energy	2,392.63	-	1,650.00	742.63	221.84	-	0.00	520.79
Crest Energy	3,231.01	-	1,336.50	1,894.51	910.28	-	0.00	984.23
Yunus Energy	3,348.22	439.95	1,595.00	2,193.17	720.12	35.10	0.00	1,437.95
Metro Power	3,262.99	494.53	1,595.00	2,162.52	1,071.30	8.31	0.00	1,082.91
Tenaga Generasi	2,460.30	668.15	1,180.00	1,948.45	799.59	-	-	1,148.86
Master Energy	1,499.23	465.19	280.00	1,684.42	503.53	96.29	0.00	1,084.60
Act Wind	1,058.76	167.93	865.00	361.69	313.65	-	0.00	48.04
Gul Ahmed	3,765.04	476.89	1,765.00	2,476.93	1,050.55	23.92	-	1,402.46
Hamza Sugar Mills	293.74	-	165.00	128.74	118.77	-	0.00	9.97
Hydro Dawood China	2,478.75	474.25	641.00	2,311.99	1,172.47	69.41	-	1,070.11
Sachal Energy	1,952.09	748.99	272.00	2,429.08	970.44	-	-	1,458.64
Quaid-E-Azam Thermal	57,731.05	29,497.12	31,350.00	55,878.17	22,930.24	17,663.20	-	15,284.73
UEP Power	2,371.39	1,023.29	1,778.00	1,616.68	402.71	-	-	1,213.96
Huaneng Shandong Ruyi	120,073.35	(740.68)	30,587.00	88,745.67	21,111.27	43,738.96	0.00	23,895.43
NPPMCL (HBS)	114,518.05	14,330.18	38,100.00	90,748.23	23,733.34	49,779.08	-	17,235.81
NPPMCL (Balloki)	99,668.01	12,888.10	33,700.00	78,856.11	24,437.11	39,465.18	0.00	14,953.81
Harappa Solar	139.24	111.04	140.00	110.28	110.28	-	0.00	-
Star Hydro Power	8,804.62	508.67	6,775.00	2,538.29	14.66	498.93	0.00	2,024.69
Thal Industries	267.91	212.54	245.00	235.45	235.45	-	0.00	-
AJ Power	30.63	65.42	77.00	19.05	19.05	-	0.00	-
Port Qasim Electric	66,706.64	(141.97)	17,180.50	49,384.18	23,495.33	8,988.42	0.00	16,900.42
Artistic Energy	1,180.90	319.03	740.00	759.94	649.82	-	0.00	110.11
Hawa Energy	1,651.44	412.06	445.00	1,618.50	853.32	-	0.00	765.17
Jhimpir Power	1,551.25	419.87	445.00	1,526.12	756.10	-	-	770.02
Three Gorges Second	1,351.65	345.50	272.00	1,425.16	888.68	-	-	536.48
Three Gorges Third	1,541.55	363.86	318.00	1,587.40	1,021.01	-	-	566.39
Tricon Boston (A)	1,712.06	762.99	735.00	1,740.05	931.49	16.59	0.00	791.97
Tricon Boston (B)	1,473.16	726.24	685.00	1,514.40	793.84	16.97	0.00	703.59
Tricon Boston (C)	1,511.50	735.49	685.00	1,561.99	819.14	16.97	0.00	725.88
Almoiz Industries	47.31	-	47.31	-	-	-	-	-
Chanar Energy	228.05	(61.85)	140.00	26.19	26.19	-	0.00	-
Zephyr Power	1,413.61	460.22	565.00	1,308.83	954.54	-	-	354.29
Engro Powergen Thar	39,563.90	1,401.98	9,198.00	31,767.88	6,544.94	15,301.17	0.00	9,921.78
China Power Hub Generation	72,275.71	2,048.99	18,158.50	56,166.20	9,470.83	34,821.98	-	11,873.39
Jagran AJK	-	26.36	26.36	-	-	-	-	-

Payables to Power Producers/NTDC by DISCOs through CPPA-G Circular Debt (Rs. in Million)					Breakup (EPP, CPP, Others and Interest) (Rs. in Million)			
Type	**Opening Balance on 01-06-2023**	**IPPs & etc.- Billing During 06/2023**	**Payments During 06/2023**	**Balance on 30-06-2023**	**EPP**	**CPP**	**Others**	**Interest**
Neelum Jhelum	63,512.55	11.54	5,400.00	58,124.08	-	48,442.09	0.00	9,681.99
Mira Power	2,374.12	1,480.52	3,700.00	154.63	-	-	0.00	154.63
Master Green Energy	206.64	147.08	353.72	-	-	-	-	-
Lucky Renewables	41.18	87.16	128.34	-	-	-	-	-
Artistic Wind	31.97	653.39	685.36	-	-	-	-	-
Act2 Din	21.33	724.92	746.24	-	-	-	-	-
Lucky Electric Power	21,797.98	4,778.94	15,950.00	10,626.92	3,990.89	5,153.24	0.00	1,482.79
Indus Wind Energy	15.19	725.55	740.75	-	-	-	-	-
Din Energy	17.67	697.95	715.62	-	-	-	-	-
Lakeside Energy	21.94	99.40	121.34	-	-	-	-	-
Gul Ahmed Electric	36.15	661.41	697.56	-	-	-	-	-
Atlas Solar Limited	40.47	107.94	148.41	-	-	-	-	-
Liberty Wind Power-I	9.82	90.00	99.82	-	-	-	-	-
NASDA Green Energy	36.29	101.16	137.45	-	-	-	-	-
Liberty Wind Power-II	7.58	93.02	100.61	-	-	-	-	-
Metro Wind Power	23.80	820.57	844.38	-	-	-	-	-
Karot Power	42.03	2,271.15	1,806.00	507.18	115.03	308.01	0.00	84.15
Thar Energy Limited	3,902.31	1,654.59	5,556.89	-	-	-	-	-
Daral Khwar	423.19	207.80	630.98	-	-	-	-	-
Thar Coal Block-1	5,804.99	7,600.04	10,752.00	2,653.03	2,564.62	25.27	0.00	63.15
Punjab Thermal	1,595.33	1,403.89	2,999.22	-	-	-	-	-
ThalNova Power Thar	1,504.75	2,119.89	3,624.65	-	-	-	-	-
Chashma Nuclear Plant-1	17,366.08	1,837.22	1,304.39	17,898.90	2,970.00	9,580.11	0.00	5,348.79
Chashma Nuclear Plant-2	38,817.46	3,119.32	6,775.00	35,161.78	4,366.18	23,029.50	0.00	7,766.10
Chashma Nuclear Plant-3	64,508.76	3,486.81	10,939.37	57,056.20	5,349.07	44,446.03	0.00	7,261.11
Chashma Nuclear Plant-4	58,838.12	3,851.67	9,511.51	53,178.28	4,952.46	45,672.62	0.00	2,553.21
KANUPP-2	23,984.61	10,516.02	34,500.63	-	-	-	-	-
KANUPP-3	14,284.26	7,634.23	21,918.49	-	-	-	-	-
NTDC [1]	41,232.06	30,911.00	10,000.00	62,143.06	-	-	62,143.06	-
NTDC (PMLTC)	25,676.00	17,703.19	8,793.16	34,586.03	-	-	34,586.03	-
Tavanir Iran/QESCO (GST)/B.R.A	6,936.92	686.26	686.26	6,936.92	6,936.92	-	-	-
WAPDA Hydel	232,950.80	7,327.34	17,028.61	223,249.53	6,417.33	241,832.15	(24,999.95)	-
Allied Office (CPPA-G/PEPCO)	-	241.30	241.30	-	-	-	-	-
Sukuk Escrow Account	-	16,587.31	16,587.31	-	-	-	-	-
Total	**1,770,745.02**	**259,939.28**	**596,467.53**	**1,434,216.77**	**453,524.70**	**693,799.36**	**71,729.92**	**215,162.79**
Payable to Fuel Suppliers by GENCOs	110,268.30	258.83	-	110,527.13	110,527.13	-	-	-
Grand Total	**1,881,013.33**	**260,198.11**	**596,467.53**	**1,544,743.90**	**564,051.83**	**693,799.36**	**71,729.92**	**215,162.79**
PHPL Loan	765,253.45			765,253.45				
Grand Total (Circular Debt)	**2,646,266.78**			**2,309,997.36**				

[1] *Memorandum payment on behalf of DISCOs and K-Electric.*

Source: CPPA-G

PERFORMANCE OF TRANSMISSION SECTOR

04

4.1 GENERAL

The transmission network serves as the crucial link for transferring power from generation plants to various load centers nationwide. A robust and efficient transmission system is not only vital for ensuring a continuous supply of electricity but also for dispatching power from the most efficient plants situated in different regions, aligning with the EMO. The transmission of electric power is a licensed activity under the following Sections of NEPRA Act, 1997:

(a) Section 16 of the Act provides for granting the Transmission Licence.
(b) Section 17 of the Act stipulates grant of Transmission Licence for NGC.
(c) Section 18(A) of the Act authorizing a company owned by a Provincial Government to engage in the transmission of electric power within the territorial limits of such Province.
(d) Section 19 of the Act stipulates grant of Special Purpose Transmission Licence.

4.2 NATIONAL GRID COMPANY

Under Section 17 of the NEPRA Act, the NTDC has been granted a transmission licence. NTDC is primarily responsible for the efficient transmission of electric power, operating at voltage levels of 220 kV and above. According to the provisions of the NEPRA Act, a single entity, known as the NGC, is permitted to operate at the national level at any given point in time. Presently, NTDC holds the status of NGC under NEPRA's licence. Being NGC, the NTDC has a pivotal role to ensure the smooth flow of electricity across the National Grid.

The NGC is responsible to operate and provide safe, reliable transmission and inter-connection services on a non-discriminatory basis, including a BPC who desires to directly connect to its facilities. NGC is, inter alia, responsible for:

(a) to make available to the general public the tariff specifying the Authority's approved rates, charges and other terms and conditions for transmission and inter-connection services, and
(b) it shall not levy any rate or charge or impose any condition for the transmission of electric power which has not been approved by the Authority as a tariff.

The responsibilities of NTDC as NGC are stipulated in detail under Section 18 of the NEPRA Act, 1997. As of June 30, 2023, NTDC is maintaining the following transmission facilities:

(a) Nineteen (19) 500 kV grid stations with transformation capacity of 25,950 MVA.
(b) Forty-Seven (47) 500/220 kV auto/power transformers installed at 500 kV grid stations.
(c) Seventy-One (71) 500 kV circuits having length of 8,825 km.
(d) Fifty (50) 220 kV grid stations with transformation capacity of 37,190 MVA.
(e) Thirty-Eight (38) 220/132 kV transformers installed at 500/220 kV grid stations.
(f) One Hundred & Forty-One (141) 220/132 kV transformers installed at 220 kV grid stations.
(g) One Hundred & Sixty-Six (166) 220 kV circuits having length of 11,633 km.

Section 18 (A) of the NEPRA (Amendment) Act of 2018 empowers Provincial Governments to undertake the construction of powerhouses, grid stations, and transmission lines for intra-provincial use, allowing them to determine tariffs for electricity distribution within the respective provinces. Additionally, the NEPRA Act enables Provincial Governments to establish Provincial Grid Companies (PGCs), which are authorized to engage in power transmission within the provincial boundaries. As stipulated under the NEPRA Act, 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 and Khyber Pakhtunkhwa. Additionally, the application from the province of Punjab for a PGC licence is in advanced stage of processing and is anticipated to be concluded very soon.

Under the provisions of Section 19 of the NEPRA Act, Special Purpose Transmission Licenses were granted to three entities: Fatima Transmission Company Limited, Sindh Transmission and Dispatch Company (Pvt.) Limited, and Pak Matiari-Lahore Transmission Company (Pvt.) Limited.

Furthermore, under Section 23(G) of NEPRA Act, 2018, no person shall, unless licensed by the Authority under this Act, undertake functions as a System Operator. Accordingly, NTDC submitted an application for grant of licence for System Operator and the Authority after due diligence granted the same to NTDC on March 21, 2023 for a term of twenty (20) years.

The System Operator, under its licence, shall be performing functions as stipulated under Section 23G of the Act, including but not limited to generation scheduling, commitment and dispatch, transmission scheduling and generation outage coordination, transmission congestion management, cross-border transmission coordination, procurement and scheduling of ancillary services, integrated power system planning with regard to availability of adequate transmission and generation capacity to meet the electric power demand of the country and such other activities as may be required for safe, secure, stable, reliable, and efficient system operations.

4.3 POWER BALANCES IN NTDC SYSTEM

A: Actual Figures				
FY ending 30th June	Generation Capability (MW)	Demand During NTDC's System Peak Hours (MW) (including KE Supply)		Surplus/ (Deficit) (MW)
2022	27,748	24,564		3,184
2023	30,574	23,679		6,895
B: Projected Figures (as per IGCEP 2022-31)				
FY ending 30th June	Planned Generation Capability as per NTDC (MW)	NTDC Projected Demand Growth Rate (%)	NTDC's Projected Demand during Peak Hours (MW)	Surplus/ (Deficit) (MW)
2024	33,953	15.3	27,302	6,651
2025	38,854	8.7	29,675	9,179
2026	40,595	5.2	31,227	9,368
2027	41,865	4.9	32,753	9,112
2028	43,180	5.1	34,438	8,742

Source: NTDC

From the above projection it is evident that for the period up till 2028, the generation capability is expected to exceed NTDC's projected demand. Although the surplus capacity on one hand is a positive signal reflecting on the strides made during previous years to overcome the capacity shortfall; however, it is imperative to acknowledge that having surplus capacity on a 'Take or Pay' basis, especially amidst a negative growth in electricity consumption, during the FY 2022-23, poses a considerable financial strain on both electricity consumers and the national exchequer. Therefore, it necessitates a thorough and comprehensive analysis for the future development of the electricity sector in the country. This analysis should encompass an in-depth evaluation of demand trends, capacity requirements, and financial implications to formulate effective strategies that balance supply, demand, and fiscal sustainability in the energy sector. Such measures will be important in ensuring an economically viable and sustainable electricity sector in the long run.

4.4 UNDER-UTILIZATION OF TRANSMISSION SYSTEM OF NTDC

Under-utilization of resources within a company hints at grave inefficiency, where valuable assets remain idle. This idle capacity represents a missed opportunity for productive use, hindering the company's capacity to allocate resources optimally. This, in turn, can impede crucial investments in essential upgrades and expansions, potentially stalling progress and modernization efforts.

Furthermore, under-utilization has direct repercussions for consumers. When transmission infrastructure is not fully utilized, the fixed costs associated with its maintenance and operations are spread across a reduced volume of transmitted electricity. Consequently, this will result in an increase in per-unit transmission costs. These elevated costs have a tangible impact on consumers, influencing their overall expenditure on electricity. Thus, it becomes imperative to address under-utilization not only for the benefit of the company but also to ensure that consumers are not unduly burdened. NTDC has provided the following statistics of under-utilization of transmission system:

Financial Year	No. of Under-utilized Power Transformers		No. of Under-utilized Transmission Lines	
	500 kV	220 kV	500 kV	220 kV
2021-22	7	24	43	71
2022-23	9	48	53	65

Source: NTDC

4.5 OVER-LOADING OF NTDC'S 500 KV AND 220 KV NETWORK

The over-loading of grid stations occurs when the electrical load on a specific part of the power grid exceeds from its designed capacity. One of the critical consequences of this over-loading is the increased likelihood of system failures and blackouts. The transmission lines, substations, and associated equipment are designed to operate within specified load limits. When these limits are exceeded, it can lead to overheating, voltage instability, and even equipment failure. This not only disrupts the flow of electricity but can also have cascading effects on downstream components of the grid. Moreover, over-loading poses a heightened risk during peak demand periods, such as during hot summer months or in industrial hubs, where demand spikes are common. Such instances can strain the network to its limits, potentially leading to widespread outages.

Addressing the issue of over-loading necessitates a multi-faceted approach. Up-gradation and expansion of the existing infrastructure is paramount. This involves the construction of additional transmission lines and substations, as well as the installation of advanced technologies for load management and real-time monitoring. The following table shows number of power transformers installed at 500 kV and 220 kV grid stations of NTDC over-loaded (80% and above) during the FY 2022-23:

Month (FY 2022-23)	500/220 kV Power Transformers	220/132 kV Power Transformers	Grand Total
July	14	73	87
August	-	-	-
September	14	9	23
October	2	4	6
November	2	4	6
December	0	20	20
January	0	11	11
February	0	8	8
March	0	25	25
April	3	18	21
May	4	15	19
June	19	69	88

Source: NTDC

Despite substantial investments, NTDC could not address the critical system constraints, notably the persistent over-loading of important grids like Gatti, New Multan, Sarfaraz Nagar, Muzaffargarh, and

Lahore (Sheikhupura). This situation has led to the operation of higher-cost power plants, bypassing the EMO in contravention of grid protocols. Additionally, NTDC's delayed project completions have resulted in significant cost escalations, indicative of cost overruns.

The over-loading of these important grids not only strains the existing infrastructure but also undermines the efficiency and economic viability of the power transmission network. It is imperative to swiftly rectify these issues to ensure that the grid operates optimally, meeting the demands of a growing population and industrial sector. This calls for targeted investments in grid augmentation and the timely execution of projects.

Moreover, a rigorous review of NTDC's project management practices is essential to identify and rectify the underlying causes of delays and cost overruns. This may involve streamlining procurement processes, bolstering project monitoring mechanisms, and enhancing coordination with relevant stakeholders. By addressing these challenges head-on, Pakistan's power transmission sector can move towards a more robust, cost-effective, and reliable energy infrastructure that aligns with the country's growing energy needs.

4.6 TRANSMISSION AND TRANSFORMATION (T&T) LOSSES OF NTDC

T&T losses are energy losses that occur in electrical power systems during transmission of electricity from power plants to end-users. These losses occur primarily in two stages, during transmission and during transformation.

During the transmission phase, electric power travels over long distances through transmission lines. This movement of electricity encounters resistance in the form of heat, leading to what is known as transmission losses. These losses are proportional to the square of the current passing through the lines and inversely proportional to the voltage. Hence, higher voltage transmission lines are used for long-distance transmission to minimize these losses.

During the transformation phase, the voltage of the electricity is either stepped up or stepped down using transformers to align with the requirements of end-users. This process also involves energy losses, referred to as transformation losses. These losses are associated with the conversion of electrical energy and are influenced by factors like the type and condition of transformers, as well as the load being served. Though transformation losses are generally lower than transmission losses, they are nonetheless important in overall grid efficiency.

Reducing transmission and transformation losses is a priority in the electric power sector, as it enhances the overall efficiency and sustainability of the grid. The following table presents the month-wise T&T losses for the FY 2022-23, as reported by NTDC. Additionally, the corresponding financial impact of these losses has been calculated and included for reference:

Month (FY 2022-23)	Energy Rec. by NTDC at CDPs (kWh)	Energy Del. by NTDC at CDPs (kWh)	Units Lost (kWh)	T&T Losses (%)	Financial Impact of Lost Units (Rs. Million)
July	14,296,513,129	13,967,316,159	329,196,970	2.303	3,605.89
August	14,686,947,883	14,341,110,491	345,837,392	2.355	3,602.66
September	13,048,060,335	12,746,618,308	301,442,027	2.310	3,094.72
October	11,174,674,297	10,910,578,252	264,096,045	2.363	2,402.51
November	8,665,661,470	8,432,478,552	233,182,918	2.691	1,506.62
December	8,983,552,157	8,737,745,871	245,806,286	2.736	1,813.66
January	9,172,231,493	8,913,208,226	259,023,267	2.824	2,990.76
February	8,038,422,442	7,843,891,109	194,531,333	2.420	1,480.68
March	9,039,619,986	8,807,494,919	232,125,067	2.568	2,292.54
April	9,908,191,213	9,683,695,716	224,495,497	2.266	2,332.06
May	11,612,467,181	11,349,984,820	262,482,361	2.260	2,679.37
June	13,382,205,433	13,076,892,057	305,313,376	2.281	2,993.29
Total	**132,008,547,019**	**128,811,014,480**	**3,197,532,539**	**2.422**	**30,794.75**

Source: NTDC

4.7 INVESTMENT DETAILS OF NTDC

A robust investment plan is paramount for an electric power transmission company to meet the evolving demands of a growing electric power system. This involves the construction of new transmission lines, substations, and associated infrastructure. These additions not only cater to the increased demand for electricity but also enhance the resilience of the grid against unforeseen contingencies.

With the global shift towards sustainable energy, transmission companies are directing substantial resources towards upgrading the grid to accommodate the fluctuating and distributed nature of renewable generation. This entails investments in smart grid technologies, energy storage solutions, and grid-interactive systems that enable smooth integration of solar, wind, and other renewable sources into the existing transmission infrastructure.

Being the NGC operating in the whole of Pakistan except Karachi, NTDC has significant and specific investment requirements. A summary of investment requested by NTDC in September, 2022 for next three (03) years is as follows:

Description	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Requested by NTDC (Million Rs.)	71,782	114,303	145,355	109,563
Allowed by the Authority (Million Rs.)	50,560	Approval under process		

Source: NTDC

Subsequently, keeping in view the inflation, escalation factors and devaluation of US$/PKR, NTDC has re-submitted its investment plan in August 2023 which is under process with the Authority.

4.8 NEPRA PERFORMANCE STANDARDS (TRANSMISSION) RULES, 2005

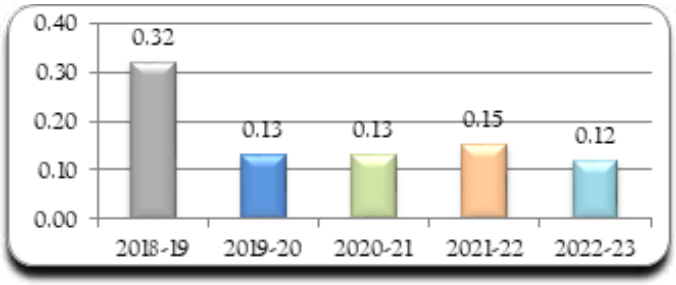
The Authority has established the Performance Standards (Transmission) Rules, 2005 (PSTR 2005). These rules mandate that every transmission licensee must annually furnish an Annual Performance Report (APR) in the manner specified by the Authority. In compliance, NTDC has submitted its report for the FY 2022-23. This report was subjected to a comprehensive analysis, scrutinizing key performance parameters. These parameters encompassed System Duration of Interruption, System Frequency of Interruption, Energy Not Served, Loss of Supply Incidents, as well as instances of Voltage and Frequency Variations that contravened the limits specified in the PSTR 2005. A concise summary of the analysis and the findings is given in the following paragraphs:

(i) System Reliability

The System Reliability Indicators as reported by NTDC are as follows:

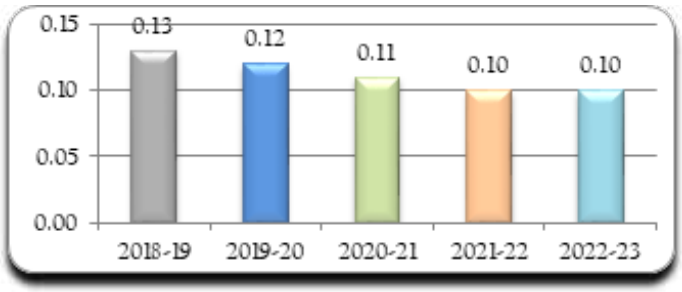
(a) System Duration of Interruption (Hrs./Point)

This indicator reflects the average duration of outages observed at an interconnection point throughout a year. In the FY 2022-23, this duration remained at 0.12 hours, signifying a notable 20% reduction compared to the preceding year, as illustrated in the graph.



(b) System Frequency of Interruption (Nos./Circuit)

This metric signifies the average number of outages experienced on a circuit over the course of a year. In the FY 2022-23, this figure stood at 0.10, as illustrated in the graph.

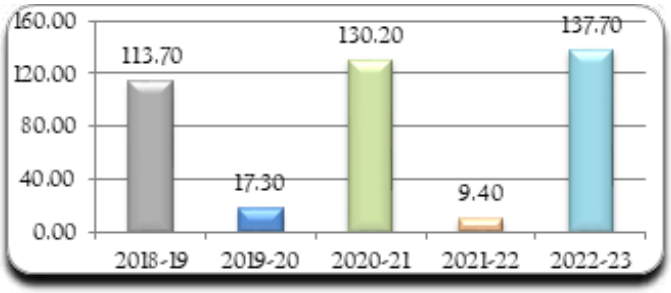


(ii) System Security

NTDC's reported System Security Indicators are as follows:

(a) Energy Not Served (ENS) (MkWh)

This indicator provides an estimate of the Total Energy Not Served (ENS) resulting from loss of supply incidents in the FY 2022-23. Following are the specific details:



(b) Loss of Supply Incidents, Average ENS per Incident and Average Duration per Incident

Year	Loss of Supply Incidents (Nos.)	Average ENS per Incident (MkWh)	Average Duration per Incident (Hrs)
2018-19	66	1.72	2:40
2019-20	62	0.30	1:10
2020-21	57	2.28	1:20
2021-22	51	0.20	1.60
2022-23	55	2.50	1.14

Source: NTDC

(iii) Major Breakdown

The category of "Loss of Supply Incidents" reflects major disturbances. Below are the details for the past two years:

S. No.	Date	Remarks
FY 2021-22		
1	09-09-2021	All 500 kV & 220 kV transmission lines emanating from 500 kV Jamshoro grid station along with 500/220 kV and 220/132 kV Auto T/F's tripped at Jamshoro, grid station. The event resulted in power supply failure to KE and HESCO, K2 (1,030 MW), Hub Power (0 MW), China Hub Power (600 MW) and all Wind Power Plants (310 MW).
2	23-03-2022	500 kV Jamshoro grid station, K2, KE isolated from NTDC network; Circuits affected include: 500 kV Jamshoro - Matiari Circuit 1 & 2, 500 kV Jamshoro - Dadu Circuit, 500 kV Jamshoro - China Hub Circuit, 500 kV Jamshoro - K2 Circuit and 220 kV Jamshoro - T.M. Khan Circuit 1 & 2.
FY 2022-23		
1	13-10-2022	**Partial System Blackout:** 500 NKI-K2/K3 and 500 kV K2/K3 - Jamshoro T/L tripped due to conductor break down on red phase (both circuits are on the same tower) at loc # 26 A to 27 & 26 to 26 A respectively.

S. No.	Date	Remarks
2	23-01-2023	**Full System Blackout:** All system from Sheikh Muhammadi to KE went under dark from 07:34:15 hrs, System frequency gone up to 50.75 Hz and severe hunting was observed on 500 kV transmission lines. As a result, following 500 kV Transmission lines tripped which resulted in isolation of North and South system followed by blocking of HVDC system. (i) 500 kV Muzaffargarh - DG Khan Circuit (ii) 500 kV Guddu - Muzaffargarh Circuit (iii) 500 kV Guddu - DG Khan Circuit (iv) 500 kV Rahim Yar Khan - Guddu 747 Circuit (v) 500 kV Guddu Old - Guddu 747 Circuit

Source: NTDC

(iv) Frequency

Rule 8 of the PSTR sets forth frequency limits. According to NTDC's reported frequency data, there were instances of frequency exceeding the upper permissible limit of 50.50 Hz. The highest recorded frequency was 50.66 Hz, representing a deviation of 1.32% from the nominal frequency of 50 Hz in the FY 2022-23. Following is the detailed comparison with the preceding years:

(a) NTDC System Frequency

Year	Number of times Frequency remained outside the Limits			Time duration the Frequency remained outside the Limits		
	In a year	Average/month	Average/day	hours	Min.	% of year
2018-19	25	2.10	0.07	2.98	179	0.34
2019-20	9	0.80	0.02	0.80	48	0.009
2020-21	4	0.30	0.01	0.60	36	0.007
2021-22	1	0.11	0.003	0.12	7	0.001
2022-23	15	1.25	0.041	1.70	102	0.013

Source: NTDC

(b) NTDC Monthly Frequency Violating Limit (Hz)

Month	Highest System					Lowest System				
	2018-19	2019-20	2020-21	2021-22	2022-23	2018-19	2019-20	2020-21	2021-22	2022-23
July	50.66	50.62	50.72	50.59	50.66	50.51	NIL	NIL	NIL	NIL
August	50.54	50.55	NIL	NIL	50.61	50.51	NIL	NIL	NIL	NIL
September	50.6	NIL	50.54	50.54	50.65	50.51	NIL	NIL	NIL	NIL
October	50.58	50.59	NIL	NIL	NIL	50.51	NIL	NIL	NIL	NIL
November	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
December	50.64	NIL	NIL	NIL	50.53	50.51	NIL	NIL	NIL	NIL
January	50.67	50.58	NIL	NIL	50.57	49.44	NIL	NIL	NIL	NIL
February	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
March	50.59	NIL	NIL	NIL	NIL	50.51	NIL	NIL	NIL	NIL
April	50.68	NIL	NIL	NIL	50.57	50.52	NIL	NIL	NIL	NIL
May	NIL	50.60	NIL	50.61	50.55	NIL	NIL	NIL	NIL	NIL
June	50.79	50.54	NIL	50.66	50.56	50.51	NIL	NIL	NIL	NIL

Source: NTDC

4.9 TRANSMISSION NETWORK OF KE

KE holds a Transmission Licence granted pursuant to Section 16 of the NEPRA Act, 1997, enabling it to manage the transmission of electric power within its designated territory. KE is responsible for the ownership, operation, and maintenance of a transmission network spanning both 220 kV and 132 kV levels. Following are the specifics of KE's current transmission network (both KE's and consumer owned):

(a) 364 km of 220 kV Transmission Lines (321 km overhead and 43 km underground)
(b) 11 Nos. of 220 kV Grid Stations with transformation capacity of 4,580 MVA
(c) 838 km of 132 kV Transmission Lines 652 km overhead and 186 km underground)
(d) 69 Nos. of 132 kV Grid Stations having transformation capacity of 7,707 MVA

4.10 POWER BALANCES IN KE SYSTEM

Following table illustrates the power supply and demand status within the KE system. The data indicates that up till the year 2024, even with the procurement of power from external sources, KE falls short of meeting the demand during peak periods.

A: Actual Figures				
Financial Year ending 30th June	**Generation Capability (MW) [1]**	**Demand During KE's System Peak Hours (MW)**		**Surplus/(Deficit) (MW) [2]**
2022	3,383	3,670		(287)
2023	3,409	3,654		(245)
B: Projected Figures				
Financial Year ending 30th June	**Planned Generation Capability as per KE (MW)**	**KE's Projected Demand Growth Rate (%)**	**KE's Projected Demand during Peak hours (MW)**	**Surplus/ (Deficit) (MW)**
2024	3,678	4.10	3,879	(201)
2025	4,377	4.10	4,070	307
2026	4,426	4.10	4,252	174
2027	4,857	4.10	4,367	490
2028	4,957	4.10	4,474	483

[1] Based on maximum supply achieved in KE's System.

[2] Deficit based on peak demand and maximum supply achieved during the year.

Source: NTDC

4.11 LOADING POSITION OF POWER TRANSFORMERS IN KE SYSTEM

KE maintains a network comprising 11 grid stations operating at the 220/132 kV level, equipped with 13 auto transformers boasting a total transformation capacity of 4,580 MVA. Additionally, there are 69 grid stations functioning at the 132/11 kV level, with a fleet of 177 power transformers collectively providing a transformation capacity of 7707 MVA. Moreover, KE also maintains 3 grid stations operating at the 66/11 kV level, housing 4 power transformers, the aggregate transformation capacity of which is 79 MVA.

The operational data for the 220/132 kV grid stations, as reported by KE, indicates that there were no instances of over-loading during the reported period of FY 2022-23. However, in the case of the 132/11 kV level, out of the 177 power transformers, 36 were reported to be over-loaded during the same period. Additionally, one power transformer at the 66/11 kV level was operated beyond 80% of its rated capacity. This information required KE to closely monitoring and managing transformer loads by taking prudent action to ensure optimal performance and prevent potential issues.

4.12 TRANSMISSION LOSSES OF 660 kV HVDC LINE

NEPRA has granted a permissible margin of 4.30% for annual transmission losses on the 660 kV HVDC transmission line. This includes allowances for 2.7% losses attributed to the two converter stations located at Matiari and Lahore, as well as an additional 1.6% allowance for losses along the 876 km Bi-pole transmission line.

The following table provides a breakdown of the monthly transmission losses for the 660 kV HVDC transmission line operated by PMLTC during the FY 2022-23:

Month (FY 2022-23)	Energy Rec. by HVDC at CDPs (kWh)	Energy Del. by HVDC at CDPs (kWh)	Utilization of HVDC Line (%)	Units Lost (kWh)	Losses (%)
July	1,270,094	1,236,600	42.6779	33,494	2.637
August	1,298,135	1,263,908	43.6201	34,227	2.637
September	1,160,764	1,130,479	40.3043	30,285	2.609
October	1,064,326	1,037,016	35.7636	27,310	2.566
November	919,651	895,949	31.9323	23,702	2.577
December	1,310,817	1,276,776	44.0463	34,041	2.597
January	1,446,223	1,409,182	48.5962	37,041	2.561
February	683,434	663,259	25.4254	20,175	2.952
March	892,844	867,280	30.0015	25,564	2.863
April	1,052,650	1,024,788	36.5503	27,862	2.647
May	1,212,412	1,176,921	40.7397	35,491	2.927
June	1,564,878	1,520,805	54.3360	44,074	2.816
Total	**13,876,228**	**13,502,963**	**39.6011**	**373,266**	**2.690**

Source: CDP Metering Data of NTDC

4.13 TRANSMISSION INVOICE RAISED BY PMLTC

The following table provides the details of monthly energy received by HVDC at CDPs as well as the invoices raised by PMLTC against Transmission Service Charges for the respective months:

Month (FY 2022-23)	Energy Received by HVDC at CDPs (kWh)	Transmission Service Charges (Rs.)			Pass through Item Invoice (Rs.)	Delayed Payment Interest Invoice (Rs.)	Total Invoices of PMLTC (Rs.)
		Invoice	Differential Rate Invoice	Total Invoices			
July	1,270,094	4,646,726,400	-	4,646,726,400	-	121,239,706	4,767,966,106
August	1,298,135	4,646,726,400	-	4,646,726,400	-	259,088,037	4,905,814,437
September	1,160,764	5,001,984,000	1,043,980,800	6,045,964,800	-	455,515,597	6,501,480,397
October	1,064,326	5,168,716,800	-	5,168,716,800	-	-	5,168,716,800
November	919,651	5,001,984,000	-	5,001,984,000	-	89,376,020	5,091,360,020
December	1,310,817	5,168,716,800	-	5,168,716,800	-	-	5,168,716,800
January	1,446,223	5,659,161,600	1,379,376,000	7,038,537,600	39,948,000	168,661,097	7,247,146,697
February	683,434	5,111,500,800	-	5,111,500,800	-	-	5,111,500,800
March	892,844	6,468,038,400	1,539,475,200	8,007,513,600	-	312,804,166	8,320,317,766
April	1,052,650	6,259,392,000	-	6,259,392,000	-	-	6,259,392,000
May	1,212,412	6,468,038,400	-	6,468,038,400	-	206,184,126	6,674,222,526
June	1,564,878	6,675,840,000	846,777,600	7,522,617,600	-	561,565,559	8,084,183,159
Total	**13,876,228**	**66,276,825,600**	**4,809,609,600**	**71,086,435,200**	**39,948,000**	**2,174,434,308**	**73,300,817,508**

Source: PMLTC

4.14 TRANSMISSION LOSSES OF STDC

NEPRA has stipulated a maximum annual margin of 2.0% for transmission losses permitted to STDC for its 132 kV transmission line, which connects SNPC-I and SNPC-II power plants to the KDA-33 grid station of KE. For the FY 2022-23, STDC has reported the following transmission losses:

Month (FY 2022-23)	Gross Energy Rec. by STDC from SNPC-I & II (GWh)	Gross Energy Del. by STDC to KE KDA (GWh)	Net STDC T&T Loss (MWh)	T&T Loss (%)
July	63.72	62.61	1.11	1.735
August	54.05	53.19	0.86	1.599
September	55.58	54.57	1.01	1.818
October	56.01	55.02	0.99	1.768
November	42.22	41.68	0.54	1.275
December	41.87	41.41	0.46	1.104
January	35.54	35.20	0.34	0.956
February	44.69	43.98	0.71	1.597
March	49.76	49.10	0.66	1.328

Month (FY 2022-23)	Gross Energy Rec. by STDC from SNPC-I & II (GWh)	Gross Energy Del. by STDC to KE KDA (GWh)	Net STDC T&T Loss (MWh)	T&T Loss (%)
April	45.42	44.79	0.63	1.380
May	49.16	48.40	0.76	1.549
June	41.19	40.50	0.69	1.679
Total	**579.20**	**570.44**	**8.77**	**1.513**

Source: STDC

4.15 DURATION OF TRANSMISSION LINE OUTAGES OF STDC

Following table provides a monthly breakdown of the number of transmission line outages, including their respective durations and reasons, for the FY 2022-23:

Month (FY 2022-23)	No. of Outages	Duration of Outages	Reason(s) of Outages
July	1	8 hrs 2 mins	Fault
August	1	6 hrs 11 mins	Fault
September	Nil	Nil	-
October	2	10 hrs 33 mins	Fault
November	Nil	Nil	-
December	Nil	Nil	-
January	1	5 hrs 34 mins	Fault
February	1	4 hrs 46 mins	Fault
March	Nil	Nil	-
April	Nil	Nil	-
May	Nil	Nil	-
June	Nil	Nil	-
Total	**6**	**35 Hrs 06 Mins**	**Fault**

Source: STDC

PERFORMANCE OF DISTRIBUTION/SUPPLY SECTOR 05

5.1 GENERAL

The distribution of electric power in Pakistan is a regulated activity governed by Section 20 of the NEPRA Act of 1997. Currently, there are ten DISCOs that are fully owned by the Federal Government, and KE, which operates as a private vertically integrated utility. These entities are authorized to perform the function of distributing electric power within their designated territories under the licenses granted by the NEPRA. Additionally, some private entities have also been issued distribution licenses to serve consumers within their specific geographic areas.

Before the NEPRA Act was amended in April 2018, the scope of electricity distribution encompassed both the physical infrastructure (wire business) and the sale of electricity to end-consumers. However, with the introduction of the NEPRA (Amendment) Act, 2018, the sale of electricity was separated from the distribution function. Under the amended Act, a distinct 'Electric Power Supply Licence' is now required for the sale of electricity, as stipulated in Section 23E of the Act. This amendment effectively decouples the distribution of electricity from its sale, providing a clear regulatory framework for these two essential aspects of the power sector.

Furthermore, according to Section 23E(1) of the NEPRA (Amendment) Act, 2018, the existing distribution licensees automatically held a licence for the supply of electric power for a period of five years from the effective date of the NEPRA (Amendment) Act, 2018. Upon expiry of 05 years period, the DISCOs have approached NEPRA for Supply Licence. The applications of DISCOs are under NEPRA's consideration.

5.2 CONSUMER BASE OF DISCO'S AND KE

In the FY 2022-23, both the public sector DISCOs and KE experienced an expansion of their consumer base. As of June 2023, the total number of electricity consumers nationwide surged to approximately 38,249,950 with 1,654,824 new consumers integrated into the network during the FY 2022-23. Out of this, around 1,494,355 consumers were added to the DISCOs network while 160,469 were connected to the KE system. Following the new electricity connection energized during FY 2022-23, the total number of electricity consumers, as on June 30, 2023, stands 34,684,149 for ten (10) DISCOs and 3,565,801 for KE.

However, despite this noteworthy growth in terms of the number of electricity consumers, an unexpected dip in sales figures has been observed for both the DISCOs and the KE system. A decline in electricity sales growth means a further under-utilization of the existing 'Take or Pay' generation capacity. This trend warrants a thorough analysis to pinpoint the underlying factors for this abnormal pattern. This analysis will be instrumental in formulating strategies to address and rectify the discrepancies and ensuring the sustainability and efficiency of the electric power sector in Pakistan.

5.3 SALES OF DISCOS AND KE

In the FY 2022-23, the sale of electricity to the National Grid, which includes the energy supplied to KE, saw a decrease to 129,574 GWh from the 143,031 GWh recorded in the previous FY 2021-22. These figures do not include KE's own generation and purchases from IPPs. Within KE itself, the sale of electricity also saw a reduction to 15,553.81 GWh in FY 2022-23, as against 16,763.23 GWh sales registered in the preceding FY.

The category-wise trend of annual sales growth percentage (%) across the country for the FY 2021-22 and FY 2022-23 is as follows:

Category	FY 2020-21	FY 2021-22		FY 2022-23	
	Units Sold (GWh)	Units Sold (GWh)	Growth (%)	Units Sold (GWh)	Growth (%)
Domestic	57,855.86	60,408.89	4.23	53,522.91	-12.87
Commercial	8,396.55	9,233.35	9.06	8,891.62	-3.84
Industrial	29,885.94	33,957.77	11.99	31,088.00	-9.23
Agricultural	10,237.02	11,032.61	7.21	9,639.68	-14.45
Public Lighting	589.89	408.59	-44.37	459.59	11.10
Bulk Supply	3,613.08	4,078.89	11.42	4,454.68	8.44
Others	4,863.06	5,508.80	11.72	4,834.72	-13.94
Total	**115,441.40**	**124,628.90**	7.37	**112,891.20**	**-10.40**
Supplied to KE	6,118.04	9,036.54	32.30	8,960.81	-0.85

Source: KE

The pattern of change in electricity consumption given above provides insights into the factors that drive demand and consumption within the grid. A thorough analysis of the reasons for this trend is necessary to make informed, strategic decisions for optimization of both generation and distribution operations, tackling potential challenges, and ultimately elevating the efficiency of the entire power supply system. Such proactive approach will ensure a more reliable and responsive energy provision for consumers.

5.4 TRANSMISSION AND DISTRIBUTION LOSSES OF DISCOS

In the process of tariff determination for electric power DISCOs, 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, such as the consumer mix, feeder lengths, geographical coverage area, HT to LT ratio and many more. The T&D losses incurred by a DISCO beyond the target set by NEPRA cannot be passed on to 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 allowed T&D loss levels, along with their financial impact, is presented in the following table:

DISCO	Description	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
PESCO	Actual (%)	37.10	38.87	38.20	37.47	37.40
	Allowed (%)	22.43	21.33	21.33	20.73	20.16
	Financial impact of units lost beyond target (Rs. Million)	11,994	22,521	32,385	63,939	77,352
TESCO	Actual (%)	12.00	9.92	9.64	9.32	9.02
	Allowed (%)	11.96	11.96	9.60	9.31	9.21
	Financial impact of units lost beyond target (Rs. Million)					(164)
IESCO	Actual (%)	8.90	8.69	8.54	8.17	8.06
	Allowed (%)	8.65	8.60	8.50	8.15	7.80
	Financial impact of units lost beyond target (Rs. Million)	256	158	88	217	277
GEPCO	Actual (%)	9.90	9.51	9.23	9.07	8.61
	Allowed (%)	9.76	9.51	9.23	9.20	9.10
	Financial impact of units lost beyond target (Rs. Million)	(265)	(880)	(1,127)	(1,116)	(1,856)
LESCO	Actual (%)	13.20	12.40	11.96	11.52	11.29
	Allowed (%)	11.76	10.88	10.03	9.08	8.00
	Financial impact of units lost beyond target (Rs. Million)	4,553	5,859	7,693	9,279	21,785

DISCO	Description	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
FESCO	Actual (%)	9.80	9.56	9.28	9.09	8.59
	Allowed (%)	10.24	10.10	9.76	9.34	8.84
	Financial impact of units lost beyond target (Rs. Million)	(1,032)	(1,252)	(1,206)	(636)	(1,449)
MEPCO	Actual (%)	15.80	15.23	14.97	14.70	14.22
	Allowed (%)	15.79	14.90	13.12	12.79	12.34
	Financial impact of units lost beyond target (Rs. Million)	2,174	682	34	(902)	7,945
HESCO	Actual (%)	29.50	28.89	28.15	28.09	27.49
	Allowed (%)	20.74	19.47	19.43	19.07	18.57
	Financial impact of units lost beyond target (Rs. Million)	7,673	7,915	8,666	14,000	15,002
SEPCO	Actual (%)	37.00	36.27	35.31	35.63	34.39
	Allowed (%)	19.41	18.11	17.89	17.41	17.05
	Financial impact of units lost beyond target (Rs. Million)	5,951	5,955	9,174	21,370	20,380
QESCO	Actual (%)	23.60	26.68	27.97	28.06	26.72
	Allowed (%)	18.58	17.15	14.70	14.49	14.27
	Financial impact of units lost beyond target (Rs. Million)	5,378	10,933	13,421	18,588	21,214
Total	**Actual (%)**	**17.70**	**17.82**	**17.32**	**16.85**	**16.45**
	Allowed (%)	**15.72**	**15.63**	**14.43**	**13.46**	**11.70**
	Financial impact of units lost beyond target (Rs. Million)	**36,700**	**51,891**	**69,128**	**124,739**	**160,486**

Source: DISCOs

This comprehensive analysis not only provides a snapshot of the performance of each DISCO in managing losses but also given a clear picture of the financial ramifications for both the DISCO as well as the power sector as a whole. It serves as a critical reference point for policy-makers and stakeholders to formulate targeted strategies aimed at reducing T&D losses to fortify the financial stability of the distribution sector.

5.5 RECOVERY RATIOS IN DISCOS SYSTEM

NEPRA establishes tariffs with the expectation of 100% recovery for the electricity units sold by DISCOs. Any shortfall in the amount billed cannot be shifted onto the consumers; instead, it is reflected on the DISCOs' balance sheets which ultimately contributes to escalation of circular debt. The following table provides the actual recovery ratio (%) of each DISCOs during last five years, along with the corresponding unrecovered amount of units that have been sold:

DISCO		FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
PESCO	Recovery Ratio (%)	88.62	87.65	101.87	91.79	91.65
	Amount could not Recovered (Rs. Million)	15,415.17	19,829.85	-3,300.10	19,171.61	26,180.15
TESCO	Recovery Ratio (%)	65.31	68.16	83.27	66.22	85.15
	Amount could not Recovered (Rs. Million)	8,595.22	8,754.97	5,123.10	14,657.41	7,145.82
IESCO	Recovery Ratio (%)	87.87	90.27	116.87	95.62	104.98
	Amount could not Recovered (Rs. Million)	21,291.00	19,552.52	-37,199.00	12,692.72	-19,181.22
GEPCO	Recovery Ratio (%)	96.37	94.36	105.10	98.19	98.00
	Amount could not Recovered (Rs. Million)	5,227.86	9,481.37	-9,805.75	4,579.66	6,842.49
LESCO	Recovery Ratio (%)	97.65	94.48	98.72	96.69	94.33
	Amount could not Recovered (Rs. Million)	7,669.00	21,384.00	5,529.93	19,419.33	45,183.25

DISCO		FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
FESCO	Recovery Ratio (%)	91.03	94.18	97.20	94.84	100.39
	Amount could not Recovered (Rs. Million)	18,149.48	13,338.64	7,240.96	18,930.01	-1,876.57
MEPCO	Recovery Ratio (%)	99.56	92.94	102.15	92.08	98.27
	Amount could not Recovered (Rs. Million)	14,404.70	17,937.69	-6,033.90	31,739.28	8,853.39
HESCO	Recovery Ratio (%)	72.56	73.19	75.63	73.72	74.42
	Amount could not Recovered (Rs. Million)	16,843.60	17,728.83	17,551.62	23,361.68	29,132.97
SEPCO	Recovery Ratio (%)	63.29	56.54	64.48	63.78	66.50
	Amount could not Recovered (Rs. Million)	15,618.08	20,787.67	17,865.74	22,895.13	27,209.75
QESCO	Recovery Ratio (%)	24.41	49.25	39.80	35.28	36.92
	Amount could not Recovered (Rs. Million)	57,767.19	31,282.73	51,580.21	62,469.78	82,305.02
Total	**Recovery Ratio (%)**	**87.18**	**88.77**	**97.30**	**90.51**	**93.39**
	Amount could not Recovered (Rs. Million)	**180,981.30**	**180,078.27**	**48,552.81**	**229,916.60**	**211,795.04**
KE	Recovery Ratio (%)	92.62	92.14	94.87	96.69	92.76
	Amount could not Recovered (Rs. Million)	16,881.24	20,030.00	16,200.44	12,900.46	38,882.06

Source: DISCOs

One of the persistent challenge in the power sector of Pakistan is the issue of non-recovery of sold electricity units by DISCOs. It has profound implications for the financial health of these companies. The unrecovered amounts directly affect their revenue streams, leading to financial deficits and a reliance on subsidies or loans to cover operational costs. Moreover, this non-recovery contributes significantly to the circular debt issue in Pakistan's power sector. The accumulated debt hampers the ability to invest in infrastructure improvements and can lead to a vicious cycle of financial instability. To tackle this challenge, it is imperative to enhance governance at all levels within DISCOs and instill a robust culture of accountability. Accurate billing to consumers is equally crucial for achieving full recovery. Resorting to fictitious billing as a means to handle T&D losses is a contributing factor to the shortfall. Swift and decisive action is imperative to bolster the financial stability of the power sector.

5.6 RECEIVABLES OF DISCOS

The receivables of electric power DISCOs in Pakistan represent a critical financial aspect of the sector. These receivables refer to the outstanding payments owed by different categories of consumers to the DISCOs for the electricity supplied to them. Unfortunately, the power sector in Pakistan grapples with a substantial amount of receivables, for reason including but not limited to the poor governance at DISCOs, inefficiencies in billing and collection processes, non-payment or delayed payment by consumers etc. This accumulated backlog of receivables has a significant negative impact on the financial health of DISCOs. It hampers their ability to cover operational costs, invest in infrastructure upgrades and debt servicing. Moreover, it exacerbates the circular debt issue within the sector, which has vast ramifications for the entire energy landscape of the country. Effective strategy is required immediately to reducing these receivables for the sustainable operation and growth of the power sector in Pakistan. These strategic measures may include improved governance in DISCOs, improved billing systems, enhanced collection mechanisms, and stricter enforcement of payment policies. Additionally, fostering a culture of accountability and promoting awareness among consumers about the importance of timely payments can also contribute to mitigating the receivables challenge. The detail of receivable (Rs. in Million) of each DISCO as of June 30, 2023 is given in the following table:

Category	PESCO [1]	TESCO [2]	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO [3]	TOTAL
Government Receivables											
Federal Government	819	721	5,941	1,510	3,955	292	1,088	5,075	4,655	1,716	**25,772**
AJ&K Government	7,719	0	48,393	4,898	0	0	0	0	0	0	**61,010**
Provincial Government	25,513	2,485	-233	48	11,087	2,921	5,985	16,884	21,660	32,423	**118,771**
Government Receivables (06/2023)	**34,051**	**3,206**	**54,101**	**6,456**	**15,042**	**3,213**	**7,073**	**21,958**	**26,315**	**34,139**	**205,553**
Government Receivables (06/2022)	**38,180**	**2,523**	**81,377**	**11,985**	**10,689**	**2,793**	**4,130**	**18,188**	**18,779**	**29,437**	**218,082**
Private Receivables (Aging of Running Defaulters)											
1 month	4,452	640	2,855	2,464	10,504	3,304	4,445	1,379	774	527	**31,343**
2 months	1,166	152	308	212	1,795	426	872	312	158	146	**5,548**
3 months	1,385	30	32	68	1,595	26	615	375	170	140	**4,436**
4-6 months	6,345	26	99	11	1,884	11	1,158	1,150	411	330	**11,424**
Over 6 months and up to 01 year	6,338	124	61	0	1,921	2	751	1,295	755	578	**11,827**
1-3 years	12,266	319	31	0	3,725	0	84	13,327	2,705	3,994	**36,451**
Over 3 years	69,891	53,944	1	0	46	0	0	103,992	145,556	426,365	**799,793**
Running Defaulters Receivables (06/2023)	**101,843**	**55,235**	**3,386**	**2,755**	**21,470**	**3,770**	**7,924**	**121,830**	**150,528**	**432,080**	**900,821**
Running Defaulters Receivables (06/2022)	**75,959**	**50,153**	**2,330**	**1,815**	**13,089**	**2,284**	**4,498**	**95,986**	**133,265**	**363,066**	**742,446**
Aging of Disconnected Defaulters											
1 month	364	0	50	58	525	156	201	190	103	1	**1,648**
2 months	11	0	25	42	62	170	95	2	0	1	**408**
3 months	188	98	43	59	73	171	87	51	16	1	**786**
4-6 months	1,607	837	198	618	877	359	345	125	30	4	**4,999**
Over 6 months and up to 01 year	1,359	242	251	430	1,996	507	1,041	163	45	26	**6,059**
1-3 years	2,590	413	199	381	5,820	216	1,743	2,001	108	46	**13,517**
Over 3 years	58,623	7,135	129	670	12,279	540	5,299	15,665	13,337	2,294	**115,971**
Disconnected Defaulters Receivables (06/2023)	**64,743**	**8,724**	**895**	**2,258**	**21,632**	**2,118**	**8,810**	**18,197**	**13,639**	**2,373**	**143,388**
Disconnected Defaulters Receivables (06/2022)	**61,086**	**6,865**	**443**	**1,314**	**18,764**	**1,007**	**7,458**	**17,186**	**14,345**	**2,224**	**130,693**
Spill Over	7,199	1,591	11,226	19,426	59,817	33,862	35,069	4,520	2,964	6,579	**182,253**
Deferred Amount	5,077	15,636	2,519	5,698	31,726	6,144	10,944	308	80	164	**78,297**
Instalments	19	0	502	229	554	441	791	27	4	13	**2,580**
Subsidies (Private)	4,251	3,389	2,413	6,602	65,380	22,135	39,896	6,338	6,063	68,159	**224,628**
Private Receivables	**183,133**	**84,575**	**20,941**	**36,968**	**200,580**	**68,470**	**103,435**	**151,220**	**173,277**	**509,368**	**1,531,967**
Unidentified Cash/Credited Debtors	-2,121	-1,211	-1,084	-393	-2,386	-397	-909	-419	-1,248	-246	**-10,415.10**
Total Private Receivables (06/2023)	**181,012**	**83,364**	**19,857**	**36,575**	**198,193**	**68,073**	**102,526**	**150,801**	**172,029**	**509,122**	**1,521,552**
Total Private Receivables (06/2022)	**156,713**	**76,900**	**19,371**	**33,408**	**152,441**	**70,365**	**96,624**	**121,621**	**153,457**	**431,519**	**1,312,418**
Increase/Decrease of Private Receivables (06/2022)	**24,299**	**6,464**	**485**	**3,167**	**45,753**	**-2,292**	**5,902**	**29,180**	**18,573**	**77,603**	**209,134**
Net Receivables in DISCOs (06/2023)	**215,063**	**86,570**	**73,958**	**43,031**	**213,235**	**71,286**	**109,599**	**172,759**	**198,344**	**543,260**	**1,727,104**
Net Receivables in DISCOs (06/2022)	**194,893**	**79,423**	**100,749**	**45,393**	**163,130**	**73,158**	**100,753**	**139,809**	**172,236**	**460,956**	**1,530,500**
Increase/Decrease of Net Receivables (06/2022)	**20,170**	**7,146**	**-26,791**	**-2,362**	**50,106**	**-1,872**	**8,845**	**32,950**	**26,108**	**82,305**	**196,605**
K-Electric Receivables											**187,046**
IPPs Receivables											**2,440**
Total Receivables											**1,916,590**

[1] Provincial Government of KPK receivables includes Rs. 18.60 billion assessed for KPK consumers for the period 05-09-2008 to 15-09-2010 on account of Tariff Differential after withdrawal of KPK petition from PHC, the said amount has not been passed on to consumers. The payment of said receivables has been linked with the markup on NHP arrears payable to Government of KPK, as proposed by Government of KPK.

[2] Total Private Receivables include FATA domestic consumer's receivables.

[3] Total Private Receivables include Agriculture Tubewell Subsidies in Balochistan.

Source: PEPCO

5.7 OVER-LOADING POSITIONS IN DISCOS SYSTEM

Power delivery through networks of DISCO mainly depends on the adequacy of three major components including power transformers (mostly 132/11 kV transformers), 11 kV feeders and subsequently the distribution transformers.

The issue of power and distribution transformer over-loading in DISCOs of Pakistan is a critical concern within the energy sector. This problem arises when transformers designed for specific capacity thresholds are subjected to loads that exceed their intended limits. Over-loading can result from various factors including increased demand for electricity, faulty equipment, or inadequate planning for capacity expansion. The consequences of over-loading are severe and multifaceted. Firstly, it leads to reduced operational efficiency and compromises the reliability of the distribution network. Over-loaded transformers are prone to overheating, which can lead to equipment failure, service disruptions, and in extreme cases, even fires. Additionally, over-loading accelerates wear and tear, necessitating more frequent maintenance and replacements, in turn incurring higher costs for DISCOs. Moreover, it poses a safety hazard to both personnel and the general public.

Similar is the case with over-loading of 11 kV feeders. This occurs when the demand for electricity surpasses the designed capacity of the 11 kV feeders, leading to an excess load that strains the system. Several factors contribute to this problem, including rapid urbanization, population growth, and increased industrial activity. The consequences of over-loading are far-reaching. It can lead to voltage drops, frequent tripping of circuit breakers, and in severe cases, equipment failures. This not only disrupts power supply to consumers but also places excessive stress on the distribution infrastructure. Furthermore, over-loading poses safety risks to both the public and maintenance personnel.

To address these issues, DISCOs must prioritize transformers and feeders capacity planning, invest in modern monitoring and control systems, and conduct regular maintenance to ensure transformers and feeders operate within their designated limits. By proactively addressing over-loading concerns, DISCOs can enhance the reliability and resilience of the power supply network, ultimately benefiting consumers and the overall energy sector.

Loading position of 132/11 kV power transformers, 11 kV feeders and distribution transformers on over all basis in all DISCOs is given in the following paragraphs.

(i) Loading Position of Power Transformers

During the FY 2022-23 the over-loading position of all power transformers on overall basis is as under:

(a) On an overall basis, over-loading on power transformers has decreased from 20.48% in FY 2021-22 to 16.90% in FY 2022-23.
(b) On DISCO-to-DISCO comparison, PESCO with above 40.07%, has the highest number of over-loaded power transformers among all the DISCOs followed by QESCO with 33.56% and GEPCO with 31.32%.
(c) TESCO, IESCO, LESCO, FESCO, MEPCO, HESCO, and SEPCO have shown decrease in percentage of over-loaded power transformers over last year.

(ii) Loading Position of 11 kV Feeders

During the FY 2022-23 the over-loading position of all 11 kV feeders on overall basis is as under:

(a) On an overall basis, over-loading on 11 kV feeders has decreased from 20.24% of FY 2021-22 to 15.69% in FY 2022-23.
(b) On individual DISCO level, TESCO has the highest percentage i.e. 46.54% of over-loaded 11 kV feeders followed by QESCO with 42.48% and PESCO with 31.06%.
(c) The percentage of over-loaded feeders in IESCO, GEPCO, LESCO, FESCO, MEPCO, HESCO, and SEPCO during FY 2022-23 has decreased showing improvement over last year.

(iii) Loading Position of Distribution Transformers

During the FY 2022-23 the over-loading position of all distribution transformers on overall basis is as under:

(a) On overall basis, the over-loading of distribution transformers has decreased from 5.67% in FY 2021-22 to 4.96% during FY 2022-23.
(b) On individual DISCO level, TESCO has the highest percentage i.e. 17.99% of over-loaded distribution transformers followed by SEPCO with 16.52%.
(c) The percentage of over-loaded distribution transformers in PESCO, TESCO, GEPCO, FESCO, and QESCO during FY 2022-23 has decreased showing improvement over last year.
(d) The percentage of over-loaded distribution transformers in MEPCO, and HESCO has increased during FY 2022-23 showing decline in the loading position of distribution transformers.

5.8 FATAL ACCIDENTS/POOR SAFETY ENVIRONMENT IN DISCOS AND KE

Fatal accidents in electric power DISCOs are tragic events resulting in loss of precious lives. The loss of life not only deeply impacts the families of the victims but also leaves a lasting scar on the company and the community it serves. These incidents often occur due to a combination of factors, including high-voltage equipment, complex systems, and sometimes human error.

Occurrence of such accidents highlight the critical importance of strict safety protocols and continuous training for employees working in the field. Proper equipment maintenance, regular inspections, and a culture of safety consciousness are paramount in preventing these tragic incidents. Thorough investigations should be carried out following a fatal accident to understand the root causes and implementing measures to prevent similar occurrences in the future.

It is incumbent upon electric power DISCOs to prioritize the well-being and safety of their workforce as well as the general public. A culture of safety needs to be fostered in the DISCOs. Proper training of work force can help to minimize the risk of fatal accidents and ensure a safer working environment for all employees as well as the general public. The following table shows the DISCO-wise number of fatal accidents during FY 2021-22 and FY 2022-23:

DISCO	FY 2021-22			FY 2022-23		
	Employee	Public	Total	Employee	Public	Total
PESCO	10	29	39	12	29	41
TESCO	0	0	0	0	1	1
IESCO	10	17	27	8	16	24
GEPCO	3	7	10	3	6	9
LESCO	9	18	27	8	3	11
FESCO	5	0	8	3	3	6
MEPCO	4	4	8	4	1	5
HESCO	3	32	34	4	10	14
SEPCO	2	8	10	6	3	9
QESCO	4	4	8	4	6	10
KE	0	27	27	0	33	33
Total	**50**	**146**	**196**	**52**	**111**	**163**

Source: DISCOs

Although, the overall number of fatalities has been decreased in FY 2022-23 as compared to FY 2021-22, however, every single incident is taken seriously by the Authority. In light of the safety issues/hazards in the service areas of DISCOs that caused a number of fatal incidents, the Authority issued directions to undertake thorough investigations and commenced legal action against DISCOs in accordance with the NEPRA Act. Further details of the investigations are given in the following paragraphs.

(i) Investigation on Account of Fatal Accidents in DISCOs

NEPRA has conducted an investigation in all fatal cases and on the basis of the outcome of the investigation, NEPRA levied substantial fines on DISCOs; SEPCO has been fined Rs. 28 million, FESCO Rs. 26 million, GEPCO Rs. 21 million, HESCO Rs. 31 million, IESCO Rs. 65 million, and MEPCO Rs. 28 million.

Moreover, the Authority has issued a directive to these DISCOs, mandating them to provide compensation to the families of deceased members of the public. This compensation is to be equivalent to the amount offered in the case of DISCOs own employees. Additionally, DISCOs are required to extend employment opportunities to the immediate next of kin of the deceased.

(ii) Investigation against HESCO on Account of Transformer Blasts at Hyderabad

The Authority has taken serious notice of the incidents involving the explosions of distribution transformer in HESCO territory. The Authority has levied a fine of Rs. 26 million on HESCO in relation to the explosion of a distribution transformer at Latifabad, Hyderabad, which tragically resulted in the loss of 10 lives. Additionally, a fine of Rs. 10 million has been imposed for the blast of a 200 kVA transformer at Islamabad Chowk, which led to the unfortunate loss of three lives.

Further, the Authority has directed HESCO to provide compensation to the families of the deceased members of the public. This compensation should be at par with that provided in the case of DISCO's own employees. Furthermore, HESCO has been instructed to extend employment opportunities to the immediate next of kin of the deceased individuals, both employees and members of the public.

(iii) Investigation against LESCO on Account of a Fatal Accident that occurred due to the Falling of a Transformer at Ichra Bazar, Lahore

NEPRA has imposed a fine of Rs. 10 million on LESCO in light of the incident involving the fall of a 200 kVA transformer at Ichra Bazar, Lahore. This event led to the tragic loss of a woman's life, while her daughter sustained injuries. The Authority has directed LESCO to extend compensation to the bereaved family equivalent to what is provided in the case of its own employees. Additionally, LESCO is required to offer employment opportunities to the immediate next of kin of the deceased woman.

(iv) Investigation against LESCO and UET Lahore (KSK Campus) on Account of a Fatal Accident that occurred at UET (KSK Campus)

NEPRA has levied fines of Rs. 10 million each on both LESCO and UET Lahore (KSK Campus) on account of a tragic accident at UET-KSK Campus in Lahore. The Authority has directed UET to provide compensation to the victim's family, and to extend employment opportunities to his immediate next of kin.

These stringent measures underscore the seriousness of the Authority toward such fatal incidents and emphasis the need for heightened safety standards within the power distribution sector. It also show Authority's commitment to holding companies accountable for ensuring the safety and well-being of both their employees and the general public they serve.

5.9 APPROVAL OF INVESTMENT PLAN OF DISCOS AND KE

In accordance with Section 32 of the NEPRA Act and the NEPRA Guidelines for determining Consumer-end Tariffs (Methodology and Process) 2015, the Authority has approved the five-year investment plans for three DISCOs (i.e. IESCO, LESCO, and FESCO). This plan will be in effect from the FY 2023-24 to the FY 2027-28; the approved investment plans in respect of above DISCOs are available on NEPRA website.

Regarding KE's investment plan, all regulatory proceedings, including public hearings and the collection of stakeholder comments, have been concluded. The final determination for KE will be issued in due course. The details of the approved investment plan are given in the following tables:

(a) Investment Plan of IESCO (Million Rs.)

Head	Year 1	Year 2	Year 3	Year 4	Year 5	Total
STG	5,816	9,799	8,440	3,599	12,448	40,104
ELR	2,902	3,274	3,437	3,594	3,769	16,976
DOP	971	1,106	1,158	1,213	1,273	5,720
AMI	2,529	4,571	4,571	4,945	9,184	25,800
Transformer Monitoring System	1,109	691	979	597	765	4,141
Functional Improvement Plans	2,115	1,051	751	660	732	5,310
Safety Hazard	861	763	839	924	1015	4,403
GIS Mapping	52	106.25	106.5	46.75	47	358
T&P	613	705	810	932	1,072	4,131
Civil Works	660	180	185	180	270	1,475
Operational Vehicles	583.35	330	348.5	592.8	478.5	2333.15
Own Resources	**18,211**	**22,576**	**21,625**	**17,284**	**31,054**	**110,752**
Village Electrification	1,231	1,364	1,509	1,664	1,830	7,599
Deposit Works	4,120	4,521	4,958	5,439	5,964	25,001
Consumer Contribution	**5,351**	**5,885**	**6,467**	**7,103**	**7,794**	**32,600**
Grand Total	**23,562**	**28,461**	**28,092**	**24,387**	**38,848**	**143,351**

(b) Investment Plan of LESCO (Million Rs.)

Head	Year 1	Year 2	Year 3	Year 4	Year 5	Total
STG	5,186	2,035	3,516	3,368	2,079	16,184
ELR	2,518	3,187	3,654	4,268	4,945	18,572
ABC Program	200	246	316	268	396	1,425
DOP Self	509	672	628	823	904	3,536
AMI/Smart Meter	1,500	2,879	1,509	1,509	1,509	8,906
IT & ERP/Data Centre	500	756	1356	561	474	3,647
Line T&P/PPEs	263	280	298	318	338	1,497
Bucket Mounted Vehicles	650	692	737	785	836	3,700
Operational Vehicles	240	256	272	290	309	1,367
Buildings and Civil Works	500	533	567	604	643	2,847
CCTV - Camera	100	107	113	121	129	570
Furniture & Office Equipment	50	53	57	60	64	284
Transformer Workshop	80	85	91	97	103	456
GIS Mapping/SCADA	200	213	227	242	257	1,139
Total Own Resources	**12,496**	**11,994**	**13,341**	**13,314**	**12,986**	**64,130**
Consumer Financing	**7,428**	**7,812**	**8,454**	**9,185**	**10,298**	**43,177**
Grand Total	**19,924**	**19,806**	**21,795**	**22,499**	**23,284**	**107,307**

(c) Investment Plan of FESCO (Million Rs.)

Head	Year 1	Year 2	Year 3	Year 4	Year 5	Total
STG	6,076	6,774	6,897	8,071	4,903	32,721
ELR	1,749	2,179	2,536	3,108	3,297	12,869
DOP Own Resources	1,162	1,268	1,259	1,257	1,341	6,287
Commercial Improvement (AMI/AMR)	388	348	430	430	430	2,026
Technical Improvement Plan (GIS, SCADA, etc.)	525	1,190	1,435	400	100	3,650
Financial Improvement Plan (ERP, IBS, IT & security, etc.)	312	213	229	252	377	1383
HR Improvement Plan	200	170	180	190	190	930
Operational Vehicles	1,642	1,028	866	755	583	4,874
Safety Equipment	595	383	468	541	1061	3,049
Civil Works	330	400	376	472	422	2,000
FESCO Own Resources	**12,979**	**13,954**	**14,677**	**15,476**	**12,704**	**69,789**
Consumer Financing	**10,858**	**10,960**	**10,593**	**10,909**	**11,259**	**54,578**
Grand Total	**23,837**	**24,914**	**25,270**	**26,385**	**23,963**	**124,367**

Source: DISCOs

5.10 STATUS OF NET-METERING

The following table presents data regarding the number of consumers of different categories across DISCOs who have embraced net-metering, along with the volume of electricity units these consumers have exported to the DISCOs. It also includes the quantity of electricity units they have imported during the FY 2022-23:

Net-Metering Consumers, Import and Export for FY 2022-23

DISCO	Tariff Category	No. of Consumers (As of June, 2023)	Exported Units (kWh)	Imported Units (kWh)	Net (Import-Export) (kWh)
			By Distributed Generators		
PESCO	Domestic	3,423	19,931,595	20,271,350	339,755
	Commercial	201	1,738,826	7,329,350	5,590,524
	Industrial	44	2,007,880	16,303,434	14,295,554
	Agriculture	5	38,765	89,133	50,368
	General Services	68	1,034,400	3,380,405	2,346,005
	Total	**3,741**	**24,751,466**	**47,373,672**	**22,622,206**
IESCO	Domestic	13,880	97,006,525	87,291,552	-9,714,973
	Commercial	708	7,159,543	20,184,275	13,024,732
	Industrial	129	4,200,332	18,839,542	14,639,210
	Agriculture	42	304,072	330,209	26,137
	General Services	199	5,712,677	19,370,914	13,658,237
	Total	**14,958**	**114,383,149**	**146,016,492**	**31,633,343**
GEPCO	Domestic	3,288	17,204,299	18,623,223	1,418,924
	Commercial	480	4,329,394	11,840,273	7,510,879
	Industrial	492	12,913,044	79,959,411	67,046,367
	Agriculture	33	208,708	373,706	164,998
	General Services	133	2,818,068	6,398,599	3,580,531
	Total	**4,426**	**37,473,513**	**117,195,212**	**79,721,699**
LESCO	Domestic	17,302	119,195,416	146,028,100	26,832,684
	Commercial	983	11,987,362	44,361,113	32,373,751
	Industrial	501	22,141,021	241,029,602	218,888,581
	Agriculture	23	91,922	606,170	514,248
	General Services	217	5,843,003	33,029,682	27,186,679
	Total	**19,026**	**159,258,724**	**465,054,667**	**305,795,943**
FESCO	Domestic	3,349	23,462,301	27,725,703	4,263,402
	Commercial	463	5,483,659	17,310,345	11,826,686
	Industrial	429	14,344,836	102,143,205	87,798,369
	Agriculture	30	308,274	404,671	96,397
	General Services	104	3,289,595	7,860,388	4,570,793
	Total	**4,375**	**46,888,665**	**155,444,312**	**108,555,647**
MEPCO	Domestic	7,277	41,811,092	40,723,276	-1,087,816
	Commercial	1,360	17,361,464	41,729,924	24,368,460
	Industrial	684	29,233,574	255,214,336	225,980,762
	Agriculture	135	917,831	2,540,843	1,623,012
	General Services	211	5,180,866	7,278,165	2,097,299
	Total	**9,667**	**94,504,827**	**347,486,544**	**252,981,717**
HESCO	Domestic	116	1,231,676	1,421,737	190,061
	Commercial	21	255,637	750,383	494,746
	Industrial	13	868,540	5,479,111	4,610,571
	Agriculture	-	-	-	-
	General Services	-	-	2,400	2,400
	Total	**150**	**2,355,853**	**7,653,631**	**5,297,778**
SEPCO	Domestic	27	712,041	593,910	-118,131
	Commercial	8	42,751	326,769	284,018
	Industrial	10	726,321	2,790,692	2,064,371
	Agriculture	-	-	-	-
	General Services	-	-	-	-
	Total	**45**	**1,481,113**	**3,711,371**	**2,230,258**

DISCO	Tariff Category	No. of Consumers (As of June, 2023)	Exported Units (kWh)	Imported Units (kWh)	Net (Import-Export) (kWh)
			By Distributed Generators		
QESCO	Domestic	27	197,362	149,763	-47,599
	Commercial	5	41,131	254,838	213,707
	Industrial	1	85,720	35,236	-50,484
	Agriculture	-	-	-	-
	General Services	6	441,842	497,156	55,314
	Total	**39**	**766,055**	**936,993**	**170,938**
ALL DISCOs	**Domestic**	**48,689**	**320,752,307**	**342,828,614**	**22,076,307**
	Commercial	**4,229**	**48,399,767**	**144,087,270**	**95,687,503**
	Industrial	**2,303**	**86,521,268**	**721,794,569**	**635,273,301**
	Agriculture	**268**	**1,869,572**	**4,344,732**	**2,475,160**
	General Services	**938**	**24,320,451**	**77,817,709**	**53,497,258**
	Total	**56,427**	**481,863,365**	**1,290,872,894**	**809,009,529**

Source: DISCOs

Following the notification from the GOP under Section 14B(5) of the NEPRA Act, the Authority exempted the net-metering systems below 25 kW from licence/concurrence which are now handled directly by the respective DISCOs. The Authority has received numerous complaints regarding a lack of consumer support from the DISCOs, resulting in substantial delays. The Authority has acknowledged this concern and has instructed the DISCOs to promptly assist consumers and process these cases within the specified timeframe.

5.11 STATUS OF PENDING CONNECTIONS

The delayed provision of electricity connections to potential consumers is a critical issue that bears significant consequences for individuals and the businesses. This delay arises from a combination of factors, including non-availability of material, insufficient infrastructure coupled with laxity at DISCO's level.

For individuals, the absence of a timely electricity connection can lead to disruptions in daily life, affecting everything from household chores to personal comfort. For businesses, the delay can impede operations, resulting in lost productivity and potential revenue. Moreover, it can discourage potential entrepreneurs from setting up business, which in turn hinders economic growth and development. On a larger scale, these delays strain the resources and reputation of power DISCOs.

The first and the foremost requirement to improve this situation is change of mindset at DISCOs for customer orientation. DISCOs need to streamline their processes, invest in infrastructure and enhance coordination with stakeholders to avoid delays. By prioritizing efficient and timely provision of electricity connections, DISCOs can not only ensure convenience for consumers but also help stimulate economic progress. The details of pending electricity connection along with age of pendency are given in the following table:

DISCO	Total Nos.	Total Load (kW)	Pending Connections after expiry of time limit given in PSDR, 2005					
			Up to 1 month	Up to 2 months	Up to 3 months	Up to 6 months	Up to 1 year	above 1 year
PESCO	19	13.61	4	0	6	0	5	4
TESCO	14,464	122.00	11,620	2,706	34	19	25	60
IESCO	7,155	23.66	6,440	313	357	32	10	3
GEPCO	24,945	76.02	24,330	609	0	4	2	0
LESCO	52,615	210.34	32,611	19,624	217	163	0	0
FESCO	17,192	69.56	15,533	1,577	82	0	0	0
MEPCO	156,315	435.68	25,583	30,042	26,411	74,201	51	27
HESCO	937	40.213	749	53	27	10	17	81
SEPCO	337	12.072	527	23	24	10	4	9
QESCO	1,307	7.766	1,170	19	26	24	62	6
KE	3,548	106.38	388	159	1,451	940	145	465
Total	**278,834**	**1,117.31**	**118,955**	**55,125**	**28,635**	**75,403**	**321**	**655**

Source: DISCOs

5.12 TRANSMISSION AND DISTRIBUTION LOSSES IN KE

The allowed Transmission and Distribution losses of the KE as under:

Year	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Allowed T&D Losses (%)	18.75	17.76	16.80	15.95	15.36
Actual T&D Losses (%)	19.09	19.73	17.54	15.35	15.27

Source: KE

5.13 RECOVERY OF BILLED AMOUNT IN KE SYSTEM

The overall recovery ratio, which stood at 96.69% in the preceding year, has experienced a dip, registering at 92.76% this year. This represents a decline of 3.93% in the recovery position.

The recovery performance from different sectors exhibits varying trends. The domestic, commercial, industrial, public lighting, and other sectors have all witnessed a decrease in recovery percentages. Conversely, the agricultural and bulk supply categories have shown marked improvements in the FY 2022-23 compared to the previous FY 2021-22.

The notable 3.93% decline in KE's recovery position is a matter of serious concern, as it is poised to significantly impact the financial stability of the utility. This decrease, rather than expected improvement, underscores a performance issue within KE. It highlights the urgency for focused efforts to address the underlying challenges affecting revenue collection and overall financial health of the utility.

5.14 OVER-LOADING POSITIONS IN KE SYSTEM

As of June 30, 2023, there has been a decrease in the over-loading of power transformers in KE, standing at 20.44% for the FY 2022-23 compared to approximately 26.82% in the previous FY of 2021-22. Additionally, a marginal increase from 5.70% to 5.80% has been observed in the over-loading of 11 kV feeders, relative to the preceding year.

Furthermore, the percentage of total over-loaded distribution transformers has seen a reduction in the FY 2022-23, amounting to 17.94% compared to the 20.68% recorded during the FY 2021-22. These statistics indicate progress in mitigating over-loading issues to enhance the stability and efficiency of the distribution network.

5.15 RECEIVABLES OF KE

As of June 30, 2023, KE's total receivables amounted to Rs. 229.30 billion, marking a significant increase from Rs. 197.88 billion recorded on the same date in 2022. This reflects a substantial rise of Rs. 31.42 billion in receivables over the course of the reporting year in FY 2022-23. This increase underscores the need for effective strategies to manage and recover outstanding payments in order to maintain financial stability.

MONITORING OF THE POWER SECTOR

06

6.1 GENERAL

The NEPRA Act, along with the Rules, Regulations, and Performance Standards made under the Act forms the foundation for regulating the power sector. A crucial aspect of this regulation involves monitoring the performance of licensees. These monitoring activities are conducted in alignment with NEPRA's decisions, determinations, and relevant documents on various matters. As a result, the responsibilities of licensees are assessed in accordance with their roles across distinct phases, encompassing planning, design, implementation, and operation.

In the subsequent sections, comprehensive details regarding the monitoring and enforcement activities, including the legal actions against the licensees initiated by NEPRA in consequence to reported violations will be provided. These details cover an evaluation of adherence by licensees to the relevant rules, regulations, terms, and conditions specified in their licenses and other applicable documents.

6.2 MONITORING ACTIVITIES IN GENERATION SECTOR

6.2.1 Data Exchange Portal (Generation Module):

An online Data Exchange Portal (Generation Module) was created to facilitate the seamless acquisition of daily Key Performance Indicators (KPIs) data from all active generation licensees regarding their respective generation facilities. Following the successful implementation of the Data Exchange Portal for nine initial power projects, a total of 116 power plants are now registered on the portal.

6.2.2 Performance Evaluation Reports of Thermal Power Plants:

The Authority conducted a thorough review of the quarterly reports submitted by thermal power plants for the FY 2021-22, in accordance with the NEPRA Performance Standards (Generation) Rules, 2009. This comprehensive evaluation ends-up in the preparation of a Performance Evaluation Report (PER), which was subsequently approved by the Authority and is now available on the NEPRA website for information of the stakeholders. The PER for the FY 2022-23 is under preparation.

6.2.3 Under-Utilization of Efficient Power Plants/Non-Compliance of EMO:

NEPRA maintains a consistent vigil over the performance of the System Operator. This entails a thorough analysis of the hourly generation data provided by NPCC. Any deviations from the established guidelines, such as the EMO and Grid Code, are promptly identified and addressed during the monthly FCA proceedings. This vigilant oversight has resulted in a significant enhancement of system operation, notably reducing instances of out-of-merit generation. In addition, the Authority has directed CPPA-G to establish its own robust mechanism for efficiently monitoring the generation data submitted by NPCC.

Another significant result of identifying out-of-merit generation by NPCC is the spotlight on NTDC's system constraints. NEPRA maintains a close watch on the constraints within NTDC's Transmission System and assesses their impact on system operation. This includes instances of under-utilizing efficient

plants and resorting to the operation of costly or less efficient ones. Consequently, NTDC now provides monthly progress reports regarding the steps taken to alleviate these constraints, which have a direct bearing on the economic dispatch of generating units.

It was noted that the commissioning of Thar Coal Energy Block-I (TCEB-I) to Matiari Line experienced a delay. This delay led to an increase in generation costs in the system due to the operation of more expensive plants in lieu of use of cost-effective Thar Coal-based energy. Therefore, a series of meetings were convened involving NTDC, NPCC, TCEB-I, and other relevant stakeholders to address this issue. Following the meticulous monitoring efforts, the transmission line, originally projected for completion in September 2023, was successfully commissioned in May, 2023. This achievement translated into substantial savings amounting to millions of rupees for the electricity consumers' and national exchequer.

Besides NTDC, NEPRA also oversees the performance of KE. The hourly generation data provided by KE is scrutinized and any discrepancies in compliance with the EMO and Grid Code are brought to light during the monthly FCA proceedings. This vigilant monitoring has resulted in a notable enhancement in system operation, marked by a significant reduction in instances of out-of-merit generation.

The effective oversight by NEPRA has yielded substantial improvements in the system operation of both KE and NTDC which is visible in a considerable reduction in the financial impact caused by operational inefficiencies and violations of the EMO.

6.2.4 Inquiry/Investigation Initiated Against Generation Licensees:

The following inquiries and investigations have been initiated against generation licensees in the reporting period:

(a) An inquiry is in process against CPGCL in the matter of tripping and fire incident of ST-16 of Guddu 747 CCPP.
(b) An investigation is in process against CPGCL regarding the acquisition of a gas booster compressor station from Engro Fertilizers without cost, in exchange for the utilization of gas quota, and its subsequent transfer to NPGCL for Rs. 1.242 billion.

6.2.5 Legal Proceedings concluded during FY 2022-23:

During the reporting period, NEPRA concluded legal proceedings against various generation licensees, resulting in penalties as below:

(a) CPGCL was fined Rs. 100 million for multiple violations, including the non-filing of a tariff petition, failure to submit a rehabilitation plan for Unit-13, and issuing invoices for excess capacity payments.
(b) CPPA-G was fined Rs. 50 million for making excess capacity payments to CPGCL.
(c) CPPA-G was fined Rs. 10 million for extending the term of the PPA signed with KAPCO by 485 days without prior approval from the Authority.
(d) CPGCL was fined Rs. 50 million for its failure to timely restore damaged Unit-14.
(e) China Power Hub Generation Company Limited was fined Rs. 10 million for an extended forced outage of Unit-1 in their plant.
(f) CPPA-G was fined Rs. 50 million for non-compliance with Authority directives, including those related to Market Operator Fee determinations, non-implementation of obligations outlined in the commercial code, and other applicable documents.
(g) A cumulative fine of Rs. 250 million was levied on 17 IPPs, including KE, for their involvement in the total power system collapse occurred on January 09, 2021. The details of fine imposed is as follows:

S. No.	Name of Licensee with Amount of Fine (Rs. in Million)	S. No.	Name of Licensee with Amount of Fine (Rs. in Million)
1	Pak Gen Power (Rs. 25 Million)	2	Engro Powergen. Thar (Rs. 20 Million)
3	Quaid-e-Azam Thermal Power (Rs. 20 Million)	4	Huaneng Shandong Ruyi (Rs. 20 Million)
5	China Power Hub (Rs. 15 Million)	6	Sapphire Electric Power (Rs. 15 Million)
7	Halmore Power Generation (Rs. 15 Million)	8	Orient Power Company (Rs. 15 Million)
9	Saif Power (Rs. 15 Million)	10	Port Qasim Electric Power (Rs. 10 Million)
11	NPPMCL (Balloki) (Rs. 10 Million)	12	NPPMCL (HBS) (Rs. 10 Million)
13	Engro Powergen. Qadirpur (Rs. 10 Million)	14	Saba Power Company (Rs. 10 Million)
15	Kot Addu Power Company (Rs. 10 Million)	16	Uch-II Power (Rs. 10 Million)
17	K-Electric Limited (Rs. 20 Million)		

Source: NEPRA

In response to the Authority decision, the above-mentioned IPPs and KE filed appeals before the Appellate Tribunal, Islamabad which are currently under adjudication.

Further, during FY 2022-23, the Authority issued an explanation to HESCO due to their failure to comply with the Authority's directives regarding the submission of Power Acquisition Contracts (PACs) for the procurement of power from various bagasse-based captive power projects. HESCO eventually adhered to the Authority's instructions and submitted the PACs, which were approved by the Authority. Consequently, the Authority acknowledging HESCO's compliance to its directive, considered the matter as closed and settled.

6.2.6 Legal Proceedings under Process:

The ongoing legal proceedings against generation licensees are as follows:

(a) An Explanation has been issued to CPPA-G and PEDO regarding the delay in commissioning the Daral Khwar HPP.

(b) PEDO and PESCO have been issued an Explanation for the delay in commissioning and non-execution of the EPA with Machai HPP.

(c) A Show Cause Notice (SCN) has been served to KAPCO for extending the term of the PPA signed with CPPA-G by 485 days, beyond the duration of its generation licence. KAPCO has filed appeal against this decision before the Appellate Tribunal in Islamabad. The Tribunal has nullified the SCN and referred the case back to NEPRA for a fresh examination starting from the explanation stage.

(d) CPPA-G has been served a SCN for failing to submit initialed PPAs/EPAs/TPPAs for NEPRA's approval before executing these documents.

(e) WAPDA has been served a SCN for the non-performance of the Golen Gol HPP since its commissioning.

(f) WAPDA has been served a SCN for surpassing the allowable outage limits specified in the PPA at some of its Hydel Power Stations.

(g) CPPA-G has been served a SCN for not imposing LDs on WAPDA for exceeding the allowed outage limits at certain Hydel Power Stations, as stipulated in the PPA.

6.3 POWER SYSTEM STABILIZERS AT DIFFERENT POWER PLANTS

NEPRA, in collaboration with NTDC/NPCC, has gathered comprehensive information from diverse power plants regarding the status of their Power System Stabilizers. Following this, discussions were conducted with Lucky Electric Power, Neelum Jhelum, Karot Hydro, ThalNova Power, and Thar Energy Power Plants on this matter.

The responses received from these power plants have revealed that PSS is currently operational at ThalNova Power and Thar Energy. As for the remaining power plants, the implementation of PSS is at varying stages, which include commissioning and ongoing stability studies.

In light of this, NTDC has been mandated to support and assist the power plants in activating their respective Power System Stabilizers. This strategic initiative is poised to significantly elevate the stability and efficiency of the power generation process across these facilities.

6.4 DIRECTIONS OF THE AUTHORITY IN THE MATTER OF POWER SYSTEM COLLAPSE

On January 23, 2023, a power system collapse plunged the entire country into darkness. Restoration efforts took approximately 20 hours, and the whole system came to its normal condition on January 24, 2023. The Authority took action by forming an Inquiry Committee (IC) to thoroughly investigate the incident.

The Inquiry Committee compiled a comprehensive inquiry report, which was then thoroughly reviewed and deliberated upon by the Authority. Subsequently, specific directives were issued to NTDC, KE, and WAPDA to ensure compliance with the recommended measures. These directives were further communicated to all relevant entities through letter dated June 9, 2023.

6.5 OPERATING PROCEDURES AND BLACK START FACILITY

In the course of legal proceeding following the country-wide power system collapse on January 9, 2021, the Authority gave following directions to NTDC/NPCC:

(a) To finalize the Operating Procedures of all power plants in coordination with relevant stakeholders.

(b) To conduct a comprehensive study regarding essential requirements of black start facility at different power plants vis-à-vis financial impact involved vs. cost of not having appropriate black start facility in the system.
NTDC/NPCC reported that the work on this matter is currently underway in collaboration with all relevant stakeholders and will be completed soon. Once completed, it will be presented before the Authority for review.

6.6 MONITORING ACTIVITIES IN TRANSMISSION SECTOR

6.6.1 Data Exchange Portal (Transmission Module):

NEPRA has established a Data Exchange Portal (Transmission Module) to facilitate the acquisition of performance data from transmission licensees. This encompasses crucial metrics related to Infrastructure, System Reliability (Duration/Frequency, Regional Trend, Seasonal Trend, Location Trend), System Security (Energy not Served), Quality of Supply (Voltage Violations, Frequency Violations, Highest Frequency record), and Loading Position (Transformers, Circuits).

6.6.2 Legal Proceeding initiated Against Transmission Licensees:

The legal proceedings against transmission licensees are as follows:

(a) An incident of partial blackout occurred on September, 2021 due to lightning at 500 kV Jamshoro Grid Station which resulted in power supply failure in the areas served by KE's and HESCO. An inquiry was conducted in the matter and based on inquiry report as well as subsequent legal proceedings, a fine of Rs. 10 million was imposed on NTDC.

(b) An incident of partial blackout occurred on May, 2021 on account of collapse of eight (08) 500 kV towers due to cyclonic winds in southern part of the country. NTDC was directed to investigate the matter and submit the report. Accordingly, NTDC submitted the report which was examined in NEPRA and found unsatisfactory. Legal proceedings were initiated and after observing due formality a fine of Rs. 10 million was imposed on NTDC in September, 2022.

(c) NEPRA team visited grid stations including Jhimpir-II, to check the progress for improvement of the Grids in the backdrop of investment allowed for this purpose. During visit at Jhimpir-II grid station, it was found under construction and energized without proper handing/ taking over. After an inquiry in the matter, the Authority initiated legal proceedings and SCN was issued to NTDC.

(d) An accident involving fatality of a contractor's staff occurred due to electrocution during an approved shutdown by NTDC on 500 kV Thar-Matiari Circuit. Investigation under section 27A of the NEPRA Act was conducted in the matter and after detailed deliberations, legal proceedings were initiated. After following due process of law and considering the NTDC's submissions unsatisfactory, a fine of Rs. 10 million was imposed on NTDC.

6.6.3 Review of Progress of Interconnection Arrangements and System Constraints:

In an effort to expedite the removal of constraints hindering the smooth evacuation of power from certain efficient power plants, NEPRA has taken the initiative to ensure that NTDC initiates and complete the necessary remedial work in timely manner. In this regard, NEPRA has established a structured monthly/quarterly meetings to closely monitor the progress of NTDC's projects aimed at constraint removal.

As a result of these regular meetings, several constraints have been successfully addressed. However, there are still outstanding constraints that require resolution. Below are the details:

(a) To address the constraints at the over-loaded 500 kV New Rawat grid station; NTDC has put forth a proposal for the completion of two new grid stations: the 500 kV Chakwal grid station and the 500/220/132 kV Islamabad West grid station. Both of these projects are slated for completion during the 2024-25 timeframe.
For the Chakwal grid station, a loan agreement has already been signed with kfW, while the evaluation process for the Islamabad West grid station is currently underway. The constraint at the 500 kV New Rawat grid station has necessitated the operation of costly RFO-based generation at Attock Gen. Operation of this RFO plant is adversely impacting the power sector, national exchequer and electricity consumers in Pakistan. An immediate solution of this issue is required for optimization of the power supply system.

(b) The addition of a 1x600 MVA transformer at Nokhar is pending since June, 2018. The completion of the 220 kV transmission line, (completion of the 500 kV Lahore North grid station), was initially scheduled for March 31, 2023. Unfortunately, this transmission line remains incomplete to date. As a result of this constraint, NPCC is operating costly RFO-based generation units at HUBCO Narowal and the Nandipur Power Plant. Operation of these RFO plants is adversely impacting the power sector, national exchequer and electricity consumers in Pakistan. An immediate solution of this issue is required for optimization of the power supply system.

(c) Slow progress in addition of 1x250 MVA transformer at Islamabad University and completion of 500/220/132 kV Islamabad West grid station has been noted.

(d) Under Phase-3, completion of 220/132 kV Sundar grid station and Kasur grid station is pending since June, 2018. The deadline for the said grids is 2023-24 and 2024-25 respectively. As a result of this constraint, expensive RFO based generation of Nishat Chunian, Nishat Power and Kohinoor Power Plants is committed.

(e) Under Phase-3, augmentation of transformer from 4x160 to 4x250 MVA at Sheikhupura grid station is pending since August, 2019. The slow progress has been noted on the project. The completion date for the same is September, 2023. Due to this constraint, expensive generation of Saba Power, Halmore Power and Sapphire Electric Power Plants is committed.

(f) Under Phase-3, the constraints at 220 kV Daud Khel grid station and 220 kV Ludewala grid station are pending since June, 2018 and June, 2017 respectively. The addition of 1x160 MVA transformer at Daud Khel is delayed which was supposed to be completed on 15 February, 2023 as per its contractual obligations. The overall progress for the said grid station is 95%. Augmentation of 1x160 transformer with 1x250 MVA transformer at Ludewala is still pending and the deadline for the same is February 08, 2024, wherein the percentage for procurement progress is 49% and the percentage for design & engineering is 87%. Due to the said constrain, load management (load-shedding) of 50-60 MWs in the area is being carried out since last many years.

(g) Under Phase-3, the constraints at 220 kV Kassowal, 500 kV Yousuf-wala and 220 kV Vehari are pending since June 2017 and June 2018, respectively. The completion date of 220/132 kV Arif-wala new grid station and 220 kV/132 kV Arif-wala grid station is 2023-24. Due to this constraint, expensive generation of Fauji Kabirwala and Saif Power is committed.

(h) In order to remove constraint persisting since June, 2017 at 220 kV Jamshoro grid station; the completion of 220/132 kV Mirpur Khas and extension works at Hala Road grid station was proposed by NTDC. The overall progress for Mirpur Khas grid station and Hala Road grid station is 40.03% and 59% respectively.

(i) The constraint at 220 kV Quetta Industrial is persisting since Jun, 2017 and slow progress in its removal i.e. "Completion of 220/132 kV Mastung grid station" has been observed.

The 500 kV K2/K3 - Port Qasim transmission line was expected to be completed on April 21, 2022, however, the same was energized through interim arrangement on March 03, 2022. The country faced a partial black out on October 13, 2022 due to the broken conductor of interim arrangement being used for evacuation of power from K2/K3 nuclear power plant instead of dedicated transmission line. In this regard, the Authority directed NTDC to complete the pending work of dedicated transmission line for evacuation of power from K2 and K3 plants on top priority. NTDC was further directed that periodic maintenance with respect to interim arrangement designed for K2/K3 circuits must be ensured as per SOP.

6.6.4 Inquiry Report (Partial Power Blackout in the Country):

On October 13, 2022, a partial breakdown in the power supply system occurred due to a conductor failure on the red phase of the 500 kV NKI-K2/K3 and 500 kV K2/K3-Jamshoro transmission lines. Due to this, substantial portion of the country went into dark. An inquiry was held in the matter. After careful consideration of the Inquiry Committee Report, the Authority has decided to initiate legal proceedings against both NTDC and the relevant power plants. Additionally, the Authority has issued the following directives to NTDC and the power plants involved:

(a) The existing interim arrangement may immediately be reinforced with standard hardware. Aging factor of conductor and quality of material before and proper workmanship during the execution of interim arrangement must be ensured.

(b) Periodic maintenance/monitoring activities, especially the interim arrangement designed for K2/K3 Circuits, must be ensured as per SOP.

(c) Pending work of dedicated transmission lines for evacuation of power from K2 and K3 power plants must completed on top priority.

(d) VAR compensations study shall be carried out and required measures in light of study shall be taken to avoid power swing.

(e) Availability of required professionals and staff as per approved yard stick, along with required T&P including Thermo vision camera, especially in southern region must be arranged on urgent basis in order to ensure timely maintenance of existing network for system stability, reliability and security.

(f) NTDC Telecom Department's deficiencies must be addressed to ensure proper communication of inter grid signals and avoid transmission of false signals.

(g) Execution work of dedicated transmission lines shall be completed before the energization of transformation equipment or COD of power plants in order to avoid the LDs resultantly reducing the basket price for end-consumer.

(h) Implementation of coordinated over-frequency/over-speed trip schemes on newly synchronized generating units (i.e. Lucky Electric, Shanghai Electric, ThalNova Power and Thar Energy), after system study, shall be expedited in order to ensure the system reliability.

(i) Automatic tripping to be implemented through SCS on Lucky Electric, Shanghai Electric, ThalNova Power and Thar Energy in case of outage on mono-pole/bi-pole HVDC system at Matiari Converter Station.

(j) Protocols/SOPs to be developed in order to streamline the operational co-ordination between KE and NPCC.
(k) Quantum of load to be shed through under-frequency and ROCOF schemes in South region needs to be increased for survival of the region whenever the region experiences under-frequency situation.
(l) It is noticed that there is a practice of switching off transmission lines to control the over voltage on system, which is neither prudent nor recommended. Therefore, a study shall be carried out to install additional Shunt Reactors at appropriate locations i.e. on Grid Station Busbar.

6.6.5 Inquiry Report (Total Power System Collapse):

On January 23, 2023, Pakistan faced a country-wide blackout. In the matter, the Authority organized a hearing involving all relevant stakeholders to elucidate the causes behind this incident. Subsequently, an Inquiry Committee (IC) was notified to conduct an in-depth investigation. The inquiry committee submitted a comprehensive report of the incident. Aligned with the findings and recommendations of the IC, legal proceedings were initiated against NTDC and the relevant power plants. Moreover, the Authority issued the following directives to NTDC and the involved power plants:

(a) VAR compensations study shall be carried out and required measures in light of study shall be taken to avoid power swing.
(b) The stability of HVDC system needs to be ensured through proper study to avoid frequent signals of 'Commutation Failure'.
(c) Fully functional SCADA facility for complete system related to NTDC, GENCOs, IPPs and DISCOs is essentially required for System Operator in order to ensure the online monitoring of system parameters in all respect for sake of system security, stability and analysis of events through GPS synched time event recorder.
(d) NTDC shall ensure the healthiness and operation of recently installed Out of Step devices, as the same did not operate during the event.
(e) Quantum of load to be rejected through under frequency schemes need to be increased, especially in South region, where it is considerably less.
(f) Simultaneous tripping of K2-K3 Units on Over Frequency shall be made stage-wise.
(g) Standard Operating Procedure (SOP) to be developed between all stakeholders to maintain required water indent for relevant Hydel Power Station under acute emergency situations.
(h) KE shall set right the cause of undesired tripping of Unit-10 at BQPS-III and shall also set right their Black Start facilities as multiple attempts were made during restoration and as such not satisfactory.
(i) Black start facilities are required at some additional locations, study based near Lahore and Hyderabad to help early restoration during Black Out.
(j) Repeated tripping of Machines at Tarbela and Mangla during black start need to be checked and set right, as successful restorations have been carried out through these situations in the past.
(k) To ensure the installation of modern technologies device such as Wide Area Management including Phasor Management Units to detect oscillations instability which can be mitigated by Remedial Action Scheme.

6.6.6 Tower Collapses:

In recent years, there has been a worrisome increase in tower collapses, leading to power disruptions, safety concerns, and economic losses. During the FY 2022-23, the record shows a total of fourty-six (46) tower both 500 kV and 220 kV collapsed. Among these, thirty-three (33) towers collapsed in the Southern region, nine (09) in the Northern region, and four (4) within the service area of KE. Following is the breakdown of tower collapses during the FY 2022-23:

Details of Tower Collapse of 500 kV and 220 kV Transmission Lines during FY (2022-23)

Region	Grid Stations and Transmission Lines	No. of Towers Collapsed
K-Electric	132 kV T/L Baldia-Hub Chowki and Tapal-Hub Chowki (D/C)	4
South Region	500 kV Dadu - Jamshoro	2
	500 kV Port Qasim – Matiari	6
	500 kV Dadu - Shikarpur	2
	500 kV NKI - Jamshoro T/Line	2
	500 kV Port Qasim - Matiari T/Line	6
	500 kV Jamshoro - Dadu T/Line	3
	500 kV Jamshoro - Matiari T/Line Ckt-II	1
	500 kV Dadu - Matiari T/Line and 500 kV Guddu-Shikarpur Ckt-I, T/Line	3
	500 kV Guddu - Shikarpur-I T/Line	3
	220 kV T/Line Guddu – Shikarpur - Circuit-I/Guddu-Sibbi (D/C)	4
	220 kV Guddu - Sibbi T/Line	1
North Region	500 kV Sheikhupura - Nokhar T/Line	4
	500 kV Dera Ghazi Khan - Guddu Old T/Line	5
Total		**46**

Source: NTDC

The Authority took a serious notice of these tower collapses and issued direction to NTDC to prioritize regular inspection, maintenance, and upgrades and consider advanced engineering techniques, implement robust weather monitoring systems, develop emergency response plans, and invest in training and education for relevant personnel. Collaboration with experts and adherence to best practices in tower design, construction, and maintenance are also essential to ensure the reliability and safety of the transmission network.

6.6.7 Theft of Braces on 500 kV/220 kV Transmission Line:

While looking into the sudden surge of tower collapse incidents, the Authority sought an explanation from NTDC regarding the matter. NTDC emphasized that the rampant theft of braces was a major factor contributing to these incidents.

The Authority directed NTDC to develop thorough policies and Standard Operating Procedures (SOPs) designed specifically to counter this challenge. Furthermore, the Authority mandated regular patrols of the affected areas to take proactive measures to prevent further instances of brace theft. These measures are crucial in strengthening the stability and reliability of the transmission network.

6.7 MONITORING ACTIVITIES IN DISTRIBUTION SECTOR

6.7.1 Data Exchange Portal (Distribution Module):

Through an Online Data Exchange Portal, essential monthly data concerning the Distribution Network's Loading Position, TOU Meters, Transformer Failures, Pending Connections, Malfunctioning Meters, and Power Outage Restoration Times is gathered from all DISCOs. This data is then analyzed to inform and implement strategic measures aimed at bolstering the performance of each DISCO.

6.7.2 Annual Performance Reports of DISCOs:

NEPRA established the PSDR 2005. According to PSDR 2005, every DISCO is required to submit an Annual Performance Report (APR) to NEPRA before August 31st of the subsequent year. The APR comprehensively covers relevant information regarding adherence to the rules throughout the year. The APR is inclusive of System Performance Reports, Consumer Service Performance Reports, DISCOs' written assessments on performance along with plans and targets for improvement.

The APRs submitted by various DISCOs are currently under review. The assessment is centered around specific performance parameters, including Transmission and Distribution Losses, Recovery, System

Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), Timeframe for new Connections, Load-Shedding, Nominal Voltage, Consumer Complaints, Safety, and Fault Rate. Once the analysis on the report for FY 2022-23 is approved by the Authority, it will be made available on the NEPRA website.

6.7.3 Monitoring of Load-Shedding in the Country:

AT&C losses have persistently challenged Pakistan's power sector. These losses represent the discrepancy between the electricity supplied into the distribution system and the revenue collected from consumers. They encompass both technical losses from the physical transmission and distribution of electricity, as well as commercial losses attributed to theft, billing inefficiencies, and non-payment.

In an attempt to address these losses, DISCOs in Pakistan instead of improving governance in their service territory have resorted to AT&C-based load-shedding. This tactic involves selectively reducing power supply to specific areas, ostensibly to mitigate losses and bolster revenue collection. However, this approach has sparked considerable controversy, with concerns raised about its efficacy and fairness.

The Authority views the practice of load-shedding based on AT&C losses as a violation of established rules and regulations. Following a hearing with DISCOs, it became evident that this approach was being employed even when there was ample available generation capacity. CEOs from major DISCOs including PESCO, SEPCO, HESCO, QESCO, and KE confirmed the use of this practice.

The Authority has unequivocally directed utilities to discontinue this method and improve governance in their jurisdiction. The Authority stressed that this approach unfairly impacts conscientious consumers who diligently meet their payment obligations. An advisory was subsequently issued to the Ministry of Energy, underscoring the contradiction between AT&C-based load-shedding and established regulations.

The issue of AT&C-based load-shedding underscores the complexity of managing losses in the power sector. It highlights the need for a comprehensive strategy that balances immediate gains with long-term sustainability, ensuring equitable access to electricity while effectively managing losses.

6.7.4 Pending Ripe Connections in DISCOs:

The issue of pending connections remains a significant concern for consumers across various DISCOs. Recognizing the gravity of the situation, the Authority has taken proactive measures by regularly collecting online data from all DISCOs. Upon meticulous examination of the submitted data, it was disconcerting to note that a substantial number of connections remain pending across different DISCOs.

In light of above, the Authority initiated legal proceedings against several DISCOs, including PESCO, IESCO, GEPCO, FESCO, LESCO, MEPCO, and KE. Subsequent to the initiation of legal proceedings, hearings were conducted to elicit explanations from the concerned parties. During these hearings, the Authority unequivocally directed the DISCOs to expeditiously address and clear all pending connection requests within the span of one month. Additionally, the Authority directed DISCOs to furnish a comprehensive compliance report upon the completion of this task. This directive is aimed at compelling DISCOs to provide electricity connections promptly and focus on customer satisfaction.

6.7.5 Earthing/Grounding of DISCOs:

Following NEPRA's investigations into fatal accidents within various DISCOs, a critical deficiency emerged: the lack of proper grounding in distribution facilities, including poles and structures. This was identified as a major contributing factor to these unfortunate incidents. In light of this, the Authority took a resolute stance and decided to conduct a hearing on the matter.

During this hearing, the Authority issued a directive to all DISCOs directing them to furnish a comprehensive plan, complete with specific timelines, outlining the execution of grounding for 100% of their HT/LT lines within their distribution systems. This measure was implemented to address this serious safety concern.

Furthermore, recognizing the urgency and importance of this task, the Authority initiated legal proceedings against all DISCOs. This action was taken in response to the observed sluggishness and subpar performance in executing the necessary grounding measures, which posed significant hazards. The Authority is committed to ensure the safety and well-being of both consumers and workers within the power distribution sector.

6.7.6 Advanced Metering Infrastructure (AMI)/Automated Meter Reading (AMR) in KE System:

In recent years, DISCOs have witnessed a significant transformation in their operations with the introduction of AMI/AMR systems. The use of AMI/AMR meter is beneficial for both the utility and the consumers as this system allow for the continuous and automatic collection of electricity consumption data. This system monitor usage pattern, detect irregularities and respond quickly to outage or other services. This leads to more precise billing, improved revenue collection, and ultimately, a more financially stable distribution operation. For consumers, the introduction of AMI/AMR metering brings about increased transparency and control over their energy consumption. Real-time data accessibility allows customers to monitor their usage patterns, identify areas for potential energy savings, and make informed decisions regarding their electricity consumption. Additionally, accurate and timely billing fosters trust between consumers and their DISCO, reducing disputes and ensuring fair and transparent transactions. Further, the AMI/AMR systems also play a pivotal role in grid optimization and load management. The continuous flow of data enables DISCOs to analyze load patterns and demand fluctuations, facilitating better load forecasting and distribution planning. This, in turn, leads to a more stable and efficient grid, capable of handling varying loads and minimizing the risk of over-loads or blackouts.

Acknowledging that AMI/AMR meters have been successfully deployed at PMT level in the KE system, the Authority directed KE to extend it further to explore avenues for remote disconnection/reconnection of meters and getting rid of the AT&C-based load-shedding. In response, KE presented several challenges in achieving this transition.

Subsequently, a meeting/hearing was convened on October 04, 2022, where KE was once again urged to explore avenues for remote disconnection/reconnection of meters, focusing on design and development possibilities. However, no compliance was received from KE. Therefore, the Authority took the step to initiate legal proceedings and issued an Explanation to KE. This was done, among other reasons, due to KE's non-compliance with the Authority's repeated directives and its continued practice of AT&C-based load-shedding. KE responded with its own submission, prompting a hearing to further address the matter.

6.7.7 AMI/AMR in IESCO System:

During the process of its MYT determination; IESCO gave a detailed presentation about its AMI/AMR project. This initiative involves the installation of AMR meters at both the PMT level and individual consumer level, focusing on the Rawalpindi and Cantt: Circles. Subsequently, a collaborative meeting was held in May, 2023, with representatives from IESCO and KE.

IESCO presented a comprehensive outline of their AMI/AMR project to the Authority during this meeting. The Authority appreciated this endeavor and directed IESCO to submit monthly progress reports regarding the project's execution. This initiative demonstrates a positive step towards enhancing metering technology and improving operational efficiency within the power distribution network.

6.7.8 Interconnection Issues in respect of Small Renewable Projects:

Access Solar (Pvt.) Limited and Access Electric (Pvt.) Limited intend to commission small, around 11 MW, distributed solar power projects since last many years. Unfortunately, the project, so far, could not be materialized for reasons one or the other. The projects are yet facing challenges in integrating renewable energy into the grid. The Authority has taken note of the delay in grid interconnection for

these projects by IESCO. Consequently, legal action has been initiated against IESCO in this matter. The Authority consistently supports the promotion of renewable energy sources, specifically smaller distributed generation at 11 kV, recognizing them as indigenous, cost-effective resources which can contribute to reduce the overall energy costs and limiting financial burdens on the national exchequer.

The Authority extended an opportunity for IESCO to present their case during a hearing. Regrettably, the response provided was deemed unsatisfactory. Consequently, the Authority issued a SCN to IESCO.

6.7.9 Maximum Demand Indicator (MDI) Calculation NTDC v/s IESCO:

IESCO approached the Authority, seeking intervention in the dispute with NTDC concerning the calculation of MDI totaling Rs. 1,513 million for the period from August, 2020 to June, 2021. This dispute arose during the process of load shifting to an alternate transformer in the event of a fault. Additionally, IESCO urged the Authority to devise a transparent mechanism or formula for calculating MDI in cases of outages, shutdowns, and load shifts to parallel transformers.

To address this issue, a Special Tribunal was established under Section 11 of the NEPRA Act, 1997. This tribunal conducted proceedings, facilitating extensive discussions and correspondence between the involved parties, namely NTDC and IESCO. Furthermore, multiple meetings and hearings were convened to deliberate on the matter. Following thorough deliberations, the dispute has been resolved. Subsequently, the comprehensive decision was communicated to both parties in February, 2023.

MAJOR REGULATORY ACTIVITIES

07

7.1 COMPETITIVE TRADING BILATERAL CONTRACT MARKET (CTBCM)

The establishment of a competitive wholesale electricity market has long been a key objective outlined in the 1992 Strategic Plan of the GOP. This initiative aimed to transition from a monopoly-based structure towards a more competitive framework by implementing measures such as unbundling, corporatization, and privatization across the electricity generation, distribution, and retail/supply sectors. However, for various reasons, the wholesale electricity market has remained in the implementation phase. Nevertheless, recent years have witnessed substantial efforts, bringing the realization of a competitive electricity market within reach.

During this period, the Authority diligently oversaw the execution of the CTBCM test-run plan, which had been approved alongside the issuance of the Market Operator Licence in May, 2022. Furthermore, the Authority actively monitored and provided necessary guidance to pertinent agencies, including PPIB, AEDB, CPPA-G, NTDC/NPCC, and DISCOs, in addressing challenges and attaining the desired outcomes as per the pending Action Items outlined in the CTBCM Implementation Roadmap of the Detailed Design determination in 2020.

A pivotal milestone of the year was the finalization of three pivotal regulations for the CTBCM: the NEPRA (Electric Power Procurement) Regulations, 2022, the NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022, and the NEPRA Licensing (System Operator) Regulations, 2022.

(i) Lifting of Moratorium

In accordance with Section 1(3) of the NEPRA Act, the NEPRA Amendment Act of 2018, a moratorium was granted to Sections 23A, 23B, 23G, and 23H. These sections were slated to come into force after a five-year period following the promulgation of the Amended NEPRA Act which was April 27, 2018. However, the Federal Government was authorized to lift the moratorium earlier by notification in the Gazette, if deemed necessary. The predetermined date for lifting the moratorium, according to Section 1(3) of the NEPRA Amended Act, was April 27, 2023, unless the Federal Government decided to take earlier action, which it did not.

The roles of both the Market Operator and the System Operator are pivotal for the smooth operation of the CTBCM. Given that these roles and functions are outlined in the aforementioned sections, it was necessary that they come into force prior to the initiation of the CTBCM.

As the Federal Government did not issue an earlier notification, as authorized by the NEPRA amended Act, therefore, the moratorium on the specified sections was lifted on April 27, 2023, following the expiration of five years. This activation of Sections 23A, 23B, 23G, and 23H paved the way for the initiation of CTBCM after the successful completion of the test run and declaration of the CMOD.

(ii) CTBCM Test Run Report

As stipulated in the Market Operator Licence and Market Commercial Code, CPPA-G was mandated to conduct a six-month test-run of the Market Commercial Code from June 01, 2022, to November 30, 2022, without imposing any financial obligations on market participants. Furthermore, CPPA-G was required to provide a comprehensive report of the test-run, in consultation with all stakeholders including NTDC/NPCC, DISCOs, etc., within seven (07) days, i.e., by November 07, 2022.

Regrettably, CPPA-G has failed to meet its obligation to submit the final test-run report within the specified time frame. The Authority viewed this approach by CPPA-G with utmost concern, as it has resulted in a delay in commencing the CTBCM. Consequently, the Authority is presently in the process of initiating legal proceedings against CPPA-G.

(iii) Use of System Charges

The determination of Use of System Charges (UoSC) is of paramount importance for the commencement of the CTBCM. This requirement is outlined in the NEPRA Open Access (Interconnection and Wheeling of Eletric Power) Regulations, 2022. Pursuant to the provisions of the regulation, DISCOs have submitted petitions for the determination of UoSC, all of which underwent thorough processing by the Authority.

Given the re-basing of tariffs, effective from July 2023, it became imperative to revisit the UoSC petitions previously submitted by DISCOs. Consequently, DISCOs were duly advised to furnish revised UoSC tariff petitions. This step is integral to the launch of the wholesale competitive electricity market, also recognized as the CTBCM.

(iv) Approval of Eligibility Criteria Rules

The NEPRA Amendment Act, 2018 stipulates that formulation of eligibility criteria rules is the responsibility of the Federal Government, while NEPRA is responsible for formulating Regulations for governing the licensee or registered persons manners, procedures, duties and responsibilities along with terms and conditions. The scope of rules is to prescribe the technical, human resource and solvency requirement etc. for the electric power services requiring licence or registrations under the Act.

The formulation of the Eligibility Criteria Rules for the Licensing and Registration of Eectric Power Services (Transmission, Distribution, Electric Supplier, Trader, Marker Operator, System Operator, and Registration) was awaited till the end of June 30, 2023. The Authority has already provided its input on the draft Rules highlighting to the Federal Government. The earliest notification of the Eligibility Criteria Rules is necessary for regulatory certainty and legal sanctity with respect to grant of licenses and registrations.

(v) Development and Notification of Regulations by NEPRA

The Authority has notified three important regulations pursuant to the NEPRA Act to provide the necessary enabling regulatory framework for the CTBCM. The regulations notified during the FY 2022-23 are:

(a) NEPRA (Electric Power Procurement) Regulations, 2022,
(b) NEPRA Licensing (System Operator) Regulations, 2022 and
(c) NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022

These Regulations provide the necessary regulatory framework for the procurement of electric power by suppliers of last resort, provision of open access by network licensees, and rights and obligations of the System Operator. In addition to the said, Regulations pertaining to Performance Standards for Distribution, System Operator, Market Operator, and Electric Power Trader Licensees remained under preparation.

(vi) Grid Code

Pursuant to Section 23H of the Act, the System Operator has to prepare a Grid Code to regulate its operations, standards of practice and business conduct, and to enable it to carry out its functions as a System Operator. The earlier Grid Code was notified in 2005 and was deficient in providing the framework required for CTBCM and other dynamics of the power sector that change over time.

After extensive stakeholders' consultation including general public, the Authority approved the Grid Code 2023 in January 2023, along with licence to the System Operator. The revised Grid Code provides for, inter-alia, the non-discriminatory open access by the transmission network operators, the roles and responsibilities of Metering Service Provider, long-term system planning by the System Operator, and coordination of the independent System Operator with the Transmission Network Operators, etc.

(vii) Agency Code

Under the previous single-buyer regime, CPPA-G operated as an agent of the DISCOs, with its functions regulated by the Commercial Code. The Authority has now approved the Market Commercial Code, which governs the operations of the Market Operator. Consequently, the existing Commercial Code will undergo substantial revisions to accommodate CPPA-G's modified role as an agent of the DISCOs for handling legacy contracts, and it has been renamed as Agency Code.

The Agency Code, which was submitted by CPPA-G along with the application for registration as a Special Purpose Agent, is currently under review by the Authority and will be finalized very soon.

(viii) Distribution Code

Following the initiation of the CTBCM, a comprehensive overhaul of the existing Distribution Code is imperative to incorporate provisions related to the competitive electric power market. This encompasses aspects such as non-discriminatory open access and harmonization with the Market Settlement Point, among others.

Pursuant to NEPRA Amendment Act of 2018, the functions of supply have been separated from distribution functions. As a result, the revised Distribution Code will not encompass matters related to the supply of electric power, which will be addressed in the Consumer Supply Manual.

To fulfill this requirement, DISCOs have engaged a consultant to conduct a thorough review and overhaul of the existing Distribution Code. Active discussions and consultations among stakeholders are currently underway. The revised draft of the Distribution Code will be finalized and submitted to NEPRA for the necessary approval process very soon.

(ix) Connection Agreements

Connection Agreements between DISCOs, NTDC, and generators have been a continuous requirement and have been in practice, albeit in varying forms. With the introduction of CTBCM, it becomes crucial to delineate the new roles and responsibilities of the parties involved in signing the Connection Agreements. Thus, as part of the approval process for the CTBCM Implementation Roadmap, the Authority directed the relevant entities to draft Connection Agreements for submission.

MEPCO, representing all DISCOs, submitted draft Connection Agreements to the Authority. Upon review, significant deficiencies were noted. These observations were communicated to the DISCOs' working group, with instructions to revise the draft Connection Agreements and resubmit them for Authority approval.

Concurrently, PPIB has acquired the services of an international consultant to prepare the Security Package Documents for the CTBCM, which also encompass the Connection Agreements. It is imperative that all Connection Agreements align seamlessly with one another. The submitted Connection Agreements from the DISCOs required substantial revisions. Consequently, the Authority directed both the DISCOs and PPIB to collaborate in the preparation of Connection Agreements for approval.

(x) Use of System Agreement

Pursuant to Regulation 5 of the NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022, the DISCOs were mandated to create and present to the Authority for approval of the Use of System Agreements. These agreements delineate the entitlements and responsibilities of both the open access user and the respective network licensee for provision of open access. The DISCOs have duly submitted the draft Use of System Agreements, which are currently under review and consideration.

(xi) Market-based Security Package Documents

The creation of Security Package Documents stands as a pivotal task by NEPRA in the CTBCM Implementation Roadmap. These Security Package Documents are crafted in alignment with the ratified wholesale market design for the CTBCM and are intended to displace existing agreements like the EPA, PPA, and IA.

To this end, PPIB has acquired the services of an International Consultant, for the formulation of Security Package Documents pertaining to the CTBCM. NEPRA has been urging PPIB to expedite the development and submission of these documents for regulatory approval. However, despite the passage of over two years, PPIB has yet to conclude and present the finalized Security Package Documents.

The creation of Security Package Documents is a pivotal step in transitioning from the single-buyer regime to a bilateral contracts market. It is therefore imperative for PPIB to actively drive the prompt development of these documents, ensuring a smooth shift to the bilateral contract market.

(xii) Capacity Building of Power Sector Entities

To ensure comprehensive understanding and proficient participation in the wholesale electricity market/ CTBCM, the Authority launched capacity-building initiative, marking one of the most significant programs in the power sector. CPPA-G was entrusted as the lead agency for orchestrating this training endeavor. Over the last fiscal year, a range of training courses were conducted in physical settings. These encompassed Generation Planning, Transmission Planning, Load Forecasting, orientation sessions for entities' Boards of Directors and Senior Management, as well as the Electricity Market Professionals program. Additionally, a series of six consultative workshops on the CTBCM Test Run were organized.

In addition to the physical workshops, an online training platform was also deployed. Approximately nineteen online sessions focused on Contract Management & Regulatory Affairs were delivered. This comprehensive training program has resulted in the certification of over 100 professionals and a cumulative of 5000+hours dedicated to professional development.

7.2 INDICATIVE GENERATION CAPACITY EXPANSION PLAN (IGCEP)

In September 2022, NTDC, in adherence to the relevant provisions of the Grid Code, submitted the second iteration of the IGCEP 2022-31 for review and approval by the Authority. A public hearing on this matter took place on October 19, 2022, which saw the participation of pertinent stakeholders and the general public. Subsequently, the Authority thoroughly deliberated on the subject and approved the IGCEP 2022-31 through its determination issued on February 01, 2023.

In alignment with the Authority's directives, NTDC has presented the Assumption Set for the preparation of the forthcoming IGCEP 2023-32 for its consideration and approval. In May, 2023 a hearing involving relevant stakeholders, including CPPA-G, AEDB, PPIB, Energy Departments of Provincial Governments, DISCOs, and KE was conducted. Presently, the Assumption Set is being reviewed by the Authority for its final approval.

7.3 LICENSING

(i) Generation Licenses

In pursuance to the NEPRA Act provisions, during the FY 2022-23, NEPRA processed a total of twenty-four (24) applications for generation licenses, accounting for an installed capacity of 2,398.96 MW. These applications were at various stages of processing. Among them, six (06) applications were new cases, collectively representing an installed capacity of 21.507 MW.

During the year, twelve (12) licenses were granted, which included two (02) Micro Grid Licenses. These licenses amounted to a total installed capacity of 1,430.492 MW. The remaining applications are currently in different stages of processing. Below is the list of generation/micro-grid licenses issued during the aforementioned period:

S. No.	Name of Licensee	Installed Cap. (MW)	Fuel	Licence	Date of Issuance
1	Burj DG (Pvt.) Limited	0.25	Solar	SGC/168/2022	29 July, 2022
2	Burj DG (Pvt.) Limited	0.40	Solar	SGC/169/2022	29 July, 2022
3	Burj DG (Pvt.) Limited	0.25	Solar	SGC/170/2022	29 July, 2022
4	GSolar Power (Pvt.) Limited	4.79	Solar	SGC/171/2022	29 July, 2022
5	GSolar Power (Pvt.) Limited	1.93	Solar	SGC/172/2022	29 July, 2022
6	Gorkin-Matiltan – PEDO	88.30	Hydel	GL(Hydel)/18/2022	15 September, 2022
7	Balakot – PEDO	300.00	Hydel	GL(Hydel)/19/2022	22 November, 2022
8	NPGCL (GENCO-III)	565.65	Thermal	GL/28/2022	25 January, 2023
9	KOAK Power Limited	229.40	Hydel	IGSPL/109/2023	12 June, 2023
10	KA Power Limited	238.20	Hydel	IGSPL/110/2023	12 June, 2023
11	Quaid-e-Azam Solar Power	0.60	Micro-grid	MGL/01/2023	17 January, 2023
12	Quaid-e-Azam Solar Power	0.7215	Micro-grid	MGL/02/2023	17 January, 2023
Total Installed Capacity		**1,430.492**			

Source: NEPRA

(ii) Distribution Licenses

In the FY 2022-23, eight (08) distribution licenses were issued to DISCOs, namely IESCO, PESCO, GEPCO, LESCO, MEPCO, QESCO, FESCO, and HESCO. In addition to the issuance of distribution licenses to aforementioned DISCOs, ten (10) applications for the grant of distribution licenses are currently under process. These include KE, five (05) projects of PIEDMC, Rashakai Special Economic Zone, Bahria Town (Rawalpindi/Islamabad), Bahria Town (Lahore), and PECHS Valancia, Lahore.

(iii) Transmission Licenses (PGC)

In accordance with Section 18(A) of the NEPRA Act; one (01) application from Punjab Grid Company Limited, seeking a licence to serve as the Provincial Grid Company (PGC) for the Province of Punjab, has been submitted and is currently under processing.

(iv) Supplier Licenses

As per Section 23E of the amended NEPRA Act, the Authority is currently reviewing twenty-three (23) applications for the issuance of Supplier Licenses. These applications were submitted by IESCO, PESCO, GEPCO, LESCO, MEPCO, QESCO, FESCO, HESCO, SEPCO, TESCO, KE, and various projects under PIEDMC, including Sundar, Vehari, Bhalwal, Rahim Yar Khan, and Sheikhupura. Additionally, applications from Rashakai Special Economic Zone, Maple Leaf Power Limited, Lucky Energy (Pvt.) Limited, Shams Power Limited, Innovative Energy Solutions (Pvt.) Limited, Aquagen (Pvt.) Limited, and Nishat Mills Limited are also under consideration.

(v) Net-Metering Licenses

In the FY 2022-23, a total of 1,596 Net-Metering Licenses were issued, representing a cumulative installed capacity of 221.05 MW. The detailed breakdown of the Net-Metering Licenses issued during this period is given in the following table:

DISCO	PESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	KE	DHA (EME)
Net-Metering Lic. Issued (No.)	44	136	116	331	183	292	25	6	3	458	2
Installed Cap. (MW)	6.16	13.76	20.02	51.52	25.03	48.89	5.91	6.0	0.50	48.12	0.25

Source: NEPRA

(vi) Modifications in the Existing Licenses

The Authority reviewed and approved seven (07) cases related to Licensee Proposed Modifications within the existing generation licenses. The details of the modified licenses are given in the following table:

S. No.	Name of Licensee	Licence No.	Modification/ Decision Issued
1	Access Solar (Pvt.) Limited	SPGL/03/2013	28 July, 2022
2	Access Electric (Pvt.) Limited	SPGL/05/2014	03 August, 2022
3	Northern Power Generation Company Limited	GL/03/2002	25 January, 2023
4	Pakistan Steel Mills Corporation (Pvt.) Limited	SGC/41/2008	26 January, 2023
5	UEP Wind Power (Pvt.) Limited	WPGL/22/2013	01 March, 2023
6	National Transmission and Despatch Company Limited	TL/01/2002	21 March, 2023
7	Trans-Atlantic Energy (Pvt.) Limited	WPGL/43/2017	23 June, 2023

Source: NEPRA

(vii) Cancellation of Licenses

In the specified period, the Authority, upon request from licensees, revoked four (04) generation licenses. The details of the revoked licenses are given in the following table:

S. No.	Name of Licensee	Licence No.	Cancellation Date
1	Ramzan Sugar Mills Limited	SGC/92/2013	01 November, 2022
2	Al-Arabia Sugar Mills Limited	SGC/126/2018	01 November, 2022
3	Digri-Gen Limited	IGSPL/102/2018	26 December, 2022
4	Shams Power (Pvt.) Limited	SGC/135/2020	13 April, 2023

Source: NEPRA

(viii) Registration of AEDB and PPIB as Independent Auction Administrator (IAA)

The amendments made to the NEPRA Act in 2018 were aimed at fostering the development of a competitive electric power market in the country. This involved the introduction of new categories of licenses and the registration of other market participants and service providers. In alignment with these amendments, the Authority gave its approval for both the high-level and detailed design of the CTBCM.

As per the detailed design of the CTBCM, a registered entity will play the role of an Independent Auction Administrator (IAA). Its primary function will be to assist DISCOs and Suppliers of Last Resorts (SoLR) in meeting their capacity obligations through the procurement of new capacity. This registered entity will also oversee competitive auctions for the approved capacity procurement plan.

Subsequently, PPDB and AEDB have each submitted separate applications under Section-25A of the NEPRA Act to serve as IAAs. These applications from AEDB and PPIB, seeking to act as IAAs, are currently in an advanced stage of processing.

(ix) Grant of System Operator Licence to NTDC

The Section 23G of the NEPRA Act outlines the separation of the System Operator function from the NGC. This entails the responsibility of overseeing system operation, dispatch, and integrated planning for the nation's power system.

To comply with this provision, NTDC submitted an application for the issuance of a System Operator Licence on August 24, 2022, alongside the draft Grid Code 2023 for the Authority's approval.

After thorough consideration, the Authority granted the System Operator licence to NTDC and approved the Grid Code 2023. Furthermore, the Authority notified the NEPRA Licensing (System Operator) Regulations, 2022, in accordance with the relevant provisions of the NEPRA Act. These regulations serve to delineate the functions, responsibilities, and terms & conditions of the System Operator in conducting efficient and economically viable system operations.

(x) Registration of CPPA-G as Special Purpose Agent

The comprehensive design of the CTBCM outlines a restructuring and division of functions currently held by CPPA-G. This includes the establishment of two distinct roles: (i) Market Operator, tasked with the development and administration of the market; and (ii) Special Purpose Agent, responsible for managing the existing legacy contracts currently overseen by CPPA-G.

In accordance with this framework, CPPA-G has filed an application for registration as Special Purpose Agent, along with the assigned Agency Code, to undertake these functions. The application is currently under review by the Authority.

(xi) Proposed Amendments and Formulation of Connectivity Standards Regulations in light of Section -14B of the NEPRA Act

Pursuant to Section 14(B) of the NEPRA Act, generation companies are required to obtain 'concurrence' after five (05) years from the amendment of the Act. Following this period, any generation company seeking to establish a generating facility must develop and submit a comprehensive scheme covering financial, geological, hydrological, technical, safety, and environmental aspects to the Authority for its approval.

As above, amendments to the relevant regulations have been initiated to align them with the provisions of the NEPRA Act. Additionally, a draft of the NEPRA Generation (Connectivity Standards) Regulations, 2023 has been drafted and will be finalized as stipulated in Section 47(3) of the NEPRA Act.

7.4 TARIFF

NEPRA, the regulatory authority, is responsible for setting tariffs for Generation, Transmission, Distribution, and Supply across different categories of licensees. The detailed procedure for tariff determination is outlined in the NEPRA (Tariff Standards & Procedure) Rules, 1998. During the FY 2022-23, NEPRA finalized tariffs for a range of generation technologies as well as for electric power distribution and supply companies.

(i) Hydropower Projects

During the year, following Tariff Determinations, Modification, Review Decisions, and Adjustments/ Indexations were issued:

List of Tariff Determinations, Modification and Review Decisions

S. No.	Name of the Plant	Capacity (MW)	Determination Date	Decision Sought
1	Ravi HPP	4.6	29-07-2022	Motion for Leave for Review
2	Uzghor HPP	82.25	29-07-2022	Motion for Leave for Review
3	WAPDA	8,420	29-12-2022	Motion for Leave for Review
			29-09-2022	Modification in Tariff
4	Pehur HPP	18	06-10-2022	Modification in Tariff
5	Shishi HPP	1.875	22-02-2023	Motion for Leave for Review

Source: NEPRA

List of Tariff Adjustments/Indexation of Tariff

S. No.	Name of Project
1	**Karot Hydropower Project:** **Decision Dates:** 09-02-2023, 29-05-2023
2	**Laraib Hydropower Project:** **Decision Dates:** 07-07-2022, 27-07-2022, 01-08-2022, 04-10-2022, 28-10-2022, 01-02-2023, 29-05-2023
3	**Patrind Hydropower Project:** **Decision Dates:** 17-08-2022, 30-08-2022, 16-10-2022, 01-02-2023, 21-02-2023, 20-04-2023, 09-06-2023
4	**Malakand-III Hydropower Project:** **Decision Dates:** 04-10-2022, 27-12-2022, 12-04-2023, 16-06-2023
5	**Jagran-I Hydropower Project:** **Decision Date:** 05-05-2023
6	**Gulpur Hydropower Project:** **Decision Dates:** 01-02-2023, 12-04-2023, 10-10-2022

Source: NEPRA

(ii) Solar Power Projects

During the FY 2022-23, NEPRA made tariff determinations for three Solar PV Projects: Zorlu Solar Pakistan Limited (100 MW), Access Electric (Pvt.) Limited (10 MW), and Access Solar (Pvt.) Limited (11.52 MW), in accordance with NEPRA's Tariff (Standards and Procedure) Rules, 1998. The levelized tariffs approved were US Cents 3.9017/kWh, US Cents 4.5586/kWh, and US Cents 4.5950/kWh, respectively.

During the same reporting period, Siachen Energy Limited (100 MW) submitted a tariff petition for approval of generation tariff. However, due to incomplete information, the Authority returned the petition.

During the FY 2022-23, the Atlas Solar Limited (ASL) (100 MW) [formerly Zhenfa Pakistan New Energy Company (Pvt.) Limited] submitted an application for tariff adjustment, true-up, at the COD. The verification process of the submitted documents is currently underway. The ASL achieved commercial operation in FY 2021-22.

During FY 2022-23, CPPA-G filed a motion for leave for review against the determinations of the Authority in respect of Zorlu Solar Pakistan Limited, Access Electric (Pvt.) Limited, and Access Solar (Pvt.) Limited. Hearings for these review motions were conducted, and subsequently, the Authority re-evaluated the determinations for these solar IPPs and issued a decision. The approved levelized tariffs for Zorlu Solar Pakistan Limited, Access Electric (Pvt.) Limited, and Access Solar (Pvt.) Limited were US Cents 3.9017/kWh, US Cents 4.5586/kWh, and US Cents 4.5950/kWh respectively.

(iii) Wind Power Projects

During FY 2022-23, the Authority issued a decision on Master Green Energy Limited true-up application, approving a levelized tariff of US Cents 4.4450/kWh.

Following the successful achievement of Commercial Operation during FY 2021-22, the eleven (11) Wind Power Projects, namely, Lucky Renewables (Pvt.) Limited [formerly Tricom Wind Power (Pvt.) Limited], Gul Ahmed Electric Limited, Din Energy Limited, Act 2 Din Wind (Pvt.) Limited (formerly Act2 Wind (Pvt.) Limited), Artistic Wind Power (Pvt.) Limited, Metro Wind Power Limited, NASDA Green Energy (Pvt.) Limited, Liberty Wind Power 1 (Pvt.) Limited, Liberty Wind Power 2 (Pvt.) Limited, Lakeside Energy (Pvt.) Limited, and Indus Wind Energy Limited, collectively with a capacity of 610 MW, commenced electricity delivery to the National Grid. The verification process for claimed project costs, along with other financial parameters and submitted information of the remaining wind IPPs, is currently underway.

(iv) Bagasse-based Power Projects

During FY 2022-23, the Authority issued decision in respect of the Tariff Modification Petition filed by Shahtaj Sugar Mills Limited regarding Generation Tariff of its bagasse based project. A levelized tariff of Rs. 9.0611/kWh was approved for a tariff control period of thirty years.

Furthermore, in accordance with the Judgment of the NEPRA Appellate Tribunal dated November 18, 2022, and following the Ministry of Energy's (Power Division) letter dated December 18, 2020, which urged NEPRA to rationalize the bagasse price for cogeneration projects, the Authority held a hearing involving stakeholders. The case is currently in progress.

(v) Indexation/Adjustment of RE Tariff

In line with the indexation mechanism outlined in the Authority's decisions/determination for Wind, Solar and Bagasse based power generation companies, the relevant components underwent adjustments on quarterly, bi-annual and/or annual basis. The adjustments were made to account for variation in US CPI, Local CPI (General), Exchange Rate, and KIBOR/LIBOR. Throughout the reporting period, the Authority issued decision pertaining to these IPPs.

S. No.	Name of IPPs	S. No.	Name of IPPs
1	Quaid-e-Azam Solar Power (Pvt.) Limited	22	Artistic Energy (Pvt.) Limited
2	Apollo Solar Development Pakistan Limited	23	Zephyr Power (Pvt.) Limited
3	Best Green Energy Pakistan Limited	24	FFC Energy Limited
4	Crest Energy Pakistan Limited	25	Zorlu Enerji Pakistan Limited
5	Harappa Solar (Pvt.) Limited	26	Foundation Wind Energy-I (Pvt.) Limited
6	AJ Power (Pvt.) Limited	27	Foundation Wind Energy-II (Pvt.) Limited
7	Oursun Pakistan Limited	28	Metro Power Company Limited
8	Gharo Solar (Pvt.) Limited	29	Sachal Energy Development (Pvt.) Limited
9	Act Wind (Pvt.) Limited	30	Master Green Energy Limited
10	Yunus Energy Limited	31	JDW Sugar Mills Limited (Unit-II)
11	Sapphire Wind Power Company Limited	32	JDW Sugar Mills Limited (Unit-III)
12	HydroChina Dawood Power (Pvt.) Limited	33	Chiniot Power Limited
13	UEP Wind Power (Pvt.) Limited	34	RYK Mills Limited
14	Master Wind Energy Limited	35	Hamza Sugar Mills Limited
15	Gul Ahmed Wind Power Limited	36	Al-Moiz Industries Limited
16	Tenaga Generasi Limited	37	Thal Industries Corporation Limited
17	Hawa Energy (Pvt.) Limited	38	Chanar Energy Limited
18	Jhimpir Power (Pvt.) Limited	39	Tricon Boston Consulting Corporation (Pvt.) Limited-A
19	Three Gorges First Wind Farm (Pvt.) Limited	40	Tricon Boston Consulting Corporation (Pvt.) Limited-B
20	Three Gorges Second Wind Farm (Pvt.) Limited	41	Tricon Boston Consulting Corporation (Pvt.) Limited-C
21	Three Gorges Third Wind Farm (Pvt.) Limited		

Source: NEPRA

(vi) RFO-based Power Plants

During FY 2022-23, the Authority issued following decision or determinations:

(a) On December 1, 2022, the Authority granted immediate application of the proposed tariff for Gul Ahmed Energy Limited with a gross capacity of 136.17 MW.

(b) In compliance with the directives of the Islamabad High Court regarding the Plea Bargain amount adjustments in the tariffs of SNPC-I and SNPC-II, a decision was made on January 16, 2023. This decision pertains to NEPRA's earlier determinations issued on June 1, 2016, and August 4, 2017.

(c) On January 23, 2023, the Authority gave its determination, for a period of two years, in the matter of Tariff Petition filed by Tapal Energy (Pvt.) Limited for approval of generation tariff for its RFO based power plant having a gross power generation capacity of 126 MW.

(d) On February 22, 2023, the Authority gave its determination, for a control period of two years, in the matter of Tariff Petition filed by Gul Ahmed Energy Limited for approval of generation tariff for its RFO Based Power Plant having a gross capacity of 136.17 MW.

(vii) Coal-based Power Plants

During FY 2022-23, the Authority addressed the following petitions and applications related to coal-based power plants:

(a) The Authority approved guidelines for the procurement of coal on a spot basis for coal power projects.

(b) Decision was made in the matter of Motion for Leave for Review filed by FFBL against the Authority's Decision dated June 20, 2022, regarding the Tariff Modification Petition for the sale of 52 MW Power to KE, was considered. The decision was issued on December 26, 2022.

(viii) Indexation/Adjustment of Thermal Tariffs

The Indexation/adjustments approved by the Authority during FY 2022-23 is given in the following table:

Adjustments	Quantity
Monthly Adjustment	286
Quarterly Adjustment	162
Annual Adjustment	40
Total	**488**

Source: NEPRA

(ix) Distribution and Supply Tariff (KE)

The MYT determination for KE, dated July 05, 2018, was notified vides SRO No. 576(I)/2019 dated May 22, 2019. This notified MYT outlines a mechanism for adjustments to the approved tariff on a monthly, quarterly, and annual basis.

(x) Distribution and Supply Tariff (DISCOs)

NEPRA set the tariff for DISCOs from FY 2020-21 to FY 2022-23. The determined national average tariff stands at Rs. 24.82/kWh, a notable increase of Rs. 7.91/kWh compared to the previous average tariff of Rs. 16.91/kWh. This revised tariff was notified by the Federal Government with effect from July 25, 2022. The rise of Rs. 7.91/kWh is primarily attributed to elevated fuel prices, the addition of new plant capacities (such as Coal, Nuclear, and RLNG Power Plants), exchange rate fluctuations, and inflationary factors.

DISCOs, FESCO with regard to MYT adjustment/indexation decision, and GEPCO, MEPCO, HESCO, SEPCO, PESCO, and QESCO in response to MYT determinations, have submitted motions for leave for reviews. These motions were subsequently decided by the Authority. Both the NEPRA Act and the notified decisions outline a framework for implementing specific adjustments in the approved tariff on a monthly and quarterly basis.

(xi) Market Operator Fee (CPPA-G)

The Authority determined the Market Operator fee of CPPA-G for FY 2022-23 on November 23, 2022, and forwarded it to the Federal Government for notification in the Official Gazette of Pakistan. Aggrieved with the Authority's determination, CPPA-G, submitted a Motion for Leave for Review. This motion was subsequently decided by the Authority on May 22, 2023. The decision was then conveyed to the Federal Government for notification in the Official Gazette.

7.5 CONSUMER AFFAIRS

The NEPRA is responsible for receiving and addressing complaints from electricity consumers against the Licensees. These complaints typically involve issues such as excessive or incorrect billing, un-justified detection bills, delays in providing new connections, replacement of faulty meters, low voltage problems, delayed augmentation of transformers, replacement of damaged transformers, non-receipt of electricity bills, and excessive or unscheduled load-shedding. The status of these complaints is closely monitored and tracked by NEPRA to ensure timely resolution and improved service delivery.

Status of Consumer Complaints (Head Office & Regional Offices) (July, 2022 – June, 2023)

DISCO	Total Complaints Received/Processed	Total Complaints Disposed Off	Under Process
PESCO	638	372	266
TESCO	3	2	1
IESCO	313	284	29
GEPCO	423	377	46
LESCO	3536	3195	341

DISCO	Total Complaints Received/Processed	Total Complaints Disposed Off	Under Process
FESCO	723	606	117
MEPCO	827	754	73
HESCO	1125	1043	82
SEPCO	732	661	71
QESCO	167	110	57
KE	10,097	9,886	211
Pakistan Citizen Portal	255	255	0
Total	**18,839**	**17,545**	**1,294**

Source: NEPRA

(i) Other Highlights/Developments

(a) In October and November of 2022, an online open forum named "Khuli Kachehri" was convened to address concerns and complaints of the consumers of KE and DISCOs. This platform proved instrumental in resolving consumers' issues.

(b) Based on the valuable feedback received during the Khuli Kachehri, all DISCOs have been directed to provide consumers with a minimum of seven (07) clear days for payment of their electricity bills. In instances of delayed bill delivery, DISCOs are obligated to extend the payment deadline, ensuring that consumers are not burdened with Late Payment Surcharges (LPS).

(c) The Consumer Service Manual (CSM) has been revised, eliminating the three-year-old connection restriction for load extension from 5 MW to 7.5 MW for industrial connections, facilitating smoother operations for businesses in the sector.

(d) Electric inspectors have been instructed to carry out thorough assessments of the internal distribution systems for individual consumers receiving single-point supply for further distribution. This proactive measure aims to eradicate any potential risks or hazards.

(e) DISCOs were directed to include clear instructions in Urdu on electricity bills regarding the process for filing complaints with both the NEPRA and Provincial Office of Inspection (POIs).

(f) All DISCOs are mandated to strictly comply with the timelines specified for consumer cases involving Distributed Generation facilities. These timelines are outlined in Clause 3 of the NEPRA (Alternative & Renewable Energy) Distributed Generation and Net-Metering Regulations, 2015. This ensures a streamlined and efficient process for consumers seeking to commission distributed generation systems.

(g) Explanation letters have been served to DISCOs that have billed or are currently billing electricity consumers for detection bill based on energy meter slowness for a duration exceeding two (2) billing cycles. This practice stands in violation of the stipulations set forth in the CSM.

(h) DISCOs have been instructed to immediately rectify detection bills, in upcoming bills, issued to the consumers due to energy meter slowness or defectiveness, exceeding two billing cycles. Further, it is mandated that these companies take decisive disciplinary action against the officials accountable for these erroneous billing practices.

(i) A consultative session was convened with DISCOs on May 15, 2023, to deliberate on proposed amendments to the CSM.

(j) HESCO, SEPCO, PESCO, and TESCO were directed to furnish explanations for the low recovery ratios against the detection bills. These DISCOs are required to justify their position that these detection bills are not issued primarily for the purpose of managing T&D losses.

(k) The Authority convened Public Hearings on May 10, 2023, and June 06, 2023, to address matters concerning the application of Fixed Charges and Tariffs for Cold Storages.

(l) All DISCOs have been directed to accord top priority to the supply of electricity for industrial and commercial entities, as per directives from the Prime Minister of Pakistan conveyed through the Task Management System.

(m) NEPRA Regional Offices have been instructed to carry out unscheduled audits on DISCOs'

complaint resolution mechanisms throughout the summer season, guaranteeing high-quality service provision to consumers. Moreover, DISCOs are mandated to uphold easily accessible records of complaint resolution and allocate dedicated teams/officers to ensure the swift and effective resolution of consumer grievances.

(n) In order to enhance consumer service, all DISCOs have been obligated to reinstate electricity supply within four (04) working days following the completion of necessary procedural formalities in cases of temporary disconnection.

(o) All DISCOs have been directed to promptly furnish reports on complaints referred by the Consumer Affairs Department within a strict timeframe of seven (07) days for expedited resolution.

(p) DISCOs have been directed to replace transformers that have been in operation for more than twenty (20) years and are no longer deemed viable for continued use. Furthermore, it is mandatory that all essential tests, including grounding/earthling, to be conducted to ensure the safe and secure utilization of these transformers.

(q) Efforts are underway to develop a mobile application that will facilitate consumers in lodging complaints against all DISCOs.

(r) NEPRA is currently in the process of creating an electricity bill estimator/calculator, which will be made accessible on the NEPRA website. This tool is designed to offer consumers a convenient means of estimating their electricity bills.

(s) A connection cost estimator will soon be accessible on the NEPRA website, simplifying the process for prospective consumers to assess the expenses associated with new connections. This tool aims to provide a user-friendly platform for individuals seeking to establish new connections.

(t) NEPRA has commenced the modernization and automation process for its Regional Offices, with initial focus on the offices in Lahore and Karachi. This strategic step aims to enhance operational efficiency and effectiveness in key regions.

(u) During the reporting period, the Consumer Affairs Department conducted a comprehensive total of 3,236 hearings, which encompassed a combination of online sessions, Head Office meetings, and meeting at Regional Offices. These proceedings led to the issuance of decision and instructions, further reinforcing consumer-centric initiatives.

7.6 NEPRA APPELLATE BOARD

The Authority has established an Appellate Board to adjudicate on appeals received in NEPRA against decisions made by the Provincial Offices of Inspection under Section 38 of the NEPRA Act, 1997. The table below illustrates the status of appeals and review petitions deliberated by the Appellate Board during the FY 2022-23:

(i) Appeals

DISCO	Pending as on 01 July, 2022	Filed from 01st July, 2022 to 30th June, 2023	Total	Decided	Balance as on 30th June, 2023
PESCO	2	13	15	6	9
TESCO	0	1	1	0	1
IESCO	12	5	17	8	9
GEPCO	26	9	35	14	21
LESCO	107	28	135	51	84
FESCO	51	16	67	40	27
MEPCO	16	21	37	22	15
HESCO	5	1	6	5	1
KE	6	10	16	12	4
Total	**225**	**104**	**329**	**158**	**171**

Source: NEPRA Appellate Board

(ii) Review Petitions

DISCO	Pending as on 01 July, 2022	Filed from 01st July, 2022 to 30th June, 2023	Total	Decided	Balance as on 30th June, 2023
IESCO	4	1	5	3	2
LESCO	5	0	5	1	4
FESCO	1	0	1	1	0
MEPCO	0	1	1	1	0
KE	7	0	7	6	1
Total	**17**	**2**	**19**	**12**	**7**

Source: NEPRA Appellate Board

7.7 CYBER SECURITY OF POWER SECTOR CRITICAL INFRASTRUCTURE

As part of its "Power with Security" initiative, NEPRA is actively enforcing cyber security measures within Pakistan's Critical Power Infrastructure. The NEPRA (Security of Information Technology and Operational Technology) Regulations, 2022, were published in the Official Gazette of Pakistan on September 6, 2022. NEPRA has issued directives to all licensees to provide their compliance reports in response to these regulations. Currently, fifty (50) licensees have submitted their compliance reports, and one hundred and twenty-five (125) licensees have designated focal points for reporting and coordinating in the event of a Cyber Security Incident.

A thorough and impactful cyber security awareness campaign has been carried out among NEPRA Licensees, with the aim of instilling a culture of cyber security and disseminating the implementation roadmap for NEPRA's Cyber Security IT/OT Regulations. Cyber security experts from well-known international organizations participated and shared their experiences during these sessions. The details of webinars and workshops held in this regard are given below:

(a) August 16, 2022: Webinar held on "Cyber Security Challenges in Critical Infrastructure (Power Sector)" by LUMS and ACET Solutions
(b) September 13, 2022: Workshop held on "Cyber Incident Response Management" in collaboration with CY4Gate, Itlay and TechAccess
(c) November 4, 2022: Webinar held on "Role of CERT in 21st Century" by Security Experts
(d) December 9, 2022: Webinar held on "Cyber Security Roadmap – Practitioner's Approach" by KE and Server4Sale
(e) December 16, 2023: Webinar held on "Cyber Security Roadmap – Practitioner's Approach" by NREL, USA and Kaspersky
(f) January 11, 2023: Webinar held on "Cyber Security Roadmap – Practitioner's Approach" by Bahria University and Supersecure
(g) February 15, 2023: Webinar held on "Power Sector Cyber Security Threats and Way Forward" by Engro and ACET Solutions
(h) May 16, 2023: Workshop held on "NEPRA Security IT/OT Regulations – Implementation Roadmap" by Siemens , UAE and ACET Solutions
(i) June 12, 2023: Webinar held on "NEPRA Security IT/OT Regulations – Implementation Roadmap" by KE and Engro Powergen
(j) June 20, 2023: Webinar held on "NEPRA Security IT/OT Regulations – Implementation Roadmap – Distribution Network" by USAID, LUMS and PITC

In accordance with regulation 12 of the NEPRA (Security of Information Technology and Operational Technology) Regulations, 2022, the Authority established the Power CERT (Cyber Emergency Response Team) on February 2, 2023. The team comprises proficient in the field of cyber security. Ten members from diverse stakeholders, including power sector licensees, industry experts, and academia. Subsequently, the Power CERT portal was launched, providing a platform for disseminating vital cyber security alerts and advisories to NEPRA licensees.

Demonstrating a steadfast commitment to collaboration and cooperation, NEPRA entered into a Memorandum of Understanding (MOU) with the Pakistan Telecommunication Authority on September 12, 2022. This MOU facilitates seamless information sharing and mutual coordination between the two entities, fortifying their joint efforts in safeguarding Pakistan's critical infrastructure.

7.8 CORPORATE SOCIAL RESPONSIBILITY (CSR)

The NEPRA CSR launched its dedicated CSR Data Portal in October, 2021. To date, a total of 316 NEPRA Licensees and 46 Social Welfare Organizations (SWOs) have successfully registered under the "Power with Prosperity" (PwP) initiative. As part of the PwP Drive, NEPRA spearheaded several commendable initiatives throughout the year.

On December 16, 2022, NEPRA hosted the 2nd NEPRA CSR Award Ceremony to acknowledge the outstanding contribution of NEPRA Licensees towards community development through their CSR endeavors. The following NEPRA Licensees secured top positions based on their exceptional services in the field of community development:

(a)	Pakistan Atomic Energy Commission	Gold Award (Winner)
(b)	K-Electric Limited	Silver Award (1st Runner Up)
(c)	Pakhtunkhwa Energy Development Organization	Bronze Award (2nd Runner Up)

Akhuwat Foundation established a PwP Fund wherein, 04-NEPRA Licensees i.e. KE, Engro Energy, KAPCO and Port Qasim Electric Power participated under PwP Fund for provision of Interest Free Solar Loans to the local communities on easy installments for solarization of communities. As per latest progress review report by the Akhuwat, Solar Loans have been provided to 311 applicants through its 61 operating branches in the country.

During FY 2022-23, Chairman, NEPRA visited the following Licensees and SWOs to witness their CSR activities:

(a) Children Emergency Rooms established by Childlife Foundation at PIMS Hospital, Islamabad and Civil Hospital, Karachi.
(b) JDC's projects including JDC Free IT City and JDC's First Largest Mortuary established in Karachi.
(c) Disabled Welfare Association which is doing remarkable work for the persons with disabilities to empower, nurture and grow them enabling to meet the real-time challenges of life.
(d) SAHARA for Life Trust, Sahara Medical College, Narowal and Sughra Shafi Hospital run by the trust of Mr. Abrar-ul-Haq.
(e) SOS Children Village Karachi and lauded their performance to support the orphans.
(f) Site of Lucky Cement Limited to inaugurate the PwP wall built by them.
(g) Indus Hospital, Karachi established newly block as well as other facilities provided to patients.
(h) Star School for Girls run by Pakistan Alliance for Girls Education (PAGE) in Badia Qadir Baksh, Islamabad.

In line with NEPRA CSR's vision, a series of CSR Webinars were conducted during the FY 2022-23, enlisted hereunder:

(a) August 3, 2022: Webinar for Engagement of SWOs held wherein PAGE Foundation, Transparent Hands and Hands Pakistan showcased their CSR agendas in front of NEPRA licensees.
(b) August 23, 2022: Webinar on Rehabilitation of Balochistan's Flood Affected Areas held wherein Saahil Welfare Association & Akhuwat delivered presentation on rehabilitation activities done in Balochistan's most affected flood hit areas.
(c) September 14, 2022: Webinar on Engagement of SWOs held wherein Bin Qutab Foundation, Disabled Welfare Association and Roshni showcased their work in the field of Social Welfare to all NEPRA Licensees.
(d) October 4, 2022: Webinar held on impact of collaboration of NEPRA Licensees and SWOs for

flood relief activities in Balochistan and Sindh.

(e) January 4, 2023: Webinar held on Engagement of SWOs wherein Chief Secretary Gilgit-Baltistan, Roshni Helpline 1138, National Logistics Cell and Disabled Welfare Association highlighted their CSR activities.

(f) March 20, 2023: Webinar held on Engagement of SWOs wherein SAHARA for Life Trust, PAGE Foundation and Teacher's Resource Centre portrayed their work in the fields of Health and Education.

(g) May 17, 2023: Seminar/Webinar held in collaboration with Rotary International. RI Director presented the idea of "Building up Sustainable Smart Villages" in flood-hit areas.

(h) June 21, 2023: Open House Seminar/Webinar about Pakistan's First smart female security solution "IYZIL APP" for female employees of Public/Private Sector Organizations.

(i) June 22, 2023: Appreciation ceremony to honor the KE 7/11 Innovation Challenge Finalists. Top-10 finalists participated and showcased their innovations before the power sector of Pakistan.

7.9 HEALTH, SAFETY & ENVIRONMENT (HSE)

During the FY 2022-23, NEPRA introduced a range of initiatives to elevate the priority of HSE measures. These endeavors were undertaken with the aim of safeguarding human lives, preserving and nurturing the environment, and securing the assets within the power sector. The primary focus was on enforcing adherence to the NEPRA Power Safety Code and relevant legal obligations among licensees. NEPRA remained steadfast in its commitment to attaining a zero-incident goal within the power sector by implementing the most effective and forward-thinking practices.

During the FY 2022-23, NEPRA achieved significant milestones in the field of HSE. These accomplishments included activities such as conducting HSE Performance Evaluations, hosting awareness sessions and webinars for licensees, engaging in meetings with licensees to review Power Safety Code requirements, approving safety manuals for DISCOs, issuing incident alerts, running safety campaigns, developing a Job Safety Analysis checklist in Urdu for DISCOs, and conducting a fire drill at the NEPRA Tower. These initiatives exemplified NEPRA's unwavering dedication to cultivating a safety-conscious culture and ensuring compliance with HSE standards throughout the power sector. In addition to these, following HSE-related events were also organized:

(a) Webinar on Electrical Safety in the Workplace based on NFPA 70E Standard
(b) Webinar on Isolation and Permit to Work
(c) Developed JSA/JHA for DISCO's
(d) Issued Incident Alerts
(e) Launched Public Safety Awareness Campaign during Monsoon Season
(f) Webinar on Transmission & Distribution Network Protection
(g) NEPRA HSE Recognition and Awards Distribution Ceremony 2022
(h) Published HSE Performance Evaluation Report 2021-22
(i) Webinar on International Standard for Occupational Health & Safety Management Systems ISO-45001
(j) Approved DISCO's Safety Manuals
(k) Webinar on Incident Investigation
(l) Webinar on HSE Performance Evaluation Results of Top Performers
(m) Conducted Personal Protective Equipment Assessment at NEPRA
(n) Webinar on Fire Load Calculation
(o) Webinar on Legal & Safety Requirements for Bulk Power Consumers
(p) Awareness Session on Work Permit
(q) Emergency Mock Drill
(r) Developed NEPRA Emergency Management Plan
(s) Public Safety Campaign via Print and Social Media

7.10 LEGAL

In accordance with Section 47 of the NEPRA Amended Act, 2018, NEPRA is tasked with developing Regulations that govern the conduct, procedures, duties, responsibilities, and terms and conditions of licensees or registered entities, provided they do not conflict with the Act and Rules. In the FY 2022-23, NEPRA notified the following Regulations:

(a) NEPRA Licensing (Micro-Grid) Regulations, 2022; Notified vide SRO No. 994(I)/2022 dated 06-07-2022.
(b) NEPRA (Security of Information Technology and Operational Technology) Regulations, 2022; Notified vide SRO No. 1708(I)/2022 dated 06-09-2022.
(c) NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022; Notified vide SRO No. 1194(I)/2022 dated 02-11-2022.
(d) NEPRA Licensing (System Operator) Regulations, 2022; Notified vide SRO No. 2051(I)/2022 dated 21-11-2022.
(e) NEPRA (Electric Power Procurement) Regulations, 2022; Notified vide SRO No. 2136(I)/2022 dated 06-12-2022.
(f) Amendment to the NEPRA (Fees Pertaining to the Tariff Standards and Procedure) Regulations, 2002; Notified vide SRO No. 995(I)/2022 dated 05-07-2022.

(i) Status of Pending Legal Cases

A summary of cases before the Honorable Courts of Pakistan as on June 30, 2023 is as under. These are the cases, wherein either the decision of the Authority has been challenged or NEPRA is party to the case:

Court	Pending on 30th June, 2022	Filed in FY 2022-23	Total (No.)	Decided/Disposed in FY 2022-23	Pending on 30th June, 2023
Supreme Court of Pakistan	166	351	517	2	515
Islamabad High Court	124	6	130	0	130
Lahore High Court	634	100	734	22	712
Peshawar High Court	491	20	511	0	511
High Court of Sindh	708	53	761	65	696
Balochistan High Court	5	2	7	1	6
Civil Courts	31	12	43	0	43
Appellate Tribunal (NEPRA)	131	90	221	18	203
Total	**2,290**	**634**	**2,924**	**108**	**2,816**

Source: NEPRA

INITIATIVES BY STAKEHOLDERS

08

8.1 GENERAL

The Private Power and Infrastructure Board (PPIB) and Alternative Energy Development Board (AEDB) operate at the federal level as one-window facilitators for investment in the power sector, in alignment with the relevant government policies. Additionally, there are provincial government agencies involved in facilitating investments in the power sector, including Punjab Power Development Board (PPDB), Pakhtunkhwa Energy Development Organization (PEDO), Energy Department (Government of Sindh), and Energy Department (Government of Balochistan).

All these agencies play important role in the power sector, and they have provided briefs on their respective activities during the FY 2023, as well as their future initiatives and planned activities. These details are included in following paragraphs:

8.2 PRIVATE POWER AND INFRASTRUCTURE BOARD (PPIB)

The PPIB, operating as an autonomous entity under the Power Division of the GOP, serves as a focal point of contact for investors venturing into power generation and associated infrastructure. PPIB has played a pivotal role in overseeing the successful commissioning of forty-six (46) IPPs, collectively contributing gross capacity of 22,174 MW and garnering an investment of over US$ 27 billion.

PPIB has also achieved a significant milestone by spearheading the Lahore-Matiari Transmission Line Project, marking not only Pakistan's inaugural HVDC transmission initiative but also representing the pioneering effort by the private sector in the country's power sector. This project was realized through a Foreign Direct Investment of US$ 1.65 billion.

Forty Six (46) Commissioned IPPs (22,174 MW)

Oil	RLNG	Gas/RLNG	Thar Coal	Imported Coal	Hydel
4,443 (20%)	4,896 (22%)	4,522 (20%)	3,300 (15%)	3,960 (18%)	1,053 (5%)

Source: PPIB

At present, PPIB is actively advancing a portfolio of fifteen (15) IPPs primarily focused on hydro and coal-based projects, boasting a combined capacity of 7,705 MW. This portfolio predominantly emphasizes the utilization of domestic resources, particularly Thar Coal and Hydro resources, which collectively account for 96% of the total portfolio.

PPIB is also facilitating the implementation of CPEC initiative under which it is handling portfolio of thirteen (13) power generation projects of 11,648 MW. PPIB has so far successfully implemented 63% program while remaining 37% is under active processing.

(i) Performance Highlights of PPIB during FY 2022-23

PPIB short-term target is to achieve following targets:

Calendar Year	Hydel	Thar Coal	Imported Coal	RLNG	Total
2024	884.00	-	-	-	884.00
2025	15.08	-	300.00	-	315.08
Grand Total (MW)	**899.08**	**-**	**300.00**	**-**	**1,199.08**

Source: PPIB

Upcoming projects are as under:

(a) Kohala Hydropower Project (1,124 MW) September, 2024
(b) Suki Kinari Hydropower Project (884 MW) November, 2024
(c) Azad Pattan Hydropower Project (700 MW) December, 2024
(d) Riali-II and Kathai Small Hydropower Projects (708 MW) December, 2025

(ii) Other Initiatives/Activities

(a) Merger of PPIB and AEDB was under way by the close of FY 2022-23;
(b) PPIB submitted an application to NEPRA for registration as IAA which is under process;
(c) PPIB is working in augmenting the power sector infrastructure based on affordable and environment friendly power;
(d) PPIB is planning to process 2-3 new hydro-based IPPs under International Competitive Bidding (ICB);
(e) Carrying out assessment to identify Pumped Storage Hydropower Sites to cater for intermittency issues associated with wind and solar power generation options as well as to supplement the peak demand;
(f) PPIB has engaged USAID pursuant to the USAID Power Sector Improvement Activity (PSIA) Task Order pertaining to "Implementation Plan for Private Sector Participation in Pakistan Power Transmission" to provide support/assistance in preparation of Standardized Security Package Documents for award of transmission projects to private sector through ICB and review of the existing "Policy Framework for Private Sector Transmission Line Projects, 2015". After receipt of list of candidate transmission line projects from NTDC and finalization of framework/ RFP/Security Package for Transmission Line Projects, PPIB would initiate the process of ICB in consultation with all key stakeholders.
(g) PPIB is in the process of initiating a bankable feasibility study for converting existing three imported coal based power plants on Thar Coal.

8.3 ALTERNATIVE ENERGY DEVELOPMENT BOARD (AEDB)

AEDB has been promoting and facilitating the development and deployment of alternative and renewable energy technologies in the country, particularly in the private sector. The status of RE power projects as of 30th June, 2023 is as follows:

(a) Thirty six (36) wind power projects of 1,835 MW cumulative capacity were operational and providing electricity to the grid.
(b) Seven (07) solar projects of 530 MW cumulative capacity were operational.
(c) Eight (08) sugar mill based on bagasse co-generation projects of 259.1 MW capacity were operational.

Several ARE projects, initiated under the RE Policy 2006, are in pipeline. These include three (03) solar projects of 150 MW cumulative capacity which are under construction and are expected to be completed by August, 2023. One (01) bagasse-based power project of 32 MW is also under development and is expected to be completed by December, 2023.

In order to reduce the impact of prevailing high prices of oil and LNG in the international markets resulting in high electricity tariffs and drain of precious foreign exchange, the Government has approved the Framework Guidelines for Fast-Track Solar PV Initiatives 2022 for fast-track deployment of solar PV. These initiatives include:

(a) Substitution of Expensive Imported Fossil Fuels with Solar PV Energy;
(b) Solar PV Generation on 11 kV Feeders - 40 MW Maximum Capacity through Competitive Bidding process among all DISCOs.
(c) Solarization of Public Sector Buildings - Initially 85 public sector buildings on own cost model for solarization has been tendered.

AEDB undertook a number of supportive measures in order to promote ARE technologies and to attract private sector investments. Some of the supportive measures taken by AEDB are as follows:

(a) AEDB engaged with World Bank to carry out an initial study on renewable energy development in Balochistan titled "Balochistan Renewable Energy Development Study" with the objective of strategic development of utility-scale solar and wind power in Balochistan to help meet Pakistan's ambitious renewable energy targets for the power sector and support the broader transition that is needed to achieve "affordable, reliable, sustainable and modern energy for all".
(b) AEDB organized an Investors Conference, on September 14, 2022 at Islamabad in order to present the salient features of the Framework Guidelines for Fast-Track Solar PV Initiatives 2022 to the prospective investors and seek their feedback.
(c) A program for training of solar technicians has been initiated with the support of GIZ under which customized training to 500 technicians at relevant Pakistani training institutions will be provided on Competence Based Training & Assessment approach as per National Vocational Qualification Framework (NVQF).

8.4 NATIONAL ENERGY EFFICIENCY AND CONSERVATION AUTHORITY (NEECA)

Pakistan's Energy Intensity stand out as notably high, both in comparison to neighboring countries and on global scale, as reported by the World Bank in 2019. Despite being an early adopter of Energy Efficiency and Conservation (EE&C) principles, with the establishment of the National Energy Conservation Centre (ENERCON) in 1985, Pakistan's focus on this important aspect dwindled from the year 2000 onwards.

NEECA, established under the NEECA Act of 2016, operates as a pivotal federal agency entrusted with the responsibility of initiating, catalyzing, and harmonizing EE&C endeavors across all sectors of the economy, with a particular focus on the power sector. According to Section-7(a) of the NEECA Act, coupled with Section 2(XIV, XXV & XXX), NEECA holds the authority to serve as the central body for implementing EE&C measures within the Generation, Transmission, and Distribution segments of Pakistan's power sector.

Recognizing the pivotal role of EE&C in the Power Sector, the GOP has underscored its significance by incorporating EE&C as one of the six core guiding principles within the National Electricity Policy, 2021. This inclusion serves to provide a framework for actions and strategic plans in the power sector, ultimately aimed at achieving three critical objectives outlined by the said Policy:

(a) Ensuring access to affordable energy;
(b) Enhancing energy security; and
(c) Fostering sustainability.

The role of EE&C is indispensable in pursuit of attaining the aforementioned goals for the power sector in the most cost-effective manner. Section 4.1.1 of the National Electricity Policy, 2021 delineates the following:

> "Efficiency will be progressively increased across the entire value chain of the sector. This will be done, broadly, by gradually improving efficiency in the generation fleet, system operations, optimum utilization of the fuel base, reduction in Transmission and Distribution (T&D) losses, and improvement in collections and demand side management, conservation, sound governance practices including decentralization, etc."

Given the aforementioned considerations, the GOP has recently reaffirmed its commitment to EE&C by designating it as Priority Area-17 in the recently approved National Electricity Plan 2023-27 by the Cabinet Committee on Energy (CCoE). NEECA, in response, has taken significant strides towards institutionalizing and executing a comprehensive array of EE&C initiatives across the country. This includes the formulation and approval by CCoE of the following pivotal measures:

(a) The National Energy Efficiency and Conservation (NEEC) Policy, 2023;
(b) The National Energy Efficiency and Conservation (NEEC) Action Plan, 2023-2030;
(c) Implementation of Minimum Energy Performance Standards (MEPS) and introduction of Star Rating Labeling for Fans, Refrigerators, Air Conditioners, Motors, and LED Lamps;
(d) Prohibition of Incandescent Bulbs; and
(e) Enactment of the Energy Conservation Building Code (ECBC), 2023.

(i) National Energy Efficiency and Conservation (NEEC) Policy 2023

EE&C is vital for sustainable development, especially in Pakistan with rising energy costs and fluctuating exchange rates. It's a cost-effective approach to strengthen the sustainability of the energy sector. Savings from efficiency measures outweigh energy production costs, leading to benefits like enhanced competitiveness, reduced energy imports, and progress towards environmental goals.

However, integrating EE&C into energy planning was previously overlooked. Challenges like high prices, peak demand, and circular debt persist. Implementing demand-side management through EE&C measures can effectively address these issues.

In a Business-as-Usual scenario, Pakistan's primary energy supply is projected to be 116 MTOE by 2030. But implementing the National Energy Efficiency and Conservation Policy, 2023 aims to save 9 MTOE, reducing greenhouse gas emissions by 35 million tonnes of CO2 equivalent.

The National Energy Efficiency and Conservation Policy, 2023, aim to deeply institutionalize and operationalize EE&C across all economic sectors, particularly in the Power Sector.

(ii) National Energy Efficiency and Conservation (NEEC) Action Plan 2023-2030

The NEEC Action Plan outlines 29 priority actions across various sectors, including the power sector. Projections indicate a cumulative savings of 9 MTOE by 2030, with a mapped investment potential of 8 billion US$. This translates to a cumulative financial savings of 6.4 billion US$ at 2022 prices. Notably, some of these savings will have a lasting effect through 2050, contributing to the economic transition towards net-zero emissions.

(iii) Labeling Regime/MEPS for Fans

During Pakistan's summers, the total power demand surges to over 29,000 MW, while in winter, it stands at a comparatively modest 12,000 MW. This indicates that approximately 17,000 MW of the cooling load stems from the widespread use of domestic fans and air conditioners-a load that doesn't contribute directly to economic productivity.

Of this, a significant portion, about 11,700 MW (69%), is attributed to fan usage alone. Remarkably, Pakistan boasts nearly 140 million fans, many of which are energy-inefficient. By implementing NEECA's Labeling Regime and MEPS for fans, and subsequently replacing these inefficient models, we can slash peak cooling load demand by 5,000 MW. This reduction is achievable because efficient fans consume significantly less power (40-60 Watts) compared to their inefficient counterparts.

Such a measure holds immense potential for savings across the board, from reducing fuel imports and subsidies to avoiding the operation of costly power plants during peak demand. This, in turn, leads to an overall decrease in electricity costs for end consumers. Additionally, NEECA has taken a further step by issuing a Statutory Regulatory Order (SRO) to prohibit the manufacturing and import of inefficient fans.

(iv) Labeling Regime/MEPS for Refrigerators

According to a report from Japan International Cooperation Agency (JICA), Pakistan manufactures roughly 1.8 million inefficient refrigerators each year. Through the adoption of NEECA's Labeling Regime and MEPS for refrigerators, Pakistan has the potential to conserve up to 1,074 GWh of electricity annually.

(v) Labeling Regime/MEPS for ACs

According to a report from JICA, Pakistan manufactures roughly 237,306 inefficient air conditioners each year. Through the adoption of NEECA's Labeling Regime and MEPS for air-conditioners, Pakistan has the potential to conserve up to 135 GWh of electricity annually.

(vi) Labeling Regime/MEPS for Motors

As indicated by the 2020 report from the Collaborative Labeling and Appliance Standards Program (CLASP), Pakistan currently has an estimated 14 million motors, a number anticipated to surge to 25 million by 2030. The majority of these motors fall short of meeting the efficiency standards set by international benchmarks. Through the adoption of NEECA's Labeling Regime and MEPS for motors, Pakistan stands to conserve up to 9,000 GWh of electricity on an annual basis.

(vii) Labeling Regime/MEPS for LED Lamps

Each year, Pakistan imports approximately 86 million inefficient Compact Fluorescent Lamp (CFL) bulbs and 96 million inefficient Fluorescent Tube Lights. Through the adoption of NEECA's Labeling Regime and MEPS for LED Lights, and by replacing these inefficient CFL Bulbs and Fluorescent Tube Lights with energy-efficient LEDs, Pakistan has the potential to conserve up to 8,523 GWh of electricity annually.

(viii) Banning of the Incandescent Bulbs

NEECA has taken a significant step by prohibiting the manufacturing and operation of Incandescent Bulbs in Pakistan, which have an annual production of 4 million. This action was prompted by the bulbs' highly inefficient energy consumption (100 W), especially when compared to LED lights which consume only 12 W while providing the same level of luminosity. By replacing these Incandescent Bulbs with energy-efficient LED lights, Pakistan stands to save a substantial 385 GWh of electricity annually.

(ix) Energy Conservation Building Code (ECBC), 2023

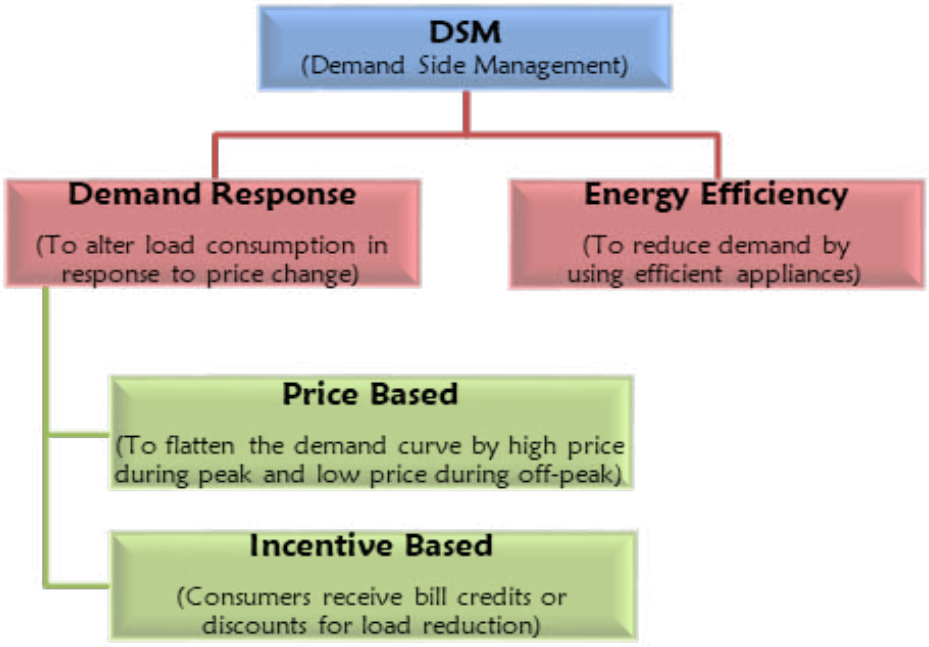
Over the past two decades, Pakistan's building sector, encompassing residential, commercial, and public structures, has experienced a robust compound annual growth rate of 12.3%. Unfortunately, this sector is responsible for a considerable 54% of the country's total electricity consumption, primarily due to inefficient design and construction materials leading to substantial cooling and heating loads.

In response to this pressing concern, NEECA has introduced the ECBC-2023. Building upon the foundation of the Building Code of Pakistan (Energy Provisions-2011), this revision integrates cutting-edge technology to enforce EE&C measures. The ECBC-2023 sets forth minimum standards for energy-efficient design and techniques for conserving energy throughout the construction and operation of buildings, including their systems and equipment.

This code encourages energy-efficient building designs, the adoption of energy-saving appliances, incorporation of renewable energy sources, retrofitting of existing structures, backing for e-mobility, and the establishment of robust monitoring systems. Its adoption holds the potential for a significant reduction in electricity consumption within the building sector, ranging from 15% to 40%. This progress is paramount in advancing towards net-zero emissions goals and diminishing our carbon footprint.

(x) Demand Side Management (DSM)

The primary objective of DSM is to curtail energy demand by influencing consumer consumption patterns. DSM encompasses an array of programs, technologies, and measures geared towards the demand side, all with the aim of regulating or diminishing energy consumption. This, in turn, leads to a reduction in the overall energy costs for the system. DSM is segmented into various classifications, as illustrated in the following chart:



DSM serves as a highly effective tool for enhancing EE&C within the power sector. It achieves this by strategically managing peak demands, thereby smoothing out the overall demand curve of the power sector. Various DSM strategies, as depicted in the figure above, play a crucial role in this process.

Section 5.7.3 of the National Electricity Policy, 2021 outlines a vision to encourage the efficient utilization of available resources. This will be accomplished through a collaborative effort between NEPRA and NEECA, which will work together to advance an Incentive-Based Demand Participation Mechanism within the regulatory framework.

(xi) Electric Vehicles (EVs)

Pakistan stands as one of the most adversely affected nations due to climate change, with its major cities, Karachi and Lahore, grappling with high levels of pollution. The rapid growth of the transportation sector, heavily reliant on fossil fuels, significantly contributes to urban pollution and greenhouse gas emissions. Pakistan annually expends nearly US$ 13 billion on oil imports, and if the current pace of transport sector expansion persists, this figure is projected to escalate to US$ 30 billion by 2025.

Meanwhile, the power sector faces the challenge of excess capacity, leading to an impending capacity trap. This is where EVs emerge as a pivotal solution to address the trio of escalating oil import costs, environmental degradation, and capacity surplus. A widespread adoption of electric vehicles promises a reduction in pollution, curtails oil import expenses, and optimizes under-utilized generation capacity, thereby lowering capacity charges per kilowatt-hour and reducing end-consumer tariffs.

In line with this vision, the GOP introduced the EV Policy in 2019, setting a target of achieving 30% penetration of new EV sales by 2030. This policy entrusted NEECA and NTDC with the responsibility of standardizing and ensuring compliance with EV charging infrastructure across Pakistan. A robust and sustainable EV charging network is pivotal in driving the widespread adoption of EVs in any country. In light of this, NEECA is presently in the process of developing the EV Charging Infrastructure Regulation 2023, aiming to facilitate the sustainable and standardized growth of EV charging infrastructure in Pakistan.

8.5 PUNJAB POWER DEVELOPMENT BOARD (PPDB)

The PPDB functions as a centralized facilitator for IPP projects within the province of Punjab, streamlining their development. Thus far, PPDB has played a pivotal role in adding 1,820 MW of capacity to the

National Grid. This includes 500 MW from a solar PV project and a 1,320 MW coal power venture. Additionally, a 100 MW solar PV project is currently in the developmental phase. PPDB has also been actively involved in the formulation and approval process of the National Electricity Policy, 2021, and has contributed to the detailed design of the CTBCM.

Looking ahead, PPDB's future ventures comprise three coal power projects (2,640 MW), twenty small HPPs (128.91 MW), six solar PV power projects (975 MW), and one wind power project (250 MW). Furthermore, PPDB aims to expand its renewable energy portfolio through competitive bidding, encompassing projects in solar PV, wind, waste to energy, small hydropower, biomass, and solar Concentrated Solar Power (CSP). The Canal Top Solar PV power project is also a forthcoming endeavor, with detailed feasibility studies conducted in various regions.

The Government of Punjab is actively working towards the establishment of the Punjab Grid Company (PGC), which has been registered with the SECP as of January 3, 2023. An application for a transmission licence has been submitted to NEPRA, with a hearing on the matter held on June 13, 2023. The award of the licence is pending NEPRA's decision.

Furthermore, Waste Management Companies (WMCs) have been established in major cities across Punjab, focusing on centralized Municipal Solid Waste (MSW) collection. These companies have expressed interest in supplying waste as a fuel source for the development of Waste to Energy (WtE) projects in Punjab. The potential aggregate capacity for WtE projects in these cities is estimated to be 150 MW.

PPDB is actively promoting the development of small HPPs in captive mode, aiming to supply generated energy for the self-use of small enterprises, both new and existing. This initiative aims to stimulate the growth of small industries and increase rural employment. To this end, Captive Guidelines for small HPPs have been approved in the 58th PPDB Board meeting, allowing for the initiation of ten projects in six districts of Punjab in the initial phase.

8.6 PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION (PEDO)

Established in 1986, the PEDO was created with the primary objective of identifying and harnessing the substantial hydropower potential present in the Khyber Pakhtunkhwa region. This province boasts an abundant hydropower capacity, estimated to be nearly 30,000 MW, of which only 7,000 MW has been officially recognized, and a fraction of that has been effectively utilized.

While a majority of the HPPs currently in development are in the public sector, the provincial government has adopted a multifaceted approach to encourage investment through IPP ventures and Public-Private Partnerships (PPP). PEDO is actively engaged in exploring all conceivable energy avenues, including renewable sources like hydro, solar, and wind energy. The highlight of PEDO's project is as follows:

(a) Seven HPPs with a combined capacity of 160 MW are currently operational.
(b) Six plants, totaling 226.37 MW in capacity, are currently under construction. Noteworthy is the 18 MW Pehur Hydel station, supplying power to five industries in KPK through a wheeling arrangement. PEDO has initiated the execution of the 188 MW Naran Dam HPP in District Mansehra and the 96 MW Batakundi HPP in District Mansehra, in collaboration with private investors under the PPP financing mode. Furthermore, the Directorate of Renewable Energy in Private Power is processing approximately 2,225 MW capacity of hydel and solar projects through various implementation modes.
(c) The development of the 300 MW Balakot HPP in District Mansehra is underway. PEDO is actively involved in initiatives such as the solarization of villages, mosques/worship places, construction of mini-grids, solarization of public sector buildings, and the establishment of micro hydel power plants along canals.
(d) With its vast hydropower potential, KPK has established its first-ever Transmission and Grid System Company, The KPK Government has also obtained a licence for the PGC.

(e) The projects for the 245 MW Gabral Kalam HPP in Swat and the 157 MW Madian HPP in Swat, funded through the World Bank, are in progress. The PC-I for these initiatives has been approved.

In addition to above, PEDO has also initiated a paid internship program for trainee engineers.

8.7 ENERGY DEPARTMENT, GOVERNMENT OF SINDH

The Energy Department, Government of Sindh (EDS), serves as a centralized platform for energy sector investors at the provincial level. Its aim is to harness and strengthen the Renewable Energy (RE) potential within the province, fostering sustainable economic growth through the utilization of local resources. Additionally, EDS strives to augment the proportion of RE within Pakistan's overall energy mix.

(i) Sindh Solar Energy Project (SSEP)

The SSEP, a World Bank-funded initiative of US$ 100 million, is geared towards amplifying solar power generation and enhancing electricity accessibility across the Province of Sindh. This project comprises four key components:

(a) Component-I (Utility Scale Solar):

Under this segment, a 400 MW Grid-Connected Solar Power project will be developed through a competitive bidding process. The Request for Proposal (RFP) document for the first 50 MW Solar Power Project has been submitted to NEPRA for approval. NEPRA conducted a public hearing on the RFP in January 2023, and a decision is pending.

The Preliminary Qualification Process (PQD) for the 50 MW Manjhand and 350 MW Karachi sites has been successfully completed. The RFP document for the remaining 350 MW has been forwarded by KE to NEPRA for approval. Once the RFPs for all sites are approved, the bidding process will be initiated.

(b) Component-II (Distributed Solar):

This facet involves the installation of 50 MW of rooftop solar power systems on public sector buildings. As part of an emergency COVID-19 project, 33 Government hospitals have been selected for solarization (up to 21 MW), and 31 of these sites have been completed. Additionally, 23 new public sector buildings in Karachi and Hyderabad are undergoing solarization with a combined capacity of 12 MW.

(c) Component-III (Solar Home System):

This component aims to provide 200,000 households in Sindh with Solar Home Systems (SHS). BISP NSER survey data will be utilized to identify eligible beneficiaries, and a bulk supply model is being implemented. The final estimate of Local Market Dealer (LMD) costs will be entirely covered by the consumer, formalized through an upper cap on the amount that LMDs can charge per SHS sold. This approach fosters competition between LMDs and enables those with lower costs to pass on savings to consumers.

(d) Component-IV (Technical Assistance and Capacity Building):

This component is focused on offering support for project design and implementation, ensuring compliance with fiduciary, gender, monitoring and evaluation, procurement, and safeguards requirements. It has also successfully conducted training sessions for 300 solar technicians.

This project stands as a significant initiative poised to boost solar power generation and improve electricity accessibility in the Sindh Province. It has already made noteworthy progress and is anticipated to have a transformative impact on the lives of millions in the region.

(ii) Sindh Transmission and Dispatch Company (Pvt.) Limited Progress Report on FY 2022-23

The Government of Sindh has obtained the licence for PGC - STDC, marking a significant milestone. STDC has achieved a major accomplishment by completing the first provincial Transmission Line of 132 kV Double Circuit, extending from the two projects SNPC to KE KDA-33 Grid Station in Karachi. This line spans a length of 95.47 kilometers. STDC's future endeavors include the following projects:

(a) KWSB Greater Water Bulk Supply K-IV Project:

This initiative involves the construction of a 132 kV STDC grid station near the K-IV pumping station, along with the establishment of an approximately 20 km-long 132 kV Double Circuit Transmission Line. This line will operate on a loop-in and loop-out arrangement between HESCO Jhimpir and Thatta grid to supply 50 MW of power to the K-IV pumping station at Kinjhar Lake. Currently, STDC is in the process of technical evaluation after floating a Request for Proposal (RFP) for hiring a consortium of technical, financial, legal, and environmental consultants for the construction of the grid and transmission line of the K-IV Power Component.

(b) Amreli Steels Limited Project:

In collaboration with Amreli Steels Limited, STDC will develop transmission line infrastructure for a proposed dedicated initial 50 MW IPP Hybrid RE project at Jhimpir. This project aims to supply power for Amreli Steels Plant located at Dhabeji, Sindh. STDC will construct a double-circuit Transmission Line to facilitate the supply of 50 MW Hybrid RE.

(c) Engro Energy Limited Project:

Energy Department, Government of Sindh and STDC have recently entered into a MOU with Engro Energy Limited for the supply of 400 MW Hybrid RE on a Business-to-Business (B2B) basis. The transmission line required for this project will be constructed by STDC.

(d) Performance Parameters of STDC's Existing Transmission System for FY 2022-23:

(i) Number of tripping: 24.
(ii) Total outage hours: 35 hours and 06 minutes (NEPRA allows an annual outage allowance of 131.4 hours).
(iii) Transmission line losses: Approximately 1.43%, within the permissible limit.
(iv) Acquisition of the first-ever Provincial Grid Company Licence in Pakistan.

8.8 ENERGY DEPARTMENT, GOVERNMENT OF BALOCHISTAN

The Energy Department of the Government of Balochistan (EDB) has been entrusted with the responsibility of electrifying villages in Balochistan through collaboration with the QESCO. Furthermore, EDB is actively engaged in implementing renewable energy projects across different regions of the Province, harnessing the potential of available renewable resources. During the FY 2022-23, EDB made substantial progress and accomplishments in these endeavors. The renewable/solar energy scheme of EDB are as follows:

(i) Renewable/Solar Energy Schemes

(a) In PSDP 2022-23, Rs. 570 million have been allocated for provision of Solar Home System. Accordingly 3,500 Solar Home Systems are to be installed to facilitate about 2,100 population with cheap and clean energy to off-grid/severe load-shedding areas, and to minimize reliance on conventional sources of electricity and to encourage RE.
(b) Installation of street lights at a cost of Rs. 358 million.
(c) Solarization of District Headquarter Hospitals at the cost of Rs. 330 million.
(d) Solarization of Central Jails at the cost of Rs. 140 million.
(e) Solarization of Masajids/Imam Barghas at the cost of Rs. 100 million.

(ii) Village Electrification Schemes

With the estimated cost of Rs. 3,114.59 million, about 250 villages are to be electrified and existing system augmented to improve/provide stable supply of electricity to the population of about 20,000 people.

STATE OF INDUSTRY REPORT 2023

STATISTICAL DATA



TABLE 1

Primary Energy Supplies by Source (TOE)

Source	Unit	2017-18	2018-19	2019-20	2020-21	2021-22
Oil [1]	TOE	26,903,431	21,568,315	18,311,004	22,577,047	27,970,739
	% share	31.17	25.73	22.67	27.33	27.03
Gas	TOE	29,849,030	29,318,489	26,658,176	25,500,568	24,810,015
	% share	34.59	34.98	33.01	30.87	23.98
LPG [2]	TOE	1,054,006	953,834	1,044,884	1,116,597	1,522,345
	% share	1.22	1.14	1.29	1.35	1.47
Coal	TOE	10,925,200	12,933,087	14,711,973	16,530,528	25,695,920
	% share	12.66	15.43	18.22	20.01	24.83
Hydro Electricity [3]	TOE	6,665,328	6,525,607	8,016,386	8,007,673	7,806,686
	% share	7.72	7.79	9.93	9.69	7.54
Nuclear Electricity [3]	TOE	2,358,200	2,365,268	2,581,494	2,230,835	4,576,563
	% share	2.73	2.82	3.20	2.70	4.42
Renewable Electricity [4]	TOE	920,580	1,117,482	991,041	1,031,857	1,478,685
	% share	1.07	1.33	1.23	1.25	1.43
LNG Import [4]	TOE	7,492,597	8,913,006	8,320,497	5,498,263	9,499,119
	% share	8.68	10.63	10.30	6.66	9.18
Imported Electricity [5]	TOE	132,659	116,196	122,625	118,957	110,485
	% share	0.15	0.14	0.15	0.14	0.11
Total	**TOE**	**86,301,031**	**83,811,284**	**80,758,080**	**82,612,325**	**103,470,557**
	% share	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Annual Growth Rate (%)		**8.44**	**-2.88**	**-3.64**	**2.30**	**28.12**

[1] Excluding petroleum products exports and bunkering.

[2] Include imports and production from field plants.

[3] Converted @ 10,000 Btu/kWh to represent primary energy equivalent of hydro and nuclear electricity as if this was generated by using fossil fuels.

[4] LNG Imports and Renewable Generation reported for the first time in FY 2014-15.

[5] WAPDA importing electricity from Iran since October, 2002.

Source: Pakistan Energy Yearbook, HDIP, Islamabad

Figure 1: Primary Energy Supplies by Source (TOE)

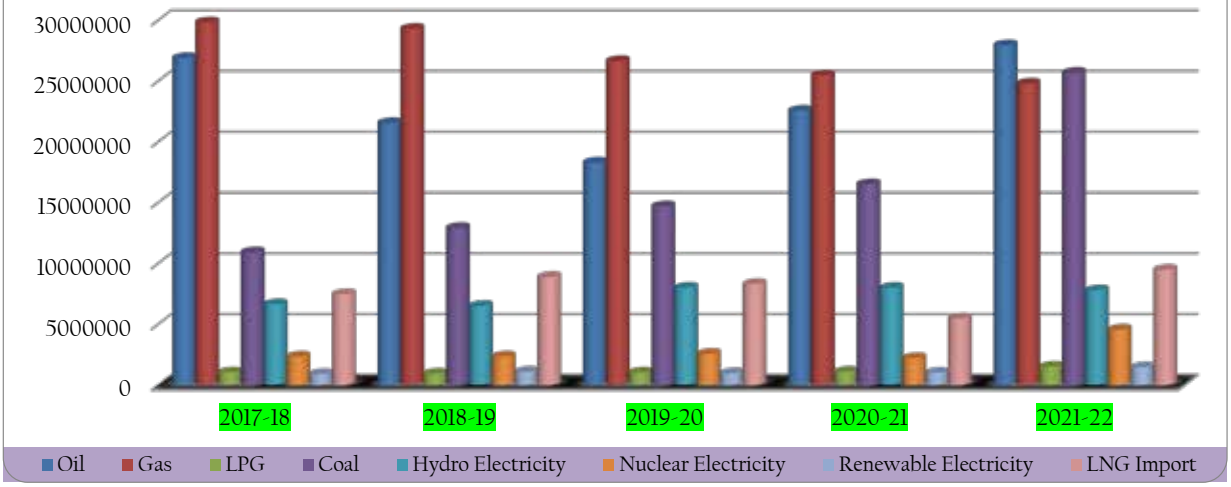


TABLE 2

Final Energy Consumption by Source (TOE)

Source	Unit	2017-18	2018-19	2019-20	2020-21	2021-22
Oil [1]	TOE	19,264,954	17,364,897	16,364,304	18,569,102	20,224,963
	% share	35.03	31.58	31.39	30.84	31.02
Gas [2]	TOE	16,693,880	17,275,180	15,912,689	18,346,902	16,577,599
	% share	30.36	31.41	30.52	30.47	25.42
LPG	TOE	1,385,427	1,148,380	1,196,005	1,371,416	1,381,531
	% share	2.52	2.09	2.29	2.28	2.12
Coal [2]	TOE	8,940,477	10,292,739	9,836,671	12,407,520	17,964,407
	% share	16.26	18.72	18.87	20.61	27.55
Electricity [3]	TOE	8,708,151	8,914,489	8,825,770	9,513,502	9,061,238
	% share	15.84	16.21	16.93	15.80	13.90
Total	**TOE**	**54,992,889**	**54,995,685**	**52,135,439**	**60,208,443**	**65,209,738**
	% share	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Annual Growth Rate (%)		**9.72**	**0.01**	**-5.20**	**15.48**	**8.31**

[4] *Excluding consumption for power generation.*

[2] *Excluding consumption for power generation and feedstock.*

[3] *@ 3412 Btu/kWh being the actual energy content of electricity.*

Source: Pakistan Energy Yearbook, HDIP, Islamabad

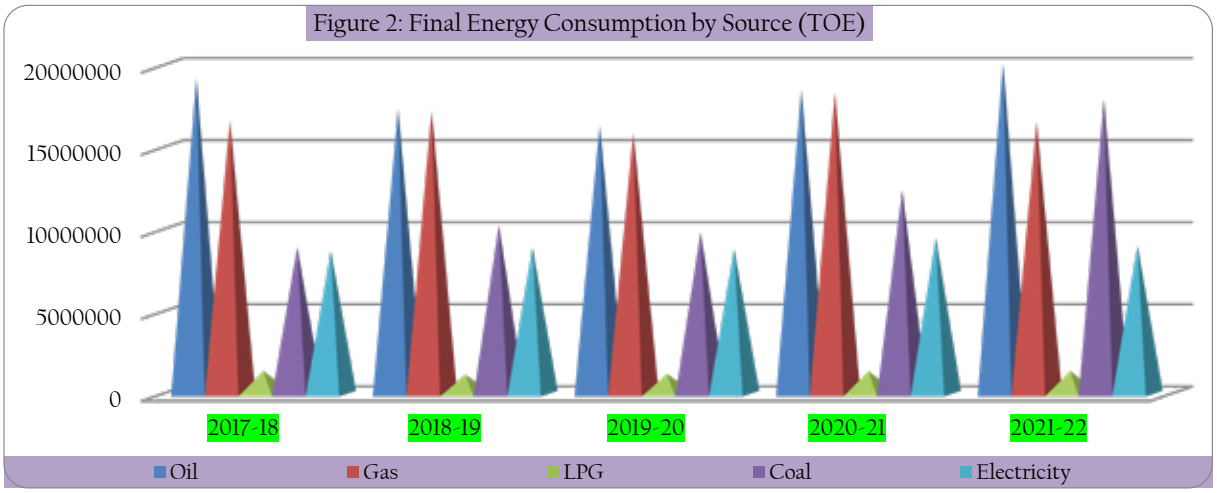


TABLE 3

Fuel Consumption for Thermal Power Generation (TOE)

Source	Unit	2017-18	2018-19	2019-20	2020-21	2021-22
Gas	TOE	10,831,662	10,050,101	8,426,767	8,648,124	7,292,032
	% share	56.89	65.35	56.98	57.34	39.14
Furnace Oil	TOE	6,029,947	2,661,528	1,474,895	2,206,605	3,346,890
	% share	31.67	17.31	9.97	14.63	17.97
Diesel Oil	TOE	194,033	27,383	12,683	103,427	258,652
	% share	1.02	0.18	0.09	0.69	1.39
Coal	TOE	1,984,722	2,640,347	4,875,302	4,123,008	7,731,514
	% share	10.42	17.17	32.96	27.34	41.50
Total	**TOE**	**19,040,364**	**15,379,359**	**14,789,647**	**15,081,164**	**18,629,088**
	% share	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Annual Growth Rate (%)		**9.70**	**-19.23**	**-3.83**	**1.97**	**23.53**

Source: Pakistan Energy Yearbook, HDIP, Islamabad

Figure 3: Fuel Consumption for Thermal Power Generation (%)

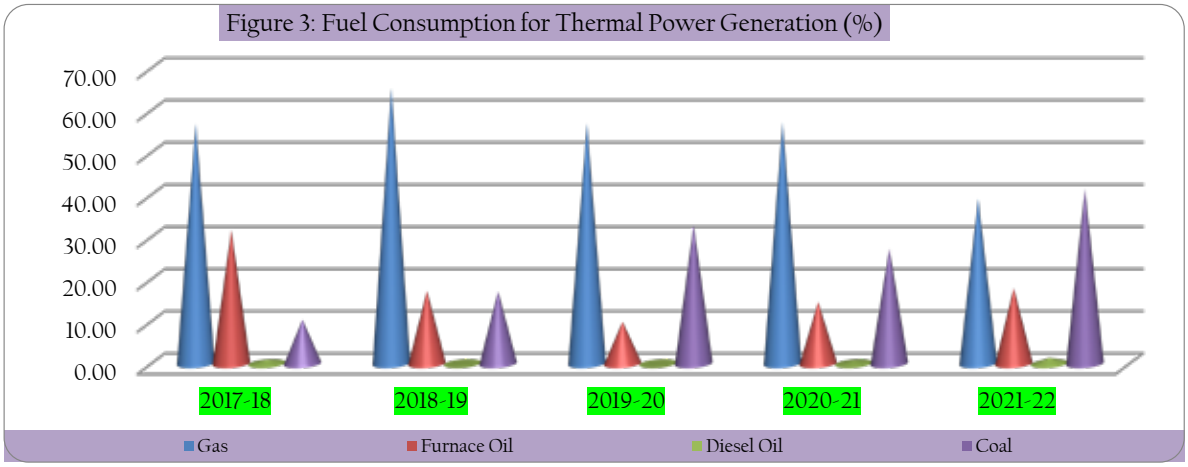


TABLE 4

Installed Capacity by Type (MW)

As on 30th June	2019	2020	2021	2022	2023
HYDEL					
WAPDA Hydel	9,389	9,389	9,389	9,389	9,389
IPPs Hydel	372	472	526	1,246	1,246
Sub-Total	**9,761**	**9,861**	**9,915**	**10,635**	**10,635**
% Share (Hydel Installed Capacity)	25.03	25.47	24.93	24.26	23.18
THERMAL					
GENCOs: CPPA-G System	5,637	4,881	4,881	4,731	4,587
KE Own	2,294	2,294	2,084	2,345	2,816
IPPs: CPPA-G System	16,946	17,276	17,276	18,750	20,563
IPPs: KE System	366	366	366	366	366
SPPs/CPPs/N-CPPs: CPPA-G System	340	340	340	340	340
SPPs/CPPs/N-CPPs connected with KE	87	87	151	151	139
Sub-Total	**25,670**	**25,244**	**25,098**	**26,683**	**28,811**
% Share (Thermal Installed Capacity)	65.83	65.20	63.11	60.87	62.79
NUCLEAR					
CHASNUPP (I, II, III and IV)	1,330	1,330	1,330	1,330	1,330
KANUPP (I, II & III)	137	137	1,282	2,290	2,290
Sub-Total	**1,467**	**1,467**	**2,612**	**3,620**	**3,620**
% Share (Nuclear Installed Capacity)	3.76	3.79	6.57	8.26	7.89
RENEWABLE ENERGY (WIND, SOLAR AND BAGASSE)					
Wind Power Plants	1,248	1,248	1,248	1,838	1,838
Solar Power Plants	430	430	430	530	530
Bagasse based Power Plants	369	369	369	369	249
RE Power Plants: CPPA-G System	**2,047**	**2,047**	**2,047**	**2,737**	**2,617**
Solar Power Plants: KE System	50	100	100	160	202
RE Power Plants: KE System	**50**	**100**	**100**	**160**	**202**
Sub-Total	**2,097**	**2,147**	**2,147**	**2,897**	**2,819**
% Share (RE Installed Capacity)	5.38	5.55	5.40	6.61	6.14
Total Installed Capacity of the Country	**38,995**	**38,719**	**39,772**	**43,835**	**45,885**

Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

TABLE 5

Plant-wise Installed Capacity (MW) as on 30th June

Power Station	Plant Location	Type of Power Station	2019	2020	2021	2022	2023	Dependable Capacity as on 30-6-2023
A1: Hydel (WAPDA)								
Major Hydropower Units								
Tarbela	Tarbela, KPK	Reservoir	3,478	3,478	3,478	3,478	3,478	
Tarbela 4th Ext.	Tarbela, KPK	Reservoir	1,410	1,410	1,410	1,410	1,410	
Ghazi Barotha	Ghazi Barotha, Punjab	Run of River	1,450	1,450	1,450	1,450	1,450	
Mangla	Mangla, AJ&K	Reservoir	1,000	1,000	1,000	1,000	1,000	
Warsak	Warsak, KPK	Run of River	243	243	243	243	243	
Chashma	Chashma, Punjab	Run of River	184	184	184	184	184	
Khan Khwar	Shangla, KPK	Reservoir	72	72	72	72	72	
Allai Khwar	Battagram, KPK	Reservoir	121	121	121	121	121	
Jinnah Hydel	Mianwali, Punjab	Run of River	96	96	96	96	96	
Duber Khwar	Kohistan, KPK	Reservoir	130	130	130	130	130	
Neelum Jhelum	Muzaffarabad, AJ&K	Run of River	969	969	969	969	969	
Golen Gol	Chitral, KPK	Run of River	108	108	108	108	108	9,349
Small Hydropower Units								
Dargai	Dargai, KPK	Run of Canal	20	20	20	20	20	
Rasul	Rasul, Punjab	Run of Canal	22	22	22	22	22	
Shadiwal	Shadiwal, Punjab	Run of Canal	14	14	14	14	14	
Chichoki Mallian	Chichoki Mallian, Punjab	Run of Canal	13	13	13	13	13	
Nandipur	Nandipur, Punjab	Run of Canal	14	14	14	14	14	
Kurram Garhi	Kurram Garhi, KPK	Run of Canal	4	4	4	4	4	
Renala	Renala, Punjab	Run of Canal	1	1	1	1	1	
Chitral	Chitral, KPK	Run of Canal	1	1	1	1	1	
Gomal Zam	South Waziristan, KPK	Reservoir	17	17	17	17	17	
Malakand/Jabban	Malakand, KPK	Run of River	22	22	22	22	22	
Total Hydel (WAPDA)			**9,389**	**9,389**	**9,389**	**9,389**	**9,389**	**9,349**
A2: Hydel (IPPs)								
Jagran (AJ&K)	Jagran, AJ&K	Hydro	30	30	30	30	30	30
Malakand-III (PEDO)	Malakand, KPK	Run of River/Canal	84	84	84	84	84	81
Pehur (PEDO)	Swabi, KPK	Canal Fall/Run of River	18	18	18	18	18	18
Laraib Energy (AJ&K)	Jhelum River, AJ&K	Hydro	84	84	84	84	84	84
Garam Chashma	Chitral, KPK	Hydro	1	1	1	1	1	1
Marala Hydro (PPDCL)	Sialkot, Punjab	Canal Fall/Run of River	8	8	8	8	8	8
Patrind Hydro (AJ&K)	Muzaffarabad, AJ&K	Run of River	147	147	147	147	147	147
Gulpur Hydropower	Gulpur, Kotli, AJK	Run of River	-	100	100	100	100	101
Daral Khwar	Swat, KPK	Run of River	-	-	37	37	37	37
Ranolia	Kohistan, KPK	High Head	-	-	17	17	17	17
Karot Power Company	Karot, Dist Rawalpindi	Run of River				720	720	720
Total Hydel (IPPs)			**372**	**472**	**526**	**1,246**	**1,246**	**1,244**
Total Hydel (A1+A2)			**9,761**	**9,861**	**9,915**	**10,635**	**10,635**	**10,593**
B1: Thermal (GENCOs: CPPA-G System)								
TPS Jamshoro	Jamshoro, Sindh	STs	880	880	880	880	880	782
GTPS Kotri	Kotri, Sindh	GTs+CCPP	144	0	0	0	0	0
TPS Guddu (Units 1-4)	Guddu, Sindh	STs	640	0	0	0	0	0
TPS Guddu (Units 5-10)	Guddu, Sindh	GTs+CCPPs	600	600	600	600	600	530
TPS Guddu (Units 11-13)	Guddu, Sindh	GTs+OCPPs	415	415	415	415	415	390
TPS Guddu (Units 14-16)	Guddu, Sindh	GTs+ST+CCPPs	747	747	747	747	747	721
TPS Quetta	Quetta, Balochistan	GT	0	28	28	28	28	0
TPS Muzaffargarh	Muzaffargarh, Punjab	STs	1,350	1,350	1,350	1,350	1,350	1,085
GTPS Faisalabad	Faisalabad, Punjab	GTs+CCPPs	144	144	144	144	0	117
TPS Nandipur	Gujranwala, Punjab	GTs+CCPPs	567	567	567	567	567	411
FBC Lakhra	Lakhra, Sindh	STs	150	150	150	0	0	0
Total Thermal (GENCOs: CPPA-G System)			**5,637**	**4,881**	**4,881**	**4,731**	**4,587**	**4,036**
B2: Thermal (IPPs: CPPA-G System)								
Lal Pir Power	Mehmood Kot, Punjab	ST	362	362	362	362	362	350
Pak Gen. Power	Mehmood Kot, Punjab	ST	365	365	365	365	365	349
Altern Energy	Fateh Jang, Punjab	GEs	31	31	31	0	0	0
Fauji Kabirwala	Kabirwala, Punjab	GTs+CCPP	170	170	170	170	170	151
Habibullah Coastal	Quetta, Balochistan	GTs+CCPP	155	155	155	155	0	0
Hub Power	Hub, Balochistan	STs	1,292	1,292	1,292	1,292	1,292	1,200
Japan Power	Raiwind, Punjab	DE	120	120	120	0	0	0
KAPCO	Kot Addu, Punjab	GTs+CCPPs	1,600	1,600	1,600	1,600	1,600	1,336
Kohinoor Energy	Raiwind, Punjab	DEs+ST	131	131	131	131	131	124
Rousch Power	Sidhnai, Punjab	GTs+ST	450	450	450	450	450	395
Saba Power	Farooqabad, Punjab	ST	136	136	136	136	136	126
Southern Electric	Raiwind, Punjab	DEs	117	117	117	0	0	0
Liberty Daharki Power	Daharki, Sindh	GTs+CCPP	235	235	235	235	235	212

Power Station	Plant Location	Type of Power Station	2019	2020	2021	2022	2023	Dependable Capacity as on 30-6-2023
B2: Thermal (IPPs: CPPA-G System)								
Uch Power	Murad Jamali, Balochistan	GTs+ST	586	586	586	586	586	551
Attock Gen.	Attock Morgah, Punjab	DGs+ST	165	165	165	165	165	156
Atlas Power	Sheikhupura, Punjab	REs+ST	224	224	224	224	224	214
Engro Power Gen. Qadirpur	Qadirpur, Sindh	GT+ST	227	227	227	227	227	213
Saif Power	Sahiwal, Punjab	GTs+ST	225	225	225	225	225	204
Orient Power	Balloki, Punjab	GTs+ST	225	225	225	225	225	213
Nishat Power	Qasur, Punjab	REs+ST	202	202	202	202	202	195
Nishat Chunian	Qasur, Punjab	DEs+ST	202	202	202	202	202	196
Sapphire Electric	Muridke, Punjab	GTs+ST	235	235	235	235	235	203
Halmore Power	Bhikki, Punjab	GTs+ST	225	225	225	225	225	199
Narowal Energy	Narowal, Punjab	DEs+ST	214	214	214	214	214	214
Liberty Power Tech.	Faisalabad, Punjab	DEs+ST	202	202	202	202	202	196
Foundation Power	Daharki, Sindh	GT+ST	179	179	179	179	179	171
Davis Energen.	Jhang, Punjab	GEs	12	12	12	12	0	0
Uch-II Power	Murad Jamali, Balochistan	GTs+ST	404	404	404	404	404	381
Huaneng Shandong Ruyi (Sahiwal Imported Coal)	Sahiwal, Punjab	STs	1,320	1,320	1,320	1,320	1,320	1,320
QATPL (Bhikki)	Bhikki, Punjab	GTs+HRSGs+ST	1,231	1,231	1,231	1,231	1,231	1,180
NPPMCL (HBS)	HBS, Punjab	GTs+HRSGs+ST	1,277	1,277	1,277	1,277	1,277	1,230
NPPMCL (Balloki)	Balloki, Punjab	GTs+HRSGs+ST	1,276	1,276	1,276	1,276	1,276	1,320
Port Qasim Electric Power	Port Qasim, Sindh	ST+CB	1,320	1,320	1,320	1,320	1,320	1,320
Reshma Power	Raiwind, Punjab	Reciprocating Engine	97	97	97	0	0	0
Gulf Powergen	Gujranwala, Punjab	Reciprocating Engine	84	84	84	0	0	0
China Power Hub	Lasbella, Balochistan	ST+CB	1,320	1,320	1,320	1,320	1,320	1,220
Engro Powergen Thar	Tharparkar, Sindh	ST+CB	330	660	660	660	660	660
Lucky Electric Power	Bin Qasim Town, Karachi	ST+CB	-	-	-	660	660	660
Punjab Thermal Power	Trimmu, Punjab	GTs+HRSGs+ST	-	-	-	1,263	1,263	1,320
Thar Energy			-	-	-	-	330	330
Thar Coal Block-1 Power			-	-	-	-	1,320	1,320
ThalNova Power			-	-	-	-	330	220
Total Thermal (IPPs: CPPA-G System)			**16,946**	**17,276**	**17,276**	**18,750**	**20,563**	**19,648**
Total Thermal in CPPA-G System (B1+B2)			**22,583**	**22,157**	**22,157**	**23,481**	**25,150**	**23,684**
C: Nuclear								
CHASNUPP-I	Chashma, Punjab	STs	325	325	325	325	325	300
CHASNUPP-II	Chashma, Punjab	STs	325	325	325	325	325	315
CHASNUPP-III	Chashma, Punjab	STs	340	340	340	340	340	340
CHASNUPP-IV	Chashma, Punjab	STs	340	340	340	340	340	340
KANUPP	Karachi, Sindh	STs	137	137	137	0	0	0
KANUPP-II	Karachi, Sindh	STs	-	-	1,145	1,145	1,145	1,140
KANUPP-III	Karachi, Sindh	STs	-	-	-	1,145	1,145	1,140
Total Nuclear (C)			**1,467**	**1,467**	**2,612**	**3,620**	**3,620**	**3,575**
D: Renewable Energy (CPPA-G System)								
D1: Wind Power Projects								
Zorlu Enerji Pakistan	Thatta, Sindh	WTs	56	56	56	56	56	56
FFC Energy	Thatta, Sindh	WTs	50	50	50	50	50	50
Three Gorges First Wind	Thatta, Sindh	WTs	60	60	60	50	50	50
Foundation Wind-I	Thatta, Sindh	WTs	50	50	50	50	50	50
Foundation Wind-II	Thatta, Sindh	WTs	50	50	50	50	50	50
Sapphire Wind	Thatta, Sindh	WTs	53	53	53	53	53	50
Yunus Energy	Thatta, Sindh	WTs	50	50	50	50	50	50
Metro Power Company	Thatta, Sindh	WTs	50	50	50	50	50	50
Gul Ahmad Wind	Thatta, Sindh	WTs	50	50	50	50	50	50
Master Wind Energy	Thatta, Sindh	WTs	50	50	50	50	50	50
Tenaga Generasi	Thatta, Sindh	WTs	50	50	50	50	50	50
HydroChina Dawood	Thatta, Sindh	WTs	50	50	50	50	50	50
Sachal Energy Dev.	Thatta, Sindh	WTs	50	50	50	50	50	50
UEP Wind Power	Thatta, Sindh	WTs	99	99	99	99	99	99
Artistic Wind Power	Thatta, Sindh	WTs	50	50	50	50	50	50
Act Wind (formerly Tapal Wind Energy)	Thatta, Sindh	WTs	30	30	30	30	30	30
Hawa Energy	Thatta, Sindh	WTs	50	50	50	50	50	50
Jhimpir Power	Thatta, Sindh	WTs	50	50	50	50	50	50
Three Gorges Second Wind	Thatta, Sindh	WTs	50	50	50	50	50	50
Three Gorges Third Wind	Thatta, Sindh	WTs	50	50	50	50	50	50
Tricon Boston Consulting-A	Thatta, Sindh	WTs	50	50	50	50	50	50
Tricon Boston Consulting-B	Thatta, Sindh	WTs	50	50	50	50	50	50
Tricon Boston Consulting-C	Thatta, Sindh	WTs	50	50	50	50	50	50
Zephyr Power	Thatta, Sindh	WTs	50	50	50	50	50	50
Lucky Renewables	Thatta, Sindh	WTs	-	-	-	50	50	50

Power Station	Plant Location	Type of Power Station	2019	2020	2021	2022	2023	Dependable Capacity as on 30-6-2023
D: Renewable Energy (CPPA-G System)								
D1: Wind Power Projects								
Master Green Energy	Thatta, Sindh	WTs	-	-	-	50	50	50
Act 2 Din Wind	Thatta, Sindh	WTs	-	-	-	50	50	50
Artistic 2 Wind Power	Thatta, Sindh	WTs	-	-	-	50	50	50
Indus Wind Energy	Thatta, Sindh	WTs	-	-	-	50	50	50
Lakeside Energy	Thatta, Sindh	WTs	-	-	-	50	50	50
Liberty Wind Power-I	Thatta, Sindh	WTs	-	-	-	50	50	50
Din Energy	Thatta, Sindh	WTs	-	-	-	50	50	50
Gul Ahmed Electric	Thatta, Sindh	WTs	-	-	-	50	50	50
Liberty Wind Power-II	Thatta, Sindh	WTs	-	-	-	50	50	50
NASDA Green Energy	Thatta, Sindh	WTs	-	-	-	50	50	50
Metro 2 Wind Power	Thatta, Sindh	WTs	-	-	-	50	50	50
Total Wind Power Projects			**1,248**	**1,248**	**1,248**	**1,838**	**1,838**	**1,828**
D2: Solar Power Projects								
Quaid-e-Azam Solar Park	Bahawalpur, Punjab	Solar	100	100	100	100	100	52
Appolo Solar Development	Bahawalpur, Punjab	Solar	100	100	100	100	100	100
Best Green Energy	Bahawalpur, Punjab	Solar	100	100	100	100	100	100
Crest Energy	Bahawalpur, Punjab	Solar	100	100	100	100	100	100
AJ Power	Khushab, Punjab	Solar	12	12	12	12	12	18
Harappa Solar	Sahiwal, Punjab	Solar	18	18	18	18	18	18
Atlas Solar (formerly Zhenfa Pakistan New Energy)	Layyah, Punjab	Solar	-	-	-	100	100	50
Total Solar Power Projects			**430**	**430**	**430**	**530**	**530**	**438**
D3: Bagasse/Biomass Power Projects								
Jamal Din Wali-II	Rahim Yar Khan, Punjab	Bagasse+Biomass	26	26	26	26	26	26
Jamal Din Wali-III	Rahim Yar Khan, Punjab	Bagasse+Biomass	27	27	27	27	27	26
RYK Mills	Rahim Yar Khan, Punjab	Bagasse	40	40	40	40	40	24
Chiniot Power	Chiniot, Punjab	Bagasse	63	63	63	63	63	62
Fatima Energy	Muzaffargarh, Punjab	Biomass/Coal	120	120	120	120	0	0
Hamza Sugar Mills	Rahim Yar Khan, Punjab	Bagasse+Biomass	15	15	15	15	15	15
The Thal Industries Corporation	Layyah, Punjab	Bagasse	20	20	20	20	20	41
Almoiz Industries	Mianwali, Punjab	Bagasse	36	36	36	36	36	36
Chanar Energy	Faisalabad, Punjab	Bagasse+Biomass	22	22	22	22	22	22
Total Bagasse/Biomass Power Projects			**369**	**369**	**369**	**369**	**249**	**253**
Total Renewable Energy (D1+D2+D3) (CPPA-G system) (D)			**2,047**	**2,047**	**2,047**	**2,737**	**2,617**	**2,519**
E1: Thermal (KE Own)								
Bin Qasim TPS-I	Karachi, Sindh	STs	1,260	1,260	1,050	840	840	730
Bin Qasim TPS-II	Karachi, Sindh	GTs	572	572	572	572	572	526
Bin Qasim TPS-III	Karachi, Sindh	GTs	-	-	-	471	942	918
Korangi Town GTPS-II	Karachi, Sindh	GTs	107	107	107	107	107	96
Site GTPS-II	Karachi, Sindh	GTs	107	107	107	107	107	97
Korangi CCPP	Karachi, Sindh	GTs	248	248	248	248	248	227
Total Thermal (KE Own)			**2,294**	**2,294**	**2,084**	**2,345**	**2,816**	**2,594**
E2: Thermal (IPPs connected with KE System)								
Gul Ahmed	Karachi, Sindh	DE+ST	136	136	136	136	136	128
Tapal Energy	Karachi, Sindh	DE+ST	126	126	126	126	126	124
SNPCL-I (IPP-2002)	Jamshoro, Sindh	GEs+STs	52	52	52	52	52	51
SNPCL-II (IPP-2002)	Jamshoro, Sindh	GEs+STs	52	52	52	52	52	51
Total Thermal (IPPs connected with KE System)			**366**	**366**	**366**	**366**	**366**	**354**
E3: Thermal (Others connected with KE System)								
Anoud Power (IGC)	Karachi, Sindh	DGs	12	12	12	12	0	0
Intl. Steel Limited (CPP)	Karachi, Sindh	GEs+DGs	19	19	19	19	19	19
Intl. Ind. Limited (CPP)	Karachi, Sindh	GEs+ST	4	4	4	4	4	4
FFBL Power (Distri. Gen.)	Karachi, Sindh	CFB+STs	52	52	52	52	52	52
Lotte Chemicals	Karachi, Sindh	RLNG	-	-	48	48	48	14
Lucky Cement	Lakki Marwat, KPK	Waste Heat Recovery	-	-	16	16	16	5
Total Thermal (Others connected with KE System)			**87**	**87**	**151**	**151**	**139**	**94**
Total Thermal KE (E1+E2+E3)			**2,747**	**2,747**	**2,601**	**2,862**	**3,321**	**3,042**
E4: Renewable Energy (KE System)								
Oursun Pakistan	Thatta, Sindh	Solar	50	50	50	50	50	39
Gharo Solar	Thatta, Sindh	Solar	-	50	50	50	50	40
Net-Metering Import		Solar	-	-	-	60	102	0
Total RE (KE System)			**50**	**100**	**100**	**160**	**202**	**79**
Total KE (KE own and others connected with KE System)			**2,797**	**2,847**	**2,701**	**3,022**	**3,523**	**3,121**
F: SPPs/CPPs/N-CPPs: CPPA-G System [Contract Capacity (MW)]								
Total SPPs/CPPs/N-CPPs: CPPA-G System (F)			**340**	**340**	**340**	**340**	**340**	**257**
Grand Total (A+B+C+D+E+F)			**38,995**	**38,719**	**39,772**	**43,835**	**45,885**	**43,748**

Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

TABLE 6

Installed Capacity by Systems and by Sectors (MW)

As on 30th June	2019	2020	2021	2022	2023
BY SYSTEM					
Total Installed Capacity: CPPA-G System	**36,061**	**35,735**	**36,934**	**40,813**	**42,362**
% Share (Installed Capacity: CPPA-G System)	92.48	92.29	92.86	93.11	92.32
Total Installed Capacity: KE System	**2,934**	**2,984**	**2,838**	**3,022**	**3,523**
% Share (Installed Capacity: KE System)	7.52	7.71	7.14	6.89	7.68
BY SECTOR					
Total Installed Capacity in Public Sector	**20,344**	**19,588**	**20,733**	**22,991**	**22,847**
% Share (Installed Capacity in Public Sector)	52.17	50.59	52.13	52.45	49.79
Total Installed Capacity in Private Sector	18,651	19,131	19,039	20,844	23,038
% Share (Installed Capacity in Private Sector)	47.83	49.41	47.87	47.55	50.21
Total Installed Capacity in the Country	**38,995**	**38,719**	**39,772**	**43,835**	**45,885**

Note: See tables 4 and 5 for breakup details.
Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

Figure 6A: Share of Installed Generation Capacity by System (%)

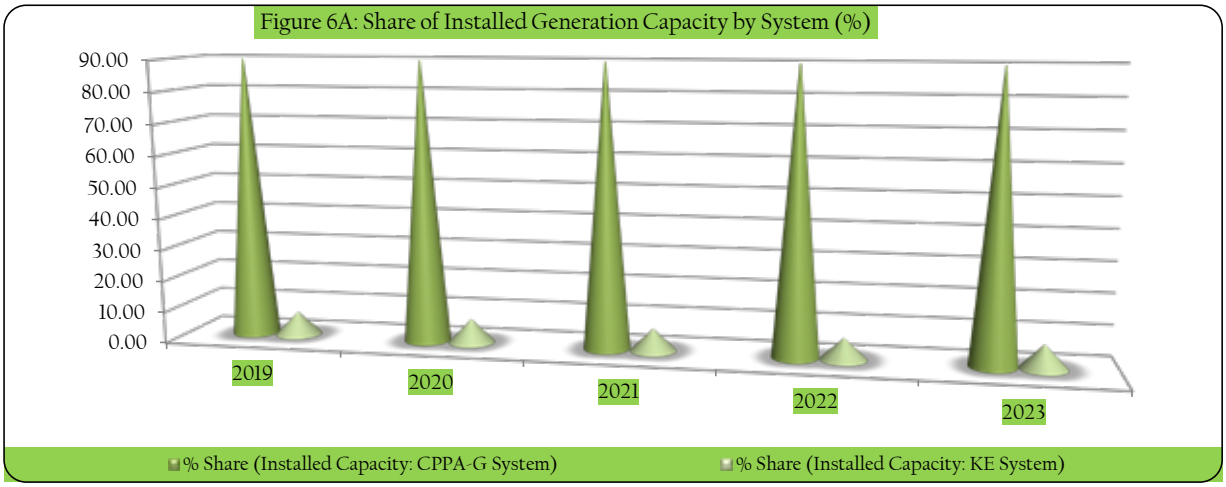


Figure 6B: Share of Installed Generation Capacity by Sector (%)

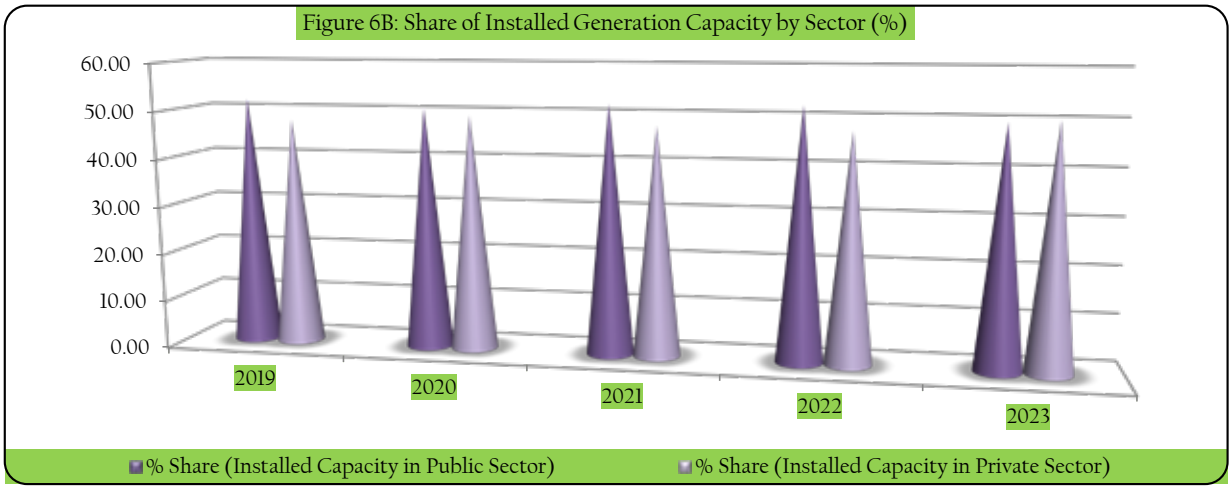


TABLE 7

Electricity Generation by Type (GWh) (Net)

As on 30th June	2018-19	2019-20	2020-21	2021-22	2022-23
HYDEL					
WAPDA Hydel	31,167.85	37,136.04	36,856.88	32,522.88	30,410.47
IPPs Hydel	1,928.04	1,562.55	1,943.66	3,023.40	4,863.15
Sub-Total	**33,095.89**	**38,698.59**	**38,800.54**	**35,546.28**	**35,273.63**
% Share (Hydel Electricity Generation)	24.30	28.83	27.02	23.07	25.56
THERMAL					
GENCOs: CPPA-G System	13,016.93	7,907.85	6,802.93	6,349.56	5,945.94
KE Own	9,928.92	9,628.90	10,185.60	7,889.96	7,093.09
IPPs: CPPA-G System	62,597.73	60,720.31	68,708.63	76,280.90	56,697.83
IPPs Connected with KE	2,118.31	1,863.60	2,184.57	2,130.46	1,606.81
SPPs/CPPs/N-CPPs: CPPA-G System	405.13	170.99	216.80	136.31	150.02
SPPs/CPPs/N-CPPs connected with KE	523.74	534.30	578.90	482.94	406.90
Sub-Total	88,590.76	80,825.95	88,677.43	93,270.13	71,900.59
% Share (Thermal Electricity Generation)	65.04	60.21	61.76	60.54	52.09
NUCLEAR					
CHASNUPP (I, II, III and IV)	9,005.68	9,704.89	9,172.09	9,450.30	9,709.21
KANUPP (I, II and III)	129.99	193.13	1,917.96	8,843.25	14,345.35
Sub-Total	**9,135.67**	**9,898.02**	**11,090.05**	**18,293.55**	**24,054.56**
% Share (Nuclear Electricity Generation)	6.71	7.37	7.72	11.87	17.43
IMPORT					
Import from Iran	486.80	513.74	498.37	514.36	478.62
Sub-Total	**486.80**	**513.74**	**498.37**	**514.36**	**478.62**
% Share (Imported Electricity Generation)	0.36	0.38	0.35	0.33	0.35
RENEWABLE ENERGY (WIND, SOLAR AND BAGASSE)					
RE Power Plants: CPPA-G System	4,840.59	4,151.91	4,322.13	6,195.64	6,023.28
RE Power Plants connected with KE	56.92	153.28	199.56	236.22	298.19
Sub-Total	**4,897.51**	**4,305.19**	**4,521.69**	**6,431.86**	**6,321.47**
% Share (RE Electricity Generation)	3.60	3.21	3.15	4.18	4.58
Total Electricity Generation of the Country	**136,206.63**	**134,241.49**	**143,588.08**	**154,056.18**	**138,028.87**

Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

Figure 7: Share of Electricity Generation by Type (%)

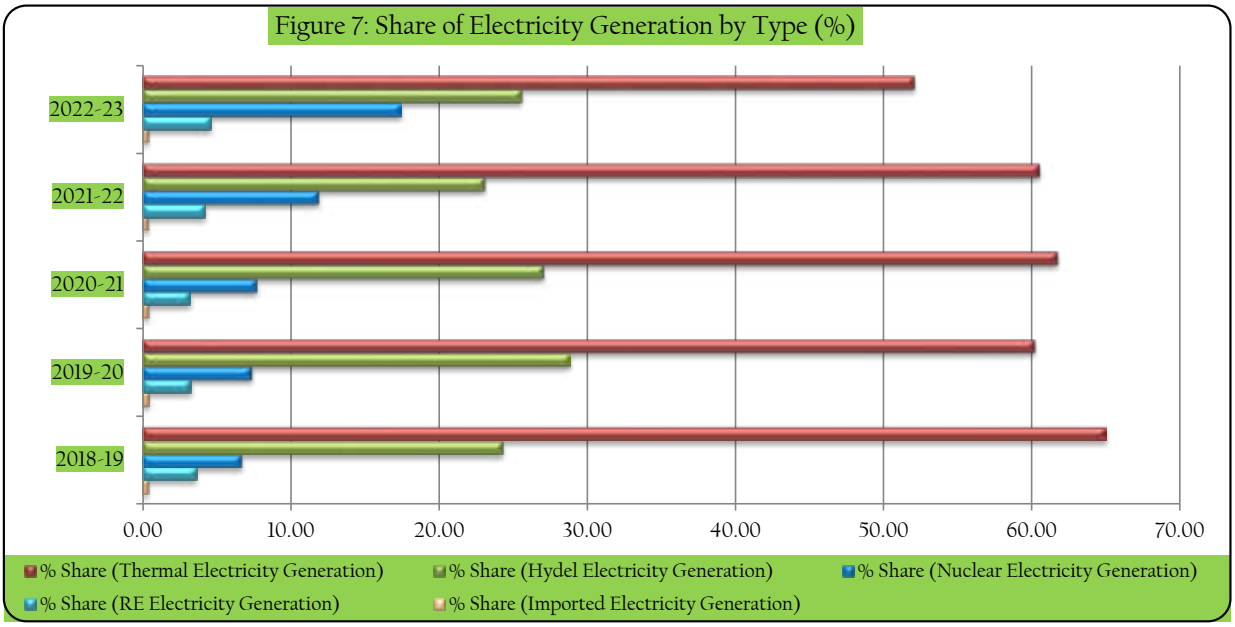


TABLE 8

Plant-wise Electricity Generation (GWh) (Net)

Power Station	Primary Fuel	Alternate Fuel	2018-19	2019-20	2020-21	2021-22	2022-23
A1: Hydel (WAPDA)							
Major Hydropower Units							
Tarbela	Hydel	Hydel	10,619.28	11,857.69	12,565.74	10,955.73	12,445.84
Tarbela 4th Ext.	Hydel	Hydel	2,318.06	5,485.66	3,418.78	3,276.12	3,443.25
Ghazi Barotha	Hydel	Hydel	6,552.14	6,482.21	6,810.91	6,761.55	6,813.18
Mangla	Hydel	Hydel	3,860.85	4,589.33	5,313.83	4,200.26	3,838.38
Warsak	Hydel	Hydel	1,002.27	1,095.46	1,064.99	933.85	898.59
Chashma	Hydel	Hydel	767.16	747.16	772.32	795.68	876.34
Khan Khwar	Hydel	Hydel	237.74	273.88	231.19	162.44	263.29
Allai Khwar	Hydel	Hydel	462.09	469.47	438.78	373.03	480.85
Jinnah Hydel	Hydel	Hydel	225.63	176.58	235.02	256.06	206.70
Duber Khwar	Hydel	Hydel	594.42	609.40	640.78	616.96	494.96
Neelum Jhelum	Hydel	Hydel	3,964.68	4,842.30	4,784.16	3,620.23	107.72
Golen Gol	Hydel	Hydel	99.31	86.13	82.40	138.14	131.94
Small Hydropower Units							
Dargai	Hydel	Hydel	109.35	98.42	108.72	87.40	71.27
Rasul	Hydel	Hydel	71.86	34.04	76.63	58.90	54.12
Shadiwal	Hydel	Hydel	28.39	13.68	31.90	28.06	32.45
Chichoki Mallian	Hydel	Hydel	29.05	29.54	27.38	22.46	30.88
Nandipur	Hydel	Hydel	36.97	33.82	32.48	29.21	36.13
Kurram Garhi	Hydel	Hydel	14.23	15.11	19.71	10.95	14.45
Renala	Hydel	Hydel	2.19	1.03	1.96	1.81	1.74
Chitral	Hydel	Hydel	3.51	3.04	2.65	2.15	2.69
Gomal Zam	Hydel	Hydel	32.68	54.42	62.09	57.15	40.72
Malakand/Jabban	Hydel	Hydel	135.99	137.67	134.46	134.74	124.99
Total Hydel (WAPDA)			**31,167.85**	**37,136.04**	**36,856.88**	**32,522.88**	**30,410.47**
A2: Hydel (IPPs)							
Jagran (AJ&K)	Hydel	Hydel	83.65	86.25	113.23	121.27	103.61
Malakand-III (PEDO)	Hydel	Hydel	399.25	408.53	321.57	353.87	267.77
Pehur (PEDO)	Hydel	Hydel	35.86	50.59	0.00	0.00	0.00
Laraib Energy (AJ&K)	Hydel	Hydel	354.38	384.43	465.29	412.66	345.00
Marala Hydro (PPDCL)	Hydel	Hydel	527.45	32.16	36.59	26.61	22.79
Patrind Hydro (AJ&K)	Hydel	Hydel	527.45	566.25	624.45	1,160.15	548.60
Gulpur Hydropower Project	Hydel	Hydel	-	34.33	256.88	230.99	304.69
Daral Khwar	Hydel	Hydel	-	-	91.84	117.37	127.29
Ranolia	Hydel	Hydel	-	-	33.81	54.06	12.73
Karot Power Company	Hydel	Hydel	-	-	-	546.42	3,130.67
Total Hydel (IPPs)			1,928.04	1,562.55	1,943.66	3,023.40	4,863.15
Total Hydel (A1+A2)			**33,095.89**	**38,698.59**	**38,800.54**	**35,546.28**	**35,273.63**
B1: Thermal (GENCOs: CPPA-G System)							
TPS Jamshoro	RFO+Gas	RFO	880.09	209.90	199.55	245.53	25.40
GTPS Kotri	Gas	HSD	37.19	0.00	0.00	0.00	0.00
TPS Guddu (Units 1-4)	Gas	RFO	10.02	0.00	138.94	0.00	0.00
TPS Guddu (Units 5-10)	Gas	-	3,467.30	1,294.84	1,338.17	1,385.84	1,948.96
TPS Guddu (Units 11-13)	Gas	-	837.20	311.56	223.96	148.16	19.42
TPS Guddu (Units 14-16)	Gas	HSD	5,069.78	4,315.35	3,123.82	2,609.95	2,635.92
TPS Muzaffargarh	Gas	RFO	836.73	299.86	282.26	220.43	50.56
GTPS Faisalabad	Gas	HSD	149.53	0.00	14.26	98.83	0.00
TPS Nandipur	Gas	HSD	1,729.09	1,476.33	1,481.98	1,640.82	1,265.68
Total Thermal (GENCOs: CPPA-G System)			**13,016.93**	**7,907.85**	**6,802.93**	**6,349.56**	**5,945.94**
B2: Thermal (IPPs: CPPA-G System)							
Lal Pir Power	RFO	-	613.80	186.32	620.78	1,022.68	397.59
Pak Gen. Power	RFO	-	495.56	149.76	445.54	1,304.35	443.74
Altern Energy	Gas	-	22.03	3.73	12.40	0.00	0.00
Fauji Kabirwala	Gas	HSD	563.13	346.32	389.96	357.21	66.33
Habibullah Coastal	Gas	HSD	716.78	108.37	0.00	0.00	0.00
Hub Power	RFO	-	814.43	32.38	112.91	1,219.58	191.61
KAPCO	Gas	RFO+HSD	4,959.40	3,476.67	3,562.24	5,142.00	587.84
Kohinoor Energy	RFO	-	387.44	363.86	337.07	515.84	329.16
Rousch Power	Gas	HSD	1,035.85	217.53	284.36	495.78	179.04
Saba Power	RFO	-	225.41	50.83	121.65	329.95	148.54
Liberty Daharki Power	Gas	HSD	1,307.61	896.74	983.33	1,054.06	1,001.19
Uch Power	Gas	HSD	3,895.85	4,087.33	4,088.44	4,300.52	3,901.33
Attock Gen.	RFO	-	532.18	320.96	384.03	721.93	483.59
Atlas Power	RFO	-	691.30	259.33	517.08	1,007.25	521.94

Power Station	Primary Fuel	Alternate Fuel	2018-19	2019-20	2020-21	2021-22	2022-23
B2: Thermal (IPPs: CPPA-G System)							
Engro Powergen. Qadirpur	Gas	HSD	1,385.13	700.74	648.50	791.03	935.42
Saif Power	Gas	HSD	828.20	476.28	639.40	734.99	538.22
Orient Power	Gas	HSD	877.80	338.00	597.92	836.38	604.79
Nishat Power	RFO	-	675.10	277.46	523.40	794.25	537.90
Nishat Chunian	RFO	-	599.74	351.23	537.57	882.46	386.13
Sapphire Electric	Gas	HSD	808.51	296.76	568.04	780.50	452.52
Halmore Power	Gas	HSD	612.91	347.69	509.79	675.93	287.05
Narowal Energy	RFO	-	636.13	338.08	496.06	867.49	469.88
Liberty Power Tech.	RFO	-	776.26	458.54	606.66	925.44	544.54
Foundation Power	Gas	-	1,330.60	777.30	1,000.37	1,272.89	1,196.12
Uch-II Power	Low BTU Gas	-	3,018.37	2,148.02	2,339.37	2,828.67	2,776.43
Huaneng Shandong Ruyi (Sahiwal Imported Coal)	Bituminous Coal		8,220.07	6,167.19	7,342.70	6,881.38	2,876.85
QATPL (Bhikki)	RLNG	HSD	6,149.75	5,192.50	7,118.80	6,090.92	4,697.55
NPPMCL (Haveli Bahadur Shah)	RLNG	HSD	7,027.24	7,050.34	7,682.35	7,488.57	6,520.55
NPPMCL (Balloki)	RLNG	HSD	5,284.19	5,911.84	6,032.81	7,186.71	6,863.66
Port Qasim Electric Power	Bituminous Coal	HSD	7,553.64	8,969.74	8,372.38	7,478.64	3,203.00
Reshma Power	RFO/HSFO	-	15.11	2.07	0.00	0.00	0.00
China Power Hub	Imported Coal		260.82	6,136.20	7,923.41	6,764.89	1,546.92
Engro Powergen Thar	Thar Coal		277.42	4,280.22	3,909.30	3,676.95	3,646.06
Lucky Electric Power	Coal		-	-	-	1,774.10	3,323.89
Punjab Thermal Power	RLNG		-	-	-	77.56	885.23
Thar Energy	Thar Coal		-	-	-	-	1,238.50
Thar Coal Block-1 Power	Thar Coal		-	-	-	-	3,991.21
ThalNova Power	Thar Coal		-	-	-	-	923.53
Total Thermal (IPPs/SPPs/CPPs: CPPA-G System)			**62,597.73**	**60,720.31**	**68,708.63**	**76,280.90**	**56,697.83**
Total Thermal: CPPA-G System (B1+B2)			**75,614.66**	**68,628.16**	**75,511.56**	**82,630.46**	**62,643.77**
C: Nuclear							
CHASNUPP-I	NUC	NUC	2,141.02	2,044.64	2,244.33	2,512.58	2,298.98
CHASNUPP-II	NUC	NUC	2,262.73	2,636.12	2,067.98	2,437.86	2,437.89
CHASNUPP-III	NUC	NUC	2,484.34	2,322.85	2,403.62	2,320.38	2,500.37
CHASNUPP-IV	NUC	NUC	2,117.59	2,701.28	2,456.15	2,179.48	2,471.98
KANUPP	NUC	NUC	129.99	193.13	219.04	45.77	0.00
KANUPP-II	NUC	NUC	-	-	1,698.92	6,830.42	7,562.27
KANUPP-III	NUC	NUC	-	-	-	1,967.06	6,783.07
Total Nuclear (C)			**9,135.67**	**9,898.02**	**11,090.05**	**18,293.55**	**24,054.56**
D: Import							
Import from Iran (Tavanir)			486.80	513.74	498.37	514.36	478.62
Total Import: CPPA-G System (D)			**486.80**	**513.74**	**498.37**	**514.36**	**478.62**
E: Renewable Energy (CPPA-G System)							
E1: Wind Power Projects							
Zorlu Enerji Pakistan	Wind	Wind	143.96	143.55	109.66	128.63	95.69
FFC Energy	Wind	Wind	115.74	118.40	90.90	114.54	76.55
Three Gorges First Wind Farm	Wind	Wind	129.21	135.62	99.14	123.79	88.43
Foundation Wind Energy-I	Wind	Wind	229.31	239.29	123.24	127.14	88.92
Foundation Wind Energy-II	Wind	Wind			73.18	141.83	97.68
Sapphire Wind	Wind	Wind	135.00	89.70	104.01	129.94	81.42
Yunus Energy	Wind	Wind	128.69	89.86	108.84	135.73	89.81
Metro Power Company	Wind	Wind	138.46	153.06	120.11	147.63	106.75
Gul Ahmad Wind	Wind	Wind	127.74	91.15	110.38	137.87	87.18
Master Wind Energy	Wind	Wind	135.82	96.90	110.13	137.64	89.93
Tenaga Generasi	Wind	Wind	111.31	125.77	104.07	133.08	76.23
HydroChina Dawood Power	Wind	Wind	115.98	121.06	101.60	132.45	71.44
Sachal Energy Development	Wind	Wind	124.49	142.36	107.79	130.88	95.70
UEP Wind Power	Wind	Wind	243.99	179.13	203.64	254.06	172.73
Artistic Wind Power	Wind	Wind	192.37	132.16	166.05	192.09	127.06
Act Wind	Wind	Wind	89.60	64.76	74.68	88.39	53.80
Hawa Energy	Wind	Wind	167.41	115.45	140.96	169.85	117.07
Jhimpir Power	Wind	Wind	167.06	119.18	143.91	166.01	115.78
Three Gorges Second Wind Farm	Wind	Wind	131.12	92.77	108.43	138.80	93.90
Three Gorges Third Wind Farm	Wind	Wind	134.15	95.18	112.54	142.76	97.67
Tricon Boston Consulting-A	Wind	Wind	147.35	124.95	149.90	181.46	125.44
Tricon Boston Consulting-B	Wind	Wind	127.24	117.64	144.15	177.71	121.04
Tricon Boston Consulting-C	Wind	Wind	131.19	117.47	143.56	178.69	121.42
Zephyr Power	Wind	Wind	64.44	177.05	149.07	189.43	110.75
Lucky Renewables	Wind	Wind	-	-	-	127.50	140.29
Master Green Energy	Wind	Wind	-	-	-	145.41	132.31

Power Station	Primary Fuel	Alternate Fuel	2018-19	2019-20	2020-21	2021-22	2022-23
E: Renewable Energy (CPPA-G System)							
E1: Wind Power Projects							
Act 2 Din Wind	Wind	Wind	-	-	-	86.89	138.67
Artistic 2 Wind Power	Wind	Wind	-	-	-	83.61	132.45
Indus Wind Energy	Wind	Wind	-	-	-	86.32	137.66
Lakeside Energy	Wind	Wind	-	-	-	73.55	139.46
Liberty Wind Power-I	Wind	Wind	-	-	-	69.85	123.89
Din Energy	Wind	Wind	-	-	-	72.89	131.07
Gul Ahmed Electric	Wind	Wind	-	-	-	84.43	143.93
Liberty Wind Power-II	Wind	Wind	-	-	-	42.92	125.06
NASDA Green Energy	Wind	Wind	-	-	-	62.56	143.10
Metro 2 Wind Power	Wind	Wind	-	-	-	47.84	195.76
Total Wind Power Projects			**3,231.64**	**2,882.48**	**2,899.94**	**4,584.17**	**4,086.05**
E2: Solar Power Projects							
Quaid-e-Azam Solar Park	Solar	Solar	164.34	164.99	165.56	164.69	160.47
Appolo Solar Development	Solar	Solar	166.64	163.02	164.90	168.68	165.83
Best Green Energy	Solar	Solar	165.69	162.92	164.25	167.34	166.17
Crest Energy	Solar	Solar	167.56	165.31	166.97	169.18	169.83
AJ Power	Solar	Solar	18.66	18.03	18.50	65.37	18.35
Harappa Solar	Solar	Solar	31.63	30.69	31.45	18.78	31.07
Atlas Solar (formerly Zhenfa Pakistan New Energy)	Solar	Solar	-	-	-	31.37	197.12
Net-Metering	Solar	Solar	-	-	-	-	183.04
Total Solar Power Projects			**714.52**	**704.97**	**711.63**	**785.41**	**1,091.87**
E3: Bagasse/Biomass Power Projects							
Jamal Din Wali-II	Bagasse + Biomass		187.80	161.88	177.17	169.48	190.76
Jamal Din Wali-III	Bagasse + Biomass		181.18	129.21	144.44	136.74	186.04
RYK Mills	Bagasse	Bagasse	141.31	73.67	73.94	97.27	100.99
Chiniot Power	Bagasse	Bagasse	194.67	80.45	160.56	222.54	186.81
Hamza Sugar Mills	Bagasse + Biomass		61.20	45.03	39.99	61.06	53.48
The Thal Industries Corporation	Bagasse	FO	65.75	36.79	46.37	73.67	61.22
Almoiz Industries	Bagasse	Bagasse	48.92	15.10	29.83	17.38	25.02
Chanar Energy	Bagasse	Bagasse	13.61	22.34	38.26	47.92	41.05
Total Bagasse/Biomass Power Projects			894.43	564.46	710.56	826.06	845.36
Total Renewable Energy (E1+E2+E3) (CPPA-G System) (E)			**4,840.59**	**4,151.91**	**4,322.13**	**6,195.64**	**6,023.28**
F1: Thermal (KE Own)							
Bin Qasim TPS-I	Dual	RLNG	4,217.77	3,824.66	4,730.00	3,289.10	1,851.70
Bin Qasim TPS-II	Dual	RLNG	3,815.95	4,030.54	3,926.00	3,587.52	2,634.48
Bin Qasim TPS-III	RLNG	RLNG	-	-	-	243.50	2,522.58
Korangi Town GTPS-II	Gas	RLNG	375.62	299.73	365.23	114.52	10.18
Site GTPS-II	Gas	RLNG	355.24	397.23	215.67	102.86	24.41
Korangi CCPP	Gas	RLNG	1,164.34	1,076.74	948.70	552.46	49.74
Total Thermal (KE Own)			**9,928.92**	**9,628.90**	**10,185.60**	**7,889.96**	**7,093.09**
F2: Thermal (IPPs connected with KE System)							
Gul Ahmed	RFO	-	675.54	496.14	673.00	705.43	508.68
Tapal Energy	RFO	-	645.02	627.77	737.00	715.86	518.44
SNPCL-I (IPP-2002)	Gas	-	403.06	371.86	394.35	363.36	292.66
SNPCL-II (IPP-2002)	Gas	-	394.69	367.83	380.22	345.81	287.03
Total Thermal (IPPs connected with KE System)			**2,118.31**	**1,863.60**	**2,184.57**	**2,130.46**	**1,606.81**
F3: Thermal (Others connected with KE System)							
Anoud Power (IGC)	RFO/Gas	DO	51.58	59.52	12.00	0.00	0.00
Intl. Steel Limited (CPP)	Gas	-	46.00	51.21	43.00	28.54	26.89
Intl. Ind. Limited (CPP)	Gas	-	12.65	10.66	10.00	9.29	10.41
FFBL Power (Distributed Gen.)	Imported/Local Coal		413.51	412.91	452.88	406.69	346.26
Lotte Chemicals	Gas	Gas	-	-	61.00	35.44	21.08
Lucky Cement	Gas	Gas	-	-	0.02	2.98	2.26
Total Thermal (Others connected with KE System)			**523.74**	**534.30**	**578.90**	**482.94**	**406.90**
Total Thermal KE (F1+F2+F3)			**12,570.97**	**12,026.80**	**12,949.07**	**10,503.36**	**9,106.80**
F4: Renewable Energy (connected with KE System)							
Oursun Pakistan	Solar	Solar	56.92	88.28	90.87	89.58	89.32
Gharo Solar	Solar	Solar	-	65.00	108.69	102.64	101.69
Net-Metering	Solar	Solar	-	-	-	44.00	107.18
Total RE (connected with KE System)			**56.92**	**153.28**	**199.56**	**236.22**	**298.19**
Total KE (KE own and others connected with KE System)			**12,627.89**	**12,180.08**	**13,148.63**	**10,739.58**	**9,404.99**
G: SPPs/CPPs/N-CPPs: CPPA-G System							
Total SPPs/CPPs/N-CPPs: CPPA-G System (G)			**405.13**	**170.99**	**216.80**	**136.31**	**150.02**
Grand Total (A+B+C+D+E+F+G)			**136,206.63**	**134,241.49**	**143,588.08**	**154,056.18**	**138,028.87**

Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

TABLE 9

Electricity Generation by Systems and by Sectors (GWh) (Net)

As on 30th June	2018-19	2019-20	2020-21	2021-22	2022-23
BY SYSTEM					
Total Electricity Generation: CPPA-G System*	**123,448.75**	**121,868.28**	**130,220.41**	**143,270.83**	**128,623.88**
% Share (Generation: CPPA-G System)	90.63	90.78	90.69	93.00	93.19
Total Electricity Generation: KE System	**12,757.88**	**12,373.21**	**13,367.67**	**10,785.35**	**9,404.99**
% Share (Generation: KE System)	9.37	9.22	9.31	7.00	6.81
BY SECTOR					
Total Electricity Generation in Public Sector	**73,100.52**	**74,321.88**	**76,803.28**	**79,352.20**	**80,596.73**
% Share (Generation in Public Sector)	53.67	55.36	53.49	51.51	58.39
Total Electricity Generation in Private Sector	**63,106.11**	**59,919.61**	**66,784.80**	**74,703.98**	**57,432.13**
% Share (Generation in Private Sector)	46.33	44.64	46.51	48.49	41.61
Total Electricity Generation of the Country	**136,206.63**	**134,241.49**	**143,588.08**	**154,056.18**	**138,028.87**

Note: See tables 7 and 8 for details and explanations. * Include Import from Iran.

Source: WAPDA/GENCOs/KE/IPPs/CPPA-G

Figure 9A: Share of Electricity Generation by System (%)

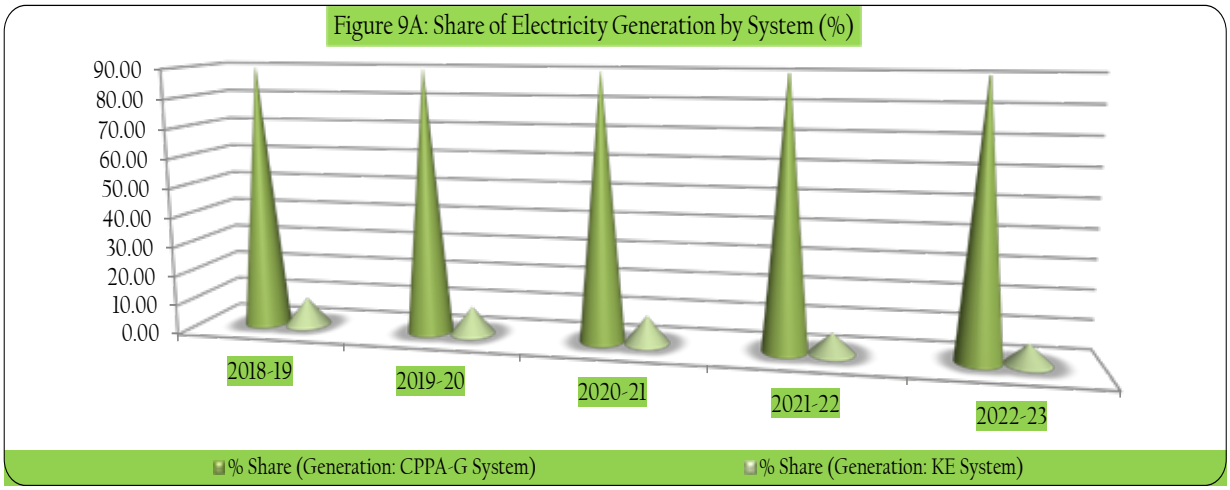


Figure 9B. Share of Electricity Generation by Sector (%)

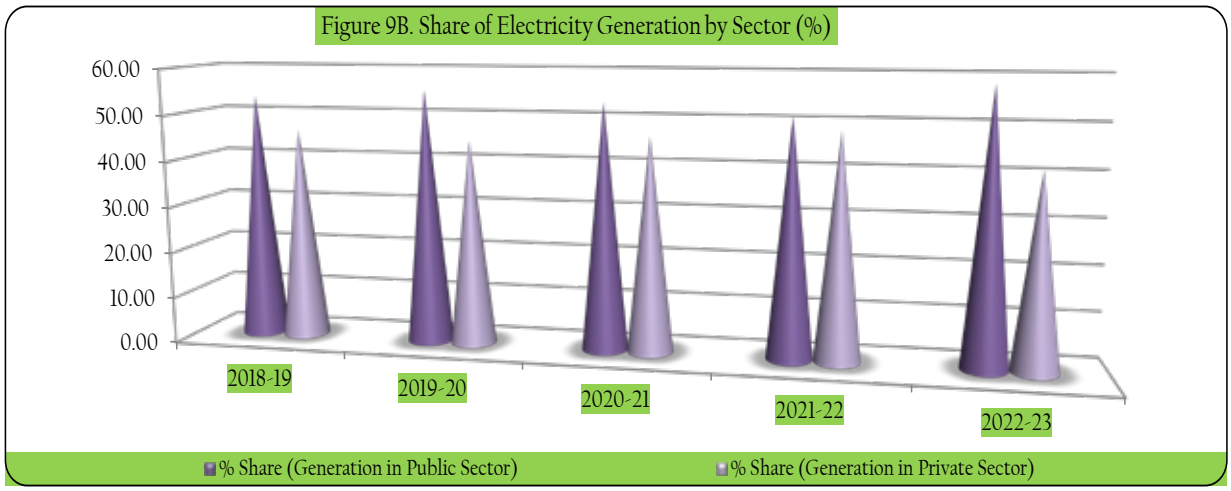


TABLE 10

Month-wise CPPA-G Electricity Generation Data (GWh) (2022-23)

Power Producers	July	August	September	October	November	December	January	February	March	April	May	June	Total
WAPDA	3,443.96	3,786.06	3,143.89	2,528.25	2,004.14	1,576.69	680.85	1,824.61	1,662.16	1,270.32	2,550.04	3,369.75	**27,840.71**
Jagran	18.76	16.08	9.79	3.16	1.37	2.07	1.51	2.38	5.94	10.18	15.46	16.91	**103.61**
Malakand-III	44.77	32.20	14.51	13.16	13.40	10.52	13.10	2.90	29.28	30.04	32.03	31.86	**267.77**
Laraib Energy	15.74	8.56	22.27	49.90	39.74	21.62	1.06	34.72	30.15	33.90	55.10	32.24	**345.00**
Star Hydro	84.79	49.68	46.61	27.01	21.97	17.31	15.31	15.66	26.70	53.74	85.49	104.34	**548.60**
Head Marala	2.14	1.25	1.15	-0.01	1.25	1.57	-	1.41	3.19	3.39	3.86	3.61	**22.79**
Neelum Jhelum	107.72	-	-	-	-	-	-	-	-	-	-	-	**107.72**
Tarbela 4th Ext.	795.89	1,016.43	919.07	387.93	264.27	-	-	-	-	59.66	-	-	**3,443.25**
Mira Power	45.24	63.30	34.85	13.36	12.30	2.96	2.46	12.77	11.91	29.02	36.23	40.28	**304.69**
Daral Khwar	17.53	14.04	1.13	5.40	6.07	2.95	2.57	3.61	8.51	17.75	24.12	23.62	**127.29**
Karot Hydro	393.48	360.28	210.56	115.46	119.86	84.74	83.47	154.11	223.78	364.24	509.87	510.82	**3,130.67**
Ranolia	6.90	5.84	-	-	-	-	-	-	-	-	-	-	**12.73**
GENCO-I	12.09	12.29	-	-	-	-	-	-	-	-	-	-	**24.38**
GENCO-II	538.40	483.31	445.51	513.61	370.85	351.40	286.18	289.90	361.92	320.88	334.66	306.77	**4,603.40**
GENCO-III	262.48	240.96	159.26	96.97	1.65	-	23.81	-	19.80	123.70	228.52	156.19	**1,313.36**
KAPCO	290.65	146.86	111.60	36.02	-	-	2.71	-	-	-	-	-	**587.84**
HUBCO	41.04	72.22	86.27	-1.33	-1.28	-1.21	0.93	-	-1.20	-1.22	-1.31	-1.29	**191.61**
Kohinoor Energy	31.53	60.13	60.49	14.12	-	1.77	29.06	19.84	6.94	28.84	35.75	40.68	**329.16**
Lalpir Power	86.17	95.55	96.14	13.56	-	-	4.81	-	-	-	8.86	92.49	**397.59**
Pakgen Power	74.84	85.98	134.02	7.67	-	-	31.89	-	-	2.48	-	106.85	**443.74**
Fauji Kabirwala	5.53	-	-	-	-	0.00	-	-	-	20.79	34.34	5.66	**66.33**
Rousch Power	39.36	-	-	-	0.98	0.03	3.63	-	-	52.84	79.62	2.59	**179.04**
Saba Power	12.80	30.63	24.73	3.96	-	-	11.99	-	-	8.12	9.39	46.91	**148.54**
Uch	346.94	285.46	213.88	256.67	305.29	386.58	399.44	269.49	342.17	371.97	374.20	349.24	**3,901.33**
Liberty Deharki	133.95	127.81	140.23	103.18	110.42	108.28	-	-	8.86	74.98	96.24	97.21	**1,001.19**
CHASNUPP-I	221.74	94.25	141.70	195.11	214.24	215.21	209.17	191.63	170.94	210.49	220.92	213.59	**2,298.98**
CHASNUPP-II	228.51	214.46	217.88	198.58	221.96	224.46	210.95	201.35	208.65	59.27	230.79	221.03	**2,437.89**
CHASNUPP-III	227.11	191.32	215.40	223.67	224.89	224.90	216.72	200.70	231.18	225.18	204.85	114.46	**2,500.37**
CHASNUPP-IV	229.63	178.32	209.74	223.13	223.84	235.10	104.33	157.77	232.33	223.14	231.36	223.29	**2,471.98**
KANUPP-II	347.65	590.72	735.21	654.46	744.16	688.41	535.21	587.95	638.49	705.83	654.61	679.59	**7,562.27**
KANUPP-III	754.91	604.91	745.58	711.40	708.73	696.79	599.28	543.69	520.43	492.16	0.06	405.15	**6,783.07**
Tavanir Iran	46.57	54.47	53.65	47.77	44.70	39.85	37.13	32.95	31.58	30.46	34.50	24.98	**478.62**
Attock Gen.	49.17	95.49	89.29	18.67	11.88	24.58	73.84	19.75	4.21	28.11	16.84	51.75	**483.59**
Atlas Power	54.83	94.87	102.28	16.32	-	4.22	69.80	11.75	10.86	30.05	48.12	78.84	**521.94**
Nishat Power	95.83	97.67	101.77	13.73	-	2.02	55.47	-	1.86	20.50	45.89	103.15	**537.90**
Foundation Power	113.77	117.06	113.16	116.15	89.89	109.42	114.76	15.08	96.97	103.24	100.11	106.52	**1,196.12**
Orient Power	99.60	84.23	32.44	-	22.95	21.30	35.32	16.84	48.25	72.48	98.44	72.93	**604.79**
Nishat Chunian	57.79	72.65	79.09	8.97	-	1.93	41.59	12.01	1.67	12.71	14.42	83.30	**386.13**
Saif Power	86.83	63.34	69.28	50.47	15.51	0.84	21.73	-	13.70	63.76	92.91	59.85	**538.22**
Engro Powergen Qadirpur	77.38	74.48	75.36	57.81	74.14	78.54	97.35	81.06	83.77	81.80	79.57	74.16	**935.42**
Sapphire Power	70.57	55.89	37.62	8.33	-	-	9.91	14.62	41.88	67.03	83.02	63.64	**452.52**
Narowal Energy	46.34	68.41	93.50	14.86	-	4.22	56.51	24.89	12.32	55.28	27.14	66.41	**469.88**
Liberty Power	70.68	101.42	101.30	10.03	-	1.38	87.42	19.54	3.86	37.73	35.85	75.34	**544.54**

Power Producers	July	August	September	October	November	December	January	February	March	April	May	June	Total
Halmore	49.47	21.03	-	39.36	-	-	7.42	-	-	43.26	77.29	49.20	**287.05**
Uch-II	250.43	227.09	217.36	248.95	238.55	239.57	248.16	194.08	213.32	215.79	251.78	231.37	**2,776.43**
JDW-II	17.03	14.82	17.10	12.53	16.71	15.38	15.33	14.15	15.83	17.38	17.26	17.24	**190.76**
JDW-III	16.08	14.29	16.93	13.41	16.98	15.15	15.14	13.57	17.36	17.20	12.77	17.16	**186.04**
RYK	7.29	4.02	-	4.93	6.34	13.48	13.19	12.58	10.40	9.35	9.86	9.56	**100.99**
Chiniot Power	0.20	-	-	6.95	19.44	28.50	27.62	25.04	33.38	10.55	19.69	15.43	**186.81**
Hamza Sugar Mills	-	-	-	-	5.25	9.31	7.84	7.42	6.18	8.26	8.80	0.42	**53.48**
Almoiz Industries	0.02	-	0.00	0.00	3.97	0.17	-	3.51	2.50	5.01	3.17	6.68	**25.02**
Chanar Energy	-	-	-	-	0.95	12.08	11.69	10.67	5.66	-	-	-	**41.05**
China Hub Power	412.10	290.15	199.27	304.03	-	2.48	48.53	-	16.36	-	31.69	242.31	**1,546.92**
Engro PowerGen Thar	393.71	332.18	427.16	341.31	319.32	368.50	243.52	112.08	162.44	176.34	394.63	374.88	**3,646.06**
Layyah Sugar Mills	-	-	-	-	0.09	7.03	10.63	13.17	13.54	13.42	3.34	-	**61.22**
QATPL (RLNG)	230.26	365.91	459.30	670.00	-	121.72	258.86	400.93	390.83	589.69	662.44	487.28	**4,637.23**
QATPL (HSD)	50.08	-	-	-	-	-	-	-	-	-	-	10.24	**60.32**
HBS (RLNG)	573.17	238.03	399.53	254.46	668.13	740.19	416.74	520.53	565.13	627.74	779.10	654.44	**6,437.19**
HBS (HSD)	83.36	-	-	-	-	-	-	-	-	-	-	-	**83.36**
HSR	434.83	495.64	323.37	175.39	-	82.12	639.04	101.05	-	239.74	44.29	341.37	**2,876.85**
Balloki (RLNG)	560.55	673.02	663.73	724.09	296.18	261.31	500.83	505.74	684.95	689.78	677.07	553.87	**6,791.12**
Balloki (HSD)	72.54	-	-	-	-	-	-	-	-	-	-	-	**72.54**
Port Qasim	276.31	657.52	219.16	310.57	352.58	248.96	445.12	13.13	32.29	175.82	327.67	143.86	**3,203.00**
Lucky Electric	282.26	354.59	128.66	369.95	116.36	271.94	341.48	228.28	223.08	296.82	357.80	352.66	**3,323.89**
Punjab Thermal	100.42	0.58	-	0.05	6.34	8.34	4.82	3.70	20.04	87.46	209.64	443.86	**885.23**
Thar Energy	2.97	32.93	151.58	155.26	187.19	183.92	163.69	-	-	19.23	141.63	200.09	**1,238.50**
Thar Coal-I	-	-	-	-	-	363.01	491.34	505.08	749.29	748.04	548.06	586.38	**3,991.21**
ThalNova	-	-	-	-	-	-	71.06	131.52	150.05	162.52	215.52	192.87	**923.53**
Zorlu Enerji	8.21	7.97	10.34	4.35	3.26	5.28	7.38	2.84	5.33	6.85	15.05	15.62	**92.48**
FFCEL	9.42	5.76	8.03	2.89	2.44	4.78	7.11	2.31	3.93	4.99	12.55	12.35	**76.55**
TGF	10.80	7.56	9.48	4.03	3.06	4.74	7.09	2.66	4.87	6.34	13.65	14.14	**88.43**
Foundation Wind-I	12.19	9.49	10.93	3.72	1.80	2.59	5.27	2.83	4.08	7.34	15.25	13.44	**88.92**
Sapphire Wind	11.30	7.22	9.61	3.64	2.86	3.64	4.54	1.08	4.25	6.02	13.73	13.53	**81.42**
Younus Energy	11.69	7.44	9.98	4.74	4.01	5.15	5.25	1.32	5.27	6.92	14.31	13.73	**89.81**
Metro Power	12.76	8.27	10.73	5.39	5.07	7.97	10.68	3.17	6.13	7.50	14.82	14.28	**106.75**
Gul Ahmad Wind	11.90	7.59	8.01	3.92	4.28	5.16	5.51	1.41	5.39	7.04	13.61	13.36	**87.18**
Master Wind	12.18	7.52	10.08	4.06	3.39	4.60	4.82	1.31	4.66	6.38	15.46	15.48	**89.93**
Tenaga Generasi	12.59	9.51	11.11	3.98	2.01	2.62	3.85	1.35	4.04	7.51	3.12	14.54	**76.23**
Act Wind	6.86	4.53	6.18	2.39	1.64	2.27	2.72	0.79	2.56	4.24	9.68	9.96	**53.80**
HDPPL Wind	12.94	9.45	11.53	3.88	1.74	2.57	3.70	1.19	3.74	7.10	1.34	12.27	**71.44**
Sachal Wind	11.52	7.74	9.51	4.62	4.26	6.33	8.56	2.74	5.34	7.09	14.05	13.95	**95.70**
UEPL Wind	24.04	16.31	20.68	9.07	5.85	6.60	7.77	2.06	9.21	14.33	29.05	27.76	**172.73**
Quid-e-Azam Solar	11.82	12.26	14.66	14.77	11.83	11.09	12.03	12.73	15.00	15.11	14.87	14.30	**160.47**
Appolo Solar	12.53	13.03	15.05	14.22	11.88	11.47	12.07	13.01	15.57	15.87	15.91	15.22	**165.83**
Best Green Energy	12.48	13.06	14.56	14.50	12.14	11.79	12.69	13.10	15.40	15.64	15.79	15.01	**166.17**
Crest Energy	12.55	13.15	14.93	15.22	12.45	12.18	12.88	13.45	15.78	15.98	15.95	15.31	**169.83**
Harappa	2.58	2.99	2.83	2.52	1.85	1.57	1.68	2.20	2.74	3.26	3.41	3.44	**31.07**
AJ Solar	1.38	1.65	1.65	1.59	1.35	1.16	1.25	1.33	1.61	1.86	1.80	1.72	**18.35**
AEP Wind	15.24	12.20	14.69	6.64	4.75	6.38	7.44	1.77	6.31	10.51	20.20	20.93	**127.06**
Jhimpir Wind	14.29	10.50	13.11	6.03	5.12	6.86	6.53	1.76	6.50	8.32	18.06	18.71	**115.78**

Power Producers	July	August	September	October	November	December	January	February	March	April	May	June	Total
Hawa Energy	14.53	10.45	12.37	6.10	5.99	8.34	7.35	1.84	6.65	8.06	17.44	17.96	**117.07**
TGT	12.82	8.85	10.93	5.25	4.40	5.39	6.06	1.34	5.63	7.33	15.44	14.21	**97.67**
TGS	12.56	8.39	10.54	4.90	3.94	4.93	5.67	1.26	5.26	7.01	15.22	14.25	**93.90**
Tricon Boston-A	16.13	12.81	15.30	7.19	4.93	4.42	5.81	1.77	7.26	10.47	19.83	19.52	**125.44**
Tricon Boston-B	15.73	11.94	14.36	6.55	4.80	5.12	6.20	1.64	6.69	9.95	19.16	18.91	**121.04**
Tricon Boston-C	15.69	11.88	14.08	6.63	4.97	5.72	6.62	1.60	6.70	9.89	18.98	18.66	**121.42**
Zephyr Wind	15.46	15.58	16.50	6.49	3.41	3.81	6.22	1.86	6.54	11.00	3.82	20.06	**110.75**
Foundation Wind-II	12.96	10.41	11.17	3.88	2.10	3.55	7.05	2.66	4.40	7.87	16.25	15.37	**97.68**
Master Green	17.34	13.56	15.77	7.23	6.29	7.54	9.95	3.56	7.21	8.19	18.45	17.21	**132.31**
Lucky Renewables	17.01	13.45	15.29	7.01	6.25	8.87	11.78	3.61	7.55	9.78	20.53	19.17	**140.29**
ACT2 Din	16.64	13.34	15.61	7.14	5.07	7.08	11.13	4.26	7.42	10.68	21.35	18.96	**138.67**
Artistic Wind	15.87	12.21	14.75	6.37	4.95	7.54	11.05	3.91	7.21	10.12	20.90	17.58	**132.45**
Indus Wind Energy	16.69	13.11	16.07	7.96	5.46	7.68	11.66	3.80	7.16	11.16	21.73	15.16	**137.66**
Lakeside Energy	16.96	13.39	14.92	7.23	5.29	7.00	11.31	4.13	7.92	11.47	21.05	18.78	**139.46**
Liberty Wind-1	15.45	11.50	13.40	6.48	5.11	7.54	10.78	3.40	6.38	10.08	20.03	13.73	**123.89**
Din Energy	15.48	11.58	13.45	6.48	5.54	8.72	12.51	3.50	6.71	9.89	19.59	17.61	**131.07**
Gul Ahmad Electric	17.15	14.22	15.92	8.18	5.68	6.68	10.76	4.33	8.26	12.63	21.68	18.43	**143.93**
Zhenfa Pakistan	17.43	17.30	18.01	16.26	11.97	10.22	12.25	13.46	17.78	20.16	21.78	20.51	**197.12**
Liberty Wind-2	15.60	11.57	14.14	6.56	4.71	7.02	10.08	3.42	6.47	10.46	20.62	14.43	**125.06**
NASDA	17.36	13.65	15.61	7.33	5.44	7.65	11.89	4.22	7.54	11.58	21.87	18.98	**143.10**
Metro Wind	23.15	19.78	22.71	11.40	7.90	9.41	15.12	5.52	10.80	16.81	28.73	24.43	**195.76**
Net-Metering	-	-	-	12.66	15.48	9.99	7.32	12.98	26.86	37.92	34.56	19.55	**177.30**
Mixed-Captives	16.92	17.78	15.88	14.77	6.82	2.18	2.15	1.87	3.56	13.35	27.66	27.07	**150.02**
Total	**14,150.91**	**14,052.59**	**12,877.82**	**10,704.94**	**8,367.07**	**8,416.81**	**8,514.85**	**7,755.54**	**8,741.32**	**10,010.30**	**12,283.68**	**13,715.48**	**129,591.32**

Source: CPPA-G

TABLE 11

Monthly Source-wise Actual and Projected Generation (GWh) (2022-23)

Months	July, 2022		August, 2022		September, 2022		October, 2022		November, 2022		December, 2022	
	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual
Hydel	4,722.48	4,976.93	5,659.23	5,353.69	5,267.07	4,403.81	3,562.03	3,143.62	3,361.45	2,484.36	2,085.96	1,720.43
Coal	2,280.78	1,802.19	3,781.25	2,163.01	3,071.38	1,449.20	2,696.97	1,656.52	1,422.22	975.44	2,777.06	1,520.93
HSD	-	205.97	-	-	-	-	-	-	-	-	-	-
RFO	621.39	876.92	-	1,021.59	-	1,080.48	-	156.57	-	10.61	-	38.91
Gas	1,578.27	1,466.41	1,387.15	1,315.21	1,298.23	1,205.50	1,354.70	1,296.37	311.70	1,189.14	781.52	1,165.52
RLNG	3,254.01	2,119.55	2,510.07	1,755.80	2,587.63	1,821.18	1,316.89	1,843.74	618.51	1,011.74	487.60	1,262.01
Nuclear	1,021.69	2,009.54	1,892.81	1,873.98	1,531.92	2,265.51	1,764.14	2,206.33	1,889.26	2,337.81	1,821.71	2,284.86
Import Iran	51.42	46.57	52.09	54.47	46.66	53.65	40.56	47.77	33.45	44.70	33.23	39.85
Mixed	13.87	16.92	20.26	17.78	11.90	15.88	23.82	14.77	26.13	6.82	20.01	2.18
Wind	582.41	521.72	571.00	390.71	378.48	466.88	308.29	209.70	357.71	157.77	439.81	211.57
Bagasse	37.46	40.63	45.10	33.13	31.23	34.03	41.09	37.81	88.39	69.73	131.51	101.09
Solar	67.49	70.77	99.44	73.44	101.84	87.43	99.86	91.74	75.92	78.95	78.61	69.46
Total	14,231.27	14,154.12	16,018.40	14,052.81	14,326.34	12,883.55	11,208.35	10,704.94	8,184.74	8,367.07	8,657.02	8,416.81
Sale to IPPs	(16.00)	(29.18)	(22.78)	(30.88)	(20.37)	(21.95)	(15.94)	(32.86)	(11.64)	(35.53)	(12.31)	(37.83)
Transmission Losses	(399.84)	(362.69)	(505.01)	(380.06)	(461.88)	(331.57)	(383.63)	(291.41)	(316.93)	(256.89)	(334.75)	(279.85)
Net Delivered	13,815.43	13,762.25	15,490.61	13,641.87	13,844.09	12,530.03	10,808.78	10,380.67	7,856.17	8,074.65	8,309.96	8,099.13

Months	January, 2023		February, 2023		March, 2023		April, 2023		May, 2023		June, 2023	
	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual
Hydel	1,121.13	800.33	2,775.75	2,052.16	2,374.30	2,001.61	3,314.57	1,873.19	4,420.00	3,312.20	5,212.24	4,133.45
Coal	3,525.79	2,443.77	1,692.89	1,091.14	3,627.60	1,333.51	3,920.14	1,818.73	4,642.81	2,061.30	4,524.18	2,434.43
HSD	-	-	-	-	-	-	-	-	-	-	-	10.24
RFO	-	463.32	-	107.77	-	40.52	-	222.57	-	240.97	-	744.42
Gas	1,260.45	1,145.89	556.16	850.15	498.07	1,107.01	1,029.76	1,191.29	1,264.48	1,270.90	1,478.59	1,169.97
RLNG	631.99	1,285.79	686.29	1,462.36	634.88	1,784.59	734.66	2,417.75	884.98	2,988.05	1,278.92	2,543.86
Nuclear	1,821.40	1,875.65	1,766.47	1,883.09	2,018.49	2,002.01	1,770.06	1,916.07	2,021.84	1,542.59	2069.54	1,857.11
Import Iran	31.65	37.13	29.65	32.95	38.70	31.50	44.84	30.46	47.39	34.50	49.91	24.98
Mixed	1.06	2.15	13.37	1.87	20.88	3.56	22.74	13.35	16.39	-	10.21	-
Wind	333.75	287.21	229.67	92.20	362.71	221.33	408.44	322.93	740.14	606.58	875.21	597.44
Bagasse	125.23	101.44	125.78	100.12	119.42	104.86	99.58	81.17	71.58	74.87	82.67	66.49
Solar	75.94	72.16	90.00	82.26	107.98	110.73	110.37	125.80	111.75	89.50	105.99	85.52
Total	8,928.39	8,514.84	7,966.03	7,756.07	9,803.03	8,741.23	11,455.16	10,013.31	14,221.36	12,221.46	15,687.46	13,667.91
Sale to IPPs	(12.70)	(30.10)	(11.33)	(22.88)	(13.94)	(23.08)	(16.29)	(23.93)	(20.22)	(27.24)	-22.31	(35.45)
Transmission Losses	(352.97)	(296.06)	(293.81)	(214.71)	(354.90)	(257.69)	(372.49)	(251.46)	(425.67)	(297.97)	-459.25	(349.39)
Net Delivered	8,562.72	8,188.68	7,660.89	7,518.48	9,434.19	8,460.46	11,066.38	9,737.92	13,775.47	11,896.25	15,205.90	13,283.07

Source: CPPA-G

TABLE 12

Monthly Source-wise Actual and Projected Energy Purchase (Rs. in Million) (2022-23)

Months	July, 2022		August, 2022		September, 2022		October, 2022		November, 2022		December, 2022	
	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual
Coal	27,479.10	36,089.07	81,310.16	44,437.09	64,389.71	26,056.11	55,116.02	29,178.27	27,997.43	12,522.10	57,321.13	17,101.87
HSD	-	5,744.30	-	-	-	-	-	-	-	-	-	-
RFO	8,132.36	31,304.65	-	36,235.39	-	37,399.84	-	5,276.79	-	256.47	-	1,002.41
Gas	12,871.43	14,603.21	10,718.37	13,800.47	10,295.08	12,957.79	10,331.55	13,801.00	2,647.60	12,629.04	5,964.69	10,903.52
RLNG	36,803.01	55,968.46	58,505.18	43,402.91	60,314.78	46,271.36	31,124.29	44,649.04	14,214.68	20,520.75	11,144.91	25,779.67
Nuclear	1,012.46	2,108.63	1,800.21	1,910.33	1,487.23	2,354.10	1,708.03	2,355.84	1,771.78	2,492.75	1,703.81	2,450.80
Import Iran	665.49	1,063.62	968.75	1,141.51	867.82	1,172.06	754.26	1,011.64	622.13	946.55	618.03	859.04
Mixed	91.38	80.50	133.45	84.53	78.40	74.24	156.91	67.90	172.11	27.58	131.80	7.14
Bagasse	231.50	243.07	274.58	198.17	188.66	203.57	249.70	226.21	542.61	417.16	804.63	603.80
Solar	-	-	-	-	-	110.97	-	244.54	-	299.07	-	192.91
Total	**87,286.73**	**147,205.51**	**153,710.70**	**141,210.40**	**137,621.68**	**126,600.04**	**99,440.76**	**96,811.23**	**47,968.34**	**50,111.47**	**77,689.00**	**58,901.16**
Supplemental Charges	-	752.37	-	(1,761.25)	-	(393.60)	-	2,110.62	-	1,433.72	-	(568.65)
Sale to IPPs	(416.81)	(1,164.97)	(455.59)	(1,582.34)	(407.47)	(947.24)	(318.78)	(1,093.08)	(232.79)	(952.10)	(246.22)	(1,029.10)
Grand Total	86,869.92	146,792.91	153,255.11	137,866.81	137,214.21	125,259.20	99,121.98	97,828.77	47,735.55	50,593.09	77,442.78	57,303.41
Transmission Losses (Rs./kWh)	0.184	0.295	0.326	0.296	0.334	0.274	0.327	0.268	0.244	0.219	0.374	0.267

Months	January, 2023		February, 2023		March, 2023		April, 2023		May, 2023		June, 2023	
	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual	Ref.	Actual
Coal	64,976.58	39,227.87	33,620.49	13,716.34	61,898.13	11,570.63	67,903.20	22,275.02	78,221.87	21,699.97	75,780.97	34,198.23
HSD	-	-	-	-	-	-	-	-	-	-	-	311.84
RFO	-	13,420.00	-	2,335.81	-	862.27	-	5,162.87	-	5,600.44	-	19,427.32
Gas	9,504.62	10,987.07	4,584.18	8,553.86	3,939.17	12,467.31	8,480.88	14,047.30	10,391.10	15,829.27	11,877.17	13,744.08
RLNG	13,085.03	28,039.64	14,211.05	34,160.96	13,147.02	42,760.23	13,498.64	57,566.01	16,264.58	73,039.68	23,510.30	61,240.93
Nuclear	1,697.96	2,014.50	1,651.69	2,010.15	1,898.90	2,162.78	1,667.96	2,021.79	1,934.10	1,771.10	1,946.39	1,991.07
Import Iran	588.57	952.74	551.44	814.91	719.78	738.56	833.97	714.20	881.34	811.62	928.21	590.26
Mixed	7.01	13.00	88.06	11.26	137.57	18.76	149.76	54.17	107.94	-	67.26	-
Bagasse	766.37	606.86	770.11	536.47	731.18	627.29	611.05	485.56	439.00	447.86	508.05	397.74
Arrears	-	-	-	-	-	12,567.06	-	-	-	-	-	-
Total	**90,626.14**	**95,261.68**	**55,477.02**	**62,139.76**	**82,471.75**	**83,774.89**	**93,145.46**	**102,326.92**	**108,239.93**	**119,199.94**	**114,618.35**	**131,901.47**
Supplemental Charges	-	1,601.20	-	(772.08)	-	230.49	-	(384.58)	-	(366.53)	-	(5,573.00)
Sale to IPPs	(253.94)	(1,060.23)	(226.57)	(762.30)	(278.82)	(2,347.71)	(325.80)	(885.89)	(404.48)	(907.51)	(446.18)	(1,322.19)
Grand Total	**90,372.20**	**95,802.65**	**55,250.45**	**60,605.38**	**82,192.93**	**81,657.67**	**92,819.66**	**101,056.45**	**107,835.45**	**117,925.90**	**114,172.17**	**125,006.28**
Transmission Losses (Rs./kWh)	0.432	0.448	0.276	0.247	0.328	0.310	0.285	0.285	0.245	0.264	0.231	0.265

Source: CPPA-G

TABLE 13

Month-wise KE Electricity Generation Data (GWh) (2022-23)

	July	August	September	October	November	December	January	February	March	April	May	June	Total
BQPS-I (RFO) Unit-1	38.966	80.498	76.646	72.809	14.291	0.000	0.000	0.000	8.584	0.000	5.368	12.770	**309.932**
BQPS-I (RFO) Unit-2	58.649	92.341	89.222	81.385	41.598	0.000	1.749	5.452	45.879	0.468	34.416	25.891	**477.049**
BQPS-I (RFO) Unit-5	83.359	100.012	105.900	68.090	42.534	1.351	0.000	14.690	45.154	7.606	51.627	46.224	**566.547**
BQPS-I (RFO) Unit-6	59.872	94.521	87.949	83.769	30.299	0.000	0.583	0.000	21.842	0.262	20.536	11.070	**410.703**
BQPS-I (Gas) Unit-1	0.523	0.283	0.031	0.032	0.027	0.000	0.000	0.003	0.295	0.000	0.078	0.000	**1.272**
BQPS-I (Gas) Unit-2	1.481	0.056	0.014	0.256	0.346	0.000	0.094	0.674	0.181	0.198	0.082	0.000	**3.383**
BQPS-I (Gas) Unit-5	11.092	3.669	0.651	0.659	1.004	0.288	0.000	7.300	4.330	0.372	0.068	0.000	**29.431**
BQPS-I (Gas) Unit-6	6.854	0.140	0.004	0.009	0.051	0.000	0.027	0.000	0.341	0.110	0.043	0.000	**7.581**
BQPS-I (LNG) Unit-1	0.062	0.906	0.204	0.193	0.125	0.000	0.000	0.006	0.665	0.000	0.605	0.866	**3.633**
BQPS-I (LNG) Unit-2	0.175	0.180	0.094	1.522	1.606	0.000	0.632	1.264	0.409	0.464	0.642	0.732	**7.720**
BQPS-I (LNG) Unit-5	1.314	11.739	4.221	3.921	4.656	0.412	0.000	13.685	9.780	0.869	0.527	0.678	**51.802**
BQPS-I (LNG) Unit-6	0.812	0.449	0.027	0.053	0.237	0.000	0.183	0.000	0.771	0.258	0.333	1.233	**4.356**
BQPS-II (Gas)	42.749	40.140	33.696	34.282	33.051	38.534	16.201	0.011	17.457	34.218	11.408	0.000	**301.747**
BQPS-II (LNG)	274.901	228.443	249.513	298.752	294.718	213.993	72.268	5.960	114.359	206.871	146.576	246.377	**2352.734**
BQPS-III (RLNG) (Unit-1)	179.812	0.000	0.755	1.705	12.034	17.989	50.846	139.061	167.959	179.602	299.178	303.626	**1352.565**
BQPS-III (RLNG) (Unit-2)	-	-	-	-	-	58.582	105.243	105.138	81.878	234.890	310.746	293.659	**1190.136**
KGTPS-II (Gas)	2.044	0.624	0.097	0.168	0.043	0.000	0.000	0.000	0.000	0.002	0.000	0.000	**2.979**
KGTPS-II (LNG)	5.344	2.179	0.616	0.753	0.119	0.001	0.000	0.004	0.000	0.006	0.000	0.000	**9.022**
SGTPS-II (Gas)	2.352	0.615	0.534	0.997	0.873	0.001	0.000	0.000	0.000	0.000	0.000	0.000	**5.372**
SGTPS-II (LNG)	7.297	2.664	3.394	5.225	2.652	0.001	0.000	0.000	0.000	0.000	0.000	0.000	**21.234**
Korangi CCPP (Gas)	3.077	0.176	0.648	0.127	0.128	0.000	0.008	0.033	0.000	0.029	0.001	0.000	**4.227**
Korangi CCPP (LNG)	9.191	0.970	4.297	0.713	0.481	0.000	2.987	0.046	0.000	0.067	0.587	0.008	**19.348**
Korangi CCPP (HSD)	2.482	9.093	5.705	8.028	1.587	0.000	1.923	1.660	0.000	0.000	0.000	0.626	**31.104**
Tapal Energy (RFO)	58.496	65.582	54.749	53.582	48.805	24.432	17.992	34.067	39.877	16.819	50.098	53.939	**518.438**
Gul Ahmed (RFO)	54.949	69.305	66.006	66.126	56.624	14.908	13.565	22.055	33.809	9.460	47.269	54.600	**508.676**
CPPA-G (Mix)	773.253	794.935	776.691	772.461	738.700	722.636	673.563	677.724	767.020	726.988	790.535	746.299	**8960.805**
ISL (Gas)	-	-	3.782	3.402	3.151	0.000	0.000	0.617	5.199	0.078	1.638	1.220	**19.087**
IIL (Gas)	4.942	5.788	1.795	1.230	0.912	0.217	0.109	0.206	1.775	0.923	0.218	0.100	**18.214**
FFBL (Coal)	35.266	40.267	29.594	38.832	38.039	24.501	14.218	19.971	35.958	36.749	13.666	19.105	**346.166**
SNPCL (I) (Gas)	62.611	53.186	26.749	27.728	21.085	20.582	17.490	22.448	24.874	20.476	23.952	20.225	**341.408**
SNPCL (II) (Gas)	-	-	27.818	27.291	20.597	20.830	17.709	21.529	24.223	24.318	24.444	20.274	**229.031**
Oursun Pakistan (Solar)	5.763	5.193	7.482	8.167	7.207	7.195	7.514	7.858	8.586	8.483	8.642	7.226	**89.316**
Gharo Solar (Solar)	6.651	6.058	8.585	9.206	7.558	7.259	7.702	8.569	9.962	10.497	10.891	8.753	**101.691**
Lotte Chemicals (RLNG)	2.644	3.237	5.902	3.289	1.791	1.215	0.825	1.034	0.569	0.014	0.157	0.399	**21.076**
Lucky Cement	0.308	0.295	0.326	0.303	0.130	0.000	0.000	0.000	0.126	0.174	0.256	0.345	**2.263**
Net-Metering	0.000	0.508	1.000	1.628	1.707	2.410	3.948	5.718	6.019	6.883	5.752	2.380	**37.952**
Total	**1797.293**	**1714.054**	**1674.700**	**1676.693**	**1428.765**	**1177.335**	**1027.378**	**1116.783**	**1477.880**	**1528.153**	**1860.338**	**1878.628**	**18358.000**

Source: KE

TABLE 14

Monthly Variation in Maximum Hydel Generating Capability (MW)

Month	Year	Tarbela	Ghazi Barotha	Mangla	Warsak	Chashma	Khan Khwar	Allai Khwar	Jinnah Hydel	Duber Khwar	Neelum Jhelum	Golen Gol	Jagran	Malakand-III	Laraib	Patrind Hydro	Daral Khwar	Gulpur	Karot Power	Small Hydels	Total
July	2018	2402	1056	239	186	91	41	65	30	127	542	-	-	-	-	-	-	-	-	60	**4839**
	2019	3348	1032	346	147	90	33	63	11	125	783	8	58	13	25	97	36	-	-	65	**6282**
	2020	3844	988	602	194	99	32	74	23	129	963	4	25	61	43	121	34	38	-	71	**7344**
	2021	2977	1013	424	196	91	33	75	25	130	951	24	26	52	33	146	23	59	-	58	**6337**
	2022	3885	1024	279	156	88	38	58	20	131	145	21	26	60	21	114	24	61	529	53	**6731**
August	2018	3445	1038	239	198	85	37	64	22	113	590	-	-	-	-	-	-	-	-	58	**5889**
	2019	4774	1024	275	181	72	34	58	10	106	865	0	68	13	12	111	21	-	-	56	**7678**
	2020	4217	999	416	209	86	30	65	21	130	887	4	26	64	25	109	22	45	-	45	**7400**
	2021	4340	1038	597	189	86	28	87	22	113	712	19	26	62	44	75	11	47	-	62	**7561**
	2022	4759	1007	240	151	41	38	96	8	99	0	14	22	42	12	67	19	85	484	46	**7229**
September	2018	3602	1042	445	126	104	19	36	35	58	301	-	-	-	-	-	-	-	-	60	**5828**
	2019	4308	1052	570	152	114	12	26	10	77	477	23	63	13	37	60	10	-	-	69	**7072**
	2020	3555	1008	905	148	96	32	72	15	56	602	4	17	32	66	77	20	51	-	65	**6819**
	2021	4102	1036	755	148	101	5	51	36	82	453	32	20	55	59	61	8	35	-	67	**7107**
	2022	3714	1043	455	161	119	34	56	21	9	0	23	14	20	31	65	2	48	292	45	**6152**
October	2018	1382	777	402	71	86	16	31	43	32	234	11	-	-	-	-	-	-	-	49	**3134**
	2019	1474	784	313	93	107	12	22	28	38	245	24	39	5	30	35	6	-	-	45	**3300**
	2020	1799	895	842	78	107	11	29	41	46	222	15	10	21	63	40	6	10	-	10	**4244**
	2021	1408	816	505	82	109	11	36	37	42	275	18	8	32	35	41	6	25	-	61	**3547**
	2022	1814	898	810	84	130	20	30	28	44	0	29	4	18	67	36	7	18	155	64	**4257**
November	2018	1353	972	527	59	100	15	26	52	30	271	15	-	-	-	-	-	-	-	48	**3468**
	2019	1658	989	604	78	118	19	35	54	33	286	16	32	5	56	32	8	-	-	40	**4063**
	2020	1772	958	797	73	122	14	24	50	33	153	15	4	16	62	29	5	-	-	55	**4181**
	2021	1550	980	821	51	122	8	20	43	24	143	10	5	16	72	25	4	5	-	45	**3945**
	2022	1341	829	608	72	124	19	35	37	36	0	19	3	19	55	31	8	17	166	55	**3473**
December	2018	523	434	387	50	68	8	16	33	18	155	11	-	-	-	-	-	-	-	37	**1740**
	2019	725	511	523	69	80	2	21	28	23	204	11	21	6	47	24	5	-	-	30	**2331**
	2020	729	523	590	74	66	17	27	38	30	163	11	4	14	48	26	4	5	-	5	**2374**
	2021	899	678	423	21	88	5	16	31	17	90	8	4	14	40	22	3	0	-	32	**2390**
	2022	921	603	333	61	83	6	19	33	20	0	13	4	14	29	23	4	4	114	39	**2325**
January	2019	232	178	38	51	44	10	1	5	11	16	7	-	-	-	-	-	-	-	23	**616**
	2020	400	279	94	77	52	11	0	4	18	162	8	13	4	12	22	4	2	-	13	**1178**
	2021	534	393	95	73	59	8	7	11	21	135	8	4	14	7	21	3	23	-	23	**1439**
	2022	203	153	22	73	51	10	2	6	15	52	8	3	20	0	21	3	29	-	24	**697**
	2023	419	271	38	67	55	3	11	4	14	0	8	3	18	1	21	3	3	112	26	**1080**
February	2019	751	632	375	61	100	24	25	20	18	134	7	-	-	-	-	-	-	-	34	**2181**
	2020	1109	783	727	65	101	23	30	16	25	243	6	26	4	68	22	7	14	-	24	**3294**
	2021	1056	833	683	57	89	15	0	16	30	109	8	5	12	67	24	6	15	-	25	**3047**
	2022	782	673	350	51	83	14	18	16	16	77	7	3	17	43	20	3	24	-	19	**2215**
	2023	1195	835	475	21	118	30	0	21	18	0	7	5	4	52	23	5	19	229	14	**3071**

Month	Year	Tarbela	Ghazi Barotha	Mangla	Warsak	Chashma	Khan Khwar	Allai Khwar	Jinnah Hydel	Duber Khwar	Neelum Jhelum	Golen Gol	Jagran	Malakand-III	Laraib	Patrind Hydro	Daral Khwar	Gulpur	Karot Power	Small Hydels	Total
March	2019	416	384	528	72	78	36	67	26	30	329	7	-	-	-	-	-	-	-	60	**2033**
	2020	234	176	492	104	47	61	72	26	47	494	6	47	7	45	38	13	64	-	54	**2027**
	2021	397	343	592	87	47	41	56	18	57	460	6	4	25	63	40	13	39	-	39	**2327**
	2022	401	365	473	60	58	45	68	25	55	484	6	10	36	59	42	19	43	-	58	**2307**
	2023	826	648	399	66	100	37	49	30	32	0	7	9	39	41	36	11	16	301	54	**2701**
April	2019	468	389	480	138	93	38	122	24	115	934	6	-	-	-	-	-	-	-	69	**2876**
	2020	549	368	747	164	72	69	112	30	95	923	6	54	15	61	85	29	69	-	64	**3512**
	2021	657	572	643	106	77	51	96	31	87	923	7	15	46	67	76	20	41	-	73	**3588**
	2022	620	574	541	96	82	29	58	40	103	849	7	23	56	66	83	34	21	5	67	**3354**
	2023	478	370	474	121	86	53	100	28	86	0	7	15	42	47	75	25	40	506	59	**2612**
May	2019	1389	1030	753	185	106	44	102	10	125	954	10	-	-	-	-	-	-	-	66	**4774**
	2020	2217	993	893	205	88	64	118	15	117	964	7	66	27	69	121	35	54	-	67	**6119**
	2021	1073	947	654	180	112	44	92	37	128	950	18	25	65	73	140	16	40	-	40	**4636**
	2022	1114	1004	546	158	119	23	48	41	126	925	20	24	57	66	121	34	17	327	66	**4840**
	2023	1180	888	705	163	133	52	113	32	114	0	6	22	43	74	115	32	49	685	63	**4470**
June	2019	1085	1039	705	171	100	35	76	10	130	955	35	-	-	-	-	-	-	-	72	**4413**
	2020	3000	976	849	172	89	40	92	17	129	962	8	25	71	66	125	35	48	-	65	**6770**
	2021	2294	1000	609	191	104	29	70	30	130	967	17	24	68	57	147	34	45	-	68	**5883**
	2022	1095	1038	415	160	107	15	38	37	121	860	32	20	65	49	109	29	27	414	48	**4679**
	2023	2586	1026	524	113	133	41	96	29	72	0	32	24	44	45	145	33	56	709	60	**5770**

Note: Errors and ommisions expected, as this data is telephonically obtained by NPCC due to no live SCADA System.

Source: National Power Control Centre, Islamabad

TABLE 15

Auxiliary Consumption and all Factors of Hydel Power Stations

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
Tarbela	2018-19	16.32	0.15	3461	35.03	99.51	34.86	75.95
	2019-20	15.60	0.13	3506	38.72	100.81	39.03	88.45
	2020-21	15.13	0.12	3506	41.06	41.39	41.39	82.54
	2021-22	27.79	0.25	3536	35.37	35.96	35.96	89.22
	2022-23	39.00	0.31	3478	40.85	40.85	40.85	87.40
Tarbela 4th Ext.	2018-19	2318.06	0.28	1276	20.73	90.49	18.76	64.01
	2019-20	12.36	0.22	1410	44.51	44.51	44.51	76.03
	2020-21	10.35	0.30	1410	27.75	27.75	27.75	37.51
	2021-22	6.77	0.21	1410	26.52	26.52	26.52	87.50
	2022-23	10.49	0.24	1410	35.48	35.48	35.48	89.30
Ghazi Barotha	2018-19	9.49	0.14	1450	51.58	100.00	51.58	89.55
	2019-20	6.63	0.10	1450	51.44	100.00	51.44	90.70
	2020-21	7.30	0.11	1450	54.25	54.25	54.25	91.12
	2021-22	75.88	1.11	1450	53.23	53.23	53.23	91.53
	2022-23	73.29	1.06	1450	53.64	53.64	53.64	90.76
Mangla	2018-19	58.07	1.50	920	47.91	115.00	55.09	93.86
	2019-20	97.04	2.07	915	58.31	114.38	66.69	88.92
	2020-21	91.41	1.69	915	67.44	77.13	77.13	96.19
	2021-22	82.88	1.93	920	52.12	47.95	47.95	92.42
	2022-23	51.41	1.32	960	45.64	43.82	43.82	93.73
Warsak	2018-19	1.01	0.10	216	52.97	88.90	47.09	80.47
	2019-20	1.17	0.11	220	57.17	90.17	51.77	81.19
	2020-21	10.47	0.97	233	52.69	50.53	50.53	68.30
	2021-22	9.46	1.00	229	46.55	43.88	43.88	75.05
	2022-23	9.33	1.03	218	47.05	42.22	42.22	79.64
Chashma	2018-19	5.29	0.69	122	71.78	66.30	69.05	70.40
	2019-20	4.42	0.59	122	70.13	66.30	72.03	67.34
	2020-21	4.21	0.54	125	70.92	72.92	72.92	68.11
	2021-22	4.60	0.57	138	65.82	49.36	49.36	67.78
	2022-23	5.12	0.58	161	62.14	54.37	54.37	79.31
Khan Khwar	2018-19	4.52	1.90	72	37.69	37.69	37.69	76.87
	2019-20	4.76	1.70	72	44.25	44.25	44.25	85.50
	2020-21	2.09	0.89	72	37.43	35.97	35.97	92.34
	2021-22	3.81	2.29	72	25.76	25.76	25.76	92.61
	2022-23	9.54	3.50	72	41.74	41.74	41.74	90.83
Allai Khwar	2018-19	0.87	0.19	121	43.59	43.59	43.59	90.13
	2019-20	0.96	0.20	121	44.70	44.70	44.70	89.63
	2020-21	1.19	0.26	121	42.27	42.27	42.27	81.74
	2021-22	5.52	1.46	121	35.19	35.19	35.19	91.34
	2022-23	5.80	1.19	121	45.36	45.36	45.36	87.53
Jinnah Hydel	2018-19	3.37	1.49	64	40.43	26.83	69.00	59.17
	2019-20	3.08	1.69	69	30.24	21.67	65.58	47.42
	2020-21	3.32	1.40	64	43.41	65.96	65.96	59.07
	2021-22	6.98	2.65	55	53.34	30.45	30.45	58.32
	2022-23	6.03	2.83	48	49.16	24.58	24.58	57.00
Duber Khwar	2018-19	2.41	0.68	130	57.20	51.95	57.20	95.78
	2019-20	2.17	0.35	130	53.55	53.55	53.55	91.84
	2020-21	2.45	0.38	130	56.49	56.49	56.49	95.10
	2021-22	2.07	0.33	130	54.18	54.18	54.18	93.50
	2022-23	1.93	0.39	130	43.46	43.46	43.46	88.80
Golen Gol	2018-19	1.68	1.67	108	110.59	31.75	31.75	97.91
	2019-20	2.42	2.72	72	14.08	9.39	9.39	86.91
	2020-21	2.48	2.92	71	13.70	8.97	8.97	73.64
	2021-22	3.14	2.22	52	30.33	14.60	14.60	93.70
	2022-23	2.89	2.14	12	130.97	13.95	13.95	93.00
Dargai	2018-19	0.30	0.28	18	69.62	89.00	61.96	92.04
	2019-20	0.28	0.33	18	90.05	89.00	80.14	88.03
	2020-21	0.30	0.28	18	69.18	62.27	62.27	88.27
	2021-22	0.35	0.40	18	54.52	49.89	49.89	79.82
	2022-23	0.39	0.55	12	70.75	40.68	40.68	87.00

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
Rasul	2018-19	0.68	0.94	15	56.57	65.91	37.28	73.73
	2019-20	0.52	1.41	13	32.02	59.09	18.92	73.30
	2020-21	0.73	0.92	15	60.48	41.24	41.24	86.75
	2021-22	2.88	4.67	13	51.72	30.56	30.56	67.80
	2022-23	2.78	4.89	13	47.52	28.08	28.08	76.94
Shadiwal	2018-19	0.42	1.47	5	69.41	31.97	24.83	94.57
	2019-20	0.32	2.25	5	34.52	34.81	12.01	94.82
	2020-21	0.49	1.52	6	62.00	27.56	27.56	94.22
	2021-22	0.63	2.21	6	58.24	23.73	23.73	94.40
	2022-23	0.69	2.09	7	56.98	27.44	27.44	94.72
Chichoki Malian	2018-19	0.35	1.01	7	51.03	49.24	25.13	89.00
	2019-20	0.34	0.98	7	49.51	53.03	26.25	90.50
	2020-21	0.53	1.89	8	42.48	24.14	24.14	89.21
	2021-22	0.44	1.92	6	42.72	19.42	19.42	72.90
	2022-23	0.48	1.54	9	39.17	26.71	26.71	88.18
Nandipur	2018-19	0.50	1.36	9	45.87	66.67	30.58	90.00
	2019-20	0.51	1.51	6	56.02	46.07	29.09	93.00
	2020-21	0.53	1.58	9	42.48	27.71	27.71	94.00
	2021-22	1.06	3.50	8	40.17	24.16	24.16	94.50
	2022-23	1.08	2.89	9	48.52	29.89	29.89	91.33
Kurram Garhi	2018-19	0.15	1.02	4	40.62	100.00	40.62	77.68
	2019-20	0.15	0.99	4	47.01	79.07	43.18	75.05
	2020-21	0.16	0.78	4	61.42	58.35	58.35	79.72
	2021-22	1.63	12.98	4	32.89	31.24	31.24	85.39
	2022-23	1.28	8.14	3	56.87	41.23	41.23	68.01
Renala	2018-19	0.05	2.14	1	60.78	33.86	22.65	79.81
	2019-20	0.05	2.28	1	43.08	50.00	21.54	76.17
	2020-21	0.05	2.50	1	42.44	20.83	20.83	79.01
	2021-22	0.05	2.76	1	41.36	18.80	18.80	79.00
	2022-23	0.06	3.54	1	39.72	18.05	18.05	94.61
Chitral	2018-19	0.01	0.17	1	50.70	40.05	40.05	94.86
	2019-20	0.01	0.21	1	48.16	34.82	84.93	93.89
	2020-21	0.01	0.23	1	48.46	85.37	85.37	97.02
	2021-22	0.01	0.27	1	38.70	24.58	24.58	98.96
	2022-23	0.01	0.23	0	178.66	30.73	30.73	99.18
Gomal Zam	2018-19	0.08	0.26	8	43.89	49.30	21.64	58.91
	2019-20	0.09	0.16	9	74.00	49.88	36.91	80.16
	2020-21	0.11	0.17	9	83.87	42.01	42.01	86.90
	2021-22	0.74	1.27	9	76.75	37.49	37.49	88.30
	2022-23	0.62	1.50	9	53.44	26.72	26.72	69.92
Malakand/ Jabban	2018-19	1.32	0.97	22	70.56	70.56	70.56	93.78
	2019-20	1.35	1.14	22	76.20	71.20	71.20	78.16
	2020-21	1.60	1.22	22	77.33	69.82	69.82	72.20
	2021-22	1.36	1.00	22	69.91	69.91	69.91	93.70
	2022-23	1.28	1.02	18	80.16	64.85	64.85	93.50

Source: WAPDA

TABLE 16

Month-Wise WAPDA Hydroelectric Invoice for Capacity Charges and Cost Data (2022-23)

Month	Export (GWh)	Import (GWh)	NEO (GWh)	Variable Energy Charges (Mln. Rs.)	Capacity Charges (Mln. Rs.)	Water Use/ NHP Charges (Mln. Rs.)	IRSA Charge Amount (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
3,478 MW Tarbela								
July	2,095.195	15.065	2,080.130	89.446	146.751	2,288.143	10.401	15.206
August	2,504.211	(1.692)	2,505.903	107.754	146.751	3,934.327	12.530	18.318
September	1,741.989	(1.149)	1,743.138	74.955	146.751	2,863.404	8.716	12.742
October	979.612	18.480	961.132	41.329	146.751	1,765.467	4.806	7.026
November	711.329	11.835	699.494	30.078	146.751	1,342.656	3.497	5.113
December	655.355	128.748	526.607	22.644	146.751	739.357	2.633	3.849
January	577.830	308.167	269.663	11.596	146.751	378.607	1.348	1.971
February	658.115	42.460	615.655	26.473	146.751	864.379	3.078	4.661
March	654.617	102.786	551.831	23.729	146.751	774.770	2.759	4.271
April	500.859	214.914	285.945	12.296	146.751	401.467	1.430	2.213
May	855.677	37.314	818.363	35.190	146.751	1,148.982	4.092	6.334
June	1,399.982	12.008	1,387.974	59.683	146.751	1,948.715	6.940	10.743
1,410 MW Tarbela 4th Extension								
July	797.440	1.546	795.894	106.650	1,102.609	875.483	3.979	18.130
August	1,018.121	1.694	1,016.427	136.201	1,102.609	1,534.844	5.082	23.154
September	920.654	1.585	919.069	123.155	1,102.609	1,398.154	4.595	20.936
October	388.911	0.984	387.927	51.982	1,102.609	652.431	1.940	8.837
November	264.872	0.603	264.269	35.412	1,102.609	464.443	1.321	6.020
December	160.165	0.483	159.682	21.397	1,102.609	224.193	0.798	3.638
January	46.674	0.316	46.358	6.212	1,102.609	65.086	0.232	1.056
February	187.478	0.525	186.953	25.052	1,102.609	262.482	0.935	4.388
March	64.134	0.392	63.742	8.541	1,102.609	89.494	0.319	1.537
April	60.122	0.462	59.660	7.994	1,102.609	83.763	0.298	1.439
May	59.755	0.652	59.103	7.920	1,102.609	82.980	0.296	1.426
June	469.093	1.245	467.848	62.692	1,102.609	656.859	2.339	11.284
1,450 MW Ghazi Barotha								
July	1,646.127	892.235	753.892	59.557	1,127.954	829.282	3.769	10.125
August	1,928.588	1,186.891	741.697	58.594	1,127.954	1,086.754	3.708	9.961
September	1,547.874	804.533	743.341	58.724	1,127.954	1,088.952	3.717	9.983
October	967.437	305.507	661.930	52.292	1,127.954	980.105	3.310	8.890
November	775.379	183.922	591.457	46.725	1,127.954	873.203	2.957	7.943
December	662.027	218.540	443.487	35.035	1,127.954	592.942	2.217	5.956
January	578.982	381.026	197.956	15.639	1,127.954	264.667	0.990	2.659
February	654.176	98.836	555.340	43.872	1,127.954	742.490	2.777	7.721
March	611.931	135.016	476.915	37.676	1,127.954	637.635	2.385	6.782
April	451.974	189.512	262.462	20.734	1,127.954	350.912	1.312	3.732
May	735.309	81.632	653.677	51.640	1,127.954	873.966	3.268	9.295
June	1,131.048	400.018	731.030	57.751	1,127.954	977.387	3.655	10.395
1,000 MW Mangla								
July	434.334	234.850	199.484	13.365	715.090	-	0.997	2.272
August	460.217	283.725	176.492	11.825	715.090	26.474	0.882	2.010
September	480.152	155.553	324.599	21.748	715.090	48.690	1.623	3.697
October	628.185	36.266	591.919	39.659	715.090	88.788	2.960	6.742
November	464.527	32.419	432.108	28.951	715.090	64.816	2.161	4.922
December	313.722	67.653	246.069	16.487	715.090	36.910	1.230	2.803
January	189.490	162.777	26.713	1.790	715.090	4.007	0.134	0.304
February	337.714	22.607	315.107	21.112	715.090	47.266	1.576	3.724
March	325.670	31.590	294.080	19.703	715.090	44.112	1.470	3.547
April	374.056	35.786	338.270	22.664	715.090	50.741	1.691	4.080
May	541.145	20.794	520.351	34.864	715.090	78.053	2.602	6.275
June	493.846	120.660	373.186	25.003	715.090	55.978	1.866	4.501
242.96 MW Warsak								
July	116.882	1.614	115.268	12.334	181.782	126.795	0.576	2.097
August	112.211	0.615	111.596	11.941	181.782	192.046	0.558	2.030
September	114.792	0.304	114.488	12.250	181.782	196.106	0.572	2.083
October	63.780	1.874	61.906	6.624	181.782	122.281	0.310	1.126
November	54.186	3.058	51.128	5.471	181.782	102.434	0.256	0.930
December	48.897	3.989	44.908	4.805	181.782	63.051	0.225	0.817
January	54.851	5.550	49.301	5.275	181.782	69.219	0.247	0.897
February	28.196	14.455	13.741	1.470	181.782	19.292	0.069	0.260
March	50.761	1.960	48.801	5.222	181.782	68.517	0.244	0.940
April	87.143	0.749	86.394	9.244	181.782	121.297	0.432	1.664
May	120.659	0.190	120.469	12.890	181.782	169.138	0.602	2.320
June	81.195	0.607	80.588	8.623	181.782	113.146	0.403	1.552

Month	Export (GWh)	Import (GWh)	NEO (GWh)	Variable Energy Charges (Mln. Rs.)	Capacity Charges (Mln. Rs.)	Water Use/ NHP Charges (Mln. Rs.)	IRSA Charge Amount (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
184 MW Chashma								
July	70.749	6.430	64.319	12.285	280.496	70.751	0.322	2.088
August	34.788	5.162	29.626	5.659	280.496	50.644	0.148	0.962
September	85.400	0.258	85.142	16.262	280.496	124.869	0.426	2.765
October	96.198	0.087	96.111	18.357	280.496	139.535	0.481	3.121
November	89.199	0.018	89.181	17.034	280.496	128.798	0.446	2.896
December	61.801	0.011	61.790	11.802	280.496	82.613	0.309	2.006
January	43.498	1.063	42.435	8.105	280.496	56.736	0.212	1.378
February	78.992	0.003	78.989	15.087	280.496	105.608	0.395	2.650
March	73.888	0.006	73.882	14.111	280.496	98.780	0.369	2.540
April	61.401	0.246	61.155	11.681	280.496	81.764	0.306	2.103
May	98.259	0.112	98.147	18.746	280.496	131.223	0.491	3.374
June	96.541	0.980	95.561	18.252	280.496	127.765	0.478	3.285
72 MW Khan Khwar								
July	69.780	45.763	24.017	5.068	114.646	26.419	0.120	0.861
August	61.883	33.860	28.023	5.913	114.646	47.498	0.140	1.005
September	26.412	2.059	24.353	5.139	114.646	42.346	0.122	0.874
October	28.208	13.852	14.357	3.029	114.646	28.311	0.072	0.515
November	24.173	11.055	13.118	2.768	114.646	25.485	0.066	0.471
December	11.937	7.415	4.522	0.954	114.646	6.348	0.023	0.162
January	8.040	5.540	2.500	0.527	114.646	3.510	0.012	0.090
February	24.762	4.654	20.108	4.243	114.646	28.232	0.101	0.751
March	36.152	8.894	27.259	5.752	114.646	38.272	0.136	1.035
April	61.356	23.856	37.500	7.912	114.646	52.649	0.187	1.424
May	72.743	34.397	38.346	8.091	114.646	53.838	0.192	1.456
June	50.882	21.695	29.186	6.158	114.646	40.978	0.146	1.109
121 MW Allai Khwar								
July	164.958	122.27	42.685	9.177	182.573	46.954	0.213	1.560
August	170.674	99.67	71.002	15.265	182.573	114.489	0.355	2.595
September	64.376	24.43	39.950	8.589	182.573	70.893	0.200	1.460
October	64.822	42.40	22.422	4.821	182.573	46.284	0.112	0.820
November	58.197	33.51	24.692	5.309	182.573	47.497	0.123	0.903
December	30.078	16.04	14.035	3.017	182.573	19.704	0.070	0.513
January	19.212	11.30	7.917	1.702	182.573	11.116	0.040	0.289
February	26.341	26.49	(0.151)	(0.033)	182.573	(0.213)	(0.001)	(0.006)
March	81.368	45.68	35.684	7.672	182.573	50.100	0.178	1.381
April	164.361	93.29	71.071	15.280	182.573	99.784	0.355	2.750
May	200.096	117.11	82.985	17.842	182.573	116.511	0.415	3.212
June	142.736	74.18	68.557	14.740	182.573	96.254	0.343	2.653
96 MW Jinnah Hydel								
July	14.434	-	14.434	3.854	146.043	15.877	0.072	0.655
August	5.346	-	5.346	1.427	146.043	9.948	0.027	0.243
September	14.654	-	14.654	3.913	146.043	22.392	0.073	0.665
October	20.456	-	20.456	5.462	146.043	30.150	0.102	0.928
November	25.990	0.000	25.990	6.939	146.043	37.176	0.130	1.180
December	24.116	-	24.116	6.439	146.043	32.243	0.121	1.095
January	2.982	0.157	2.825	0.754	146.043	3.777	0.014	0.128
February	13.744	0.203	13.541	3.616	146.043	18.105	0.068	0.640
March	21.943	-	21.943	5.859	146.043	29.338	0.110	1.055
April	19.803	-	19.803	5.287	146.043	26.476	0.099	0.952
May	23.430	-	23.430	6.256	146.043	31.325	0.117	1.126
June	20.168	0.003	20.165	5.384	146.043	26.961	0.101	0.969
130 MW Duber Khwar								
July	96.827	-	96.827	20.818	229.877	106.510	0.484	3.539
August	73.214	0.133	73.081	15.712	229.877	122.833	0.365	2.671
September	6.424	0.027	6.398	1.376	229.877	29.209	0.032	0.234
October	33.005	0.001	33.004	7.096	229.877	66.564	0.165	1.206
November	25.700	0.000	25.699	5.525	229.877	53.611	0.128	0.939
December	15.027	0.298	14.729	3.167	229.877	20.680	0.074	0.538
January	10.795	0.144	10.651	2.290	229.877	14.954	0.053	0.389
February	13.695	1.528	12.167	2.616	229.877	17.083	0.061	0.458
March	25.440	1.488	23.952	5.150	229.877	33.629	0.120	0.927
April	62.086	-	62.086	13.349	229.877	87.169	0.310	2.403
May	84.620	-	84.620	18.193	229.877	118.807	0.423	3.275
June	53.014	1.270	51.743	11.125	229.877	72.648	0.259	2.002

Month	Export (GWh)	Import (GWh)	NEO (GWh)	Variable Energy Charges (Mln. Rs.)	Capacity Charges (Mln. Rs.)	Water Use/ NHP Charges (Mln. Rs.)	IRSA Charge Amount (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
108 MW Golen Gol								
July	15.293	0.115	15.179	5.221	264.226	16.696	0.076	0.888
August	10.575	0.480	10.095	3.473	264.226	16.623	0.050	0.590
September	16.582	0.128	16.454	5.660	264.226	25.550	0.082	0.962
October	21.075	-	21.075	7.250	264.226	32.039	0.105	1.232
November	13.183	-	13.183	4.535	264.226	20.631	0.066	0.771
December	9.153	0.005	9.148	3.147	264.226	12.844	0.046	0.535
January	6.135	0.087	6.048	2.080	264.226	8.491	0.030	0.354
February	4.221	-	4.221	1.452	264.226	5.926	0.021	0.255
March	4.706	-	4.706	1.619	264.226	6.607	0.024	0.291
April	4.836	-	4.836	1.664	264.226	6.790	0.024	0.299
May	4.499	-	4.499	1.548	264.226	6.316	0.022	0.279
June	23.270	0.774	22.495	7.738	264.226	31.584	0.112	1.393
20 MW Dargai								
July	5.376	0.061	5.315	0.468	16.535	5.847	0.027	0.080
August	5.699	0.013	5.686	0.500	16.535	11.483	0.028	0.085
September	6.272	0.002	6.270	0.552	16.535	12.303	0.031	0.094
October	7.616	-	7.616	0.670	16.535	14.194	0.038	0.114
November	7.295	-	7.295	0.642	16.535	13.276	0.036	0.109
December	4.465	-	4.465	0.393	16.535	6.269	0.022	0.067
January	4.761	0.001	4.760	0.419	16.535	6.683	0.024	0.071
February	0.884	0.071	0.813	0.072	16.535	1.142	0.004	0.013
March	7.391	-	7.391	0.650	16.535	10.377	0.037	0.117
April	6.582	0.002	6.580	0.579	16.535	9.239	0.033	0.104
May	7.652	0.001	7.651	0.673	16.535	10.742	0.038	0.121
June	7.430	-	7.430	0.654	16.535	10.432	0.037	0.118
22 MW Rasul								
July	5.972	1.051	4.921	0.773	19.702	5.413	0.025	0.131
August	5.175	1.033	4.142	0.650	19.702	6.205	0.021	0.111
September	4.523	0.647	3.876	0.608	19.702	5.849	0.019	0.103
October	4.994	0.037	4.957	0.778	19.702	7.295	0.025	0.132
November	5.161	0.022	5.139	0.807	19.702	7.449	0.026	0.137
December	4.553	0.475	4.078	0.640	19.702	5.453	0.020	0.109
January	1.916	2.087	(0.171)	(0.027)	19.702	(0.228)	(0.001)	(0.005)
February	2.847	0.806	2.041	0.320	19.702	2.728	0.010	0.058
March	7.350	0.007	7.343	1.153	19.702	9.818	0.037	0.208
April	5.895	0.024	5.871	0.922	19.702	7.850	0.029	0.166
May	6.231	0.018	6.213	0.975	19.702	8.307	0.031	0.176
June	6.055	0.347	5.708	0.896	19.702	7.632	0.029	0.161
13.5 MW Shadiwal								
July	2.360	0.005	2.355	0.419	11.257	2.591	0.012	0.071
August	2.453	0.001	2.452	0.436	11.257	3.541	0.012	0.074
September	2.852	-	2.852	0.508	11.257	4.077	0.014	0.086
October	3.442	-	3.442	0.613	11.257	4.865	0.017	0.104
November	3.436	-	3.436	0.612	11.257	4.822	0.017	0.104
December	3.125	0.001	3.124	0.556	11.257	4.177	0.016	0.095
January	0.670	0.032	0.638	0.113	11.257	0.852	0.003	0.019
February	1.481	0.017	1.464	0.261	11.257	1.957	0.007	0.047
March	3.362	-	3.362	0.598	11.257	4.495	0.017	0.108
April	3.339	-	3.339	0.594	11.257	4.464	0.017	0.107
May	3.177	-	3.177	0.566	11.257	4.248	0.016	0.102
June	2.805	-	2.805	0.499	11.257	3.750	0.014	0.090
13.20 MW Chichoki Mallian								
July	3.431	0.958	2.473	0.435	11.438	2.720	0.012	0.074
August	3.575	0.644	2.931	0.516	11.438	4.356	0.015	0.088
September	3.206	0.380	2.826	0.497	11.438	4.216	0.014	0.085
October	3.680	0.148	3.532	0.622	11.438	5.160	0.018	0.106
November	3.364	0.012	3.352	0.590	11.438	4.861	0.017	0.100
December	1.811	0.415	1.396	0.246	11.438	1.866	0.007	0.042
January	1.589	1.630	(0.041)	(0.007)	11.438	(0.055)	(0.000)	(0.001)
February	1.997	1.139	0.858	0.151	11.438	1.147	0.004	0.027
March	3.093	0.145	2.948	0.519	11.438	3.941	0.015	0.093
April	3.718	0.023	3.695	0.650	11.438	4.941	0.018	0.117
May	3.711	0.022	3.689	0.649	11.438	4.932	0.018	0.117
June	3.287	0.065	3.222	0.567	11.438	4.308	0.016	0.102

Month	Export (GWh)	Import (GWh)	NEO (GWh)	Variable Energy Charges (Mln. Rs.)	Capacity Charges (Mln. Rs.)	Water Use/ NHP Charges (Mln. Rs.)	IRSA Charge Amount (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
13.8 MW Nandipur								
July	3.072	-	3.072	0.405	11.507	3.379	0.015	0.069
August	3.734	-	3.734	0.493	11.507	5.489	0.019	0.084
September	3.809	-	3.809	0.503	11.507	5.589	0.019	0.085
October	4.254	-	4.254	0.562	11.507	6.185	0.021	0.095
November	3.423	-	3.423	0.452	11.507	5.007	0.017	0.077
December	1.398	0.019	1.379	0.182	11.507	1.844	0.007	0.031
January	0.016	0.050	(0.034)	(0.005)	11.507	(0.046)	(0.000)	(0.001)
February	1.414	0.021	1.393	0.184	11.507	1.863	0.007	0.033
March	2.843	0.002	2.841	0.375	11.507	3.799	0.014	0.068
April	3.659	-	3.659	0.483	11.507	4.892	0.018	0.087
May	4.007	0.001	4.006	0.529	11.507	5.356	0.020	0.095
June	4.595	-	4.595	0.606	11.507	6.143	0.023	0.109
4 MW Kurram Garhi								
July	3.634	2.536	1.098	0.280	7.700	1.208	0.005	0.048
August	3.496	2.144	1.351	0.345	7.700	2.427	0.007	0.059
September	3.333	1.411	1.922	0.490	7.700	3.228	0.010	0.083
October	2.842	1.254	1.587	0.405	7.700	2.759	0.008	0.069
November	3.487	2.204	1.283	0.327	7.700	2.261	0.006	0.056
December	3.846	2.709	1.137	0.290	7.700	1.596	0.006	0.049
January	4.482	3.311	1.171	0.299	7.700	1.644	0.006	0.051
February	3.234	2.642	0.591	0.151	7.700	0.830	0.003	0.027
March	2.954	2.320	0.633	0.162	7.700	0.889	0.003	0.029
April	3.213	2.120	1.093	0.279	7.700	1.535	0.005	0.050
May	4.074	2.757	1.317	0.336	7.700	1.850	0.007	0.060
June	3.917	2.654	1.263	0.322	7.700	1.773	0.006	0.058
1.1 MW Renala Khurd								
July	0.219	-	0.219	0.075	2.015	0.241	0.001	0.013
August	0.198	-	0.198	0.068	2.015	0.298	0.001	0.012
September	0.176	-	0.176	0.060	2.015	0.268	0.001	0.010
October	0.178	-	0.178	0.061	2.015	0.271	0.001	0.010
November	0.142	-	0.142	0.049	2.015	0.218	0.001	0.008
December	0.106	0.002	0.104	0.036	2.015	0.139	0.001	0.006
January	0.013	0.027	(0.014)	(0.005)	2.015	(0.019)	(0.000)	(0.001)
February	0.070	0.007	0.063	0.021	2.015	0.084	0.000	0.004
March	0.125	-	0.125	0.043	2.015	0.167	0.001	0.008
April	0.183	-	0.183	0.063	2.015	0.245	0.001	0.011
May	0.159	-	0.159	0.054	2.015	0.213	0.001	0.010
June	0.205	-	0.205	0.070	2.015	0.274	0.001	0.013
1 MW Chitral								
July	0.247	-	0.247	0.085	2.165	0.271	0.001	0.014
August	0.206	-	0.206	0.071	2.165	0.406	0.001	0.012
September	0.188	-	0.188	0.065	2.165	0.382	0.001	0.011
October	0.177	-	0.177	0.061	2.165	0.367	0.001	0.010
November	0.261	-	0.261	0.090	2.165	0.469	0.001	0.015
December	0.303	-	0.303	0.104	2.165	0.426	0.002	0.018
January	0.269	-	0.269	0.092	2.165	0.378	0.001	0.016
February	0.264	-	0.264	0.090	2.165	0.370	0.001	0.016
March	0.248	-	0.248	0.085	2.165	0.348	0.001	0.015
April	0.160	-	0.160	0.055	2.165	0.224	0.001	0.010
May	0.155	-	0.155	0.053	2.165	0.218	0.001	0.010
June	0.214	-	0.214	0.073	2.165	0.301	0.001	0.013
17.40 MW Gomal Zam								
July	4.677	0.762	3.915	2.482	53.806	4.306	0.020	0.422
August	2.849	0.717	2.132	1.351	53.806	12.439	0.011	0.230
September	1.188	0.734	0.454	0.288	53.806	10.083	0.002	0.049
October	7.238	1.118	6.120	3.880	53.806	18.039	0.031	0.660
November	3.172	0.248	2.924	1.854	53.806	12.292	0.015	0.315
December	4.992	0.015	4.977	3.155	53.806	6.987	0.025	0.536
January	5.512	0.681	4.831	3.063	53.806	6.783	0.024	0.521
February	0.556	0.637	(0.081)	(0.051)	53.806	(0.114)	(0.000)	(0.009)
March	2.940	0.028	2.913	1.847	53.806	4.089	0.015	0.332
April	3.973	0.025	3.948	2.503	53.806	5.543	0.020	0.451
May	5.301	0.009	5.292	3.355	53.806	7.429	0.026	0.604
June	3.324	0.002	3.300	2.092	53.806	4.634	0.017	0.377
27 MW Jabban								
July	14.477	0.00	14.476	3.981	63.392	15.924	0.072	0.677
August	10.728	0.00	10.725	2.949	63.392	19.547	0.054	0.501
September	9.323	0.00	9.321	2.563	63.392	17.577	0.047	0.436
October	12.413	-	12.413	3.414	63.392	21.918	0.062	0.580
November	10.970	0.00	10.970	3.017	63.392	19.293	0.055	0.513
December	6.633	0.00	6.633	1.824	63.392	9.313	0.033	0.310
January	7.073	0.00	7.073	1.945	63.392	9.930	0.035	0.331
February	1.581	0.04	1.536	0.422	63.392	2.156	0.008	0.075
March	11.562	-	11.562	3.180	63.392	16.234	0.058	0.572
April	13.218	0.00	13.218	3.635	63.392	18.558	0.066	0.654
May	14.386	0.00	14.386	3.956	63.392	20.198	0.072	0.712
June	12.674	-	12.674	3.485	63.392	17.794	0.063	0.627

Source: WAPDA

TABLE 17

Thermal Electricity Generation by Sector and by Fuel (GWh) (Net)

			2018-19	2019-20	2020-21	2021-22	2022-23
Thermal Generation by:							
GENCOs (I, II, III and IV)			13,016.93	7,907.85	6,802.93	6,349.56	5,945.94
KE Own Power Plants			9,928.92	9,628.90	10,185.60	7,889.96	7,093.09
IPPs: CPPA-G System			62,597.73	60,720.31	68,708.63	76,280.90	56,697.83
IPPs: KE System			2,118.31	1,863.60	2,184.57	2,130.46	1,606.81
Others (SPPs/CPPs/N-CPPs): CPPA-G System			405.13	170.99	216.80	136.31	150.02
Others (SPPs/CPPs/N-CPPs): KE System			523.74	534.30	578.90	482.94	406.90
Total Thermal Generation			**88,590.76**	**80,825.95**	**88,677.43**	**93,270.13**	**71,900.59**
Thermal Generation using:							
Gas	CPPA-G System [1]	Generation on Gas (GWh)	22,439.38	15,236.30	14,496.44	14,527.43	14,564.81
		Share of Gas Generation (%)	25.33	18.85	16.35	15.58	20.26
	KE System [2]	Generation on Gas (GWh)	5,265.59	5,087.56	3,420.59	1,353.51	931.70
		Share of Gas Generation (%)	5.94	6.29	3.86	1.45	1.30
	Total	**Generation on Gas (GWh)**	**27,704.97**	**20,323.86**	**17,917.03**	**15,880.94**	**15,496.51**
		Share of Gas Generation (%)	**31.27**	**25.15**	**20.20**	**17.03**	**21.55**
RLNG	CPPA-G System	Generation on RLNG (GWh)	28,148.90	23,830.59	26,983.52	27,156.62	21,369.15
		Share of RLNG Generation (%)	31.77	29.48	30.43	29.12	29.72
	KE System	Generation on RLNG (GWh)	2,489.54	2,795.90	4,777.93	4,449.66	4,968.91
		Share of RLNG Generation (%)	2.81	3.46	5.39	4.77	6.91
	Total	**Generation on RLNG (GWh)**	**30,638.44**	**26,626.49**	**31,761.45**	**31,606.28**	**26,338.06**
		Share of RLNG Generation (%)	**34.58**	**32.94**	**35.82**	**33.89**	**36.63**
RFO	CPPA-G System	Generation on RFO (GWh)	9,091.76	4,178.25	6,331.07	13,276.18	5,008.38
		Share of RFO Generation (%)	10.26	5.17	7.14	14.23	6.97
	KE System [3]	Generation on RFO (GWh)	4,402.33	3,730.43	4,264.85	4,024.28	2,831.64
		Share of RFO Generation (%)	4.97	4.62	4.81	4.31	3.94
	Total	**Generation on RFO (GWh)**	**13,494.09**	**7,908.68**	**10,595.92**	**17,300.46**	**7,840.02**
		Share of RFO Generation (%)	**15.23**	**9.78**	**11.95**	**18.55**	**10.90**
HSD	CPPA-G System	Generation on HSD (GWh)	27.74	0.67	369.25	1,153.02	226.14
		Share of HSD Generation (%)	0.03	0.00	0.42	1.24	0.31
	KE System	Generation on HSD (GWh)	0.00	0.00	33.00	269.22	28.29
		Share of HSD Generation (%)	0.00	0.00	0.04	0.29	0.04
	Total	**Generation on HSD (GWh)**	**27.74**	**0.67**	**402.25**	**1,422.24**	**254.43**
		Share of HSD Generation (%)	**0.03**	**0.00**	**0.45**	**1.52**	**0.35**
Coal	CPPA-G System	Generation on Coal (GWh)	16,312.01	25,553.34	27,547.78	26,653.52	21,625.31
		Share of Coal Generation (%)	18.41	31.62	31.07	28.58	30.08
	KE System	Generation on Coal (GWh)	413.51	412.91	453.00	406.69	346.26
		Share of Coal Generation (%)	2.47	1.59	1.62	1.50	1.58
	Total	**Generation on Coal (GWh)**	**16,725.52**	**25,966.25**	**28,000.78**	**27,060.21**	**21,971.57**
		Share of Coal Generation (%)	**18.88**	**32.13**	**31.58**	**29.01**	**30.56**
Total Thermal Generation			88,590.76	80,825.95	88,677.43	93,270.13	71,900.59

[1] Including generation of SPPs/CPPs/N-CPPs in CPPA-G System. [2] Including generation of IPPs in KE system. [3] Including generation of IPPs/CPPs in KE System.

TABLE 18

Fuel Consumption and Cost of Generation Data of GENCOs (Net)

Year	Gen. on Gas (GWh)	Gas Consumption		Gen. on RFO (GWh)	RFO Consumption		Gen. on RLNG (GWh)	RLNG Consumption		Cost of Generation (Paisa/ kWh)	Overall Fuel Cost of Generation (Rs. Million)
		Total (MMCFT)	Cft/kWh (Average)		(000 M.Ton)	(Kg/kWh)		Total (MMCFT)	Cft/kWh (Average)		
TPS Jamshoro (GENCO-I)											
2018-19	373.65	6,474.85	12.20	350.30	109.42	0.32	156.14	0.00	0.00	1,572.10	13,812.35
2019-20	64.10	886.91	13.72	145.80	49.94	0.33	0.00	0.00	0.00	2,063.90	4,421.75
2020-21	0.00	0.00	0.00	199.55	64.94	0.33	0.00	0.00	0.00	1,952.40	3,895.94
2021-22	0.00	0.00	0.00	245.53	78.42	0.31	0.00	0.00	0.00	3,345.94	8,360.02
2022-23	0.00	0.00	0.00	25.40	8.75	0.34	0.00	0.00	0.00	5,462.88	1,387.78
TPS Muzaffargarh (GENCO-III)											
2018-19	(0.37)	0.00	0.00	836.63	262.18	0.28	0.47	7.15	13.14	1,788.24	16,858.09
2019-20	10.90	7.46	12.97	288.96	92.80	0.28	0.00	0.00	0.00	2,090.83	7,015.71
2020-21	(7.62)	0.00	0.00	289.84	82.75	0.26	0.03	15.60	0.00	1,918.63	6,012.81
2021-22	0.00	0.00	0.00	220.43	61.31	0.27	0.00	0.00	0.00	3,256.00	6,711.39
2022-23	0.00	0.00	0.00	50.56	14.86	0.29	0.00	0.00	0.00	5,001.00	2,471.62

Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Cost of Generation (Paisa/kWh)	Overall Fuel Cost of Generation (Rs. Million)
			Total (MMCFT)	Cft/kWh (Average)		
GTPS Kotri (GENCO-I)	2018-19	37.19	552.03	14.89	936.20	347.06
	2019-20	Plant de-licensed.				
TPS Guddu (Units 1-4)	2018-19	10.02	171.43	14.63	599.89	70.29
	2019-20	Plant de-licensed.				
TPS Guddu (Units 5-10) (GENCO-II) (GENCO-II)	2018-19	3,467.30	43,384.35	12.28	645.72	22,808.77
	2019-20	1,294.84	20,020.65	15.16	1,033.77	13,648.88
	2020-21	1,477.10	23,253.11	15.74	991.80	14,650.08
	2021-22	1,385.84	21,394.19	15.44	1,023.71	14,185.59
	2022-23	1,948.96	27,164.96	13.94	1,118.55	21,800.07
TPS Guddu (Units 11-13) (GENCO-II)	2018-19	837.20	13,445.69	15.95	806.43	6,799.87
	2019-20	311.56	6,182.73	19.67	1,381.28	4,341.99
	2020-21	223.96	4,673.71	20.87	1,160.08	2,598.15
	2021-22	148.16	2,411.30	16.26	1,129.09	1,674.39
	2022-23	19.42	0.31	0.02	1,153.85	224.08
TPS Guddu (Units 14-16) (GENCO-II)	2018-19	5,069.78	44,942.71	8.67	475.07	24,638.39
	2019-20	4,315.35	41,643.01	9.43	729.98	31,501.33
	2020-21	3,123.82	30,291.33	9.70	695.86	21,737.45
	2021-22	2,609.95	25,472.57	9.76	687.11	17,933.18
	2022-23	2,635.92	36,421.06	13.82	1,036.59	27,323.74

Power Station	Year	Gen. on RLNG (GWh)	RLNG Consumption		Cost of Generation (Paisa/kWh)	Overall Fuel Cost of Generation (Rs. Million)
			Total (MMCFT)	Cft/kWh (Average)		
GTPS Faisalabad (GENCO-III)	2018-19	149.53	1801.87	11.47	2,027.71	2,805.00
	2019-20	0.00	0.00	0.00	0.00	0.00
	2020-21	14.26	197.48	12.66	2067.37	321.76
	2021-22	98.83	197.48	12.66	3,503.00	2,879.76
	2022-23	Plant de-licensed.				
TPS Nandipur (GENCO-III)	2018-19	1,729.09	14,299.31	8.01	1,128.05	20,127.64
	2019-20	1,476.33	12,030.47	7.88	1,108.49	16,933.94
	2020-21	1,481.98	-	-	9,620.00	14,813.81
	2021-22	1,640.82	13,383.40	8.12	2,039.00	33,615.00
	2022-23	1,265.68	10,809.07	8.47	2,886.00	36,842.00

Source: GENCOs

TABLE 19

Auxiliary Consumption and all Factors of GENCOs

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
TPS Jamshoro (GENCO-I)	2018-19	117.16	11.88	550	91.24	57.38	71.06	71.10
	2019-20	25.56	10.25	320	75.49	45.07	0.94	74.57
	2020-21	24.17	10.28	290	66.01	40.85	0.88	95.83
	2021-22	23.29	8.35	355	84.87	50.00	4.40	90.25
	2022-23	4.35	14.31	125	100.00	62.50	2.70	91.78
GTPS Kotri (GENCO-I)	2018-19	3.73	9.14	81	5.75	56.20	3.23	80.47
	2019-20	Plant de-licensed.						
TPS Guddu (Units 1-4)	2018-19	1.69	14.45	110	1.22	52.38	0.79	50.00
	2019-20	Plant de-licensed.						
TPS Guddu (Units 5-10) (GENCO-II)	2018-19	64.89	1.84	582	69.28	97.00	76.08	90.87
	2019-20	25.46	0.63	468	32.12	78.00	28.36	83.17
	2020-21	19.20	0.60	440	38.82	28.47	31.06	66.82
	2021-22	27.61	0.12	393	41.05	26.89	28.76	78.95
	2022-23	30.38	0.80	390	57.94	37.66	41.08	93.11
TPS Guddu (Units 11-13) (GENCO-II)	2018-19	6.13	0.73	252	38.20	96.92	37.02	60.61
	2019-20	2.78	0.13	252	14.20	96.92	13.76	62.33
	2020-21	2.45	0.34	160	16.15	6.23	6.46	21.42
	2021-22	0.88	0.59	95	17.93	6.55	6.55	28.22
	2022-23	0.18	0.61	95	2.35	0.54	0.56	2.54
TPS Guddu (Units 14-16) (GENCO-II)	2018-19	116.50	2.25	798	72.52	106.83	80.29	90.32
	2019-20	101.87	1.80	795	61.80	106.43	68.16	86.44
	2020-21	77.98	1.70	748	47.67	48.93	48.93	69.92
	2021-22	76.72	2.03	600	51.12	41.06	42.55	57.07
	2022-23	23.09	7.00	690	43.61	40.63	40.63	50.64

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
TPS Muzaffargarh (GENCO-III)	2018-19	113.75	12.06	1,105	9.74	81.85	7.97	98.98
	2019-20	51.44	0.60	660	5.79	48.89	3.23	79.83
	2020-21	37.08	0.43	700	5.11	51.85	3.02	77.48
	2021-22	15.27	6.63	340	8.25	4.45	4.45	81.86
	2022-23	3.47	6.81	170	3.65	2.96	2.96	87.26
GTPS Faisalabad (GENCO-III)	2018-19	9.74	4.86	119	15.08	48.77	15.74	90.68
	2019-20	5.06	0.00	0	0.00	0.00	0.00	91.89
	2020-21	6.17	39.54	80	2.23	55.56	1.62	96.25
	2021-22	10.74	10.01	85	14.42	59.03	8.51	91.00
	2022-23	Plant de-licensed.						
TPS Nandipur (GENCO-III)	2018-19	52.70	2.95	561	36.31	36.05	39.10	90.81
	2019-20	52.10	2.89	541	32.23	30.87	33.47	95.31
	2020-21	57.51	2.87	541	32.48	31.10	33.73	95.03
	2021-22	50.53	3.07	541	35.84	34.31	37.21	90.81
	2022-23	50.55	3.96	557	26.99	26.61	28.86	94.85

Source: GENCOs

TABLE 20

Heat Rate and Plant Efficiency Data of GENCOs

Power Station	Year	Heat Rate (Btu/kWh)		Plant Efficiency (%)	
		On Gross Generation	On Net Export to NTDC	On Gross Generation	On Net Export to NTDC
TPS Jamshoro (GENCO-I)	2018-19	11,271.12	12,774.07	30.28	26.71
	2019-20	11,622.72	12,950.44	29.36	26.35
	2020-21	11,186.50	12,468.66	30.51	27.37
	2021-22	11,380.83	12,706.56	29.98	26.86
	2022-23	11,670.06	13,946.19	29.24	24.47
GTPS Kotri (GENCO-I)	2018-19	13,405.16	14,752.95	25.46	23.13
	2019-20	Plant de-licensed.			
TPS Guddu (Units 1-4)	2018-19	11,998.00	14,023.00	28.45	24.34
	2019-20	Plant de-licensed.			
TPS Guddu (Units 5-10) (GENCO-II)	2018-19	8,874.00	9,267.00	38.46	36.83
	2019-20	10,075.00	10,280.00	33.88	33.20
	2020-21	10,526.00	10,663.00	32.42	32.01
	2021-22	9,687.00	9,880.00	35.23	34.54
	2022-23	9,200.00	9,343.00	37.10	36.53
TPS Guddu (Units 11-13) (GENCO-II)	2018-19	11,019.00	12,299.00	30.97	27.75
	2019-20	13,844.00	13,977.00	24.65	24.42
	2020-21	15,165.00	15,331.00	22.51	22.26
	2021-22	12,176.00	12,248.00	28.03	27.87
	2022-23	9,341.00	9,426.00	36.54	36.21
TPS Guddu (Units 14-16) (GENCO-II)	2018-19	6,798.00	6,901.00	50.21	49.46
	2019-20	5,933.00	6,097.00	57.53	55.98
	2020-21	5,994.00	6,144.00	56.94	55.55
	2021-22	6,091.00	9,270.00	56.03	54.43
	2022-23	6,279.00	6,334.00	54.36	53.88
TPS Muzaffargarh (GENCO-III)	2018-19	10,729.67	12,202.05	31.81	27.97
	2019-20	10,683.58	11,037.73	31.94	30.92
	2020-21	10,181.59	10,496.14	33.52	32.51
	2021-22	9,618.10	10,255.31	35.49	31.45
	2022-23	10,597.33	11,321.69	32.22	30.16
GTPS Faisalabad (GENCO-III)	2018-19	11,678.00	11,331.00	30.12	29.02
	2019-20	0.00	0.00	0.00	0.00
	2020-21	12,755.00	14,105.00	26.76	21.01
	2021-22	12,754.00	14,285.00	26.76	23.89
	2022-23	Plant de-licensed.			
TPS Nandipur (GENCO-III)	2018-19	7,187.00	7,416.00	47.48	46.02
	2019-20	7,032.00	7,281.00	48.52	46.87
	2020-21	7,060.00	7,334.00	48.34	46.53
	2021-22	6,831.00	7,037.00	48.50	49.96
	2022-23	6,767.00	6,982.00	50.43	48.88

Source: GENCOs

TABLE 21

Fuel Consumption and Cost of Generation Data of IPPs (Net)

(Residual Furnace Oil based Power Plant)

Power Station	Year	Units Generated (GWh) (Net)	Quantity of RFO used (000 M. Tons)	Cost of Fuel (Rs. in Million)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Lal Pir Power	2018-19	613.80	153.27	n.p.	13.74	20.95
	2019-20	186.32	48.24	n.p.	15.25	n.p.
	2020-21	620.78	151.87	n.p.	14.53	n.p.
	2021-22	1,022.68	244.37	28,504.67	27.87	n.p.
	2022-23	397.59	95.67	15,291.86	38.46	56.41
Pak Gen. Power	2018-19	495.56	125.04	n.p.	14.14	22.99
	2019-20	149.76	38.39	n.p.	15.49	n.p.
	2020-21	445.54	109.16	n.p.	15.05	n.p.
	2021-22	1,304.35	312.92	35,926.41	27.54	n.p.
	2022-23	443.74	107.96	16,788.38	37.83	53.94
Hub Power	2018-19	814.43	204.13	n.p.	16.43	n.p.
	2019-20	32.38	9.62	n.p.	17.10	19.20
	2020-21	112.91	47.59	n.p.	17.32	19.50
	2021-22	1,219.58	303.62	29,837.88	24.28	26.71
	2022-23	191.61	50.73	8,276.07	40.41	43.13
Saba Power	2018-19	225.41	59.82	n.p.	17.76	22.38
	2019-20	50.83	14.25	n.p.	18.23	40.06
	2020-21	121.65	33.15	n.p.	17.89	28.12
	2021-22	329.95	88.24	10,329.68	31.33	35.94
	2022-23	148.54	40.24	5,826.97	39.11	52.16
Kohinoor Energy	2018-19	387.44	75.05	n.p.	12.98	17.90
	2019-20	363.86	70.11	n.p.	12.16	17.26
	2020-21	337.07	64.82	n.p.	11.99	16.00
	2021-22	515.84	99.68	11,515.57	22.33	25.27
	2022-23	329.16	63.55	9,139.91	27.77	33.38
Attock Gen.	2018-19	532.18	97.21	n.p.	12.89	20.86
	2019-20	320.96	58.53	n.p.	10.12	20.24
	2020-21	384.03	71.94	n.p.	11.556	20.75
	2021-22	721.93	131.11	16,154.65	21.62	33.18
	2022-23	483.59	91.63	11,600.69	23.45	36.94
Atlas Power	2018-19	691.30	132.07	n.p.	n.p.	n.p.
	2019-20	259.33	48.96	n.p.	n.p.	n.p.
	2020-21	517.08	102.33	n.p.	n.p.	n.p.
	2021-22	1,007.25	199.22	22,527.00	22.36	24.70
	2022-23	521.94	103.57	15,038.00	28.81	34.43
Nishat Power	2018-19	675.10	132.80	n.p.	13.04	13.04
	2019-20	277.46	54.59	n.p.	13.83	13.83
	2020-21	523.40	102.96	n.p.	12.50	12.50
	2021-22	794.25	156.23	18,127.06	22.82	22.82
	2022-23	537.90	105.81	16,062.55	29.86	29.86
Nishat Chunian	2018-19	599.74	117.97	n.p.	13.64	19.04
	2019-20	351.23	69.09	n.p.	14.19	23.40
	2020-21	537.57	105.74	n.p.	12.11	16.27
	2021-22	882.46	173.58	19,970.00	22.33	26.15
	2022-23	386.13	75.95	11,392.00	29.87	37.20
Liberty Power Tech.	2018-19	776.26	148.78	n.p.	n.p.	n.p.
	2019-20	458.54	88.12	n.p.	n.p.	n.p.
	2020-21	606.66	116.07	n.p.	n.p.	n.p.
	2021-22	925.44	178.17	21,073.84	23.12	28.27
	2022-23	544.54	105.12	15,346.24	29	37.02
Narowal Energy	2018-19	636.13	125.03	n.p.	12.90	17.09
	2019-20	338.08	67.32	n.p.	13.42	18.33
	2020-21	496.06	98.00	n.p.	12.35	16.83
	2021-22	867.49	170.42	19,985.40	22.71	26.35
	2022-23	469.88	96.22	14,471.82	29.01	31.12

(Gas based Power Plant)

Power Station	Year	Units Generated (GWh) (Net)	Quantity of Gas used (MMBTU)	Cost of Fuel (Rs. in Million)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Liberty Daharki Power	2018-19	1,307.61	10910993	n.p.	10.15	12.40
	2019-20	896.74	7946696	n.p.	12.26	15.63
	2020-21	983.33	8498852	n.p.	9.00	12.00
	2021-22	1,054.06	8815307	11,632.00	11.04	13.19
	2022-23	1,001.19	8430136	22,024.00	22.00	26.19
Engro Powergen Qadirpur	2018-19	1,385.13	11258742	n.p.	5.58	6.22
	2019-20	700.74	6077764	n.p.	7.68	8.99
	2020-21	648.50	6169067	n.p.	7.15	8.57
	2021-22	791.03	6634350	6,694.00	7.90	9.10
	2022-23	935.42	8264005	8,352.00	7.93	9.64
Foundation Power	2018-19	1,330.60	10526917	n.p.	n.p.	n.p.
	2019-20	777.30	6578836	n.p.	n.p.	n.p.
	2020-21	1,000.37	8258762	n.p.	n.p.	n.p.
	2021-22	1,272.89	10020395	n.p.	6.76	8.47
	2022-23	1,196.12	9610632	n.p.	7.70	10.17
Uch Power	2018-19	3,895.85	29954223	16,323.00	n.p.	4.33
	2019-20	4,087.33	31456577	19,270.00	n.p.	5.05
	2020-21	4,088.44	31503489	27,776.00	n.p.	n.p.
	2021-22	4,300.52	32978917	34,986.03	7.32	8.25
	2022-23	3,901.33	30144743	39,909.61	8.34	9.42
Uch-II Power	2018-19	3,018.37	22553022	17,030.00	5.12	6.78
	2019-20	2,148.02	16349080	15,263.00	4.58	6.33
	2020-21	2,339.37	17715815	22,505.00	n.p.	n.p.
	2021-22	2,828.67	21106347	19,306.31	6.06	7.97
	2022-23	2,776.43	20673942	25,436.11	8.00	10.41

(RLNG based Power Plant)

Power Station	Year	Units Generated (GWh) (Net)	Quantity of RLNG used (MMBTU)	Cost of Fuel (Rs. in Million)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Fauji Kabirwala	2018-19	563.13	259336	n.p.	12.19	13.10
	2019-20	346.32	2994671	n.p.	11.93	15.04
	2020-21	389.96	3518311	n.p.	9.35	12.24
	2021-22	357.21	3183962	8,690.00	24.33	26.60
	2022-23	66.33	586352	2,134.00	32.18	40.40
Rousch Power	2018-19	1,035.85	8699965	n.p.	11.98	15.92
	2019-20	217.53	1901263	n.p.	13.21	28.13
	2020-21	284.36	2403898	n.p.	12.25	23.61
	2021-22	495.78	4249152	12,525.50	25.26	31.81
	2022-23	179.04	1586681	5,543.26	30.96	51.57

(Coal based Power Plant)

Power Station	Year	Units Generated (GWh) (Net)	Quantity of Coal used (000 M. Tons)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Huaneng Shandong Ruyi (Sahiwal Imported Coal)	2018-19	8,220.07	2936.97	7.47	n.p.
	2019-20	6,167.19	2270.37	7.31	n.p.
	2020-21	7,342.70	2,750.14	7.87	n.p.
	2021-22	6,881.38	1,443.97	20.16	26.15
	2022-23	2,876.85	1,025.24	27.07	34.19
Port Qasim Electric Power	2018-19	7,553.64	2901.23	5.71	12.07
	2019-20	8,969.74	4023.93	5.93	14.62
	2020-21	8,372.34	3,618.00	5.39	13.14
	2021-22	7,478.64	3,318.74	13.09	25.12
	2022-23	3,203.00	1,751.77	16.70	48.22
China Power Hub	2019-20	6,136.20	2252.72	5.60	n.p.
	2020-21	7,923.41	3,129.71	5.482	n.p.
	2021-22	6,764.89	2,619.61	12.26	12.79
	2022-23	1,546.92	620.28	28.95	29.55
Engro Powergen Thar	2019-20	4,280.22	3776.90	5.98	9.56
	2020-21	3,909.30	3,612.93	5.94	11.89
	2021-22	3,676.95	3,347.68	2.50	3.59
	2022-23	3,646.06	3,270.64	3.33	4.52
Lucky Electric Power	2021-22	1,774.10	1,428.92	16.27	16.49
	2022-23	3,323.89	2,787.12	14.11	14.43

Power Station	Year	RLNG			HSD			Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./ kWh)
		Units Generated (GWh)	Quantity of RLNG used (MMBTU)	Cost of Fuel (Rs. in Million)	Units Gener-ated (GWh) (Net)	Quantity of HSD used (000 Liters)	Cost of Fuel (Rs. in Million)		
Sapphire Electric	2018-19	806.02	6252321	8,898.82	2.49	593	39.64	10.76	11.14
	2019-20	296.54	2337975	3,546.50	0.22	2424	169.98	12.41	16.53
	2020-21	437.99	3544896	4,727.40	130.05	28700	2,573.97	12.85	14.71
	2021-22	700.18	5568946	15,644.76	80.32	17477	1,327.77	21.75	23.35
	2022-23	452.52	3758333	13,145.05	0.00	0	0.00	29.05	32.73
Halmore Power	2018-19	609.66	4849884	7,003.45	3.25	791	47.27	11.50	13.54
	2019-20	347.69	2846605	4,039.40	--	--	--	11.62	15.72
	2020-21	471.67	3816584	4,717.45	38.12	11088	941.84	10.89	13.52
	2021-22	627.95	4986056	14,539.00	47.98	10385	1,062.00	23.08	25.81
	2022-23	287.05	2380956	8,116.00	0.00	0	0.00	28.27	34.93
Saif Power	2018-19	825.43	6403632	9,105.83	2.77	570	39.85	12.26	17.44
	2019-20	476.18	3738827	5,027.09	0.12	53	3.73	12.03	21.68
	2020-21	605.62	4757884	5,969.31	33.79	7167	637.88	10.52	15.239
	2021-22	652.41	5105963	14,649.56	82.58	17951	2,061.73	23.58	28.13
	2022-23	538.22	4275013	15,190.85	0.00	0	0.00	28.44	35.42
Orient Power	2018-19	874.43	6795121	9,696.00	3.37	799	47.00	11.10	12.85
	2019-20	337.67	2735769	4,075.00	0.33	121	4.00	12.07	16.83
	2020-21	540.74	4334139	1,618.00	57.18	18413	5,670.00	11.69	14.58
	2021-22	774.29	6167599	17,318.00	62.09	13634	1,432.00	22.42	28.45
	2022-23	604.79	4978592	17,204.00	0.00	0	0.00	25.20	33.08
QATPL (Bhikki)	2018-19	6,149.75	39877621					8.87	7.59
	2019-20	5,192.50	33462106					8.81	11.18
	2020-21	7,118.80	45974433					7.79	8.36
	2021-22	5,680.52	37289685	102,320.00	410.41	82602	9,123.00	15.87	18.53
	2022-23	4,637.23	30817773	104,659.02	60.32	11960	1649.96	21.08	28.42
NPPMCL (HBS)	2018-19	7,027.24	44670837					9.05	9.22
	2019-20	7,050.34	44350901					8.84	9.08
	2020-21	7,682.35	48283250					7.96	8.13
	2021-22	7,367.77	46730135	123,819.00	120.79	23431	2,025.00	16.80	17.02
	2022-23	6,437.19	40888370	137,239.00	83.36	16342	2228.00	20.35	20.67
NPPMCL (Balloki)	2018-19	5,284.19	31594264					9.26	9.46
	2019-20	5,911.84	38060169					8.97	9.24
	2020-21	6,032.81	38407023					7.92	8.11
	2021-22	6,896.86	44274716	118,610.00	289.85	57818	6,702.00	17.44	17.68
	2022-23	6,791.06	44024060	148,957.00	72.59	13642	1897.00	20.51	20.86
Punjab Thermal	2021-22	77.56	782592	3,077.00	0.00	0	0.00	0.00	0.00
	2022-23	875.36	7211047	25,065.00	9.87	3170	744.35	22.24	22.55

Power Station	Year	RLNG			RFO			HSD			Average Fuel Cost (Rs./ kWh)	Overall Generation Cost (Rs./kWh)
		Units Generated (GWh) (Net)	Quantity of RLNG used (MMBTU)	Cost of Fuel (Rs. in Million)	Units Generated (GWh) (Net)	Quantity of RFO used (000 M.Tons)	Cost of Fuel (Rs. in Million)	Units Generated (GWh) (Net)	Quantity of HSD used (000 Liters)	Cost of Fuel (Rs. in Million)		
KAPCO	2018-19	3,514.06	30440566	43,642.00	1,442.41	286		2.92	7321	468.00	12.90	14.24
	2019-20	2,523.98	21678499	30,793.00	952.69	188		0.00	3919	302.00	12.70	14.40
	2020-21	2,313.21	20013290	23,701.00	1,138.92	223		110.11	29553	2,660.00	11.33	12.84
	2021-22	1,864.00	16158851	46,396.00	3,219.00	638.09	74,579.00	59.00	21,027.50	2,255.00	24.75	25.72
	2022-23	110.05	1059159	3,782.00	477.79	100.36	17,617.00	-	1,775.79	247.00	36.82	44.24

Source: IPPs

TABLE 22

Auxiliary Consumption and all Factors of IPPs

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
Lal Pir Power	2018-19	42.78	6.52	350	54.25	20.02	n.p.	76.29
	2019-20	15.34	7.61	350	44.60	6.08	n.p.	93.11
	2020-21	41.26	6.23	350	63.31	20.25	n.p.	96.91
	2021-22	68.38	6.27	350	77.85	33.36	100.00	92.61
	2022-23	27.08	6.38	350	78.68	12.97	100.00	79.30
Pak Gen. Power	2018-19	35.96	6.77	350	50.65	16.16	n.p.	87.77
	2019-20	11.62	7.20	350	48.71	4.88	n.p.	83.77
	2020-21	31.32	6.57	350	63.99	14.53	n.p.	96.10
	2021-22	85.85	6.18	350	78.91	42.54	100.00	91.82
	2022-23	31.03	6.54	350	74.04	14.47	100.00	89.79
Fauji Kabirwala	2018-19	18.01	3.10	153	54.71	43.81	44.67	82.94
	2019-20	11.67	3.26	141	36.56	27.27	28.21	98.47
	2020-21	13.13	3.26	147	48.86	30.54	31.16	96.25
	2021-22	12.22	3.31	147	45.30	27.96	28.25	92.69
	2022-23	2.28	3.32	151	19.51	5.12	5.22	91.36
Hub Power	2018-19	71.55	7.96	1,200	7.87	7.87	9.45	n.p.
	2019-20	4.00	10.06	1,200	0.34	0.34	0.37	n.p.
	2020-21	17.74	9.41	1,200	1.79	1.79	1.96	n.p.
	2021-22	104.03	7.81	1,200	11.69	11.69	12.84	91.04
	2022-23	18.20	8.16	1,200	1.94	1.94	2.17	92.34
KAPCO	2018-19	120.00	2.40	1,506	42.20	91.80	46.00	91.80
	2019-20	88.00	2.50	1,449	29.50	88.90	33.20	88.90
	2020-21	105.00	2.90	1,422	30.30	85.60	35.40	85.60
	2021-22	168.00	3.30	1,525	42.40	90.00	47.00	90.00
	2022-23	29.00	4.80	1,102	5.00	97.00	15.70	97.00
Kohinoor Energy	2018-19	12.45	3.11	124	85.82	35.67	39.06	95.15
	2019-20	11.55	3.08	124	86.89	33.41	36.16	98.01
	2020-21	10.60	3.05	124	86.03	31.04	33.85	97.71
	2021-22	16.35	3.07	124	90.82	47.49	51.76	92.38
	2022-23	10.49	3.09	124	90.20	30.30	32.94	98.19
Rousch Power	2018-19	28.41	2.74	418	41.52	29.94	45.32	95.00
	2019-20	11.73	5.39	411	7.41	6.29	7.06	97.00
	2020-21	12.80	4.51	413	9.05	8.20	8.70	97.00
	2021-22	17.74	4.00	429	28.40	14.30	27.80	91.00
	2022-23	9.98	6.00	421	5.90	5.20	5.70	85.00
Saba Power	2018-19	16.33	6.73	134	23.73	20.57	20.57	86.69
	2019-20	4.08	7.40	126	5.13	4.63	4.63	90.20
	2020-21	9.08	6.92	123	12.95	11.32	11.32	87.43
	2021-22	21.99	6.44	125	35.25	30.10	30.10	85.41
	2022-23	10.66	6.68	125	16.45	14.54	14.54	88.06
Liberty Daharki Power	2018-19	31.62	2.35	226	81.04	70.30	85.74	93.02
	2019-20	25.46	2.75	215	67.70	48.08	71.56	94.14
	2020-21	20.49	2.03	220	74.46	53.06	81.42	91.05
	2021-22	18.36	1.71	225	87.82	56.78	57.34	99.03
	2022-23	19.16	1.87	226	79.66	53.79	66.59	80.78
Uch Power	2018-19	62.84	1.58	549	80.96	82.02	96.79	83.63
	2019-20	72.87	1.75	551	84.41	85.32	94.06	89.83
	2020-21	72.60	1.74	550	84.97	86.38	90.17	94.54
	2021-22	75.80	1.73	551	89.17	90.22	94.87	94.20
	2022-23	70.80	1.79	547	81.48	82.03	92.45	90.02
Attock Gen.	2018-19	15.51	2.90	158	37.48	37.94	52.93	96.93
	2019-20	8.97	2.77	158	22.66	22.92	32.92	99.60
	2020-21	11.28	2.85	158	28.00	38.00	38.00	98.19
	2021-22	19.63	2.65	157	52.00	53.00	69.00	90.28
	2022-23	13.32	2.68	158	35.00	35.00	46.00	95.95
Atlas Power	2018-19	24.61	3.68	215	35.66	35.66	39.31	n.p.
	2019-20	9.11	3.51	215	13.82	13.82	15.40	n.p.
	2020-21	19.55	3.83	215	27.27	27.27	30.34	n.p.
	2021-22	37.99	3.77	215	53.77	53.77	58.11	91.67
	2022-23	18.94	3.63	210	27.86	27.86	30.89	86.79

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
Engro Power Gen. Qadirpur	2018-19	43.20	3.12	220	79.17	96.11	82.79	92.00
	2019-20	28.99	4.14	218	38.79	95.81	40.39	92.00
	2020-21	31.12	4.58	151	40.29	97.03	41.81	90.00
	2021-22	32.95	4.00	209	50.00	84.00	60.00	78.00
	2022-23	39.67	4.20	163	50.00	100.00	50.00	99.00
Saif Power	2018-19	23.16	2.72	224	47.90	44.76	45.96	94.34
	2019-20	14.09	2.87	206	28.55	25.79	26.47	92.34
	2020-21	18.51	2.81	214	37.09	34.65	35.87	94.00
	2021-22	21.04	2.78	212	43.36	39.75	41.45	94.77
	2022-23	17.79	3.20	224	30.81	29.11	30.03	94.44
Orient Power	2018-19	23.81	2.71	218	45.98	47.11	59.48	93.00
	2019-20	12.82	3.79	210	18.41	18.14	27.51	93.00
	2020-21	20.04	3.21	214	33.21	33.46	48.57	93.00
	2021-22	24.14	2.89	218	43.87	44.89	59.37	92.00
	2022-23	19.84	3.28	217	31.87	32.46	50.44	92.00
Nishat Power	2018-19	18.71	2.70	195	41.88	39.60	41.88	96.81
	2019-20	8.22	2.88	195	17.29	16.27	17.29	95.22
	2020-21	14.93	2.77	195	32.65	30.73	32.65	96.37
	2021-22	22.41	2.74	195	51.33	46.61	51.33	93.70
	2022-23	15.03	2.72	195	32.51	31.56	32.51	94.00
Nishat Chunian	2018-19	15.69	2.55	196	92.90	64.14	79.60	95.44
	2019-20	9.79	2.71	196	54.73	20.43	21.84	89.09
	2020-21	14.58	2.64	196	66.26	31.35	47.95	95.89
	2021-22	23.41	2.58	196	71.77	51.47	56.04	91.54
	2022-23	10.44	2.63	196	83.88	22.52	23.13	91.40
Sapphire Electric Power	2018-19	24.44	2.94	222	46.73	43.51	44.70	97.74
	2019-20	13.22	4.41	208	17.90	16.12	16.62	95.32
	2020-21	20.28	3.57	221	35.73	30.57	31.47	88.89
	2021-22	24.30	3.11	222	48.08	42.01	43.19	91.14
	2022-23	16.97	3.75	223	26.75	24.35	25.13	95.41
Halmore Power	2018-19	20.68	3.37	214	37.36	37.36	39.09	82.14
	2019-20	14.27	4.10	204	20.04	20.04	19.99	99.02
	2020-21	19.06	3.67	215	32.06	32.06	33.54	82.67
	2021-22	20.27	3.00	211	39.73	39.73	41.94	89.00
	2022-23	11.93	4.15	221	21.56	21.56	19.29	88.94
Narowal Energy	2018-19	12.95	2.00	214	33.96	33.96	35.75	n.p.
	2019-20	7.11	2.07	214	18.00	18.00	18.65	n.p.
	2020-21	10.03	1.98	214	26.41	26.41	27.97	n.p.
	2021-22	15.68	1.78	214	46.31	46.31	52.75	87.80
	2022-23	8.09	1.69	214	25.09	25.09	27.58	90.97
Liberty Power Tech.	2018-19	17.33	2.18	196	96.20	45.18	47.11	98.16
	2019-20	10.65	2.27	196	95.20	26.61	28.11	97.78
	2020-21	13.88	2.24	196	95.30	35.50	37.24	96.85
	2021-22	20.18	2.13	196	95.70	53.86	56.50	91.70
	2022-23	11.61	2.09	196	94.90	31.69	33.50	97.56
Foundation Power	2018-19	34.51	2.51	198	n.p.	90.87	89.70	93.83
	2019-20	27.43	3.01	195	n.p.	52.74	51.60	92.86
	2020-21	28.99	2.63	196	n.p.	71.86	70.81	97.84
	2021-22	32.31	2.39	195	81.40	88.51	88.31	91.75
	2022-23	31.56	2.52	182	86.00	81.20	99.10	83.60
Uch-II Power	2018-19	67.81	2.19	367	94.01	94.66	95.60	98.40
	2019-20	55.12	2.49	355	68.83	69.29	72.87	94.82
	2020-21	57.00	2.37	371	71.96	72.97	76.05	94.58
	2021-22	65.30	2.25	362	89.18	89.83	95.81	93.99
	2022-23	67.00	2.34	360	87.97	88.17	91.13	98.01
Huaneng Shandong Ruyi (Sahiwal Imported Coal)	2018-19	76.48	5.79	1,244	75.37	71.03	86.00	95.00
	2019-20	76.48	5.79	1,244	58.15	54.80	90.00	98.00
	2020-21	76.48	5.79	1,244	67.38	63.50	94.09	96.00
	2021-22	76.48	5.79	1,244	63.18	59.01	99.25	100.00
	2022-23	163.60	5.38	1,244	26.41	26.31	51.37	100.00
QATPL (Bhikki)	2018-19	157.73	2.50	1,171	70.50	60.39	70.50	89.45
	2019-20	131.74	2.47	1,163	53.91	51.88	53.91	96.74
	2020-21	188.62	2.58	1,181	77.27	71.84	77.27	93.74
	2021-22	171.40	2.74	1,127	67.11	61.80	67.11	94.68
	2022-23	142.58	2.95	1,164	55.03	47.89	56.64	87.01

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)	Availability Factor (%)
		(GWh)	(%)					
NPPMCL (Haveli Bahadur Shah)	2018-19	175.57	2.41	1,261	77.54	69.93	79.42	89.88
	2019-20	189.06	2.61	1,261	69.92	69.86	70.03	95.81
	2020-21	191.82	2.44	1,246	78.58	77.07	80.35	95.92
	2021-22	181.94	2.37	1,221	87.16	74.40	87.74	84.35
	2022-23	158.00	2.36	1,210	83.19	64.37	83.19	77.26
NPPMCL (Balloki)	2018-19	175.30	3.45	1,219	68.21	50.43	68.80	76.85
	2019-20	219.95	3.59	1,214	62.06	56.78	62.10	94.82
	2020-21	223.89	3.58	1,217	75.77	58.73	75.83	81.09
	2021-22	255.57	3.43	1,207	81.47	70.38	81.45	89.66
	2022-23	240.83	3.39	1,203	71.60	67.48	71.59	96.22
Port Qasim Electric Power	2018-19	501.43	6.23	1,243	85.90	94.16	65.32	99.11
	2019-20	558.13	5.86	1,243	86.34	94.16	77.36	99.59
	2020-21	483.97	5.47	1,243	89.44	94.16	72.41	98.96
	2021-22	444.94	5.62	1,243	84.27	94.16	64.68	88.00
	2022-23	247.61	7.22	1,243	70.45	94.16	27.70	92.27
China Power Hub	2019-20	364.91	6.09	660	59.02	59.32	82.95	95.44
	2020-21	465.01	5.55	660	72.41	72.49	93.74	94.57
	2021-22	376.74	5.28	660	61.83	61.65	94.88	73.00
	2022-23	127.47	7.73	660	14.14	14.25	22.55	91.00
Engro Powergen Thar	2019-20	403.11	9.00	612	80.90	n.p.	93.50	85.30
	2020-21	360.97	9.00	608	74.10	91.71	90.00	81.40
	2021-22	335.73	9.00	606	69.66	77.87	96.22	71.88
	2022-23	349.51	9.00	611	69.15	95.50	86.14	80.26
Lucky Electric Power	2021-22	88.36	7.63	607	71.97	71.97	71.64	75.74
	2022-23	284.27	8.57	607	62.53	91.89	73.73	85.13
Punjab Thermal	2022-23	4.73	3.00	1,203	73.00	64.00	88.00	88.00

Source: IPPs

TABLE 23

Heat Rate and Plant Efficiency Data of IPPs

Power Station	Year	Heat Rate (Btu/kWh)		Plant Efficiency (%)	
		On Gross Generation	On Net Export to NTDC	On Gross Generation	On Net Export to NTDC
Lal Pir Power	2018-19	9,053.00	9,684.00	37.69	35.24
	2019-20	9,274.86	10,038.39	36.79	33.99
	2020-21	8,855.96	9,444.58	38.53	36.13
	2021-22	8,653.68	9,232.32	39.43	36.96
	2022-23	8,680.85	9,272.01	39.31	36.80
Pak Gen. Power	2018-19	9,124.72	9,786.82	37.40	34.87
	2019-20	9,224.70	9,940.67	36.99	34.33
	2020-21	8,835.67	9,456.69	38.62	36.09
	2021-22	8,697.58	9,270.03	39.24	36.81
	2022-23	8,757.70	9,370.18	38.97	36.42
Fauji Kabirwala	2018-19	7,608.93	7,852.21	44.84	43.45
	2019-20	7,685.32	7,944.45	44.40	42.95
	2020-21	7,863.36	8,128.24	43.39	41.98
	2021-22	7,764.49	8,030.02	43.94	42.49
	2022-23	7,700.36	7,964.25	44.31	42.84
Hub Power	2018-19	8,222.22	8,934.61	41.50	38.19
	2019-20	7,951.83	8,791.88	42.91	38.81
	2020-21	8,206.18	8,832.85	41.58	38.63
	2021-22	8,385.67	8,853.67	40.69	38.54
	2022-23	8,175.46	8,767.03	41.74	38.92
KAPCO	2018-19	7,996.00	8,179.00	45.00	44.00
	2019-20	7,920.00	8,102.00	45.50	44.40
	2020-21	7,882.00	8,095.00	45.70	44.50
	2021-22	8,039.00	8,301.00	44.80	43.40
	2022-23	8,187.00	8,301.00	44.00	43.40
Kohinoor Energy	2018-19	7,738.19	7,986.85	44.08	42.72
	2019-20	7,741.12	7,986.85	44.08	42.72
	2020-21	7,743.37	7,986.85	44.07	42.72
	2021-22	7,741.49	7,986.85	44.08	42.72
	2022-23	7,740.29	7,986.85	44.08	42.72
Rousch Power	2018-19	7,364.59	7,566.55	46.38	45.14
	2019-20	7,471.42	7,874.21	45.71	43.38
	2020-21	7,305.60	7,635.36	46.75	44.73
	2021-22	7,453.00	7,719.00	45.83	44.25
	2022-23	7,536.00	7,984.00	45.16	42.78
Saba Power	2018-19	9,896.00	10,610.00	34.48	32.16
	2019-20	10,376.00	11,205.00	32.88	30.45
	2020-21	10,131.69	10,894.47	33.68	31.32
	2021-22	10,018.35	10,707.41	34.06	31.87
	2022-23	10,203.95	10,934.32	33.44	31.20
Liberty Daharki Power	2018-19	8,123.67	8,344.21	42.00	40.89
	2019-20	8,589.48	8,861.71	39.72	38.50
	2020-21	8,428.61	8,627.99	40.48	39.55
	2021-22	8,201.29	8,363.17	41.60	40.80
	2022-23	8,231.55	8,415.30	41.45	40.55
Uch Power	2018-19	6,797.38	6,936.25	50.20	49.19
	2019-20	6,820.72	6,950.81	50.02	49.09
	2020-21	6,826.12	6,950.83	49.98	49.09
	2021-22	6,806.00	6,921.00	50.14	49.30
	2022-23	6,882.00	6,975.00	49.58	48.92
Attock Gen.	2018-19	7,356.00	7,582.00	46.40	45.00
	2019-20	7,366.00	7,582.00	46.33	45.00
	2020-21	7,360.00	7,582.00	46.37	45.00
	2021-22	7,376.00	7,582.00	46.27	45.00
	2022-23	7,373.00	7,582.00	46.29	45.00
Atlas Power	2018-19	7,400.00	7,584.00	46.10	45.00
	2019-20	7,400.00	7,584.00	46.10	45.00
	2020-21	7,400.00	7,584.00	46.10	45.00
	2021-22	7,400.00	7,584.00	46.10	45.00
	2022-23	7,400.00	7,584.00	46.10	45.00
Engro Power Gen. Qadirpur	2018-19	7,260.00	7,705.51	47.00	44.28
	2019-20	7,260.00	7,741.26	47.00	44.08
	2020-21	7,260.00	7,743.06	47.00	44.07
	2021-22	7,260.00	7,713.00	47.00	44.20
	2022-23	7,260.00	7,627.00	47.00	44.74

Power Station	Year	Heat Rate (Btu/kWh)		Plant Efficiency (%)	
		On Gross Generation	On Net Export to NTDC	On Gross Generation	On Net Export to NTDC
Nishat Power	2018-19	7,378.00	7,582.00	46.21	45.00
	2019-20	7,364.00	7,582.00	46.29	45.00
	2020-21	7,372.00	7,582.00	46.25	45.00
	2021-22	7,374.00	7,582.00	46.24	45.00
	2022-23	7,376.00	7,582.00	46.22	45.00
Nishat Chunian	2018-19	7,402.00	7,582.00	46.10	45.00
	2019-20	7,402.00	7,582.00	46.10	45.00
	2020-21	7,420.00	7,582.00	46.00	45.00
	2021-22	7,420.00	7,582.00	46.00	45.00
	2022-23	7,420.00	7,582.00	46.00	45.00
Narowal Energy	2018-19	7,737.44	7,885.59	46.53	45.66
	2019-20	7,749.92	7,887.43	46.45	45.65
	2020-21	7,744.22	7,887.14	46.48	45.64
	2021-22	7,747.91	7,884.41	46.48	45.68
	2022-23	7,767.58	7,900.89	46.42	45.63
Liberty Power Tech.	2018-19	7,417.70	7,582.54	46.00	45.00
	2019-20	7,417.70	7,582.54	46.00	45.00
	2020-21	7,417.70	7,582.54	46.00	46.00
	2021-22	7,417.70	7,582.54	46.00	45.00
	2022-23	7,417.70	7,582.54	46.00	45.00
Foundation Power	2018-19	6,938.53	7,146.12	49.18	47.75
	2019-20	7,314.41	7,569.29	46.64	45.08
	2020-21	7,141.27	7,359.02	47.78	46.36
	2021-22	6,899.48	7,090.02	49.45	48.12
	2022-23	7,083.00	7,289.55	48.17	46.81
Uch-II Power	2018-19	6,567.20	6,747.54	51.96	50.57
	2019-20	6,679.56	6,880.32	51.08	49.59
	2020-21	6,670.00	6,861.00	51.15	49.73
	2021-22	6,558.00	6,737.00	52.03	50.64
	2022-23	6,540.00	6,730.00	52.17	50.70
Huaneng Shandong Ruyi (Sahiwal Imported Coal)	2018-19	8,749.08	n.p.	39.00	n.p.
	2019-20	8,749.08	n.p.	39.00	n.p.
	2020-21	8,749.08	n.p.	39.00	n.p.
	2021-22	8,749.08	n.p.	39.00	42.94
	2022-23	8,749.08	n.p.	39.00	40.69
QATPL (Bhikki)	2018-19	5,425.54	5,538.26	62.89	61.61
	2019-20	5,422.95	5,531.97	62.92	61.68
	2020-21	5,428.99	5,539.16	62.85	61.60
	2021-22	5,426.43	5,537.62	62.88	61.62
	2022-23	5,424.71	5,537.32	62.90	61.62
NPPMCL (Haveli Bahadur Shah)	2018-19	5,522.35	5,654.29	61.80	60.36
	2019-20	5,524.69	5,672.84	61.78	60.16
	2020-21	5,530.16	5,668.24	61.72	60.21
	2021-22	5,416.00	5,551.00	63.00	61.47
	2022-23	5,420.00	5,535.00	62.95	61.65
NPPMCL (Balloki)	2018-19	5,607.90	5,800.26	60.85	58.83
	2019-20	5,603.60	5,805.54	60.89	58.77
	2020-21	5,593.32	5,795.28	61.00	58.86
	2021-22	5,486.00	5,661.00	62.19	60.27
	2022-23	5,507.00	5,677.00	61.96	60.11
Port Qasim Electric Power	2018-19	8,228.30	8,762.43	41.42	38.90
	2019-20	8,308.08	8,825.35	41.02	38.62
	2020-21	8,246.83	8,716.90	41.33	39.10
	2021-22	8,703.02	8,726.83	41.34	39.06
	2022-23	9,249.16	9,900.80	36.85	34.42
China Power Hub	2019-20	8,195.06	8,704.90	41.64	39.20
	2020-21	8,186.81	8,660.72	41.68	39.40
	2021-22	8,226.89	8,669.52	41.18	39.36
	2022-23	8,352.14	8,900.16	40.86	38.34
Engro Powergen Thar	2021-22	9,714.95	n.p.	35.12	n.p.
	2022-23	9,694.89	n.p.	35.20	n.p.
Lucky Electric Power	2021-22	8,042.02	8,706.66	42.43	39.19
	2022-23	8,658.21	9,400.44	40.55	37.35
Punjab Thermal Power	2022-23	5,488.32	5,579.00	62.17	61.16

Power Station	Year	Heat Rate (Btu/kWh)				Plant Efficiency (%)			
		On Gross Generation		On Net Export to NTDC		On Gross Generation		On Net Export to NTDC	
		Gas	HSD	Gas	HSD	Gas	HSD	Gas	HSD
Saif Power	2018-19	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2019-20	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2020-21	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2021-22	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2022-23	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
Orient Power	2018-19	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2019-20	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2020-21	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2021-22	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2022-23	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
Sapphire Electric Power	2018-19	n.p.	6,830.00	6,666.00	7,037.00	52.74	49.96	51.20	48.50
	2019-20	n.p.	6,830.00	6,666.00	7,037.00	52.74	49.96	51.20	48.50
	2020-21	n.p.	6,834.00	n.p.	7,037.00	n.p.	49.93	n.p.	48.50
	2021-22	6,474.00	6,834.00	6,666.00	7,037.00	52.71	49.93	51.20	48.50
	2022-23	6,474.00	6,834.00	6,666.00	7,037.00	52.71	49.93	51.20	48.50
Halmore Power	2018-19	6,479.00	6,840.00	7,182.00	8,271.00	52.68	49.90	47.52	41.27
	2019-20	6,478.00	6,839.00	7,391.00	n.p.	52.69	49.91	46.18	n.p.
	2020-21	6,478.00	6,839.00	7,367.00	7,248.00	52.69	49.91	46.33	47.09
	2021-22	6,478.00	6,839.00	6,666.00	7,037.00	52.69	49.91	n.p.	n.p.
	2022-23	6,478.00	6,839.00	6,666.00	7,037.00	52.69	49.91	n.p.	n.p.

Source: IPPs

TABLE 24

Monthly Source-wise Power Sent Out and Fuel Cost Data (2022-23)

			July	August	September	October	November	December	January	February	March	April	May	June	Total
Hydel	Generation	GWh	4,976.93	5,353.69	4,403.81	3,143.62	2,484.36	1,720.43	800.33	2,052.16	2,001.61	1,873.19	3,312.20	4,133.45	**36,255.78**
		%	35.16	38.10	34.20	29.40	29.69	20.44	9.40	26.46	22.90	18.71	27.10	30.24	**28.00**
	Fuel Cost	Mln. Rs.	-	-	-	-	-	-	-	-	-	-	-	-	**-**
		Rs./kWh	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Coal	Generation	GWh	1,802.19	2,163.01	1,449.20	1,656.52	975.44	1,520.93	2,443.77	1,091.14	1,333.51	1,818.73	2,061.30	2,434.43	**20,750.17**
		%	12.73	15.39	11.25	15.49	11.66	18.07	28.70	14.07	15.26	18.16	16.87	17.81	**16.03**
	Fuel Cost	Mln. Rs.	36,089.07	44,437.09	26,056.11	29,178.27	12,522.10	17,101.87	39,227.87	13,716.34	11,570.63	22,275.02	21,699.97	34,198.23	**308,072.56**
		Rs./kWh	20.03	20.54	17.98	17.61	12.84	11.24	16.05	12.57	8.68	12.25	10.53	14.05	**14.85**
HSD	Generation	GWh	205.97	-	-	-	-	-	-	-	-	-	-	10.24	**216.21**
		%	1.46	-	-	-	-	-	-	-	-	-	-	0.07	**0.17**
	Fuel Cost	Mln. Rs.	5,744.30	-	-	-	-	-	-	-	-	-	-	311.84	**6,056.14**
		Rs./kWh	-	-	-	-	-	-	-	-	-	-	-	-	**28.01**
RFO	Generation	GWh	876.92	1,021.59	1,080.48	156.57	10.61	38.91	463.32	107.77	40.52	222.57	240.97	744.42	**5,004.64**
		%	6.20	7.27	8.39	1.46	0.13	0.46	5.44	1.39	0.46	2.22	1.97	5.45	**3.87**
	Fuel Cost	Mln. Rs.	31,304.65	36,235.39	37,399.84	5,276.79	256.47	1,002.41	13,420.00	2,335.81	862.27	5,162.87	5,600.44	19,427.32	**158,284.25**
		Rs./kWh	35.70	35.47	34.61	33.70	-	25.76	28.97	21.67	21.28	23.20	23.24	26.10	**31.63**
Gas	Generation	GWh	1,466.41	1,315.21	1,205.50	1,296.37	1,189.14	1,165.52	1,145.89	850.15	1,107.01	1,191.29	1,270.90	1,169.97	**14,373.36**
		%	10.36	9.36	9.36	12.12	14.21	13.85	13.46	10.96	12.66	11.90	10.40	8.56	**11.10**
	Fuel Cost	Mln. Rs.	14,603.21	13,800.47	12,957.79	13,801.00	12,629.04	10,903.52	10,987.07	8,553.86	12,467.31	14,047.30	15,829.27	13,744.08	**154,323.93**
		Rs./kWh	9.96	10.49	10.75	10.65	10.62	9.36	9.59	10.06	11.26	11.79	12.46	11.75	**10.74**
RLNG	Generation	GWh	2,119.55	1,755.80	1,821.18	1,843.74	1,011.74	1,262.01	1,285.79	1,462.36	1,784.59	2,417.75	2,988.05	2,543.86	**22,296.41**
		%	14.97	12.49	14.14	17.24	12.09	14.99	15.10	18.85	20.42	24.15	24.45	18.61	**17.22**
	Fuel Cost	Mln. Rs.	55,968.46	43,402.91	46,271.36	44,649.04	20,520.75	25,779.67	28,039.64	34,160.96	42,760.23	57,566.01	73,039.68	61,240.93	**533,399.64**
		Rs./kWh	26.41	24.72	25.41	24.22	20.28	20.43	21.81	23.36	23.96	23.81	24.44	24.07	**23.92**
Nuclear	Generation	GWh	2,009.54	1,873.98	2,265.51	2,206.33	2,337.81	2,284.86	1,875.65	1,883.09	2,002.01	1,916.07	1,542.59	1,857.11	**24,054.56**
		%	14.20	13.34	17.59	20.63	27.94	27.15	22.03	24.28	22.90	19.14	12.62	13.59	**18.58**
	Fuel Cost	Mln. Rs.	2,108.63	1,910.33	2,354.10	2,355.84	2,492.75	2,450.80	2,014.50	2,010.15	2,162.78	2,021.79	1,771.10	1,991.07	**25,643.83**
		Rs./kWh	1.05	1.02	1.04	1.07	1.07	1.07	1.07	1.07	1.08	1.06	1.15	1.07	**1.07**
Import Iran	Generation	GWh	46.57	54.47	53.65	47.77	44.70	39.85	37.13	32.95	31.50	30.46	34.50	24.98	**478.54**
		%	0.33	0.39	0.42	0.45	0.53	0.47	0.44	0.42	0.36	0.30	0.28	0.18	**0.37**
	Fuel Cost	Mln. Rs.	1,063.62	1,141.51	1,172.06	1,011.64	946.55	859.04	952.74	814.91	738.56	714.20	811.62	590.26	**10,816.70**
		Rs./kWh	22.84	20.96	21.85	21.18	21.18	21.56	25.66	24.73	23.45	23.45	23.53	23.63	**22.60**
Mixed	Generation	GWh	16.92	17.78	15.88	14.77	6.82	2.18	2.15	1.87	3.56	13.35	-	-	**95.29**
		%	0.12	0.13	0.12	0.14	0.08	0.03	0.03	0.02	0.04	0.13	-	-	**0.07**
	Fuel Cost	Mln. Rs.	80.50	84.53	74.24	67.90	27.58	7.14	13.00	11.26	18.76	54.17	-	-	**439.09**
		Rs./kWh	4.76	4.75	4.67	4.60	4.05	3.28	6.04	6.01	5.27	4.06	-	-	**4.61**
Wind Power	Generation	GWh	521.72	390.71	466.88	209.70	157.77	211.57	287.21	92.20	221.33	322.93	606.58	597.44	**4,086.05**
		%	3.69	2.78	3.63	1.96	1.89	2.51	3.37	1.19	2.53	3.22	4.96	4.37	**3.16**
	Fuel Cost	Mln. Rs.	-	-	-	-	-	-	-	-	-	-	-	-	**-**
		Rs./kWh	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Solar Power	Generation	GWh	70.77	73.44	81.69	79.08	78.95	69.46	72.16	82.26	110.73	125.80	89.50	85.52	**1,019.36**
		%	0.50	0.52	0.63	0.74	0.94	0.83	0.85	1.06	1.27	1.26	0.73	0.63	**0.79**
	Fuel Cost	Mln. Rs.	-	-	-	-	299.07	192.91	-	-	-	-	-	-	**491.98**
		Rs./kWh	-	-	-	-	-	-	-	-	-	-	-	-	**0.48**
Bagasse	Generation	GWh	40.63	33.13	34.03	37.81	69.73	101.09	101.44	100.12	104.86	81.17	74.87	66.49	**845.36**
		%	0.29	0.24	0.26	0.35	0.83	1.20	1.19	1.29	1.20	0.81	0.61	0.49	**0.65**
	Fuel Cost	Mln. Rs.	243.07	198.17	203.57	226.21	417.16	603.80	606.86	536.47	627.29	485.56	447.86	397.74	**4,993.76**
		Rs./kWh	5.98	5.98	5.98	5.98	5.98	5.97	5.98	5.36	5.98	5.98	5.98	5.98	**5.91**
Total	**Generation**	**GWh**	**14,154.13**	**14,052.80**	**12,877.83**	**10,692.28**	**8,367.07**	**8,416.81**	**8,514.85**	**7,756.07**	**8,741.24**	**10,013.29**	**12,221.46**	**13,667.91**	**129,475.74**
		%	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	Fuel Cost	**Mln. Rs.**	**147,205.52**	**141,210.40**	**126,489.08**	**96,566.68**	**50,111.46**	**58,901.16**	**95,261.66**	**62,139.75**	**71,207.83**	**102,326.93**	**119,199.96**	**131,901.47**	**1,202,521.90**
		Rs./kWh	**10.40**	**10.05**	**9.82**	**9.03**	**5.99**	**7.00**	**11.19**	**8.01**	**8.15**	**10.22**	**9.75**	**9.65**	**9.29**

Note: As per data provided by CPPA-G.

TABLE 25

Electricity Statistics of K-Electric Limited

1	**Units Generated by KE Own (GWh)**						
	Name of Plant		**Year**	**Units Gen. (Gross)**	**Auxiliary Consumption**		**Units Sent Out**
					GWh	**%**	
1.1	Bin Qasim Thermal Power Station-I (BQTPS-I)		2018-19	4,646.94	429.17	9.24	4,217.77
			2019-20	4,195.00	370.34	8.83	3,824.66
			2020-21	5,130.00	400.00	7.80	4,730.00
			2021-22	3,590.67	301.57	8.40	3,289.10
			2022-23	2,033.37	181.67	8.93	1,851.70
1.2	Bin Qasim Thermal Power Station-II (BQTPS-II)		2018-19	4,065.70	249.75	6.14	3,815.95
			2019-20	4,278.00	247.46	5.78	4,030.54
			2020-21	4,173.00	247.00	5.92	3,926.00
			2021-22	3,820.55	233.03	6.10	3,587.52
			2022-23	2,806.95	172.47	6.14	2,634.48
1.3	Bin Qasim Thermal Power Station-III (BQTPS-III)		2021-22	256.10	12.60	4.92	243.50
			2022-23	2,595.58	73.00	2.81	2,522.58
1.4	Korangi Town Gas Turbine Power Station-II (KTGTPS-II)		2018-19	390.33	14.71	3.77	375.62
			2019-20	313.00	13.27	4.24	299.73
			2020-21	381.00	15.77	4.14	365.23
			2021-22	122.01	7.49	6.14	114.52
			2022-23	12.31	2.13	17.30	10.18
1.5	Site Gas Turbine Power Station-II (SGTPS-II)		2018-19	368.02	12.78	3.47	355.24
			2019-20	414.00	16.77	4.05	397.23
			2020-21	227.00	11.33	4.99	215.67
			2021-22	110.42	7.56	6.85	102.86
			2022-23	27.29	2.88	10.55	24.41
1.6	Korangi Combined Cycle Power Plant		2018-19	1,256.68	92.34	7.35	1,164.34
			2019-20	1,158.00	81.26	7.02	1,076.74
			2020-21	1,027.00	78.30	7.62	948.70
			2021-22	596.15	43.69	7.33	552.46
			2022-23	58.74	9.00	15.32	49.74
1.7	**Total Units Generated from KE's Own Power Plants**		**2018-19**	**10,727.67**	**798.76**	**7.45**	**9,928.91**
			2019-20	**10,358.00**	**729.10**	**7.04**	**9,628.90**
			2020-21	**10,938.00**	**752.40**	**6.88**	**10,185.60**
			2021-22	**8,495.90**	**605.94**	**7.13**	**7,889.96**
			2022-23	**7,534.24**	**441.15**	**5.86**	**7,093.09**
2	**Units Purchased by KE (GWh)**						
			2018-19	**2019-20**	**2020-21**	**2021-22**	**2022-23**
2.1	KANUPP [1]		129.99	193.00	219.00	45.77	0.00
2.2	Gul Ahmed		675.54	496.14	673.00	705.43	508.68
2.3	Tapal Energy		645.02	627.77	737.00	715.86	518.44
2.4	NTDC (Mixed Generation)		4,936.71	5,003.14	5,764.40	8,897.54	8,960.81
2.5	Anoud Power		51.58	59.52	12.00	0.00	0.00
2.6	International Steel Limited		46.00	51.21	43.00	28.54	26.89
2.7	International Industries Limited		12.65	10.66	10.00	9.29	10.41
2.8	FFBL Power		413.51	412.91	452.88	406.69	346.26
2.9	SNPCL-I		403.06	371.86	394.35	363.36	292.66
2.10	SNPCL-II		394.69	367.83	380.22	345.81	287.03
2.11	Oursun Pakistan		56.92	88.28	90.87	89.58	89.32
2.12	NTDC - 150 MW (Wind) [2]		20.00	423.00	353.64	139.00	0.00
2.13	Gharo Solar		0.00	65.00	108.69	102.64	101.69
2.14	Lotte Chemicals		--	--	61.00	35.44	21.08
2.15	Lucky Cement		--	--	0.02	2.98	2.26
2.16	Net-Metering Import		--	--	--	44.00	107.18
2.17	**Total**		**7,785.67**	**8,170.32**	**9,300.07**	**11,931.93**	**11,272.71**
3	**Total Units Purchased by KE including Own Gen. (GWh)**		**18,513.34**	**18,528.32**	**20,238.07**	**20,427.83**	**18,806.95**
4	**Units Available for Distribution (GWh)**		**17,714.58**	**17,799.22**	**19,485.67**	**19,821.89**	**18,365.80**
5	**Units Sold (GWh)**		**14,318.11**	**14,276.96**	**16,068.85**	**16,763.23**	**15,553.81**
6	**T&D Losses (excluding Auxiliary Consumption)**	**GWh**	**3,396.47**	**3,522.26**	**3,416.82**	**3,058.66**	**2,811.99**
		%	**19.17**	**19.79**	**17.54**	**15.43**	**15.31**
7	**Average Fuel Price**						
7.1	Gas (Rs./MMBtu) [3]		559.000	824.00	846.00	857.00	911.19
7.2	RLNG (Rs./MMBtu) - SSGC		1,605.70	1,561.00	1,358.00	2,877.91	3,749.75
7.3	RLNG (Rs./MMBtu) - PLL [5]		--	--	--	5,253.00	3,347.65
7.4	Furnace Oil (Rs./M. Ton.)		69,641.62	62,130.00	60,285.00	121,886.72	154,077.73
7.5	HSD (Rs./Liters)		0.00	0.00	98.00	132.65	230.90

		2018-19	2019-20	2020-21	2021-22	2022-23
8	**Cost of Fuel in KE Own System**					
8.1	Cost of Fuel (Rs. in Million)	120,614.57	116,186.00	126,409.00	212,615.00	212,132.18
8.2	Cost of Fuel (Paisa/kWh) [3] & [4]	1,214.88	1,207.00	1,241.00	2,695.00	2,990.72

[1] Supply from KANUPP discontinued from August, 2021.
[2] Supply from WPPs discontinued from September, 2021.
[3] Excluding GIDC which is under litigation.
[4] Based on per unit sent out.
[5] Supply from PLL initiated from February 08, 2022.
Source: KE

TABLE 26

Fuel Consumption and Cost of Generation Data of K-Electric and their IPPs (Net)

(Gas+RFO+RLNG based Power Plant)									
Year	**Gen. on Gas (GWh) (Net)**	**Gas Consumption**		**Residual Furnace Oil**		**Gen. on RLNG (GWh) (Net)**	**RLNG Consumption**		**Overall Generation Cost (Rs./ kWh) [1] & [2]**
		Total MMCFT	**CFT/kWh (Average)**	**Gen. on RFO (GWh) (Net)**	**Quantity of RFO used (000 M. Tons)**		**Total MMCFT**	**CFT/kWh (Average)**	
Bin Qasim TPS-I									
2018-19	855.00	8,672.23	10.14	3,361.94	n.p.	430.00	4,362.57	10.15	17.59
2019-20	761.00	8,552.00	11.24	2,548.00	734.00	516.00	5,821.00	11.28	16.03
2020-21	695.00	7,618.00	10.96	2,843.00	787.00	1,192.00	12,974.00	10.04	15.02
2021-22	156.12	1,744.33	11.17	2,526.74	694.71	606.24	6,784.63	11.19	31.46
2022-23	41.14	478.34	11.63	1,743.88	483.28	66.68	792.40	11.88	42.06

(Gas+RLNG based Power Plant)								
Power Station	**Year**	**Gen. on Gas (GWh) (Net)**	**Gas Consumption**		**Gen. on RLNG (GWh) (Net)**	**RLNG Consumption**		**Overall Generation Cost (Rs./ kWh) [1] & [2]**
			Total MMCFT	**CFT/kWh (Average)**		**Total MMCFT**	**CFT/kWh (Average)**	
Bin Qasim TPS-II	2018-19	2,510.24	19,118.21	7.62	1,555.47	11,868.60	7.63	8.17
	2019-20	2,387.00	19,729.00	8.27	1,643.00	13,554.00	8.25	9.51
	2020-21	1,277.00	10,448.00	8.18	2,649.00	21,671.00	8.18	9.87
	2021-22	375.68	3,094.83	8.24	3,211.84	26,470.14	8.24	23.05
	2022-23	299.56	2,505.14	8.36	2,334.92	19,134.44	8.19	27.27
Korangi Town GTPS-II	2018-19	259.12	2,418.98	9.34	131.21	1,222.94	9.32	8.63
	2019-20	196.00	1,900.00	9.69	104.00	1,006.00	9.67	9.75
	2020-21	130.00	1,261.00	9.70	235.00	2,269.00	9.66	10.75
	2021-22	24.58	251.12	10.22	89.94	923.66	10.27	22.26
	2022-23	2.53	29.31	11.60	7.65	89.12	11.64	34.59
Site GTPS-II	2018-19	253.70	2,174.20	8.57	114.32	980.14	8.57	7.86
	2019-20	254.00	2,283.00	8.99	143.00	1,292.00	9.03	9.91
	2020-21	79.00	744.00	9.42	137.00	1,303.00	9.51	11.28
	2021-22	20.90	203.03	9.71	81.96	796.61	9.72	23.31
	2022-23	4.93	49.11	9.96	19.48	195.21	10.02	32.07

(Gas+RLNG+HSD based Power Plant)									
Year	**Gen. on Gas (GWh) (Net)**	**Gas Consumption**		**Gen. on RLNG (GWh) (Net)**	**RLNG Consumption**		**Gen. on HSD (GWh) (Net)**	**Quantity of HSD used (000 liters) [3]**	**Overall Generation Cost (Rs./ kWh) [1] & [2]**
		Total MMCFT	**CFT/kWh (Average)**		**Total MMCFT**	**CFT/kWh (Average)**			
Korangi CCPP [3]									
2018-19	823.28	6,325.76	7.68	433.40	3,334.39	7.69	-	-	7.92
2019-20	688.00	5,593.00	8.13	389.00	3,161.00	8.13	-	-	8.99
2020-21	351.00	2,903.00	8.27	565.00	4,677.00	8.28	33.00	7,949.00	10.08
2021-22	67.06	558.85	8.33	216.18	1,809.51	8.37	269.22	62,853.96	24.03
2022-23	3.85	39.13	10.18	17.60	180.89	10.28	28.29	8,442.00	53.85

(RLNG based Power Plant)					
Power Station	Year	Gen. on RLNG (GWh) (Net)	RLNG Consumption		Overall Generation Cost (Rs./kWh) [1] & [2]
			Total MMCFT	CFT/kWh (Average)	
Bin Qasim TPS-III [4]	2021-22	243.50	1,891.55	7.75	36.27
	2022-23	2,522.58	15,907.54	6.31	23.23

(Residual Furnace Oil based Power Plant)					
Power Station	Year	Gen. on RFO (GWh) (Net)	Quantity of RFO used (000 M. Tons)	Average Fuel Cost (Rs./ kWh)	Overall Generation Cost (Rs./kWh) [1] & [2]
Gul Ahmed	2018-19	675.54	153	14.69	18.18
	2019-20	496.14	107	12.94	15.97
	2020-21	673.00	145	13.71	15.96
	2021-22	705.43	153.97	24.80	27.59
	2022-23	508.68	110.30	29.88	31.85
Tapal Energy	2018-19	645.02	143	14.45	15.91
	2019-20	626.77	136	12.78	13.84
	2020-21	737.00	160	13.73	14.87
	2021-22	715.86	156.37	24.84	26.70
	2022-23	518.44	115.03	29.51	33.00

(Gas based Power Plant)					
Power Station	Year	Gen. on Gas (GWh) (Net)	Quantity of Gas used (MMBTU)	Average Fuel Cost (Rs./ kWh)	Overall Generation Cost (Rs./kWh) [1] & [2]
Sindh Nooriabad-I	2018-19	403.06	3274096	5.25	6.04
	2019-20	371.86	2999996	7.22	8.16
	2020-21	394.35	3232553	6.68	7.64
	2021-22	363.36	2954899	6.94	11.17
	2022-23	292.66	2432691	7.42	12.73
Sindh Nooriabad-II	2018-19	394.69	3137925	5.25	6.04
	2019-20	367.83	2978275	7.22	8.16
	2020-21	380.22	3105772	6.68	7.64
	2021-22	345.81	2872374	6.61	11.12
	2022-23	287.03	2397322	7.37	12.65

[1] Based on Units Sent Out.

[2] Increase in cost per unit sentout mainly due to significant increase in fuel prices and non-provision of indigenous gas.

[3] Due to non-provision of indigenous gas, KE was forced to utilize HSD to ensure continuity of power supply.

[4] BQPS-III was commissioned in FY 2022-23 (Unit-1 commissioned on May 10, 2023 and Unit-2 commissioned on March 9, 2023)

Source: KE/IPPs

TABLE 27

Auxiliary Consumption and all Factors of K-Electric and their IPPs

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%) [3]	Capacity Factor (%) [4]	Utilization Factor (%) [5]	Availability Factor (%) [6]
		(GWh)	(%)					
Bin Qasim TPS-I	2018-19	429.17	9.24	1,015	52.47	65.11	80.56	76.92
	2019-20	370.34	8.83	1,060	50.03	54.09	84.13	86.62
	2020-21	400.00	7.80	1,025	58.40	77.72	97.62	90.45
	2021-22	301.57	8.40	849	53.80	55.10	80.86	86.80
	2022-23	181.67	8.93	730	52.02	35.85	86.90	89.02
Bin Qasim TPS-II	2018-19	249.75	6.14	555	85.31	95.27	96.91	92.18
	2019-20	247.46	5.78	570	88.58	97.13	99.53	95.30
	2020-21	247.00	5.92	571	85.40	95.26	99.71	95.09
	2021-22	233.03	6.10	555	81.13	86.34	96.86	96.04
	2022-23	172.47	6.14	550	72.86	67.27	96.04	91.79
Bin Qasim TPS-III [1]	2021-22	12.60	4.92	-	-	-	-	-
	2022-23	73.00	2.81	U1-455 U2-463	U1-95.8 U2-90.7	U1-94.5 U2-86.3	U1-96.6 U2-98.3	U1-99.8 U2-86.0
Korangi Town GTPS-II [2]	2018-19	14.71	3.77	97	58.67	47.27	90.47	90.97
	2019-20	13.27	4.24	97	60.08	41.90	90.28	88.69
	2020-21	15.77	4.14	96	55.75	53.60	89.86	83.52
	2021-22	7.49	6.14	96	39.29	14.97	89.85	96.56
	2022-23	2.13	17.30	90	38.38	1.49	84.31	98.40
Site GTPS-II [2]	2018-19	12.78	3.47	97	72.61	72.96	90.47	57.53
	2019-20	16.77	4.05	97	67.11	50.05	90.28	98.11
	2020-21	11.33	4.99	97	39.34	27.72	90.28	97.09
	2021-22	7.56	6.85	97	41.17	13.29	90.28	98.56
	2022-23	2.88	10.55	90	43.22	3.29	84.15	98.46
Korangi CCPP [2]	2018-19	92.34	7.35	234	70.79	74.24	94.41	83.21
	2019-20	81.26	7.02	233	70.10	60.59	94.13	96.07
	2020-21	78.30	7.62	229	57.42	56.72	92.51	91.38
	2021-22	43.69	7.33	225	54.81	34.15	90.73	87.86
	2022-23	9.00	15.32	212	38.22	3.02	85.66	97.90
Gul Ahmed Energy	2018-19	23.63	3.37	128	95.40	60.62	88.32	n.p.
	2019-20	17.45	3.41	128	96.38	50.60	52.23	n.p.
	2020-21	19.48	2.81	128	97.11	60.13	61.92	93.22
	2021-22	18.35	2.53	128	97.39	62.83	64.51	95.06
	2022-23	12.79	2.45	128	96.30	45.27	47.01	88.36
Tapal Energy	2018-19	11.13	1.70	124	60.65	59.62	57.74	95.60
	2019-20	9.94	1.56	124	58.69	57.78	56.41	96.90
	2020-21	11.23	1.50	124	69.14	68.10	66.89	96.30
	2021-22	11.11	1.53	124	67.20	66.17	62.57	92.02
	2022-23	8.89	1.69	124	48.74	47.92	43.88	92.77
Sindh Nooriabad-I	2018-19	7.18	1.75	51	91.06	91.24	100.00	89.05
	2019-20	6.78	1.82	51	93.34	84.01	98.40	88.49
	2020-21	7.51	1.85	51	87.93	89.09	96.51	88.21
	2021-22	7.13	1.96	51	98.91	79.49	83.27	80.37
	2022-23	7.64	2.61	51	96.30	65.31	71.40	67.82
Sindh Nooriabad-II	2018-19	6.21	1.55	51	89.17	89.34	100.00	88.56
	2019-20	6.31	1.72	51	90.17	83.10	99.10	87.76
	2020-21	5.90	1.54	51	84.77	85.90	93.00	84.62
	2021-22	5.87	1.70	52	97.25	76.61	83.45	78.78
	2022-23	6.95	2.42	52	96.56	63.59	70.15	65.85

[1] BQPS-III was commissioned in FY 2022-23 (Unit-1 commissioned on May 10, 2023 and Unit-2 commissioned on March 9, 2023). Capacity Factor, Utilization Factor, Load Factor & Availability Factor are based on post COD numbers.

[2] Low Load and Capacity Factor due to gas pressure and volume constraints (Load Factor of SGTPS in FY 2022-23 increased because of low maximum capacity and Operating hours on achieved generation in the year).

[3] Load Factor = Gross Generation / (Maximum Load x Operating Hours)

[4] Capacity Factor = Gross Generation / (Available Capacity x Period Hours)

[5] Utilization Factor = Maximum Gross Load / (Installed Gross Capacity)

[6] Availability Factor =(Period hours - Planned Outage hours - Forced Outage Hours) / Period Hours

Source: KE/IPPs

TABLE 28

Heat Rate and Plant Efficiency Data of K-Electric and their IPPs

Power Station	Year	Heat Rate (Btu/kWh) - LHV [1]		Plant Efficiency (%)	
		On Gross Basis	On Net Basis	On Gross Basis	On Net Basis
Bin Qasim TPS-I	2018-19	9,905.00	10,913.00	34.45	31.27
	2019-20	9,776.89	10,724.09	34.90	31.82
	2020-21	9,469.00	10,272.00	36.03	33.22
	2021-22	9,496.00	10,366.68	35.93	32.91
	2022-23	9,586.93	10,527.49	35.59	32.41
Bin Qasim TPS-II	2018-19	7,149.00	7,617.00	47.73	44.80
	2019-20	7,076.68	7,511.18	48.22	45.43
	2020-21	7,082.25	7,469.32	48.55	45.68
	2021-22	7,020.73	7,476.76	48.60	45.64
	2022-23	7,144.15	7,611.86	47.76	44.83
Bin Qasim TPS-III [2]	2021-22	-	-	-	-
	2022-23	5,753.15	5,891.31	59.31	57.92
Korangi Town GTPS-II [3]	2018-19	8,246.00	8,569.00	41.38	39.82
	2019-20	7,987.81	8,341.41	42.72	40.91
	2020-21	7,955.00	8,304.27	42.89	41.09
	2021-22	8,238.77	8,777.44	41.42	38.87
	2022-23	8,257.92	9,983.51	41.32	34.18
Site GTPS-II [3]	2018-19	7,961.00	8,248.00	42.86	41.37
	2019-20	7,832.50	8,162.82	43.56	41.80
	2020-21	8,205.00	8,677.00	41.36	39.32
	2021-22	8,255.46	8,861.89	41.33	38.50
	2022-23	8,238.25	9,209.88	41.42	37.05
Korangi CCPP [3]	2018-19	7,246.00	7,821.00	47.09	43.63
	2019-20	6,931.99	7,455.34	49.22	45.77
	2020-21	7,010.00	7,588.00	48.68	44.97
	2021-22	7,201.87	7,771.53	47.38	43.91
	2022-23	8,295.86	9,797.15	41.13	34.83
Gul Ahmed Energy	2018-19	8,966.59	9,280.32	38.05	36.76
	2019-20	8,490.07	8,789.46	40.19	38.82
	2020-21	8,535.26	8,782.17	39.97	38.85
	2021-22	8,163.78	8,376.09	41.79	40.74
	2022-23	8,154.73	8,359.80	41.84	40.81
Tapal Energy	2018-19	8,796.88	8,948.64	38.79	38.13
	2019-20	8,613.24	8,749.90	39.62	39.00
	2020-21	8,604.72	8,735.85	39.66	39.06
	2021-22	8,253.28	8,381.33	41.34	40.71
	2022-23	8,391.19	8,535.13	40.66	39.98
Sindh Nooriabad-I	2018-19	7,980.73	8,122.74	42.75	42.01
	2019-20	7,923.36	8,067.49	43.06	42.29
	2020-21	7,966.91	8,197.08	42.83	41.62
	2021-22	7,975.55	8,132.12	42.78	42.12
	2022-23	8,100.90	8,312.28	41.96	41.05
Sindh Nooriabad-II	2018-19	7,827.01	7,950.09	43.59	42.92
	2019-20	7,960.82	8,097.06	42.86	42.14
	2020-21	8,125.23	8,168.42	41.99	41.77
	2021-22	8,167.70	8,306.24	41.77	41.08
	2022-23	8,154.62	8,352.03	41.84	40.85

[1] Since most of the IPPs report heat rates on LHV basis, hence KE is also reporting on LHV using HHV-LHV factors for like to like comparison.

[2] BQPS-III was commissioned in FY 2022-23 (Unit-1 commissioned on May 10, 2023 and Unit-2 commissioned on March 9, 2023). FY 2022-23 Numbers are post COD.

[3] Reduced net efficiency in FY 2022-23 is mainly due to fuel constraints including gas pressure issues, resulting in part load and open cycle operations.

Source: KE/IPPs

TABLE 29

K-Electric (Source-wise Own Generation and Fuel Cost Adjustments) (2022-23)

Description	July	August	September	October	November	December	January	February	March	April	May	June
Fuel Cost - Gas (Rs./MMBTU)	857.00	857.00	857.00	857.00	857.00	857.00	857.00	1,050.00	1,050.00	1,050.00	1,050.00	1,050.00
Fuel Cost - FO (Rs./M.ton)	168,366.15	165,997.33	164,285.05	153,603.52	139,876.49	139,876.49	139,876.49	125,919.98	125,982.15	125,892.29	129,598.34	133,636.79
Fuel Cost - FO (Rs./MMBTU)	4,172.54	4,113.83	4,071.40	3,806.68	3,466.49	3,466.49	3,466.49	3,120.62	3,122.16	3,119.93	3,211.78	3,311.86
Fuel Cost - RLNG (Rs./MMBTU)	3,908.09	3,880.81	4,032.81	3,370.64	3,301.11	3,344.97	3,392.32	3,733.75	3,806.50	3,843.72	3,908.47	3,717.46
Bin Qasim Thermal Power Station - I												
Units Sent Out (GWh)	263.16	384.79	364.97	312.70	136.77	2.05	3.27	43.08	138.23	10.61	114.32	99.46
Fuel Cost (Rs./kWh)	42.01	43.71	43.58	40.68	36.79	33.17	36.41	37.92	33.35	33.34	34.40	35.61
Fuel Cost (Mln Rs.)	11,056.62	16,820.97	15,905.52	12,721.75	5,031.80	68.02	118.97	1,633.44	4,610.25	353.63	3,932.93	3,541.99
Bin Qasim Thermal Power Station - II												
Units Sent Out (GWh)	317.65	268.58	283.21	333.03	327.77	252.53	88.47	5.97	131.82	241.09	157.98	246.38
Fuel Cost (Rs./kWh)	29.31	28.74	30.14	25.56	23.34	22.38	22.02	28.17	27.27	26.02	28.42	30.41
Fuel Cost (Mln Rs.)	9,310.80	7,718.21	8,534.96	8,513.39	7,650.40	5,651.72	1,948.25	168.21	3,594.13	6,272.75	4,489.85	7,493.13
Bin Qasim Thermal Power Station - III												
Units Sent Out (GWh)	179.82	0.00	0.75	1.71	12.03	76.57	156.09	244.20	249.84	414.49	609.92	597.29
Fuel Cost (Rs./kWh)	34.23	0.00	22.30	20.32	18.78	18.57	19.71	21.81	22.19	21.03	21.20	20.82
Fuel Cost (Mln Rs.)	6,155.17	0.00	16.83	34.65	226.04	1,422.26	3,076.45	5,326.46	5,543.23	8,715.25	12,931.79	12,433.67
Korangi Town Gas Turbine Power Station - II												
Units Sent Out (GWh)	7.39	2.80	0.71	0.92	0.16	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Fuel Cost (Rs./kWh)	27.84	29.18	32.75	26.50	24.20	22.92	0.00	0.00	0.00	27.38	0.00	0.00
Fuel Cost (Mln Rs.)	205.72	81.82	23.37	24.41	3.92	0.02	0.00	0.12	0.00	0.23	0.00	0.00
Site Gas Turbine Power Station - II												
Units Sent Out (GWh)	9.65	3.28	3.93	6.22	3.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Cost (Rs./kWh)	28.93	30.31	32.94	27.15	24.66	23.90	11.32	0.00	0.00	0.00	0.00	0.00
Fuel Cost (Mln Rs.)	279.12	99.42	129.38	168.92	86.92	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Korangi Combined Cycle Power Plant												
Units Sent Out (GWh)	14.75	10.24	10.65	8.87	2.20	0.00	4.92	1.74	0.00	0.10	0.59	0.63
Fuel Cost (Rs./kWh)	30.83	49.93	42.67	45.43	41.25	0.00	0.00	47.78	0.00	25.53	33.08	50.06
Fuel Cost (Mln Rs.)	454.82	511.22	454.43	402.84	90.62	0.00	178.28	83.05	0.00	2.45	19.46	31.78
Total												
Units Sent Out (GWh)	**792.42**	**669.70**	**664.22**	**663.45**	**482.46**	**331.15**	**252.74**	**294.99**	**519.88**	**666.29**	**882.82**	**943.76**
Fuel Cost (Rs./kWh)	**34.66**	**37.68**	**37.74**	**32.96**	**27.13**	**21.57**	**21.06**	**24.45**	**26.44**	**23.03**	**24.21**	**24.90**
Fuel Cost (Mln Rs.)	**27,462.24**	**25,231.64**	**25,064.49**	**21,865.98**	**13,089.70**	**7,142.07**	**5,321.94**	**7,211.27**	**13,747.60**	**15,344.30**	**21,374.03**	**23,500.56**

Source: KE

TABLE 30

K-Electric (Source-wise Power Purchase and Fuel Costs) (2022-23)

		July	August	September	October	November	December	January	February	March	April	May	June
CPPA-G													
Generation	GWh	773.25	794.94	776.69	772.46	738.70	722.64	673.56	677.72	767.02	726.99	790.54	746.30
	%	76.90%	76.12%	76.86%	76.24%	78.06%	85.40%	86.95%	82.47%	80.07%	84.35%	80.87%	79.83%
Fuel Cost	Mil Rs.	8,220.76	8,017.08	7,761.71	6,835.66	4,628.25	5,060.40	7,430.75	4,887.38	7,289.68	7,266.25	7,725.42	6,970.06
	Rs./kWh	10.63	10.09	9.99	8.85	6.27	7.00	11.03	7.21	9.50	10.00	9.77	9.34
Gul Ahmed Energy Limited													
Generation	GWh	54.95	69.31	66.01	66.13	56.62	14.91	13.57	22.06	33.81	9.46	47.27	54.60
	%	5.46%	6.64%	6.53%	6.53%	5.98%	1.76%	1.75%	2.68%	3.53%	1.10%	4.84%	5.84%
Fuel Cost	Mil Rs.	2,011.34	2,405.86	2,272.34	2,150.22	1,581.32	385.08	346.71	495.51	724.29	221.80	1,247.91	1,589.43
	Rs./kWh	36.60	34.71	34.43	32.52	27.93	25.83	25.56	22.47	21.42	23.45	26.40	29.11
Tapal Energy (Pvt.) Limited													
Generation	GWh	58.50	65.58	54.75	53.58	48.81	24.43	17.99	34.07	39.88	16.82	50.10	53.94
	%	5.82%	6.28%	5.42%	5.29%	5.16%	2.89%	2.32%	4.15%	4.16%	1.95%	5.13%	5.77%
Fuel Cost	Mil Rs.	2,097.59	2,257.41	1,818.04	1,686.43	1,376.47	632.69	421.84	724.31	900.76	419.56	1,387.23	1,545.14
	Rs./kWh	35.86	34.42	33.21	31.47	28.20	25.90	23.45	21.26	22.59	24.95	27.69	28.65
International Industries Limited & International Steel Limited													
Generation	GWh	4.94	5.79	5.58	4.63	4.06	0.22	0.11	0.82	6.97	1.00	1.86	1.32
	%	0.49%	0.55%	0.55%	0.46%	0.43%	0.03%	0.01%	0.10%	0.73%	0.12%	0.19%	0.14%
Fuel Cost	Mil Rs.	52.70	61.73	59.49	49.40	43.32	2.32	1.17	9.69	82.10	10.87	19.26	14.35
	Rs./kWh	10.66	10.67	10.67	10.66	10.66	10.70	10.70	11.77	11.77	10.86	10.38	10.86
Sindh Nooriabad Power Company Limited (I & II) Including Impact of STDC Losses Cost													
Generation	GWh	62.61	53.19	54.57	55.02	41.68	41.41	35.20	43.98	49.10	44.79	48.40	40.50
	%	6.23%	5.09%	5.40%	5.43%	4.40%	4.89%	4.54%	5.35%	5.12%	5.20%	4.95%	4.33%
Fuel Cost	Mil Rs.	446.61	378.88	389.52	392.49	295.80	293.28	248.92	313.11	427.09	389.81	422.14	353.58
	Rs./kWh	7.13	7.12	7.14	7.13	7.10	7.08	7.07	7.12	8.70	8.70	8.72	8.73
FFBL Power Company Limited													
Generation	GWh	35.27	40.27	29.59	38.83	38.04	24.50	14.22	19.97	35.96	36.75	13.67	19.11
	%	3.51%	3.86%	2.93%	3.83%	4.02%	2.90%	1.84%	2.43%	3.75%	4.26%	1.40%	2.04%
Fuel Cost	Mil Rs.	607.65	937.47	688.99	904.06	935.53	602.58	349.68	388.94	700.28	715.69	266.15	399.07
	Rs./kWh	17.23	23.28	23.28	23.28	24.59	24.59	24.59	19.48	19.48	19.48	19.48	20.89
Oursun Pakistan Limited													
Generation	GWh	5.76	5.19	7.48	8.17	7.21	7.20	7.51	7.86	8.59	8.48	8.64	7.23
	%	0.57%	0.50%	0.74%	0.81%	0.76%	0.85%	0.97%	0.96%	0.90%	0.98%	0.88%	0.01
Fuel Cost	Mil Rs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Rs./kWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gharo Solar													
Generation	GWh	6.65	6.06	8.59	9.21	7.56	7.26	7.70	8.57	9.96	10.50	10.89	8.75
	%	0.66%	0.58%	0.85%	0.91%	0.80%	0.86%	0.99%	1.04%	1.04%	1.22%	1.11%	0.01
Fuel Cost	Mil Rs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Rs./kWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lotte Chemicals													
Generation	GWh	2.64	3.24	5.90	3.29	1.79	1.22	0.83	1.03	0.57	0.01	0.16	0.40
	%	0.26%	0.31%	0.58%	0.32%	0.19%	0.14%	0.11%	0.13%	0.06%	0.00%	0.02%	0.04%

		July	August	September	October	November	December	January	February	March	April	May	June
Fuel Cost	Mil Rs.	102.77	124.94	236.72	110.26	58.80	34.22	27.83	38.40	9.00	0.00	1.80	14.28
	Rs./kWh	38.87	38.60	40.11	33.52	32.83	28.16	33.74	37.13	15.82	0.00	11.44	35.80
Lucky Cement													
Generation	GWh	0.31	0.30	0.33	0.30	0.13	0.00	0.00	0.00	0.13	0.17	0.26	0.35
	%	0.03%	0.03%	0.03%	0.03%	0.01%	0.00%	0.00%	0.00%	0.01%	0.02%	0.03%	0.04%
Fuel Cost	Mil Rs.	2.94	2.82	3.12	2.90	1.24	0.00	0.00	0.00	1.33	1.84	2.70	3.64
	Rs./kWh	9.56	9.56	9.56	9.56	9.56	0.00	0.00	0.00	10.55	10.55	10.55	10.55
Net Metering													
Generation	GWh	0.64	0.51	1.00	1.63	1.71	2.41	3.95	5.72	6.02	6.88	5.75	2.38
	%	0.06%	0.05%	0.10%	0.16%	0.18%	0.28%	0.51%	0.70%	0.63%	0.80%	0.59%	0.25%
Cost	Mil Rs.	8.35	9.82	19.32	31.44	32.98	46.56	0.00	0.00	0.00	0.00	0.00	0.00
	Rs./kWh	13.05	19.32	19.32	19.32	19.32	19.32	0.00	0.00	0.00	0.00	0.00	0.00
Total Generation													
Generation	**GWh**	**1005.52**	**1044.35**	**1010.48**	**1013.24**	**946.31**	**846.18**	**774.63**	**821.80**	**958.00**	**861.86**	**977.52**	**934.87**
	%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Fuel Cost	**Mil Rs.**	**13,550.71**	**14,196.02**	**13,249.24**	**12,162.87**	**8,953.71**	**7,057.13**	**8,826.90**	**6,857.34**	**10,134.53**	**9,025.82**	**11,072.60**	**10,889.55**
	Rs./kWh	**13.48**	**13.59**	**13.11**	**12.00**	**9.46**	**8.34**	**11.39**	**8.34**	**10.58**	**10.47**	**11.33**	**11.65**

Source: KE

TABLE 31

K-Electric (Fuel-wise Own Generation and Fuel Costs) (2022-23)

		July	August	September	October	November	December	January	February	March	April	May	June
Gas													
Generation	GWh	70.17	45.70	35.68	36.53	35.52	38.82	16.33	0.00	22.60	34.93	11.68	0.00
	%	8.86%	6.82%	5.37%	5.51%	7.36%	11.72%	6.46%	0.00%	4.35%	5.24%	1.32%	0.00%
Fuel Cost	Mil Rs.	558.94	339.47	258.46	265.35	256.46	274.85	115.63	0.00	213.34	304.38	103.14	0.00
	Rs./kWh	7.97	7.43	7.24	7.26	7.22	7.08	7.08	0.00	9.44	8.71	8.83	0.00
RFO													
Generation	GWh	240.85	367.37	359.72	306.05	128.72	1.35	2.33	20.14	121.46	8.34	111.95	95.96
	%	30.39%	54.86%	54.16%	46.13%	26.68%	0.41%	0.92%	6.83%	23.36%	1.25%	12.68%	10.17%
Fuel Cost	Mil Rs.	10,755.94	16,198.24	15,691.74	12,496.05	4,771.02	49.69	86.36	667.81	4,048.29	276.21	3,835.71	3,392.30
	Rs./kWh	44.66	44.09	43.62	40.83	37.06	36.79	37.04	33.15	33.33	33.14	34.26	35.35
RLNG													
Generation	GWh	478.91	247.53	263.12	312.84	316.63	290.98	232.16	273.18	375.82	623.03	759.19	847.18
	%	60.44%	36.96%	39.61%	47.15%	65.63%	87.87%	91.86%	92.61%	72.29%	93.51%	86.00%	89.77%
Fuel Cost	Mil Rs.	16,019.41	8,215.89	8,811.48	8,723.02	7,986.00	6,817.53	5,027.63	6,462.90	9,485.98	14,763.71	17,435.17	20,076.75
	Rs./kWh	33.45	33.19	33.49	27.88	25.22	23.43	21.66	23.66	25.24	23.70	22.97	23.70
HSD													
Generation	GWh	2.48	9.09	5.70	8.03	1.59	0.00	1.92	1.66	0.00	0.00	0.00	0.63
	%	0.31%	1.36%	0.86%	1.21%	0.33%	0.00%	0.76%	0.56%	0.00%	0.00%	0.00%	0.07%
Fuel Cost	Mil Rs.	127.95	478.04	302.80	381.55	76.22	0.00	92.33	80.56	0.00	0.00	0.00	31.51
	Rs./kWh	51.55	52.57	53.08	47.53	48.02	0.00	48.02	48.55	0.00	0.00	0.00	50.31
Total Generation													
Generation	**GWh**	**792.42**	**669.70**	**664.22**	**663.45**	**482.46**	**331.15**	**252.74**	**294.99**	**519.88**	**666.29**	**882.82**	**943.76**
	%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Fuel Cost	**Mil Rs.**	**27,462.24**	**25,231.64**	**25,064.49**	**21,865.98**	**13,089.70**	**7,142.07**	**5,321.94**	**7,211.27**	**13,747.60**	**15,344.30**	**21,374.03**	**23,500.56**
	Rs./kWh	**34.66**	**37.68**	**37.74**	**32.96**	**27.13**	**21.57**	**21.06**	**24.45**	**26.44**	**23.03**	**24.21**	**24.90**

Source: KE

TABLE 32

K-Electric (Fuel-wise Power Purchase and Fuel Costs) (2022-23)

		July	August	September	October	November	December	January	February	March	April	May	June
CPPA-G													
Generation	GWh	773.25	794.94	776.69	772.46	738.70	722.64	673.56	677.72	767.02	726.99	790.54	746.30
	%	76.90%	76.12%	76.86%	76.24%	78.06%	85.40%	86.95%	82.47%	80.07%	84.35%	80.87%	79.83%
Fuel Cost	Mil Rs.	8,220.76	8,017.08	7,761.71	6,835.66	4,628.25	5,060.40	7,430.75	4,887.38	7,289.68	7,266.25	7,725.42	6,970.06
	Rs./kWh	10.63	10.09	9.99	8.85	6.27	7.00	11.03	7.21	9.50	10.00	9.77	9.34
Gas/RLNG													
Generation	GWh	70.50	62.51	66.37	63.24	47.67	42.84	36.13	45.83	56.77	45.98	50.66	42.56
	%	7.01%	5.99%	6.57%	6.24%	5.04%	5.06%	4.66%	5.58%	5.93%	5.34%	5.18%	4.55%
Fuel Cost	Mil Rs.	605.01	568.37	688.84	555.05	399.16	329.82	277.92	361.20	519.52	402.52	445.90	385.85
	Rs./kWh	8.58	9.09	10.38	8.78	8.37	7.70	7.69	7.88	9.15	8.75	8.80	9.07
RFO													
Generation	GWh	113.45	134.89	120.76	119.71	105.43	39.34	31.56	56.12	73.69	26.28	97.37	108.54
	%	11.28%	12.92%	11.95%	11.81%	11.14%	4.65%	4.07%	6.83%	7.69%	3.05%	9.96%	11.61%
Fuel Cost	Mil Rs.	4,108.93	4,663.28	4,090.38	3,836.66	2,957.80	1,017.77	768.55	1,219.82	1,625.05	641.37	2,635.14	3,134.56
	Rs./kWh	36.22	34.57	33.87	32.05	28.05	25.87	24.35	21.74	22.05	24.41	27.06	28.88
Coal													
Generation	GWh	35.27	40.27	29.59	38.83	38.04	24.50	14.22	19.97	35.96	36.75	13.67	19.11
	%	3.51%	3.86%	2.93%	3.83%	4.02%	2.90%	1.84%	2.43%	3.75%	4.26%	1.40%	2.04%
Fuel Cost	Mil Rs.	607.65	937.47	688.99	904.06	935.53	602.58	349.68	388.94	700.28	715.69	266.15	399.07
	Rs./kWh	17.23	23.28	23.28	23.28	24.59	24.59	24.59	19.48	19.48	19.48	19.48	20.89
Solar													
Generation	GWh	13.05	11.76	17.07	19.00	16.47	16.86	19.16	22.15	24.57	25.86	25.28	18.36
	%	1.30%	1.13%	1.69%	1.88%	1.74%	1.99%	2.47%	2.69%	2.56%	3.00%	2.59%	1.96%
Cost	Mil Rs.	8.35	9.82	19.32	31.44	32.98	46.56	0.00	0.00	0.00	0.00	0.00	0.00
	Rs./kWh	0.64	0.83	1.13	1.65	2.00	2.76	0.00	0.00	0.00	0.00	0.00	0.00
Total Generation													
Generation	**GWh**	**1005.52**	**1044.35**	**1010.48**	**1013.24**	**946.31**	**846.18**	**774.63**	**821.80**	**958.00**	**861.86**	**977.52**	**934.87**
	%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Fuel Cost	**Mil Rs.**	**13,550.71**	**14,196.02**	**13,249.24**	**12,162.87**	**8,953.71**	**7,057.13**	**8,826.90**	**6,857.34**	**10,134.53**	**9,025.82**	**11,072.60**	**10,889.55**
	Rs./kWh	**13.48**	**13.59**	**13.11**	**12.00**	**9.46**	**8.34**	**11.39**	**8.34**	**10.58**	**10.47**	**11.33**	**11.65**

Source: KE

TABLE 33

Capacity and Energy Invoiced by Generators (Rs. in Million)

Fuel Type	FY 2018-19		FY 2019-20		FY 2020-21		FY 2021-22		FY 2022-23	
	Capacity Charges	Energy Charges	Capacity Charges	Energy Charges	Capacity Charges	Energy Charges	Capacity Charges	Energy Charges	Capacity Charges	Energy Charges
WAPDA Hydel	160,710.00	2,282.00	107,546.00	2,858.00	95,826.00	2,650.00	121,186.97	2,446.74	100,219.33	2,650.14
Thermal	60,470.00	165,001.00	40,113.00	77,841.00	31,661.00	58,582.00	33,453.40	83,125.59	24,932.27	86,947.23
Coal	81,675.00	112,031.00	199,489.00	180,522.00	205,636.00	201,925.00	224,825.99	360,937.36	431,781.29	337,454.87
Nuclear	70,929.00	9,037.00	94,984.00	9,842.00	91,329.00	11,264.00	202,559.48	19,879.86	273,953.24	26,021.86
IPP Hydel [1]	14,461.00	535.00	89,406.00	1,380.00	47,814.00	721.00	93,473.18	1,513.58	110,872.06	5,162.11
RFO	58,669.00	94,477.00	84,834.00	54,237.00	93,977.00	84,242.00	59,802.36	325,343.79	69,226.40	171,618.00
RLNG/Gas/HSD	109,305.00	297,672.00	132,494.00	302,169.00	126,091.00	304,278.00	114,285.47	607,394.87	152,358.40	630,326.39
Baggasse	1,345.00	5,752.00	2,283.00	3,878.00	5,718.00	4,989.00	4,466.71	5,603.52	5,215.12	5,970.52
Wind	5,012.00	59,046.00	85,815.00	-	75,975.00	-	94,788.33	-	119,529.43	-
Solar	595.00	15,249.00	18,505.00	-	18,150.00	-	19,309.83	-	31,349.63	-
Import	-	-	-	5,507.00	-	4,960.00	925.62	8,139.80	1,400.67	10,363.66
Mixed	5,123.00	5,471.00	625.00	1,142.00	753.00	1,260.00	587.52	686.49	551.42	757.96
Total	**568,294.00**	**766,553.00**	**856,094.00**	**639,376.00**	**792,930.00**	**674,871.00**	**969,664.85**	**1,415,071.59**	**1,321,389.27**	**1,277,272.74**

Note: The amount of EPP of Wind and Solar Power Plants have been included in CPP as per Regulatory requirement. Capacity Charges in respect of Import have been re-stated for the last Financial Year.

[1] IPP Hydel includes Neelum Jhelum, Laraib Energy, Star Hydro, Mira Power, Jagran and Malakand.

Source: CPPA-G

TABLE 34

Energy Purchase Price (EPP) and Capacity Purchase Price (CPP) Data [Amount verified on account of EPP and CPP (Rs. in Million)]

Power Plant	FY 2018-19			FY 2019-20			FY 2020-21			FY 2021-22			FY 2022-23		
	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP
WAPDA	24706.23	2056.37	62445.31	26809.11	2023.70	55169.24	28654.17	2135.57	57421.72	25614.00	2007.68	68702.07	26853.00	1699.01	51752.95
Tarbela 4th Ext.	2489.40	378.39	5513.08	5485.66	833.82	5459.31	3417.40	514.59	7611.05	3276.00	439.00	24848.87	4427.00	663.38	12128.70
Neelum Jhelum	3928.26	--	35819.46	4843.09	44161.25	--	1809.62	16500.87	--	4306.00		66437.01	10.72		982.21
Jagran	31.67	82.03	--	86.25	223.38	--	113.23	293.27	--	121.22	314.03		103.61	235.32	
Pehur	4.80	18.83	--	--	--	--	--	--	--						
Malakand-III	399.25	2689.83	--	408.53	176.77	1577.50	321.57	101.84	1263.47	353.87	112.07	1263.47	267.77	183.97	2904.42
Laraib Energy	354.38	178.03	5409.85	384.43	6247.69	179.10	465.29	6216.27	223.76	412.67	142.56	4135.12	345.00	145.16	6197.74
Marala Hydro	527.45	92.30	7153.05	--	--	--	--	--	--						
Patrind Hydro	--	--	--	566.88	99.09	7760.55	624.45	109.28	5062.31	562.02	109.28	5062.31	548.61	99.21	11051.33
Gulpur Hydropower	--	--	--	183.18	35.56	1898.62	256.89	49.86	8664.38	243.95	47.35	7724.46	304.69	51.32	9166.52
Karot Hydropower													3161.74	1328.70	62965.31
Ranolia Hydropower										17.42	69.93		6.90	27.69	
Daral Khwar Hydropower										130.66	1074.15		127.30	1062.40	
GENCO-I	917.28	13876.28	4241.65	213.05	3944.85	3992.07	199.55	3229.15	3432.44	245.51	7385.84	3381.92	33.60	1084.11	3409.83
GENCO-II	9379.88	50950.76	17123.41	5921.76	45246.00	24321.00	4825.00	34180.00	18836.00	3521.80	30342.98	16645.11	6415.34	41474.93	7942.98
GENCO-III	2714.38	35892.63	13866.42	1776.19	23492.00	14305.00	1777.00	21012.00	10546.00	685.56	45432.17	13511.39	1302.36	39129.21	11770.55
GENCO-IV	--	--	--	--	--	--	--	--	--						
Lalpir Power	613.80	9124.00	4646.44	186.32	2894.08	5820.04	620.78	9079.76	4601.98	1022.67	27300.90	3526.85	397.59	15430.64	6997.12
Pak Gen Power	495.56	7590.60	4678.33	149.76	2358.61	5850.60	445.54	6828.03	5297.96	1304.35	36281.10	4311.02	443.74	16945.19	6988.83
Altern Energy	22.03	358.02	43.84	3.73	70.69	9.60	11.60	164.84	32.87						
Fauji Kabirwala	563.13	7400.89	1185.29	346.32	4411.68	1557.29	389.96	4518.36	1965.48	357.21	8640.11	1365.99	60.88	2140.73	1274.80
Habibullah Coastal	716.48	3718.31	2076.26	108.37	807.74	493.02	--	--	68.84		1124.35	44.67		371.22	
Hub Power	813.26	12682.21	17153.53	33.25	679.73	20973.24	174.51	3587.31	22938.88	1219.71	29875.00	25537.00	200.66	8065.00	29357.00

Power Plant	FY 2018-19			FY 2019-20			FY 2020-21			FY 2021-22			FY 2022-23		
	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP
KAPCO	4955.67	64613.17	24122.59	3476.67	45730.84	27808.83	3562.24	41419.82	34153.64	4979.78	122082.19	1403.98	587.97	17539.07	403.54
Kohinoor Energy	387.44	5592.34	1356.14	363.86	5020.78	1651.45	342.85	4634.70	1752.83	515.81	12731.17	1631.83	329.16	10131.12	1966.43
Rousch Power	1035.85	12693.73	5559.70	209.35	2844.62	6079.49	283.64	3535.18	7876.64	495.90	12439.62	4607.02	178.74	5341.37	5144.62
Saba Power	225.41	3465.50	1829.46	50.83	758.63	2243.95	121.63	1835.42	2353.45	329.67	8790.09	2208.02	148.47	4520.96	2474.30
Liberty Daharki Power	1307.61	15037.86	2313.51	896.74	14133.51	2554.39	985.03	11076.22	2661.82	1054.06	13196.00	2213.00	1001.21	20508.00	2833.00
Uch Power	3895.85	17893.55	9852.13	4087.33	21388.35	7486.68	4090.44	30533.43	6987.60	4300.52	38859.71	6613.33	3850.17	41060.35	8660.96
Attock Gen.	519.02	7263.88	2941.10	314.38	3584.05	1936.41	383.98	4934.20	1929.71	721.82	18569.22	2378.96	483.59	14445.00	2313.92
Atlas Power	668.01	9379.30	5396.42	259.57	3803.49	4405.91	418.57	5768.60	3033.20	1007.74	20722.56	3543.77	521.94	12155.49	3590.74
Engro Powergen. Qadirpur	1384.11	8601.26	4448.13	821.94	7163.08	4148.62	680.06	5904.60	2504.34	788.64	6959.71	2161.21	933.13	9053.62	2744.39
Saif Power	828.20	9678.59	4871.37	476.28	5483.57	4883.63	624.32	6796.30	3103.27	734.99	17436.07	2613.39	538.15	15271.30	8429.04
Orient Power	877.58	10073.47	4257.93	461.83	4420.97	4667.79	595.44	6824.99	3638.06	836.33	18907.47	3686.67	604.77	16997.51	28497.25
Nishat Power	775.99	9670.45	4965.24	276.42	4388.06	5224.05	523.36	7315.01	2736.17	794.25	16385.73	2904.35	537.90	13650.42	3114.75
Nishat Chunian	599.74	8869.10	5229.58	351.23	5494.46	5465.65	537.46	7318.53	2640.65	882.45	18071.26	2639.02	386.13	10504.12	3345.47
Sapphire Electric	808.51	9347.40	5043.12	289.59	3759.40	5244.52	550.54	7234.66	3454.73	780.51	17866.76	1746.06	452.52	13065.85	3037.61
Halmore Power	612.91	7116.98	4833.91	347.69	4251.08	6179.73	5615.56	6780.17	6036.18	675.91	16214.39	4612.32	287.04	81884.99	34193.11
Narowal Energy	636.13	9091.54	5823.43	338.02	5118.57	6819.13	442.09	6214.87	6641.96	867.50	18186.68	3935.30	459.87	12535.93	5379.49
Liberty Power Tech.	676.18	9529.90	4831.53	458.52	6604.90	6060.39	606.59	8563.92	4529.22	925.43	23032.97	3674.65	544.54	13873.09	3246.92
Foundation Power	1328.95	7907.81	4210.22	769.63	6716.78	4566.34	997.11	7912.48	4810.39	1269.59	9727.85	2433.20	1183.52	10387.98	3380.98
Uch-II Power	3016.91	18629.75	10296.42	2146.98	16512.87	11649.43	2339.30	17905.61	11640.03	2827.98	22281.07	12722.15	2775.37	29661.07	18077.84
Sahiwal Imported Coal	8210.76	63218.34	48253.68	6156.54	55091.58	57721.81	7341.83	72193.83	51641.54	6882.11	116730.00	54909.00	2876.85	69021.00	66661.00
Quaid-e-Azam Thermal	6149.75	57579.63	15896.34	5192.50	50670.29	25996.48	7118.80	62720.36	19160.78	6090.89	110729.86	21383.22	4538.54	111405.95	32003.80
NPPMCL – HBS	7127.24	68069.83	13200.39	7050.30	65400.36	20974.53	7682.35	64123.73	16545.69	7488.56	127962.96	18489.23	6520.55	145755.44	23511.69
NPPMCL – Balloki	4914.95	46992.17	9224.68	5911.84	55888.67	21062.20	6032.81	49527.77	13627.66	7186.75	126556.08	17746.73	6863.65	159351.35	26002.64
Port Qasim Electric	7551.36	44511.22	47488.63	8967.35	60327.41	57843.23	8371.36	55318.43	54352.58	7478.63	99892.00	58279.00	3203.00	43969.00	34633.00
China Power Hub	--	--	--	5641.50	39814.01	38028.36	7923.40	55406.50	62849.94	6764.90	85199.00	58011.00	1546.92	36007.00	77395.00
Engro Powergen. Thar	--	--	--	4170.15	51853.17	28814.68	3902.65	53533.38	31073.58	3676.97	46979.00	33770.00	3646.06	36287.00	34833.00
Reshma Powergen	15.11	265.96	19.18	2.07	44.42	2.81	--	--	--						
Lucky Electric Power										1774.10	14826.00	7415.00	3323.87	38720.00	29427.00
Punjab Thermal Power										78.42			885.23	16876.41	230.47
Thar Energy Limited													1238.50	12231.00	7445.00
ThalNova													667.25	4602.00	3419.00
Thar Coal Block-I Power													3991.44	13045.00	14654.00
CHASNUPP-I	2141.02	2020.62	10196.25	2044.64	1912.55	10939.25	2244.33	2182.16	11612.27	2512.57	3062.07	11709.75	2298.98	2801.75	11324.08
CHASNUPP-II	2262.73	1563.17	16661.51	2636.12	2559.68	19050.07	2067.98	2263.23	18146.56	2437.85	2752.33	19710.79	2437.89	3342.10	22107.61
CHASNUPP-III	2484.34	3443.79	24914.93	2322.85	2300.13	29862.04	2404.32	2281.76	30692.06	2320.37	3271.41	30425.67	2500.37	3520.51	36174.19
CHASNUPP-IV	2117.59	2189.02	24676.71	2701.28	3053.53	29461.62	2456.15	2926.54	30338.34	2179.48	2802.66	30438.59	2471.98	3244.97	36151.45
KANUPP	--	--	--	--	--	--	1698.92	1573.88	9822.17						
KANUPP-II										6043.60	6157.10	79357.21	7562.72	6745.81	91723.79
KANUPP-III										1967.06	1782.94	15026.71	6783.07	5983.23	83086.29
Tavanir-Iran (Import)	486.81	31.13	--	513.74	30.54	--	498.37	27.29	--	429.04	8061.00		478.54	7508.00	
Zorlu Enerji Pakistan	158.98	3124.00	--	145.33	3421.91	--	109.20	2293.30	--	128.64	2948.82		95.69	3270.47	
FFC Energy	115.75	2702.80	55.25	141.23	3054.14	--	123.77	2503.28	--	114.54	2766.53		64.20	3164.57	
Three Gorges First	129.21	2654.73	--	138.69	3689.87	--	138.69	3607.42	--	123.78	3756.12		215.15	5668.22	
Foundation Wind-I	145.00	3138.00	--	144.60	3651.65	--	144.60	3494.83	--	127.16	3699.71		88.92	5005.00	
Foundation Wind-II	143.41	2758.29	--	143.60	3618.98	--	143.59	3481.41	--	141.83	3684.47		97.68	4965.99	
Sapphire Wind	138.62	3085.83	--	132.11	3449.65	--	110.68	2739.76	--	129.95	3534.73		81.42	3881.23	
Yunus Energy	128.69	2863.99	87.25	125.03	3333.32	--	119.00	2862.04	--	135.62	3579.12		89.81	4017.00	
Metro Power	138.46	2654.48	29.52	141.14	3891.81	--	140.32	3380.62	--	147.64	3168.32		106.75	4394.00	
Gul Ahmed Wind	130.66	2938.05	--	128.75	3472.88	--	116.69	2885.80	--	137.86	3720.73		87.18	3981.63	

Power Plant	FY 2018-19			FY 2019-20			FY 2020-21			FY 2021-22			FY 2022-23		
	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP	Energy Delivered (GWh)	EPP	CPP
Master Wind	135.82	2881.43	--	133.90	3614.53	--	118.61	2931.90	--	38.81	3705.88		99.01	4355.29	
Tenaga Generasi	115.67	2610.31	--	126.00	3401.00	--	105.00	2632.00	--	133.08	3675.18		76.23	3878.30	
HydroChina Dawood	119.65	2702.24	--	121.51	3285.35	--	102.26	2611.83	--	132.44	3740.47		71.44	2648.03	
Sachal Energy	136.28	3245.90	--	136.28	3727.29	--	134.62	3404.26	--	130.89	3569.60		95.70	4760.00	
UEP Wind	249.21	5609.65	--	256.95	6951.39	--	215.94	5511.32	--	254.07	7155.52		172.73	8161.22	
Artistic Wind	198.55	3086.96	--	175.03	3040.58	--	172.40	2778.08	--	192.97	2991.93		126.85	2804.20	
Act Wind	91.35	1875.22	--	85.07	2275.96	--	77.97	1865.04	--	88.37	1920.65		53.76	1747.67	
Hawa Energy	170.10	3007.71	--	149.66	3079.26	--	154.77	3005.84	--	169.86	3559.69		117.07	4256.00	
Jhimpir Wind	169.73	3061.77	--	155.72	3186.51	--	157.84	3069.46	--	166.01	3474.47		115.78	4218.00	
Three Gorges Second	137.96	1633.86	--	135.00	2656.00	--	116.00	2290.00	--	138.81	3030.20		93.91	2070.02	
Three Gorges Third	140.99	1669.79	--	138.19	2709.00	--	120.00	2372.00	--	142.75	3113.26		92.94	2160.74	
Tricon Bostan-A	133.95	2467.95	23.81	159.78	2992.92	--	164.63	3191.79	--	181.46	3838.88		105.98	4623.38	
Tricon Bostan-B	106.93	2000.55	24.69	158.93	2969.00	--	151.19	2951.09	--	177.70	3759.73		111.58	4509.16	
Tricon Bostan-C	109.52	2050.28	24.09	152.91	3837.50	--	159.07	3068.26	--	178.69	3779.41		121.42	4507.78	
Zephyr Wind	57.48	722.57	--	179.96	4037.69	--	149.34	2821.61	--	191.70	3876.47		113.08	2571.00	
Lucky Renewables										128.06	967.97		140.29	1090.72	
Master Green Energy										127.51	974.20		130.86	2053.01	
Act 2 Din Wind										81.66	590.36		138.67	1365.38	
Artistic 2 Wind Power										83.20	597.04		132.37	1204.71	
Indus Wind Energy										76.45	574.74		137.66	1581.43	
Lakeside Energy										63.98	472.95		139.46	1058.09	
Liberty Wind Power-I										23.65	466.44		123.89	989.80	
Din Energy										66.82	493.53		131.07	1543.96	
Gul Ahmed Electric										71.45	533.86		143.93	1604.03	
Liberty Wind Power-II										28.99	238.96		121.51	994.01	
NASDA Green Energy										52.31	392.38		134.82	1087.34	
Metro 2 Wind Power										27.20	233.74		195.76	2108.09	
Quaid-e-Azam Solar	164.47	3623.15	--	165.05	4280.54	--	165.74	3691.30	--	164.67	3707.27		160.47	4601.17	
Appolo Solar	166.83	3619.26	--	163.13	4197.30	--	164.91	4141.89	--	168.68	1920.65		165.26	6450.57	
Best Green Energy	165.87	3747.02	--	162.97	4367.55	--	164.45	4228.00	--	167.47	4632.04		166.59	6828.96	
Crest Solar	181.50	4110.32	--	165.41	4463.19	--	167.12	4337.42	--	169.34	4715.61		170.35	6960.56	
AJ Power	18.66	352.62	--	18.12	356.80	--	18.59	350.44	--	18.80	340.91		18.35	448.93	
Harappa Solar	31.75	564.26	--	30.76	620.72	--	28.37	613.24	--	31.38	581.17		31.07	762.94	
Atlas Solar (formerly Zhenfa Pakistan)										56.00	380.63		196.42	1220.19	
Jamal Din Wali-II	187.80	1731.48	--	161.88	1088.29	668.29	177.17	1193.04	588.27	169.47	1141.23	675.77	190.76	1392.66	921.40
Jamal Din Wali-III	181.18	1726.18	--	129.21	869.00	732.35	144.44	972.10	733.19	136.74	922.42	464.42	186.04	1306.79	869.18
RYK Mills	141.31	1148.84	--	73.67	494.84	510.87	73.94	498.14	446.64	97.26	657.23	573.37	100.99	711.00	632.00
Chiniot Power	194.67	1639.33	--	80.45	539.49	566.71	160.56	1081.53	965.99	222.53	1523.86	1481.77	186.81	1529.00	1325.00
Hamza Sugar Mills	--	--	--	45.22	303.71	318.79	39.99	269.68	238.79	61.21	412.62	367.30	53.48	377.82	408.17
The Thal Industries	65.84	795.66	--	36.79	255.36	291.62	46.37	217.82	191.98	73.68	498.17	448.70	61.22	432.00	474.00
Almoiz Industries	48.92	636.45	--	15.10	114.30	147.04	29.83	200.91	176.04	17.39	117.74	107.50	24.87	177.22	206.53
Chanar Energy	8.47	108.16	--	22.34	143.87	126.08	38.26	318.05	268.46	47.92	323.71	288.35	41.03	246.89	309.40
SPPs										172.32	686.00	588.00	55.12	586.00	454.00
Total	121538.21	769779.03	504314.76	121989.09	799274.14	611561.40	132215.96	818975.07	613923.56	139605.52	1495070.75	775892.57	130623.43	1349474.12	1002107.34

Source: CPPA-G

TABLE 35

Merit Order for Power Generation Plants (CPPA-G System)

(Based on the revised fuel prices effective from 16-06-2023)

Order in Merit	Plant Groups	Fuel Type	As on 16th June, 2023		
			Fuel Cost (Rs./kWh)	O&M Cost (Rs./kWh)	Specific Cost (Rs./kWh)
1	Uch (upto 152,375 MWh)	Gas	1.910	0.638	2.547
2	Thar Coal Block-I	Coal	3.351	0.931	4.282
3	Thar Energy	Coal	3.890	0.893	4.783
4	ThalNova	Coal	3.890	0.893	4.783
5	Engro Power Thar	Coal	3.889	1.203	5.092
6	Liberty Power (upto 61,904 MWh)	Gas	4.506	0.787	5.293
7	747 MW Guddu (CCP)	Gas	7.284	1.088	8.372
8	Guddu (CCP) B-I (Unit 11-13)	Gas	8.960	0.069	9.029
9	Foundation Power	Gas	8.464	1.113	9.577
10	Uch (above 152,375 MWh)	Gas	9.111	0.638	9.748
11	Engro PowerGen	Gas	8.859	0.985	9.844
12	Guddu (CCP) B-II (Unit 5-10)	Gas	9.955	0.069	10.024
13	747 MW Guddu (OC)	Gas	10.871	1.088	11.959
14	Uch-II	Gas	11.579	0.645	12.224
15	Guddu (W/o CCP) B-I (Unit 11-13)	Gas	13.439	0.069	13.508
16	Guddu (W/o CCP) B-II (Unit 5-10)	Gas	14.932	0.069	15.001
17	Lucky Electric Power	Coal	16.268	0.573	16.841
18	NPPMC - HBS (CC)	RLNG	21.017	0.389	21.405
19	NPPMC - Baloki (CC)	RLNG	21.182	0.433	21.615
20	QATPL - Bhikki (CC)	RLNG	21.460	0.340	21.800
21	China Power Hub	Coal	22.402	0.642	23.044
22	Port Qasim	Coal	22.987	0.321	23.308
23	Liberty Power (Above 61,904 MWh)	Gas	22.528	0.787	23.316
24	Atlas Power	RFO	21.779	2.662	24.441
25	Nishat Power	RFO	22.944	2.661	25.605
26	Orient Power	RLNG	25.373	0.728	26.101
27	Sapphire Electric	RLNG	25.373	1.225	26.598
28	Saif Power	RLNG	25.375	1.239	26.614
29	Nandipur (CC)	RLNG	26.152	0.744	26.896
30	Halmore Power	RLNG	25.818	1.245	27.062
31	Nishat Chunian Power	RFO	25.032	2.827	27.859
32	Attock Gen	RFO	26.011	2.687	28.698
33	Sahiwal Imported Coal	Coal	28.555	0.316	28.871
34	Narowal Power	RFO	26.842	2.155	28.997
35	Rousch Power	RLNG	28.408	0.671	29.079
36	Saba Power	RFO	29.038	0.411	29.449
37	Liberty Power Tech.	RFO	27.079	2.849	29.928
38	Altern Energy (Ph-II)	RLNG	29.687	1.152	30.839
39	Kohinoor Energy	RFO	29.643	1.433	31.076
40	Fauji Kabirwala Power	RLNG	29.523	1.802	31.324
41	Pakgen Power	RFO	30.938	0.411	31.349
42	GTPS Faisalabad B-IV (Unit 5-9)	RLNG	33.132	0.163	33.294
43	Davis Energen	RLNG	34.296	1.102	35.397
44	Muzaffargarh B-II (Unit 4)	RLNG	37.467	0.163	37.629
45	Muzaffargarh B-I (Unit -3)	RLNG	37.520	0.163	37.682
46	Lalapir Power	RFO	37.958	0.411	38.368
47	Muzaffargarh B-I (Unit -1)	RLNG	38.319	0.163	38.482
48	Muzaffargarh B-I (Unit -2)	RLNG	38.824	0.163	38.987
49	Altern Energy (Ph-I)	RLNG	38.145	1.152	39.297
50	Jamshoro B-I (Unit -1)	RFO	39.675	0.093	39.768
51	Muzaffargarh B-III (Unit -5)	RLNG	39.819	0.163	39.982
52	HUBCO	RFO	40.222	0.342	40.564
53	Muzaffargarh B-III (Unit -6)	RLNG	40.873	0.163	41.035
54	Jamshoro B-II (Unit 4)	RLNG	41.910	0.093	42.002
55	Jamshoro B-II (Unit 4)	RFO	42.443	0.093	42.536
56	Jamshoro B-II (Unit 3)	RLNG	42.799	0.093	42.891
57	Jamshoro B-II (Unit 3)	RFO	43.356	0.093	43.449
58	NPPMC - HBS (CC)	HSD	43.531	0.504	44.035
59	Jamshoro B-II (Unit 2)	RLNG	43.948	0.093	44.040
60	QATPL - Bhikki (CC)	HSD	43.754	0.371	44.125

Order in Merit	Plant Groups	Fuel Type	As on 16th June, 2023		
			Fuel Cost (Rs./kWh)	O&M Cost (Rs./kWh)	Specific Cost (Rs./kWh)
61	Jamshoro B-II (Unit 2)	RFO	44.557	0.093	44.649
62	NPPMC - Baloki (CC)	HSD	44.625	0.550	45.175
63	Muzaffargarh B-II (Unit 4)	RFO	47.767	0.163	47.930
64	Muzaffargarh B-I (Unit 3)	RFO	47.838	0.163	48.001
65	Muzaffargarh B-I (Unit 1)	RFO	48.890	0.163	49.052
66	Muzaffargarh B-I (Unit 2)	RFO	49.552	0.163	49.714
67	Muzaffargarh B-III (Unit 5)	RFO	50.863	0.163	51.025
68	Muzaffargarh B-III (Unit 6)	RFO	52.254	0.163	52.416
69	Engro PowerGen	HSD	53.477	1.005	54.483
70	Orient Power	HSD	53.899	1.194	55.093
71	Sapphire Electric	HSD	53.892	1.768	55.660
72	Saif Power	HSD	53.898	1.788	55.686
73	Halmore Power	HSD	54.831	1.797	56.628

Note:

(1) Fuel Index for HUBCO also includes Heat Rate & Calorific Value on the basis of 100% load. The PLAC payable to HUBCO must be kept in view by NPCC. The bonus payable to IPPs when dispatch exceeds the bonus threshold specified in the PPAs of the respective IPPs must be kept in view.

(2) General Sales Tax is not included in the above calculations.

(3) RFO rates are on per Metric Ton, HSD rates are on per litre, Gas rates are in MMBTU except KAPCO.

(4) Other cost of Uch Power is due to Excise Duty on gas.

(5) RFO Revised Rates are calculated on the basis of weighted average fuel stock as provided by relevant IPP is used for merit order. Where accurate fuel stock position is not available, latest FCC rate is used for merit order.

(6) Latest available RLNG rates as notified by OGRA have been used.

(7) Fixed costs have not been used for merit order compilation pursuant to SDC 14.3.2 of the Grid Code 2005.

(8) Plant availability on any specific fuel must be confirmed before the dispatch is given. Cost of transmission losses on dispatch of plants may be given due consideration.

(9) The FCC rates have been assumed at 100% plant factor i.e. unity Part Load Correction Factor. These rates may vary at different operation/ Despatch level after application of Part Load Correction Factors given in the PPA. Therefore, PLAC be taken into account before issuing despatch instructions.

(10) The dedicated gas projects require minimum despatch of 50% against their availability on gas under respective PPAs, otherwise, shortfall energy have to be paid.

(11) Open Cycle Tariff included in line with NEPRA direction to NPCC to give despatch to Open Cycle vide NPCC letter No. 10677-82 dated 16-04-2022.

(12) KAPCO excluded due to not determination of Tariff by NEPRA.

(13) JPCL's Jamshoro Units 2, 3 & 4 and Muzaffargarh Units 1, 2,3, 4, 5 & 6 have tariff on gas fuel, there inclusion/exclusion of ranking on gas fuel in Merit Order will be finally decided once the disputes involving the Gas Supply Agreement have been resolved to the satisfaction of parties. During the dispute, dispatch on gas fuel will be given to these units, according to the tariff whenever gas fuel supplies from their Suppliers. As per NEPRA Authority direction during the FCA hearing held in NEPRA office on dated 31-05-2022, Gas and Mixed fuel firing Plants of GENCOs are being separated and please be considered the availability of these GENCOs' Plants on Gas, otherwise on RFO and other fuel as in regular Merit order.

Source: National Power Control Centre, Islamabad

Table 36

Monthly Utilization Factor of Power Plants (%) (2022-23)

Power Producers	Fuel	Dep. Cap. (MW)	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Uch Power	Gas	547	85.32	70.2	54.35	63.12	77.58	95.07	98.23	73.38	84.15	94.53	92.03	88.75
China Power Hub	Coal	1220	45.4	31.97	22.69	33.5	0	0.27	5.35	-	1.8	-	3.49	27.59
Port Qasim	Coal	1320	28.14	66.95	23.06	31.62	37.1	25.35	45.32	1.48	3.29	18.5	33.36	15.14
HBS	RLNG	1172	65.73	27.3	47.35	29.18	79.18	84.89	47.79	66.09	64.81	74.39	89.35	77.56
Uch-II	Gas	360	93.5	84.78	83.86	92.95	92.03	89.44	92.65	80.22	79.65	83.25	94	89.26
Bhikki	RLNG	1120	27.63	43.91	56.96	80.4	-	14.61	31.07	53.27	46.9	73.13	79.5	60.43
Engro Thar	Coal	603	87.76	74.04	98.39	76.08	73.55	82.14	54.28	27.66	36.21	40.62	87.96	86.35
Foundation Power	Gas	171	89.42	92.01	91.91	91.29	73.01	86.01	90.21	13.12	76.22	83.85	78.69	86.51
Sahiwal Coal	Coal	1320	44.28	50.47	34.02	17.86	0	8.36	65.07	11.39	-	25.23	4.51	35.92
Liberty Daharki	Gas	212	84.93	81.03	91.87	65.42	72.34	68.65	-	13.72	5.62	49.12	61.02	63.69
Balloki	RLNG	1165	64.67	77.65	79.13	83.54	35.31	30.15	57.78	64.6	79.02	82.23	78.11	66.03
Guddu 747	Gas	721	61.27	62.13	59.06	57.27	54.44	47.66	12.36	24.87	37.01	25.16	29	28.98
Nandipur	RLNG	411	76.15	72.9	53.82	31.71	0.56	-	7.79	0	6.48	41.8	74.73	52.78
Liberty Power	RFO	196	48.47	69.55	71.78	6.88	0	0.95	59.95	0	2.65	26.73	24.59	53.38
Engro Energy	Gas	212	49.06	47.22	49.37	36.65	48.57	49.8	61.72	56.9	53.11	53.59	50.45	48.59
Saif Power	RLNG	204	57.21	41.73	47.17	33.25	10.56	0.56	14.32	0	9.03	43.41	61.21	40.74
Nishat Chunian	RFO	196	39.63	49.82	56.05	6.15	0	1.32	28.52	9.11	1.15	9	9.89	59.03
Kohinoor Energy	RFO	124	34.18	65.18	67.75	15.31	0	1.92	31.5	23.81	7.52	32.31	38.75	45.56
Nishat Power	RFO	195	66.06	67.32	72.49	9.46	0	1.39	38.23	0	1.28	14.6	31.63	73.47
Fauji Kabirwala	Gas	151	4.92	-	-	-	0	0	-	0	-	19.12	30.57	5.21
Orient Power	RLNG	213	62.85	53.15	21.15	-	14.96	13.44	22.29	11.76	30.45	47.26	62.12	47.56
Attock-Gen	RFO	156	42.36	82.28	79.5	16.09	10.58	21.18	63.62	18.84	3.63	25.03	14.51	46.07
Atlas Power	RFO	214	34.44	59.58	66.38	10.25	0	2.65	43.84	8.17	6.82	19.5	30.23	51.17
KAPCO	FO/RLNG /HSD	1336	29.24	14.78	11.6	3.62	-	-	0.27	-	-	-	-	-
Halmore Power	RLNG	200	33.25	14.13	-	26.45	-	-	4.99	0	-	30.04	51.95	34.17
Narowal Energy	RFO	214	29.11	42.97	60.68	9.33	-	2.65	35.49	17.31	7.74	35.88	17.05	43.1
Sapphire Power	RLNG	203	46.72	37	25.74	5.52	-	-	6.56	10.71	27.73	45.86	54.97	43.54
Lalpir Power	RFO	350	33.09	36.69	38.15	5.21	-	-	1.85	0	-	-	3.4	36.7
Pakgen Power	RFO	350	28.74	33.02	53.18	2.95	-	-	12.25	0	-	0.99	-	42.4
Saba Power	RFO	126	13.66	32.67	27.26	4.22	-	-	12.79	0	-	8.95	10.02	51.71
Rousch Power	RLNG	395	13.39	-	-	-	0.34	0.01	1.24	0	-	18.58	27.09	0.91
Altern Energy	Gas	27	-	-	-	-	-	-	-	-	-	-	-	-
HUBCO	RFO	1200	4.6	8.09	9.99	-	-	-	0.1	-	-	-	-	-
GENCO-I	RFO/Gas	649	2.5	2.55	-	-	-	-	-	-	-	-	-	-

Source: CPPA-G

TABLE 37

Detail of Liquidated Damages against Power Plants

Name of Companies	Amount Verified on account of EPP and CPP (Rs. in Million)				
	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Malakand-III (PEDO)	-	-	-	123.95	209.10
Laraib Energy (AJ&K)	-	-	276.28	-	-
Gulpur Hydropower ($)	-	1.02	0.07	-	-
GENCO-I	749.18	323.49	-	3,249.96	40.23
GENCO-II	2,199.70	604.00	-	0.00	6,221.19
GENCO-III	2,842.79	2,510.00	-	1,574.38	2,579.48
Lalpir Power	-	0.12	23.05	0.00	0.80
Pak Gen. Power	-	0.36	27.71	-	-
Fauji Kabirwala	-	581.86	-	813.43	28.00
Habibullah Coastal	-	3,494.10	314.16	-	-
Hub Power	1.46	-	2.05	-	-
Japan Power	-	214.32	1228.80	-	-
Kohinoor Energy	-	109.10	0.02	0.04	0.00
Rousch Power	-	-	0.01	0.10	0.00
Saba Power	-	14.32	-	353.66	124.47
Liberty Daharki Power	1,777.86	3.19	2.70	25.09	4.55
Uch Power	-	237.86	2.20	0.00	5.89
Engro Power Gen. Qadirpur ($)	-	1.79	-	-	-
Narowal Energy	-	398.54	-	0.00	9.93
Davis Energen.	-	-	-	3.61	0.00
Sahiwal Imported Coal	-	-	-	665.60	0.00
Port Qasim Electric Power	-	-	-	0.00	4,703.20
China Power Hub	-	-	-	253.70	296.00
Lucky Electric Power	-	-	-	1,217.29	664.41
Thar Energy	-	-	-	596.12	1,126.13
ThalNova	-	-	-	0.00	1,433.93
Thar Coal Block-I Power	-	-	-	0.00	352.87
Lakeside Energy	-	-	-	0.00	11.30
Liberty Wind Power-I	-	-	-	0.00	8.17
Din Energy	-	-	-	0.00	8.02
Gul Ahmad Electric	-	-	-	0.00	10.19
Liberty Wind Power-II	-	-	-	0.00	18.82
NASDA Green Energy	-	-	-	0.00	9.34
Metro 2 Wind Power	-	-	-	0.00	46.87
HydroChina Dawood	-	77.50	-	-	-
Appolo Solar Development	-	251.18	-	-	-
Best Green Energy	-	351.33	-	-	-
Crest Energy	-	351.33	-	-	-
Hamza Sugar Mills	27.20	-	-	-	-
Total	**7,598.19**	**9,522.60**	**1,876.98**	**8,876.94**	**17,912.90**

Source: CPPA-G

TABLE 38

Reimbursement Claims Lodged by CPPA-G against Gas Supply Company (Rs. in Million)

IPP Name	Gass Supply Company (SNGP/SSGC)	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
NPPMCL – Haveli Bahadur Shah	SNGPL	1,224.80	22.55	0.00	0.00	0.00
NPPMCL – Balloki	SNGPL	1,403.24	503.81	0.00	0.00	0.00
Quaid-e-Azam Thermal Power	SNGPL	1,545.03	0.00	0.00	0.00	0.00
Total		**4,173.07**	**526.36**	**0.00**	**0.00**	**0.00**

Source: CPPA-G

TABLE 39

Detail of Partial Load Adjustment Charges

Name of Company	Verified Charges on account of Partial Load Adjustment (Rs. in Million)				
	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
GENCO-I	894.87	177.74	41.73	-	-
GENCO-III	431.23	192.00	-	26.34	64.44
KAPCO	77.25	188.88	262.20	536.20	246.80
Hub Power	578.02	70.13	224.98	2,726.10	938.51
Attock Gen.	161.74	41.84	58.13	999.44	434.64
Atlas Power	-	99.56	1337.38	281.12	197.95
Engro Powergen. Qadirpur	43.64	453.89	674.48	556.07	718.10
Saif Power	-	419.62	489.50	1,208.84	1,548.54
Orient Power	-	444.99	538.67	1,190.79	1,546.74
Nishat Power	-	70.38	72.99	146.38	164.87
Nishat Chunian	-	96.83	92.84	223.17	251.60
Sapphire Electric	-	339.18	686.00	1,256.25	1,383.22
Halmore Power	-	388.91	442.17	1,031.31	963.06
Narowal Energy	100.46	79.11	68.00	189.80	147.09
Liberty Power Tech.	75.96	54.77	55.25	153.52	86.39
Foundation Power	151.7	764.15	678.99	468.91	648.12
Uch-II Power	90.55	715.67	557.25	713.18	1,158.89
Sahiwal Imported Coal	-	937.77	773.56	622.79	1,565.08
Quaid-e-Azam Thermal	3,681.59	3,774.47	4,172.34	8,291.00	10,154.53
NPPMCL – Haveli Bahadur Shah	3,863.69	4,387.76	4,007.62	8,353.00	10,134.17
NPPMCL – Balloki	2,812.61	4,432.36	3,074.56	8,306.00	13,626.21
Port Qasim Electric Power	-	573.44	406.08	916.68	612.80
Total	**12,963.31**	**18,703.45**	**18,714.72**	**38,196.89**	**46,591.75**

Source: CPPA-G

TABLE 40

Verified Amount on Account of Non-Project Missed Volume (Rs. in Million)

Company Name	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Zorlu Enerji Pakistan	13.57	30.94	-	-	-
FFC Energy	10.53	21.25	45.50	8.76	98.88
Three Gorges First Wind	13.67	13.75	56.90	2.34	174.84
Foundation Wind Energy-I	4.00	21.32	62.26	5.60	128.12
Foundation Wind Energy-II	69.57	4.67	66.63	5.52	138.55
Sapphire Wind	63.98	1,050.27	169.26	56.67	597.71
Yunus Energy	65.55	940.26	244.54	67.25	464.29
Metro Power Company	71.91	8.11	33.10	0.48	0.06
Gul Ahmed Wind	49.33	1,001.57	158.71	59.12	544.99
Master Wind Energy	31.54	169.73	986.84	58.21	518.12
Tenaga Generasi	88.85	12.50	12.93	74.82	923.98
HydroChina Dawood	79.45	12.45	17.38	107.33	465.20
Sachal Energy Development	76.80	1.24	0.83	0.64	5.26
UEP Wind Power	111.86	2,046.97	321.95	176.64	1,220.63
Artistic Wind Power	77.93	692.59	106.20	48.18	262.79
Act Wind	21.22	548.87	79.03	33.08	131.36
Hawa Energy	42.89	671.16	274.84	47.04	533.00
Jhampir Power	43.07	700.53	280.43	41.08	523.23
Three Gorges Second Wind	105.58	813.89	135.55	57.81	421.89
Three Gorges Third Wind	104.60	819.38	136.91	57.68	416.87
Tricon Bostan Consulting-A	93.95	727.48	276.86	52.95	546.40
Tricon Bostan Consulting-B	68.29	841.31	148.23	52.28	553.63
Tricon Bostan Consulting-C	77.18	729.72	302.63	52.31	557.36
Zephyr Power	4.24	10.72	4.98	74.80	59.96
Lucky Renewables	-	-	-	9.54	85.69
Master Green Energy	-	-	-	8.58	96.05
Act 2 Din Wind	-	-	-	1.53	92.19
Artistic 2 Wind Power	-	-	-	1.97	82.66
Indus Wind Energy	-	-	-	1.10	121.44
Lakeside Energy	-	-	-	0.00	73.02
Liberty Wind Power-I	-	-	-	0.24	99.94
Din Energy	-	-	-	1.19	122.26
Gul Ahmed Electric	-	-	-	0.00	50.78
Liberty Wind Power-II	-	-	-	0.00	95.67

Company Name	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
NASDA Green Energy	-	-	-	0.00	75.79
Metro 2 Wind Power	-	-	-	0.00	159.77
Quaid-e-Azam Solar Park	3.07	4.17	3.72	1.04	13.91
Appolo Solar Development	4.42	--	--	1.02	18.19
Best Green Energy	4.38	1.31	5.06	4.47	16.70
Crest Energy	5.09	2.72	4.13	3.69	21.02
AJ Power	0.75	1.62	1.81	0.65	1.74
Harappa Solar	2.13	1.51	2.30	1.90	3.50
Total	**1,409.40**	**11,902.01**	**3,939.51**	**1,177.52**	**10,517.45**

Source: CPPA-G

TABLE 41

Year-wise Details of the Circular Debt (Rs. in Million)

S. No.	Description	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
1	Due for Payments against verified invoices of Power Generation Companies	694,261.00	1,038,115.00	1,244,835.00	1,351,023.44	1,434,216.77
2	Payables to GENCOs (Invoices based)	17,464.00	48,040.00	-	101,473.38	110,527.13
3	Payables to Fuel Suppliers by GENCOs	100,677.00	105,092.00	105,314.00	-	-
4	**Total (Payables to IPPs/GENCOs)**	**812,402.00**	**1,191,247.00**	**1,350,149.00**	**1,452,496.82**	**1,544,743.90**
5	Energy Payable Swap by GOP through Loan from Commercial Banks by Power Holding (Pvt.) Limited	805,787.00	1,007,218.00	930,000.00	800,253.45	765,253.45
6	**Grand Total (Circular Debt)**	**1,618,189.00**	**2,198,465.00**	**2,280,149.00**	**2,252,750.28**	**2,309,997.36**

Source: CPPA-G

TABLE 42

Investment Plan for Private Sector Power Generation Projects

S. No.	Name of the Project	Capacity (MW)	Estimated Investment (Million US$)	Achieved/ Expected COD	Latest Status of the Project
			A: HYDEL		
1	Suki Kinari Hydropower Project	884.00	1,707.00	November, 2024	Plant is under construction.
2	Rialli-II Hydropower Project	7.08	18.00	December, 2025	Letter of Support (LOS) issued. Financial Close (FC) in progress. Also under construction.
3	Kathai-II Hydropower Project	8.00	20.00	December, 2025	LOS issued. FC in progress.
4	Turtonas-Uzghor Hydropower Project	82.00	188.00	December, 2029	LOI issued. Feasibility Study (FS) completed and approved by POE. Further processing will be as per IGCEP.
5	Azad Pattan Hydel Project	700.00	1,357.16	September, 2030	LOS issued. FC in progress.
6	Kohala Hydropower Project	1,124.00	2,364.05	March, 2031	LOS issued. FC in progress.
7	Athmuqam Hydropower Project	450.00	1,301.00	December, 2032	Letter of Intent (LOI) issued. FS completed and approved by POE. Further processing will be as per IGCEP.
8	Rajdhani Hydropower Project	132.00	303.60	December, 2032	To be processed as per the requirements of new capacity in the IGCEP.
9	Mahl Hydropower Project	640.00	1,472.00	December, 2032	LOI issued. FS completed and approved by POE. Tariff determined by NEPRA. Further processing will be as per IGCEP.
10	Ashkot Hydel Project	300.00	450.00	December, 2032	Project has been transferred by GoAJ&K to PPIB for further processing as per IGCEP.
11	Neckeherdm-Paur Hydropower Project	80.00	184.00	To be processed as per the requirements of new capacity in the IGCEP.	
12	Kaigah Hydel Project	548.00	1,260.40		
13	Chakothi-Hattian Project	500.00	1,150.00		
			B: COAL		
1	Thar Energy Limited (Thar Coal Project)	330.00	497.70	September, 2022	Achieved COD on 1st October, 2022.
2	Shanghai Electric (Thar Coal Project)	1,320.00	1,912.20	December, 2022	Achieved COD on 5th February, 2023.
3	Thal Nova Power (Thar Coal Project)	330.00	497.70	December, 2022	Achieved COD on 17th February, 2023.
4	Gwadar Imported Coal Power Project	300.00	435.00	December, 2025	LOS issued. FC in progress.
5	Oracle (Thar Coal Project)	1,320.00	1,640.76	-	Candidate Project in the IGCEP Portfolio.
			C: PIPELINE QUALITY GAS/DUAL FUEL/RLNG		
1	Punjab Thermal Power Project	1,263.00	707.75	July, 2022	Achieved COD on 23rd June, 2023 (on gas).

Source: Private Power and Infrastructure Board, Islamabad

TABLE 43

Investment Plan for Power Generation Projects (K-Electric) (2023-24 to 2027-28) *

S. No.	Name of Project	Capacity Addition/ (Deletion) (MW)	Expected Commissioning Year	Estimated Cost (US$ Million)
Plan to induct IPPs/Additional Supply from National Grid in KE System [1]				
1	Additional Supply from National Grid	950 [3]	2025	-
2	150 MW WUB Solar	150	2025	130 [2]
3	270 MW Solar Projects	270	2025	185 [2]
4	220 MW (AC) Hybrid Renewable Plant	220	2026	229 [2]
5	Base Load Local Coal Plant	660	2027	821
6	160 MW Solar Plant	160	2027	110 [2]
7	100 MW Wind Plant	100	2028	130 [2]

** These are estimates and are subject to change.*

[1] These are indicative and subject to relevant government/regulatory approvals along with finalization of contractual modalities.

[2] The estimated costs of renewable projects (Solar and Wind) are based on the recent market prices. However, these renewable projects will be developed under the competitive bidding.

[3] As per the initialled ICA between KE and NTDC, KE can offtake power upto the interconnection capacity post comissioning of KKI grid.

Source: KE

TABLE 44

Status of Renewable Energy Projects

A:	Existing Projects (In-Operation and Under Construction)				
S. No.	**Name of Project**	**Capacity (MW)**	**COD/ Expected COD**	**Estimated Cost (US$ Million)**	**Latest Status of the Project**
Wind Power Projects:					
1	FFC Energy Limited	49.50	May, 2013	133.56	In Operation
2	Zorlu Energy Pakistan Limited	56.40	July, 2013	143.74	
3	Three Gorges First Wind Farm Pakistan (Pvt.) Limited	49.50	November, 2014	124.82	
4	Foundation Wind Energy-II Limited	50.00	December, 2014	124.91	
5	Foundation Wind Energy-I Limited	50.00	April, 2015	125.89	
6	Sapphire Wind Power Company (Pvt.) Limited	52.80	November, 2015	129.36	
7	Metro Power Company (Pvt.) Limited	50.00	September, 2016	125.24	
8	Yunus Energy Limited	50.00	September, 2016	131.00	
9	Tapal Wind Energy (Pvt.) Limited	30.00	October, 2016	78.60	
10	Tenega Generasi Limited	49.50	October, 2016	123.13	
11	Master Wind Energy (Pvt.) Limited	52.80	October, 2016	125.48	
12	Gul Ahmed Wind Power Limited	50.00	October, 2016	131.00	
13	HydroChina Dawood Power (Pvt.) Limited	49.50	April, 2017	121.75	
14	Sachal Energy Development (Pvt.) Limited	49.50	April, 2017	133.92	
15	United Energy Pakistan Limited	99.00	June, 2017	242.55	
16	Hawa Energy (Pvt.) Limited	49.74	March, 2018	107.50	
17	Jhampir Wind Power (Pvt.) Limited	49.74	March, 2018	106.64	
18	Artistic Energy (Pvt.) Limited	49.30	March, 2018	129.16	
19	Three Gorges Second Wind Farm Pakistan (Pvt.) Limited	49.50	June, 2018	106.42	
20	Three Gorges Third Wind Farm Pakistan (Pvt.) Limited	49.50	June, 2018	106.42	
21	Tricon Boston Consulting Corporation (Pvt.) Limited (A)	49.60	August, 2018	106.64	
22	Tricon Boston Consulting Corporation (Pvt.) Limited (B)	49.60	September, 2018	106.64	
23	Tricon Boston Consulting Corporation (Pvt.) Limited (C)	49.60	September, 2018	106.64	
24	Zephyr Power (Pvt.) Limited	50.00	March, 2019	106.50	
25	Master Green Energy Limited	50.00	August, 2021	63.91	
26	Tricom Wind Power (Pvt.) Limited	50.00	September, 2021	63.91	
27	Artistic Wind Power (Pvt.) Limited	50.00	February, 2022	63.91	
28	Act 2 Wind (Pvt.) Limited	50.00	February, 2022	62.95	
29	Din Energy Limited	50.00	March, 2022	63.91	
30	Indus Wind Energy Limited	50.00	March, 2022	64.07	
31	Liberty Wind Power-1 (Pvt.) Limited	50.00	April, 2022	62.95	
32	Gul Ahmed Electric Limited	50.00	April, 2022	63.91	
33	Lakeside Energy (Pvt.) Limited	50.00	April, 2022	73.93	
34	NASDA Green Energy (Pvt.) Limited	50.00	May, 2022	63.91	
35	Liberty Wind Power-2 (Pvt.) Limited	50.00	May, 2022	63.91	
36	Metro Wind Power Limited	60.00	June, 2022	62.95	

Solar Power Projects:					
37	Quaid-e-Azam Solar Power (Pvt.) Limited	100.00	July, 2015	151.40	In Operation
38	Appolo Solar Development Pakistan Limited	100.00	May, 2016	151.40	
39	Best Green Energy Pakistan (Pvt.) Limited	100.00	July, 2016	151.40	
40	Crest Energy Pakistan Limited	100.00	July, 2016	151.40	
41	Harappa Solar (Pvt.) Limited	18.00	October, 2017	19.21	
42	AJ Power (Pvt.) Limited	12.00	December, 2017	12.80	
43	Atlas Solar Limited (formerly Zhenfa Pakistan New Energy)	100.00	April, 2022	57.39	
44	Meridian Energy (Pvt.) Limited	50.00	August, 2023	30.34	Under Construction
45	HNDS Energy (Pvt.) Limited	50.00	August, 2023	30.34	
46	Helios Power (Pvt.) Limited	50.00	August, 2023	30.34	
Bagasse/Biomass Co-Generation Projects:					
47	JDW Sugar Mills Limited (Unit-II)	26.35	June, 2014	26.24	In Operation
48	JDW Sugar Mills Limited (Unit-III)	26.35	October, 2014	26.24	
49	RYK Mills Limited	30.00	March, 2015	29.88	
50	Chiniot Power Limited	62.40	November, 2015	62.15	
51	Hamza Sugar Mills Limited	15.00	March, 2017	14.94	
52	Layyah Sugar Mills	41.00	December, 2017	40.84	
53	Almoiz Industries Limited	36.00	January, 2019	35.86	
54	Chanar Energy Limited	22.00	February, 2019	21.91	
55	Shahtaj Sugar Mills Limited	23.00	December, 2023	31.01	Under Construction

B:	**Future Upcoming Projects**				
S. No.	**Name of Project**	**Capacity (MW)**	**COD/ Expected COD**	**Estimated Cost (US$ Million)**	**Latest Status of the Project**
Wind Power Projects:					
1	Western Energy (Pvt.) Limited	50.00	2025	63.12	Decision on LPM and Tariff Petition awaited.
2	Trans Atlantic Energy (Pvt.) Limited	48.30	2025	61.87	Decision on Tariff Petition awaited.
Solar PV Power Projects:					
3	Access Solar (Pvt.) Limited	11.52	2024	8.77	LOS Stage. In progress of achiveing Financial Close.
4	Access Electric (Pvt.) Limited	10.00	2024	7.54	
5	Zorlu Solar Pakistan (Pvt.) Limited	100.00	2024	68.97	
6	Safe Solar Power (Pvt.) Limited	10.28	2025	6.40	LOS Stage. Existing Tariff expired. Project to file new Tariff Petition.
7	Siachen Energy Limited	100.00	2025	61.08	

Source: Alternative Energy Development Board, Islamabad

TABLE 45

Unit Received, Delivered and Transmission Losses in NTDC System (500/220 kV) (GWh)

	Unit	2018-19	2019-20	2020-21	2021-22	2022-23
Unit Received by NTDC at CDPs	GWh	122,302.00	125,941.00	132,299.00	140,346.58	132,008.55
Unit Delivered by NTDC at CDPs	GWh	118,838.00	122,471.00	128,620.00	136,674.56	128,811.01
NTDC Losses	GWh	3,464.00	3,470.00	3,679.00	3,672.02	3,197.53
NTDC Losses	%	2.83	2.76	2.78	2.62	2.42

Source: NTDC

TABLE 46

Grid Stations, Power Transformers and Transmission Lines with NTDC

(A) Number of Grid Stations and their MVA Capacity					
As on 30th June	**2019**	**2020**	**2021**	**2022**	**2023**
Number of Grid Stations (500 kV)	17	17	17	19	19
Number of Grid Stations (220 kV)	45	45	45	50	50
(B) Number of Power Transformers and their MVA Capacity					
As on 30th June	**2019**	**2020**	**2021**	**2022**	**2023**
	Installed at 500 kV Grid Stations				
Total No. of Power Transformers (500/220 kV)		43	44	46	47
Total Capacity (MVA) of Power Transformers (500/220 kV)	22,950	24,000	24,000	25,500	25,950
Total No. of Power Transformers (220/132 kV)		33	34	36	38
Total Capacity (MVA) of Power Transformers (220/132 kV)		6,450	6,610	7,200	8,150
	Installed at 220 kV Grid Stations				
Total No. of Power Transformers (500/220 kV)	-	-	-	-	-
Total Capacity (MVA) of Power Transformers (500/220 kV)	31,060	31,900	32,220	35,360	37,190
Total No. of Power Transformers (220/132 kV)		127	129	140	141
Total Capacity (MVA) of Power Transformers (220/132 kV)		25,450	25,770	28,160	29,040
(C) Number of Circuits and Length of Transmission Lines in NTDC System (km)					
As on 30th June	**2019**	**2020**	**2021**	**2022**	**2023**
No. of Circuits (500 kV)	48	53	61	67	71
Transmission Line (km) (500 kV)	6,375	7,414	8,071	8,431	8,825
No. of Circuits (220 kV)	149	152	156	163	166
Transmission Line (km) (220 kV)	10,930	11,120	11,467	11,565	11,633

Source: NTDC

TABLE 47

Loading Position of Transmission Lines and Power Transformers in NTDC System

(A) Loading Position of Transmission Lines						
		2018-19	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Overloaded Transmission Lines/Circuits (Nos.) (>80%)	500 kV	16	12	14	18	15
	220 kV	54	36	50	58	39
Underutilized Transmission Lines/Circuits (Nos.) (<30%)	500 kV	32	40	39	43	53
	220 kV	92	101	59	71	65
(B) Loading Position of Power Transformers						
		2018-19	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Overloaded Power Transformers (Nos.) (>80%)	500 kV	16	19	29	31	40
	220 kV	57	82	122	128	80
Underutilized Power Transformers (Nos.) (<30%)	500 kV	18	17	10	7	9
	220 kV	68	46	21	24	48

Source: NTDC

TABLE 48

Grid Stations and Transmission Lines with K-Electric Limited

(A) Number of Grid Stations in KE Transmission System											
As on 30th June		**2019**		**2020**		**2021**		**2022**		**2023**	
		No.	**MVA**	**No.**	**MVA**	**No.**	**MVA**	**No.**	**MVA**	**No.**	**MVA**
KE's Owned Grid Stations	220 kV	9	3,500	10	4,500	10	4,500	10	4,500	10	4,500
	132 kV	56	6,109	57	6,373	58	6,674	58	6,824	58	6,986
	66 kV	3	69	3	79	3	79	3	79	3	79
Consumers Owned Grid Stations	220 kV	1	80	1	80	1	80	1	80	1	80
	132 kV	10	538	11	578	11	578	11	641	11	721
	66 kV	0	0	0	0	0	0	0	0	0	0
Total No. of Grid Stations		**79**	**10,296**	**82**	**11,610**	**83**	**11,911**	**83**	**12,124**	**83**	**12,366**
(B) Length of Transmission Lines in KE System (km)											
As on 30th June		**2018-19**		**2019-20**		**2020-21**		**2021-22**		**2022-23**	
Overhead Lines	220 kV	322		323		323		321		321	
	132 kV	640		650		651		652		652	
	66 kV	149		152		152		152		152	
Underground Lines	220 kV	14		42		42		43		43	
	132 kV	158		151		182		186		186	
	66 kV	1		1		1		1		1	
Total Length (km)		**1,284**		**1,319**		**1,351**		**1,354**		**1,354**	

Source: KE

TABLE 49

Investment Details in Transmission System of K-Electric Limited

(A) Amount Injected to Reinforce/Expand 500 kV, 220 kV and 132 kV Transmission System of K-Electric Limited (Million Rs.)						
Description	**During FY 2021-22 [1]**			**During FY 2022-23 [2]**		
	FC	**LC**	**Total**	**FC**	**LC**	**Total**
Grid Stations	1,560.09	1,705.51	3,265.60	3,295.36	4,973.20	8,268.56
Transmission	2,755.92	2,477.15	5,233.07	618.73	3,078.92	3,697.65
SCADA	79.85	121.84	201.69	27.54	58.57	86.11
Reinforcement	350.55	3,233.58	3,584.13	673.76	790.94	1,464.70
Total	**4,746.41**	**7,538.08**	**12,284.49**	**4,615.39**	**8,901.63**	**13,517.02**
(B) Investment Plan in Transmission Line (500 kV, 220 kV and 132 kV) of K-Electric Limited (Million US$) [3]						
Description	**During 2023-24**			**During 2024-25**		
	FC	**LC**	**Total**	**FC**	**LC**	**Total**
Grid Stations	90.82	48.76	139.58	65.59	79.21	144.80
Transmission	53.79	28.02	81.81	46.94	20.83	67.77
SCADA	0.66	0.44	1.10	1.48	0.99	2.47
Reinforcement	8.72	5.77	14.49	18.23	10.00	28.23
Others	0.00	2.69	2.69	0.00	3.78	3.78
Total	**153.99**	**85.68**	**239.67**	**132.24**	**114.81**	**247.05**

[1] Restated as per Audited Financial Statements 2022. [2] Provisional and Unaudited. [3] These are estimates and are subject to change.

FC: Foreign Currency LC: Local Currency (Local Currency converted into equivalent US$ with exchange rates of US$ to Rupees as 206 (FY 2023-24 and FY 2024-25).

Note: The investment plan is to be indexed at actual, Consumer Price Index (CPI) and other relevant mechanisms as outlined in the KE MYT application read with KE's investment plan submitted through KE letters No. KE/NEPRA/BPR/2022/525 dated December 01, 2022 and KE/NEPRA/BPR/2023/021 dated January 30, 2023 which is yet to be approved by NEPRA.

Source: KE

TABLE 50

Surplus/Deficit in Demand and Supply during NTDC's System Peak Hours

(A) Actual Figures				
Financial Year ending 30th June	**Generation Capability (MW)**	**Demand During NTDC's System Peak Hours (MW)**		**Surplus/ (Deficit) (MW)**
2022	27,748	24,564		3,184
2023	30,574	23,679		6,895
(B) Projected Figures				
Financial Year ending 30th June	**Planned Generation Capability as per NTDC (MW)**	**NTDC Projected Demand Growth Rate (%)**	**NTDC's Projected Demand during Peak Hours (MW)**	**Surplus/ (Deficit) (MW)**
2024	33,953	15.3	27,302	6,651
2025	38,854	8.7	29,675	9,179
2026	40,595	5.2	31,227	9,368
2027	41,865	4.9	32,753	9,112
2028	43,180	5.1	34,438	8,742

** Generation Capability is the maximum Generation Capability of any day recorded during the year and Demand is the Maximum Demand of any day recorded during the year.*

Source: NTDC

TABLE 51

Surplus/Deficit in Demand and Supply during K-Electric's System Peak Hours

(A) Actual Figures			
Financial Year ending 30th June	**Generation Capability (MW) [1]**	**Demand During KE's System Peak Hours (MW)**	**Surplus/(Deficit) (MW) [2]**
2022	3,383	3,670	(287)
2023	3,409	3,654	(245)
(B) Projected Figures			
Financial Year ending 30th June	**Planned Generation Capability as per KE (MW)**	**KE's Projected Demand Growth Rate (%)**	**KE's Projected Demand during Peak hours (MW)**	**Surplus/ (Deficit) (MW)**
2024	3,678	4.10	3,879	(201)
2025	4,377	4.10	4,070	307
2026	4,426	4.10	4,252	174
2027	4,857	4.10	4,367	490
2028	4,957	4.10	4,474	483

[1] Based on maximum supply achieved in KE's System.

[2] Deficit based on peak demand and maximum supply achieved during the year.

Source: KE

Table 52

Overloading (above 80% load) of 500 kV and 220 kV Power Transformers installed at 500 kV Grid Stations (2022-23)

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload (above 80%)
Islamabad	Sheikh Muhammadi Peshawar	T-1	500/220	450	1180	1040	88.14
		T-2	500/220	450	1180	1040	88.14
		T-3	500/220	450	1180	1040	88.14
		T-5	220/132	250	1093	910	83.26
		T-6	220/132	250	1093	910	83.26
		T-7	220/132	250	1093	910	83.26
		T-8	220/132	250	1093	910	83.26
	Rawat	T-1	500/220	450	1125	1000	88.89
		T-2	500/220	450	1125	1000	88.89
		T-3	500/220	450	1125	1000	88.89
		T-5	220/132	250	1093	990	90.58
		T-6	220/132	250	1093	990	90.58
		T-7	220/132	250	1093	990	90.58
		T-8	220/132	250	1093	990	90.58
Lahore	New Gakkhar (Nokhar)	T-1	500/220	600	1575	1420	90.16
		T-2	500/220	600	1575	1420	90.16
		T-3	220/132	600	1575	1340	85.08
	Yousafwala	T-1	220/132	600	1575	1375	87.30
		T-2	220/132	600	1575	1375	87.30
		T-9	220/132	600	1575	1375	87.30
	Sheikhupura	T-1	500/220	600	1575	1470	93.30
		T-2	500/220	600	1575	1470	93.30
		T-3	500/220	600	1575	1470	93.30
		T-4	500/220	600	1575	1470	93.30
		T-10	500/220	450	1181	460	38.95
	Gatti	T-1	500/220	450	1181	1075	91.02
		T-2	500/220	450	1181	1095	92.72
		T-3	500/220	450	1181	1065	90.18
		T-4	500/220	450	1181	1065	90.18
Multan	Multan	T-1	500/220	450	1125	1076	95.64
		T-2	500/220	450	1125	1076	95.64
		T-7	500/220	450	1125	1135	100.89
	Muzaffargarh	T-1	500/220	600	1500	1450	96.67
		T-2	500/220	600	1500	1470	98.00
	Rahim Yar Khan	T-5	500/220	250	1093	981	89.75
		T-6	500/220	250	1093	981	89.75
Hyderabad	Jamshoro	T-1	500/220	450	1125	1050	93.33
		T-2	500/220	450	1125	1125	100.00
		T-3	220/132	160	700	590	84.29
		T-7	220/132	160	700	590	84.29
		T-8	500/220	450	1125	1080	96.00
	Dadu	T-2	500/220	450	1125	900	80.00
		T-1	220/132	160	700	575	82.14
	NKI	T-1	500/220	600	1500	1310	87.33
		T-2	500/220	600	1500	1310	87.33
	Shikarpur	T-6	500/220	600	1500	1400	93.33
		T-7	500/220	600	1500	1580	105.33
		T-2	220/132	250	1100	1000	90.91

Source: NTDC

Table 53

Overloading (above 80% load) of 220 kV Power Transformers installed at 220 kV Grid Stations (2022-23)

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload (above 80%)
Islamabad	Mardan	T-1	220/132	250	1093	940	86.00
		T-2	220/132	250	1093	940	86.00
		T-3	220/132	250	1093	940	86.00
	Daudkhel	T-1	220/132	160	700	660	94.29
		T-2	220/132	160	700	660	94.29
	Bannu	T-1	220/132	250	1093	900	82.34
		T-2	220/132	160	700	640	91.43
		T-5	220/132	250	1093	900	82.34
	Sangjani	T-1	220/132	160	700	575	82.14
		T-2	220/132	160	700	575	82.14
		T-3	220/132	160	700	630	90.00
		T-4	220/132	160	700	610	87.14
		T-7	220/132	160	700	610	87.14
	Mansehra	T-1	220/132	250	1093	940	86.00

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload (above 80%)
Lahore	Nokhar	T-4	220/132	160	700	680	97.14
		T-5	220/132	160	700	680	97.14
		T-6	220/132	160	700	680	97.14
		T-7	220/132	250	1093	1030	94.24
	Gakkhar	T-1	220/132	160	700	670	95.71
		T-2	220/132	160	700	640	91.43
		T-3	220/132	160	700	680	97.14
		T-4	220/132	160	700	670	95.71
	Yousafwala	T-3	220/132	160	700	598	85.43
		T-4	220/132	160	700	598	85.43
		T-5	220/132	160	700	598	85.43
		T-6	220/132	160	700	598	85.43
	Ghakkhar	T-3	220/132	160	700	590	84.29
		T-4	220/132	160	700	670	95.71
	Kala Shah Kaku	T-1	220/132	160	700	670	95.71
		T-2	220/132	160	700	670	95.71
		T-3	220/132	160	700	670	95.71
		T-4	220/132	160	700	670	95.71
	NKLP	T-1	220/132	250	1095	1050	95.89
		T-2	220/132	250	1095	1050	95.89
		T-3	220/132	250	1095	1050	95.89
	Sarfraz Nagar	T-1	220/132	160	700	670	95.71
		T-2	220/132	160	700	670	95.71
		T-3	220/132	160	700	670	95.71
		T-6	220/132	160	700	670	95.71
	WAPDA Town	T-1	220/132	250	1093	995	91.03
		T-2	220/132	160	700	630	90.00
		T-3	220/132	160	700	630	90.00
	Ghazi Road	T-1	220/132	250	1093	930	85.09
		T-2	220/132	250	1093	930	85.09
		T-3	220/132	250	1093	930	85.09
	Okara	T-1	220/132	250	1093	1075	98.35
		T-2	220/132	250	1093	1075	98.35
	Sheikhupura	T-5	220/132	160	700	650	92.86
		T-6	220/132	160	700	670	95.71
		T-7	220/132	160	700	700	100.00
		T-8	220/132	160	700	705	100.71
	Faisalabad West	ATR-7	220/132	250	1095	825	75.34
		ATR-8	220/132	250	1095	1070	97.72
		ATR-9	220/132	250	1095	935	85.39
	Nishatabad	T-1	220/132	160	700	505	72.14
		T-2	220/132	160	700	575	82.14
		T-3	220/132	160	700	640	91.43
		T-4	220/132	160	700	505	72.14
		T-5	220/132	160	700	505	72.14
	Jaranawala	T-1	220/132	160	700	496	70.86
		T-2	220/132	160	700	492	70.29
		T-3	220/132	160	700	482	68.86
		T-4	220/132	160	700	516	73.71
	Sammundari Road	T-1	220/132	250	1095	905	82.64
		T-2	220/132	250	1095	610	55.71
		T-3	220/132	250	1095	570	52.05
	Ludewala	T-1	220/132	160	700	670	95.71
		T-2	220/132	250	1095	1100	100.46
		T-3	220/132	250	1095	1100	100.46
	Bandala	T-1	220/132	250	1095	930	84.93
		T-2	220/132	160	700	600	85.71
		T-3	220/132	160	700	600	85.71
	Lalian	T-1	220/132	250	1095	980	89.50
Multan	Bahawalpur	T-1	220/132	160	700	646	92.29
	NGPS Multan	T-1	220/132	160	700	633	90.43
		T-5	220/132	160	700	633	90.43
		T-3	220/132	160	700	633	90.43

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload (above 80%)
Hyderabad	Hala Road	T-1	220/132	160	700	581	83.00
		T-3	220/132	250	1093.5	989	90.48
		T-4	132/11	20/26	1305	1128	86.44
		T-5	132/11	20/26	1305	1056	80.92
	T. M. Khan	T-1	220/132	160	700	700	100.00
		T-2	220/132	160	700	700	100.00
		T-3	132/11	10/13	653	540	82.70
		T-4	132/11	10/13	653	620	94.95
	Jhampir-I	T-1	220/132	250	1093	878	80.33
		T-2	220/132	250	1093	878	80.33
		T-3	220/132	250	1093	878	80.33
		T-4	220/132	250	1093	878	80.33
	Jhampir-II	T-3	220/132	250	1200	980	81.67
	Dahariki	T-2	220/132	160	700	700	100.00
	Rohri	T-2	220/132	250	1093.5	1040	95.10
Quetta	Khuzdar	T-1	220/132	160	700	630	90.00
		T-2	220/132	160	700	630	90.00
	Loralai	T-1	220/132	250	1095	1000	95.00
		T-2	220/132	250	1095	980	89.00
	Quetta	T-1	220/132	160	700	600	86.00
		T-2	220/132	160	700	600	86.00
		T-3	220/132	250	1095	990	90.00

Source: NTDC

TABLE 54

Outages of NTDC's 500 kV and 220 kV Network

S. No.	Name of Circuit	No. of Tripping(s)		S. No.	Name of Circuit	No. of Tripping(s)	
		Experienced in June, 2023	From Jan-June, 2023			Experienced in June, 2023	From Jan-June, 2023
500 kV Transmission Lines							
1	500 kV Tarbela-Rawat	1	2	16	500 kV Multan-Yousafwala	-	1
2	500 kV Brotha-Rawat-I	-	2	17	500 kV Yousafwala-CFPP	-	1
3	500 kV Brotha-Rawat-II	-	1	18	500 kV HVDC-SKP-1	1	1
4	500 kV Rawat-Nokhar-II	1	1	19	500 kV HVDC-SKP-2	2	4
5	500 kV Terbela-Barothat-II	-	1	20	500 kV LHR South-Nokhar	-	1
6	500 kV Barotha-Gatti-1	-	1	21	500 kV Nokhar-Karot	1	2
7	500 kV Gatti-QATPL	1	1	22	500 kV Nokhar-Neelum Jhelum	2	3
8	500 kV HBS-FSD West-1	-	1	23	500 kV Nokhar-Sheikhupura	1	1
9	500 kV FSD West-Gatti-1	-	1	24	500 kV Multan-M/Garh-II	1	2
10	500 kV HBS-FSD West-2	-	1	25	500 kV Multan-Rahim Yar Khan	-	4
11	500 kV FSD West-Gatti-2	1	2	26	500 kV M/Garh-D.G.Khan	-	1
12	500 kV M/Garh-HBS	-	1	27	500 kV M/Garh-Guddu Old	-	1
13	500 kV HBS-Multan	-	1	28	500 kV M/Garh-Guddu 747 MW	-	1
14	500 kV Gatti-Rousch	-	1	29	500 kV D.G.Khan-Guddu Old	-	4
15	500 kV Rousch-Multan	-	1		**Total**	**12**	**45**
220 kV Transmission Lines							
1	220 kV KSK-Bandala-1	1	1	34	220 kV Altas P/H-Ravi	-	1
2	220 kV KSK-Bandala-2	5	8	35	220 kV K.S.Kaku-Ravi	-	4
3	220 kV Gatti-JWR-1	-	5	36	220 kV K.S.Kaku-Ghazi	-	1
4	220 kV Gatti-JWR-2	-	5	37	220 kV Yousafwala-Okara-2	-	1
5	220 kV Gatti-Y/Wala-1	-	2	38	220 kV Tarbela-Mardan-I	-	1
6	220 kV Gatti-Y/Wala-2	-	2	39	220 kV Tarbela-Mardan-II	-	1
7	220 kV Lalian-L/Wala-1	-	1	40	220 kV Daudkhel-Sheikh M. Peshawar-I	-	1
8	220 kV Lalian-L/Wala-2	3	3	41	220 kV Daudkhel-Sheikh M. Peshawar-II	1	2
9	220 kV Multan-T.T.Sing-1	2	3	42	220 kV Daudkhel-Bannu-I	1	1
10	220 kV SRD-Nishatabad-2	-	2	43	220 kV D.I.Khan-CHASNUPP-2	2	2
11	220 kV PTPL-T.T.Singh-3	-	1	44	220 kV Sheikh M. Peshawar-Shahibagh	-	1
12	220 kV PTPL-FSD West CCT:	-	1	45	220 kV Chakdara-Shahibagh	1	1
13	220 kV GKR-Mangla	1	1	46	220 kV CHASNUPP-Bannu-I	-	1
14	220 kV K.S.Kaku-Mangla-1	-	4	47	220 kV ISPR-Mansehra-I	-	2
15	220 kV K.S.Kaku-Mangla-2	3	3	48	220 kV ISPR-Mansehra-II	-	2
16	220 kV K.S.Kaku-Mangla-3	4	4	49	220 kV Mansehra-Allai Khwar-I	1	1
17	220 kV GKR-SKT	1	1	50	220 kV Burhan-ISPR	-	1

S. No.	Name of Circuit	No. of Tripping(s)		S. No.	Name of Circuit	No. of Tripping(s)	
		Experienced in June, 2023	From Jan-June, 2023			Experienced in June, 2023	From Jan-June, 2023
220 kV Transmission Lines							
18	220 kV KSK-SKT	2	5	51	220 kV Rawat-ISPR	2	3
19	220 kV New GKR-Gujrat	1	1	52	220 kV Bahria Town-ISPR	-	2
20	220 kV New GKR-Gakkhar	1	1	53	220 kV Mangla-Rawat-I	1	1
21	220 kV K.S.Kaku-Bund Road-1	-	1	54	220 kV Mangla-Rawat-II	-	1
22	220 kV K.S.Kaku-Bund Road-2	-	1	55	220 kV Peshawar-Nowshehra	-	1
23	220 kV N.K.Lakhpat-Bund Road-1	1	6	56	220 kV Multan-NGPS-I	-	1
24	220 kV N.K.Lakhpat-Bund Road-2	2	3	57	220 kV Multan-NGPS-II	-	1
25	220 kV N.K.Lakhpat-Sarfraz Nagar	1	2	58	220 kV TPS M/Garh-1-Multan-I	-	1
26	220 kV N.K.L-New LHR (South)-I	-	4	59	220 kV TPS M/Garh-1-Multan-IV	-	2
27	220 kV Bund Road-Sheikhupura-1	1	1	60	220 kV G/S M/Garh-TPS M/Garh-2	-	1
28	220 kV Bund Road-Sheikhupura-2	1	2	61	220 kV KAPCO-Multan-III	1	1
29	220 kV Bund Road-Sheikhupura-3	1	1	62	220 kV Vehari-Kassowal-II	-	1
30	220 kV Bund Road-Sheikhupura-4	1	1	63	220 kV Vehari-Chishtian-I	-	1
31	220 kV N.K.Lakhpat-Sheikhupura	1	2	64	220 kV Bahawalpur-Lal Sohanra-II	1	1
32	220 kV WAPDA Town-Sheikhupura	1	1	65	220 kV TPS M/Garh-PARCO-II	-	1
33	220 kV Ravi-Sheikhupura	1	3		**Total**	**46**	**125**

Source: NTDC

TABLE 55

Main Electricity Statistics of the Country

	2018-19	2019-20	2020-21	2021-22	2022-23
(A) Maximum Energy Demand (MW)					
CPPA-G System	24,839	24,790	26,349	29,131	30,231
KE System	3,530	3,604	3,604	3,670	3,654
(B) Auxiliary Consumption and System Losses (in percentage)					
CPPA-G System					
Auxiliary Consumption	n.p.	0.05	0.05	n.p.	n.p.
Transmission Losses	2.83	2.76	2.78	2.62	2.42
Distribution Losses	17.61	18.86	17.95	17.13	16.67
KE System					
Auxiliary Consumption (KE Own)	7.45	7.04	6.88	7.13	5.86
T&D Losses (excluding Auxiliary Consumption)	19.17	19.79	17.54	15.43	15.31
(C) Average Sales Price (Rs./kWh)					
CPPA-G System	16.00	17.49	18.29	23.03	N.P.
KE System [1]	15.88	18.13	19.64	23.34	35.17
(D) Per Capita Electricity Consumption					
CPPA-G System					
Energy Sale (GWh)	98,844.06	98,216.89	105,490.59	116,902.21	106,298.20
Per Capita Electricity Consumption (kWh)	528.00	516.00	548.64	610.04	n.p.
Average Sale/Consumer (kWh)	3,297.41	3,097.43	3,151.72	3,249.97	2,806.39
KE System					
Energy Sale (GWh)	14,318.11	14,276.96	16,068.85	16,763.23	15,553.81
Per Capita Electricity Consumption (kWh)	892.00	889.00	1,001.00	1,044.34	969.00
Average Sale/ Consumer (kWh)	5,098.92	4,824.77	5,044.64	4,922.64	4,361.94

[1] This includes amount billed to consumers including taxes, fuel cost adjustments, quarterly tariff adjustments and other government surcharges/packages.

Source: NTDC/DISCOs/KE

TABLE 56

Hourly System Demand (MW) (January - December, 2022)

Hours of the day	Maximum Demand (MW)		System Demand for a Typical day in Summer		System Demand for a Typical Day in Winter	
	Summer (29-06-2022)	Winter (28-12-2022)	Working day (09-06-2022)	Non-working day (11-06-2022)	Working day (19-01-2022)	Non-working day (15-01-2022)
01:00	27,704	12,300	26,965	26,321	12,725	12,407
02:00	27,597	11,868	26,658	26,320	12,439	12,175
03:00	26,876	11,638	26,176	25,931	12,242	12,015
04:00	26,853	11,257	25,716	25,663	12,085	11,701
05:00	26,234	11,646	25,963	25,604	12,466	12,082
06:00	26,614	12,951	25,480	25,891	13,568	13,352
07:00	27,655	14,109	25,934	25,514	14,954	14,499
08:00	28,112	14,747	26,392	26,140	15,620	15,309
09:00	28,875	15,964	26,529	26,785	15,910	15,700
10:00	29,169	16,491	26,999	27,016	15,812	15,549
11:00	29,481	17,013	27,171	27,355	15,637	15,480
12:00	29,487	17,129	27,556	27,347	15,874	15,605
13:00	29,999	16,978	27,518	27,190	15,524	15,476
14:00	30,010	17,049	28,512	28,211	15,683	15,644
15:00	30,231	17,294	29,124	28,775	16,109	16,132
16:00	30,140	17,176	29,475	28,996	16,605	15,833
17:00	30,192	17,095	28,644	29,030	16,819	16,525
18:00	29,793	17,707	28,075	28,082	17,348	17,161
19:00	29,415	17,087	27,230	25,552	17,058	16,942
20:00	28,934	16,358	28,111	25,078	16,347	16,404
21:00	29,540	15,650	27,535	24,901	16,192	16,005
22:00	29,615	14,695	27,786	24,836	15,202	14,873
23:00	29,583	13,626	27,889	25,268	14,111	14,072
24:00	29,187	12,280	27,507	25,684	13,624	13,676

** Highlighted area indicates maximum demand of the day.*

Source: National Power Control Centre, Islamabad

TABLE 57

Monthly System Peak Load Demand (MW)

Month	2018-19	2019-20	2020-21	2021-22	2022-23
July	25,575	24,927	26,085	28,650	29,305
August	25,627	25,198	26,781	27,410	28,003
September	24,838	25,753	23,931	26,140	26,023
October	20,395	19,328	20,857	23,100	22,559
November	15,760	16,704	15,962	16,795	17,425
December	15,859	15,973	17,177	17,751	17,707
January	17,320	15,938	17,012	17,602	19,342
February	15,230	15,489	16,433	17,337	18,009
March	16,480	14,746	17,617	21,477	19,151
April	19,885	18,516	21,322	27,047	22,783
May	24,233	21,191	23,847	27,474	26,394
June	24,827	24,349	26,682	30,231	30,189

"Note: (i) Monthly System Peak Demand (MW) is absolute maximum and may occur during Off-Peak Hours.
(ii) Summer months are May to September and Winter months are December to February."

Source: National Power Control Centre, Islamabad

TABLE 58

Number of Circles, Divisions, Sub-Divisions, 11 kV Feeders and their Loading Position

DISCO	As on 30th June	Circles	Divisions	Sub-Divisions	11 kV Feeders	Loading Position of 11 kV Feeders (Nos.)				%age
						80-90%	91-100%	Above 100%	Total	
PESCO	2019	8	39	187	1,056	82	110	147	339	32.10
	2020	8	39	187	1,089	99	118	124	341	31.31
	2021	8	39	187	1,138	110	145	180	435	38.22
	2022	8	39	190	1,193	118	119	149	386	32.36
	2023	9	40	193	1,249	119	123	146	388	31.06
TESCO	2019	1	9	18	215	21	128	0	149	69.30
	2020	1	9	18	245	193	0	0	193	78.78
	2021	1	5	15	266	40	70	34	144	54.14
	2022	1	5	15	302	23	28	90	141	46.69
	2023	1	5	15	318	41	25	82	148	46.54
IESCO	2019	5	19	109	1,112	5	13	9	27	2.43
	2020	5	19	109	1,166	28	20	17	65	5.57
	2021	6	20	109	1,221	6	9	11	26	2.13
	2022	6	20	110	1,293	31	18	0	49	3.79
	2023	6	20	114	1,355	16	8	12	36	2.66
GEPCO	2019	5	24	118	864	29	13	2	44	5.09
	2020	5	24	118	876	37	20	0	57	6.51
	2021	5	24	118	910	64	42	0	106	11.65
	2022	5	24	119	949	87	56	13	156	16.44
	2023	5	24	119	978	32	16	0	48	4.91
LESCO	2019	8	39	199	1,821	226	206	69	501	27.51
	2020	8	39	199	1,923	205	195	58	458	23.82
	2021	8	42	201	2,011	141	104	40	285	14.17
	2022	8	42	201	2,058	124	151	182	457	22.21
	2023	8	42	201	2,154	73	102	96	271	12.58
FESCO	2019	4	26	140	1,054	74	48	6	128	12.14
	2020	5	26	140	1,150	40	14	2	56	4.87
	2021	5	26	140	1,185	54	19	2	75	6.33
	2022	5	26	140	1,198	80	45	4	129	10.77
	2023	5	26	140	1,272	59	33	1	93	7.31
MEPCO	2019	9	37	179	1,392	139	105	13	257	18.46
	2020	9	37	181	1,508	91	127	11	229	15.19
	2021	9	37	181	1,652	207	104	12	323	19.55
	2022	9	38	181	1,726	180	119	19	318	18.42
	2023	9	39	184	1,762	184	82	13	279	15.83
HESCO	2019	4	15	69	533	26	32	10	68	12.76
	2020	4	15	69	556	45	23	1	69	12.41
	2021	4	15	69	570	58	19	0	77	13.51
	2022	4	15	69	583	60	33	0	93	15.95
	2023	4	17	71	597	51	17	0	68	11.39
SEPCO	2019	7	29	96	531	52	28	38	118	22.22
	2020	7	29	96	541	47	28	28	103	19.04
	2021	7	29	97	548	24	39	20	83	15.15
	2022	3	16	61	562	24	39	20	83	14.77
	2023	5	16	61	575	31	19	34	84	14.61
QESCO	2019	6	14	55	642	56	74	70	200	31.15
	2020	6	14	55	652	455	130	67	652	100.00
	2021	6	14	55	688	494	131	63	688	100.00
	2022	6	14	55	714	88	238	0	326	45.66
	2023	6	14	55	725	103	205	0	308	42.48
Total in CPPA-G System	**2019**	**57**	**251**	**1,170**	**9,220**	**710**	**757**	**364**	**1,831**	**19.86**
	2020	**58**	**251**	**1,172**	**9,706**	**1,240**	**675**	**308**	**2,223**	**22.90**
	2021	**59**	**251**	**1,172**	**10,189**	**1,198**	**682**	**362**	**2,242**	**22.00**
	2022	**55**	**239**	**1,141**	**10,578**	**815**	**846**	**477**	**2,138**	**20.21**
	2023	**58**	**243**	**1,153**	**10,985**	**709**	**630**	**384**	**1,723**	**15.69**
KE	As on 30th June	IBCs		11 kV Feeders		Loading Position of 11 kV Feeders (Nos.)				%age
						80-90%	91-100%	Above 100%	Total	
	2019	30		1,807		28	10	10	48	2.66
	2020	30		1,890		43	7	2	52	2.75
	2021	30		1,937		17	5	2	24	1.24
	2022	30		2,001		72	19	23	114	5.70
	2023	30		2,068		87	18	15	120	5.80

Source: Distribution Companies / KE

TABLE 59

Status of Distribution Lines (km)

DISCO	As on 30th June	132 kV	66 kV	33 kV	11 kV	Total HT Lines	Total LT Lines (0.4 kV)
PESCO	2019	2,661	714	312	36,679	40,365	**45,120**
	2020	2,764	494	75	36,935	40,269	**45,204**
	2021	2,967	494	75	37,177	40,713	**45,371**
	2022	3,000	494	75	37,694	41,263	**45,627**
	2023	3,077	494	75	38,592	42,239	**47,705**
TESCO	2019	382	442	0	9,705	10,529	**6,590**
	2020	408	384	123	10,316	11,231	**6,285**
	2021	441	384	123	10,434	11,382	**6,285**
	2022	441	384	132	10,543	11,500	**6,290**
	2023	488	233	132	10,783	11,636	**6,321**
IESCO	2019	2,897	581	69	25,457	29,004	**27,041**
	2020	3,030	528	69	25,804	29,431	**27,299**
	2021	3,482	312	44	26,237	30,075	**27,624**
	2022	3,512	312	44	26,932	30,800	**28,160**
	2023	3,581	312	44	27,269	31,206	**28,344**
GEPCO	2019	2,425	179	0	23,743	26,347	**18,410**
	2020	2,611	179	0	24,231	27,021	**18,381**
	2021	2,611	179	0	24,659	27,449	**18,456**
	2022	2,682	123	0	24,996	27,801	**18,494**
	2023	2,676	123	0	25,266	28,065	**18,585**
LESCO	2019	2,879	410	0	29,309	32,598	**15,000**
	2020	3,012	410	0	30,005	33,427	**15,000**
	2021	3,051	15	0	30,055	33,121	**15,000**
	2022	3,110	0	0	31,562	34,672	**15,533**
	2023	3,184	0	0	32,148	35,332	**15,591**
FESCO	2019	2,402	1,174	0	43,896	47,472	**30,583**
	2020	2,288	1,130	0	44,397	47,815	**30,695**
	2021	2,337	1,124	0	45,690	49,151	**31,979**
	2022	2,322	881	0	46,281	49,484	**32,054**
	2023	2,525	845	0	46,797	50,167	**32,145**
MEPCO	2019	3,929	872	0	76,057	80,858	**49,992**
	2020	4,031	702	0	78,309	83,042	**50,110**
	2021	4,072	635	0	79,837	84,544	**50,332**
	2022	4,110	635	0	80,962	85,707	**50,451**
	2023	4,135	635	0	82,237	87,007	**50,664**
HESCO	2019	2,709	687	0	28,306	31,702	**15,005**
	2020	2,771	687	0	28,413	31,871	**15,049**
	2021	2,771	687	0	28,471	31,929	**15,057**
	2022	2,778	687	0	28,502	31,967	**15,058**
	2023	2,851	687	0	28,557	32,095	**15,058**
SEPCO	2019	2,232	637	0	25,400	28,269	**13,341**
	2020	2,241	687	0	25,571	28,499	**13,350**
	2021	2,262	687	0	24,722	27,671	**13,349**
	2022	2,308	687	0	24,856	27,851	**13,353**
	2023	2,284	687	0	24,912	27,883	**13,354**
QESCO	2019	5,420	106	1,981	38,686	46,193	**16,404**
	2020	5,420	106	1,981	39,745	47,252	**16,681**
	2021	5,500	106	1,981	40,822	48,409	**17,476**
	2022	6,258	207	0	41,606	48,071	**17,908**
	2023	6,854	207	0	42,786	49,847	**19,377**
Total in CPPA-G System	**2019**	**27,936**	**5,802**	**2,362**	**337,238**	**373,337**	237,486
	2020	**28,577**	**5,307**	**2,248**	**343,726**	**379,859**	238,053
	2021	**29,495**	**4,623**	**2,223**	**348,104**	**384,445**	240,928
	2022	**30,521**	**4,411**	**251**	**353,933**	**389,116**	242,927
	2023	**31,656**	**4,224**	**251**	**359,347**	**395,477**	247,144
KE	2019	798	149	0	9,876	10,823	**19,751**
	2020	801	153	0	10,204	11,158	**18,367**
	2021	833	153	0	10,283	11,269	**18,509**
	2022	838	153	0	10,520	11,511	**18,936**
	2023	838	153	0	10,891	11,882	**19,370**

Source: Distribution Companies / KE

TABLE 60

Status of Grid Stations (Nos.)

DISCO	As on 30th June	132 kV			66 kV			33 kV			Total
		DISCO Owned	Cons. Owned	Sub-Total	DISCO Owned	Cons. Owned	Sub-Total	DISCO Owned	Cons. Owned	Sub-Total	
PESCO	2019	78	10	88	14	0	14	6	0	6	**108**
	2020	81	12	93	11	0	11	2	0	2	**106**
	2021	83	12	95	11	0	11	2	0	2	**108**
	2022	85	12	97	11	0	11	2	0	2	**110**
	2023	92	11	103	11	0	11	2	0	2	**116**
TESCO	2019	10	0	10	9	0	9	0	0	0	**19**
	2020	10	0	10	9	1	10	0	0	0	**20**
	2021	11	0	11	9	1	10	0	0	0	**21**
	2022	13	0	13	6	1	7	0	0	0	**20**
	2023	14	0	14	5	1	6	0	0	0	**20**
IESCO	2019	78	26	104	3	1	4	2	0	2	**110**
	2020	82	26	108	1	1	2	2	0	2	**112**
	2021	85	26	111	0	1	1	2	0	2	**114**
	2022	89	25	114	0	1	1	2	0	2	**117**
	2023	89	29	118	0	1	1	2	0	2	**121**
GEPCO	2019	59	0	59	1	0	1	0	0	0	**60**
	2020	59	0	59	1	0	1	0	0	0	**60**
	2021	59	0	59	1	0	1	0	0	0	**60**
	2022	59	0	59	1	0	1	0	0	0	**60**
	2023	60	0	60	1	0	1	0	0	0	**61**
LESCO	2019	110	44	154	0	0	0	0	0	0	**154**
	2020	116	46	162	0	0	0	0	0	0	**162**
	2021	117	50	167	0	0	0	0	0	0	**167**
	2022	120	52	172	0	0	0	0	0	0	**172**
	2023	121	61	182	0	0	0	0	0	0	**182**
FESCO	2019	77	19	96	14	0	14	0	0	0	**110**
	2020	78	20	98	15	0	15	0	0	0	**113**
	2021	81	21	102	14	0	14	0	0	0	**116**
	2022	86	22	108	16	0	16	0	0	0	**124**
	2023	88	28	116	16	0	16	0	0	0	**132**
MEPCO	2019	114	9	123	10	0	10	0	0	0	**133**
	2020	120	10	130	7	0	7	0	0	0	**137**
	2021	123	11	134	6	0	6	0	0	0	**140**
	2022	123	12	135	6	0	6	0	0	0	**141**
	2023	125	12	137	6	0	6	0	0	0	**143**
HESCO	2019	61	8	69	15	0	15	0	0	0	**84**
	2020	61	9	70	15	0	15	0	0	0	**85**
	2021	61	9	70	15	0	15	0	0	0	**85**
	2022	62	10	72	15	0	15	0	0	0	**87**
	2023	63	10	73	15	0	15	0	0	0	**88**
SEPCO	2019	55	1	56	9	1	10	0	0	0	**66**
	2020	57	1	58	9	1	10	0	0	0	**68**
	2021	58	2	60	9	1	10	0	0	0	**70**
	2022	60	2	62	8	1	9	0	0	0	**71**
	2023	59	3	62	8	0	8	0	0	0	**70**
QESCO	2019	71	1	72	3	0	3	32	0	32	**107**
	2020	71	1	72	3	0	3	32	0	32	**107**
	2021	73	0	73	3	0	3	32	0	32	**108**
	2022	75	0	75	3	0	3	32	0	32	**110**
	2023	76	0	76	3	0	3	32	0	32	**111**
Total in CPPA-G System	**2019**	**713**	**118**	**831**	**78**	**2**	**80**	**40**	**0**	**40**	**951**
	2020	**735**	**125**	**860**	**71**	**3**	**74**	**36**	**0**	**36**	**970**
	2021	**751**	**131**	**882**	**68**	**3**	**71**	**36**	**0**	**36**	**989**
	2022	**772**	**135**	**907**	**66**	**3**	**69**	**36**	**0**	**36**	**1,012**
	2023	**787**	**154**	**941**	**65**	**2**	**67**	**36**	**0**	**36**	**1,044**
KE	2019	56	10	66	3	0	3	0	0	0	**69**
	2020	57	11	68	3	0	3	0	0	0	**71**
	2021	58	11	69	3	0	3	0	0	0	**72**
	2022	58	11	69	3	0	3	0	0	0	**72**
	2023	58	11	69	3	0	3	0	0	0	**72**

Source: Distribution Companies / KE

TABLE 61

Category-wise Number of Consumers

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others/ General	Total
PESCO	2019	3029784	349985	26582	22896	1083	887	41228	**3472445**
	2020	3193810	362183	26919	22968	1119	886	42245	**3650130**
	2021	3374867	377986	27591	23049	1163	890	43405	**3848951**
	2022	3546157	393995	28205	23121	1203	897	44735	**4038313**
	2023	3692630	407191	28521	23145	1239	900	45618	**4199244**
TESCO	2019	402027	28688	4243	6187	5	65	1367	**442582**
	2020	402004	28790	4271	6194	5	67	1434	**442765**
	2021	402072	29061	4276	6234	5	68	1464	**443180**
	2022	402084	29763	4362	6252	5	72	1608	**444146**
	2023	404199	30165	4444	3634	5	86	2687	**445220**
IESCO	2019	2528865	411219	16272	7087	1829	960	13758	**2979990**
	2020	2649394	426132	16359	7068	1914	845	18477	**3120189**
	2021	2783354	437335	17016	7242	2039	848	28330	**3276164**
	2022	2972324	464632	17664	7391	2240	854	20512	**3485617**
	2023	3158346	484058	18107	7503	2525	853	21939	**3693331**
GEPCO	2019	3021760	366047	73133	46887	580	152	20393	**3528952**
	2020	3192199	379270	74244	50460	590	150	20930	**3717843**
	2021	3387411	394245	76337	52960	620	148	21365	**3933086**
	2022	3591198	410372	80524	54982	673	148	21815	**4159712**
	2023	3817077	425043	83312	56291	703	138	22700	**4405264**
LESCO	2019	4108067	623529	84703	61547	2554	494	8968	**4889862**
	2020	4374998	643245	86138	63671	2564	488	16090	**5187194**
	2021	4688342	664548	87918	66101	2613	469	17863	**5527854**
	2022	5018720	687951	89934	68250	2726	459	19208	**5887248**
	2023	5283943	704392	91150	69934	2779	453	19964	**6172615**
FESCO	2019	3651710	399688	50027	42763	1782	223	25216	**4171409**
	2020	3861027	413352	50911	45978	1860	226	28110	**4401464**
	2021	4081137	427149	52253	49738	1882	229	29414	**4641802**
	2022	4291224	440006	53475	51922	1913	231	30371	**4869142**
	2023	4516894	451958	54363	53345	1955	235	31085	**5109835**
MEPCO	2019	5748493	559213	56121	85977	1501	454	33673	**6485432**
	2020	6090985	579011	57541	93884	1592	457	37840	**6861310**
	2021	6415415	600662	59514	99127	1666	458	40835	**7217677**
	2022	6788616	618271	60717	102709	1742	464	42434	**7614953**
	2023	7068151	635962	60768	106349	1816	471	44290	**7917807**
HESCO	2019	907377	163791	15250	14434	540	342	13926	**1115660**
	2020	933377	166213	14852	15522	572	344	13800	**1144680**
	2021	958338	169007	15193	15660	572	345	13875	**1172990**
	2022	978572	171843	15490	15729	573	346	13941	**1196494**
	2023	1001748	175246	15866	15904	587	351	14045	**1223747**
SEPCO	2019	603885	121776	12930	9270	425	527	13319	**762132**
	2020	628208	123808	13133	9346	442	532	13347	**788816**
	2021	643103	125388	13382	9370	535	445	13494	**805717**
	2022	650565	126818	13533	9377	540	449	13496	**814778**
	2023	657961	127912	13702	9446	542	471	13552	**823586**
QESCO	2019	463332	120311	3688	29608	268	266	7128	**624601**
	2020	477757	123504	3719	29599	274	271	7852	**642976**
	2021	491006	127814	3802	29639	279	282	9346	**662168**
	2022	503579	131817	3832	29623	283	299	9958	**679391**
	2023	513399	135039	3834	29608	286	305	11029	**693500**
Total in CPPA-G System	**2019**	**24465300**	**3144247**	**342949**	**326656**	**10567**	**4370**	**178976**	**28473065**
	2020	**25803759**	**3245508**	**348087**	**344690**	**10932**	**4266**	**200125**	**29957367**
	2021	**27225045**	**3353195**	**357282**	**359120**	**11374**	**4182**	**219391**	**31529589**
	2022	**28743039**	**3475468**	**367736**	**369356**	**11898**	**4219**	**218078**	**33189794**
	2023	**30114348**	**3576966**	**374067**	**375159**	**12437**	**4263**	**226909**	**34684149**
KE	2019	2298616	474626	20842	2329	93	188	11375	**2808069**
	2020	2447129	470777	22553	2271	90	175	16104	**2959099**
	2021	2651527	490652	23244	2164	88	170	17487	**3185332**
	2022	2851946	509334	23706	2093	180	176	17897	**3405332**
	2023	3001648	519001	23618	2096	185	196	19057	**3565801**

Source: Distribution Companies / KE

TABLE 62

Category-wise Sanctioned Load (MW)

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	2019	4228.14	782.35	1563.31	163.48	50.59	282.84	402.83	**7473.54**
	2020	4563.34	825.96	1691.51	164.81	50.88	282.76	416.04	**7995.30**
	2021	4930.64	871.10	1764.04	166.15	50.69	293.52	455.33	**8531.47**
	2022	5291.42	925.50	1872.00	167.40	50.78	301.66	477.76	**9086.52**
	2023	5607.70	986.92	1946.72	167.95	50.57	310.87	510.83	**9581.56**
TESCO	2019	768.00	37.00	181.00	70.00	1.00	5.00	15.00	**1077.00**
	2020	768.15	37.62	227.11	70.51	1.00	7.00	16.00	**1127.40**
	2021	770.00	40.00	260.00	70.00	1.00	7.00	16.00	**1164.00**
	2022	768.29	40.52	295.16	71.60	0.10	7.75	19.72	**1203.14**
	2023	787.11	42.55	319.12	47.52	0.10	15.62	28.91	**1240.93**
IESCO	2019	4471.20	1200.23	1089.78	63.45	100.69	825.27	340.37	**8090.99**
	2020	4698.09	1250.58	1105.28	59.31	101.33	541.48	730.75	**8486.82**
	2021	4970.00	1267.00	1152.00	62.00	103.00	557.00	829.00	**8940.00**
	2022	5407.62	1396.10	1195.02	64.81	106.13	574.97	803.59	**9548.24**
	2023	5845.07	1478.37	1222.33	67.21	109.48	585.49	841.58	**10149.53**
GEPCO	2019	4531.07	827.30	1860.78	336.79	22.22	77.08	153.97	**7809.21**
	2020	4863.10	871.38	1923.47	369.14	22.33	75.65	177.58	**8302.65**
	2021	5241.09	920.91	2033.03	397.76	22.54	75.44	192.08	**8882.85**
	2022	5653.50	974.04	2168.16	419.08	22.83	75.44	200.34	**9513.39**
	2023	6122.84	1031.80	2263.78	432.56	23.25	79.35	227.94	**10181.52**
LESCO	2019	6456.77	1766.64	4691.43	612.69	113.45	259.37	366.92	**14267.26**
	2020	6914.42	1850.13	4930.40	614.73	111.57	343.05	488.85	**15253.15**
	2021	7471.08	1931.16	5226.09	644.81	109.22	333.87	600.73	**16316.97**
	2022	8121.77	2042.68	5526.34	673.62	110.57	346.07	645.11	**17466.17**
	2023	8652.97	2183.27	5758.92	697.31	111.12	370.77	690.22	**18464.58**
FESCO	2019	9041.00	988.00	2290.00	487.00	11.00	218.00	224.00	**13259.00**
	2020	9655.00	1046.00	2394.00	533.00	11.00	222.00	253.00	**14114.00**
	2021	10315.00	1109.00	2525.00	587.00	12.00	231.00	269.00	**15048.00**
	2022	10947.00	1172.00	2660.00	631.00	12.00	231.00	282.00	**15935.00**
	2023	11629.00	1225.00	2837.00	636.00	12.00	226.00	302.00	**16867.00**
MEPCO	2019	8343.12	1162.52	2585.25	1372.99	15.08	140.19	302.33	**13921.48**
	2020	9049.00	1235.28	2657.97	1543.54	15.76	150.21	337.64	**14989.40**
	2021	9729.66	1314.19	2776.20	1656.29	16.24	152.43	359.11	**16004.12**
	2022	10469.45	1378.99	2903.89	1729.59	16.67	160.95	380.82	**17040.36**
	2023	11204.39	1548.87	2864.79	1810.20	16.94	170.93	419.96	**18036.08**
HESCO	2019	1201.10	318.95	902.73	194.71	24.08	61.37	157.41	**2860.35**
	2020	1247.80	329.99	945.76	210.20	24.05	77.49	173.11	**3008.40**
	2021	1291.52	344.43	983.02	214.02	24.05	78.44	178.63	**3114.11**
	2022	1331.64	357.31	1046.88	216.29	24.06	80.72	184.70	**3241.59**
	2023	1378.19	370.48	1118.67	219.37	24.10	82.00	190.81	**3383.63**
SEPCO	2019	644.62	213.97	446.66	109.65	12.72	74.21	119.37	**1621.20**
	2020	678.66	222.57	462.47	111.51	13.04	75.31	120.18	**1683.75**
	2021	700.75	231.71	481.85	111.81	13.14	84.58	121.78	**1745.62**
	2022	715.43	238.56	496.46	111.47	13.15	86.78	122.50	**1784.35**
	2023	730.07	244.62	547.53	113.10	16.51	89.33	120.80	**1861.96**
QESCO	2019	674.34	198.78	180.43	957.54	5.76	69.46	103.54	**2189.86**
	2020	687.06	205.48	194.90	996.27	5.68	70.94	116.89	**2277.21**
	2021	693.43	214.01	215.15	996.52	5.77	79.50	138.15	**2342.52**
	2022	710.54	220.21	219.98	996.23	5.81	89.86	148.99	**2391.62**
	2023	724.31	226.75	225.37	995.89	6.05	92.80	159.94	**2431.12**
Total in CPPA-G System	**2019**	**40359.36**	**7495.73**	**15791.37**	**4368.31**	**356.59**	**2012.80**	**2185.73**	**72569.89**
	2020	**43124.62**	**7874.99**	**16532.88**	**4673.03**	**356.64**	**1845.89**	**2830.04**	**77238.08**
	2021	**46113.17**	**8243.51**	**17416.38**	**4906.36**	**357.65**	**1892.78**	**3159.81**	**82089.66**
	2022	**49416.66**	**8745.92**	**18383.89**	**5081.09**	**362.10**	**1955.19**	**3265.53**	**87210.38**
	2023	**52681.65**	**9338.63**	**19104.23**	**5187.11**	**370.12**	**2023.16**	**3493.00**	**92197.91**
KE	2019	6297.76	1888.21	2169.88	44.06	1.60	191.20	135.73	**10728.44**
	2020	6457.89	1938.25	2378.36	42.09	1.63	183.45	247.04	**11248.71**
	2021	6948.36	2039.96	2675.16	42.35	1.41	191.66	281.56	**12180.46**
	2022	6975.04	1754.34	2680.85	30.79	1.65	137.91	305.16	**11885.74**
	2023	7313.95	1771.55	2836.17	30.49	1.78	148.48	336.37	**12438.79**

Source: Distribution Companies / KE

TABLE 63

Peak Demand of Distribution Companies (MW)

DISCO	2018-19	2019-20	2020-21	2021-22	2022-23
PESCO	3,296	2,967	3,307	3,622	4,002
Peak Demand Growth Rate over Last Year	1.67	(9.98)	11.46	9.53	10.49
TESCO	799	805	857	983	1,082
Peak Demand Growth Rate over Last Year	3.50	0.75	6.46	14.70	10.07
IESCO	2,512	2,671	2,406	2,921	3,254
Peak Demand Growth Rate over Last Year	2.45	6.33	(9.92)	21.40	11.40
GEPCO	2,309	2,429	2,948	2,985	2,796
Peak Demand Growth Rate over Last Year	(4.94)	5.20	21.37	1.26	(6.33)
LESCO	4,616	5,004	4,835	5,995	6,099
Peak Demand Growth Rate over Last Year	(7.31)	8.41	(3.38)	23.99	1.73
FESCO	2,904	2,925	3,342	3,802	3,740
Peak Demand Growth Rate over Last Year	(4.35)	0.72	14.26	13.76	(1.63)
MEPCO	4,115	4,115	4,635	4,735	5,181
Peak Demand Growth Rate over Last Year	2.41	0.00	12.64	2.16	9.42
HESCO	1,209	1,228	1,399	1,365	1,400
Peak Demand Growth Rate over Last Year	(3.74)	1.57	13.93	(2.43)	2.56
SEPCO	1,279	1,124	1,191	1,223	1,338
Peak Demand Growth Rate over Last Year	(2.96)	(12.12)	5.96	2.69	9.40
QESCO	1,800	1,522	1,429	1,500	1,339
Peak Demand Growth Rate over Last Year	0.00	(15.44)	(6.11)	4.97	(10.73)
Peak Demand in CPPA-G System	**24,839**	**24,790**	**26,349**	**29,131**	**30,231**
Peak Demand Growth Rate over Last Year	**(1.83)**	**(0.20)**	**6.29**	**10.56**	**3.78**
KE	3,530	3,604	3,604	3,670	3,654
Peak Demand Growth Rate over Last Year	0.09	2.10	0.00	1.83	(0.44)

Source: Distribution Companies / KE

TABLE 64

Energy Volume Consumed by Demand

DISCO	FY 2018-19		FY 2019-20		FY 2020-21		FY 2021-22		FY 2022-23	
	Energy Delivered at 132 kV (GWh)	Consumption (%)	Energy Delivered at 132 kV (GWh)	Consumption (%)	Energy Delivered at 132 kV (GWh)	Consumption (%)	Energy Delivered at 132 kV (GWh)	Consumption (%)	Energy Delivered at 132 kV (GWh)	Consumption (%)
PESCO	14,427.00	12.10	14,792.33	12.48	15,542.00	12.28	16,561.55	11.90	15,254.53	12.12
TESCO	1,821.00	1.53	2,001.22	1.69	2,227.00	1.76	2,284.45	1.64	1,719.83	1.37
IESCO	11,838.00	9.93	11,435.47	9.65	11,965.00	9.45	13,026.76	9.36	11,723.84	9.32
GEPCO	11,100.00	9.31	10,991.33	9.27	12,032.00	9.50	12,678.20	9.11	11,440.06	9.09
LESCO	24,338.00	20.41	23,528.33	19.85	25,388.00	20.05	28,334.35	20.36	26,032.44	20.69
FESCO	14,970.00	12.55	14,510.32	12.24	15,985.00	12.63	17,511.52	12.59	16,040.95	12.75
MEPCO	19,367.00	16.24	19,324.88	16.30	20,541.00	16.23	22,511.51	16.18	19,505.57	15.50
HESCO	5,557.00	4.66	5,470.78	4.62	5,591.00	4.42	5,610.33	4.03	4,916.84	3.91
SEPCO	4,412.00	3.70	4,252.76	3.59	4,291.00	3.39	4,489.77	3.23	3,868.50	3.07
QESCO	6,257.00	5.25	6,603.99	5.57	6,629.00	5.24	6,716.42	4.83	6,004.55	4.77
KE	4,957.00	4.16	5,426.00	4.58	6,118.00	4.83	9,036.34	6.49	8,960.81	7.12
IPPs	201.54	0.17	193.00	0.16	289.00	0.23	375.31	0.27	349.19	0.28
Total	**119,245.54**	**100.00**	**118,530.41**	**100.00**	**126,598.00**	**100.00**	**139,136.49**	**100.00**	**125,817.11**	**100.00**

Source: CPPA-G

TABLE 65
Maximum Demand and Energy Data of all DISCOs (FY 2022-23)

	PESCO		TESCO		IESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2022	1,738,760,839	3,583,326	153,075,701	584,023	1,347,602,850	2,413,331
August, 2022	1,600,107,598	3,245,329	160,498,852	613,370	1,400,478,134	2,695,478
September, 2022	1,484,270,906	3,153,692	156,879,384	646,535	1,200,436,250	2,244,953
October, 2022	1,117,708,422	2,562,748	159,046,264	640,901	901,205,954	2,040,886
November, 2022	999,618,535	2,496,375	161,676,306	628,542	715,677,709	1,785,490
December, 2022	1,153,827,240	2,797,638	171,477,245	676,025	791,565,596	1,685,905
January, 2023	1,183,501,747	3,142,373	160,520,251	738,937	827,849,314	1,973,814
February, 2023	999,792,921	2,810,390	118,932,092	695,655	681,633,106	1,618,642
March, 2023	1,052,087,381	2,594,685	124,525,359	684,635	714,828,433	1,223,095
April, 2023	1,115,423,647	2,820,727	116,024,588	667,263	790,624,251	1,450,333
May, 2023	1,270,420,552	2,430,276	123,674,451	576,790	1,046,351,415	2,269,703
June, 2023	1,539,007,503	3,205,448	113,503,660	554,720	1,305,590,135	2,901,114

	GEPCO		LESCO		FESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2022	1,331,537,665	3,130,127	2,964,015,449	6,077,880	1,825,899,871	3,989,280
August, 2022	1,419,797,094	3,182,464	3,026,886,973	6,202,584	1,826,863,354	3,831,824
September, 2022	1,221,480,585	2,916,126	2,658,447,791	5,991,615	1,593,929,323	3,469,868
October, 2022	921,249,824	2,629,966	2,154,029,287	5,569,171	1,365,588,636	3,644,345
November, 2022	644,066,288	2,096,350	1,638,749,728	4,118,739	987,398,684	3,311,741
December, 2022	673,911,057	2,220,361	1,602,797,219	4,771,024	946,757,537	3,084,139
January, 2023	673,226,984	2,143,464	1,689,141,656	4,889,446	953,692,601	2,681,410
February, 2023	612,442,927	1,923,984	1,539,429,147	4,692,141	934,492,224	3,324,281
March, 2023	730,877,650	2,285,047	1,672,567,956	4,670,712	1,061,396,940	3,217,630
April, 2023	845,205,993	2,461,178	1,894,617,836	5,016,214	1,235,036,231	3,291,894
May, 2023	1,083,294,874	2,628,426	2,456,816,665	5,852,048	1,574,754,458	3,948,308
June, 2023	1,282,965,293	2,858,014	2,734,944,105	6,290,440	1,735,142,093	4,020,044

	MEPCO		HESCO		SEPCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2022	2,163,306,397	5,246,548	494,382,174	1,371,336	436,382,381	1,001,320
August, 2022	2,166,130,094	4,796,870	459,372,153	1,415,266	365,520,935	913,568
September, 2022	2,069,798,530	4,624,681	481,332,673	1,375,837	436,447,289	972,945
October, 2022	1,685,226,467	4,114,938	439,932,996	1,612,303	343,614,309	899,970
November, 2022	1,137,056,541	3,514,182	321,644,704	1,178,814	221,919,891	603,352
December, 2022	1,030,423,544	3,675,230	271,952,935	1,223,554	191,723,036	449,543
January, 2023	1,074,123,226	3,696,312	271,406,164	1,393,722	200,494,380	810,013
February, 2023	1,065,219,995	3,772,227	265,451,374	1,223,991	175,527,509	625,326
March, 2023	1,224,318,383	4,276,872	358,617,607	1,358,097	237,596,952	780,294
April, 2023	1,650,498,214	4,389,490	454,571,975	1,623,920	341,609,344	976,273
May, 2023	2,034,124,612	4,862,148	536,924,531	1,580,150	430,771,016	1,041,868
June, 2023	2,205,342,569	5,338,128	561,248,162	1,629,888	486,897,663	1,225,546

	QESCO		KE (Settlement Summary from NTDC)	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2022	532,101,485	1,324,660	773,253,000	1,266,000
August, 2022	418,163,009	1,288,113	794,935,000	1,264,000
September, 2022	441,267,482	1,236,689	776,691,000	1,284,000
October, 2022	504,537,184	1,201,333	772,461,000	1,302,000
November, 2022	490,915,522	1,263,080	738,700,000	1,312,000
December, 2022	529,821,804	1,323,739	722,636,000	1,254,000
January, 2023	471,143,074	1,344,248	673,563,000	1,188,000
February, 2023	432,568,061	1,508,271	677,724,000	1,176,000
March, 2023	488,548,173	1,372,274	767,020,000	1,190,000
April, 2023	526,395,995	1,306,746	726,988,000	1,202,000
May, 2023	572,135,253	1,346,261	790,535,000	1,296,000
June, 2023	596,952,348	1,442,482	746,299,000	1,330,000

Source: CPPA-G

TABLE 66

Total Units Purchased, Sold and Losses

DISCO	As on 30th June	Unit Purchased (GWh)			Unit Sold (GWh)	Losses	
		Through NTDC	Through CPPs, SPPs etc.	Total Unit Purchased		GWh	%age
PESCO	2018-19	14301.80	0.00	14301.80	9073.56	5228.24	36.56
	2019-20	14750.30	0.00	14750.30	9043.05	5707.25	38.69
	2020-21	15540.90	0.00	15540.90	9607.54	5933.36	38.18
	2021-22	16560.19	0.00	16560.19	10355.17	6205.02	37.47
	2022-23	15254.53	0.00	15254.53	9548.86	5705.67	37.40
TESCO	2018-19	1821.00	0.00	1821.00	1603.06	217.94	11.97
	2019-20	2151.00	0.00	2151.00	1802.76	348.24	16.19
	2020-21	2226.00	0.00	2226.00	2012.65	213.35	9.58
	2021-22	2284.00	0.00	2284.00	2071.59	212.41	9.30
	2022-23	1719.83	0.00	1719.83	1564.66	155.17	9.02
IESCO	2018-19	11837.79	0.00	11837.79	10789.05	1048.74	8.86
	2019-20	11435.52	0.00	11435.52	10442.03	993.49	8.69
	2020-21	11966.00	0.00	11966.00	10944.00	1022.00	8.54
	2021-22	13027.00	0.00	13027.00	11961.92	1065.08	8.18
	2022-23	11723.84	0.00	11723.84	10778.51	945.33	8.06
GEPCO	2018-19	11099.96	0.00	11099.96	10004.34	1095.62	9.87
	2019-20	10991.19	0.00	10991.19	9945.63	1045.56	9.51
	2020-21	12032.48	0.00	12032.48	10922.10	1110.38	9.23
	2021-22	12678.20	0.00	12678.20	11528.76	1149.44	9.07
	2022-23	11440.07	0.00	11440.07	10454.81	985.26	8.61
LESCO	2018-19	24338.45	0.00	24338.45	21132.00	3206.45	13.17
	2019-20	23528.33	0.00	23528.33	20610.00	2918.33	12.40
	2020-21	25387.87	0.00	25387.87	22352.15	3035.72	11.96
	2021-22	28334.00	0.00	28334.00	25070.75	3263.25	11.52
	2022-23	26032.44	0.00	26032.44	23092.17	2940.27	11.29
FESCO	2018-19	13889.66	1079.09	14968.75	13499.68	1469.07	9.81
	2019-20	13870.33	640.00	14510.33	13123.24	1387.09	9.56
	2020-21	14874.48	1110.00	15984.48	14501.20	1483.28	9.28
	2021-22	16112.53	1400.00	17512.53	15918.79	1593.74	9.10
	2022-23	16040.78	0.00	16040.78	14662.69	1378.09	8.59
MEPCO	2018-19	13494.60	5872.05	19366.65	16309.61	3057.04	15.79
	2019-20	14972.84	4351.84	19324.68	16381.93	2942.75	15.23
	2020-21	16065.16	4467.05	20532.21	17466.10	3066.11	14.93
	2021-22	18518.35	4030.36	22548.71	19202.42	3346.29	14.84
	2022-23	16332.94	3172.63	19505.57	16732.36	2773.21	14.22
HESCO	2018-19	3567.80	1987.35	5555.15	3916.68	1638.47	29.49
	2019-20	3853.27	2958.37	6811.64	3890.00	2921.64	42.89
	2020-21	4419.93	2112.65	6532.58	4014.18	2518.40	38.55
	2021-22	4836.97	1173.95	6010.92	4034.50	1976.42	32.88
	2022-23	4311.69	909.19	5220.88	3565.29	1655.59	31.71
SEPCO	2018-19	4386.30	25.33	4411.63	2780.61	1631.02	36.97
	2019-20	4252.20	0.28	4252.48	2710.10	1542.38	36.27
	2020-21	4290.96	0.00	4290.96	2777.63	1513.33	35.27
	2021-22	4489.77	0.00	4489.77	2890.17	1599.60	35.63
	2022-23	3868.50	0.00	3868.50	2538.19	1330.31	34.39
QESCO	2018-19	6251.40	0.00	6251.40	4778.76	1472.64	23.56
	2019-20	6604.01	0.00	6604.01	4842.01	1762.00	26.68
	2020-21	6624.56	0.00	6624.56	4775.00	1849.56	27.92
	2021-22	6716.30	0.00	6716.30	4831.60	1884.70	28.06
	2022-23	6004.55	0.00	6004.55	4399.85	1604.70	26.72
Total in CPPA-G System	**2018-19**	**104988.76**	**8963.82**	**113952.58**	**93887.35**	**20065.23**	**17.61**
	2019-20	**106408.99**	**7950.49**	**114359.48**	**92790.75**	**21568.72**	**18.86**
	2020-21	**113428.34**	**7689.70**	**121118.04**	**99372.55**	**21745.49**	**17.95**
	2021-22	**123557.31**	**6604.31**	**130161.62**	**107865.67**	**22295.95**	**17.13**
	2022-23	**112729.17**	**4081.82**	**116810.99**	**97337.39**	**19473.60**	**16.67**

	As on 30th June	Unit Purchased (GWh)				Unit Sold (GWh)	Losses	
		KE Own	Through NTDC	Through CPPs + Others	Total Unit Purchased		GWh	%age
KE	2018-19	9928.91	4956.71	2828.96	17714.58	14318.11	3396.47	19.17
	2019-20	9628.90	5426.14	2744.18	17799.22	14276.96	3522.26	19.79
	2020-21	10185.60	6118.04	3182.03	19485.67	16068.85	3416.82	17.54
	2021-22	7889.96	9036.54	2895.39	19821.89	16763.23	3058.66	15.43
	2022-23	7093.09	8960.81	2311.90	18365.80	15553.81	2811.99	15.31

Source: Distribution Companies / KE

TABLE 67

Units Billed, Amount of Units Billed and Amount Realized in all DISCOs (2022-23)

DISCO		Unit	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	Units Billed	GWh	5128.21	875.37	2236.23	55.71	12.32	783.91	457.11	**9548.86**
	Amount of Units Billed	Rs. Mln.	132419.66	44263.24	86761.52	1657.75	539.00	28622.72	19221.94	**313485.83**
	Amount Realized and %age	Rs. Mln.	103455.82	43175.80	86652.53	1484.53	381.96	34085.48	18069.56	**287305.68**
	Recovery to Billed Amount	%	78.13	97.54	99.87	89.55	70.86	119.09	94.00	**91.65**
TESCO	Units Billed	GWh	1110.73	6.13	394.33	21.53	0.00	20.93	11.01	**1564.66**
	Amount of Units Billed	Rs. Mln.	30577.77	249.60	15223.22	656.34	0.00	923.79	481.12	**48111.84**
	Amount Realized and %age	Rs. Mln.	26885.04	211.41	12255.05	532.16	0.00	764.83	317.53	**40966.02**
	Recovery to Billed Amount	%	87.92	84.70	80.50	81.08	0.00	82.79	66.00	**85.15**
IESCO	Units Billed	GWh	5155.61	1224.19	1389.79	28.28	78.09	1468.08	1434.47	**10778.51**
	Amount of Units Billed	Rs. Mln.	147007.79	66329.02	55147.47	859.75	3516.09	39621.96	72739.06	**385221.14**
	Amount Realized and %age	Rs. Mln.	142773.19	65340.39	53765.08	849.02	2399.01	78903.25	60372.42	**404402.36**
	Recovery to Billed Amount	%	97.12	98.51	97.49	98.75	68.23	199.14	83.00	**104.98**
GEPCO	Units Billed	GWh	6098.01	698.77	2531.64	521.62	16.01	159.90	428.86	**10454.81**
	Amount of Units Billed	Rs. Mln.	165901.28	38194.63	100456.62	14236.91	730.11	7012.38	16350.75	**342882.68**
	Amount Realized and %age	Rs. Mln.	161651.73	37342.30	94206.97	13327.59	584.09	6506.68	22420.83	**336040.19**
	Recovery to Billed Amount	%	97.44	97.77	93.78	93.61	80.00	92.79	137.12	**98.00**
LESCO	Units Billed	GWh	9088.78	1807.05	9145.70	1347.15	143.01	682.40	878.07	**23092.17**
	Amount of Units Billed	Rs. Mln.	270236.24	99648.32	328109.64	30207.82	4007.50	29968.51	34647.64	**796825.67**
	Amount Realized and %age	Rs. Mln.	261372.67	96356.11	306800.82	24100.06	3582.211	28225.36	31205.18	**751642.42**
	Recovery to Billed Amount	%	96.72	96.70	93.51	79.78	89.39	94.18	90.06	**94.33**
FESCO	Units Billed	GWh	6549.92	784.61	5669.39	1209.18	17.31	194.58	237.70	**14662.69**
	Amount of Units Billed	Rs. Mln.	170030.09	42043.01	216489.92	31886.01	809.27	8884.39	10411.86	**480554.55**
	Amount Realized and %age	Rs. Mln.	172732.48	40887.43	220727.31	28438.39	814.81	9517.00	9313.70	**482431.12**
	Recovery to Billed Amount	%	101.59	97.25	101.96	89.19	100.68	107.12	89.45	**100.39**
MEPCO	Units Billed	GWh	9100.37	1081.70	2999.15	2906.14	25.33	261.93	357.74	**16732.36**
	Amount of Units Billed	Rs. Mln.	227699.98	58116.39	120456.09	77083.69	1138.88	11570.73	15258.20	**511323.96**
	Amount Realized and %age	Rs. Mln.	232189.74	57408.79	119531.98	67758.93	1057.59	11107.93	13415.61	**502470.57**
	Recovery to Billed Amount	%	101.97	98.78	99.23	87.90	92.86	96.00	87.92	**98.27**
HESCO	Units Billed	GWh	1987.65	236.35	836.94	162.96	29.14	91.27	220.98	**3565.29**
	Amount of Units Billed	Rs. Mln.	47536.95	12701.33	33953.09	5160.18	1219.11	4014.02	9298.41	**113883.10**
	Amount Realized and %age	Rs. Mln.	21862.87	12092.14	34869.56	3355.88	1570.72	4110.28	6888.67	**84750.13**
	Recovery to Billed Amount	%	45.99	95.20	102.70	65.03	128.84	102.40	74.08	**74.42**
SEPCO	Units Billed	GWh	1371.99	215.02	373.75	174.51	77.98	185.27	139.67	**2538.19**
	Amount of Units Billed	Rs. Mln.	29827.26	11236.18	16411.48	2244.00	5637.44	7862.94	8012.91	**81232.21**
	Amount Realized and %age	Rs. Mln.	10390.18	10807.59	15139.14	1906.75	2435.59	6956.58	6386.63	**54022.46**
	Recovery to Billed Amount	%	34.83	96.19	92.25	84.97	43.20	88.47	79.70	**66.50**
QESCO	Units Billed	GWh	561.93	144.44	160.89	3146.29	12.86	136.99	236.45	**4399.85**
	Amount of Units Billed	Rs. Mln.	13825.84	7632.87	6801.55	84984.96	588.92	6127.86	10517.53	**130479.53**
	Amount Realized and %age	Rs. Mln.	7982.85	7136.51	6583.06	13987.88	35.24	5902.08	6546.89	**48174.51**
	Recovery to Billed Amount	%	57.74	93.50	96.79	16.46	5.98	96.32	62.25	**36.92**
Total in CPPA-G System	**Units Billed**	**GWh**	**46153.20**	**7073.63**	**25737.81**	**9573.37**	**412.06**	**3985.26**	**4402.06**	**97337.39**
	Amount of Units Billed	**Rs. Mln.**	**1235062.86**	**380414.59**	**979810.59**	**248977.41**	**18186.33**	**144609.30**	**196939.43**	**3204000.50**
	Amount Realized and %age	**Rs. Mln.**	**1141296.58**	**370758.48**	**950531.50**	**155741.20**	**12861.23**	**186079.47**	**174937.02**	**2992205.46**
	Recovery to Billed Amount	**%**	**92.41**	**97.46**	**97.01**	**62.55**	**70.72**	**128.68**	**88.83**	**93.39**
KE	Units Billed	GWh	7369.71	1817.99	5350.19	66.31	47.53	469.42	432.66	**15553.81**
	Amount of Units Billed	Rs. Mln.	216981.74	88368.83	193202.97	1145.84	1837.53	18268.36	17353.79	**537159.06**
	Amount Realized and %age	Rs. Mln.	183201.00	84298.00	191943.00	326.00	2472.00	18257.00	17780.00	**498277.00**
	Recovery to Billed Amount	%	84.43	95.39	99.35	28.45	134.53	99.94	102.46	**92.76**

Source: Distribution Comapnies / KE

TABLE 68

Category-wise Electricity Sold (GWh)

DISCO	Year	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	2018-19	4828.51	791.78	2342.93	66.66	13.03	667.90	362.75	**9073.56**
	2019-20	5099.18	774.96	2008.00	69.27	12.93	651.58	427.13	**9043.05**
	2020-21	5372.61	801.62	2274.06	78.97	46.37	641.42	392.49	**9607.54**
	2021-22	5688.78	874.45	2527.90	77.18	12.37	698.14	476.35	**10355.17**
	2022-23	5128.21	875.37	2236.23	55.71	12.32	783.91	457.11	**9548.86**
TESCO	2018-19	1212.94	5.13	326.86	36.49	0.00	9.30	12.34	**1603.06**
	2019-20	1415.14	4.90	329.71	32.50	0.00	10.30	10.23	**1802.76**
	2020-21	1401.58	5.01	553.82	30.99	0.00	12.48	8.77	**2012.65**
	2021-22	1468.63	5.45	547.31	26.27	0.00	12.98	10.95	**2071.59**
	2022-23	1110.73	6.13	394.33	21.53	0.00	20.93	11.01	**1564.66**
IESCO	2018-19	4990.63	1202.07	1811.16	46.82	74.37	988.54	1675.46	**10789.05**
	2019-20	5028.18	1098.90	1487.49	26.92	77.35	919.43	1803.76	**10442.03**
	2020-21	5325.00	1166.00	1521.00	35.00	81.00	918.00	1898.00	**10944.00**
	2021-22	5757.32	1305.56	1685.74	35.67	83.47	1034.07	2060.09	**11961.92**
	2022-23	5155.61	1224.19	1389.79	28.28	78.09	1468.08	1434.47	**10778.51**
GEPCO	2018-19	5804.60	602.68	2596.87	449.10	6.45	399.33	145.31	**10004.34**
	2019-20	5944.20	593.84	2397.03	474.66	7.29	156.82	371.79	**9945.63**
	2020-21	6372.55	671.74	2775.92	542.03	9.71	160.05	390.10	**10922.10**
	2021-22	6816.69	757.73	2797.44	535.09	9.92	177.32	434.57	**11528.76**
	2022-23	6098.01	698.77	2531.64	521.62	16.01	159.90	428.86	**10454.81**
LESCO	2018-19	9043.00	1685.00	8153.00	1147.00	110.00	667.00	327.00	**21132.00**
	2019-20	9259.00	1563.00	7381.00	1116.00	117.00	627.00	547.00	**20610.00**
	2020-21	9663.64	1662.38	8351.36	1187.71	139.70	654.33	693.03	**22352.15**
	2021-22	10353.55	1867.70	9775.38	1332.18	138.82	720.49	882.63	**25070.75**
	2022-23	9088.78	1807.05	9145.70	1347.15	143.01	682.40	878.07	**23092.17**
FESCO	2018-19	6486.18	737.08	4697.54	1107.98	10.35	268.36	192.19	**13499.68**
	2019-20	6656.34	712.71	4133.46	1138.95	10.47	255.43	215.88	**13123.24**
	2020-21	7061.51	769.75	4937.35	1267.71	13.42	237.80	213.66	**14501.20**
	2021-22	7390.64	847.89	5821.99	1367.22	17.72	213.72	259.61	**15918.79**
	2022-23	6549.92	784.61	5669.39	1209.18	17.31	194.58	237.70	**14662.69**
MEPCO	2018-19	8914.59	945.93	3011.39	2879.97	18.20	294.95	244.58	**16309.61**
	2019-20	9469.57	903.24	2509.25	2916.57	18.04	275.93	289.33	**16381.93**
	2020-21	9825.38	980.72	2860.58	3201.47	20.20	275.51	302.24	**17466.10**
	2021-22	10243.68	1077.49	3460.11	3736.51	23.35	294.09	367.19	**19202.42**
	2022-23	9100.37	1081.70	2999.15	2906.14	25.33	261.93	357.74	**16732.36**
HESCO	2018-19	2155.74	294.88	753.18	264.20	27.70	112.58	308.40	**3916.68**
	2019-20	2394.05	261.82	717.34	214.13	3.49	106.62	192.55	**3890.00**
	2020-21	2408.50	265.05	823.94	200.58	4.96	105.86	205.29	**4014.18**
	2021-22	2298.04	263.53	914.43	208.11	8.09	113.39	228.92	**4034.50**
	2022-23	1987.65	236.35	836.94	162.96	29.14	91.27	220.98	**3565.29**
SEPCO	2018-19	1596.67	209.51	419.90	109.89	20.20	177.07	247.37	**2780.61**
	2019-20	1765.85	209.33	365.13	81.11	16.41	159.78	112.49	**2710.10**
	2020-21	1795.88	227.32	375.13	84.90	165.92	22.85	105.63	**2777.63**
	2021-22	1794.92	235.94	412.22	87.03	40.06	206.06	113.94	**2890.17**
	2022-23	1371.99	215.02	373.75	174.51	77.98	185.27	139.67	**2538.19**
QESCO	2018-19	557.48	127.44	171.74	3567.40	9.08	126.72	218.90	**4778.76**
	2019-20	611.92	136.78	160.63	3572.06	9.60	126.94	224.08	**4842.01**
	2020-21	587.89	138.38	191.79	3485.96	10.57	130.47	229.94	**4775.00**
	2021-22	591.97	151.15	172.46	3516.63	10.97	140.79	247.63	**4831.60**
	2022-23	561.93	144.44	160.89	3146.29	12.86	136.99	236.45	**4399.85**
Total in CPPA-G System	**2018-19**	**45590.34**	**6601.50**	**24284.57**	**9675.51**	**289.38**	**3711.75**	**3734.30**	**93887.35**
	2019-20	**47643.43**	**6259.48**	**21489.04**	**9642.17**	**272.58**	**3289.83**	**4194.24**	**92790.75**
	2020-21	**49814.54**	**6687.97**	**24664.95**	**10115.32**	**491.85**	**3158.77**	**4439.15**	**99372.55**
	2021-22	**52404.21**	**7386.89**	**28114.97**	**10921.89**	**344.77**	**3611.05**	**5081.89**	**107865.67**
	2022-23	**46153.20**	**7073.63**	**25737.81**	**9573.37**	**412.06**	**3985.26**	**4402.06**	**97337.39**
KE	2018-19	7298.83	1780.58	4402.12	134.30	160.48	477.22	64.58	**14318.11**
	2019-20	7489.18	1615.20	4158.29	116.11	112.03	467.74	318.41	**14276.96**
	2020-21	8041.32	1708.58	5220.99	121.70	98.04	454.31	423.91	**16068.85**
	2021-22	8004.68	1846.46	5842.80	110.72	63.82	467.84	426.91	**16763.23**
	2022-23	7369.71	1817.99	5350.19	66.31	47.53	469.42	432.66	**15553.81**

Source: Distribution Companies / KE

TABLE 69

Category-wise Energy Sales in CPPA-G and K-Electric System

		2018-19	2019-20	2020-21	2021-22	2022-23
CPPA-G System						
Domestic	GWh	45,590.34	47,643.43	49,814.54	52,404.21	46,153.20
Percentage share	%	46.12	48.51	47.22	44.83	43.42
Commercial	GWh	6,601.50	6,259.48	6,687.97	7,386.89	7,073.63
Percentage share	%	6.68	6.37	6.34	6.32	6.65
Industrial	GWh	24,284.57	21,489.04	24,664.95	28,114.97	25,737.81
Percentage share	%	24.57	21.88	23.38	24.05	24.21
Agricultural	GWh	9,675.51	9,642.17	10,115.32	10,921.89	9,573.37
Percentage share	%	9.79	9.82	9.59	9.34	9.01
Public Lighting	GWh	289.38	272.58	491.85	344.77	412.06
Percentage share	%	0.29	0.28	0.47	0.29	0.39
Bulk Supply	GWh	3,711.75	3,289.83	3,158.77	3,611.05	3,985.26
Percentage share	%	3.76	3.35	2.99	3.09	3.75
Others	GWh	3,734.30	4,194.24	4,439.15	5,081.89	4,402.06
Percentage share	%	3.78	4.27	4.21	4.35	4.14
Supplied to KE	GWh	4,956.71	5,426.14	6,118.04	9,036.54	8,960.81
Percentage share	%	5.01	5.52	5.80	7.73	8.43
Total in CPPA-G area	**GWh**	**98,844.06**	**98,216.89**	**105,490.59**	**116,902.21**	**106,298.20**
Percentage share	**%**	**87.35**	**87.31**	**86.78**	**87.46**	**87.24**
KE System						
Domestic	GWh	7,298.83	7,489.18	8,041.32	8,004.68	7,369.71
Percentage share	%	50.98	52.46	50.04	47.75	47.38
Commercial	GWh	1,780.58	1,615.20	1,708.58	1,846.46	1,817.99
Percentage share	%	12.44	11.31	10.63	11.01	11.69
Industrial	GWh	4,402.12	4,158.29	5,220.99	5,842.80	5,350.19
Percentage share	%	30.75	29.13	32.49	34.85	34.40
Agricultural	GWh	134.30	116.11	121.70	110.72	66.31
Percentage share	%	0.94	0.81	0.76	0.66	0.43
Public Lighting	GWh	160.48	112.03	98.04	63.82	47.53
Percentage share	%	1.12	0.78	0.61	0.38	0.31
Bulk Supply	GWh	477.22	467.74	454.31	467.84	469.42
Percentage share	%	3.33	3.28	2.83	2.79	3.02
Others	GWh	64.58	318.41	423.91	426.91	432.66
Percentage share	%	0.45	2.23	2.64	2.55	2.78
Total in KE area	**GWh**	**14,318.11**	**14,276.96**	**16,068.85**	**16,763.23**	**15,553.81**
Percentage share	**%**	**12.65**	**12.69**	**13.22**	**12.54**	**12.76**
Country						
Domestic	GWh	52,889.17	55,132.61	57,855.86	60,408.89	53,522.91
Percentage share	%	46.74	49.01	47.59	45.19	43.92
Commercial	GWh	8,382.08	7,874.68	8,396.55	9,233.35	8,891.62
Percentage share	%	7.41	7.00	6.91	6.91	7.30
Industrial	GWh	28,686.69	25,647.33	29,885.94	33,957.77	31,088.00
Percentage share	%	25.35	22.80	24.59	25.41	25.51
Agricultural	GWh	9,809.81	9,758.28	10,237.02	11,032.61	9,639.68
Percentage share	%	8.67	8.67	8.42	8.25	7.91
Public Lighting	GWh	449.86	384.61	589.89	408.59	459.59
Percentage share	%	0.40	0.34	0.49	0.31	0.38
Bulk Supply	GWh	4,188.97	3,757.57	3,613.08	4,078.89	4,454.68
Percentage share	%	3.70	3.34	2.97	3.05	3.66
Others	GWh	3,798.88	4,512.65	4,863.06	5,508.80	4,834.72
Percentage share	%	3.36	4.01	4.00	4.12	3.97
Supplied to KE by CPPA-G	GWh	4,956.71	5,426.14	6,118.04	9,036.54	8,960.81
Percentage share	%	4.38	4.82	5.03	6.76	7.35
Total in the Country	**GWh**	**113,162.17**	**112,493.85**	**121,559.44**	**133,665.44**	**121,852.01**
Percentage share	**%**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Distribution Companies /KE

TABLE 70

Category-wise Consumers and their Electricity Consumption (%)

		2018-19	2019-20	2020-21	2021-22	2022-23
CPPA-G System (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	85.92	86.13	86.35	86.60	86.82
	Consumption	46.12	48.51	47.22	44.83	43.42
Commercial	Consumers	11.04	10.83	10.64	10.47	10.31
	Consumption	6.68	6.37	6.34	6.32	6.65
Industrial	Consumers	1.20	1.16	1.13	1.11	1.08
	Consumption	24.57	21.88	23.38	24.05	24.21
Agricultural	Consumers	1.15	1.15	1.14	1.11	1.08
	Consumption	9.79	9.82	9.59	9.34	9.01
Public Lighting	Consumers	0.04	0.04	0.04	0.04	0.04
	Consumption	0.29	0.28	0.47	0.29	0.39
Bulk Supply	Consumers	0.02	0.01	0.01	0.01	0.01
	Consumption	3.76	3.35	2.99	3.09	3.75
Others	Consumers	0.63	0.67	0.70	0.66	0.65
	Consumption	3.78	4.27	4.21	4.35	4.14
Supplied to KE	Consumption	5.01	5.52	5.80	7.73	8.43
KE System (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	81.86	82.70	83.24	83.75	84.18
	Consumption	50.98	52.46	50.04	47.75	47.38
Commercial	Consumers	16.90	15.91	15.40	14.96	14.55
	Consumption	12.44	11.31	10.63	11.01	11.69
Industrial	Consumers	0.74	0.76	0.73	0.70	0.66
	Consumption	30.75	29.13	32.49	34.85	34.40
Agricultural	Consumers	0.08	0.08	0.07	0.06	0.06
	Consumption	0.94	0.81	0.76	0.66	0.43
Public Lighting	Consumers	0.00	0.00	0.00	0.01	0.01
	Consumption	1.12	0.78	0.61	0.38	0.31
Bulk Supply	Consumers	0.01	0.01	0.01	0.01	0.01
	Consumption	3.33	3.28	2.83	2.79	3.02
Others	Consumers	0.41	0.54	0.55	0.53	0.53
	Consumption	0.45	2.23	2.64	2.55	2.78
Country (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	85.56	85.83	86.06	86.34	86.58
	Consumption	46.74	49.01	47.59	45.19	43.92
Commercial	Consumers	11.57	11.29	11.07	10.89	10.71
	Consumption	7.41	7.00	6.91	6.91	7.30
Industrial	Consumers	1.16	1.13	1.10	1.07	1.04
	Consumption	25.35	22.80	24.59	25.41	25.51
Agricultural	Consumers	1.05	1.05	1.04	1.02	0.99
	Consumption	8.67	8.67	8.42	8.25	7.91
Public Lighting	Consumers	0.03	0.03	0.03	0.03	0.03
	Consumption	0.40	0.34	0.49	0.31	0.38
Bulk Supply	Consumers	0.01	0.01	0.01	0.01	0.01
	Consumption	3.70	3.34	2.97	3.05	3.66
Others	Consumers	0.61	0.66	0.68	0.64	0.64
	Consumption	3.36	4.01	4.00	4.12	3.97
Supplied to KE by CPPA-G	Consumption	4.38	4.82	5.03	6.76	7.35

Source: Distribution Companies /KE

TABLE 71

Annual Growth Rate of Electricity Consumption

		2018-19	2019-20	2020-21	2021-22	2022-23
CPPA-G System						
Domestic	GWh	45,590.34	47,643.43	49,814.54	52,404.21	46,153.20
	%	-1.24	4.50	4.56	5.20	-11.93
Commercial	GWh	6,601.50	6,259.48	6,687.97	7,386.89	7,073.63
	%	-2.25	-5.18	6.85	10.45	-4.24
Industrial	GWh	24,284.57	21,489.04	24,664.95	28,114.97	25,737.81
	%	4.34	-11.51	14.78	13.99	-8.46
Agricultural	GWh	9,675.51	9,642.17	10,115.32	10,921.89	9,573.37
	%	-3.09	-0.34	4.91	7.97	-12.35
Public Lighting	GWh	289.38	272.58	491.85	344.77	412.06
	%	-9.27	-5.81	80.44	-29.90	19.52
Bulk Supply	GWh	3,711.75	3,289.83	3,158.77	3,611.05	3,985.26
	%	-25.97	-11.37	-3.98	14.32	10.36
Others	GWh	3,734.30	4,194.24	4,439.15	5,081.89	4,402.06
	%	847.50	12.32	5.84	14.48	-13.38
Supplied to KE	GWh	4,956.71	5,426.14	6,118.04	9,036.54	8,960.81
	%	-3.34	9.47	12.75	47.70	-0.84
Total	**GWh**	**98,844.06**	**98,216.89**	**105,490.59**	**116,902.21**	**106,298.20**
Percentage change	**%**	**1.87**	**-0.63**	**7.41**	**10.82**	**-9.07**
KE System						
Domestic	GWh	7,298.83	7,489.18	8,041.32	8,004.68	7,369.71
	%	1.80	2.61	7.37	-0.46	-7.93
Commercial	GWh	1,780.58	1,615.20	1,708.58	1,846.46	1,817.99
	%	1.27	-9.29	5.78	8.07	-1.54
Industrial	GWh	4,402.12	4,158.29	5,220.99	5,842.80	5,350.19
	%	6.75	-5.54	25.56	11.91	-8.43
Agricultural	GWh	134.30	116.11	121.70	110.72	66.31
	%	-11.35	-13.54	4.81	-9.02	-40.11
Public Lighting	GWh	160.48	112.03	98.04	63.82	47.53
	%	2.52	-30.19	-12.49	-34.90	-25.52
Bulk Supply	GWh	477.22	467.74	454.31	467.84	469.42
	%	1.30	-1.99	-2.87	2.98	0.34
Others	GWh	64.58	318.41	423.91	426.91	432.66
	%	119.36	393.05	33.13	0.71	1.35
Total	**GWh**	**14,318.11**	**14,276.96**	**16,068.85**	**16,763.23**	**15,553.81**
Percentage change	**%**	**3.30**	**-0.29**	**12.55**	**4.32**	**-7.21**
Country						
Domestic	GWh	52,889.17	55,132.61	57,855.86	60,408.89	53,522.91
	%	-0.83	4.24	4.94	4.41	-11.40
Commercial	GWh	8,382.08	7,874.68	8,396.55	9,233.35	8,891.62
	%	-1.52	-6.05	6.63	9.97	-3.70
Industrial	GWh	28,686.69	25,647.33	29,885.94	33,957.77	31,088.00
	%	4.70	-10.60	16.53	13.62	-8.45
Agricultural	GWh	9,809.81	9,758.28	10,237.02	11,032.61	9,639.68
	%	-3.21	-0.53	4.91	7.77	-12.63
Public Lighting	GWh	449.86	384.61	589.89	408.59	459.59
	%	-5.39	-14.50	53.37	-30.73	12.48
Bulk Supply	GWh	4,188.97	3,757.57	3,613.08	4,078.89	4,454.68
	%	-23.63	-10.30	-3.85	12.89	9.21
Others	GWh	3,798.88	4,512.65	4,863.06	5,508.80	4,834.72
	%	796.89	18.79	7.76	13.28	-12.24
Supplied to KE by CPPA-G	GWh	4,956.71	5,426.14	6,118.04	9,036.54	8,960.81
	%	-3.34	9.47	12.75	47.70	-0.84
Total	**GWh**	**113,162.17**	**112,493.85**	**121,559.44**	**133,665.44**	**121,852.01**
Percentage change	**%**	**2.05**	**-0.59**	**8.06**	**9.96**	**-8.84**

Source: Distribution Companies /KE

TABLE 72

Average Annual Electricity Consumption per Connection (kWh)

DISCO	Year	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Overall
PESCO	2018-19	1593.68	2262.33	88139.72	2911.43	12031.39	752987.60	8798.63	2613.02
	2019-20	1596.58	2139.69	74594.15	3015.94	11554.96	735417.61	10110.78	2477.46
	2020-21	1591.95	2120.77	82420.35	3426.18	39871.02	720696.63	9042.51	2496.15
	2021-22	1604.21	2219.44	89625.95	3338.09	10282.63	778305.46	10648.26	2564.23
	2022-23	1388.77	2149.78	78406.44	2407.00	9943.50	871011.11	10020.39	2273.95
TESCO	2018-19	3017.06	178.82	77035.12	5897.85	0.00	143076.92	9027.07	3622.06
	2019-20	3520.20	170.09	77196.68	5246.37	0.00	153671.64	7135.98	4071.60
	2020-21	3485.89	172.40	129518.24	4971.13	0.00	183529.41	5990.44	4541.38
	2021-22	3652.55	183.11	125472.26	4201.86	0.00	180277.78	6809.70	4664.21
	2022-23	2747.98	203.22	88733.12	5924.60	0.00	243372.09	4097.51	3514.35
IESCO	2018-19	1973.47	2923.19	111305.31	6606.46	40661.56	1029729.17	121780.78	3620.50
	2019-20	1897.86	2578.78	90927.93	3808.72	40412.75	1088082.84	97621.91	3346.60
	2020-21	1913.16	2666.15	89386.46	4832.92	39725.36	1082547.17	66996.12	3340.49
	2021-22	1936.98	2809.88	95433.65	4826.14	37263.39	1210854.80	100433.40	3431.79
	2022-23	1632.38	2529.02	76754.29	3769.16	30926.73	1721078.55	65384.48	2918.37
GEPCO	2018-19	1920.93	1646.46	35508.87	9578.35	11120.69	2627171.05	7125.48	2834.93
	2019-20	1862.10	1565.74	32285.84	9406.66	12355.93	1045466.67	17763.50	2675.11
	2020-21	1881.24	1703.86	36364.02	10234.71	15661.29	1081418.92	18258.83	2776.98
	2021-22	1898.17	1846.45	34740.45	9732.09	14739.97	1198108.11	19920.70	2771.53
	2022-23	1597.56	1644.00	30387.46	9266.49	22773.83	1158695.65	18892.51	2373.25
LESCO	2018-19	2201.28	2702.36	96253.97	18636.16	43069.69	1350202.43	36462.98	4321.59
	2019-20	2116.34	2429.87	85688.08	17527.60	45631.83	1284836.07	33996.27	3973.25
	2020-21	2061.21	2501.52	94990.33	17968.11	53463.45	1395159.91	38796.95	4043.55
	2021-22	2062.99	2714.88	108695.00	19519.12	50924.43	1569699.35	45951.27	4258.48
	2022-23	1720.07	2565.40	100336.84	19263.22	51462.04	1506410.60	43982.72	3741.07
FESCO	2018-19	1776.20	1844.14	93900.09	25909.78	5808.08	1203408.07	7621.75	3236.24
	2019-20	1723.98	1724.22	81189.92	24771.63	5629.03	1130221.24	7679.83	2981.56
	2020-21	1730.28	1802.06	94489.31	25487.76	7130.71	1038427.95	7263.89	3124.05
	2021-22	1722.27	1927.00	108873.12	26332.19	9262.94	925194.81	8547.96	3269.32
	2022-23	1450.09	1736.02	104287.66	22667.17	8854.22	828000.00	7646.77	2869.50
MEPCO	2018-19	1550.77	1691.54	53658.88	33496.98	12125.25	649669.60	7263.39	2514.81
	2019-20	1554.69	1559.97	43608.04	31065.68	11331.66	603785.56	7646.14	2387.58
	2020-21	1531.53	1632.73	48065.67	32296.65	12124.85	601550.22	7401.49	2419.91
	2021-22	1508.95	1742.75	56987.50	36379.58	13404.13	633814.66	8653.20	2521.67
	2022-23	1287.52	1700.89	49354.10	27326.44	13948.24	556114.65	8077.22	2113.26
HESCO	2018-19	2375.79	1800.34	49388.85	18304.00	51296.30	329181.29	22145.63	3510.64
	2019-20	2564.93	1575.21	48299.22	13795.26	6101.40	309941.86	13952.90	3398.33
	2020-21	2513.21	1568.28	54231.55	12808.43	8671.33	306840.58	14795.68	3422.18
	2021-22	2348.36	1533.55	59033.38	13230.97	14115.18	327719.65	16420.84	3371.94
	2022-23	1984.19	1348.69	52750.54	10246.23	49647.36	260019.94	15733.50	2913.42
SEPCO	2018-19	2644.00	1720.45	32474.86	11854.37	47529.41	335996.20	18572.72	3648.46
	2019-20	2810.93	1690.76	27802.48	8678.58	37126.70	300338.35	8428.11	3435.66
	2020-21	2792.52	1812.93	28032.43	9060.83	310130.84	51348.31	7827.92	3447.40
	2021-22	2759.02	1860.46	30460.36	9281.22	74185.19	458930.96	8442.50	3547.19
	2022-23	2085.21	1681.00	27277.04	18474.49	143874.54	393354.56	10306.23	3081.88
QESCO	2018-19	1203.20	1059.25	46567.25	120487.71	33880.60	476390.98	30709.88	7650.90
	2019-20	1280.82	1107.49	43191.72	120681.78	35036.50	468413.28	28537.95	7530.62
	2020-21	1197.32	1082.67	50444.50	117613.95	37885.30	462659.57	24603.04	7211.16
	2021-22	1175.53	1146.67	45005.22	118712.82	38763.25	470869.57	24867.44	7111.66
	2022-23	1094.53	1069.62	41964.01	106264.86	44965.03	449147.54	21438.93	6344.41
Total in CPPA-G System	**2018-19**	**1863.47**	**2099.55**	**70811.02**	**29619.88**	**27385.26**	**849370.71**	**20864.81**	**3297.41**
	2019-20	**1846.38**	**1928.66**	**61734.67**	**27973.44**	**24934.14**	**771173.46**	**20958.12**	**3097.43**
	2020-21	**1829.73**	**1994.51**	**69034.96**	**28166.96**	**43243.36**	**755325.20**	**20233.97**	**3151.72**
	2021-22	**1823.20**	**2125.44**	**76454.23**	**29570.09**	**28976.97**	**855902.58**	**23303.06**	**3249.97**
	2022-23	**1532.60**	**1977.55**	**68805.36**	**25518.17**	**33131.46**	**934848.93**	**19400.10**	**2806.39**
KE	2018-19	3175.32	3751.54	211213.90	57664.23	1725591.40	2538404.26	5677.36	5098.92
	2019-20	3060.39	3430.92	184378.57	51127.26	1244777.78	2672800.00	19772.11	4824.77
	2020-21	3032.71	3482.26	224616.68	56238.45	1114090.91	2672411.76	24241.44	5044.64
	2021-22	2806.74	3625.24	246469.25	52900.14	354555.56	2658181.82	23853.72	4922.64
	2022-23	2455.22	3502.86	226530.19	31636.45	256918.92	2395000.00	22703.47	4361.94

Source: Distribution Companies / KE

TABLE 73

Distribution Losses (voltage category-wise)

DISCO	Losses of	2018-19		2019-20		2020-21		2021-22		2022-23	
		GWh	%	GWh	%	GWh	%	GWh	%	GWh	%
PESCO	132 kV system (including 66 & 33 kV)	221.80	1.60	273.70	1.90	235.60	1.50	322.67	1.95	160.92	1.06
	11 kV and below system	5006.40	35.60	5433.50	37.50	5697.60	37.20	5843.37	35.99	5498.76	36.46
	Overall system	5228.24	36.56	5707.25	38.69	5933.36	38.18	6205.02	37.47	5705.67	37.40
TESCO	132 kV system (including 66 & 33 kV)	40.79	2.24	87.76	4.08	39.85	1.79	2284.45	1.20	1719.83	2.06
	11 kV and below system	177.21	9.96	260.24	12.61	173.50	7.94	2251.01	7.97	1698.38	7.90
	Overall system	217.94	11.97	348.24	16.19	213.35	9.58	212.41	9.30	155.17	9.02
IESCO	132 kV system (including 66 & 33 kV)	212.00	1.79	199.00	1.74	137.00	1.15	128.00	0.99	10.00	0.09
	11 kV and below system	837.00	7.20	795.00	7.07	885.00	7.48	937.00	7.26	935.00	7.98
	Overall system	1048.74	8.86	993.49	8.69	1022.00	8.54	1065.08	8.18	945.33	8.06
GEPCO	132 kV system (including 66 & 33 kV)	138.17	1.24	120.87	1.10	115.16	0.96	115.69	0.91	65.89	0.58
	11 kV and below system	957.50	8.73	924.71	8.51	995.21	8.35	1033.75	8.23	919.37	8.08
	Overall system	1095.62	9.87	1045.56	9.51	1110.38	9.23	1149.44	9.07	985.26	8.61
LESCO	132 kV system (including 66 & 33 kV)	228.67	0.90	114.91	0.50	74.91	0.30	138.65	0.50	180.96	0.70
	11 kV and below system	2977.77	12.40	2802.65	12.00	2960.83	11.70	3125.07	11.10	2759.37	10.70
	Overall system	3206.45	13.17	2918.33	12.40	3035.72	11.96	3263.25	11.52	2940.27	11.29
FESCO	132 kV system (including 66 & 33 kV)	254.47	1.70	218.42	1.50	225.36	1.40	248.68	1.42	107.47	0.67
	11 kV and below system	1214.76	8.26	1168.66	8.20	1257.81	8.00	1346.58	7.80	1271.48	7.98
	Overall system	1469.07	9.81	1387.09	9.56	1483.28	9.28	1593.74	9.10	1378.09	8.59
MEPCO	132 kV system (including 66 & 33 kV)	352.88	1.80	292.07	1.51	321.38	1.57	383.87	1.69	118.30	0.60
	11 kV and below system	2704.17	14.20	2650.66	13.90	2744.74	13.60	2962.42	13.30	2655.72	13.50
	Overall system	3057.04	15.79	2942.75	15.23	3066.11	14.93	3346.29	14.84	2773.21	14.22
HESCO	132 kV system (including 66 & 33 kV)	212.90	3.83	157.64	2.88	145.60	2.61	102.20	1.84	98.62	2.02
	11 kV and below system	1425.90	25.67	1423.22	26.04	1414.70	26.06	1423.00	26.50	1220.10	25.50
	Overall system	1638.47	29.49	2921.64	42.89	2518.40	38.55	1976.42	32.88	1655.59	31.71
SEPCO	132 kV system (including 66 & 33 kV)	104.89	2.38	76.03	1.79	75.32	1.76	87.49	1.95	68.19	1.76
	11 kV and below system	1485.99	34.83	1423.40	34.44	1412.9	33.73	1454.27	33.47	1227.48	32.60
	Overall system	1631.02	36.97	1542.38	36.27	1513.33	35.27	1599.60	35.63	1330.31	34.39
QESCO	132 kV system (including 66 & 33 kV)	99.54	1.60	127.10	1.90	114.91	1.70	126.71	1.90	15.47	0.30
	11 kV and below system	1373.18	22.30	1634.91	25.20	1734.4	26.60	1758.01	26.70	1587.36	26.50
	Overall system	1472.64	23.56	1762.00	26.68	1849.56	27.92	1884.70	28.06	1604.70	26.72
Total Distribution Losses in CPPA-G System		**20065.23**	**17.61**	**21568.72**	**18.86**	**21745.49**	**17.95**	**22295.95**	**17.13**	**19473.60**	**16.67**
KE	220 kV & 132 kV system (including 66 kV)	214.93	1.21	198.16	1.11	208.00	1.07	164.41	0.83	157.19	0.86
	11 kV and below system	3163.78	18.10	3311.38	18.83	3210.00	16.65	2874.59	14.64	2646.00	14.54
	Overall system	3396.47	19.17	3522.26	19.79	3416.82	17.54	3058.66	15.43	2811.99	15.43

Source: Distribution Companies / KE

TABLE 74

DISCOs' Billing, Collection and Percentage of Recovery against Computed Billing

DISCO	FY	Billing (Rs. in Million)			Collection (Rs. in Million)			%age of Collection		
		Govt.	Pvt.	Total	Govt.	Pvt.	Total	Govt.	Pvt.	Total
PESCO	2019-20	25655.13	134829.74	160484.87	21838.78	118959.50	140798.28	85.12	88.23	87.73
	2020-21	26085.99	149987.73	176073.72	39300.85	141973.17	181274.02	150.66	94.66	102.95
	2021-22	33716.95	198912.01	232628.96	31700.19	182719.49	214419.68	94.02	91.86	92.17
	2022-23	46958.67	265016.19	311974.86	51075.45	236230.22	287305.67	108.77	89.14	92.09
TESCO	2019-20	940.60	26847.10	27787.70	727.96	5051.32	5779.28	77.39	18.82	20.80
	2020-21	715.43	29468.12	30183.55	652.17	8475.67	9127.84	91.16	28.76	30.24
	2021-22	1302.22	41107.73	42409.95	1098.64	27628.96	28727.60	84.37	67.21	67.74
	2022-23	1900.73	47457.25	49357.98	1536.02	39430.00	40966.02	80.81	83.09	83.00
IESCO	2019-20	58096.00	143613.00	201709.00	42364.00	139041.00	181405.00	72.92	96.82	89.93
	2020-21	62450.00	155904.00	218354.00	97902.00	159841.00	257743.00	156.77	102.53	118.04
	2021-22	79036.63	211166.14	290202.77	66812.50	210472.16	277284.66	84.53	99.67	95.55
	2022-23	102916.05	277452.64	380368.69	130243.48	274158.60	404402.08	126.55	98.81	106.32
GEPCO	2019-20	11422.67	155525.30	166947.97	9382.33	149261.88	158644.21	82.14	95.97	95.03
	2020-21	12638.14	177724.79	190362.93	19149.48	183045.64	202195.12	151.52	102.99	106.22
	2021-22	16134.85	233013.74	249148.59	15989.04	232418.32	248407.36	99.10	99.74	99.70
	2022-23	21121.32	315385.02	336506.34	27194.12	308846.06	336040.18	128.75	97.93	99.86
LESCO	2019-20	26270.56	356035.93	382306.49	23939.14	342529.91	366469.05	91.13	96.21	95.86
	2020-21	29356.20	397310.87	426667.07	26575.26	399496.97	426072.23	90.53	100.55	99.86
	2021-22	27136.98	585816.12	612953.10	26575.49	533012.27	559587.76	97.93	90.99	91.29
	2022-23	46971.08	774200.94	821172.02	62239.00	708829.95	771068.95	132.50	91.56	93.90
FESCO	2019-20	12513.30	246482.21	258995.51	11449.36	240305.21	251754.57	91.50	97.49	97.20
	2020-21	12506.79	229123.46	241630.25	11446.92	234916.46	246363.38	91.53	102.53	101.96
	2021-22	15854.00	350853.00	366707.00	15295.00	332482.00	347777.00	96.47	94.76	94.84
	2022-23	20785.00	459771.00	480556.00	20376.00	462056.00	482432.00	98.03	100.50	100.39
MEPCO	2019-20	15391.32	224018.62	239409.94	14601.86	210938.55	225540.41	94.87	94.16	94.21
	2020-21	16415.69	256160.34	272576.03	15465.82	266938.30	282404.12	94.21	104.21	103.61
	2021-22	21753.73	342325.10	364078.83	21062.28	342032.95	363095.23	96.82	99.91	99.73
	2022-23	27915.53	458049.02	485964.55	26022.28	450843.06	476865.34	93.22	98.43	98.13
HESCO	2019-20	8948.73	57176.51	66125.24	4680.62	43718.77	48399.39	52.30	76.46	73.19
	2020-21	9719.55	62307.38	72026.93	8097.82	46377.55	54475.37	83.31	74.43	75.63
	2021-22	11924.19	76968.38	88892.57	8258.76	57272.08	65530.84	69.26	74.41	73.72
	2022-23	17224.00	92487.80	109711.80	13559.50	69692.70	83252.20	78.72	75.35	75.88
SEPCO	2019-20	9086.48	38780.76	47867.24	4175.64	23156.53	27332.17	45.95	59.71	57.10
	2020-21	9105.61	40992.00	50097.61	6847.01	25587.24	32434.25	75.20	62.42	64.74
	2021-22	12550.67	49771.01	62321.68	9338.77	30975.67	40314.44	74.41	62.24	64.69
	2022-23	25263.24	53937.00	79200.24	19563.32	34445.11	54008.43	77.44	63.86	68.19
QESCO	2019-20	10489.18	60175.97	70665.15	5340.74	13548.81	18889.55	50.92	22.52	26.73
	2020-21	10525.65	57714.92	68240.57	9482.33	15537.55	25019.88	90.09	26.92	36.66
	2021-22	31211.70	64932.00	96143.70	15455.30	18665.70	34121.00	49.52	28.75	35.49
	2022-23	36074.90	94405.00	130479.90	24985.20	23189.80	48175.00	69.26	24.56	36.92
Total in CPPA-G System	**2019-20**	**178813.97**	**1443485.14**	**1622299.11**	**138500.43**	**1286511.48**	**1425011.91**	**77.46**	**89.13**	**87.84**
	2020-21	**189519.05**	**1556693.61**	**1746212.66**	**234919.66**	**1482189.55**	**1717109.21**	**123.96**	**95.21**	**98.33**
	2021-22	**250621.92**	**2154865.23**	**2405487.15**	**211585.97**	**1967679.60**	**2179265.57**	**84.42**	**91.31**	**90.60**
	2022-23	**347130.52**	**2838161.86**	**3185292.38**	**376794.37**	**2607721.50**	**2984515.87**	**108.55**	**91.88**	**93.70**
KE	2019-20	25826.00	229060.00	254886.00	22769.00	212087.00	234856.00	88.16	92.59	92.14
	2020-21	28154.00	287719.00	315873.00	27617.00	272056.00	299673.00	98.09	94.56	94.87
	2021-22	32989.01	357246.72	390235.73	36407.91	340927.00	377334.91	110.36	95.43	96.69
	2022-23	40406.85	496752.20	537159.05	40709.87	457566.49	498276.36	100.75	92.11	92.76

Source: Distribution Companies / KE

TABLE 75

DISCOs' Technical and Commercial Losses

DISCO		T&D Losses			Commercial Losses			Combined Technical & Commercial Losses (%)
		Units Purchased (MWh)	Units Billed (MWh)	Losses (%)	Billing (Computed) (Rs. in Million)	Collection (Rs. in Million)	Losses (%)	
PESCO	2019-20	14791.90	9043.10	38.86	160627.34	140798.28	12.34	46.41
	2020-21	15540.95	9607.69	38.18	176816.03	181273.88	-2.52	36.62
	2021-22	16560.19	10394.15	37.23	232628.96	214419.68	7.83	42.15
	2022-23	15243.61	9583.92	37.13	311974.86	287305.67	7.91	42.10
TESCO	2019-20	2001.32	1802.77	9.92	30625.54	18745.13	38.79	39.20
	2020-21	2226.2	2012.67	9.59	27499.78	25501.88	7.27	23.60
	2021-22	2284.45	2071.59	9.32	42409.95	28727.60	32.26	38.60
	2022-23	1719.83	1564.66	9.02	49357.98	40966.02	17.00	24.50
IESCO	2019-20	11436.00	10442.00	8.69	201709.00	181405.00	10.07	17.88
	2020-21	11966.00	10943.00	8.55	218353.00	257742.00	-18.04	-7.95
	2021-22	13026.93	11961.96	8.18	290202.77	277284.66	4.45	12.26
	2022-23	11723.70	10778.52	8.06	380368.69	404402.08	-6.32	2.25
GEPCO	2019-20	10991.19	9945.62	9.51	166947.97	158644.21	4.97	14.49
	2020-21	12032.48	10922.11	9.23	190363.93	202195.12	-6.22	3.01
	2021-22	12678.20	11528.75	9.07	249148.59	248407.15	0.30	9.34
	2022-23	11440.07	10454.80	8.61	336506.28	336040.19	0.14	8.74
LESCO	2019-20	23528.32	20610.77	12.40	382306.49	366469.05	4.14	16.03
	2020-21	25387.87	22352.13	11.96	426667.07	426072.23	0.14	12.12
	2021-22	28334.45	25070.73	11.52	571563.62	567879.83	0.64	12.10
	2022-23	26032.47	23092.14	11.29	783469.41	751642.42	4.06	14.90
FESCO	2019-20	14510.33	13123.23	9.56	229297.52	215959.00	5.82	14.82
	2020-21	15984.48	14501.28	9.28	258995.51	251754.57	2.80	11.82
	2021-22	17512.55	15919.00	9.10	328930.00	327371.00	0.47	9.57
	2022-23	16040.90	14663.00	8.59	480556.00	482431.00	-0.39	8.20
MEPCO	2019-20	19324.68	16381.95	15.23	239409.94	225540.41	5.79	20.14
	2020-21	20532.21	17466.09	14.93	272576.03	282404.12	-3.61	11.87
	2021-22	22733.91	19202.42	15.53	364078.83	363095.23	0.27	14.90
	2022-23	19818.25	16732.37	15.57	485964.55	476865.34	1.87	15.60
HESCO	2019-20	5470.77	3890.01	28.89	65357.05	45707.20	30.07	50.29
	2020-21	5574.40	4014.10	27.99	70839.90	54302.40	23.34	44.79
	2021-22	5559.80	4034.50	27.43	86037.60	64650.00	24.86	45.50
	2022-23	4884.00	3565.30	27.00	109711.80	83252.20	24.12	44.60
SEPCO	2019-20	4252.50	2710.08	36.27	47867.24	27049.55	43.49	63.60
	2020-21	4290.96	2775.76	35.31	50097.61	32434.25	35.26	58.10
	2021-22	4489.77	2890.18	35.63	62321.68	40314.44	35.31	77.27
	2022-23	3867.55	2538.14	34.37	79200.24	54008.43	31.81	79.13
QESCO	2019-20	6594.90	4841.95	26.58	70665.20	18889.50	73.27	80.00
	2020-21	6615.8	4775.373	27.82	68240.57	25019.88	63.34	74.00
	2021-22	6716.30	4831.57	28.06	96144.00	34121.00	64.51	74.46
	2022-23	6002.60	4399.90	26.70	130480.00	48175.00	63.08	72.94
Total in CPPA-G System	**2019-20**	**112901.91**	**92791.48**	**17.81**	**1594813.29**	**1399207.33**	**12.27**	**30.08**
	2020-21	**120151.35**	**99370.20**	**17.30**	**1760449.43**	**1738700.33**	**1.24**	**18.37**
	2021-22	**129896.55**	**107904.85**	**16.93**	**2323466.00**	**2166270.59**	**6.77**	**23.70**
	2022-23	**116772.98**	**97372.75**	**16.61**	**3147589.81**	**2965088.35**	**5.80**	**22.41**
KE	2019-20	17786.51	14277.42	19.73	254886.00	234855.00	7.86	26.00
	2020-21	19487.42	16068.83	17.54	315873.00	299672.00	5.13	218.00
	2021-22	19802.21	16763.22	15.35	390235.00	377335.00	3.31	18.10
	2022-23	18356.53	15553.83	15.27	537159.00	498276.00	7.24	21.40

Source: Distribution Companies / KE

TABLE 76

Receivables of Distribution Companies including K-Electric Limited

DISCO	Category	June, 2022 (Rs. in Million)				June, 2023 (Rs. in Million)			
		Opening Balance of Receivables at begin of Month (1st of June)	Billing during Month	Collection during Month	Closing Balance of Receivables at end of Month (30th of June)	Opening Balance of Receivables at begin of Month (1st of June)	Billing during Month	Collection during Month	Closing Balance of Receivables at end of Month (30th of June)
PESCO	Federal Govt.	16,614.65	1,712.78	943.64	17,374.25	29,372.70	1,982.77	22,939.80	8,415.72
	Provincial Govt.	1,843.73	1,291.16	1,228.05	1,916.70	6,673.22	1,612.31	1,505.11	6,781.09
	Private	143,602.31	18,005.00	16,994.79	146,490.58	172,146.00	23,051.32	20,005.80	176,761.06
	Total	162,060.69	21,008.94	19,166.48	165,781.53	208,191.92	26,646.40	44,450.71	191,957.87
TESCO	Federal Govt.	1,010.34	55.03	105.71	683.71	792.46	86.67	113.75	721.03
	Provincial Govt.	1,581.61	65.64	84.35	1,839.68	2,466.98	73.25	99.99	2,484.61
	Private	76,077.00	4,042.90	3,218.74	76,900.32	81,550.01	2,659.20	844.89	83,364.31
	Total	78,668.95	4,163.57	3,408.80	79,423.71	84,809.45	2,819.12	1,058.63	86,569.95
IESCO	Federal Govt.	79,797.77	6,827.85	4,882.22	81,743.71	88,699.00	8,659.00	43,025.00	54,334.00
	Provincial Govt.	836.71	153.90	1,357.40	(366.30)	1,371.00	382.00	1,988.00	(233.00)
	Private	18,383.41	24,038.48	23,050.44	19,371.42	22,751.00	30,006.00	32,900.00	19,856.00
	Total	99,017.89	31,020.23	29,290.06	100,748.83	112,821.00	39,047.00	77,913.00	73,957.00
GEPCO	Federal Govt.	9,652.40	1,090.21	716.51	10,026.10	11,196.46	1,535.40	6,324.19	6,407.68
	Provincial Govt.	2,362.34	325.70	728.42	1,959.62	939.08	587.67	1,478.70	48.05
	Private	30,663.16	27,454.94	24,710.88	33,407.22	42,082.80	33,788.79	39,297.02	36,574.57
	Total	42,677.90	28,870.85	26,155.81	45,392.94	54,218.34	35,911.86	47,099.91	43,030.30
LESCO	Federal Govt.	4,233.00	560.00	3,874.00	3,314.81	4,749.00	658.00	1,453.00	3,955.00
	Provincial Govt.	9,827.00	1,240.00	3,703.00	7,374.33	15,366.00	(311.00)	3,971.00	11,087.00
	Private	148,407.00	63,078.00	56,637.00	152,440.99	194,190.00	70,264.00	66,258.00	198,193.00
	Total	162,467.00	64,878.00	64,214.00	163,130.13	214,305.00	70,611.00	71,682.00	213,235.00
FESCO	Federal Govt.	810.55	610.86	477.97	943.66	541.86	694.69	944.39	292.09
	Provincial Govt.	2,393.04	835.57	1,380.22	1,849.28	3,108.83	1,440.48	1,638.26	2,921.02
	Private	69,507.62	37,353.15	36,495.31	70,364.63	93,385.43	44,926.53	70,239.04	68,072.63
	Total	72,711.21	38,799.58	38,353.50	73,157.57	97,036.12	47,061.70	72,821.69	71,285.74
MEPCO	Federal Govt.	774.57	706.47	752.42	729.45	928.18	908.86	726.17	1,087.70
	Provincial Govt.	4,686.83	255.59	2,508.24	3,400.29	6,375.78	2,156.03	911.04	5,985.10
	Private	95,531.41	40,046.42	38,599.44	96,623.73	115,677.02	49,235.55	62,386.29	102,525.99
	Total	100,992.81	41,008.48	41,860.10	100,753.47	122,980.98	52,300.44	64,023.50	109,598.79
HESCO	Federal Govt.	4,968.35	285.92	445.07	4,809.20	5,019.24	452.80	397.38	5,074.82
	Provincial Govt.	12,798.36	594.57	13.85	13,379.08	15,675.17	1,209.57	1.24	16,883.50
	Private	119,414.67	8,408.59	6,078.73	121,744.53	148,297.77	10,896.10	8,392.67	150,801.05
	Total	137,181.38	9,289.08	6,537.65	139,932.81	168,992.18	12,558.47	8,791.29	172,759.37
SEPCO	Federal Govt.	1,525.15	4,773.90	3,520.60	2,778.42	4,860.21	6,237.40	4,364.40	4,646.27
	Provincial Govt.	13,061.70	8,196.30	5,818.20	15,444.68	19,615.70	20,970.80	15,213.00	21,115.48
	Private	130,793.71	50,240.00	30,975.67	150,052.82	163,773.53	54,024.00	34,445.11	165,966.04
	Total	145,380.56	63,210.20	40,314.47	168,275.92	188,249.44	81,232.20	54,022.51	191,727.79
QESCO	Federal Govt.	1,752.15	451.80	524.88	1,679.07	1,947.20	510.57	708.28	1,749.49
	Provincial Govt.	27,743.20	780.83	751.45	27,772.58	32,794.87	949.61	1,306.92	32,437.56
	Private	430,781.46	8,084.10	7,361.50	431,504.06	506,737.50	10,477.21	8,073.00	509,141.71
	Total	460,276.81	9,316.73	8,637.83	460,955.71	541,479.57	11,937.39	10,088.20	543,328.76

DISCO	Category	FY 2021-22 (Rs. in Million)					
		Opening Balance of Receivable as at July, 2021	Billing due	Collection	Billing not due	Adjustments	Closing Balance of Receivable as at June, 2022
KE	Federal Govt.	4,637.67	16,481.36	(17,637.05)	272.71	(27.27)	3,727.42
	Provincial Govt.	46,340.18	16,507.94	(18,770.86)	161.18	343.09	44,581.53
	Private	147,667.80	357,246.72	(340,926.67)	2,921.32	(17,336.29)	149,572.88
	Total	198,645.65	390,236.02	(377,334.58)	3,355.21	(17,020.47)	197,881.83
	Category						**FY 2022-23 (Rs. in Million)**
		Opening Balance of Receivable as at July, 2022	**Billing due**	**Collection**	**Billing not due**	**Adjustments [Note 3]**	**Closing Balance of Receivable as at June, 2023**
	Federal Govt.	3,727.43	19,432.29	(19,926.19)	361.74	(331.61)	3,263.66
	Provincial Govt.	44,581.53	20,974.51	(20,783.67)	1,999.69	(720.35)	46,051.71
	Private	149,572.88	496,752.20	(457,566.49)	12,618.23	(21,390.33)	179,986.49
	Total	**197,881.84**	**537,159.00**	**(498,276.35)**	**14,979.66**	**(22,442.29)**	**229,301.86**
	Note 1: Adjustments include write-offs, internal transfers etc. Note 2: All figures are inclusive of taxes, duties and LPS. Note 3: Closing balance as of June, 2023 includes provisional write-off amount of PKR 17 billion for FY 2022-23.						

Source: Distribution Companies / KE

TABLE 77

Province-wise Electricity Consumption by Economic Groups of the Country (GWh)

Category	Year	Punjab [1]	Sindh [2]	Khyber Pakhtunkhwa [3]	Balochistan [4]	K-Electric Limited	Total
Domestic	2018-19	35239.00	3752.41	6041.45	557.48	7298.83	52889.17
	2019-20	36357.29	4159.90	6514.32	611.92	7489.18	55132.61
	2020-21	38248.08	4204.38	6774.19	587.89	8041.32	57855.86
	2021-22	40561.88	4092.96	7157.41	591.97	8004.68	60408.89
	2022-23	35992.69	3359.64	6238.94	561.93	7369.71	53522.91
Commercial	2018-19	5172.76	504.39	796.91	127.44	1780.58	8382.08
	2019-20	4871.69	471.15	779.86	136.78	1615.20	7874.68
	2020-21	5250.59	492.37	806.63	138.38	1708.58	8396.55
	2021-22	5856.37	499.47	879.90	151.15	1846.46	9233.35
	2022-23	5596.32	451.37	881.50	144.44	1817.99	8891.62
Industrial	2018-19	20269.96	1173.08	2669.79	171.74	4402.12	28686.69
	2019-20	17908.23	1082.47	2337.71	160.63	4158.29	25647.33
	2020-21	20446.21	1199.07	2827.88	191.79	5220.99	29885.94
	2021-22	23540.66	1326.65	3075.21	172.46	5842.80	33957.77
	2022-23	21735.67	1210.69	2630.56	160.89	5350.19	31088.00
Agricultural	2018-19	5630.87	374.09	103.15	3567.40	134.30	9809.81
	2019-20	5673.10	295.24	101.77	3572.06	116.11	9758.28
	2020-21	6233.92	285.48	109.96	3485.96	121.70	10237.02
	2021-22	7006.67	295.14	103.45	3516.63	110.72	11032.61
	2022-23	6012.37	337.47	77.24	3146.29	66.31	9639.68
Public Lighting	2018-19	219.37	47.90	13.03	9.08	160.48	449.86
	2019-20	230.15	19.90	12.93	9.60	112.03	384.61
	2020-21	264.03	170.88	46.37	10.57	98.04	589.89
	2021-22	273.28	48.15	12.37	10.97	63.82	408.59
	2022-23	279.75	107.12	12.32	12.86	47.53	459.59
Bulk Supply	2018-19	2618.18	289.65	677.20	126.72	477.22	4188.97
	2019-20	2234.61	266.40	661.88	126.94	467.74	3757.57
	2020-21	2245.69	128.71	653.90	130.47	454.31	3613.08
	2021-22	2439.69	319.45	711.12	140.79	467.84	4078.89
	2022-23	2766.89	276.54	804.84	136.99	469.42	4454.68
Others	2018-19	2584.54	555.77	375.09	218.90	64.58	3798.88
	2019-20	3227.76	305.04	437.36	224.08	318.41	4512.65
	2020-21	3497.03	310.92	401.26	229.94	423.91	4863.06
	2021-22	4004.09	342.86	487.30	247.63	426.91	5508.80
	2022-23	3336.84	360.65	468.12	236.45	432.66	4834.72
Total	**2018-19**	**71734.68**	**6697.29**	**10676.62**	**4778.76**	**14318.11**	**108205.46**
	2019-20	**70502.83**	**6600.10**	**10845.81**	**4842.01**	**14276.96**	**107067.71**
	2020-21	**76185.55**	**6791.81**	**11620.19**	**4775.00**	**16068.85**	**115441.40**
	2021-22	**83682.64**	**6924.67**	**12426.76**	**4831.60**	**16763.23**	**124628.90**
	2022-23	**75720.54**	**6103.48**	**11113.52**	**4399.85**	**15553.81**	**112891.20**

[1] Islamabad Capital Territory is included

[2] Consumption in KE Area is not included

[3] FATA is included

[4] Area served by KE is excluded

Source: Distribution Companies / KE

TABLE 78

Province-wise Electricity Consumption by Economic Groups of the Country (%)

Category	Year	Punjab [1]	Sindh [2]	Khyber Pakhtunkhwa [3]	Balochistan [4]	K-Electric Limited	Total
Domestic	2018-19	49.12	56.03	56.59	11.67	50.98	48.88
	2019-20	51.57	63.03	60.06	12.64	52.46	51.49
	2020-21	50.20	61.90	58.30	12.31	50.04	50.12
	2021-22	48.47	59.11	57.60	12.25	47.75	48.47
	2022-23	47.53	55.04	56.14	12.77	47.38	47.41
Commercial	2018-19	7.21	7.53	7.46	2.67	12.44	7.75
	2019-20	6.91	7.14	7.19	2.82	11.31	7.35
	2020-21	6.89	7.25	6.94	2.90	10.63	7.27
	2021-22	7.00	7.21	7.08	3.13	11.01	7.41
	2022-23	7.39	7.40	7.93	3.28	11.69	7.88
Industrial	2018-19	28.26	17.52	25.01	3.59	30.75	26.51
	2019-20	25.40	16.40	21.55	3.32	29.13	23.95
	2020-21	26.84	17.65	24.34	4.02	32.49	25.89
	2021-22	28.13	19.16	24.75	3.57	34.85	27.25
	2022-23	28.71	19.84	23.67	3.66	34.40	27.54
Agricultural	2018-19	7.85	5.59	0.97	74.65	0.94	9.07
	2019-20	8.05	4.47	0.94	73.77	0.81	9.11
	2020-21	8.18	4.20	0.95	73.00	0.76	8.87
	2021-22	8.37	4.26	0.83	72.78	0.66	8.85
	2022-23	7.94	5.53	0.70	71.51	0.43	8.54
Public Lighting	2018-19	0.31	0.72	0.12	0.19	1.12	0.42
	2019-20	0.33	0.30	0.12	0.20	0.78	0.36
	2020-21	0.35	2.52	0.40	0.22	0.61	0.51
	2021-22	0.33	0.70	0.10	0.23	0.38	0.33
	2022-23	0.37	1.76	0.11	0.29	0.31	0.41
Bulk Supply	2018-19	3.65	4.32	6.34	2.65	3.33	3.87
	2019-20	3.17	4.04	6.10	2.62	3.28	3.51
	2020-21	2.95	1.90	5.63	2.73	2.83	3.13
	2021-22	2.92	4.61	5.72	2.91	2.79	3.27
	2022-23	3.65	4.53	7.24	3.11	3.02	3.95
Others	2018-19	3.60	8.30	3.51	4.58	0.45	3.51
	2019-20	4.58	4.62	4.03	4.63	2.23	4.21
	2020-21	4.59	4.58	3.45	4.82	2.64	4.21
	2021-22	4.78	4.95	3.92	5.13	2.55	4.42
	2022-23	4.41	5.91	4.21	5.37	2.78	4.28
Total	**2018-19**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	2019-20	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	2020-21	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	2021-22	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
	2022-23	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

[1] Islamabad Capital Territory is included

[2] Consumption in KE Area is not included

[3] FATA is included

[4] Area served by KE is excluded

Source: Distribution Companies / KE

Table 79

Safety (Number of Fatal Accidents)

DISCO	2018-19			2019-20			2020-21			2021-22			2022-23		
	Employees	Public	Total	Employees	Public	Total	Employees	Public	Total	Employees	Public	Total	Employees	Public	Total
PESCO	0	16	16	14	17	31	7	16	23	10	29	39	12	29	41
TESCO	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
IESCO	8	21	29	6	11	17	5	17	22	10	17	27	8	16	24
GEPCO	1	11	12	9	3	12	7	2	9	3	7	10	3	6	9
LESCO	6	3	9	8	0	8	9	2	11	9	18	27	8	3	11
FESCO	6	2	8	3	5	8	4	3	7	5	0	5	3	3	6
MEPCO	10	4	14	10	3	13	6	7	13	4	4	8	4	1	5
HESCO	5	7	12	6	2	8	2	30	32	3	32	35	4	10	14
SEPCO	5	7	12	4	9	13	2	12	14	2	8	10	6	3	9
QESCO	4	3	7	1	6	7	3	3	6	4	4	8	4	6	10
Total	**45**	**74**	**119**	**61**	**56**	**117**	**45**	**92**	**137**	**50**	**119**	**169**	**52**	**78**	**130**
KE	1	53	54	0	43	43	0	39	39	0	27	27	0	33	33

Source: Distribution Companies / KE

TABLE 80

Applications of New Connections Received, Energized and Pending

DISCO	Year	Connection		Applications Pending (Nos.)
		Sanctioned (Nos.)	Load (kW)	
PESCO	2018-19	154,946	362,637	22,611
	2019-20	180,789	454,197	17,667
	2020-21	173,012	637,325	4,664
	2021-22	171,607	632,149	7,134
	2022-23	147,168	566,138	14,464
TESCO	2018-19	601	8,025	100
	2019-20	112	23,340	0
	2020-21	280	31,446	55
	2021-22	393	31,430	57
	2022-23	803	37,438	17
IESCO	2018-19	146,873	814,407	27,754
	2019-20	134,510	784,476	24,623
	2020-21	163,575	454,310	44,225
	2021-22	204,951	607,246	38,201
	2022-23	207,714	601,283	26,337
GEPCO	2018-19	186,313	441,455	53,732
	2019-20	183,495	434,495	50,467
	2020-21	216,378	510,388	51,030
	2021-22	232,001	615,489	11,114
	2022-23	239,077	597,409	24,945
LESCO	2018-19	301,210	886,319	78,918
	2019-20	287,736	985,887	92,115
	2020-21	345,825	1,063,820	107,866
	2021-22	357,818	1,149,193	12,827
	2022-23	309,040	998,417	52,615
FESCO	2018-19	231,178	695,740	37,839
	2019-20	208,040	727,937	23,495
	2020-21	254,965	848,446	54,278
	2021-22	191,387	693,825	96,880
	2022-23	261,939	1,081,439	68,418
MEPCO	2018-19	355,023	1,006,082	70,660
	2019-20	359,506	1,067,923	67,065
	2020-21	352,712	1,018,929	218,012
	2021-22	384,812	1,658,540	117,684
	2022-23	276,142	1,003,729	185,721
HESCO	2018-19	34,946	124,898	-3,180
	2019-20	29,020	148,070	4,707
	2020-21	28,310	105,713	3,069
	2021-22	23,504	127,480	2,448
	2022-23	25,635	135,706	1,606
SEPCO	2018-19	16,824	52,030	1,152
	2019-20	26,684	62,547	2,397
	2020-21	16,901	61,864	524
	2021-22	9,061	38,738	394
	2022-23	8,808	77,610	337
QESCO	2018-19	15,597	32,124	1,183
	2019-20	18,051	87,351	3,888
	2020-21	18,171	65,350	470
	2021-22	14,826	49,100	713
	2022-23	12,791	44,768	1,307
KE	2018-19	252,483	881,408	-59,358
	2019-20	209,747	800,119	-47,635
	2020-21	200,835	837,708	17,705
	2021-22	212,595	629,099	43,378
	2022-23	147,710	458,985	34,548

Source: Distribution Companies / KE

TABLE 81

DISCOs' Power Transformers, Capacities and their Loading Positions

DISCO	As on 30th June	No. of Power Transformers				Capacity of Power Transformers (MVA)				No. of Over-Loaded Power Transformers (above 80%)				
		132 kV	66 kV	33 kV	Total	132 kV	66 kV	33 kV	Total	132 kV	66 kV	33 kV	Total	% age
PESCO	2019	206	29	8	243	6,029.50	265.75	32.00	6,327.25	93	12	5	110	45.27
	2020	210	24	5	239	6,148.50	217.95	23.00	6,389.45	80	6	0	86	35.98
	2021	221	26	5	252	6,658.50	243.95	23.00	6,925.45	81	11	3	95	37.70
	2022	230	24	5	259	7,103.90	238.35	23.00	7,365.25	79	12	4	95	36.68
	2023	238	24	5	267	7,368.40	238.35	23.00	7,629.75	94	10	3	107	40.07
TESCO	2019	27	21	0	48	540.30	242.30	0.00	782.60	8	9	0	17	35.42
	2020	31	24	0	55	592.30	242.80	0.00	835.10	8	1	0	9	16.36
	2021	34	21	0	55	711.30	263.30	0.00	974.60	13	1	0	14	25.45
	2022	40	17	0	57	1,066.40	176.70	0.00	1,243.10	8	0	0	8	14.04
	2023	39	16	0	55	1,118.30	171.20	0.00	1,289.50	6	0	0	6	10.91
IESCO	2019	243	8	6	257	6,213.00	125.00	24.00	6,362.00	7	0	1	8	3.11
	2020	253	4	6	263	6,425.00	73.00	24.00	6,522.00	8	0	1	9	3.42
	2021	260	1	6	267	6,651.00	46.00	24.00	6,721.00	8	0	1	9	3.37
	2022	266	1	6	273	6,867.00	46.00	25.00	6,938.00	23	0	0	23	8.42
	2023	272	1	6	279	7,139.50	46.00	25.00	7,210.50	15	0	2	17	6.09
GEPCO	2019	174	2	0	176	4,925.80	26.00	0.00	4,951.80	24	1	0	25	14.20
	2020	171	2	0	173	4,939.30	26.00	0.00	4,965.30	15	0	0	15	8.67
	2021	172	2	0	174	5,084.80	26.00	0.00	5,110.80	34	0	0	34	19.54
	2022	179	2	0	181	5,229.30	26.00	0.00	5,255.30	50	1	0	51	28.18
	2023	181	1	0	182	5,298.80	13.00	0.00	5,311.80	56	1	0	57	31.32
LESCO	2019	388	3	0	391	11,674.50	39.00	0.00	11,713.50	78	0	0	78	19.95
	2020	403	1	0	404	12,128.00	37.50	0.00	12,165.50	66	0	0	66	16.34
	2021	427	1	0	428	12,916.00	37.50	0.00	12,953.50	74	0	0	74	17.29
	2022	441	0	0	441	13,443.50	0.00	0.00	13,443.50	70	0	0	70	15.87
	2023	452	0	0	452	13,813.50	0.00	0.00	13,813.50	56	0	0	56	12.39
FESCO	2019	210	25	0	235	5,648.00	282.50	0.00	5,930.50	36	6	0	42	17.87
	2020	212	24	0	236	5,673.00	272.00	0.00	5,945.00	18	7	0	25	10.59
	2021	217	23	0	240	5,778.00	261.00	0.00	6,039.00	39	6	0	45	18.75
	2022	223	26	0	249	5,961.00	299.60	0.00	6,260.60	38	7	0	45	18.07
	2023	228	26	0	254	6,295.00	299.60	0.00	6,594.60	21	4	0	25	9.84
MEPCO	2019	274	19	0	293	7,969.00	219.00	0.00	8,188.00	33	1	0	34	11.60
	2020	294	8	0	302	8,245.00	118.80	0.00	8,363.80	16	21	0	37	12.25
	2021	301	11	0	312	8,602.00	118.80	0.00	8,720.80	30	0	0	30	9.62
	2022	308	9	0	317	8,897.00	93.00	0.00	8,990.00	45	1	0	46	14.51
	2023	311	9	0	320	8,997.00	93.00	0.00	9,090.00	13	0	0	13	4.06
HESCO	2019	105	16	0	121	2,561.40	133.10	0.00	2,694.50	31	3	0	34	28.10
	2020	106	16	0	122	2,628.40	136.90	0.00	2,765.30	25	1	0	26	21.31
	2021	106	16	0	122	2,654.40	136.90	0.00	2,791.30	14	0	0	14	11.48
	2022	124	4	0	128	2,831.30	103.50	0.00	2,934.80	24	1	0	25	19.53
	2023	117	16	0	133	2,956.90	136.90	0.00	3,093.80	21	0	0	21	15.79
SEPCO	2019	107	22	1	130	2,558.80	228.40	6.30	2,793.50	17	7	0	24	18.46
	2020	110	22	0	132	2,687.10	228.40	0.00	2,915.50	9	7	0	16	12.12
	2021	111	22	0	133	2,782.10	228.40	0.00	3,010.50	14	6	0	20	15.04
	2022	112	22	0	134	2,873.10	228.40	0.00	3,101.50	24	8	0	32	23.88
	2023	113	21	0	134	2,859.10	223.40	0.00	3,082.50	18	6	0	24	17.91
QESCO	2019	130	4	40	174	3,183.00	33.10	160.00	3,376.10	63	3	0	66	37.93
	2020	133	4	40	177	3,221.00	33.10	160.00	3,414.10	49	2	0	51	28.81
	2021	135	4	40	179	3,267.00	38.60	160.00	3,465.60	47	2	0	49	27.37
	2022	145	3	0	148	3,504.60	32.30	0.00	3,536.90	51	2	0	53	35.81
	2023	146	3	0	149	3,570.60	32.30	0.00	3,602.90	49	1	0	50	33.56
Total in CPPA-G System	**2019**	**1,864**	**149**	**55**	**2,068**	**51,303.30**	**1,594.15**	**222.30**	**53,119.75**	**390**	**42**	**6**	**438**	**21.18**
	2020	**1,923**	**129**	**51**	**2,103**	**52,687.60**	**1,386.45**	**207.00**	**54,281.05**	**294**	**45**	**1**	**340**	**16.17**
	2021	**1,984**	**127**	**51**	**2,162**	**55,105.10**	**1,400.45**	**207.00**	**56,712.55**	**354**	**26**	**4**	**384**	**17.76**
	2022	**2,068**	**108**	**11**	**2,187**	**57,777.10**	**1,243.85**	**48.00**	**59,068.95**	**412**	**32**	**4**	**448**	**20.48**
	2023	**2097**	**117**	**11**	**2,225**	**59,417.10**	**1253.75**	**48.00**	**60,718.85**	**349**	**22**	**5**	**376**	**16.90**
KE	2019	157	3	0	160	6,008.50	69.00	0.00	6,077.50	45	0	0	45	28.13
	2020	163	4	0	167	6,273.00	79.00	0.00	6,352.00	39	1	0	40	23.95
	2021	168	4	0	172	6,457.00	79.00	0.00	6,536.00	49	1	0	50	29.07
	2022	175	4	0	179	6,724.00	79.00	0.00	6,803.00	46	2	0	48	26.82
	2023	177	4	0	181	6,886.00	79.00	0.00	6,965.00	36	1	0	37	20.44

Source: Distribution Companies / KE

TABLE 82

DISCOs' Number of Distribution Transformers, Capacities and their Loading Positions

DISCO	As on 30th June	No. of Distribution Transformers	Capacity of Distribution Transformers (kVA)	Loading Position of Distribution Transformers (Nos.)				
				80-90%	91-100%	Above 100%	Total	%age
PESCO	2019	76,126	5,998,755	1,732	1,175	1,163	4,070	5.35
	2020	77,307	6,091,795	1,474	968	1,035	3,477	4.50
	2021	79,437	6,264,345	892	738	811	2,441	3.07
	2022	81,149	6,424,565	1,108	540	794	2,442	3.01
	2023	83,093	6,591,035	976	602	756	2,334	2.81
TESCO	2019	18,730	1,439,000	2,333	1,431	213	3,977	21.23
	2020	18,903	1,441,000	2,335	4,133	214	6,682	35.35
	2021	18,903	2,093,400	3,491	890	1,850	6,231	32.96
	2022	19,194	1,440,705	893	1,910	699	3,502	18.25
	2023	19,412	1,474,760	890	1,906	696	3,492	17.99
IESCO	2019	49,109	4,032,000	181	188	417	786	1.60
	2020	50,210	4,121,000	1,248	174	241	1,663	3.31
	2021	51,988	4,279,000	529	215	206	950	1.83
	2022	53,616	4,395,000	215	393	895	1,503	2.80
	2023	55,242	4,546,000	420	181	20	621	1.12
GEPCO	2019	67,587	4,219,000	1,037	690	232	1,959	2.90
	2020	72,007	4,538,000	1,080	720	142	1,942	2.70
	2021	76,125	4,745,000	1,065	685	133	1,883	2.47
	2022	80,085	4,798,000	1,170	501	301	1,972	2.46
	2023	93,854	6,570,075	1,408	563	252	2,223	2.37
LESCO	2019	110,092	8,516,090	13,211	9,358	3,963	26,532	24.10
	2020	116,030	8,885,600	12,991	9,250	3,502	25,743	22.19
	2021	122,124	9,245,095	10,393	7,330	2,724	20,447	16.74
	2022	126,758	9,479,195	9,354	5,764	2,757	17,875	14.10
	2023	132,211	9,902,000	7,591	4,612	2,050	14,253	10.78
FESCO	2019	108,652	7,084,000	497	99	18	614	0.57
	2020	113,079	7,291,000	473	133	46	652	0.58
	2021	120,446	7,628,000	1,055	110	33	1,198	0.99
	2022	124,801	7,934,146	1,230	130	23	1,383	1.11
	2023	128,948	8,280,716	1,186	120	18	1,324	1.03
MEPCO	2019	169,938	8,383,000	2,269	1,588	1,816	5,673	3.34
	2020	179,577	8,769,045	3,499	1,750	583	5,832	3.25
	2021	187,791	9,102,165	2,270	1,787	0	4,057	2.16
	2022	223,922	12,960,060	5,711	1,021	0	6,732	3.01
	2023	230,606	13,390,490	6,915	1,268	0	8,183	3.55
HESCO	2019	37,305	1,854,070	594	355	131	1,080	2.90
	2020	37,896	1,881,556	682	408	121	1,211	3.20
	2021	43,873	2,680,585	635	405	74	1,114	2.54
	2022	44,317	2,720,905	637	420	76	1,133	2.56
	2023	44,865	2,776,095	831	598	250	1,679	3.74
SEPCO	2019	38,196	2,151,140	1,351	696	541	2,588	6.78
	2020	38,616	2,163,805	1,365	735	576	2,676	6.93
	2021	39,076	2,178,305	1,378	718	581	2,677	6.85
	2022	39,444	2,167,720	4,261	1,816	1,076	7,153	18.13
	2023	40,169	2,332,690	4,089	1,743	805	6,637	16.52
QESCO	2019	60,870	3,132,630	3,974	2,104	971	7,049	11.58
	2020	62,337	3,213,540	3,828	1,869	1,117	6,814	10.93
	2021	64,119	3,339,400	3,088	1,301	954	5,343	8.33
	2022	66,119	3,466,225	3,024	1,212	788	5,024	7.60
	2023	68,074	3,584,750	2,459	789	472	3,720	5.46
Total in CPPA-G System	**2019**	**736,605**	**46,809,685**	**27,179**	**17,684**	**9,465**	**54,328**	**7.38**
	2020	**765,962**	**48,396,341**	**28,975**	**20,140**	**7,577**	**56,692**	**7.40**
	2021	**803,882**	**51,555,295**	**24,796**	**14,179**	**7,366**	**46,341**	**5.76**
	2022	**859,405**	**55,786,521**	**27,603**	**13,707**	**7,409**	**48,719**	**5.67**
	2023	**896,474**	**59,448,611**	**26,765**	**12,382**	**5,319**	**44,466**	**4.96**
KE	2019	28,183	7,702,245	432	203	173	808	2.87
	2020	28,842	7,915,705	987	591	672	2,250	7.80
	2021	29,702	8,153,340	1,018	649	900	2,567	8.64
	2022	29,971	8,685,305	1,983	1,474	2,740	6,197	20.68
	2023	31,261	8,807,605	1,989	1,302	2,317	5,608	17.94

Source: Distribution Companies / KE

TABLE 83

Feeders Outages Statistics of DISCOs (2022-23)

DISCO	Nature of Tripping	132 kV Feeders		66 kV Feeders		33 kV Feeders		11 kV Feeders		All Feeders	
		No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)
PESCO	Planned	434	150978	50	14353	21	9340	20771	4024688	21276	4199359
	Forced	501	79548	132	31844	2	5405	31014	2676710	31649	2793507
	Total	935	230526	182	46197	23	14745	51785	6701398	52925	6992866
TESCO	Planned	11	3302	3	735	0	0	7676	108441	7690	112478
	Forced	235	56274	85	30931	1	1570	19003	2210907	19324	2299682
	Total	246	59576	88	31666	1	1570	26679	2319348	27014	2412160
IESCO	Planned	360	175500	0	0	0	0	199816	15152263	200176	15327763
	Forced	0	0	0	0	0	0	2662	177955	2662	177955
	Total	360	175500	0	0	0	0	202478	15330218	202838	15505718
GEPCO	Planned	22	7995	4	1440	0	0	3663	561533	3689	570968
	Forced	135	67728	8	246	0	0	12685	221960	12828	289934
	Total	157	75723	12	1686	0	0	16348	783493	16517	860902
LESCO	Planned	430	140768	0	0	0	0	26515	6363986	26945	6504754
	Forced	5313	392105	0	0	0	0	21433	643128	26746	1035233
	Total	5743	532873	0	0	0	0	47948	7007114	53691	7539987
FESCO	Planned	190	47746	78	21015	0	0	11662	2281812	11930	2350573
	Forced	39	2184	12	767	0	0	51351	680188	51402	683139
	Total	229	49930	90	21782	0	0	63013	2962000	63332	3033712
MEPCO	Planned	1021	322801	63	11705	0	0	149135	14211863	150219	14546369
	Forced	493	60388	19	983	0	0	363605	7636558	364117	7697929
	Total	1514	383189	82	12688	0	0	512740	21848421	514336	22244298
HESCO	Planned	144	47955	13	5579	0	0	929	293400	1086	346934
	Forced	625	126476	61	42602	0	0	53221	752012	53907	921090
	Total	769	174431	74	48181	0	0	54150	1045412	54993	1268024
SEPCO	Planned	674	77165	91	40252	0	0	2425	564045	3190	681462
	Forced	67	87156	19	9136	0	0	47694	23657286	47780	23753578
	Total	741	164321	110	49388	0	0	50119	24221331	50970	24435040
QESCO	Planned	145	44370	14	3360	108	11009	1249	18750	1516	77489
	Forced	175	21875	18	1620	780	1131100	46490	464900	47463	1619495
	Total	320	66245	32	4980	888	1142109	47739	483650	48979	1696984
KE	Planned	5	2214	0	0	0	0	71874	2545281	71879	2547495
	Forced	10	4950	0	0	0	0	39347	3112654	39357	3117604
	Total	15	7164	0	0	0	0	111221	5657935	111236	5665099

Source: Distribution Companies / KE

TABLE 84
Village Electrification in all Distribution Companies

DISCO	As on 30th June	Total Number of Villages in DISCO	Total Villages Electrified in DISCO	Remaining Villages in DISCO	Percentage of Total Electrified Villages in DISCO
PESCO	2019	31,689	25,789	5,900	81.38
	2020	32,940	26,492	6,448	80.43
	2021	33,761	27,301	6,460	80.87
	2022	34,344	28,371	5,973	82.61
	2023	34,433	29,065	5,368	84.41
TESCO	2019	463	257	206	55.51
	2020	483	277	206	57.35
	2021	4,196	2,421	1,775	57.70
	2022	4,196	2,521	31,430	60.08
	2023	4,196	2,610	1,586	62.20
IESCO	2019	922	387	535	41.97
	2020	816	260	556	31.86
	2021	913	633	280	69.33
	2022	691	272	419	39.36
	2023	816	314	502	38.48
GEPCO	2019	7,578	7,322	256	96.62
	2020	7,854	7,608	246	96.87
	2021	7,854	7,744	110	98.60
	2022	8,330	7,919	411	95.07
	2023	8,434	8,097	337	96.00
LESCO	2019	246	207	39	84.15
	2020	246	212	34	86.18
	2021	246	215	31	87.40
	2022	495	32	463	6.46
	2023	463	71	392	15.33
FESCO	2019	26,830	25,770	1,060	96.05
	2020	27,916	26,661	1,255	95.50
	2021	29,282	27,589	1,693	94.22
	2022	31,929	28,544	3,385	89.40
	2023	34,716	29,319	5,397	84.45
MEPCO	2019	39,518	30,660	8,858	77.58
	2020	41,579	31,858	9,721	76.62
	2021	44,603	34,703	9,900	77.80
	2022	48,761	35,806	12,955	73.43
	2023	52,643	47,188	5,455	89.64
HESCO	2019	23,803	18,940	4,863	79.57
	2020	23,803	19,181	4,622	80.58
	2021	23,803	19,315	4,488	81.15
	2022	23,803	19,435	4,368	81.65
	2023	23,803	19,695	4,108	82.74
SEPCO	2019	23,263	18,280	4,983	78.58
	2020	23,263	18,423	4,840	79.19
	2021	23,263	18,475	4,788	79.42
	2022	23,263	18,475	4,788	79.42
	2023	23,263	18,593	4,670	79.93
QESCO	2019	27,932	25,812	2,120	92.41
	2020	29,692	26,231	3,461	88.34
	2021	29,692	26,434	3,258	89.03
	2022	2,560	1,134	1,426	44.30
	2023	2,460	1,380	1,080	56.10
Total in CPPA-G System	**2019**	**182,244**	**153,424**	**28,820**	**84.19**
	2020	**188,592**	**157,203**	**31,389**	**83.36**
	2021	**197,613**	**164,830**	**32,783**	**83.41**
	2022	**178,372**	**142,509**	**35,863**	**79.89**
	2023	**185227**	**156,332**	**28,895**	**84.40**
KE	2019	913	912	1	99.89
	2020	954	913	41	95.70
	2021	954	938	16	98.32
	2022	976	958	18	98.16
	2023	976	969	7	99.28

Source: Distribution Companies / KE

TABLE 85

WAPDA Hydroelectric Tariff (2022-23)

Power Stations	Province	Capacity (MW)	NEO (GWh)	Variable Rate (Rs./kWh)	Fixed Charges (Rs./kW/M)			Hydel Levies			
					Fixed Rate	Revenue Gap	Interest on Loans for NHP	NHP Regular (Rs./kWh)	WUC (Rs./kWh)	NHP Arrears (Rs./kW/M)	IRSA (Rs./kWh)
Tarbela	KPK	3,478	4,933.47	0.043	421.940	-425.917	63.837	1.1	-	-	0.005
Warsak	KPK	243	305.5	0.107	748.198	64.332	63.837	1.1	-	-	0.005
Duber Khwar	KPK	130	173.98	0.215	1,768.284	369.329	63.837	1.1	-	-	0.005
Allai Khwar	KPK	121	125.05	0.215	1,508.871	523.789	63.837	1.1	-	-	0.005
Khan Khwar	KPK	72	31.78	0.211	1,592.305	213.254	63.837	1.1	-	-	0.005
Jabban	KPK	22	38.94	0.275	2,881.467	3,505.165	63.837	1.1	-	-	0.005
Dargai	KPK	20	28.1	0.088	826.772	-587.876	63.837	1.1	-	-	0.005
Kuram Garhi	KPK	4	4.59	0.255	1,924.961	343.330	63.837	1.1	-	-	0.005
Chitral	KPK	1	0.53	0.343	2,164.941	-4,020.787	63.837	1.1	-	-	0.005
Tarbela 4th Ext.	KPK	1,410	2,259.96	0.134	781.992	876.992	0.000	1.1	-	-	0.005
Golen Gol	KPK	108	50.65	0.344	2,446.539	3,225.457	0.000	1.1	-	-	0.005
Gomal Zam	KPK	17	17.03	0.634	3,092.300	-470.671	0.000	1.1	-	454.646	0.005
Ghazi Barotha	Pujnab	1,450	2,105.09	0.079	777.899	434.090	366.499	1.1	-	-	0.005
Chashma	Punjab	184	216.29	0.191	1,524.435	1,403.294	366.499	1.1	-	-	0.005
Jinnah HPP	Punjab	96	63.34	0.267	1,521.280	1,113.603	366.499	1.1	-	-	0.005
Rasul	Punjab	22	18.04	0.157	895.550	-34.025	366.499	1.1	-	-	0.005
Nandipur	Punjab	14	11.57	0.132	833.858	-1,222.819	366.499	1.1	-	-	0.005
Shadiwal	Punjab	14	7.93	0.178	833.830	-790.848	366.490	1.1	-	-	0.005
Chichoki	Punjab	13	9.11	0.176	866.551	-870.662	366.499	1.1	-	-	0.005
Renala Khurd	Punjab	1	0.53	0.342	1,831.918	-3,455.565	366.499	1.1	-	-	0.005
Mangla	AJK	1,000	1,342.19	0.067	715.090	41.611	0.000	-	0.15	-	0.005

Source: NEPRA

TABLE 86 (A)

Indexed/Adjusted Tariff of GENCOs on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	Fuel	July			October			January			April		
			FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
GENCO-I														
Block-1 (Unit-1)	2018-19	RFO	17.633			17.633			17.703			8.967		
	2019-20		19.753			22.550			13.874			13.874		
	2020-21		13.874			13.874			17.040			19.912		
	2021-22		21.511			26.862			30.734			30.733		
	2022-23		45.356											
Block-2 (Unit-2)	2018-19	RLNG	20.181			19.912								
	2018-19	RFO				20.381						19.102		
	2019-20		22.550											
	2020-21								19.136					
	2021-22		24.158			30.167			34.515			34.514		
	2022-23		50.937											
	2019-20	Gas	10.918											
Block-2 (Unit-3)	2018-19	RLNG	19.645			19.392								
	2018-19	RFO				22.888						21.452		
	2019-20		25.325											
	2020-21								18.621			19.136		
	2021-22		23.507			29.354			33.585					
	2022-23		49.564											
	2019-20	Gas	10.633											
Block-2 (Unit-4)	2018-19	RLNG	19.223			18.989								
	2018-19	RFO				22.272						20.874		
	2019-20		24.642											
	2020-21								18.229					
	2021-22		23.012			28.736			32.878			32.877		
	2022-23		48.521											
	2019-20	Gas	10.412											
Kotri (Unit 3-7)	2018-19	RLNG	16.946											
	2018-19	RFO				21.803						20.435		
	2019-20		24.123											
	2019-20	Gas	9.4590*											
			14.1885**											
GENCO-II														
Guddu 747 (Block-I)	2018-19	Gas	4.748	1.019		6.235	1.045			1.166			1.327	
	2019-20		7.884	1.514			1.458			1.458			1.540	
	2020-21			1.554			1.540			0.853			0.845	
	2022-23		7.680			7.680				8.960				
Guddu 747 (Block-II)	2018-19	Gas	5.275			6.927								
	2019-20		8.760											
	2021-22			0.542	0.857		0.595	1.202		0.630	1.245		0.662	1.280
	2021-22			0.542	0.857		0.595	1.202		0.630	1.245		0.662	1.280
	2022-23		8.533			8.533				9.955				
Guddu 747 (Block-III)	2018-19	Gas	6.330			8.313								
	2019-20		10.512											
Guddu 747 (Block-IV)	2018-19	Gas	6.782			8.906								
	2019-20		11.263											
GENCO-III														
Nandipur	2018-19	RLNG	10.084	0.442	0.245		0.451	0.251		0.504	0.271		0.512	0.275
	2019-20		11.204	0.606	0.311		0.579	0.305		0.575	0.307	11.163	0.621	0.324
	2020-21		7.544	0.623	0.326	8.843	0.622	0.326		0.602 1	0.319	10.874	0.581	0.312
	2021-22		14.980	0.613	0.323	19.565	0.673	0.343	16.215	0.712	0.356	20.833	0.748	0.369
	2022-23		26.000	0.526	0.501	23.263	0.594	0.543	23.308	0.590	0.540	26.898	0.744	0.634
Muzaffargarh (Unit-1)	2018-19	RFO/ RLNG	17.243						14.267			19.368		
	2019-20		10.442											
	2021-22		22.456			28.238			31.518			31.518		
	2022-23		46.540											
Muzaffargarh (Unit-2)	2018-19	RFO/ RLNG	17.477						14.460			19.630		
	2019-20		10.579											
	2021-22		22.760			28.621			31.945			31.945		
	2022-23		47.170											

Power Plant	Year	Fuel	July			October			January			April		
			FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
GENCO-III														
Muzaffargarh (Unit-3)	2018-19	RFO/ RLNG	16.872						13.960			18.951		
	2019-20		10.224											
	2021-22		21.973			27.631			30.841			30.841		
	2022-23		45.539											
Muzaffargarh (Unit-4)	2018-19	RFO/ RLNG	16.847						13.939			18.923		
	2019-20		10.209											
	2021-22		21.940			27.590			30.795			30.795		
	2022-23		45.472											
Muzaffargarh (Unit-5)	2018-19	RFO/ RLNG	17.939						14.843			20.149		
	2019-20		10.850											
	2021-22		23.362			29.378			32.790			32.790		
	2022-23		48.418											
Muzaffargarh (Unit-6)	2018-19	RFO/ RLNG	18.429						15.249			20.701		
	2019-20		11.137											
	2021-22		24.001			30.181			33.687			33.687		
	2022-23		49.742											
GTPS Faisalabad (Units 5-9)	2019-20	RFO/ RLNG	8.376											
	2021-22		18.684			24.412			20.225			20.225		

** CCP ** without CCP*

Source: NEPRA

TABLE 86 (B)

Indexed/Adjusted Tariff of Hydel Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		WUC	VOM	CPP	WUC	VOM	CPP	WUC	VOM	CPP	WUC	VOM	CPP
Jagran	2018-19		1.200	1.390									
	2020-21		1.200	1.390		1.327	1.390		1.327	1.390		1.327	1.390
	2021-22		1.327	1.390		1.444	1.390		1.444	1.390		1.444	1.390
	2022-23		1.663	1.390		1.663	1.390		1.663	1.390		1.663	1.390
Pehur Hydro	2018-19	0.150	0.135	3.733									
Malakand-III	2019-20	0.321	0.337	4.879	0.361	0.322	4.665	0.321	0.319	4.633	0.321	0.344	4.964
	2020-21	0.321	0.347	5.010	0.321	0.346	4.961	0.377	0.335	4.802	0.377	0.323	4.604
	2021-22	0.377	0.341	4.756	0.377	0.374	5.132	0.377	0.395	5.347	0.377	0.416	5.517
	2022-23	0.377	0.481	6.207	0.377	0.544	6.920	0.377	0.54	6.837	0.377	6832	8.522
Laraib Energy	2018-19	0.347	0.058	10.670	0.352	0.059	11.001	0.360	0.060	11.591	0.366	0.061	11.081
	2019-20	0.378	0.063	13.020	0.393	0.065	13.538	0.403	0.067	13.016	0.410	0.068	13.037
	2020-21	0.412	0.069	13.627	0.412	0.069	13.779	0.412	0.069	12.858	0.412	0.069	12.774
	2021-22	0.412	0.579	12.173	0.412	0.069	13.315	0.412	0.069	14.182	0.412	0.069	12.851
	2022-23	0.412	0.069	14.762	0.412	0.069	16.028	0.412	0.069	16.324			
Patrind Hydro	2018-19	0.150	0.025	1.728	0.150	0.025	1.773	0.150	0.025	2.001	0.150	0.025	2.009
	2019-20	0.150	0.025	2.144	0.150	0.025	2.128	0.150	0.025	2.364			
	2021-22	0.187	0.043	13.823	1.187	1.188	13.923	0.188	0.043	14.965	1.188	0.043	15.108
	2022-23	0.188	0.043	10.918	0.188	0.043	18.450	0.188	0.043	21.873	0.188	0.043	23.390
Neelum Jhelum	2018-19		0.722	8.397									
	2021-22		0.722	8.396		0.722	8.396		0.722	8.396		0.722	8.396
	2022-23		0.722	8.396		0.722	8.396		0.722	8.396		0.722	8.396
Marala Hydro	2018-19	0.150	0.338	8.312									
Gulpur Hydro	2018-19	0.150	0.044	8.854									
	2022-23	0.150	0.044	17.311	0.150	0.044	20.134	0.150	0.044	22.218			
Karot Hydro	2021-22										0.150	0.264	13.914
	2022-23	0.150	0.281	17.757	0.150	0.297	18.487	0.150	0.296	21.142	0.202	0.333	22.868

Source: NEPRA

TABLE 86 (C)

Indexed/Adjusted Tariff of Gas-based Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
Uch-II	2018-19	5.725	0.259	2.668	6.044	0.265	2.727	6.499	0.292	3.053	6.706	0.296	3.085
	2019-20	7.080	0.343	3.574	7.572	0.332	3.393	7.495	0.332	3.405	7.494	0.354	3.612
	2020-21	7.843	0.355	3.585	7.215	0.355	3.585	6.942	0.346	3.563	6.847	0.336	3.364
	2021-22	6.680	0.351	3.477	7.104	0.380	3.750	7.535	0.398	3.954	7.667	0.415	4.082
	2022-23	8.413	0.472	4.575	9.668	0.526	5.147	9.610	0.522	5.299	11.209	0.645	6.619
Foundation Power	2018-19	3.868	0.447	2.408	5.640	0.457	2.436	5.640	0.503	2.673	5.640	0.510	2.689
	2019-20	7.148	0.591	2.935	7.148	0.572	2.888	7.148	0.572	2.887	7.148	0.611	2.968
	2020-21	7.148	0.613	2.924	6.630	0.613	2.911	6.630	0.596	2.899	6.630	0.579	1.399
	2021-22	6.630	0.605	1.439	6.630	0.655	1.538	6.630	0.687	1.603	6.630	0.716	1.652
	2022-23	6.630	0.814	1.843	6.630	0.908	2.032	8.123	0.901	2.014	8.123	1.113	2.469
Engro PowerGen. Qadirpur	2018-19		0.394	2.054		0.403	2.099		0.443	2.328		0.451	2.346
	2019-20	7.681	0.522	2.694		0.505	2.590		0.505	2.572		0.539	1.313
	2020-21		0.541	1.311		0.542	1.300		0.527	1.267		0.512	1.228
	2021-22	7.124	0.535	1.255	7.124	0.578	1.329	7.124	0.607	1.379	7.124	0.633	1.415
	2022-23	7.124	1.336	0.720	7.124	1.343	0.803	8.728	1.347	0.797	8.728	1.375	0.985

Source: NEPRA

TABLE 86 (D)

Indexed/Adjusted Tariff of RFO-based Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
Attock Gen.	2018-19	12.341	1.106	2.402	13.163	1.131	2.449	10.999	1.241	2.570	13.645	1.258	1.177
	2019-20	13.668	1.451	1.344	15.590	1.408	1.301	9.877	1.410	1.300	6.467	1.501	1.379
	2020-21	9.219	1.507	1.392	9.801	1.508	1.381	11.697	1.469	1.344	14.246	1.428	1.299
	2021-22	15.629	1.490	1.336	20.589	1.606	1.425	18.859	1.681	1.477	28.131	1.752	1.519
	2022-23	31.447	1.982	1.490	24.136	2.202	1.602	20.018	2.187	1.591	23.501	2.687	1.854
Atlas Power	2018-19	12.264	1.089	2.507	13.038	1.114	2.587	11.661	1.223	2.766	11.667	1.240	2.797
	2019-20	14.048	1.431	3.018		1.388	2.984	11.518	1.390	1.499		1.481	1.550
	2020-21	12.014	1.487	1.510	12.619	1.487	1.497	12.398	1.448	1.457	11.484	1.408	1.413
	2021-22	15.923	1.470	1.450	18.893	1.585	1.548	22.273	1.660	1.639	23.832	1.730	1.702
	2022-23	33.800	1.959	1.698	31.650	2.179	1.748	29.818	2.163	1.763	18.623	2.662	1.925
Nishat Power	2018-19	12.277	1.089	2.492	13.962	1.114	2.580	14.047	1.223	2.763	11.003	1.240	2.796
	2019-20	14.863	1.431	3.012	14.25	1.388	2.992	15.523	1.390	2.978		1.481	3.006
	2020-21	11.238	1.487	1.369	11.954	1.487	1.359	11.487	1.448	1.324	12.005	1.408	1.287
	2021-22	16.304	1.470	1.320	19.524	1.585	1.407	23.432	1.660	1.492	21.637	1.730	1.551
	2022-23	34.294	1.959	1.563	31.487	2.179	1.615	31.296	2.163	1.630	30.024	2.661	1.797
Nishat Chunian	2018-19	12.553	1.086	2.639	14.191	1.111	2.732	14.586	1.220	2.921	10.922	1.237	2.955
	2019-20	14.743	1.428	3.178	13.742	1.385	3.156	13.881	1.386	3.142	11.698	1.477	3.171
	2020-21	10.748	1.483	2.696	11.876	1.484	1.399		1.445	1.354	11.733	1.405	1.315
	2021-22	15.049	1.466	1.349	18.623	1.581	1.439	22.983	1.656	1.524	25.220	1.726	1.583
	2022-23	33.204	1.954	1.589	35.301	2.173	1.640	31.799	2.158	1.655	30.467	2.655	1.819
Narowal Energy	2018-19	12.037	1.012	2.772	13.599	1.034	2.885	12.988	1.116	3.148	12.359	1.131	3.191
	2019-20	14.577	1.274	3.519	13.700	1.255	3.480	12.510	1.265	3.455		1.331	3.486
	2020-21	12.851	1.337	3.386	12.479	1.336	3.385	12.202	1.312	3.347	11.728	1.284	3.305
	2021-22	15.898	1.327	1.844	19.799	1.407	1.981	22.760	1.459	2.111	24.570	1.508	2.200
	2022-23	35.837	1.667	2.203	32.425	1.819	2.777	29.505	1.809	2.300	21.493	2.155	2.542
Liberty Power	2018-19	12.952	1.207	2.756	12.938	1.234	2.864	12.174	1.349	3.093	11.121	1.368	3.137
	2019-20	13.244	1.568	3.413	13.246	1.528	3.391	11.543	1.532	3.375		1.627	3.403
	2020-21	11.638	1.634	3.337	12.606	1.635	3.348	11.362	1.594	3.329	12.042	1.553	1.498
	2021-22	15.879	1.616	1.540	20.049	1.736	1.649	22.520	1.813	1.748	28.284	1.886	1.817
	2022-23	33.027	2.122	1.819	31.209	2.349	1.879	26.653	2.334	1.894	20.818	2.849	2.083

Source: NEPRA

TABLE 86 (E)

Indexed/Adjusted Tariff of HSD-based Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
Saif Power	2018-19		0.640	2.332		0.656	2.402		0.734	2.571		0.744	2.599
	2019-20		0.881	2.816		0.841	2.773		0.836	2.760		0.903	2.824
	2020-21	20.888	0.905	1.432	18.675	0.905	1.418	19.770	0.876	1.377	20.293	0.845	1.329
	2021-22	20.438	0.892	1.368	23.175	0.979	1.468	23.175	1.035	1.541	30.137	1.088	1.595
	2022-23		1.260	1.565		1.425	1.633		1.413	1.635		1.788	1.813
Sapphire Electric	2018-19		0.633	2.243		0.649	2.319		0.725	2.498		0.736	2.528
	2019-20		0.872	2.757		0.832	2.720		0.827	2.706		0.893	2.760
	2020-21	18.904	0.895	2.740		0.895	2.775	19.5726 20.0947	0.866	1.387	19.665	0.836	1.338
	2021-22	20.237	0.882	1.377	22.971	0.968	1.474	27.879	1.023	1.553	29.920	1.075	1.607
	2022-23		1.246	1.574		1.409	1.644		1.398	1.647		1.768	1.831
Orient Power	2018-19	19.005	0.427	2.094	18.927	0.438	2.158	19.029	0.490	2.322		0.497	2.351
	2019-20		0.589	2.572		0.562	2.534	22.679	0.558	2.527		0.603	2.417
	2020-21	18.115	0.604	1.560	18.575	0.604	1.546	19.6700 20.1920	0.585	1.504	19.7621 19.7621	0.564	1.455
	2021-22	20.334	0.595	1.496	23.066	0.653	1.599	26.290	0.691	1.674	26.290	0.726	1.731
	2022-23		0.841	1.704		0.951	1.839		0.944	1.833		1.194	2.171
Halmore Power	2018-19		0.643	2.635		0.659	2.738	18.978	0.737	2.970		0.748	3.012
	2019-20		0.886	3.303		0.845	3.270		0.840	3.253		0.961	3.293
	2020-21	18.041	0.910	3.228	18.518	0.909	3.233	20.124	0.880	3.205	19.695	0.849	3.173
	2021-22	20.717	0.896	1.596	23.001	0.983	1.714	27.764	1.040	1.800	27.764	1.093	1.864
	2022-23		1.266	1.818		1.432	2.008		1.420	1.997		1.797	2.472
Engro PowerGen. Qadirpur	2018-19		0.403	2.097		0.412	2.143		0.454	2.376		0.460	2.395
	2019-20		0.533	2.751		0.516	2.644		0.516	2.626		0.551	1.340
	2020-21		0.553	1.339		0.553	1.327		0.538	1.294		0.522	1.253
	2021-22		0.546	1.281		0.590	1.356	30.130	0.619	1.408	31.439	0.646	1.445
	2022-23	45.717	1.364	0.735	52.687	1.371	0.819		1.375	0.813		1.404	1.005
NPPMCL (HBS)	2021-22	17.314	0.251	1.802	17.314	0.276	1.929	23.900	0.292	2.133	27.501	0.306	2.230
	2022-23	50.289	0.355	2.687		0.402	2.850		0.398	2.816		0.504	3.353
NPPMCL (Balloki)	2021-22	17.727	0.274	1.700	17.727	0.301	1.821	24.481	0.318	2.007	26.316	0.334	2.081
	2022-23		0.387	2.552		0.438	2.682		0.435	2.576		0.550	3.192

Source: NEPRA

TABLE 86 (F)

Indexed/Adjusted Tariff of RLNG-based Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
Saif Power	2018-19	10.693	0.445	2.301	10.641	0.454	2.367	10.474	0.508	2.529	9.936	0.516	2.555
	2019-20	11.841	0.611	2.765	11.149	0.583	2.720		0.579	2.708	10.661	0.625	2.780
	2020-21	7.212	0.627	1.4	8.481	0.627	1.387		0.607	1.346	10.423	0.586	1.296
	2021-22	14.269	0.618	1.336	18.781	0.678	1.435	18.876	0.717	1.499	19.960	0.754	1.548
	2022-23	24.892	0.873	1.508	22.272	0.987	1.573	22.315	0.979	1.571	25.752	1.239	1.732
Sapphire Electric	2018-19	10.692	0.439	2.212	10.64	0.449	2.282	10.473	0.503	2.454	9.935	0.510	2.482
	2019-20	11.84	0.604	2.704	11.148	0.576	2.664	10.798	0.573	2.651		0.618	2.714
	2020-21	7.211	0.620	2.707	8.480	0.62	2.743	9.749	0.600	1.354	10.422	0.579	1.305
	2021-22	14.268	0.611	1.344	18.779	0.670	1.444	15.540	0.709	1.509	19.958	0.745	1.558
	2022-23	24.890	0.863	1.514	22.270	0.976	1.582	22.313	0.968	1.580	25.749	1.225	1.746
Orient Power	2018-19	10.692	0.261	2.062	10.64	0.267	2.122	10.473	0.299	2.279	9.935	0.303	2.306
	2019-20	11.84	0.359	2.520	11.175	0.343	2.478	10.798	0.341	2.472	8.018	0.368	2.370
	2020-21	7.211	0.369	1.527	8.480	0.369	1.514	9.749	0.357	1.472	10.422	0.344	1.421
	2021-22	14.268	0.363	1.463	18.779	0.399	1.564	15.670	0.421	1.631	19.958	0.443	1.682
	2022-23	24.890	0.513	1.644	22.270	0.580	1.776	22.313	0.576	1.766	25.749	0.728	2.087
Halmore Power	2018-19	10.693	0.446	2.598	10.64	0.456	2.695	10.474	0.511	2.918	9.935	0.518	2.958
	2019-20	11.841	0.614	3.241	11.149	0.585	3.204	10.799	0.582	3.188	10.66	0.628	3.238
	2020-21	7.212	0.630	3.190	8.481	0.630	3.194	9.750	0.609	3.167	10.422	0.588	3.133
	2021-22	14.269	0.621	1.557	18.780	0.681	1.673	19.233	0.720	1.748	19.960	0.757	1.806
	2022-23	24.891	0.877	1.747	22.271	0.992	1.934	22.314	0.984	1.918	25.751	1.245	2.373
QATPL (Bhikki)	2018-19	1.938			2.080			2.352			2.358		
	2019-20	2.643			2.679			2.646			2.547		
	2020-21	2.233			2.204			2.197			1.999		
	2021-22	11.919	0.542	2.025	15.567	0.595	2.213	13.024	0.630	2.502	16.576	0.662	2.606
	2022-23	20.921	0.766	3.205	18.719	0.867	3.375	18.755	0.860	3.364	21.644	0.340	3.091

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
NPPMCL (HBS)	2018-19	1.504			1.613			1.798			1.815		
	2019-20	2.070			2.065			2.042			1.929		
	2020-21	1.748			1.7316 1.5644			1.543			1.539		
	2021-22	11.805	0.194	1.579	15.418	0.213	1.691	12.886	0.225	1.869	16.418	0.236	1.954
	2022-23	20.489	0.274	2.355	18.332	0.310	2.497	18.368	0.307	2.468	21.197	0.389	2.938
NPPMCL (Balloki)	2018-19	1.452			1.558			1.729			1.764		
	2019-20	2.015			2.026			1.951			1.876		
	2020-21	1.697			1.6819 1.5201			1.503			1.492		
	2021-22	11.898	0.216	1.543	15.539	0.237	1.653	12.988	0.251	1.821	16.547	0.264	1.888
	2022-23	20.65	0.305	2.316	18.476	0.345	2.433	18.512	0.343	2.338	21.363	0.433	2.896

Source: NEPRA

TABLE 86 (G)

Indexed/Adjusted Tariff of Coal Fired Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July			October			January			April		
		FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	CPP
China Hub Power	2021-22	6.356	0.509	5.711	8.638	0.522	6.141	12.034	0.530	6.730	11.290	0.538	7.212
	2022-23	28.629	0.564	8.597	25.888	0.588	10.513	29.370	0.586	10.174		0.642	13.795
HSR (Sahiwal Coal)	2021-22	11.083	0.189	4.789	12.849	0.201	5.238	16.344	0.209	5.779	23.956	0.217	6.139
	2022-23	27.997	0.241	7.906	28.446	0.264	8.529	29.685	0.263	8.645	32.175	0.316	11.226
Engro Power Gen Thar	2021-22	5.677 2.485	1.078	5.816	6.135 2.408	1.090	6.253	6.345 2.518	1.098	6.641	6.816 2.528	1.105	6.976
	2022-23	10.266	1.128	7.869	8.227	1.151	9.236	8.200	1.150	9.402	9.547	1.203	11.874
Port Qasim	2021-22	7.303	0.192	4.780	10.731	0.204	5.188	16.691	0.212	5.768	15.306	0.220	6.177
	2022-23	12.873	0.244	7.657	18.151	0.268	8.452	17.876	0.266	8.775	16.251	0.320	10.975

Source: NEPRA

TABLE 86 (H)

Indexed/Adjusted Tariff of Wind Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July	October	January	April
Zorlu Enerji Pakistan	2018-19	17.967	18.144	20.419	20.528
	2019-20	23.603	23.199	22.288	22.971
	2020-21	23.287	23.166	22.329	21.916
	2021-22	22.082	22.837	24.640	24.968
	2022-23	28.565	29.996	31.098	34.497
FFC Energy	2018-19	17.255	17.395	19.546	19.634
	2019-20	21.515	21.244	21.067	21.576
	2020-21	19.980	19.896	19.825	19.524
	2021-22	19.855	18.9647*	19.713	19.914
	2022-23	20.875	21.729	9.617	11.639
Three Gorges First Wind	2018-19	20.308	20.466	23.213	23.312
	2019-20	27.063	26.6905 26.5770	25.103	25.682
	2020-21	26.710	26.620	25.500	25.145
	2021-22	25.122	25.776	28.242	28.541
	2022-23	33.425	34.663	36.968	39.893
Foundation Wind Energy-I	2018-19	17.844	18.028	19.769	19.884
	2019-20	25.147	24.760	23.894	24.6497 24.9775
	2020-21	24.457	24.346	23.532	23.084
	2021-22	23.363	24.267	26.295	26.728
	2022-23	30.941	32.656	34.115	38.143
Foundation Wind Energy-II	2018-19	17.880	18.070	19.752	19.871
	2019-20	25.037	24.5439 24.8512	24.084	24.887
	2020-21	24.543	24.427	23.610	23.147
	2021-22	23.440	24.370	26.342	26.786
	2022-23	30.848	32.612	33.897	38.043

Power Plant	Year	July	October	January	April
Sapphire Wind	2018-19	20.684	21.132	23.791	23.868
	2019-20	27.540	26.061	24.905	27.172
	2020-21	26.657	26.295	25.445	24.349
	2021-22	25.118	27.112	28.293	29.565
	2022-23	33.955	38.604	38.491	48.066
Younus Energy	2018-19	20.490	21.601	24.025	24.396
	2019-20	27.240	27.167	26.845	26.299
	2020-21	24.243	24.148	23.815	23.525
	2021-22	23.886	25.011	26.801	27.818
	2022-23	30.808	32.711	32.828	38.559
Metro Power	2018-19	17.239	17.405	19.997	20.100
	2019-20	22.752	22.328	22.302	22.976
	2020-21	21.508	21.408	20.801	20.409
	2021-22	20.688	21.466	23.337	23.704
	2022-23	23.704	28.855	30.073	33.539
Gul Ahmad Wind	2018-19	20.672	21.467	24.053	24.274
	2019-20	27.552	26.770	26.412	26.844
	2020-21	25.462	25.230	24.639	23.946
	2021-22	24.506	26.067	27.584	28.792
	2022-23	32.620	36.046	36.147	44.463
Master Wind Energy	2018-19	20.672	21.467	24.053	24.274
	2019-20	27.552	26.770	26.412	26.844
	2020-21	25.462	25.230	24.639	23.946
	2021-22	24.506	26.067	27.584	28.792
	2022-23	32.620	36.046	36.147	44.003
Tenaga Generasi	2018-19	20.750	21.377	24.027	24.170
	2019-20	27.648	26.503	26.129	27.069
	2020-21	26.060	25.759	25.038	24.142
	2021-22	24.803	26.580	27.933	29.222
	2022-23	33.434	37.613	37.691	46.551
Act Wind	2018-19	20.515	21.647	24.106	24.484
	2019-20	27.360	27.304	26.978	26.393
	2020-21	24.268	24.172	23.839	23.554
	2021-22	23.911	21.2522*	22.963	23.902
	2022-23	26.532	28.010	28.207	33.018
HydroChina Dawood	2018-19	20.899	21.361	24.101	24.160
	2019-20	27.843	26.320	25.921	27.354
	2020-21	26.657	26.284	25.435	24.333
	2021-22	25.093	27.082	28.276	29.692
	2022-23	34.389	39.457	39.593	49.595
Sachal Energy	2018-19	20.491	20.619	23.001	24.385
	2019-20	27.977	27.614	25.570	26.178
	2020-21	26.368	26.278	24.560	24.208
	2021-22	24.216	24.908	26.689	27.045
	2022-23	32.852	34.168	36.489	39.587
UEP Wind	2018-19	20.899	21.361	24.101	24.160
	2019-20	27.843	26.320	25.921	27.354
	2020-21	26.657	26.284	25.435	24.333
	2021-22	25.093	27.082	28.276	29.692
	2022-23	34.389	39.457	39.593	49.595
AEP Wind	2018-19	14.004	14.365	15.367	15.516
	2019-20	17.071	16.781	16.659	16.938
	2020-21	16.478	16.393	16.110	15.799
	2021-22	16.094	14.863	15.515	15.939
	2022-23	10.354	11.659	11.755	13.959
Jhimpir Power	2018-19	15.539	15.899	18.035	18.071
	2019-20	20.907	19.718	19.402	20.482
	2020-21	19.873	19.587	18.934	18.088
	2021-22	18.677	20.210	21.139	22.288
	2022-23	26.024	30.081	30.274	38.133
Hawa Energy	2018-19	15.539	15.899	18.035	18.071
	2019-20	20.907	19.718	19.402	20.482
	2020-21	19.873	19.587	18.934	18.088
	2021-22	18.677	20.210	21.139	22.288
	2022-23	26.024	30.081	30.274	38.133

Power Plant	Year	July	October	January	April
Three Gorges Third Wind	2018-19	14.779	15.115	16.977	17.133
	2019-20	20.001	19.005	18.809	20.112
	2020-21	20.114	19.859	19.195	18.321
	2021-22	18.915	20.467	21.408	22.588
	2022-23	26.407	30.565	30.791	38.801
Three Gorges Second Wind	2018-19	14.779	15.115	16.977	17.133
	2019-20	20.001	19.005	18.809	20.112
	2020-21	20.114	19.859	19.195	18.321
	2021-22	18.915	20.467	21.408	22.588
	2022-23	26.407	30.565	30.791	38.801
Tricon Boston Consulting-A	2018-19	15.811	16.181	18.366	18.399
	2019-20	21.279	20.064	19.738	20.823
	2020-21	20.164	19.871	19.209	18.349
	2021-22	18.944	20.497	21.441	22.640
	2022-23	26.503	30.717	30.980	30.048
Tricon Boston Consulting-B	2018-19	15.811	16.181	18.366	18.399
	2019-20	21.279	20.064	19.738	20.823
	2020-21	20.164	19.871	19.209	18.349
	2021-22	18.944	20.497	21.441	22.640
	2022-23	26.503	30.717	30.980	30.048
Tricon Boston Consulting-C	2018-19	15.811	16.181	18.366	18.399
	2019-20	21.279	20.064	19.738	20.823
	2020-21	20.164	19.871	19.209	18.349
	2021-22	18.944	20.497	21.441	22.640
	2022-23	26.503	30.717	30.980	30.048
Zephyr Power	2018-19			18.368	18.544
	2019-20	21.172	20.576	20.272	20.475
	2020-21	19.117	18.927	18.463	17.933
	2021-22	18.355	19.578	20.906	22.004
	2022-23	25.336	28.273	28.567	35.224
Act 2 Din Wind Power	2022-23	10.354	11.659	11.755	13.959
Din Energy	2022-23	10.492	11.815	11.911	14.122
Gul Ahmad Electric	2022-23	-	-	-	13.866
Indus Wind Energy	2022-23	10.516	11.842	11.939	14.154
Lakeside Energy	2022-23	8.960	11.417	11.624	13.831
Liberty Wind Power-I	2022-23	10.279	11.606	11.825	-
Liberty Wind Power-II	2022-23	10.279	11.606	11.825	-
Master Green Energy	2022-23	10.757	12.040	12.268	14.468
Metro 2 Wind Power	2022-23	10.085	11.368	11.579	13.681
NASDA Green Energy	2022-23	10.143	11.452	11.668	13.865

** Revised Tariff after negotiations*

Source: NEPRA

TABLE 86 (I)

Indexed/Adjusted Tariff of Solar Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	July	October	January	April
Quid-e-Azam Solar	2018-19	20.537	21.544	23.792	24.100
	2019-20	26.764	26.613	26.279	25.846
	2020-21	24.041	23.923	23.557	21.025
	2021-22	21.298	22.169	23.569	24.339
	2022-23	26.646	28.077	28.055	32.363
Appollo Solar	2018-19	20.039	20.468	23.004	23.145
	2019-20	26.868	25.492	25.185	26.782
	2020-21	26.541	26.189	25.317	24.212
	2021-22	24.995	27.001	28.169	29.316
	2022-23	33.501	37.903	37.684	47.148
Best Green Energy	2018-19	21.084	21.557	24.345	24.416
	2019-20	28.225	26.687	23.199	27.803
	2020-21	27.169	26.790	25.906	24.769
	2021-22	25.558	27.613	28.837	30.225
	2022-23	34.917	39.926	39.929	50.021
Crest Energy	2018-19	21.202	21.678	24.458	24.548
	2019-20	28.408	26.882	26.505	28.063
	2020-21	27.513	27.129	26.233	25.090
	2021-22	25.891	27.973	29.208	30.566
	2022-23	35.227	40.191	40.145	50.287

Power Plant	Year	July	October	January	April
Harappa Solar	2018-19	16.621	16.891	18.336	18.405
	2019-20	20.390	19.687	19.548	20.344
	2020-21	20.068	19.881	19.441	18.865
	2021-22	19.259	18.3647*	18.914	19.569
	2022-23	21.740	24.104	24.196	28.849
AJ Power	2018-19	16.336	16.605	18.038	18.108
	2019-20	20.073	19.380	19.243	20.033
	2020-21	19.757	19.575	19.142	18.574
	2021-22	18.967	18.0936*	18.642	19.298
	2022-23	21.461	23.819	23.918	28.549
Gharo Solar	2022-23	12.365	14.115	14.373	17.444
Oursun Pakistan	2022-23	25.020	27.050	23.373	32.718
Atlas Solar	2022-23	9.362	10.554	10.974	14.082

** Revised Tariff after negotiations.*

Source: NEPRA

TABLE 86 (J)

Indexed/Adjusted Tariff of Bagasse-based Power Plants on Quarterly Basis (Rs./kWh) As on 1st of

Power Plant	Year	FCC	July	October	January	April
Almoiz Industries	2018-19	Upfront			6.974	7.101
	2019-20		7.899	8.002	7.931	7.569
	2020-21		6.732	6.716	6.645	6.627
	2021-22		6.689	6.2498*	6.880	7.213
	2022-23		8.063	8.422	8.609	10.065
RYK Mills	2018-19	6.209	5.962	6.284	6.922	7.026
	2019-20		7.719	7.769	7.706	7.471
	2020-21		6.863	6.852	6.786	6.751
	2021-22		6.825	6.3624*	6.807	7.035
	2022-23		7.641	7.940	8.000	9.032
Chiniot Power	2018-19	6.209	5.941	6.275	6.931	7.038
	2019-20		7.750	7.810	7.744	7.487
	2020-21		6.841	6.829		6.730
	2021-22		6.802	7.047	7.543	7.808
	2022-23		8.535	8.926	8.998	10.298
The Thal Industries	2018-19	Upfront	5.872	6.242	6.961	7.082
	2019-20		7.855	7.945	7.876	7.545
	2020-21		6.764	6.749	6.679	6.657
	2021-22		6.722	6.279	6.862	7.170
	2022-23		7.960	8.304	8.461	9.814
Jamal Din Wali-II	2018-19	6.209	5.962	6.284	6.922	7.026
	2019-20		7.719	7.769	7.706	7.471
	2020-21		6.863	6.852	6.786	6.751
	2021-22		6.825	6.3685*	6.807	7.035
	2022-23		7.641	7.940	8.000	9.032
Jamal Din Wali-III	2018-19	6.209	5.962	6.284	6.922	7.026
	2019-20		7.719	7.769	7.706	7.471
	2020-21		6.863	6.852	6.786	6.751
	2021-22		6.825	6.3685*	6.807	7.035
	2022-23		7.641	7.940	8.000	9.032
Hamza Sugar	2018-19	6.209	5.896	6.253	6.951	7.067
	2019-20		7.818	7.898	7.830	7.525
	2020-21		6.791	6.777	6.708	
	2021-22		6.750	6.3029*	6.847	7.134
	2022-23		7.874	8.207	8.337	9.604
Channar Energy	2021-22		6.689	6.2498*	6.880	7.213
	2022-23		8.063	8.422	8.609	10.065

** Revised Tariff after negotiations.*

Source: NEPRA

TABLE 87

Insurance Cost Component

Company Name	Insurance Premium (Rs. in Million)		Insurance Component (Rs./kWh)		Period
	Reference	Revised	Reference	Revised	
Appolo Solar	66,707,000	52,510,736	0.435	0.343	May 31, 2020 to May 30, 2021
Best Green	20,518,000	24,310,091	0.134	0.159	August 01, 2020 to July 31, 2021
Crest Energy	19,583,000	23,126,315	0.128	0.151	August 01, 2020 to July 31, 2021
Three Gorges 1st	74,157,000	70,856,437	0.535	0.511	November 26, 2020 to November 25, 2021
	74,157,000	82,361,457	0.535	0.594	November 26, 2021 to November 25, 2022
Zorlu Enerji	56,790,000	110,767,164	0.668	0.697	January 01, 2021 to December 31, 2021
Zephyr Power	96,554,760	73,061,170	0.635	0.477	March 28, 2021 to March 27, 2022
Act Wind	44,669,719	70,219,390	0.548	0.862	October 08, 2021 to October 07, 2022
Harappa Solar	12,849,379	15,646,010	0.481	0.584	October 14, 2020 to October 13, 2021
	12,849,379	17,277,160	0.481	0.645	October 14, 2021 to October 13, 2022
Tricon Boston-A	96,554,760	34,948,169	0.635	0.229	November 22, 2020 to November 21, 2021
	96,554,760	47,121,195	0.635	0.309	November 22, 2021 to November 21, 2022
Tricon Boston-B	96,554,760	34,948,169	0.635	0.229	November 22, 2020 to November 21, 2021
	96,554,760	47,121,195	0.635	0.309	November 22, 2021 to November 21, 2022
Tricon Boston-C	96,554,760	34,948,169	0.635	0.229	November 22, 2020 to November 21, 2021
	96,554,760	47,121,195	0.635	0.309	November 22, 2021 to November 21, 2022
Oursun Pakistan	96,554,760	37,550,940	0.635	0.476	November 30, 2021 to November 29, 2022
AJ Power	7,034,305	5,488,860	0.394	0.307	December 14, 2020 to December 13, 2021
	6,195,668	5,488,860	0.347	0.307	December 14, 2021 to December 13, 2022
Gharo Solar	29,290,000	23,853,150	0.301	0.297	December 23, 2021 to December 22, 2022
FFC Energy	69,874,959	54,195,702	0.487	0.378	January 01, 2022 to December 31, 2022
Hawa Energy	96,817,558	66,138,233	0.635	0.434	March 15, 2021 to March 14, 2022
	96,819,125	120,984,666	0.635	0.793	March 15, 2022 to March 14, 2023
Jhimpir Power	96,817,558	66,281,550	0.635	0.435	March 16, 2021 to March 15, 2022
	96,819,125	117,140,272	0.635	0.768	March 16, 2022 to March 15, 2023
Artistic Wind	67,179,530	71,233,632	0.444	0.471	March 16, 2021 to March 15, 2022
	67,179,530	114,455,320	0.444	0.757	March 16, 2022 to March 15, 2023
Three Gorges 3rd	96,360,090	43,054,329	0.635	0.284	June 09, 2021 to June 08, 2022
	96,360,090	54,840,971	0.635	0.361	June 09, 2022 to June 08, 2023
Three Gorges 2nd	96,360,090	43,053,387	0.635	0.284	June 20, 2021 to June 19, 2022
	96,360,090	54,840,971	0.635	0.361	June 20, 2022 to June 19, 2023
Foundation Wind-I	47,555,000	64,949,535	0.329	0.450	July 01, 2021 to June 30, 2022
	47,555,000	41,435,248	0.3291	0.600	July 01, 2022 to December 31, 2022
Foundation Wind-II	47,555,000	64,949,532	0.331	0.452	July 01, 2021 to June 30, 2022
	47,555,000	41,435,248	0.331	0.604	July 01, 2022 to December 31, 2022
Master Green	36,687,608	53,143,184	0.218	0.315	August 21, 2022 to August 20, 2023
Metro Power	61,436,000	105,617,984	0.432	0.742	September 16, 2021 to September 15, 2022
	61,433,587	135,467,827	0.432	0.952	September 16, 2022 to September 15, 2023
Sachal Energy	66,547,000	67,482,923	0.488	0.494	April 11, 2021 to April 10, 2022
	66,547,000	124,300,752	0.488	0.911	April 11, 2023 to April 10, 2024

Source: NEPRA

Table 88

Use of Transmission System Charges

(A) National Transmission and Despatch Company Limited	
Description	**Rs./kW/Month**
FY 2018-19	176.16
FY 2019-20	199.64
FY 2020-21	224.12
FY 2021-22	235.30
FY 2022-23	-

Note: No petition for determination of Use of System Charges for FY 2022-23 is submitted by NTDC, therefore, the notified tariff of FY 2021-22 is applicable till revision/modification of transmission tariff.

(B) Pak Matiari-Lahore Transmission Company (Pvt.) Limited (PMLTC)

Description		Jul-Sep 2021	Oct-Dec 2021	Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023
	Reference	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Fixed O&M ITC (Foreign)	0.044	0.075	0.082	0.087	0.091	0.105	0.119	0.118	0.150
ITC O&M (Local)	0.032	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
NTDC O&M (Local)	0.041	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
Land Lease	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Insurance	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
ROE	0.168	0.255	0.275	0.286	0.295	0.332	0.370	0.365	0.457
ROEDC	0.039	0.059	0.064	0.066	0.068	0.077	0.086	0.084	0.106
Principal	0.304	0.461	0.461	0.518	0.518	0.634	0.634	0.698	0.698
Interest	0.219	0.273	0.273	0.321	0.321	0.527	0.527	0.741	0.741
Sinosure Fee	0.025	0.025	0.025	0.025	0.025	0.023	0.023	0.023	0.023
Total Tariff (PKR/kW/hr)	0.920	1.290	1.323	1.446	1.461	1.840	1.902	2.173	2.318
Total Tariff (US Cents/kWh)	0.881	0.815	0.774	0.813	0.798	0.893	0.827	0.958	0.816

(C) Sindh Transmission and Dispatch Company (Pvt.) Limited (STDC)

Description	Reference (Rs./kW/Hr)	(July - December, 2021) (Rs./kW/Hr)	(January - June, 2022) (Rs./kW/Hr)	(July - December, 2022) (Rs./kW/Hr)	(January - June, 2023) (Rs./kW/Hr)
O&M	0.182	0.197	0.221	0.221	0.275
Insurance	0.019	0.019	0.019	0.019	0.019
ROE	0.094	0.094	0.094	0.094	0.094
Debt Servicing	0.213	0.229	0.264	0.296	0.304

Source: NEPRA

TABLE 89 (A)

Consumer-end Applicable Tariff from November, 2021 and onwards CPPA-G System

Description	Fixed Charge (Rs./ kW/M)	Notified Tariff w.e.f. 01-01-2019 Variable Charges (Rs./kWh)	Fixed Charge (Rs./ kW/M)	Notified Tariff w.e.f. 12-02-2021 Variable Charges (Rs./kWh)	Fixed Charge (Rs./ kW/M)	Notified Base Tariff w.e.f. 01-11-2021 Variable Charges (Rs./kWh)
A1- Residential						
Up to 50 Units		2.00		3.95		3.95
For Peak load requirement less than 5 kW						
01-100 Units		5.79		7.74		9.42
101-200 Units		8.11		10.06		11.74
201-300 Units		10.20		12.15		13.83
301-700 Units		17.60		19.55		21.23
Above 700 Units		20.70		22.65		24.33
For Peak load requirement exceeding 5 kW						
Time of Use (TOU) - Peak		20.70		22.65		24.33
Time of Use (TOU) - Off-Peak		14.38		16.33		18.01
Temporary Supply		20.84		22.79		24.47
A2 - Commercial						
For Peak load requirement less than 5 kW		18.00		19.95		21.34
For Peak load requirement exceeding 5 kW						
Regular	400	19.68	440	21.63	440	23.02
Time of Use (TOU) - Peak		21.60		23.55		24.94
Time of Use (TOU) - Off-Peak	400	15.63	440	17.58	440	18.97
Temporary Supply		18.39		20.34		21.73
A3 - General Services		17.56		19.51		20.90
B - Industrial						
B1 (upto 25 kW)		15.28		17.23		18.62

Description	Fixed Charge (Rs./ kW/M)	Notified Tariff w.e.f. 01-01-2019 Variable Charges (Rs./kWh)	Fixed Charge (Rs./ kW/M)	Notified Tariff w.e.f. 12-02-2021 Variable Charges (Rs./kWh)	Fixed Charge (Rs./ kW/M)	Notified Base Tariff w.e.f. 01-11-2021 Variable Charges (Rs./kWh)
B1 - TOU (Peak)		18.84		20.79		16.62
B1 Off Peak		13.28		15.23		16.62
B2 (25-500 kW)	400	14.78	440	16.73	440	18.12
B2 - TOU (Peak)		18.78		20.73		16.41
B2 - TOU (Off-Peak)	400	13.07	440	15.02	440	16.41
B3 - TOU (Peak)		18.78		20.73		16.32
B3 - TOU (Off-Peak)	380	12.98	420	14.93	420	16.32
B4 - TOU (Peak)		18.78		20.73		16.22
B4 - TOU (Off-Peak)	360	12.88	400	14.83	400	16.22
Temporary Supply		16.36		18.31		19.70
C - Single Point Supply						
C1(a) Supply at 400 Volts-less than 5 kW		18.68		20.63		22.02
C1(b) Supply at 400 Volts-exceeding 5 kW	400	18.18	440	20.13	440	21.52
Time of Use (TOU) - Peak		21.60		23.55		24.94
Time of Use (TOU) - Off-Peak	400	15.00	440	16.95	440	18.34
C2 Supply at 11 kV	380	17.98	420	19.93	420	21.32
Time of Use (TOU) - Peak		21.60		23.55		24.94
Time of Use (TOU) - Off-Peak	380	14.80	420	16.75	420	18.14
C3 Supply above 11 kV	360	17.88	400	19.83	400	21.22
Time of Use (TOU) - Peak		21.60		23.55		24.94
Time of Use (TOU) - Off-Peak	360	14.70	400	16.65	400	18.04
D - Agricultural						
SCARP		15.68		17.63		19.02
Time of Use (TOU) - Peak		18.60		20.55		21.94
Time of Use (TOU) - Off-Peak	200	11.35	200	13.30	200	14.69
Agricultual Tube-wells	200	5.35	200	7.30	200	8.69
Time of Use (TOU) - Peak		5.35		7.30		8.69
Time of Use (TOU) - Off-Peak	200	5.35	200	7.30	200	8.69
Public Lighting - Tariff G		18.68		20.63		22.02
Residential Colonies - Tariff H		18.68		20.63		22.02
Railway Traction - Tariff I		18.68		20.63		22.02
Tariff K - AJK	360	15.90	400	17.85	400	19.24
Time of Use (TOU) - Peak		21.60		23.55		24.94
Time of Use (TOU) - Off-Peak	360	14.70	400	16.65	400	18.04
Tariff K - Rawat Lab		18.68		20.63		22.02

Table 89 (B)

Consumer-end Determined Tariff for K-Electric Applicable for April – June, 2022

TARIFF CATEGORY / PARTICULARS	Fixed Charge (Rs./ kW/M)	Variable Charges (Rs./kWh)		Quarterly Adjustment (Rs./kWh)		TOTAL VARIABLE CHARGES (Rs./kWh)	
A 1 Residential							
For Sanctioned load less than 5 kW							
Up to 50 Units - Life Line	-		4.00				4.00
51 - 100 Units - Life Line			23.41		3.55		26.96
001 - 100 Units			23.41		3.55		26.96
101 - 200 Units			25.00		3.55		28.55
201- 300 Units	-		26.21		3.55		29.76
301- 400 Units	-		27.26		3.55		30.81
401- 500 Units			27.26		3.55		30.81
501- 600 Units			27.26		3.55		30.81
601- 700 Units			27.26		3.55		30.81
Above 700 Units	-		29.61		3.55		33.16
For Sanctioned load 5 kW & above							
		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Time Of Use	-	30.82	26.64	3.55	3.55	34.37	30.19
A-2 GENERAL SUPPLY TARIFF - COMMERCIAL							
For Sanctioned load less than 5 kW			27.57		3.55		31.12
For Sanctioned load 5 kW & above	440		26.80		3.55		30.35
		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Time Of Use	440	30.81	26.58	3.55	3.55	34.36	30.13

TARIFF CATEGORY / PARTICULARS	Fixed Charge (Rs./ kW/M)	Variable Charges (Rs./kWh)		Quarterly Adjustment (Rs./kWh)		TOTAL VARIABLE CHARGES (Rs./kWh)	
A-3 GENERAL SERVICES							
General Services	-		27.76		3.55		31.31
B INDUSTRIAL SUPPLY TARIFFS							
B1 - Upto 25 kW (at 400/230 Volts)	-		27.81		3.55		31.36
B2(a) - 25-500 kW (at 400 Volts)	440		26.96		3.55		30.51
B3(a) - For all loads upto 5000 KW (at 11,33 kV)	420		26.81		3.55		30.36
B4(a) - For all loads upto 5000 KW (at 66,132 kV)	400		26.31		3.55		29.86
Time Of Use		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
B1(b) - Upto 25 kW (at 400/230 Volts)	-	30.81	26.81	3.55	3.55	34.36	30.36
B2(b) - 25-500 kW (at 400 Volts)	440	30.81	26.31	3.55	3.55	34.36	29.86
B3(b) - For All Loads up to 5000 kW (at 11,33 kV)	420	30.81	25.81	3.55	3.55	34.36	29.36
B4(b) - For All Loads (at 66,132 kV & above)	400	30.81	25.56	3.55	3.55	34.36	29.11
B5 - For All Loads (at 220 kV & above)	340	30.81	24.81	3.55	3.55	34.36	28.36
C - SINGLE-POINT SUPPLY							
C1 - For supply at 400/230 Volts							
Sanctioned load less than 5 kW	-		27.81		3.55		31.36
Sanctioned load 5 kW & up to 500 kW	440		26.81		3.55		30.36
C2(a) - For supply at 11,33 kV up to and including 5000 kW	420		26.81		3.55		30.36
C3(a) - For supply at 132 and above, up to and including 5000 kW	400		26.31		3.55		29.86
Time Of Use		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
C1(c) - For supply at 400/230 Volts 5 kW & up to 500 kW	440	30.81	26.31	3.55	3.55	34.36	29.86
C2(b) - For supply at 11,33 kV up to and including 5000 kW	420	30.81	25.81	3.55	3.55	34.36	29.36
C3(b) - For supply at 132 kV up to and including 5000 kW	400	30.81	25.56	3.55	3.55	34.36	29.11
D - AGRICULTURE TARIFF							
D1 - For all Loads	200		25.53		3.55		29.08
Time of Use		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
D2 - For all Loads	200	30.81	25.11	3.55	3.55	34.36	28.66
E - Temporary Supply Tariffs							
E1 (i) - Residential Supply	-		28.31		3.55		31.86
E1 (ii) - Commercial Supply	-		28.91		3.55		32.46
E2 (i) - Industrial Supply	-		29.36		3.55		32.91
E2 (ii) - Bulk Supply							
(a) at 400 Volts	-		29.31		3.55		32.86
(b) at 11 kV			29.29		3.55		32.84
For the categories of E-1 (i & ii) and E-2 (i & ii) above, the minimum bill of the consumers shall be Rs. 50/- per day subject to a minimum of Rs. 500/- for the entire period of supply, even if no energy is consumed.							
F - SEASONAL INDUSTRIAL SUPPLY TARIFF	**125% of relevant industrial tariff**						
Note: Tariff-F consumers will have the option to convert to Regular Tariff and vice versa. This option can be exercised at the time of a new connection or at the beginning of the season. Once exercised , the option remains in force for at least one year.							
G - PUBLIC LIGHTING			**28.21**		**3.55**		**31.76**
H - RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES			**28.31**		**3.55**		**31.86**

Source: NEPRA

TABLE 90

National Average Uniform Applicable Base Tariff

	Description	Fixed Charge (Rs./kW/M)	July, 2022 Variable Charges (Rs./kWh)	August-September, 2022 Variable Charges (Rs./kWh)	October, 2022 Onward Variable Charges (Rs./kWh)
	Residential				
	For Peak load requirement less than 5 kW				
Protected	Up to 50 Units - Life Line		3.95	3.95	3.95
	51-100 units - Life Line		7.74	7.74	7.74
	01-100 Units		7.74	7.74	7.74
	101-200 Units		10.06	10.06	10.06
Un-Protected	01-100 Units		13.48	13.48	13.48
	101-200 Units		14.43	18.58	18.95
	201-300 Units		17.04	21.47	22.14
	301-400 Units		20.28	24.63	25.53
	401-500 Units		21.74	26.09	27.74
	501-600 Units		22.66	27.01	29.16
	601-700 Units		23.30	27.65	30.30
	Above 700 Units		27.72	31.12	35.22
	For Peak load requirement exceeding 5 kW				
	Time of Use (TOU) - Peak		28.78	33.23	34.39
	Time of Use (TOU) - Off-Peak		22.46	26.91	28.07

Description	Fixed Charge (Rs./kW/M)	July, 2022 Variable Charges (Rs./kWh)	August-September, 2022 Variable Charges (Rs./kWh)	October, 2022 Onward Variable Charges (Rs./kWh)
Temporary Supply		28.92	33.37	34.53
Total Residential				**20.73**
Commercial - A2				
For Peak load requirement less than 5 kW		24.84	29.34	30.25
For Peak load requirement exceeding 5 kW				
Regular	500	26.52	31.02	31.93
Time of Use (TOU) - Peak		28.44	32.94	33.85
Time of Use (TOU) - Off-Peak	500	22.47	26.97	27.88
Temporary Supply		25.23	29.73	30.64
Electric Vehicle Charging Station		26.52	31.02	31.93
Total Commercial				**29.55**
General Services-A3		24.40	28.90	29.81
Industrial				
B1		22.12	25.92	26.83
B1 Peak		25.68	29.48	30.39
B1 Off Peak		20.12	23.92	24.83
B2	500	21.62	25.42	26.33
B2 - TOU (Peak)		25.62	29.42	30.33
B2 - TOU (Off-Peak)	500	19.91	23.71	24.62
B3 - TOU (Peak)		25.62	29.42	30.33
B3 - TOU (Off-Peak)	460	19.82	23.62	24.53
B4 - TOU (Peak)		25.62	29.42	30.33
B4 - TOU (Off-Peak)	440	19.72	23.52	24.43
Temporary Supply		23.20	27.00	27.91
Total Industrial		**20.71**	**24.51**	**25.42**
Single Point Supply				
C1(a) Supply at 400 Volts-less than 5 kW		25.52	30.02	30.93
C1(b) Supply at 400 Volts-exceeding 5 kW	500	25.02	29.52	30.43
Time of Use (TOU) - Peak		28.44	32.94	33.85
Time of Use (TOU) - Off-Peak	500	21.84	26.34	27.25
C2 Supply at 11 kV	460	24.82	29.32	30.23
Time of Use (TOU) - Peak		28.44	32.94	33.85
Time of Use (TOU) - Off-Peak	460	21.64	26.14	27.05
C3 Supply above 11 kV	440	24.72	29.22	30.13
Time of Use (TOU) - Peak		28.44	32.94	33.85
Time of Use (TOU) - Off-Peak	440	21.54	26.04	26.95
Total Single Point Supply				
Agricultural Tube-wells - Tariff D				
SCARP		22.52	26.02	26.93
Time of Use (TOU) - Peak		25.44	28.94	29.85
Time of Use (TOU) - Off-Peak	200	18.19	21.69	22.60
Agricultural Tube-wells	200	12.19	15.69	16.60
Time of Use (TOU) - Peak		12.19	15.69	16.60
Time of Use (TOU) - Off-Peak	200	12.19	15.69	16.60
Total Agricultural				
Public Lighting - Tariff G		25.52	29.02	29.93
Residential Colonies		25.52	29.02	29.93
Railway Traction		25.52	29.02	29.93
Tariff K - AJK	440	22.74	26.24	27.15
Time of Use (TOU) - Peak		28.44	31.94	32.85
Time of Use (TOU) - Off-Peak	440	21.54	25.04	25.95
Tariff K - Rawat Lab		25.52	29.02	29.93

Source: NEPRA

TABLE 91 (A)

Monthly Fuel Price Adjustment in respect of all DISCOs and K-Electric

Monthly Fuel Price Adjustment of CPPA System (Rs./kWh)															
Year	FY 2018-19			FY 2019-20			FY 2020-21			FY 2021-22			FY 2022-23		
	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation
July	5.501	4.993	0.508	5.322	3.542	1.780	4.380	3.542	0.838	6.657	5.280	1.377	10.631	6.288	4.344
August	5.919	4.755	1.164	4.866	3.205	1.662	3.687	3.205	0.483	6.687	4.733	1.954	10.085	9.893	0.192
September	5.322	5.122	0.200	4.668	2.841	1.827	3.955	2.841	1.114	7.550	5.023	2.527	9.993	9.911	0.082
October	5.711	5.237	0.474	5.324	3.758	1.566	4.051	-3.758	0.293	9.918	5.173	4.745	8.849	9.171	-0.321
November	4.727	5.050	-0.323	3.470	2.488	0.982	3.527	-2.488	0.770	8.040	3.738	4.302	6.265	6.076	0.189
December	6.430	5.862	0.569	6.338	4.460	1.878	5.996	4.460	1.536	8.632	5.535	3.097	7.003	9.319	-2.317
January	7.563	5.758	1.806	6.868	5.758	1.111	6.653	5.758	0.895	12.461	6.512	5.949	11.032	10.554	0.478
February	4.780	3.971	0.809	5.176	3.971	1.205	4.783	4.141	0.642	9.105	4.252	4.853	7.211	7.212	-0.001
March	4.964	5.001	-0.037	5.108	5.001	0.107	5.586	6.230	-0.643	9.097	6.230	2.868	9.504	8.712	0.792
April	5.788	5.236	0.551	4.532	5.236	-0.704	6.172	6.609	-0.437	10.601	6.609	3.992	9.995	8.388	1.608
May	5.146	5.046	0.100	3.794	5.046	-1.252	5.668	5.932	-0.264	13.836	5.932	7.904	9.732	7.828	1.904
June	5.313	3.542	1.799	4.055	5.115	-1.058	5.741	5.934	-0.193	15.832	5.934	9.897	9.318	7.508	1.810

Monthly Fuel Price Adjustment of K-Electric System (Rs./kWh)															
Year	FY 2018-19			FY 2019-20			FY 2020-21			FY 2021-22			FY 2022-23		
	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation	Act. Fuel Cost (Rs.)	Ref. Fuel Cost (Rs.)	Variation
July	9.045	8.430	0.615	11.307	10.096	1.211	8.618	7.892	-0.748	11.581	10.892	0.689	23.868	27.985	-4.117
August	8.982	8.430	0.552	10.854	10.096	0.758	8.200	7.892	0.753	11.653	10.892	0.761	23.099	27.985	-4.886
September	9.181	8.430	0.751	10.403	10.096	0.307	8.602	7.892	0.308	14.649	10.892	3.757	22.859	27.985	-5.126
October	10.769	9.181	1.588	10.505	10.403	0.102	8.573	8.602	0.710	15.724	14.649	1.075	20.405	22.859	-2.454
November	9.761	9.181	0.580	8.276	10.403	-2.127	7.501	8.602	-0.029	13.890	14.649	-0.759	15.428	22.859	-7.431
December	9.840	9.181	0.658	8.644	10.403	-1.759	9.101	8.602	-0.102	12.056	14.649	-2.594	12.061	22.859	-10.798
January	9.802	9.840	-0.038	9.586	8.644	0.943	10.351	9.101	1.251	15.334	12.056	3.278	13.772	12.061	1.711
February	8.908	9.840	-0.932	9.153	8.644	0.509	11.199	9.101	2.098	13.442	12.056	1.386	12.640	12.061	0.580
March	8.621	9.840	-1.219	8.640	8.644	-0.004	11.043	9.101	1.942	16.883	12.056	4.827	15.995	12.061	3.934
April	9.278	8.621	0.657	7.853	8.640	-0.787	10.493	11.043	-0.550	22.155	16.883	5.272	15.948	15.995	-0.047
May	10.054	8.621	1.433	7.286	8.640	-1.354	10.093	11.043	-0.950	26.401	16.883	9.518	17.441	15.995	1.447
June	10.060	8.621	1.475	7.892	8.640	-0.748	10.892	11.043	0.151	27.985	16.883	11.102	18.306	15.995	2.311

Source: NEPRA

TABLE 91 (B)

Detail of Quarterly Adjustments of DISCOs

Quarterly Adjustments Period	Decision Dated	Allowed National Average (Rs./kWh)	Applicability Period (with effect from)
FY 2019-20 (2nd & 3rd Quarter)	24-09-2020	1.624	October, 2020 to September, 2021
FY 2019-20 (4th Quarter)	10-02-2021	0.828	October, 2021 to September, 2022
FY 2020-21 (1st & 2nd Quarter)	02-07-2021	0.897	October, 2021 to September, 2022
FY 2020-21 (3rd Quarter)	30-07-2021	-0.067	October, 2021 to September, 2022
FY 2020-21 (4th Quarter)	30-12-2021	-0.991	February, 2022 to April, 2022
FY 2021-22 (1st Quarter)	09-05-2022	0.572	June, 2022 to August, 2022
FY 2021-22 (2nd Quarter)	16-06-2022	1.550	July, 2022 to September, 2022
FY 2021-22 (3rd Quarter)	29-07-2022	0.509	September, 2022 to November, 2022
FY 2021-22 (4th Quarter)	14-10-2022	3.297	October, 2022 to January, 2023
FY 2022-23 (1st Quarter)	17-01-2023	3.081	February, 2023 to March, 2023
FY 2022-23 (2nd Quarter)	12-04-2023	0.469	April, 2023 to June, 2023

Source: NEPRA

TABLE 92

CPI (General/US), Exchange Rate, KIBOR and LIBOR

Quarter	CPI (General)	CPI (US)	PKR/USD	KIBOR (3 Month) (%)	LIBOR (3 Month) (%)
July, 2018 – September, 2018	225.40	251.59	121.60	6.92	2.34
October, 2018 – December, 2018	229.27	252.15	124.30	8.32	2.40
January, 2019 – March, 2019	234.75	252.04	139.10	10.55	2.81
April, 2019 – June, 2019	237.61	252.78	140.70	10.99	2.60
July, 2019 – September, 2019	245.94	256.09	164.50	12.97	2.32
October, 2019 – December, 2019	255.94	256.56	156.70	13.85	2.09
January, 2020 – March, 2020	263.59	257.21	155.35	13.55	1.91
April, 2020 – June, 2020	266.20	258.68	166.75	11.22	1.45
July, 2020 – September, 2020	269.27	256.39	168.75	7.26	0.30
October, 2020 – December, 2020	269.27	259.92	166.40	7.25	0.23
January, 2021 – March, 2021	269.27	260.23	160.80	7.29	0.24
April, 2021 – June, 2021	269.27	263.01	153.60	7.59	0.19
July, 2021 – September, 2021	269.27	269.20	158.30	7.45	0.16
October, 2021 – December, 2021	269.27	273.57	170.95	7.78	0.16
January, 2022 – March, 2022	269.27	277.95	177.95	10.52	0.34
April, 2022 – June, 2022	269.27	283.72	183.20	11.89	0.34
July, 2022 – September, 2022	269.27	292.30	206.00	15.32	2.94
October, 2022 – December, 2022	269.27	296.17	229.95	15.71	2.94
January, 2023 – March, 2023	269.27	297.71	226.90	17.06	5.14
April, 2023 – June, 2023	269.27	300.84	284.10	22.08	5.14

Source: NEPRA

TABLE 93

CPPA-G Market Operator Fee

Description	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Revenue Requirement (Rs. in Million)	391.92	236.90	468.07	863.67	1,152.00
Average Monthly MDI (MW)	23,507.00	23,640.00	23,693.00	26,535.00	27,588.00
Market Operation Fee (Rs./kW/Month)	1.39	0.84	1.71	2.71	3.48

Source: NEPRA

TABLE 94

Import by K-Electric from CPPA-G Basket (GWh)

Day	July, 2022	August, 2022	Septem-ber, 2022	October, 2022	Novem-ber, 2022	Decem-ber, 2022	January, 2023	February, 2023	March, 2023	April, 2023	May, 2023	June, 2023
1	25.45	27.83	26.45	26.25	19.45	24.46	21.69	22.17	25.07	24.61	23.78	25.20
2	25.23	27.36	26.43	26.02	21.61	20.31	23.66	22.97	25.07	24.58	25.96	25.57
3	24.29	26.96	26.31	26.73	23.44	24.44	24.32	23.26	24.95	25.03	27.25	24.42
4	24.40	25.54	25.43	25.97	24.75	22.32	22.73	23.24	24.61	24.40	27.34	23.27
5	25.83	25.89	26.12	26.57	21.80	24.79	23.49	18.88	19.56	23.85	26.41	25.24
6	25.39	26.02	26.41	26.53	24.87	24.84	22.12	24.92	24.79	24.03	26.92	25.37
7	25.98	25.57	26.79	26.34	25.77	24.63	23.63	24.58	24.65	24.41	26.37	25.66
8	25.07	24.48	26.18	26.18	24.49	25.18	21.97	24.78	25.36	24.23	27.39	25.07
9	23.18	21.29	26.78	24.93	22.96	25.32	23.24	25.77	24.71	24.58	24.57	25.46
10	23.21	23.58	25.71	26.11	25.64	24.96	24.21	25.06	22.48	24.56	23.98	25.46
11	19.87	23.18	26.97	26.27	25.81	22.09	24.47	25.34	23.67	24.77	24.88	23.35
12	24.11	24.83	26.31	26.34	25.12	24.75	23.81	23.52	25.79	24.83	24.67	25.67
13	24.42	21.96	25.58	13.04	22.63	23.58	22.52	24.75	24.69	25.00	24.73	24.65
14	25.73	23.10	26.91	19.81	25.79	23.98	21.66	25.33	23.25	24.23	24.16	25.45
15	24.66	23.75	26.68	24.15	25.80	24.29	23.51	25.52	23.94	24.44	24.92	24.50
16	24.77	25.96	25.43	24.45	25.14	23.80	23.44	24.91	24.05	24.00	24.61	25.09
17	25.23	26.05	25.71	25.67	26.01	23.73	24.50	24.90	24.53	24.33	25.02	17.67
18	23.97	26.24	24.25	26.77	27.15	22.03	24.13	23.26	24.79	24.31	24.84	23.80
19	24.95	26.06	25.46	26.45	25.65	24.51	24.72	21.65	24.89	24.42	25.54	24.83
20	25.19	25.88	23.94	26.04	21.97	24.51	21.59	24.78	25.09	24.45	25.41	25.02
21	25.02	25.96	24.64	25.91	26.10	24.07	20.26	25.12	25.33	22.34	24.27	24.88
22	25.59	26.23	25.04	25.71	25.46	24.02	15.49	25.10	24.80	22.36	25.47	25.60
23	26.19	26.10	25.85	23.65	25.60	22.67	4.11	25.27	22.95	24.11	25.32	25.43
24	25.00	26.41	25.93	25.80	25.34	20.15	10.59	25.15	24.60	22.76	25.56	25.83
25	23.58	26.95	24.68	26.50	24.57	21.05	20.14	22.25	24.60	21.64	26.19	25.74
26	23.23	26.17	25.44	25.87	22.28	21.45	21.51	21.95	25.16	25.16	25.63	25.65
27	25.81	26.61	25.96	26.16	23.23	21.06	22.27	24.26	24.84	25.06	25.03	24.97
28	25.39	26.08	25.53	23.15	24.67	21.26	21.76	24.53	25.00	24.39	23.84	24.87
29	26.15	26.51	25.57	24.07	24.52	21.82	22.69		24.94	24.45	24.76	24.95
30	22.71	26.45	25.83	19.67	24.84	20.75	22.16		25.08	20.29	24.80	25.28
31	25.62	26.14		23.91		22.94	23.60		25.06		24.94	
Total	**765.22**	**791.12**	**774.28**	**771.02**	**732.45**	**719.77**	**669.98**	**673.22**	**758.32**	**721.61**	**784.54**	**743.95**

TABLE 95

Technology-wise Generation Capacity (MW) and Daily Energy Generation (GWh)

July, 2022

Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,612	10,431	5,937	4,883	128.04	51.14	1,835	1,835	1,685	1,151	36.46	82.78
2	10,612	10,431	5,859	4,503	123.27	49.24	1,835	1,835	1,363	243	21.30	48.37
3	10,612	10,431	6,281	4,417	131.28	52.44	1,835	1,835	742	157	8.74	19.85
4	10,612	10,431	7,391	5,044	148.20	59.20	1,835	1,835	1,291	0	4.77	10.84
5	10,612	10,431	7,397	5,810	159.47	63.70	1,835	1,835	1,094	-2	2.19	4.98
6	10,612	10,431	7,156	5,801	158.60	63.35	1,835	1,835	796	2	2.97	6.75
7	10,612	10,431	7,157	5,640	155.21	62.00	1,835	1,835	1,287	83	15.86	36.02
8	10,612	10,431	7,259	5,852	160.55	64.13	1,835	1,835	1,399	-1	4.51	10.25
9	10,612	10,431	7,721	5,757	163.40	65.27	1,835	1,835	1,625	110	11.52	26.17
10	10,612	10,431	7,832	6,192	167.22	66.79	1,835	1,835	745	11	5.06	11.48
11	10,612	10,431	8,059	6,404	170.68	68.18	1,835	1,835	1,615	280	21.27	48.29
12	10,612	10,431	7,674	5,484	164.98	65.90	1,835	1,835	1,447	327	19.01	43.17
13	10,612	10,431	7,846	5,580	156.30	62.43	1,835	1,835	422	15	4.23	9.60
14	10,612	10,431	7,650	4,714	148.66	59.38	1,835	1,835	1,344	0	3.71	8.42
15	10,612	10,431	7,947	5,102	148.69	59.39	1,835	1,835	1,766	46	33.13	75.24
16	10,612	10,431	8,075	5,190	145.07	57.95	1,835	1,835	1,728	843	35.61	80.86
17	10,612	10,431	7,968	4,961	157.77	63.02	1,835	1,835	1,230	2	18.17	41.26
18	10,612	10,431	7,984	6,416	173.35	69.24	1,835	1,835	333	0	2.46	5.60
19	10,612	10,431	7,947	5,276	163.57	65.33	1,835	1,835	1,189	18	10.52	23.89
20	10,612	10,431	8,074	6,586	170.83	68.24	1,835	1,835	1,760	713	30.41	69.05
21	10,612	10,431	7,526	6,269	169.53	67.72	1,835	1,835	1,766	1,231	38.00	86.28
22	10,612	10,431	7,910	6,179	169.84	67.84	1,835	1,835	1,449	40	17.11	38.84
23	10,612	10,431	7,902	4,775	153.57	61.34	1,835	1,835	1,449	262	18.08	41.05
24	10,612	10,431	8,163	5,327	161.97	64.69	1,835	1,835	913	221	11.46	26.02
25	10,612	10,431	7,963	5,702	171.12	68.35	1,835	1,835	774	137	10.03	22.79
26	10,612	10,431	8,054	6,126	178.29	71.21	1,835	1,835	481	80	6.39	14.50
27	10,612	10,431	7,849	6,236	175.92	70.27	1,835	1,835	796	251	10.90	24.75
28	10,612	10,431	8,072	6,707	181.19	72.37	1,835	1,835	1,480	542	24.25	55.07
29	10,612	10,431	8,338	7,003	185.47	74.08	1,835	1,835	1,561	798	27.38	62.16
30	10,612	10,431	8,197	7,167	182.14	72.75	1,835	1,835	1,664	1,018	32.72	74.29
31	10,612	10,431	8,256	7,029	182.55	72.92	1,835	1,835	1,735	706	32.26	73.25
Total	**10,612**	**10,431**	--	--	**5,006.72**	**64.51**	**1,835**	**1,835**	--	--	**520.49**	**38.12**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	500	289	0	1.85	15.42	364	278	125	74	2.35	35.15
2	500	500	297	0	2.16	17.97	364	278	108	88	2.28	34.24
3	500	500	243	0	1.52	12.65	364	278	110	48	2.48	37.19
4	500	500	354	0	2.80	23.36	364	278	115	89	2.58	38.68
5	500	500	346	0	2.58	21.50	364	278	116	109	2.69	40.24
6	500	500	290	0	1.93	16.07	364	278	115	81	2.30	34.54
7	500	500	337	0	2.56	21.33	364	278	116	82	2.57	38.49
8	500	500	342	0	2.59	21.62	364	278	104	94	2.39	35.89
9	500	500	350	0	2.68	22.30	364	278	101	91	2.38	35.60
10	500	500	357	0	2.06	17.17	364	278	78	59	1.75	26.23
11	500	500	330	0	2.53	21.11	364	278	104	77	2.29	34.33
12	500	500	341	0	2.16	17.96	364	278	105	78	2.43	36.47
13	500	500	362	0	2.67	22.24	364	278	107	93	2.39	35.89
14	500	500	371	0	2.39	19.91	364	278	100	41	1.98	29.66
15	500	500	327	0	2.14	17.80	364	278	91	52	1.73	25.95
16	500	500	399	0	2.10	17.47	364	278	89	84	2.07	31.07
17	500	500	383	0	1.59	13.25	364	278	89	83	2.07	30.96
18	500	500	311	0	2.21	18.38	364	278	98	85	2.18	32.69
19	500	500	370	0	2.82	23.54	364	278	99	24	2.32	34.82
20	500	500	377	0	3.00	25.02	364	278	212	84	2.28	34.10
21	500	500	311	0	2.02	16.82	364	278	96	68	2.10	31.50
22	500	500	209	0	1.24	10.37	364	278	95	66	2.13	31.87
23	500	500	352	0	1.48	12.29	364	278	96	82	2.24	33.50
24	500	500	357	0	1.64	13.63	364	278	92	72	1.97	29.48
25	500	500	248	0	1.35	11.27	364	278	77	66	1.69	25.40
26	500	500	343	0	1.88	15.64	364	278	71	44	1.55	23.25
27	500	500	343	0	2.52	20.98	364	278	73	35	1.32	19.79
28	500	500	282	0	1.53	12.71	364	278	74	50	1.53	22.90
29	500	500	325	0	2.13	17.72	364	278	77	48	1.73	25.92
30	500	500	338	0	2.56	21.33	364	278	115	72	2.14	32.06
31	500	500	316	0	2.16	17.96	364	278	115	81	2.49	37.37
Total	**500**	**500**	--	--	**66.81**	**17.96**	**364**	**278**	--	--	**66.40**	**32.10**

August, 2022												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,612	10,431	8,396	7,169	187.56	74.92	1,835	1,835	1,514	640	26.07	59.21
2	10,612	10,431	8,167	7,011	185.64	74.15	1,835	1,835	1,321	580	23.89	54.24
3	10,612	10,431	8,237	6,814	180.25	72.00	1,835	1,835	703	213	11.76	26.71
4	10,612	10,607	8,135	4,855	151.24	59.41	1,835	1,835	696	127	7.05	16.01
5	10,612	10,607	7,871	4,489	153.24	60.20	1,835	1,835	502	173	6.78	15.40
6	10,612	10,607	8,090	4,783	158.15	62.12	1,835	1,835	704	38	5.73	13.02
7	10,612	10,607	8,019	6,443	178.19	70.00	1,835	1,835	264	1	1.63	3.70
8	10,612	10,607	8,251	6,697	182.03	71.50	1,835	1,835	306	15	2.47	5.61
9	10,612	10,607	8,192	6,182	177.46	69.71	1,835	1,835	941	49	6.03	13.69
10	10,612	10,607	8,188	6,341	179.36	70.45	1,835	1,835	1,567	40	12.65	28.72
11	10,612	10,607	8,031	6,501	176.16	69.20	1,835	1,835	1,183	81	10.01	22.73
12	10,612	10,607	8,164	6,307	178.35	70.06	1,835	1,835	1,614	21	21.20	48.13
13	10,612	10,607	7,998	6,740	179.95	70.69	1,835	1,835	448	3	3.77	8.57
14	10,612	10,607	7,829	6,824	177.34	69.66	1,835	1,835	790	17	7.12	16.18
15	10,612	10,607	7,887	6,806	176.77	69.44	1,835	1,835	679	8	6.37	14.47
16	10,612	10,467	8,018	6,217	177.42	70.62	1,835	1,835	685	1	3.83	8.71
17	10,612	10,467	8,012	6,344	173.58	69.10	1,845	1,845	1,445	174	14.76	33.33
18	10,612	10,467	8,110	6,423	177.11	70.50	1,845	1,845	1,414	335	22.70	51.26
19	10,612	10,467	7,903	6,329	172.24	68.56	1,845	1,845	1,633	582	26.18	59.12
20	10,612	10,467	8,022	6,669	173.60	69.10	1,845	1,845	992	443	17.89	40.41
21	10,612	10,467	7,958	6,851	176.11	70.10	1,845	1,845	1,246	299	18.28	41.28
22	10,612	10,467	7,749	5,976	171.32	68.19	1,845	1,845	790	117	11.06	24.98
23	10,612	10,467	7,714	6,211	173.13	68.92	1,845	1,845	646	66	5.63	12.71
24	10,612	10,467	7,954	5,613	173.57	69.09	1,845	1,845	1,216	571	21.70	49.01
25	10,612	10,467	7,741	5,667	170.37	67.82	1,845	1,845	1,410	356	21.48	48.50
26	10,612	10,467	7,491	5,743	167.31	66.60	1,845	1,845	1,002	357	14.47	32.68
27	10,612	10,467	7,703	5,876	166.35	66.22	1,845	1,845	1,039	353	15.15	34.21
28	10,612	10,467	7,710	6,550	169.92	67.64	1,845	1,845	1,203	446	19.41	43.83
29	10,612	10,467	7,716	6,503	172.74	68.76	1,845	1,845	690	91	10.86	24.52
30	10,612	10,467	7,473	6,347	171.07	68.10	1,845	1,845	318	14	2.61	5.90
31	10,612	10,467	7,696	6,132	171.02	68.08	1,845	1,845	701	69	8.69	19.63
Total	**10,612**	**10,467**	**--**	**--**	**5,378.58**	**69.07**	**1,845**	**1,845**	**--**	**--**	**387.24**	**28.21**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	500	274	0	1.72	14.32	364	278	86	74	1.90	28.43
2	500	500	352	0	2.40	20.02	364	278	103	77	2.27	34.03
3	500	500	349	0	2.36	19.68	364	278	109	76	2.17	32.54
4	500	500	342	0	2.58	21.54	364	278	104	79	2.37	35.54
5	500	500	344	0	2.63	21.88	364	278	101	86	2.29	34.38
6	500	500	320	0	1.84	15.36	364	278	100	86	2.33	34.94
7	500	500	318	0	2.23	18.57	364	278	78	65	1.75	26.22
8	500	500	358	0	2.76	23.03	364	278	91	59	1.87	28.00
9	500	500	318	0	2.50	20.83	364	278	91	76	2.06	30.94
10	500	500	345	0	2.51	20.91	364	278	90	80	2.07	31.01
11	500	500	373	0	2.78	23.14	364	278	67	62	1.55	23.29
12	500	500	342	0	2.59	21.55	364	278	69	48	1.55	23.27
13	500	500	281	0	1.39	11.55	364	278	92	52	1.86	27.85
14	500	500	320	0	2.17	18.07	364	278	73	52	1.40	20.98
15	500	500	269	0	2.17	18.07	364	278	77	72	1.78	26.61
16	500	500	367	0	2.53	21.12	364	278	85	54	1.90	28.43
17	500	500	169	0	0.75	6.29	364	278	86	61	1.93	28.94
18	500	500	234	0	1.85	15.41	364	278	82	69	1.80	27.02
19	500	500	357	0	2.43	20.25	364	278	78	40	1.48	22.21
20	500	500	382	0	2.50	20.86	364	278	78	54	1.55	23.18
21	500	500	320	0	2.16	17.96	364	278	74	53	1.69	25.32
22	500	500	351	0	2.22	18.49	364	278	79	61	1.73	25.88
23	500	500	310	0	1.77	14.77	364	278	76	36	1.58	23.71
24	500	500	328	0	1.65	13.73	364	278	68	21	1.28	19.17
25	500	500	255	0	1.59	13.29	364	278	67	24	1.19	17.79
26	500	500	325	0	2.37	19.72	364	278	74	47	1.55	23.24
27	500	500	341	0	2.40	19.98	364	278	74	63	1.69	25.39
28	500	500	324	0	2.41	20.08	364	278	83	51	1.82	27.22
29	500	500	288	0	2.09	17.42	364	278	85	72	1.88	28.14
30	500	500	363	0	2.46	20.49	364	278	88	48	1.98	29.67
31	500	500	378	0	2.95	24.62	364	278	86	66	1.93	28.96
Total	**500**	**500**	**--**	**--**	**68.76**	**18.48**	**364**	**278**	**--**	**--**	**56.20**	**27.17**

September, 2022												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,612	10,467	7,718	5,765	171.88	68.42	1,845	1,845	1,072	328	16.55	37.37
2	10,612	10,467	7,783	5,861	169.85	67.61	1,845	1,845	740	353	11.57	26.13
3	10,612	10,467	7,810	6,236	172.09	68.50	1,845	1,845	1,585	512	26.69	60.28
4	10,612	10,467	7,824	6,297	173.26	68.97	1,845	1,845	1,771	1,399	38.76	87.55
5	10,612	10,467	7,669	6,563	172.94	68.84	1,845	1,845	1,611	557	27.49	62.08
6	10,612	10,467	7,829	6,402	173.74	69.16	1,845	1,845	1,013	165	12.10	27.33
7	10,612	10,467	7,762	6,306	173.68	69.13	1,845	1,845	432	46	4.77	10.78
8	10,612	10,467	8,253	6,604	174.63	69.51	1,845	1,845	251	0	1.21	2.73
9	10,612	10,467	8,125	6,120	174.75	69.56	1,845	1,845	348	8	3.46	7.82
10	10,612	10,467	8,363	6,153	176.48	70.25	1,845	1,845	205	6	2.17	4.89
11	10,612	10,467	8,459	6,321	178.92	71.22	1,845	1,845	1,116	65	7.53	17.00
12	10,612	10,467	8,102	6,041	174.10	69.30	1,845	1,845	1,309	3	6.65	15.02
13	10,612	10,467	8,050	6,109	170.98	68.06	1,845	1,845	457	0	3.69	8.32
14	10,612	10,467	7,660	5,133	153.89	61.26	1,845	1,845	356	84	4.57	10.33
15	10,612	10,467	6,718	4,438	129.91	51.71	1,845	1,845	1,191	177	16.13	36.42
16	10,612	10,467	7,021	4,787	140.47	55.92	1,845	1,845	1,761	996	32.58	73.58
17	10,612	10,467	6,807	4,648	141.64	56.38	1,845	1,845	1,451	270	24.78	55.97
18	10,612	10,467	6,739	4,511	135.18	53.81	1,845	1,845	518	90	5.70	12.88
19	10,612	10,467	6,778	4,237	132.75	52.84	1,845	1,845	791	240	12.93	29.21
20	10,612	10,467	6,409	3,849	123.79	49.28	1,845	1,845	954	458	17.62	39.80
21	10,612	10,467	6,846	3,833	121.42	48.33	1,845	1,845	1,047	408	17.30	39.07
22	10,612	10,467	6,412	4,655	131.80	52.46	1,845	1,845	1,158	576	19.53	44.10
23	10,612	10,467	6,684	4,031	123.85	49.30	1,845	1,845	1,652	711	28.42	64.18
24	10,612	10,467	6,524	4,147	124.01	49.36	1,845	1,845	1,632	975	31.84	71.91
25	10,612	10,467	6,644	3,982	126.11	50.20	1,845	1,845	1,538	388	24.53	55.39
26	10,612	10,467	6,081	4,064	122.17	48.63	1,845	1,845	695	194	9.76	22.05
27	10,612	10,467	6,086	3,738	117.36	46.71	1,845	1,845	974	136	11.54	26.06
28	10,612	10,467	6,221	4,037	116.52	46.38	1,845	1,845	1,023	290	14.64	33.07
29	10,612	10,467	5,621	3,467	114.27	45.49	1,845	1,845	877	322	14.35	32.42
30	10,481	10,476	7,256	3,160	117.16	46.60	1,845	1,845	977	331	16.07	36.28
Total	**10,612**	**10,467**	--	--	**4,429.61**	**56.88**	**1,845**	**1,845**	--	--	**464.95**	**33.87**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	500	379	0	2.99	24.92	364	278	89	73	1.95	29.16
2	500	500	379	0	2.99	24.91	364	278	87	58	1.91	28.63
3	500	500	384	0	2.99	24.95	364	278	88	79	1.99	29.83
4	500	500	361	0	2.78	23.20	364	278	89	80	2.01	30.06
5	500	500	302	0	2.41	20.12	364	278	86	78	2.00	29.98
6	500	500	334	0	2.54	21.18	364	278	92	77	1.99	29.79
7	500	500	349	0	2.68	22.34	364	278	87	75	1.98	29.60
8	500	400	359	0	2.74	28.52	364	278	89	48	1.90	28.48
9	500	400	332	0	2.49	25.97	364	278	88	58	1.97	29.46
10	500	400	361	0	2.65	27.64	364	278	88	63	2.00	30.01
11	500	400	334	0	2.39	24.94	364	278	87	79	1.99	29.90
12	500	400	314	0	2.11	21.95	364	278	88	76	2.00	30.02
13	500	400	302	0	2.31	24.03	364	278	89	80	2.00	29.99
14	500	400	311	0	2.19	22.77	364	278	90	79	2.01	30.19
15	500	400	339	0	2.41	25.07	364	278	90	78	2.04	30.62
16	500	400	362	0	2.74	28.54	364	278	91	81	2.07	30.97
17	500	400	363	0	2.72	28.32	364	278	89	81	2.06	30.81
18	500	400	351	0	2.57	26.82	364	278	91	63	2.06	30.90
19	500	400	363	0	2.72	28.37	364	278	91	70	2.04	30.57
20	500	400	347	0	2.59	26.97	364	278	90	81	2.07	30.96
21	500	400	335	0	2.47	25.71	364	278	89	83	2.06	30.89
22	500	400	324	0	2.40	24.98	364	278	91	82	2.08	31.13
23	500	400	328	0	2.40	24.99	364	278	92	80	2.06	30.84
24	500	400	331	0	2.30	24.01	364	278	89	81	2.06	30.82
25	500	400	350	0	2.49	25.92	364	278	90	83	2.08	31.12
26	500	400	334	0	2.40	24.99	364	278	100	63	2.11	31.66
27	500	400	357	0	2.54	26.49	364	278	99	88	2.28	34.14
28	500	400	364	0	2.68	27.94	364	278	102	92	2.30	34.44
29	500	400	370	0	2.75	28.63	364	278	100	86	2.27	33.96
30	500	484	367	0	2.75	23.71	364	278	101	92	2.28	34.10
Total	**500**	**400**	--	--	**77.21**	**25.94**	**364**	**278**	--	--	**61.58**	**29.77**

October, 2022												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,481	10,476	7,054	4,502	139.60	55.53	1,845	1,845	1,440	712	23.41	52.86
2	10,481	10,476	7,402	4,057	136.08	54.12	1,845	1,845	996	262	17.36	39.20
3	10,681	10,676	6,769	3,923	132.42	51.68	1,845	1,845	815	121	7.60	17.16
4	10,681	10,676	6,536	3,443	122.76	47.91	1,845	1,845	289	43	3.70	8.36
5	10,681	10,676	6,156	3,528	121.32	47.35	1,845	1,845	344	12	3.81	8.61
6	10,681	10,676	7,146	3,322	122.51	47.81	1,845	1,845	590	99	7.07	15.97
7	10,681	10,676	6,658	3,860	123.57	48.23	1,845	1,845	401	2	4.42	9.98
8	10,681	10,676	6,112	3,440	110.08	42.96	1,845	1,845	1,424	540	22.28	50.31
9	10,681	10,676	6,575	3,669	120.22	46.92	1,845	1,845	896	5	7.29	16.46
10	10,681	10,676	6,587	3,910	119.66	46.70	1,845	1,845	247	0	2.23	5.04
11	10,681	10,676	6,620	3,795	119.80	46.76	1,845	1,845	351	0	2.82	6.36
12	10,681	10,676	5,879	3,605	119.02	46.45	1,845	1,845	480	31	2.81	6.36
13	10,681	10,676	7,710	3,008	118.47	46.24	1,845	1,845	96	0	0.60	1.35
14	10,681	10,676	4,274	2,089	72.33	28.23	1,845	1,845	366	0	1.98	4.46
15	10,681	10,676	4,147	2,893	85.39	33.33	1,845	1,845	265	0	2.88	6.51
16	10,681	10,676	4,534	2,480	82.15	32.06	1,845	1,845	457	0	3.95	8.92
17	10,681	10,676	4,444	2,553	80.38	31.37	1,845	1,845	576	0	4.20	9.47
18	10,681	10,676	5,202	2,443	85.44	33.35	1,845	1,845	847	205	11.50	25.98
19	10,681	10,676	4,643	2,585	84.46	32.96	1,845	1,845	529	46	6.04	13.64
20	10,681	10,676	5,386	2,209	91.10	35.56	1,845	1,845	589	94	7.35	16.61
21	10,681	10,676	5,195	3,423	103.85	40.53	1,845	1,845	452	1	3.74	8.45
22	10,681	10,676	5,162	3,006	95.18	37.15	1,845	1,845	398	0	3.91	8.82
23	10,681	10,676	4,465	2,672	84.72	33.07	1,845	1,845	384	0	2.92	6.59
24	10,681	10,676	4,654	2,563	80.69	31.49	1,845	1,845	766	78	9.40	21.22
25	10,681	10,676	5,033	2,709	85.26	33.28	1,845	1,845	950	445	17.35	39.17
26	10,681	10,676	5,200	2,144	80.51	31.42	1,845	1,845	470	57	5.84	13.19
27	10,681	10,676	5,177	2,112	85.53	33.38	1,845	1,845	350	14	4.08	9.22
28	10,681	10,676	4,757	2,434	90.15	35.18	1,845	1,845	271	0	2.35	5.30
29	10,681	10,676	4,937	2,905	93.68	36.56	1,845	1,845	419	10	5.34	12.07
30	10,681	10,676	4,991	2,361	91.61	35.76	1,845	1,845	451	76	5.76	13.01
31	10,681	10,676	5,156	1,610	88.63	34.59	1,845	1,845	454	39	5.27	11.91
Total	**10,681**	**10,676**	**--**	**--**	**3,166.60**	**39.87**	**1,845**	**1,845**	**--**	**--**	**209.25**	**15.24**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	368	0	2.74	23.55	364	278	102	75	2.27	34.06
2	500	484	373	0	2.77	23.83	364	278	104	91	2.38	35.70
3	500	484	373	0	2.80	24.09	364	278	103	66	2.31	34.60
4	500	484	365	0	2.71	23.32	364	278	103	67	2.29	34.35
5	500	484	365	0	2.70	23.22	364	278	127	67	2.50	37.40
6	500	484	377	0	2.84	24.46	364	278	127	92	2.91	43.56
7	500	484	358	0	2.62	22.51	364	278	158	122	3.29	49.37
8	500	484	369	0	2.51	21.63	364	278	154	100	3.15	47.17
9	500	484	335	0	2.34	20.18	364	278	157	150	3.72	55.69
10	500	484	319	0	2.25	19.38	364	278	158	122	3.38	50.65
11	500	484	359	0	2.55	21.93	364	278	129	114	3.03	45.43
12	500	484	357	0	2.61	22.49	364	278	130	117	3.01	45.18
13	500	484	270	0	1.35	11.58	364	278	130	0	1.31	19.62
14	500	484	349	0	2.55	21.95	364	278	101	59	2.10	31.45
15	500	484	361	0	2.66	22.94	364	278	93	59	1.94	29.12
16	500	484	359	0	2.68	23.09	364	278	91	37	1.98	29.69
17	500	484	362	0	2.67	22.96	364	278	91	81	2.11	31.61
18	500	484	355	0	2.54	21.82	364	278	91	49	1.90	28.46
19	500	484	333	0	2.31	19.85	364	278	91	83	2.12	31.73
20	500	484	325	0	2.19	18.83	364	278	91	79	2.10	31.54
21	500	484	343	0	2.34	20.18	364	278	97	84	2.11	31.55
22	500	484	326	0	2.24	19.25	364	278	115	61	2.35	35.24
23	500	484	317	0	2.17	18.70	364	278	116	88	2.68	40.22
24	500	484	317	0	2.18	18.76	364	278	39	24	0.92	13.86
25	500	484	322	0	2.22	19.07	364	278	24	24	0.58	8.70
26	500	484	321	0	2.21	19.00	364	278	37	24	0.84	12.65
27	500	484	311	0	2.09	18.03	364	278	37	37	0.90	13.50
28	500	484	307	0	2.08	17.87	364	278	37	37	0.89	13.41
29	500	484	347	0	2.36	20.29	364	278	37	37	0.90	13.49
30	500	484	339	0	2.37	20.44	364	278	61	37	0.98	14.71
31	500	484	337	0	2.31	19.92	364	278	61	57	1.47	22.05
Total	**500**	**484**	**--**	**--**	**74.94**	**20.81**	**364**	**278**	**--**	**--**	**64.43**	**31.15**

November, 2022												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	5,451	3,117	100.27	39.13	1,845	1,845	606	36	7.35	16.59
2	10,681	10,676	5,952	2,606	102.68	40.08	1,845	1,845	623	3	7.60	17.17
3	10,681	10,676	5,982	2,972	105.54	41.19	1,845	1,845	700	74	8.91	20.12
4	10,681	10,676	6,027	2,393	102.46	39.99	1,845	1,845	597	30	7.75	17.51
5	10,681	10,676	5,690	2,305	93.39	36.45	1,845	1,845	739	143	9.93	22.43
6	10,681	10,676	4,891	2,741	94.26	36.79	1,845	1,845	738	116	9.96	22.50
7	10,681	10,676	5,349	2,722	95.98	37.46	1,845	1,845	333	0	2.43	5.48
8	10,681	10,676	5,366	2,748	93.74	36.58	1,845	1,845	496	6	4.44	10.03
9	10,681	10,676	5,171	2,752	91.27	35.62	1,845	1,845	151	0	0.91	2.06
10	10,681	10,676	4,901	2,497	81.40	31.77	1,845	1,845	181	16	1.73	3.90
11	10,681	10,676	4,350	2,272	76.76	29.96	1,845	1,845	682	0	6.11	13.79
12	10,681	10,676	4,754	1,970	74.86	29.22	1,845	1,845	86	0	0.49	1.11
13	10,681	10,676	4,140	1,934	73.44	28.66	1,845	1,845	706	1	5.19	11.72
14	10,681	10,676	4,770	1,868	76.42	29.82	1,845	1,845	578	10	4.78	10.79
15	10,681	10,676	5,024	1,920	81.87	31.95	1,845	1,845	1,338	401	20.05	45.29
16	10,681	10,676	5,213	2,222	90.02	35.13	1,845	1,845	666	0	3.53	7.97
17	10,681	10,676	5,640	1,889	85.43	33.34	1,845	1,845	216	0	1.13	2.54
18	10,681	10,676	4,566	2,214	82.00	32.00	1,845	1,845	425	0	3.22	7.27
19	10,681	10,676	5,053	1,516	75.56	29.49	1,845	1,845	220	0	0.97	2.20
20	10,681	10,676	4,969	1,566	74.12	28.93	1,845	1,845	647	47	9.86	22.26
21	10,681	10,676	5,022	2,149	77.29	30.16	1,845	1,845	701	0	2.88	6.50
22	10,681	10,676	5,096	1,870	76.48	29.85	1,845	1,845	347	0	1.80	4.06
23	10,681	10,676	5,233	1,677	75.77	29.57	1,845	1,845	195	-1	1.48	3.34
24	10,681	10,676	5,399	1,630	74.19	28.96	1,845	1,845	205	0	1.18	2.67
25	10,681	10,676	4,674	1,798	74.64	29.13	1,845	1,845	252	0	1.49	3.36
26	10,681	10,676	4,706	1,564	73.23	28.58	1,845	1,845	597	0	4.81	10.85
27	10,681	10,676	4,573	1,631	74.03	28.89	1,845	1,845	74	0	0.25	0.56
28	10,681	10,676	5,183	1,799	75.51	29.47	1,845	1,845	330	0	3.61	8.16
29	10,681	10,676	5,345	1,753	74.42	29.04	1,845	1,845	766	365	11.92	26.91
30	10,681	10,676	5,065	1,395	73.86	28.83	1,845	1,845	727	203	11.38	25.71
Total	**10,681**	**10,676**	**--**	**--**	**2,500.89**	**31.49**	**1,845**	**1,845**	**--**	**--**	**157.12**	**11.45**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	287	0	1.77	15.27	364	278	75	47	1.55	23.20
2	500	484	264	0	1.68	14.45	364	278	76	72	1.80	27.00
3	500	484	294	0	1.85	15.95	364	278	76	61	1.80	26.93
4	500	484	300	0	1.87	16.12	364	278	77	75	1.83	27.41
5	500	484	184	0	1.19	10.26	364	278	76	65	1.83	27.40
6	500	484	255	0	1.60	13.79	364	278	76	61	1.80	26.94
7	500	484	334	0	2.17	18.65	364	278	77	74	1.83	27.40
8	500	484	284	0	1.76	15.11	364	278	188	102	3.20	48.01
9	500	484	308	0	1.99	17.17	364	278	190	181	4.46	66.80
10	500	484	263	0	1.54	13.28	364	278	187	129	4.31	64.61
11	500	484	300	0	1.90	16.33	364	278	175	144	3.96	59.32
12	500	484	297	0	1.94	16.69	364	278	176	128	3.98	59.66
13	500	484	311	0	1.80	15.46	364	278	171	157	4.02	60.22
14	500	484	196	0	1.11	9.59	364	278	165	149	3.85	57.78
15	500	484	364	0	2.50	21.54	364	278	161	96	3.32	49.81
16	500	484	347	0	2.36	20.34	364	278	152	121	3.42	51.28
17	500	484	349	0	2.42	20.83	364	278	141	134	3.32	49.72
18	500	484	359	0	2.22	19.11	364	278	138	121	3.27	48.98
19	500	484	345	0	2.24	19.32	364	278	155	133	3.42	51.22
20	500	484	344	0	2.11	18.14	364	278	152	131	3.27	49.05
21	500	484	345	0	2.17	18.70	364	278	140	124	3.23	48.47
22	500	484	343	0	2.34	20.14	364	278	149	118	3.23	48.42
23	500	484	356	0	2.47	21.27	364	278	152	142	3.59	53.78
24	500	484	367	0	2.32	19.96	364	278	153	141	3.58	53.71
25	500	484	358	0	2.43	20.92	364	278	146	135	3.39	50.85
26	500	484	356	0	2.16	18.63	364	278	159	115	3.31	49.66
27	500	484	346	0	2.32	20.00	364	278	161	138	3.72	55.78
28	500	484	326	0	2.13	18.34	364	278	170	153	3.86	57.82
29	500	484	322	0	2.00	17.19	364	278	185	142	4.21	63.10
30	500	484	301	0	1.89	16.28	364	278	178	146	4.03	60.47
Total	**500**	**484**	**--**	**--**	**60.27**	**16.74**	**364**	**278**	**--**	**--**	**96.40**	**46.61**

December, 2022												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	5,321	1,408	79.70	31.10	1,845	1,845	553	0	4.71	10.65
2	10,681	10,676	4,640	1,107	73.00	28.49	1,845	1,845	302	0	1.67	3.77
3	10,681	10,676	4,965	1,500	78.96	30.82	1,845	1,845	327	8	3.93	8.88
4	10,681	10,676	4,932	1,516	74.18	28.95	1,845	1,845	989	39	9.41	21.26
5	10,681	10,676	5,034	1,977	79.45	31.01	1,845	1,845	220	0	1.77	3.99
6	10,681	10,676	4,973	1,420	76.34	29.80	1,845	1,845	468	119	5.72	12.92
7	10,681	10,676	5,280	1,771	78.75	30.74	1,845	1,845	120	0	1.26	2.85
8	10,681	10,676	5,538	1,616	76.04	29.68	1,845	1,845	78	0	0.65	1.48
9	10,681	10,676	5,379	1,627	76.69	29.93	1,845	1,845	181	0	1.32	2.99
10	10,681	10,676	4,811	1,318	70.14	27.38	1,845	1,845	1,154	173	17.90	40.43
11	10,681	10,676	4,846	1,329	70.32	27.44	1,845	1,845	1,361	730	25.96	58.63
12	10,681	10,676	4,778	1,537	69.46	27.11	1,845	1,845	1,038	294	14.17	32.00
13	10,681	10,676	4,269	1,645	68.22	26.63	1,845	1,845	1,450	20	21.47	48.48
14	10,681	10,676	4,882	1,708	70.40	27.48	1,845	1,845	1,110	37	13.91	31.42
15	10,681	10,676	4,746	1,447	69.63	27.18	1,845	1,845	235	0	1.90	4.28
16	10,681	10,676	4,148	1,200	68.69	26.81	1,845	1,845	214	0	0.62	1.41
17	10,681	10,676	4,803	938	70.59	27.55	1,845	1,845	125	0	0.46	1.05
18	10,681	10,676	3,451	864	53.36	20.83	1,845	1,845	217	0	1.54	3.48
19	10,681	10,676	4,084	1,518	60.87	23.76	1,845	1,845	305	6	2.32	5.23
20	10,681	10,676	3,532	1,193	53.18	20.75	1,845	1,845	352	0	2.43	5.49
21	10,681	10,676	4,605	1,197	54.08	21.11	1,845	1,845	552	139	7.65	17.28
22	10,681	10,676	4,113	817	48.85	19.07	1,845	1,845	598	1	4.38	9.88
23	10,681	10,676	2,828	628	33.07	12.91	1,845	1,845	187	0	0.78	1.76
24	10,681	10,676	2,089	529	24.82	9.69	1,845	1,845	659	3	5.51	12.45
25	10,681	10,676	1,908	521	25.36	9.90	1,845	1,845	463	0	2.89	6.52
26	10,681	10,676	2,348	479	28.83	11.25	1,845	1,845	815	26	8.30	18.75
27	10,681	10,676	2,359	435	21.05	8.22	1,845	1,845	940	82	10.79	24.37
28	10,681	10,676	2,069	451	17.98	7.02	1,845	1,845	278	0	2.16	4.89
29	10,681	10,676	2,040	363	20.90	8.16	1,845	1,845	1,056	301	13.33	30.11
30	10,681	10,676	1,871	341	19.81	7.73	1,845	1,845	951	392	15.85	35.80
31	10,681	10,676	1,605	342	16.37	6.39	1,845	1,845	973	4	6.29	14.20
Total	**10,681**	**10,676**	**--**	**--**	**1,729.12**	**21.77**	**1,845**	**1,845**	**--**	**--**	**211.09**	**15.38**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	317	0	1.95	16.80	364	278	168	138	3.72	55.83
2	500	484	332	0	1.68	14.47	364	278	192	134	4.13	61.86
3	500	484	301	0	1.81	15.60	364	278	178	162	4.17	62.53
4	500	484	288	0	1.67	14.34	364	278	185	159	4.09	61.26
5	500	484	292	0	1.77	15.24	364	278	180	166	4.15	62.26
6	500	484	286	0	1.65	14.22	364	278	175	139	3.96	59.36
7	500	484	330	0	2.00	17.20	364	278	177	151	4.01	60.06
8	500	484	338	0	2.11	18.13	364	278	176	140	3.99	59.80
9	500	484	317	0	1.61	13.88	364	278	175	133	4.07	60.96
10	500	484	290	0	1.75	15.04	364	278	177	149	4.09	61.37
11	500	484	310	0	1.98	17.09	364	278	175	166	4.14	61.99
12	500	484	328	0	2.12	18.25	364	278	178	136	4.13	61.94
13	500	484	340	0	2.18	18.75	364	278	181	159	4.17	62.50
14	500	484	354	0	2.37	20.37	364	278	183	145	4.21	63.05
15	500	484	352	0	2.36	20.36	364	278	186	151	4.23	63.36
16	500	484	358	0	2.32	19.94	364	278	181	168	4.20	62.91
17	500	484	341	0	2.23	19.19	364	278	178	168	4.14	62.09
18	500	484	348	0	2.28	19.62	364	278	178	156	4.18	62.64
19	500	484	335	0	2.04	17.54	364	278	181	158	4.15	62.22
20	500	484	319	0	1.84	15.87	364	278	178	131	3.94	59.04
21	500	484	307	0	1.81	15.56	364	278	180	116	3.94	59.04
22	500	484	327	0	1.22	10.51	364	278	168	99	3.66	54.83
23	500	484	342	0	1.48	12.74	364	278	160	123	3.47	51.99
24	500	484	229	0	0.94	8.06	364	278	162	115	3.56	53.40
25	500	484	259	0	1.08	9.26	364	278	163	87	3.59	53.79
26	500	484	361	0	1.78	15.37	364	278	170	95	3.79	56.74
27	500	484	357	0	1.79	15.40	364	278	171	146	3.96	59.40
28	500	484	340	0	2.07	17.85	364	278	172	140	3.94	59.05
29	500	484	251	0	0.73	6.30	364	278	171	151	3.90	58.50
30	500	484	348	0	1.83	15.72	364	278	172	146	4.06	60.81
31	500	484	359	0	0.00	0.00	364	278	174	163	4.06	60.80
Total	**500**	**484**	**--**	**--**	**54.44**	**15.12**	**364**	**278**	**--**	**--**	**123.79**	**59.85**

January, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	1,405	349	13.21	5.15	1,845	1,845	377	4	2.24	5.05
2	10,681	10,676	1,495	335	15.13	5.91	1,845	1,845	803	28	11.65	26.30
3	10,681	10,676	1,507	337	14.73	5.75	1,845	1,845	1,342	372	21.87	49.39
4	10,681	10,676	1,116	339	13.20	5.15	1,845	1,845	1,280	474	22.88	51.68
5	10,681	10,676	1,522	344	14.73	5.75	1,845	1,845	1,531	563	27.52	62.15
6	10,681	10,676	1,047	328	13.36	5.21	1,845	1,845	1,524	593	25.37	57.30
7	10,681	10,676	1,129	320	13.82	5.40	1,845	1,845	1,115	574	20.08	45.35
8	10,681	10,676	1,169	333	14.01	5.47	1,845	1,845	1,106	0	6.80	15.36
9	10,681	10,676	1,247	371	15.11	5.90	1,845	1,845	413	1	3.83	8.65
10	10,681	10,676	1,446	345	14.64	5.72	1,845	1,845	350	0	1.93	4.35
11	10,681	10,676	1,068	310	16.45	6.42	1,845	1,845	987	0	4.79	10.81
12	10,681	10,676	1,376	309	17.30	6.75	1,845	1,845	296	0	1.75	3.94
13	10,681	10,676	1,298	383	18.86	7.36	1,845	1,845	556	0	1.96	4.42
14	10,681	10,676	1,940	294	17.43	6.80	1,845	1,845	596	47	7.91	17.86
15	10,681	10,676	1,812	314	16.61	6.48	1,845	1,845	141	0	0.96	2.17
16	10,681	10,676	1,685	310	18.53	7.23	1,845	1,845	531	0	3.41	7.70
17	10,681	10,676	1,531	346	18.01	7.03	1,845	1,845	366	0	2.01	4.55
18	10,681	10,676	2,604	516	26.18	10.22	1,845	1,845	557	0	3.51	7.92
19	10,681	10,676	2,712	685	35.84	13.99	1,845	1,845	1,030	0	16.28	36.75
20	10,681	10,676	2,945	936	37.63	14.69	1,845	1,845	557	0	7.69	17.36
21	10,681	10,676	2,951	683	36.52	14.25	1,845	1,845	425	59	6.78	15.31
22	10,681	10,676	2,614	701	38.39	14.98	1,845	1,845	540	0	4.32	9.75
23	10,681	10,676	3,780	0	20.32	7.93	1,845	1,845	108	0	0.40	0.91
24	10,681	10,676	4,486	1,465	70.30	27.44	1,845	1,845	304	0	1.74	3.93
25	10,681	10,676	2,596	951	37.50	14.64	1,845	1,845	473	3	4.73	10.67
26	10,681	10,676	2,584	729	36.99	14.44	1,845	1,845	1,255	500	20.56	46.43
27	10,681	10,676	2,614	741	37.80	14.75	1,845	1,845	1,057	744	22.24	50.23
28	10,681	10,676	2,970	793	38.87	15.17	1,845	1,845	868	266	12.79	28.89
29	10,681	10,676	3,034	699	38.36	14.97	1,845	1,845	545	0	4.51	10.19
30	10,681	10,676	2,923	960	42.34	16.52	1,845	1,845	850	0	7.09	16.01
31	10,681	10,676	3,036	801	40.83	15.93	1,845	1,845	742	197	7.41	16.74
Total	**10,681**	**10,676**	--	--	**803.01**	**10.11**	**1,845**	**1,845**	--	--	**286.99**	**20.91**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	358	0	2.22	19.13	364	278	174	156	3.99	59.83
2	500	484	351	0	2.29	19.71	364	278	173	139	3.90	58.50
3	500	484	333	0	2.18	18.74	364	278	173	158	4.02	60.26
4	500	484	344	0	2.15	18.47	364	278	180	165	4.09	61.35
5	500	484	357	0	2.29	19.75	364	278	180	148	4.06	60.91
6	500	484	337	0	1.90	16.33	364	278	175	147	3.97	59.48
7	500	484	329	0	1.77	15.20	364	278	174	162	3.97	59.48
8	500	484	363	0	1.58	13.59	364	278	172	128	3.98	59.65
9	500	484	268	0	1.43	12.33	364	278	172	146	3.95	59.28
10	500	484	333	0	2.05	17.63	364	278	170	136	3.71	55.56
11	500	484	341	0	1.63	14.02	364	278	170	106	3.73	55.96
12	500	484	294	0	1.51	13.01	364	278	172	114	3.90	58.50
13	500	484	382	0	2.44	20.97	364	278	172	132	3.87	58.01
14	500	484	382	0	2.60	22.36	364	278	170	158	3.92	58.78
15	500	484	383	0	2.59	22.31	364	278	169	148	3.88	58.21
16	500	484	370	0	2.48	21.38	364	278	175	153	3.94	59.06
17	500	484	355	0	2.38	20.51	364	278	174	164	4.07	61.04
18	500	484	354	0	1.27	10.94	364	278	174	132	3.55	53.18
19	500	484	171	0	0.81	7.01	364	278	180	167	4.16	62.40
20	500	484	325	0	2.06	17.74	364	278	182	151	4.15	62.16
21	500	484	344	0	2.09	18.03	364	278	176	137	3.82	57.30
22	500	484	338	0	2.18	18.73	364	278	184	171	4.24	63.55
23	500	484	29	0	0.00	0.01	364	278	178	0	1.57	23.54
24	500	484	354	0	2.18	18.81	364	278	186	77	3.62	54.32
25	500	484	368	0	2.50	21.55	364	278	182	156	4.04	60.58
26	500	484	394	0	2.69	23.15	364	278	178	154	4.10	61.45
27	500	484	380	0	2.66	22.93	364	278	181	171	4.23	63.47
28	500	484	383	0	2.46	21.19	364	278	181	170	4.24	63.57
29	500	484	316	0	1.81	15.58	364	278	202	172	4.55	68.12
30	500	484	317	0	1.53	13.17	364	278	197	169	4.39	65.84
31	500	484	379	0	2.20	18.95	364	278	185	156	4.24	63.52
Total	**500**	**484**	--	--	**61.94**	**17.20**	**364**	**278**	--	--	**121.89**	**58.93**

February, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	3,074	858	44.29	17.28	1,845	1,845	340	150	5.18	11.69
2	10,681	10,676	3,399	933	52.02	20.30	1,845	1,845	349	0	3.69	8.33
3	10,681	10,676	3,827	1,107	58.90	22.99	1,845	1,845	336	0	3.08	6.95
4	10,681	10,676	3,702	1,555	65.61	25.61	1,845	1,845	33	0	0.38	0.86
5	10,681	10,676	3,479	835	49.56	19.34	1,845	1,845	275	0	2.29	5.17
6	10,681	10,676	3,173	1,356	55.23	21.56	1,845	1,845	167	0	1.20	2.70
7	10,681	10,676	2,969	1,138	55.91	21.82	1,845	1,845	384	0	1.95	4.41
8	10,681	10,676	4,194	1,308	60.95	23.79	1,845	1,845	292	0	1.99	4.50
9	10,681	10,676	4,381	1,958	76.36	29.80	1,845	1,845	593	0	4.07	9.19
10	10,681	10,676	4,947	1,570	76.65	29.92	1,845	1,845	520	0	6.86	15.49
11	10,681	10,676	4,752	1,652	75.13	29.32	1,845	1,845	445	4	4.26	9.62
12	10,681	10,676	4,931	1,845	76.69	29.93	1,845	1,845	475	0	8.38	18.93
13	10,681	10,676	4,315	1,547	71.06	27.73	1,845	1,845	506	0	3.23	7.29
14	10,681	10,676	4,397	1,698	74.52	29.08	1,845	1,845	78	0	0.47	1.06
15	10,681	10,676	4,433	1,989	82.10	32.04	1,845	1,845	321	0	1.96	4.43
16	10,681	10,676	4,611	2,458	86.47	33.75	1,845	1,845	535	0	4.63	10.46
17	10,681	10,676	4,619	2,162	84.75	33.07	1,845	1,845	362	0	2.58	5.82
18	10,681	10,676	4,345	1,868	83.30	32.51	1,845	1,845	422	0	2.83	6.40
19	10,681	7,198	4,357	1,955	84.14	48.71	1,845	1,845	67	0	0.16	0.36
20	10,681	7,198	4,723	1,881	85.84	49.69	1,845	1,845	443	8	4.22	9.54
21	10,681	10,676	4,747	1,615	84.70	33.06	1,845	1,845	193	0	1.48	3.35
22	10,681	10,676	4,888	2,003	86.52	33.77	1,845	1,845	686	0	6.41	14.48
23	10,681	10,676	4,460	1,608	82.02	32.01	1,845	1,845	422	0	1.98	4.47
24	10,681	10,676	4,577	1,818	82.26	32.11	1,845	1,845	501	0	3.13	7.08
25	10,681	10,676	4,718	1,980	80.47	31.41	1,845	1,845	536	0	2.97	6.71
26	10,681	10,676	4,813	2,320	83.57	32.61	1,845	1,845	227	0	1.39	3.13
27	10,681	10,676	4,845	1,810	83.73	32.68	1,845	1,845	816	0	4.61	10.41
28	10,681	10,676	4,850	2,091	80.94	31.59	1,845	1,845	757	0	6.87	15.51
Total	**10,681**	**10,676**	**--**	**--**	**2,063.67**	**28.76**	**1,845**	**1,845**	**--**	**--**	**92.26**	**7.44**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	374	0	2.49	21.41	364	278	187	178	4.37	65.49
2	500	484	367	0	2.55	21.92	364	278	186	158	4.26	63.91
3	500	484	353	0	2.32	19.94	364	278	185	163	4.32	64.69
4	500	484	343	0	2.35	20.24	364	278	194	154	4.28	64.10
5	500	484	324	0	2.25	19.36	364	278	184	174	4.29	64.32
6	500	484	367	0	2.48	21.39	364	278	187	156	4.24	63.58
7	500	484	371	0	2.58	22.24	364	278	184	150	4.28	64.14
8	500	484	352	0	1.98	17.05	364	278	184	161	4.22	63.19
9	500	484	342	0	2.15	18.52	364	278	184	160	4.28	64.16
10	500	484	304	0	2.05	17.65	364	278	189	151	4.36	65.37
11	500	484	378	0	2.68	23.05	364	278	189	156	4.20	62.90
12	500	484	402	0	2.92	25.11	364	278	193	165	4.40	65.90
13	500	484	393	0	2.67	23.00	364	278	195	172	4.48	67.12
14	500	484	347	0	2.34	20.11	364	278	196	167	4.29	64.24
15	500	484	376	0	2.66	22.91	364	278	199	185	4.58	68.62
16	500	484	332	0	2.11	18.19	364	278	198	187	4.59	68.80
17	500	484	342	0	2.38	20.50	364	278	208	113	4.54	68.02
18	500	484	352	0	2.42	20.84	364	278	200	121	4.43	66.40
19	500	484	351	0	2.09	17.95	364	278	210	151	4.57	68.43
20	500	484	325	0	1.85	15.90	364	278	155	136	3.60	53.96
21	500	484	357	0	2.15	18.51	364	278	197	154	4.37	65.50
22	500	484	307	0	2.05	17.65	364	278	200	189	4.66	69.92
23	500	484	367	0	2.54	21.84	364	278	202	182	4.68	70.12
24	500	484	363	0	2.46	21.14	364	278	206	166	4.72	70.77
25	500	484	366	0	2.61	22.45	364	278	204	173	4.64	69.61
26	500	484	344	0	2.36	20.35	364	278	191	173	4.46	66.91
27	500	484	334	0	2.20	18.97	364	278	188	172	4.38	65.67
28	500	484	362	0	2.08	17.92	364	278	188	167	4.35	65.18
Total	**500**	**484**	**--**	**--**	**65.76**	**20.22**	**364**	**278**	**--**	**--**	**122.83**	**65.75**

March, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	4,590	2,192	83.93	32.76	1,845	1,845	627	0	7.38	16.66
2	10,681	10,676	4,671	2,342	84.44	32.95	1,845	1,845	556	3	7.61	17.19
3	10,681	10,676	4,538	2,358	84.92	33.14	1,845	1,845	482	0	6.58	14.86
4	10,681	10,676	4,784	2,506	89.74	35.02	1,845	1,845	561	94	6.39	14.44
5	10,681	10,676	4,862	1,929	82.72	32.28	1,845	1,845	825	25	8.78	19.82
6	10,681	10,676	4,705	1,980	85.31	33.30	1,845	1,845	297	9	3.60	8.12
7	10,681	10,676	4,325	1,796	81.10	31.65	1,845	1,845	409	0	2.82	6.36
8	10,681	10,676	4,577	1,969	77.73	30.34	1,845	1,845	372	0	2.32	5.23
9	10,681	10,676	4,250	2,053	79.92	31.19	1,845	1,845	173	3	1.04	2.34
10	10,681	10,676	4,307	1,767	75.50	29.47	1,845	1,845	495	0	3.97	8.97
11	10,681	10,676	4,457	2,009	78.44	30.61	1,845	1,845	765	85	9.99	22.57
12	10,681	10,676	4,821	1,389	71.81	28.03	1,845	1,845	669	9	6.70	15.12
13	10,681	10,676	4,556	2,230	76.95	30.03	1,845	1,845	336	0	3.35	7.56
14	10,681	10,676	4,671	2,263	78.33	30.57	1,845	1,845	599	0	4.28	9.66
15	10,681	10,676	3,957	2,234	73.66	28.75	1,845	1,845	572	85	7.05	15.93
16	10,681	10,676	4,139	1,840	68.52	26.74	1,845	1,845	1,304	0	10.67	24.10
17	10,681	10,676	4,115	2,049	74.04	28.90	1,845	1,845	297	0	2.17	4.90
18	10,681	10,676	3,781	1,596	63.88	24.93	1,845	1,845	698	4	6.43	14.51
19	10,681	10,676	3,923	1,597	65.23	25.46	1,845	1,845	597	0	3.97	8.96
20	10,681	10,676	3,375	1,715	59.42	23.19	1,845	1,845	666	0	2.67	6.03
21	10,681	10,676	3,450	1,615	56.69	22.12	1,845	1,845	917	22	9.32	21.05
22	10,681	10,676	3,358	1,617	53.29	20.80	1,845	1,845	1,036	8	7.47	16.87
23	10,681	10,676	3,116	1,391	51.60	20.14	1,845	1,845	1,237	8	10.53	23.77
24	10,681	10,676	3,604	1,317	55.28	21.57	1,845	1,845	1,014	239	13.83	31.24
25	10,681	10,676	3,635	1,365	50.18	19.58	1,845	1,845	566	0	3.91	8.84
26	10,681	10,676	2,413	1,055	40.50	15.81	1,845	1,845	727	28	5.64	12.74
27	10,681	10,676	3,137	983	35.32	13.78	1,845	1,845	1,411	65	10.73	24.23
28	10,681	10,676	1,859	897	30.34	11.84	1,845	1,845	1,494	159	16.92	38.22
29	10,681	10,676	1,712	847	26.98	10.53	1,845	1,845	1,416	215	18.36	41.46
30	10,681	10,676	2,170	956	33.88	13.22	1,845	1,845	898	66	8.13	18.35
31	10,681	10,676	2,293	1,192	38.94	15.20	1,845	1,845	1,166	25	8.65	19.54
Total	**10,681**	**10,676**	**--**	**--**	**2,008.60**	**25.29**	**1,845**	**1,845**	**--**	**--**	**221.25**	**16.12**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	321	0	2.19	18.87	364	278	197	141	4.41	66.05
2	500	484	377	0	2.21	19.05	364	278	188	172	4.36	65.31
3	500	484	393	0	2.59	22.26	364	278	191	163	4.38	65.61
4	500	484	389	0	2.75	23.72	364	278	191	181	4.45	66.76
5	500	484	383	0	2.80	24.11	364	278	198	182	4.55	68.16
6	500	484	383	0	2.78	23.96	364	278	205	149	4.46	66.89
7	500	484	380	0	2.68	23.04	364	278	203	128	4.35	65.13
8	500	484	394	0	2.81	24.23	364	278	208	164	4.54	68.11
9	500	484	392	0	2.97	25.56	364	278	207	164	4.42	66.25
10	500	484	396	0	2.96	25.46	364	278	189	164	4.19	62.76
11	500	484	396	0	2.94	25.29	364	278	214	147	4.67	69.95
12	500	484	369	0	2.36	20.29	364	278	216	191	4.99	74.78
13	500	484	371	0	2.74	23.55	364	278	217	204	5.08	76.12
14	500	484	373	0	2.78	23.91	364	278	218	185	5.01	75.04
15	500	484	373	0	2.19	18.82	364	278	191	177	4.44	66.49
16	500	484	364	0	2.50	21.51	364	278	189	90	4.40	65.96
17	500	484	202	0	1.18	10.14	364	278	192	179	4.48	67.21
18	500	484	416	0	2.77	23.88	364	278	186	137	4.13	61.95
19	500	484	186	0	1.30	11.21	364	278	170	163	3.99	59.85
20	500	484	375	0	2.78	23.90	364	278	175	161	4.03	60.41
21	500	484	368	0	2.09	18.00	364	278	192	146	4.03	60.44
22	500	484	326	0	2.57	22.12	364	278	181	161	4.00	59.98
23	500	484	396	0	2.73	23.47	364	278	170	111	3.48	52.19
24	500	484	365	0	2.17	18.66	364	278	186	142	3.88	58.17
25	500	484	403	0	3.11	26.74	364	278	192	154	4.14	62.09
26	500	484	420	0	3.29	28.32	364	278	166	155	3.85	57.78
27	500	484	410	0	3.17	27.26	364	278	166	154	3.85	57.70
28	500	484	397	0	3.00	25.79	364	278	165	140	3.84	57.58
29	500	484	360	0	2.27	19.54	364	278	164	122	3.76	56.42
30	500	484	310	0	2.32	20.01	364	278	231	129	3.79	56.78
31	500	484	397	0	2.55	21.97	364	278	182	149	4.02	60.22
Total	**500**	**484**	**--**	**--**	**79.53**	**22.08**	**364**	**278**	**--**	**--**	**131.98**	**63.81**

April, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	2,131	984	34.78	13.57	1,845	1,845	1,343	223	19.17	43.30
2	10,681	10,676	2,160	1,096	35.10	13.70	1,845	1,845	1,304	441	21.09	47.63
3	10,681	10,676	2,031	1,030	34.11	13.31	1,845	1,845	1,356	375	19.36	43.72
4	10,681	10,676	2,106	1,163	37.60	14.68	1,845	1,845	771	5	7.32	16.53
5	10,681	10,676	2,360	1,079	33.28	12.99	1,845	1,845	1,488	37	10.81	24.41
6	10,681	10,676	1,790	1,052	32.50	12.68	1,845	1,845	355	82	4.75	10.73
7	10,681	10,676	1,798	992	30.20	11.79	1,845	1,845	948	54	7.47	16.86
8	10,681	10,676	2,108	975	33.57	13.10	1,845	1,845	931	21	8.76	19.77
9	10,681	10,676	2,588	1,002	36.23	14.14	1,845	1,845	721	33	5.96	13.45
10	10,681	10,676	2,947	945	40.08	15.64	1,845	1,845	309	0	3.33	7.51
11	10,681	10,676	3,456	1,018	45.71	17.84	1,845	1,845	619	12	3.79	8.55
12	10,681	10,676	3,864	1,061	51.79	20.21	1,845	1,845	1,214	11	8.53	19.27
13	10,681	10,676	4,494	2,102	67.95	26.52	1,845	1,845	1,482	85	10.65	24.06
14	10,681	10,676	4,615	2,083	73.41	28.65	1,845	1,845	1,028	357	15.32	34.59
15	10,681	10,676	4,695	2,425	77.55	30.27	1,845	1,845	1,288	152	13.45	30.36
16	10,681	10,676	4,831	2,416	78.08	30.47	1,845	1,845	1,418	252	18.59	41.97
17	10,681	10,676	4,818	2,643	83.36	32.53	1,845	1,845	1,390	229	20.67	46.68
18	10,681	10,676	5,522	2,297	91.96	35.89	1,845	1,845	1,171	176	14.74	33.28
19	10,681	10,676	4,827	2,697	90.23	35.21	1,845	1,845	1,179	161	15.22	34.38
20	10,681	10,676	4,146	2,595	79.17	30.90	1,845	1,845	1,471	166	17.19	38.82
21	10,681	10,676	3,648	2,233	67.87	26.49	1,845	1,845	1,005	98	14.34	32.38
22	10,681	10,676	3,022	1,863	57.11	22.29	1,845	1,845	769	0	5.36	12.10
23	10,681	10,676	2,944	1,827	52.06	20.32	1,845	1,845	521	86	6.42	14.49
24	10,681	10,676	3,372	1,864	56.76	22.15	1,845	1,845	495	6	4.27	9.64
25	10,681	10,676	4,537	2,166	70.06	27.34	1,845	1,845	887	6	8.79	19.86
26	10,681	10,676	5,404	2,534	84.82	33.10	1,845	1,845	1,180	77	11.92	26.92
27	10,681	10,676	6,080	2,893	96.61	37.70	1,845	1,845	1,359	239	15.42	34.83
28	10,681	10,676	6,071	3,260	101.44	39.59	1,845	1,845	660	2	4.07	9.18
29	10,681	10,676	5,845	2,914	99.91	38.99	1,845	1,845	642	0	2.83	6.40
30	10,681	10,676	5,880	3,581	105.59	41.21	1,845	1,845	837	4	3.33	7.52
Total	**10,681**	**10,676**	--	--	**1,878.88**	**23.65**	**1,845**	**1,845**	--	--	**322.89**	**23.52**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	411	0	2.92	25.15	364	278	160	132	3.58	53.71
2	500	484	401	0	2.81	24.17	364	278	175	127	3.92	58.73
3	500	484	409	0	2.59	22.29	364	278	175	146	4.08	61.15
4	500	484	399	0	3.10	26.67	364	278	176	152	4.10	61.49
5	500	484	392	0	2.45	21.06	364	278	174	135	4.10	61.38
6	500	484	424	0	3.18	27.36	364	278	172	162	3.98	59.66
7	500	484	402	0	3.21	27.65	364	278	170	162	4.01	60.07
8	500	484	396	0	2.98	25.63	364	278	171	163	4.00	60.02
9	500	484	386	0	2.98	25.64	364	278	181	161	4.15	62.19
10	500	484	381	0	2.99	25.72	364	278	185	165	4.23	63.47
11	500	484	386	0	2.34	20.17	364	278	182	158	4.04	60.60
12	500	484	388	0	2.97	25.55	364	278	186	176	4.31	64.63
13	500	484	380	0	3.02	25.96	364	278	185	156	4.29	64.37
14	500	484	383	0	2.98	25.69	364	278	184	142	3.79	56.83
15	500	484	377	0	2.98	25.62	364	278	151	124	3.39	50.74
16	500	484	349	0	2.58	22.23	364	278	149	108	3.37	50.46
17	500	484	351	0	2.35	20.24	364	278	158	110	3.47	51.97
18	500	484	371	0	2.52	21.73	364	278	155	121	3.44	51.63
19	500	484	394	0	2.70	23.24	364	278	156	137	3.54	53.05
20	500	484	390	0	3.03	26.11	364	278	155	104	3.54	53.01
21	500	484	388	0	3.08	26.53	364	278	154	144	3.61	54.12
22	500	484	395	0	3.05	26.30	364	278	150	121	3.15	47.23
23	500	484	410	0	3.26	28.10	364	278	175	102	3.32	49.74
24	500	484	397	0	3.16	27.24	364	278	155	141	3.60	53.97
25	500	484	377	0	2.85	24.53	364	278	154	137	3.58	53.68
26	500	484	344	0	2.55	21.96	364	278	156	118	3.51	52.57
27	500	484	334	0	2.41	20.76	364	278	151	134	3.50	52.42
28	500	484	351	0	2.39	20.56	364	278	173	131	3.69	55.34
29	500	484	164	0	1.17	10.06	364	278	176	166	4.14	62.00
30	500	484	325	0	2.15	18.48	364	278	175	167	4.14	62.08
Total	**500**	**484**	--	--	**82.75**	**22.98**	**364**	**278**	--	--	**113.58**	**54.91**

May, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	6,106	3,208	102.91	40.16	1,845	1,845	884	1	5.83	13.16
2	10,681	10,676	5,095	3,285	97.56	38.07	1,845	1,845	878	10	5.95	13.44
3	10,681	10,676	5,040	3,171	89.02	34.74	1,845	1,845	966	5	7.96	17.97
4	10,681	10,676	5,822	3,144	93.70	36.57	1,845	1,845	922	1	5.90	13.32
5	10,681	10,676	6,192	3,362	109.99	42.93	1,845	1,845	1,012	6	7.79	17.60
6	10,681	10,676	5,877	3,489	108.24	42.24	1,845	1,845	1,211	6	9.69	21.89
7	10,681	10,676	5,533	3,166	97.12	37.90	1,845	1,845	1,299	111	12.33	27.85
8	10,681	10,676	5,303	2,993	91.64	35.77	1,845	1,845	1,265	153	12.16	27.47
9	10,681	10,676	5,162	2,668	90.21	35.21	1,845	1,845	727	51	6.48	14.63
10	10,681	10,676	5,368	2,514	98.01	38.25	1,845	1,845	662	51	6.38	14.40
11	10,681	10,676	5,476	3,356	106.47	41.55	1,845	1,845	1,327	322	19.78	44.67
12	10,681	10,676	6,003	2,739	103.23	40.29	1,845	1,845	1,515	432	23.72	53.57
13	10,681	10,676	5,705	3,507	110.14	42.99	1,845	1,845	1,584	537	24.28	54.84
14	10,681	10,676	5,667	3,213	106.47	41.55	1,845	1,845	1,488	624	23.64	53.38
15	10,681	10,676	5,574	2,943	102.04	39.83	1,845	1,845	1,550	864	30.32	68.47
16	10,681	10,676	5,655	2,878	105.41	41.14	1,845	1,845	1,612	393	26.05	58.84
17	10,681	10,676	5,057	2,789	104.55	40.80	1,845	1,845	1,550	44	28.22	63.72
18	10,681	10,676	5,467	3,481	110.85	43.26	1,845	1,845	1,110	198	12.70	28.68
19	10,681	10,676	5,385	3,721	108.27	42.25	1,845	1,845	973	131	12.40	28.00
20	10,681	10,676	5,107	3,836	108.60	42.39	1,845	1,845	1,473	562	24.80	56.01
21	10,681	10,676	5,116	3,671	108.67	42.41	1,845	1,845	1,561	854	29.14	65.81
22	10,681	10,676	5,124	3,825	108.02	42.16	1,845	1,845	1,528	715	29.55	66.73
23	10,681	10,676	5,430	3,589	108.91	42.51	1,845	1,845	1,531	638	25.91	58.52
24	10,681	10,676	5,385	3,471	111.72	43.60	1,845	1,845	1,609	362	29.19	65.91
25	10,681	10,676	5,482	3,836	119.00	46.44	1,845	1,845	1,611	1,267	36.00	81.30
26	10,681	10,676	5,827	3,962	122.06	47.64	1,845	1,845	1,704	1,251	37.56	84.83
27	10,681	10,676	5,779	4,363	122.73	47.90	1,845	1,845	1,595	1,118	34.03	76.86
28	10,681	10,676	5,784	3,784	120.07	46.86	1,845	1,845	1,661	861	30.11	67.99
29	10,681	10,676	6,230	4,259	120.59	47.06	1,845	1,845	1,384	32	11.69	26.39
30	10,681	10,676	5,446	3,993	121.50	47.42	1,845	1,845	1,294	149	14.71	33.23
31	10,681	10,676	5,511	4,004	117.78	45.97	1,845	1,845	1,719	6	22.28	50.31
Total	**10,681**	**10,676**	**--**	**--**	**3,325.47**	**41.87**	**1,845**	**1,845**	**--**	**--**	**606.55**	**44.19**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	364	0	2.62	22.53	364	278	175	165	4.11	61.54
2	500	484	199	0	1.12	9.63	364	278	174	156	3.91	58.65
3	500	484	363	0	2.90	24.93	364	278	174	142	4.10	61.50
4	500	484	372	0	2.49	21.46	364	278	175	136	4.01	60.10
5	500	484	371	0	2.82	24.26	364	278	174	153	4.07	60.99
6	500	484	372	0	3.00	25.81	364	278	173	144	3.89	58.25
7	500	484	390	0	3.17	27.32	364	278	172	164	4.08	61.19
8	500	484	384	0	3.12	26.84	364	278	146	125	3.21	48.09
9	500	484	384	0	3.15	27.09	364	278	128	125	3.03	45.46
10	500	484	382	0	3.10	26.71	364	278	127	125	3.04	45.56
11	500	484	373	0	2.99	25.75	364	278	130	113	3.03	45.44
12	500	484	358	0	2.91	25.04	364	278	128	119	3.02	45.20
13	500	484	339	0	2.59	22.29	364	278	130	123	3.02	45.26
14	500	484	342	0	2.71	23.32	364	278	129	92	2.99	44.78
15	500	484	349	0	2.74	23.59	364	278	131	79	2.93	43.86
16	500	484	352	0	2.84	24.46	364	278	152	90	3.22	48.28
17	500	484	364	0	2.75	23.65	364	278	153	101	3.11	46.54
18	500	484	380	0	3.07	26.41	364	278	160	124	3.72	55.80
19	500	484	386	0	3.18	27.34	364	278	159	126	3.73	55.88
20	500	484	378	0	3.08	26.55	364	278	157	134	3.70	55.44
21	500	484	373	0	3.02	25.97	364	278	160	151	3.72	55.81
22	500	484	360	0	2.83	24.37	364	278	157	114	3.61	54.18
23	500	484	318	0	2.07	17.79	364	278	156	89	3.14	47.05
24	500	484	352	0	2.81	24.18	364	278	159	127	3.58	53.60
25	500	484	337	0	2.53	21.80	364	278	159	111	3.40	50.97
26	500	484	353	0	2.49	21.47	364	278	157	148	3.67	54.96
27	500	484	371	0	2.96	25.47	364	278	159	149	3.73	55.88
28	500	484	319	0	1.73	14.89	364	278	155	101	2.87	42.96
29	500	484	358	0	2.59	22.32	364	278	105	94	2.46	36.90
30	500	484	334	0	2.02	17.43	364	278	105	79	2.38	35.73
31	500	484	379	0	2.90	24.92	364	278	108	87	2.47	37.08
Total	**500**	**484**	**--**	**--**	**84.28**	**23.41**	**364**	**278**	**--**	**--**	**104.95**	**50.74**

June, 2023												
Day	Hydel						Wind					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	10,681	10,676	5,559	4,064	121.62	47.47	1,845	1,845	1,521	552	27.82	62.83
2	10,681	10,676	5,497	3,950	117.71	45.94	1,845	1,845	1,239	168	12.80	28.91
3	10,681	10,676	5,446	3,600	111.98	43.70	1,845	1,845	1,574	312	23.99	54.18
4	10,681	10,676	5,503	3,630	116.69	45.54	1,845	1,845	1,523	82	18.72	42.28
5	10,681	10,676	5,474	3,993	116.75	45.56	1,845	1,845	1,549	261	19.06	43.04
6	10,681	10,676	5,354	4,123	118.50	46.25	1,845	1,845	1,478	314	21.25	47.99
7	10,681	10,676	5,390	4,117	117.68	45.93	1,845	1,845	985	113	12.00	27.11
8	10,681	10,676	5,455	4,179	117.92	46.02	1,845	1,845	1,329	181	19.47	43.98
9	10,681	10,676	5,811	4,314	123.25	48.10	1,845	1,845	1,661	950	32.83	74.13
10	10,681	10,676	5,840	3,323	125.05	48.80	1,845	1,845	1,455	181	22.06	49.81
11	10,681	10,676	6,299	4,054	128.50	50.15	1,845	1,845	495	10	4.97	11.23
12	10,681	10,676	6,287	3,280	117.76	45.96	1,845	1,845	1,408	12	11.32	25.56
13	10,681	10,676	6,873	3,975	132.99	51.91	1,845	1,845	1,646	404	25.89	58.46
14	10,681	10,676	6,671	4,335	133.62	52.15	1,845	1,845	970	159	13.02	29.40
15	10,681	10,676	6,476	4,359	125.12	48.83	1,845	1,845	616	374	12.09	27.31
16	10,681	10,676	6,946	4,754	136.90	53.43	1,845	1,845	513	83	9.34	21.09
17	10,681	10,676	7,653	3,984	133.56	52.13	1,845	1,845	1,326	194	16.19	36.57
18	10,681	10,676	7,120	4,186	134.60	52.53	1,845	1,845	1,478	1,017	29.87	67.45
19	10,681	10,676	7,515	4,664	145.63	56.84	1,845	1,845	1,434	779	30.10	67.99
20	10,681	10,676	7,148	4,948	150.07	58.57	1,845	1,845	1,259	768	26.63	60.14
21	10,681	10,676	7,073	5,844	155.81	60.81	1,845	1,845	1,387	713	25.87	58.43
22	10,681	10,676	7,113	5,904	158.33	61.79	1,845	1,845	1,233	638	24.55	55.45
23	10,681	10,676	7,227	5,894	159.82	62.37	1,845	1,845	1,226	773	24.35	54.98
24	10,681	10,676	7,044	6,400	163.45	63.79	1,845	1,845	1,310	561	21.85	49.35
25	10,681	10,676	7,375	5,099	152.95	59.69	1,845	1,845	1,040	305	13.83	31.24
26	10,681	10,676	7,610	5,791	166.44	64.96	1,845	1,845	1,474	278	16.59	37.46
27	10,681	10,676	7,745	6,421	173.96	67.89	1,845	1,845	985	39	11.79	26.62
28	10,681	10,676	7,794	6,534	176.53	68.90	1,845	1,845	1,006	45	11.34	25.61
29	10,681	10,676	7,858	5,849	166.79	65.10	1,845	1,845	1,696	717	26.35	59.51
30	10,681	10,676	7,815	3,804	154.27	60.21	1,845	1,845	1,660	607	31.57	71.30
Total	**10,681**	**10,676**	**--**	**--**	**4,154.25**	**52.30**	**1,845**	**1,845**	**--**	**--**	**597.52**	**43.53**

Day	Solar						Bagasse					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	500	484	383	0	2.61	22.47	364	278	101	81	2.36	35.44
2	500	484	396	0	3.21	27.66	364	278	107	87	2.35	35.16
3	500	484	368	0	2.66	22.89	364	278	98	95	2.32	34.78
4	500	484	389	0	3.11	26.80	364	278	95	94	2.32	34.81
5	500	484	376	0	3.10	26.72	364	278	97	69	2.31	34.63
6	500	484	123	0	0.72	6.23	364	278	149	83	2.74	41.08
7	500	484	375	0	3.04	26.21	364	278	151	139	3.55	53.27
8	500	484	360	0	2.92	25.17	364	278	151	143	3.53	52.92
9	500	484	363	0	2.95	25.40	364	278	153	106	3.45	51.64
10	500	484	354	0	2.89	24.89	364	278	153	48	3.35	50.18
11	500	484	337	0	2.61	22.45	364	278	151	136	3.51	52.56
12	500	484	347	0	2.76	23.77	364	278	151	145	3.57	53.51
13	500	484	360	0	2.87	24.67	364	278	156	141	3.62	54.33
14	500	484	353	0	2.81	24.17	364	278	159	146	3.69	55.24
15	500	484	364	0	2.83	24.37	364	278	161	113	3.65	54.64
16	500	484	339	0	2.59	22.32	364	278	159	148	3.68	55.08
17	500	484	338	0	2.74	23.57	364	278	159	149	3.74	55.99
18	500	484	345	0	2.53	21.74	364	278	159	141	3.72	55.72
19	500	484	338	0	2.68	23.10	364	278	159	153	3.74	56.05
20	500	484	331	0	2.69	23.17	364	278	160	114	3.64	54.50
21	500	484	357	0	2.89	24.90	364	278	160	150	3.70	55.53
22	500	484	358	0	2.91	25.04	364	278	159	141	3.74	56.08
23	500	484	362	0	2.92	25.17	364	278	158	151	3.72	55.80
24	500	484	357	0	2.89	24.85	364	278	157	150	3.71	55.53
25	500	484	345	0	2.77	23.83	364	278	158	112	3.27	48.96
26	500	484	237	0	1.86	16.04	364	278	130	113	2.96	44.38
27	500	484	363	0	2.69	23.16	364	278	125	113	2.87	43.01
28	500	484	321	0	2.36	20.31	364	278	110	102	2.57	38.50
29	500	484	320	0	2.31	19.85	364	278	116	55	2.46	36.86
30	500	484	341	0	2.44	21.04	364	278	110	102	2.57	38.57
Total	**500**	**484**	**--**	**--**	**80.38**	**22.32**	**364**	**278**	**--**	**--**	**96.40**	**46.61**

TABLE 96

Daily Generation Capacity (MW), Daily Generation (GWh) and Load Management

Day	July, 2022											August, 2022										
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	40,156	37,662	21,198	19,227	482.89	53.42	2,850	11	1,684	0	4,545.00	40,012	37,547	20,506	15,610	439.12	48.73	2,124	10	1,024	0	3,158.00
2	40,156	37,662	20,700	18,444	472.64	52.29	2,886	0	4,861	0	7,747.23	40,012	37,547	20,618	17,721	466.14	51.73	2,408	9	1,599	0	4,016.00
3	40,156	37,662	21,277	19,184	487.75	53.96	3,292	10	3,078	0	6,380.00	40,012	37,547	21,012	18,195	467.90	51.92	2,013	14	1,905	0	3,932.00
4	40,156	37,662	22,311	19,456	505.30	55.90	2,644	11	2,266	38	4,959.00	40,342	37,547	22,369	16,967	459.72	51.02	1,942	14	2,959	0	4,915.00
5	40,156	37,662	22,191	19,897	506.96	56.09	2,443	11	3,737	0	6,191.00	40,342	37,455	21,374	18,320	481.25	53.54	2,292	10	1,180	0	3,482.00
6	40,156	37,662	21,833	17,961	485.70	53.74	3,325	11	0	0	3,336.00	40,342	37,455	21,457	17,494	469.95	52.28	2,253	11	1,482	0	3,746.00
7	40,156	37,662	22,054	18,557	488.66	54.06	2,831	11	1,969	0	4,811.00	40,342	37,455	21,269	18,695	479.40	53.33	2,106	11	1,195	0	3,312.00
8	40,156	37,662	22,502	19,470	501.90	55.53	2,444	11	1,030	0	3,485.00	40,342	37,455	21,266	18,473	477.17	53.08	1,943	11	1,509	23	3,486.00
9	40,156	37,662	21,885	16,735	463.86	51.32	1,961	5	0	0	1,966.00	40,342	37,455	21,302	17,312	462.62	51.46	2,137	11	0	0	2,148.00
10	40,156	37,662	20,656	16,321	446.66	49.42	1,619	11	0	0	1,630.00	40,342	37,455	21,783	19,120	484.08	53.85	2,447	11	4,149	133	6,740.00
11	40,156	37,662	21,615	18,148	467.42	51.71	1,430	11	0	0	1,441.00	40,342	37,455	20,511	18,428	470.67	52.36	2,684	11	1,082	0	3,777.00
12	40,156	37,662	22,311	19,436	492.17	54.45	1,851	5	0	0	1,856.00	40,342	37,455	21,250	18,304	474.48	52.78	2,623	11	2,297	0	4,931.00
13	40,156	37,662	20,622	16,219	452.38	50.05	2,260	11	619	0	2,890.00	40,342	37,455	21,059	19,253	482.79	53.71	2,915	11	2,880	0	5,806.00
14	40,012	37,547	18,904	14,516	402.51	44.67	2,915	5	0	0	2,920.00	40,342	37,455	20,999	18,178	476.38	53.00	2,624	11	1,110	0	3,745.00
15	40,012	37,547	18,050	15,380	400.83	44.48	2,492	5	0	0	2,497.00	40,342	37,455	20,252	17,711	458.34	50.99	2,635	9	1,052	0	3,696.00
16	40,012	37,547	19,262	16,227	424.87	47.15	2,702	5	553	0	3,260.00	40,342	37,315	20,502	17,564	455.08	50.82	2,433	11	2,092	0	4,536.00
17	40,012	37,547	19,907	16,497	431.76	47.91	2,936	5	0	0	2,941.00	40,352	37,325	19,696	16,401	434.16	48.47	2,728	11	0	0	2,739.00
18	40,012	37,547	22,227	18,092	479.43	53.20	2,723	5	1,593	0	4,321.00	40,352	37,325	19,624	16,503	430.71	48.08	2,277	11	1,099	0	3,387.00
19	40,012	37,547	22,079	19,427	499.24	55.40	2,706	5	3,198	0	5,909.00	40,352	37,325	19,528	17,011	436.36	48.71	1,889	11	1,629	0	3,529.00
20	40,012	37,547	22,100	20,417	498.87	55.36	2,739	5	1,816	0	4,560.00	40,352	37,325	19,281	16,756	432.12	48.24	1,941	12	1,554	0	3,507.00
21	40,012	37,547	20,430	16,966	447.45	49.65	3,084	11	0	0	3,095.00	40,352	37,325	18,904	16,976	427.28	47.70	2,018	6	1,291	0	3,315.00
22	40,012	37,547	19,686	15,740	426.71	47.35	2,382	11	498	0	2,891.00	40,352	37,325	20,568	17,045	449.92	50.23	1,927	11	1,200	0	3,138.00
23	40,012	37,547	19,000	16,555	430.18	47.74	2,795	10	908	0	3,713.00	40,352	37,325	20,654	17,671	459.94	51.34	2,142	11	1,321	0	3,474.00
24	40,012	37,547	18,658	15,638	410.26	45.53	2,273	5	629	0	2,907.00	40,352	37,325	19,604	16,383	431.07	48.12	2,272	11	0	0	2,283.00
25	40,012	37,547	18,539	16,230	419.77	46.58	2,456	10	1,066	0	3,532.00	40,352	37,325	18,783	16,572	425.66	47.52	1,910	10	0	0	1,920.00
26	40,012	37,547	19,525	16,654	436.63	48.45	2,722	11	1,650	0	4,383.00	40,352	37,325	18,496	16,131	415.30	46.36	1,996	5	0	0	2,001.00
27	40,012	37,547	20,193	17,774	452.81	50.25	2,548	10	1,112	0	3,670.00	40,352	37,325	19,325	16,098	419.49	46.83	1,704	0	796	0	2,500.00
28	40,012	37,547	19,730	17,473	449.40	49.87	2,211	11	1,034	0	3,256.00	40,352	37,325	19,827	16,689	429.56	47.95	1,532	11	1,128	0	2,671.00
29	40,012	37,547	19,451	16,820	437.44	48.54	2,679	9	0	0	2,688.00	40,262	37,261	19,568	17,131	441.46	49.37	1,733	11	1,091	0	2,835.00
30	40,012	37,547	19,921	17,268	450.42	49.98	2,428	8	1,304	0	3,740.00	40,262	37,261	19,830	17,493	448.42	50.14	1,795	11	1,692	0	3,498.00
31	40,012	37,547	19,020	16,409	429.30	47.64	2,507	9	0	0	2,516.00	40,262	37,261	20,384	18,017	460.32	51.48	1,919	9	1,883	0	3,811.00

	September, 2022											October, 2022										
Day	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	40,262	37,261	20,259	18,300	467.82	52.31	2,134	9	2,256	0	4,399.00	40,130	37,192	18,623	15,684	414.30	46.41	2,645	5	920	70	3,640.00
2	40,262	37,261	20,194	18,409	466.00	52.11	2,130	10	1,967	0	4,107.00	40,130	37,192	18,203	15,257	402.76	45.12	2,380	8	433	0	2,821.00
3	40,262	37,261	20,832	18,219	468.76	52.42	2,379	11	1,350	0	3,740.00	40,330	37,392	18,255	15,532	409.69	45.65	2,522	10	831	0	3,363.00
4	40,262	37,261	20,227	17,990	456.29	51.02	2,409	10	1,415	200	4,034.00	40,330	37,392	18,427	15,448	411.80	45.89	2,503	10	815	0	3,328.00
5	40,262	37,261	18,613	16,635	430.91	48.19	2,429	11	984	100	3,524.00	40,330	37,392	18,298	15,583	410.76	45.77	2,571	11	863	0	3,445.00
6	40,262	37,261	19,561	16,149	423.76	47.39	2,388	11	2,162	0	4,561.00	40,330	37,392	17,520	15,596	398.91	44.45	2,289	9	805	0	3,103.00
7	40,262	37,261	19,044	16,977	436.83	48.85	2,292	148	3,438	80	5,958.00	40,330	37,392	17,580	14,512	392.42	43.73	2,373	9	650	0	3,032.00
8	40,262	37,264	19,870	17,699	449.18	50.23	2,610	11	3,363	100	6,084.00	40,330	37,392	18,629	14,918	396.19	44.15	2,763	0	1,024	0	3,787.00
9	40,262	37,264	20,225	17,747	455.54	50.94	2,340	11	3,121	70	5,542.00	40,330	37,392	16,842	14,016	368.58	41.07	2,189	7	0	0	2,196.00
10	40,262	37,264	20,148	17,820	452.62	50.61	2,289	5	2,169	110	4,573.00	40,330	37,392	16,635	14,288	371.38	41.38	2,471	7	0	0	2,478.00
11	40,262	37,264	19,450	15,919	426.35	47.67	2,163	11	698	90	2,962.00	40,330	37,392	16,470	13,802	361.82	40.32	2,992	5	0	0	2,997.00
12	40,262	37,264	18,924	15,840	417.24	46.65	2,286	10	2,342	70	4,708.00	40,330	37,392	16,003	12,719	346.36	38.60	2,551	5	821	0	3,377.00
13	40,262	37,264	19,534	16,099	433.49	48.47	2,410	10	2,536	80	5,036.00	40,330	37,392	14,315	6,478	280.56	31.26	1,915	7	4,497	170	6,589.00
14	40,262	37,264	19,242	17,038	432.88	48.40	2,360	10	3,788	0	6,158.00	40,330	37,392	15,483	10,499	317.28	35.36	2,074	8	585	0	2,667.00
15	40,262	37,264	19,861	16,537	429.58	48.03	2,246	11	3,507	0	5,764.00	40,330	37,392	15,699	12,859	344.29	38.36	2,438	5	724	0	3,167.00
16	40,262	37,264	19,301	17,426	445.04	49.76	2,100	10	2,708	0	4,818.00	40,330	37,392	15,102	12,705	334.16	37.24	2,338	5	759	0	3,102.00
17	40,262	37,264	18,713	15,550	419.28	46.88	2,427	5	2,285	0	4,717.00	40,330	37,392	15,622	12,500	336.19	37.46	2,532	5	788	0	3,325.00
18	40,262	37,264	18,487	15,286	405.19	45.31	2,350	11	2,653	0	5,014.00	40,330	37,392	15,835	12,230	336.62	37.51	2,307	5	685	0	2,997.00
19	40,262	37,264	18,916	15,821	417.02	46.63	2,079	5	3,743	0	5,827.00	40,330	37,392	15,696	12,516	333.52	37.16	2,358	5	588	0	2,951.00
20	40,262	37,264	18,552	16,825	419.99	46.96	2,318	11	4,073	0	6,402.00	40,330	37,392	14,970	12,129	314.85	35.08	2,480	5	0	0	2,485.00
21	40,262	37,264	19,700	16,242	427.63	47.82	2,357	9	2,637	0	5,003.00	40,330	37,392	14,274	11,175	309.57	34.50	2,436	0	0	0	2,436.00
22	40,262	37,264	20,084	16,689	439.72	49.17	2,480	5	2,127	0	4,612.00	40,330	37,392	14,608	11,220	311.31	34.69	2,758	0	0	0	2,758.00
23	40,262	37,264	18,711	16,522	426.67	47.71	2,209	11	1,509	0	3,729.00	40,330	37,392	13,983	11,142	304.61	33.94	2,607	5	0	0	2,612.00
24	40,262	37,264	17,740	15,677	406.32	45.43	2,581	11	1,339	0	3,931.00	40,330	37,392	14,959	10,827	310.15	34.56	2,548	8	0	0	2,556.00
25	40,262	37,264	17,475	14,772	389.04	43.50	2,667	5	1,339	0	4,011.00	40,330	37,392	14,882	11,452	314.74	35.07	2,580	7	0	0	2,587.00
26	40,262	37,264	18,206	14,484	396.67	44.35	3,010	9	1,310	0	4,329.00	40,330	37,392	15,155	11,487	316.92	35.32	2,711	8	0	0	2,719.00
27	40,262	37,264	18,640	14,753	404.76	45.26	2,555	10	1,378	0	3,943.00	40,330	37,392	15,156	11,524	317.14	35.34	2,654	8	0	0	2,662.00
28	40,262	37,264	18,547	15,199	410.61	45.91	2,428	10	1,406	0	3,844.00	40,330	37,392	14,426	11,317	310.05	34.55	2,652	7	0	0	2,659.00
29	40,262	37,264	18,299	15,160	409.45	45.78	2,448	10	1,582	0	4,040.00	40,330	37,392	14,748	10,847	309.96	34.54	2,718	8	0	0	2,726.00
30	40,130	37,192	18,881	15,203	412.38	46.20	2,580	10	607	0	3,197.00	40,330	37,392	13,644	11,098	301.42	33.59	2,606	5	0	0	2,611.00
31												40,330	37,392	14,281	10,926	303.96	33.87	2,858	0	0	0	2,858.00

November, 2022												December, 2022										
Day	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	40,330	37,392	14,654	10,945	310.06	34.55	2,575	5	0	0	2,580.00	40,330	36,047	13,836	8,710	280.12	32.38	2,773	0	0	0	2,773.00
2	40,330	37,392	14,473	10,962	307.85	34.30	2,570	5	0	0	2,575.00	41,650	37,367	13,377	8,582	273.15	30.46	2,707	0	0	0	2,707.00
3	40,330	36,047	14,720	11,086	308.83	35.70	2,491	5	0	0	2,496.00	41,650	37,367	13,786	8,548	277.26	30.92	2,775	0	0	0	2,775.00
4	40,330	36,047	13,981	11,079	306.44	35.42	2,478	0	0	0	2,478.00	41,650	37,367	13,247	8,771	269.24	30.02	2,683	0	0	0	2,683.00
5	40,330	36,047	12,676	9,523	268.90	31.08	2,857	0	0	0	2,857.00	41,650	37,367	13,782	8,620	272.94	30.43	2,733	0	0	0	2,733.00
6	40,330	36,047	13,736	10,221	296.06	34.22	3,136	0	0	0	3,136.00	41,650	37,253	13,819	8,777	276.29	30.90	2,784	0	0	0	2,784.00
7	40,330	36,047	13,831	9,223	274.29	31.71	2,633	0	0	0	2,633.00	41,650	37,253	14,063	8,896	279.01	31.21	2,848	0	0	0	2,848.00
8	40,330	36,047	13,716	9,602	279.81	32.34	2,738	0	0	0	2,738.00	41,650	37,253	14,185	8,982	281.69	31.51	2,800	0	0	0	2,800.00
9	40,330	36,047	13,310	9,516	277.91	32.12	2,601	0	0	0	2,601.00	41,650	37,253	13,601	8,900	278.82	31.19	2,704	0	0	24	2,728.00
10	40,330	36,047	13,651	9,332	280.23	32.39	2,578	0	0	0	2,578.00	41,650	37,253	13,788	8,834	277.59	31.05	2,714	0	0	13	2,727.00
11	40,330	36,047	13,050	9,927	279.03	32.25	2,676	0	0	0	2,676.00	41,650	37,253	13,054	8,577	270.77	30.28	2,821	0	0	9	2,830.00
12	40,330	36,047	13,595	9,428	278.81	32.23	2,716	0	0	0	2,716.00	41,650	37,253	13,713	8,366	270.60	30.27	2,654	0	0	0	2,654.00
13	40,330	36,047	13,073	9,445	273.33	31.59	2,846	0	0	0	2,846.00	41,650	37,253	14,119	8,742	273.32	30.57	2,709	0	0	0	2,709.00
14	40,330	36,047	13,046	8,648	263.33	30.44	2,547	5	0	0	2,552.00	41,650	37,253	13,907	8,735	274.13	30.66	2,548	5	0	0	2,553.00
15	40,330	36,047	13,556	8,867	269.69	31.17	2,659	0	0	0	2,659.00	41,650	37,253	14,113	8,848	276.02	30.87	2,707	0	0	0	2,707.00
16	40,330	36,047	13,654	9,103	271.99	31.44	2,505	0	0	0	2,505.00	41,650	37,253	13,475	8,712	274.99	30.76	2,536	0	0	0	2,536.00
17	40,330	36,047	13,508	9,083	271.22	31.35	2,402	5	0	0	2,407.00	41,650	37,253	13,542	8,335	271.52	30.37	2,795	0	226	0	3,021.00
18	40,330	36,047	13,159	9,192	274.11	31.68	2,569	0	0	0	2,569.00	41,650	37,253	13,071	8,601	268.34	30.01	2,646	5	0	0	2,651.00
19	40,330	36,047	13,386	8,970	272.74	31.53	2,738	0	0	0	2,738.00	41,650	37,253	14,017	8,281	269.88	30.19	2,411	5	0	0	2,416.00
20	40,330	36,047	12,891	8,794	264.05	30.52	2,656	0	0	0	2,656.00	41,650	37,253	13,900	8,116	269.86	30.18	2,911	0	0	0	2,911.00
21	40,330	36,047	13,860	8,719	271.05	31.33	2,577	0	0	0	2,577.00	41,650	37,253	14,133	8,145	266.39	29.80	3,011	0	0	0	3,011.00
22	40,330	36,047	13,747	9,107	273.34	31.60	2,625	0	0	0	2,625.00	41,650	37,253	14,052	7,343	260.39	29.12	2,739	5	0	0	2,744.00
23	40,330	36,047	13,946	8,977	274.35	31.71	2,432	0	0	0	2,432.00	41,650	37,253	13,771	8,239	270.40	30.24	2,986	0	1,698	0	4,684.00
24	40,330	36,047	13,879	8,988	273.91	31.66	2,573	0	0	0	2,573.00	41,650	37,253	13,072	8,303	268.07	29.98	2,874	0	1,168	0	4,042.00
25	40,330	36,047	13,106	9,006	273.04	31.56	2,715	0	0	0	2,715.00	41,650	37,253	13,233	8,180	266.17	29.77	2,750	5	409	0	3,164.00
26	40,330	36,047	13,470	8,718	270.16	31.23	2,617	0	0	0	2,617.00	41,950	37,554	13,455	8,028	266.92	29.61	2,799	5	1,188	0	3,992.00
27	40,330	36,047	13,114	8,888	266.92	30.85	2,680	0	0	0	2,680.00	41,950	37,554	13,629	8,528	273.13	30.30	2,781	0	1,106	0	3,887.00
28	40,330	36,047	13,859	8,551	270.12	31.22	2,721	0	0	0	2,721.00	41,950	37,554	13,679	8,481	272.97	30.29	2,881	0	1,147	0	4,028.00
29	40,330	36,047	14,056	8,838	273.29	31.59	2,777	0	0	0	2,777.00	41,950	37,554	12,868	8,455	262.60	29.14	3,135	9	0	0	3,144.00
30	40,330	36,047	13,869	9,002	274.27	31.70	2,849	0	0	0	2,849.00	41,950	37,554	12,903	8,247	263.18	29.20	2,990	0	575	0	3,565.00
31												41,950	37,554	13,113	8,436	266.67	29.59	2,895	5	894	0	3,794.00

	January, 2023											February, 2023										
Day	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	41,950	37,554	12,853	8,778	267.14	29.64	2,828	8	0	0	2,836.00	41,950	37,554	13,689	9,016	283.59	31.46	2,919	10	586	0	3,515.00
2	41,950	37,554	13,958	8,650	275.52	30.57	2,655	5	957	0	3,617.00	41,950	37,554	13,510	9,295	283.94	31.50	2,808	2	647	0	3,457.00
3	41,950	37,554	13,994	8,818	282.24	31.31	2,832	0	1,020	0	3,852.00	41,950	37,554	13,563	9,193	282.21	31.31	2,850	0	1,018	0	3,868.00
4	41,950	37,554	13,850	9,335	275.94	30.62	2,788	0	1,181	0	3,969.00	41,950	37,554	13,087	8,917	275.97	30.62	2,680	10	622	0	3,312.00
5	41,950	37,554	14,025	8,998	285.41	31.67	2,966	0	1,155	0	4,121.00	41,950	37,554	12,543	8,714	264.08	29.30	2,837	10	478	0	3,325.00
6	41,950	37,554	14,016	8,925	286.17	31.75	3,125	0	1,282	0	4,407.00	41,950	37,554	13,205	8,064	266.89	29.61	2,811	0	978	0	3,789.00
7	41,950	37,554	14,020	8,855	288.51	32.01	2,936	9	321	0	3,266.00	41,950	37,554	13,267	9,049	275.01	30.51	2,783	5	919	0	3,707.00
8	41,950	37,554	13,375	8,825	278.23	30.87	2,802	9	602	0	3,413.00	41,950	37,554	13,350	8,987	277.58	30.80	2,841	5	989	0	3,835.00
9	41,950	37,554	14,173	8,707	282.52	31.35	2,844	0	1,191	0	4,035.00	41,950	37,554	13,317	8,979	278.98	30.95	2,861	5	951	0	3,817.00
10	41,950	37,554	14,196	8,863	285.08	31.63	2,876	5	985	0	3,866.00	41,950	37,554	13,346	8,876	276.92	30.72	2,794	9	612	0	3,415.00
11	41,950	37,554	13,351	9,050	277.65	30.81	2,668	9	830	0	3,507.00	41,950	37,554	12,960	9,145	274.47	30.45	2,859	5	892	0	3,756.00
12	41,950	37,554	13,856	8,746	281.34	31.21	2,768	0	1,142	0	3,910.00	41,950	37,554	12,685	9,039	268.36	29.77	2,934	9	600	0	3,543.00
13	41,950	37,554	13,915	8,634	282.57	31.35	2,677	9	610	0	3,296.00	41,950	37,554	13,369	8,734	272.65	30.25	2,943	8	630	0	3,581.00
14	41,950	37,554	14,299	8,604	283.57	31.46	2,702	5	907	0	3,614.00	41,950	37,554	13,422	8,996	276.64	30.69	2,945	5	976	0	3,926.00
15	41,950	37,554	14,022	9,206	283.60	31.47	2,779	9	649	0	3,437.00	41,950	37,554	13,208	9,211	282.03	31.29	3,105	8	643	0	3,756.00
16	41,950	37,554	14,502	8,898	287.26	31.87	2,865	5	896	0	3,766.00	41,950	37,554	13,282	9,110	278.08	30.85	2,925	5	909	0	3,839.00
17	41,950	37,554	14,419	9,366	290.80	32.26	2,860	5	962	0	3,827.00	41,950	37,554	13,341	9,297	277.78	30.82	3,065	0	0	0	3,065.00
18	41,950	37,554	13,811	9,335	291.14	32.30	3,137	0	1,126	0	4,263.00	41,950	37,554	13,413	8,982	279.99	31.07	3,080	9	0	0	3,089.00
19	41,950	37,554	13,625	9,139	286.16	31.75	2,777	5	1,085	0	3,867.00	41,950	34,076	12,926	9,321	274.30	33.54	3,034	5	0	0	3,039.00
20	41,950	37,554	13,542	8,709	275.25	30.54	2,798	9	609	0	3,416.00	41,950	34,076	13,554	9,074	279.38	34.16	3,164	5	0	50	3,219.00
21	41,950	37,554	13,802	8,553	277.06	30.74	2,813	0	1,081	0	3,894.00	41,950	37,554	13,290	8,561	275.92	30.61	3,108	5	0	0	3,113.00
22	41,950	37,554	12,942	8,615	266.76	29.60	2,832	10	995	0	3,837.00	41,950	37,554	13,571	9,226	283.40	31.44	3,149	5	0	0	3,154.00
23	41,950	37,554	12,119	0	89.70	9.95	0	0	0	0	0.00	41,950	37,554	13,390	9,375	280.55	31.13	3,011	5	0	0	3,016.00
24	41,950	37,554	11,944	6,122	232.69	25.82	3,439	0	4,357	0	7,796.00	41,950	37,554	13,671	9,255	280.51	31.12	3,113	5	0	0	3,118.00
25	41,950	37,554	14,410	8,998	298.15	33.08	2,827	10	988	0	3,825.00	41,950	37,554	13,368	9,269	273.89	30.39	3,124	5	0	0	3,129.00
26	41,950	37,554	14,534	9,222	300.58	33.35	3,079	0	1,100	0	4,179.00	41,950	37,554	13,079	9,447	277.33	30.77	3,206	5	0	0	3,211.00
27	41,950	37,554	13,763	9,426	290.27	32.21	2,838	0	1,034	0	3,872.00	41,950	37,554	13,406	9,382	280.41	31.11	3,398	5	0	0	3,403.00
28	41,950	37,554	13,701	9,041	284.16	31.53	2,902	9	632	0	3,543.00	41,950	37,554	12,469	9,175	265.59	29.47	3,518	5	0	0	3,523.00
29	41,950	37,554	12,975	8,818	270.42	30.00	3,109	0	1,124	0	4,233.00											
30	41,950	37,554	13,606	8,085	268.61	29.80	2,827	5	830	0	3,662.00											
31	41,950	37,554	13,303	8,431	270.81	30.05	3,238	5	877	0	4,120.00											

Day	March, 2023											April, 2023										
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	41,950	37,554	12,440	8,691	263.26	29.21	3,518	5	0	0	3,523.00	41,980	37,580	13,968	9,643	282.22	29.29	1,596	8	0	0	1,604.00
2	41,950	37,554	12,409	8,861	266.16	29.53	3,121	39	0	0	3,160.00	41,980	37,580	14,121	9,535	284.43	31.54	1,629	8	0	0	1,637.00
3	41,950	37,554	12,547	9,147	264.82	29.38	2,890	42	0	0	2,932.00	41,980	37,580	13,315	9,349	274.71	30.46	1,764	8	0	0	1,772.00
4	41,950	37,554	13,010	8,969	275.24	30.54	2,933	9	0	0	2,942.00	41,980	37,580	14,365	9,678	285.69	31.68	1,951	12	0	0	1,963.00
5	41,950	37,554	12,777	9,543	271.41	30.11	2,943	12	0	0	2,955.00	41,981	37,580	13,687	10,490	285.32	31.64	2,579	12	0	0	2,591.00
6	41,950	37,554	13,701	9,402	286.02	31.73	3,107	5	0	0	3,112.00	41,981	37,580	14,674	9,940	291.05	32.27	1,593	12	0	0	1,605.00
7	41,950	37,554	13,570	10,148	293.06	32.52	2,773	9	597	0	3,379.00	41,981	37,580	14,761	10,483	300.09	33.27	1,561	8	0	0	1,569.00
8	41,950	37,554	13,917	10,362	296.43	32.89	3,398	0	0	0	3,398.00	41,981	37,580	15,724	10,783	316.77	35.12	1,661	8	0	0	1,669.00
9	41,980	37,580	14,061	10,558	305.16	33.83	3,306	0	0	0	3,306.00	41,981	37,580	16,268	11,105	324.84	36.02	1,465	8	0	0	1,473.00
10	41,980	37,580	13,739	10,595	301.55	33.43	3,142	8	0	0	3,150.00	41,981	37,580	17,108	11,909	339.83	37.68	1,475	11	0	0	1,486.00
11	41,980	37,580	14,187	10,693	304.22	33.73	3,173	8	0	0	3,181.00	41,981	37,580	17,464	12,594	352.18	39.05	1,515	11	0	0	1,526.00
12	41,980	37,580	14,056	10,986	299.90	33.25	3,073	11	413	0	3,497.00	41,981	37,580	18,024	12,846	366.25	40.61	1,662	12	0	0	1,674.00
13	41,980	37,580	14,751	11,042	301.70	33.45	2,797	11	707	0	3,515.00	41,981	37,580	18,666	13,300	378.84	42.00	1,550	12	0	0	1,562.00
14	41,980	37,580	14,845	11,337	309.75	34.34	3,057	8	749	0	3,814.00	41,981	37,580	18,803	13,771	386.47	42.85	1,741	7	0	0	1,748.00
15	41,980	37,580	14,794	11,470	312.73	34.67	3,113	5	759	0	3,877.00	41,981	37,580	19,225	14,113	394.42	43.73	2,043	12	0	0	2,055.00
16	41,980	37,580	13,193	10,037	292.56	32.44	3,882	0	634	0	4,516.00	41,981	37,580	18,704	13,970	392.06	43.47	2,022	12	0	0	2,034.00
17	41,980	37,580	12,200	8,789	258.04	28.61	3,048	9	0	0	3,057.00	41,981	37,580	19,134	14,153	394.33	43.72	1,840	12	0	0	1,852.00
18	41,980	37,580	12,454	9,484	270.66	30.01	3,226	5	0	0	3,231.00	41,981	37,580	17,453	11,457	367.15	40.71	2,352	12	0	0	2,364.00
19	41,980	37,580	12,376	9,355	265.86	29.48	3,079	5	0	0	3,084.00	41,981	37,580	17,108	12,790	360.33	39.95	1,866	12	0	0	1,878.00
20	41,980	37,580	13,000	9,858	276.98	30.71	3,507	0	0	0	3,507.00	41,981	37,580	15,951	11,352	335.27	37.17	1,991	12	0	0	2,003.00
21	41,980	37,580	12,415	10,286	275.10	30.50	3,414	7	0	0	3,421.00	41,981	37,580	15,950	10,204	319.09	35.38	1,718	9	0	0	1,727.00
22	41,980	37,580	14,667	9,920	281.88	31.25	1,847	5	0	0	1,852.00	41,981	37,580	14,169	10,678	295.01	32.71	2,582	13	0	0	2,595.00
23	41,980	37,580	13,288	9,442	272.42	30.20	3,243	2	0	0	3,245.00	41,981	37,580	13,886	10,773	291.47	32.32	2,711	14	0	0	2,725.00
24	41,980	37,580	11,838	8,545	243.77	27.03	1,672	55	0	0	1,727.00	41,981	37,580	14,859	11,542	310.97	34.48	2,993	14	0	0	3,007.00
25	41,980	37,580	13,143	8,399	255.51	28.33	996	20	0	0	1,016.00	41,981	37,580	15,715	12,092	328.00	36.37	3,534	9	0	0	3,543.00
26	41,980	37,580	13,291	8,600	263.88	29.26	1,613	13	0	0	1,626.00	41,981	37,580	16,233	13,330	349.69	38.77	3,727	12	0	0	3,739.00
27	41,980	37,580	14,079	9,751	278.68	30.90	1,556	10	0	0	1,566.00	41,981	37,580	16,145	13,462	351.55	38.98	3,382	0	0	0	3,382.00
28	41,980	37,580	14,491	10,323	293.18	32.51	1,657	8	0	0	1,665.00	41,981	37,580	15,504	13,290	343.43	38.08	3,666	7	0	0	3,673.00
29	41,980	37,580	13,744	10,187	289.02	32.05	1,548	12	0	0	1,560.00	41,981	37,580	15,689	13,102	343.38	38.07	3,666	7	0	0	3,673.00
30	41,980	37,580	13,211	9,925	278.97	30.93	1,926	12	0	0	1,938.00	41,981	37,580	15,605	13,057	338.42	37.52	3,275	11	0	0	3,286.00
31	41,980	37,580	13,276	9,745	273.44	30.32	1,618	12	0	0	1,630.00											

Day	May, 2023											June, 2023										
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)					Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Load Management (MW)				
	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total	Inst.	Dep.	Max.	Min.			DISCOs Constraint	Furnaces	Generation	NTDC+ WAPDA Trans.	Total
1	41,981	37,580	15,285	12,737	334.48	37.09	3,490	12	0	0	3,502.00	41,981	37,580	15,079	11,570	322.04	35.71	3,674	7	0	0	3,681.00
2	41,981	37,580	14,868	12,070	321.28	35.62	3,419	12	0	0	3,431.00	41,981	37,580	16,326	12,689	344.00	38.14	3,652	6	0	0	3,658.00
3	41,981	37,580	16,248	12,581	344.37	38.18	3,391	12	0	0	3,403.00	41,981	37,580	17,258	14,031	378.95	42.02	3,765	7	0	0	3,772.00
4	41,981	37,580	16,142	10,890	341.50	37.86	4,070	0	0	0	4,070.00	41,981	37,580	17,764	14,222	390.01	43.24	3,848	7	0	0	3,855.00
5	41,981	37,580	15,691	11,922	333.19	36.94	3,625	13	0	0	3,638.00	41,981	37,580	19,793	15,939	428.53	47.51	3,919	9	545	0	4,473.00
6	41,981	37,580	16,413	13,330	362.37	40.18	3,894	5	0	0	3,899.00	41,981	37,580	18,875	14,837	421.07	46.69	4,990	7	0	0	4,997.00
7	41,981	37,580	16,785	12,085	348.37	38.62	3,396	11	0	0	3,407.00	41,981	37,580	19,609	15,695	421.47	46.73	4,134	8	0	0	4,142.00
8	41,981	37,580	17,221	13,308	368.29	40.83	3,464	7	0	0	3,471.00	41,981	37,580	20,758	17,167	453.84	50.32	3,711	4	580	0	4,295.00
9	41,981	37,580	17,275	14,279	375.99	41.69	3,672	12	871	0	4,555.00	41,981	37,580	20,965	18,441	469.14	52.02	4,092	8	1,137	0	5,237.00
10	41,981	37,580	18,112	14,555	389.04	43.13	2,998	13	573	0	3,584.00	41,981	37,580	21,389	12,556	446.57	49.51	7,843	11	0	0	7,854.00
11	41,981	37,580	18,708	15,219	412.06	45.69	3,170	12	0	0	3,182.00	41,981	37,580	20,265	15,251	422.67	46.86	3,868	9	882	0	4,759.00
12	41,981	37,580	18,839	15,274	421.04	46.68	3,566	12	0	0	3,578.00	41,981	37,580	21,482	17,685	469.05	52.01	3,919	8	1,388	0	5,315.00
13	41,981	37,580	19,346	16,023	424.11	47.02	3,748	12	0	0	3,760.00	41,981	37,580	20,843	17,875	464.45	51.50	3,626	8	1,544	0	5,178.00
14	41,981	37,580	19,299	15,678	414.23	45.93	3,412	0	0	0	3,412.00	41,981	37,580	20,531	17,977	464.12	51.46	3,611	8	2,047	0	5,666.00
15	41,981	37,580	19,956	16,819	437.23	48.48	4,011	12	0	0	4,023.00	41,981	37,580	19,728	16,328	435.94	48.33	3,488	11	955	0	4,454.00
16	41,981	37,580	19,682	16,395	431.99	47.90	3,689	14	0	0	3,703.00	41,981	37,580	20,431	17,205	450.58	49.96	3,628	11	895	0	4,534.00
17	41,981	37,580	19,111	9,960	406.28	45.05	3,801	0	1,931	0	5,732.00	41,981	37,580	21,699	18,608	474.87	52.65	3,973	9	1,169	0	5,151.00
18	41,981	37,580	19,528	13,066	389.52	43.19	3,804	10	0	0	3,814.00	41,981	38,033	21,291	17,667	480.54	52.65	4,882	10	149	0	5,041.00
19	41,981	37,580	19,430	16,402	431.44	47.84	3,535	10	0	0	3,545.00	41,981	38,033	22,435	18,139	482.99	52.91	3,803	2	1,193	0	4,998.00
20	41,981	37,580	19,903	16,995	439.72	48.75	3,435	7	604	0	4,046.00	41,981	38,033	22,863	20,409	518.57	56.81	4,023	2	1,555	0	5,580.00
21	41,981	37,580	20,813	17,585	452.61	50.18	3,798	3	853	0	4,654.00	41,981	37,950	23,262	21,044	529.03	58.08	4,038	8	1,511	0	5,557.00
22	41,981	37,580	21,455	18,569	470.07	52.12	3,815	8	1,086	0	4,909.00	41,981	37,950	23,533	21,127	539.96	59.28	3,475	11	2,027	0	5,513.00
23	41,981	37,580	20,646	16,992	461.72	51.19	4,065	13	1,121	0	5,199.00	41,981	37,950	23,679	20,990	540.16	59.31	3,939	11	1,445	0	5,395.00
24	41,981	37,580	20,080	15,323	432.46	47.95	3,899	8	1,112	0	5,019.00	41,981	37,950	23,538	20,632	540.49	59.34	4,361	8	1,214	0	5,583.00
25	41,981	37,580	19,161	15,770	423.92	47.00	4,203	12	0	0	4,215.00	41,981	37,950	23,263	15,733	507.41	55.71	5,508	4	0	0	5,512.00
26	41,981	37,580	17,400	14,316	389.05	43.14	3,719	11	0	0	3,730.00	41,981	37,950	20,362	15,248	438.32	48.12	4,396	2	0	0	4,398.00
27	41,981	37,580	18,504	14,854	402.73	44.65	3,877	10	0	0	3,887.00	41,981	37,950	21,673	17,992	480.99	52.81	4,414	2	0	0	4,416.00
28	41,981	37,580	18,296	14,328	396.70	43.98	5,605	10	0	0	5,615.00	41,981	37,950	21,124	17,348	462.21	50.75	3,978	2	0	0	3,980.00
29	41,981	37,580	17,593	14,249	375.79	41.67	3,811	10	0	0	3,821.00	41,981	37,950	22,173	18,229	485.31	53.28	3,175	0	0	0	3,175.00
30	41,981	37,580	17,167	13,326	368.13	40.82	3,363	11	162	0	3,536.00	41,981	37,950	21,227	17,117	449.63	49.37	3,516	2	0	0	3,518.00
31	41,981	37,580	16,123	12,888	351.28	38.95	4,211	2	0	0	4,213.00											

TABLE 97

Source-wise Generation Capacity (MW) and Daily Energy Generation (GWh)

July, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,651	4,014	1,670	1,294	36.86	38.26	18,559	17,258	10,224	8,518	222.91	53.82	3,635	3,345	2,278	2,265	54.43	67.80
2	4,651	4,014	1,587	1,391	37.21	38.63	18,559	17,258	10,663	8,942	231.96	56.00	3,635	3,345	2,280	2,266	54.46	67.84
3	4,651	4,014	1,677	1,466	38.79	40.26	18,559	17,258	10,879	9,795	250.42	60.46	3,635	3,345	2,281	2,270	54.51	67.90
4	4,651	4,014	1,691	1,480	40.18	41.70	18,559	17,258	11,093	9,332	252.41	60.94	3,635	3,345	2,281	2,272	54.36	67.71
5	4,651	4,014	1,691	1,478	38.99	40.47	18,559	17,258	10,899	9,681	249.93	60.34	3,635	3,345	2,281	1,980	51.11	63.67
6	4,651	4,014	1,692	1,193	36.27	37.64	18,559	17,258	11,357	7,314	229.00	55.29	3,635	3,345	2,283	2,269	54.64	68.06
7	4,651	4,014	1,785	1,395	39.27	40.76	18,559	17,258	10,456	7,332	218.72	52.81	3,635	3,345	2,283	2,275	54.48	67.86
8	4,651	4,014	1,802	1,460	39.59	41.10	18,559	17,258	11,046	8,514	237.59	57.36	3,635	3,345	2,280	2,272	54.67	68.09
9	4,651	4,014	1,706	1,281	36.09	37.46	18,559	17,258	10,610	6,549	196.48	47.44	3,635	3,345	2,277	1,840	51.31	63.92
10	4,651	4,014	1,271	586	22.45	23.30	18,559	17,258	9,066	6,523	191.24	46.17	3,635	3,345	2,470	2,070	56.88	70.85
11	4,651	4,014	1,280	935	26.88	27.90	18,559	17,258	8,978	5,873	186.71	45.08	3,635	3,345	2,475	2,352	56.94	70.92
12	4,651	4,014	1,205	1,045	26.70	27.71	18,559	17,258	10,038	7,866	213.03	51.43	3,635	3,345	2,779	2,482	63.86	79.55
13	4,651	4,014	1,223	1,030	27.18	28.21	18,559	17,258	9,578	6,448	192.81	46.55	3,635	3,345	2,891	2,767	66.79	83.20
14	4,507	3,900	1,125	785	23.05	24.63	18,559	17,258	8,283	4,838	154.48	37.30	3,635	3,345	2,975	2,532	68.24	85.01
15	4,507	3,900	1,020	674	21.46	22.93	18,559	17,258	7,119	4,568	140.87	34.01	3,635	3,345	2,430	2,043	52.62	65.54
16	4,507	3,900	898	802	20.75	22.17	18,559	17,258	7,620	6,141	166.46	40.19	3,635	3,345	2,280	2,108	52.82	65.79
17	4,507	3,900	907	650	20.53	21.93	18,559	17,258	8,429	5,866	169.99	41.04	3,635	3,345	2,675	2,379	61.66	76.80
18	4,507	3,900	1,016	797	21.61	23.09	18,559	17,258	10,493	7,430	214.00	51.67	3,635	3,345	2,670	2,657	63.62	79.25
19	4,507	3,900	1,121	774	22.78	24.34	18,559	17,258	10,596	8,528	235.00	56.74	3,635	3,345	2,667	2,579	62.22	77.50
20	4,507	3,900	1,050	1,008	24.77	26.47	18,559	17,258	9,790	7,573	198.22	47.86	3,635	3,345	2,966	2,681	69.36	86.39
21	4,507	3,900	1,043	711	19.09	20.40	18,559	17,258	7,434	4,799	145.27	35.07	3,635	3,345	3,133	2,767	71.44	88.99
22	4,507	3,900	1,146	711	22.96	24.53	18,559	17,258	6,869	4,672	139.28	33.63	3,635	3,345	3,329	2,643	74.16	92.37
23	4,507	3,900	1,141	800	24.82	26.52	18,559	17,258	6,902	4,886	150.53	36.34	3,635	3,345	3,328	3,317	79.48	99.00
24	4,507	3,900	1,152	480	21.49	22.96	18,559	17,258	6,096	4,938	130.84	31.59	3,635	3,345	3,322	3,313	80.91	100.78
25	4,507	3,900	1,050	956	23.48	25.09	18,559	17,258	6,117	4,712	133.94	32.34	3,635	3,345	3,330	3,311	78.14	97.34
26	4,507	3,900	1,114	776	25.11	26.83	18,559	17,258	6,827	5,015	142.56	34.42	3,635	3,345	3,330	3,314	80.86	100.73
27	4,507	3,900	1,026	913	24.03	25.67	18,559	17,258	7,608	5,479	159.16	38.43	3,635	3,345	3,328	3,305	78.96	98.36
28	4,507	3,900	1,015	579	20.29	21.68	18,559	17,258	6,678	5,217	141.38	34.13	3,635	3,345	3,326	3,313	79.23	98.69
29	4,507	3,900	1,015	498	17.64	18.85	18,559	17,258	6,035	4,386	124.39	30.03	3,635	3,345	3,323	3,178	78.71	98.04
30	4,507	3,900	1,104	678	23.15	24.73	18,559	17,258	6,175	4,761	128.79	31.09	3,635	3,345	3,325	3,184	78.84	98.20
31	4,507	3,900	937	458	15.35	16.40	18,559	17,258	5,794	4,253	117.05	28.26	3,635	3,345	3,324	3,020	117.05	145.80
Total	**4,507**	**3,900**	--	--	**838.82**	**28.91**	**18,559**	**17,258**	--	--	**5,665.42**	**44.12**	**3,635**	**3,345**	--	--	**2,056.74**	**82.64**

August, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,900	1,100	558	19.49	20.82	18,559	17,258	6,935	4,015	126.99	30.66	3,635	3,345	3,316	3,018	75.39	93.91
2	4,507	3,900	1,144	825	25.26	26.99	18,559	17,258	7,192	5,224	147.64	35.65	3,635	3,345	3,309	3,291	79.04	98.45
3	4,507	3,900	1,305	943	27.07	28.92	18,559	17,258	7,858	5,575	165.00	39.84	3,635	3,345	3,305	3,286	79.28	98.75
4	4,507	3,926	1,250	755	24.43	25.93	18,889	17,055	10,064	7,167	200.45	48.97	3,635	3,345	3,294	2,971	71.59	89.18
5	4,507	3,901	1,355	1,201	30.92	33.03	18,889	16,988	9,901	7,329	213.88	52.46	3,635	3,345	3,058	2,972	71.51	89.07
6	4,507	3,901	1,312	1,155	30.85	32.95	18,889	16,988	8,957	7,743	199.74	48.99	3,635	3,345	3,054	2,961	71.31	88.82
7	4,507	3,901	1,145	1,042	25.55	27.29	18,889	16,988	8,891	7,186	192.06	47.11	3,635	3,345	3,283	3,111	78.00	97.15
8	4,507	3,901	1,351	1,038	25.79	27.55	18,889	16,988	8,343	6,361	183.72	45.06	3,635	3,345	3,279	3,268	78.42	97.68
9	4,507	3,901	1,361	960	29.23	31.22	18,889	16,988	8,292	5,651	166.71	40.89	3,635	3,345	3,275	3,228	78.30	97.54
10	4,507	3,901	1,408	1,191	32.85	35.08	18,889	16,988	8,549	6,057	176.21	43.22	3,635	3,345	3,274	3,258	78.29	97.52
11	4,507	3,901	1,477	1,298	35.21	37.60	18,889	16,988	7,384	6,067	166.99	40.96	3,635	3,345	3,264	3,246	77.93	97.07
12	4,507	3,901	1,394	870	30.56	32.64	18,889	16,988	8,312	5,468	162.08	39.75	3,635	3,345	3,267	3,153	77.98	97.13
13	4,507	3,901	1,457	1,291	33.40	35.68	18,889	16,988	9,261	7,214	196.25	48.14	3,635	3,345	3,264	2,217	66.16	82.41
14	4,507	3,901	1,354	1,257	31.13	33.25	18,889	16,988	9,287	7,179	203.98	50.03	3,635	3,345	2,222	2,207	53.23	66.31
15	4,507	3,901	1,291	748	30.25	32.31	18,889	16,988	8,672	7,057	188.23	46.17	3,635	3,345	2,219	2,132	52.77	65.73
16	4,507	3,901	1,241	850	26.43	28.23	18,889	16,988	9,750	7,804	207.58	50.91	3,635	3,345	2,063	1,289	35.39	44.08
17	4,507	3,901	1,148	707	22.22	23.73	18,889	16,988	8,971	6,077	184.99	45.37	3,635	3,345	2,061	1,179	35.93	44.75
18	4,507	3,901	955	584	18.16	19.39	18,889	16,988	7,910	5,583	151.05	37.05	3,635	3,345	2,463	2,199	58.04	72.30
19	4,507	3,901	942	416	15.88	16.96	18,889	16,988	8,653	5,927	166.08	40.74	3,635	3,345	2,472	1,422	52.07	64.86
20	4,507	3,901	907	763	19.71	21.06	18,889	16,988	8,467	6,579	182.70	44.81	3,635	3,345	1,430	1,424	34.15	42.54
21	4,507	3,901	907	700	19.54	20.87	18,889	16,988	8,268	6,385	175.11	42.95	3,635	3,345	1,594	1,424	34.40	42.85
22	4,507	3,901	823	783	19.22	20.53	18,889	16,988	9,253	6,859	189.08	46.37	3,635	3,345	2,466	1,687	55.30	68.88
23	4,507	3,901	919	690	18.99	20.29	18,889	16,988	9,572	7,603	208.32	51.09	3,635	3,345	2,454	2,038	50.52	62.93
24	4,507	3,901	912	588	18.17	19.41	18,889	16,988	7,950	6,075	168.01	41.21	3,635	3,345	2,159	1,881	46.70	58.17
25	4,507	3,901	892	589	18.90	20.19	18,889	16,988	7,501	6,008	161.84	39.69	3,635	3,345	2,271	1,924	50.28	62.64
26	4,507	3,901	1,069	639	19.45	20.78	18,889	16,988	7,705	6,038	158.60	38.90	3,635	3,345	2,271	2,112	51.55	64.22
27	4,507	3,901	1,068	887	22.49	24.02	18,889	16,988	7,946	5,626	159.14	39.03	3,635	3,345	2,215	2,152	52.27	65.11
28	4,507	3,901	1,074	882	22.07	23.57	18,889	16,988	8,435	5,661	162.14	39.77	3,635	3,345	2,166	2,159	51.79	64.51
29	4,507	3,901	988	879	21.51	22.97	18,889	16,988	8,592	6,727	179.43	44.01	3,545	3,281	2,358	2,159	52.97	67.26
30	4,507	3,901	911	859	21.50	22.96	18,889	16,988	8,999	6,690	185.68	45.54	3,545	3,281	2,720	2,441	63.11	80.15
31	4,507	3,901	1,058	887	22.21	23.72	18,889	16,988	8,619	6,616	188.57	46.25	3,545	3,281	2,718	2,710	188.57	239.48
Total	**4,507**	**3,900**	--	--	**758.43**	**26.14**	**18,889**	**16,988**	--	--	**5,518.26**	**43.66**	**3,545**	**3,281**	--	--	**2,002.23**	**82.02**

September, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,901	1,056	868	22.87	24.43	18,889	16,988	8,296	7,199	185.78	45.57	3,545	3,281	2,799	2,693	65.81	83.57
2	4,507	3,901	1,024	868	21.43	22.89	18,889	16,988	8,286	7,131	188.92	46.34	3,545	3,281	2,932	2,794	69.32	88.03
3	4,507	3,901	888	868	21.08	22.52	18,889	16,988	8,093	6,473	172.94	42.42	3,545	3,281	3,004	2,924	70.97	90.12
4	4,507	3,901	922	888	21.81	23.30	18,889	16,988	7,034	5,195	145.48	35.68	3,545	3,281	3,017	3,007	72.18	91.66
5	4,507	3,901	928	365	15.18	16.21	18,889	16,988	6,458	4,751	138.49	33.97	3,545	3,281	3,024	3,007	72.40	91.94
6	4,507	3,901	853	554	19.14	20.45	18,889	16,988	7,458	4,937	142.00	34.83	3,545	3,281	3,024	3,011	72.26	91.76
7	4,507	3,901	952	854	22.59	24.13	18,889	16,988	7,651	6,602	168.68	41.37	3,545	3,281	3,014	2,423	62.46	79.32
8	4,507	3,901	955	947	22.61	24.15	18,889	17,036	8,002	6,590	174.90	42.78	3,545	3,336	3,018	2,787	71.19	88.92
9	4,507	3,901	953	657	21.74	23.22	18,889	17,036	8,189	6,643	179.03	43.79	3,545	3,336	3,020	3,005	72.10	90.05
10	4,507	3,901	955	947	22.34	23.86	18,889	17,036	7,680	6,689	172.16	42.11	3,545	3,336	3,220	3,010	74.82	93.45
11	4,507	3,901	1,048	590	20.13	21.50	18,889	17,036	7,292	4,300	138.14	33.79	3,545	3,336	3,247	3,209	77.24	96.47
12	4,507	3,901	1,054	917	22.94	24.51	18,889	17,036	6,577	4,617	131.76	32.23	3,545	3,336	3,247	3,239	77.68	97.02
13	4,507	3,901	912	809	21.22	22.67	18,889	17,036	7,102	5,628	154.17	37.71	3,545	3,336	3,323	3,253	79.13	98.83
14	4,507	3,901	796	571	17.16	18.32	18,889	17,036	7,964	6,082	173.47	42.43	3,545	3,336	3,324	3,311	79.59	99.40
15	4,507	3,901	796	792	18.86	20.15	18,889	17,036	8,135	6,952	183.55	44.89	3,545	3,336	3,327	2,972	76.68	95.78
16	4,507	3,901	794	752	18.54	19.81	18,889	17,036	7,800	6,845	175.19	42.85	3,545	3,336	3,223	3,002	73.44	91.73
17	4,507	3,901	797	755	18.53	19.79	18,889	17,036	7,201	5,038	152.94	37.41	3,545	3,336	3,310	3,070	76.62	95.70
18	4,507	3,901	1,039	607	19.94	21.30	18,889	17,036	7,266	6,241	161.45	39.49	3,545	3,336	3,310	3,249	78.28	97.77
19	4,507	3,901	1,003	954	22.96	24.53	18,889	17,036	7,313	6,576	164.74	40.29	3,545	3,336	3,313	3,261	78.87	98.51
20	4,507	3,901	958	793	21.27	22.71	18,889	17,036	8,198	6,622	173.88	42.53	3,545	3,336	3,304	3,262	78.78	98.40
21	4,507	3,901	922	902	21.81	23.29	18,889	17,036	8,259	7,259	183.28	44.83	3,545	3,336	3,323	3,292	79.30	99.04
22	4,507	3,901	924	587	20.27	21.65	18,889	17,036	8,671	6,806	184.89	45.22	3,545	3,336	3,326	3,239	78.76	98.37
23	4,507	3,901	1,026	826	22.13	23.64	18,889	17,036	8,241	6,249	168.95	41.32	3,545	3,336	3,325	3,225	78.86	98.49
24	4,507	3,901	1,028	916	23.87	25.50	18,889	17,036	6,965	5,178	143.18	35.02	3,545	3,336	3,327	3,259	79.05	98.73
25	4,507	3,901	1,027	458	18.88	20.17	18,889	17,036	6,341	5,196	135.12	33.05	3,545	3,336	3,331	3,320	79.83	99.71
26	4,507	3,901	843	607	19.30	20.61	18,889	17,036	7,680	5,447	162.03	39.63	3,545	3,336	3,325	3,170	78.90	98.55
27	4,507	3,901	844	332	17.63	18.83	18,889	17,036	7,869	6,664	175.81	43.00	3,545	3,336	3,324	3,107	77.61	96.93
28	4,507	3,901	854	825	20.21	21.59	18,889	17,036	7,853	6,475	175.53	42.93	3,545	3,336	3,313	3,299	78.73	98.33
29	4,507	3,901	852	825	20.08	21.45	18,889	17,036	7,925	6,451	176.16	43.08	3,545	3,336	3,318	3,295	79.56	99.37
30	4,507	3,628	893	825	20.28	23.29	18,889	17,156	7,886	6,078	174.46	42.37	3,545	3,326	3,317	3,306	79.39	99.46
Total	**4,507**	**3,628**	**--**	**--**	**616.81**	**22.85**	**18,889**	**17,156**	**--**	**--**	**4,957.10**	**38.84**	**3,545**	**3,326**	**--**	**--**	**2,269.77**	**91.72**

October, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	1,066	686	21.90	25.15	18,889	17,156	6,751	5,142	145.32	35.29	3,545	3,326	3,313	3,294	79.06	99.04
2	4,507	3,628	971	762	22.72	26.10	18,889	17,156	6,379	5,519	141.92	34.47	3,545	3,326	3,326	3,312	79.54	99.64
3	4,507	3,628	1,083	756	24.84	28.54	18,889	17,156	7,337	6,219	160.31	38.93	3,545	3,326	3,323	3,299	79.42	99.49
4	4,507	3,628	1,078	1,053	25.41	29.18	18,889	17,156	7,409	7,113	175.85	42.71	3,545	3,326	3,314	3,286	79.09	99.07
5	4,507	3,628	1,170	1,050	26.15	30.03	18,889	17,156	7,622	7,020	175.49	42.62	3,545	3,326	3,308	3,287	78.79	98.70
6	4,507	3,628	1,190	968	24.94	28.65	18,889	17,156	7,379	5,458	159.28	38.68	3,545	3,326	3,313	3,300	79.36	99.42
7	4,507	3,628	1,077	1,044	25.19	28.93	18,889	17,156	7,479	5,216	153.82	37.36	3,545	3,326	3,334	2,374	79.51	99.61
8	4,507	3,628	1,071	814	21.78	25.01	18,889	17,156	7,555	5,471	156.60	38.03	3,545	3,326	3,334	3,320	79.80	99.96
9	4,507	3,628	824	814	19.55	22.45	18,889	17,156	6,103	5,317	135.72	32.96	3,545	3,326	3,332	3,322	79.73	99.88
10	4,507	3,628	930	817	20.38	23.41	18,889	17,156	6,667	5,197	143.78	34.92	3,545	3,326	3,332	3,325	79.69	99.83
11	4,507	3,628	936	705	19.65	22.57	18,889	17,156	6,261	4,254	133.92	32.53	3,545	3,326	3,330	3,311	80.05	100.28
12	4,507	3,628	756	485	15.45	17.74	18,889	17,156	5,816	3,912	123.81	30.07	3,545	3,326	3,322	3,310	79.65	99.78
13	4,507	3,628	767	158	11.50	13.21	18,889	17,156	6,389	2,067	107.51	26.11	3,545	3,326	3,311	0	39.82	49.88
14	4,507	3,628	926	618	17.50	20.10	18,889	17,156	9,384	6,477	199.43	48.43	3,545	3,326	936	817	21.40	26.80
15	4,507	3,628	964	864	21.78	25.02	18,889	17,156	8,773	6,989	195.48	47.47	3,545	3,326	1,969	934	34.14	42.77
16	4,507	3,628	975	962	23.10	26.53	18,889	17,156	7,348	6,313	169.06	41.06	3,545	3,326	2,291	1,975	51.24	64.19
17	4,507	3,628	1,194	944	24.04	27.61	18,889	17,156	7,328	5,710	162.44	39.45	3,545	3,326	2,822	2,287	60.37	75.63
18	4,507	3,628	1,087	536	25.05	28.77	18,889	17,156	6,393	4,954	134.76	32.73	3,545	3,326	3,332	2,846	75.43	94.50
19	4,507	3,628	1,020	617	23.00	26.41	18,889	17,156	6,324	4,347	135.82	32.98	3,545	3,326	3,332	3,325	79.79	99.96
20	4,507	3,628	943	408	17.88	20.54	18,889	17,156	5,941	3,954	114.56	27.82	3,545	3,326	3,335	3,277	79.66	99.80
21	4,507	3,628	835	308	12.81	14.72	18,889	17,156	5,252	4,020	108.70	26.40	3,545	3,326	3,326	2,867	76.01	95.22
22	4,507	3,628	762	357	15.73	18.07	18,889	17,156	6,110	3,556	117.47	28.53	3,545	3,326	3,323	2,970	74.43	93.25
23	4,507	3,628	768	751	18.24	20.95	18,889	17,156	5,864	4,207	120.92	29.37	3,545	3,326	3,069	3,014	72.96	91.40
24	4,507	3,628	766	712	17.63	20.25	18,889	17,156	5,878	4,134	125.54	30.49	3,545	3,326	3,073	3,065	73.79	92.44
25	4,507	3,628	757	623	17.43	20.02	18,889	17,156	5,561	4,044	116.34	28.25	3,545	3,326	3,333	3,072	75.57	94.67
26	4,507	3,628	869	334	18.06	20.74	18,889	17,156	6,003	4,545	129.89	31.55	3,545	3,326	3,337	3,328	79.58	99.69
27	4,507	3,628	862	349	20.19	23.19	18,889	17,156	6,133	4,775	131.72	31.99	3,545	3,326	3,338	2,881	72.62	90.98
28	4,507	3,628	865	599	18.74	21.52	18,889	17,156	6,092	4,525	126.99	30.84	3,545	3,326	2,890	2,881	68.85	86.25
29	4,507	3,628	869	428	17.05	19.58	18,889	17,156	6,146	3,844	121.70	29.56	3,545	3,326	2,889	2,724	68.94	86.36
30	4,507	3,628	849	461	15.24	17.50	18,889	17,156	5,817	3,706	110.25	26.78	3,545	3,326	3,330	2,483	75.15	94.15
31	4,507	3,628	874	436	14.40	16.54	18,889	17,156	6,242	3,716	14.40	3.50	3,545	3,326	3,336	3,326	79.70	99.84
Total	**4,507**	**3,628**	--	--	**617.31**	**22.87**	**18,889**	**17,156**	--	--	**4,248.79**	**33.29**	**3,545**	**3,326**	--	--	**2,213.13**	**89.44**

November, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	658	336	12.46	14.31	18,889	17,156	4,964	3,593	106.69	25.91	3,545	3,326	3,338	3,331	79.95	100.15
2	4,507	3,628	878	578	15.83	18.18	18,889	17,156	4,803	3,498	98.28	23.87	3,545	3,326	3,338	3,328	79.98	100.19
3	4,507	3,628	618	558	14.15	16.26	18,889	15,811	4,457	3,425	96.67	25.48	3,545	3,326	3,336	3,331	79.91	100.11
4	4,507	3,628	608	413	12.89	14.81	18,889	15,811	4,994	3,222	99.71	26.27	3,545	3,326	3,337	3,328	79.92	100.12
5	4,507	3,628	608	250	9.52	10.93	18,889	15,811	3,871	2,673	77.48	20.42	3,545	3,326	3,329	2,741	75.57	94.67
6	4,507	3,628	763	200	14.34	16.47	18,889	15,811	4,831	2,726	97.53	25.70	3,545	3,326	3,336	3,032	76.58	95.94
7	4,507	3,628	618	100	8.67	9.96	18,889	15,811	4,997	3,052	95.23	25.09	3,545	3,326	2,932	2,676	67.99	85.18
8	4,507	3,628	618	310	12.42	14.27	18,889	15,811	4,541	3,122	93.96	24.76	3,545	3,326	3,332	2,681	70.29	88.06
9	4,507	3,628	620	410	12.70	14.59	18,889	15,811	4,724	2,815	90.26	23.78	3,545	3,326	3,329	2,814	76.32	95.61
10	4,507	3,628	620	410	13.54	15.55	18,889	15,811	4,553	3,107	98.81	26.04	3,545	3,326	3,331	2,779	78.90	98.84
11	4,507	3,628	618	410	13.21	15.18	18,889	15,811	4,586	3,049	97.49	25.69	3,545	3,326	3,333	3,322	79.61	99.73
12	4,507	3,628	618	408	13.46	15.46	18,889	15,811	4,746	3,158	104.23	27.47	3,545	3,326	3,330	3,320	79.84	100.02
13	4,507	3,628	610	360	12.47	14.32	18,889	15,811	5,054	2,654	97.57	25.71	3,545	3,326	3,328	2,787	78.84	98.77
14	4,507	3,628	618	350	11.58	13.30	18,889	15,811	4,621	2,686	90.86	23.95	3,545	3,326	3,327	2,727	74.72	93.61
15	4,507	3,628	618	370	10.89	12.51	18,889	15,811	4,225	2,647	76.56	20.18	3,545	3,326	3,330	3,025	74.48	93.31
16	4,507	3,628	618	300	12.75	14.65	18,889	15,811	4,714	2,347	83.12	21.90	3,545	3,326	3,327	2,873	76.79	96.20
17	4,507	3,628	619	410	13.15	15.10	18,889	15,811	4,534	2,781	86.13	22.70	3,545	3,326	3,327	3,321	79.65	99.78
18	4,507	3,628	618	379	12.77	14.67	18,889	15,811	4,191	2,955	90.71	23.90	3,545	3,326	3,328	3,322	79.92	100.12
19	4,507	3,628	608	379	12.89	14.81	18,889	15,811	4,774	2,938	97.87	25.79	3,545	3,326	3,327	3,323	79.77	99.94
20	4,507	3,628	608	358	11.09	12.74	18,889	15,811	4,406	2,752	83.52	22.01	3,545	3,326	3,332	3,326	80.08	100.32
21	4,507	3,628	618	358	12.94	14.86	18,889	15,811	4,704	2,753	94.00	24.77	3,545	3,326	3,332	3,128	78.55	98.40
22	4,507	3,628	618	386	13.03	14.97	18,889	15,811	4,721	3,000	96.63	25.46	3,545	3,326	3,333	3,325	79.82	100.00
23	4,507	3,628	618	386	13.44	15.44	18,889	15,811	4,751	3,018	98.12	25.86	3,545	3,326	3,333	3,328	79.48	99.57
24	4,507	3,628	618	136	11.42	13.12	18,889	15,811	4,706	3,204	101.34	26.71	3,545	3,326	3,333	3,321	79.87	100.05
25	4,507	3,628	618	138	11.44	13.14	18,889	15,811	4,735	3,106	99.92	26.33	3,545	3,326	3,333	3,328	79.73	99.88
26	4,507	3,628	616	405	13.64	15.67	18,889	15,811	4,710	2,572	94.31	24.85	3,545	3,326	3,333	3,130	78.69	98.58
27	4,507	3,628	616	300	13.05	14.99	18,889	15,811	4,678	2,788	93.83	24.73	3,545	3,326	3,334	3,328	79.71	99.86
28	4,507	3,628	616	406	13.62	15.65	18,889	15,811	4,476	2,573	91.56	24.13	3,545	3,326	3,334	3,316	79.83	100.00
29	4,507	3,628	616	134	11.36	13.05	18,889	15,811	4,366	2,511	89.76	23.65	3,545	3,326	3,328	3,315	79.64	99.77
30	4,507	3,628	616	256	12.07	13.86	18,889	15,811	4,381	2,611	91.08	24.00	3,545	3,326	3,333	3,326	79.95	100.15
Total	**4,507**	**3,628**	--	--	**376.82**	**13.96**	**18,889**	**15,811**	--	--	**2,813.22**	**23.92**	**3,545**	**3,326**	--	--	**2,344.37**	**94.74**

December, 2022																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	618	406	13.69	15.73	18,889	15,811	4,363	2,717	96.58	25.45	3,545	3,326	3,334	3,328	79.76	99.91
2	4,507	3,628	616	408	13.89	15.95	20,209	17,131	4,443	3,358	98.63	23.99	3,545	3,326	3,333	3,328	80.16	100.42
3	4,507	3,628	618	406	13.52	15.53	20,209	17,131	4,439	2,863	95.43	23.21	3,545	3,326	3,332	3,328	79.43	99.51
4	4,507	3,628	618	406	12.92	14.84	20,209	17,131	4,351	2,541	87.07	21.18	3,545	3,326	3,334	3,329	79.90	100.09
5	4,507	3,628	618	386	13.05	14.99	20,209	17,131	4,523	2,489	92.96	22.61	3,545	3,326	3,336	3,329	79.78	99.94
6	4,507	3,628	618	384	12.94	14.86	20,209	17,017	4,569	2,748	95.90	23.48	3,545	3,326	3,340	3,333	79.77	99.93
7	4,507	3,628	618	384	13.17	15.13	20,209	17,017	4,676	3,045	101.37	24.82	3,545	3,326	3,339	3,148	78.44	98.27
8	4,507	3,628	618	384	13.10	15.05	20,209	17,017	5,423	3,147	106.13	25.99	3,545	3,326	3,340	3,334	79.68	99.81
9	4,507	3,628	617	388	12.85	14.76	20,209	17,017	5,356	3,164	102.26	25.04	3,545	3,326	3,340	3,333	80.01	100.24
10	4,507	3,628	618	358	12.31	14.14	20,209	17,017	4,801	2,955	92.24	22.58	3,545	3,326	3,340	2,877	79.16	99.17
11	4,507	3,628	616	250	10.48	12.04	20,209	17,017	4,070	2,674	82.69	20.25	3,545	3,326	3,340	2,790	75.20	94.21
12	4,507	3,628	606	300	10.36	11.90	20,209	17,017	4,716	2,738	94.27	23.08	3,545	3,326	3,342	2,740	76.08	95.31
13	4,507	3,628	616	355	11.91	13.68	20,209	17,017	4,739	2,734	88.96	21.78	3,545	3,326	3,340	2,791	76.42	95.73
14	4,507	3,628	616	375	12.94	14.86	20,209	17,017	4,676	2,731	94.14	23.05	3,545	3,326	3,341	2,839	76.16	95.41
15	4,507	3,628	615	405	12.48	14.33	20,209	17,017	5,403	3,025	107.48	26.32	3,545	3,326	3,339	2,972	77.94	97.64
16	4,507	3,628	615	403	12.32	14.15	20,209	17,017	5,409	2,898	109.58	26.83	3,545	3,326	3,339	2,842	77.26	96.79
17	4,507	3,628	626	403	13.16	15.12	20,209	17,017	5,155	2,917	102.18	25.02	3,545	3,326	3,340	3,038	78.75	98.66
18	4,507	3,628	615	403	12.90	14.82	20,209	17,017	5,793	3,685	115.29	28.23	3,545	3,326	3,340	2,842	78.61	98.48
19	4,507	3,628	618	270	11.67	13.40	20,209	17,017	5,672	3,225	112.10	27.45	3,545	3,326	3,339	2,840	76.74	96.14
20	4,507	3,628	616	391	12.99	14.92	20,209	17,017	6,122	3,430	119.08	29.16	3,545	3,326	3,340	2,822	76.40	95.71
21	4,507	3,628	613	375	12.78	14.67	20,209	17,017	6,170	3,288	121.52	29.75	3,545	3,326	3,339	2,157	64.62	80.95
22	4,507	3,628	618	379	12.62	14.49	20,209	17,017	6,472	3,603	129.52	31.71	3,545	3,326	2,893	2,067	60.15	75.35
23	4,507	3,628	616	359	12.84	14.74	20,209	17,017	7,034	3,874	144.24	35.32	3,545	3,326	3,340	2,730	74.51	93.35
24	4,507	3,628	614	318	11.40	13.09	20,209	17,017	7,032	4,329	145.16	35.54	3,545	3,326	3,339	2,790	76.52	95.87
25	4,507	3,628	614	134	8.85	10.16	20,209	17,017	7,320	4,164	148.02	36.24	3,545	3,326	3,340	2,792	76.25	95.52
26	4,507	3,628	613	120	6.62	7.60	20,509	17,318	7,583	4,319	155.17	37.33	3,545	3,326	3,007	2,391	62.42	78.20
27	4,507	3,628	573	384	11.38	13.07	20,509	17,318	7,988	4,454	161.94	38.96	3,545	3,326	2,840	2,344	62.22	77.95
28	4,507	3,628	514	234	10.54	12.11	20,509	17,318	8,695	4,995	180.03	43.32	3,545	3,326	2,390	2,334	56.24	70.46
29	4,507	3,628	234	105	5.03	5.78	20,509	17,318	7,395	4,695	154.17	37.09	3,545	3,326	2,845	2,449	64.53	80.84
30	4,507	3,628	234	79	4.91	5.64	20,509	17,318	7,398	4,285	153.55	36.94	3,545	3,326	2,844	2,355	63.18	79.14
31	4,507	3,628	236	0	4.32	4.96	20,509	17,318	8,273	4,673	169.84	40.86	3,545	3,326	2,844	2,344	63.49	79.54
Total	**4,507**	**3,628**	**--**	**--**	**353.94**	**25.78**	**20,509**	**17,318**	**--**	**--**	**3,657.49**	**1,015.70**	**3,545**	**3,326**	**--**	**--**	**2,289.77**	**1,107.07**

January, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	476	123	7.37	8.47	20,509	17,318	8,327	5,437	173.04	41.63	3,545	3,326	2,844	2,395	65.07	81.51
2	4,507	3,628	477	352	11.04	12.68	20,509	17,318	8,417	4,551	163.56	39.35	3,545	3,326	2,839	2,828	67.95	85.13
3	4,507	3,628	477	352	10.91	12.53	20,509	17,318	8,327	4,432	163.55	39.35	3,545	3,326	2,835	2,485	64.98	81.40
4	4,507	3,628	605	403	12.82	14.73	20,509	17,318	8,667	4,291	160.63	38.65	3,545	3,326	2,832	2,032	60.17	75.37
5	4,507	3,628	605	475	13.65	15.68	20,509	17,318	8,700	4,562	171.88	41.35	3,545	3,326	2,283	1,989	51.04	63.94
6	4,507	3,628	607	467	13.61	15.63	20,509	17,318	8,538	4,777	171.30	41.22	3,545	3,326	2,779	1,936	56.54	70.83
7	4,507	3,628	607	456	13.63	15.66	20,509	17,318	9,088	4,463	173.30	41.70	3,545	3,326	2,710	2,480	61.94	77.59
8	4,507	3,628	610	438	13.33	15.31	20,509	17,318	8,297	4,790	170.31	40.98	3,545	3,326	3,296	2,518	68.21	85.45
9	4,507	3,628	609	285	12.16	13.96	20,509	17,318	9,169	4,794	173.21	41.68	3,545	3,326	3,303	2,825	72.82	91.22
10	4,507	3,628	607	438	13.46	15.46	20,509	17,318	8,819	4,822	173.89	41.84	3,545	3,326	3,306	2,816	75.41	94.47
11	4,507	3,628	609	341	12.79	14.69	20,509	17,318	9,152	4,633	169.08	40.68	3,545	3,326	3,301	2,703	69.18	86.66
12	4,507	3,628	609	243	11.03	12.67	20,509	17,318	9,168	5,087	181.23	43.60	3,545	3,326	2,707	2,646	64.61	80.95
13	4,507	3,628	607	361	11.92	13.69	20,509	17,318	9,089	4,620	180.34	43.39	3,545	3,326	2,692	2,633	63.19	79.17
14	4,507	3,628	364	210	8.14	9.35	20,509	17,318	8,694	4,617	174.04	41.88	3,545	3,326	3,355	2,554	69.53	87.10
15	4,507	3,628	364	231	8.16	9.38	20,509	17,318	8,538	4,756	172.64	41.54	3,545	3,326	3,289	3,210	78.76	98.66
16	4,507	3,628	366	327	8.59	9.87	20,509	17,318	9,079	4,683	177.43	42.69	3,545	3,326	3,204	3,019	72.88	91.30
17	4,507	3,628	366	321	8.55	9.82	20,509	17,318	9,566	5,135	183.39	44.12	3,545	3,326	3,027	3,018	72.38	90.67
18	4,507	3,628	342	0	6.59	7.57	20,509	17,318	9,088	5,214	178.00	42.83	3,545	3,326	3,024	2,782	72.04	90.25
19	4,507	3,628	333	0	3.96	4.55	20,509	17,318	7,727	4,640	155.35	37.38	3,545	3,326	3,024	2,626	69.76	87.39
20	4,507	3,628	366	257	8.01	9.20	20,509	17,318	7,513	4,321	143.51	34.53	3,545	3,326	3,023	3,019	72.21	90.46
21	4,507	3,628	366	210	7.06	8.11	20,509	17,318	7,340	4,077	148.40	35.71	3,545	3,326	3,024	3,019	72.38	90.67
22	4,507	3,628	366	105	7.40	8.50	20,509	17,318	6,974	4,547	143.78	34.59	3,545	3,326	3,020	2,561	66.45	83.25
23	4,507	3,628	360	0	2.18	2.51	20,509	17,318	6,954	0	46.12	11.10	3,545	3,326	2,914	0	19.10	23.92
24	4,507	3,628	915	281	13.69	15.73	20,509	17,318	8,582	1,601	139.56	33.58	3,545	3,326	404	0	1.38	1.73
25	4,507	3,628	920	687	19.43	22.32	20,509	17,318	10,383	6,573	212.13	51.04	3,545	3,326	1,477	426	17.82	22.32
26	4,507	3,628	914	417	14.87	17.08	20,509	17,318	8,453	5,145	162.75	39.16	3,545	3,326	2,475	1,541	58.62	73.44
27	4,507	3,628	364	187	8.34	9.58	20,509	17,318	8,103	4,841	156.58	37.67	3,545	3,326	2,480	2,272	58.41	73.17
28	4,507	3,628	325	106	6.07	6.97	20,509	17,318	7,926	5,043	162.24	39.04	3,545	3,326	2,477	2,273	57.48	72.01
29	4,507	3,628	327	105	6.18	7.09	20,509	17,318	7,912	4,834	157.41	37.87	3,545	3,326	2,479	2,279	57.61	72.17
30	4,507	3,628	327	106	6.40	7.35	20,509	17,318	7,190	4,474	144.74	34.83	3,545	3,326	2,707	2,272	62.12	77.82
31	4,507	3,628	362	197	7.23	8.31	20,509	17,318	7,246	4,049	144.68	34.81	3,545	3,326	2,709	2,554	64.22	80.45
Total	**4,507**	**3,628**	**--**	**--**	**308.59**	**11.43**	**20,509**	**17,318**	**--**	**--**	**5,028.07**	**39.02**	**3,545**	**3,326**	**--**	**--**	**1,884.23**	**76.14**

February, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	364	205	8.56	9.83	20,509	17,318	7,755	4,968	160.90	38.71	3,545	3,326	2,471	2,344	57.81	72.42
2	4,507	3,628	367	258	8.02	9.22	20,509	17,318	7,285	5,137	152.34	36.65	3,545	3,326	2,707	2,257	61.06	76.49
3	4,507	3,628	366	211	7.62	8.75	20,509	17,318	7,677	4,304	144.04	34.66	3,545	3,326	2,708	2,259	61.94	77.59
4	4,507	3,628	365	209	7.91	9.09	20,509	17,318	6,249	4,019	133.54	32.13	3,545	3,326	2,707	2,204	61.90	77.54
5	4,507	3,628	366	212	7.14	8.20	20,509	17,318	6,331	4,129	134.26	32.30	3,545	3,326	2,707	2,360	64.27	80.52
6	4,507	3,628	266	211	5.91	6.78	20,509	17,318	7,042	3,979	133.17	32.04	3,545	3,326	2,907	2,285	64.67	81.01
7	4,507	3,628	364	210	6.68	7.67	20,509	17,318	6,698	3,967	132.52	31.89	3,545	3,326	3,134	2,705	71.08	89.04
8	4,507	3,628	363	253	6.86	7.88	20,509	17,318	6,745	3,895	132.49	31.88	3,545	3,326	2,935	2,819	69.10	86.56
9	4,507	3,628	364	184	7.61	8.74	20,509	17,318	5,853	3,687	115.20	27.72	3,545	3,326	2,938	2,782	69.31	86.83
10	4,507	3,628	364	234	7.34	8.42	20,509	17,318	5,510	3,564	109.64	26.38	3,545	3,326	2,938	2,781	70.02	87.72
11	4,507	3,628	607	261	12.40	14.24	20,509	17,318	5,424	3,402	106.57	25.64	3,545	3,326	2,937	2,785	69.24	86.74
12	4,507	3,628	748	482	13.32	15.30	20,509	17,318	4,372	3,198	93.30	22.45	3,545	3,326	2,936	2,696	69.36	86.88
13	4,507	3,628	748	482	13.77	15.82	20,509	17,318	5,448	3,368	109.10	26.25	3,545	3,326	2,930	2,633	68.35	85.63
14	4,507	3,628	754	461	13.33	15.31	20,509	17,318	5,849	3,528	112.62	27.10	3,545	3,326	2,931	2,726	69.08	86.54
15	4,507	3,628	749	462	13.22	15.18	20,509	17,318	5,511	3,467	108.73	26.16	3,545	3,326	2,931	2,727	68.78	86.16
16	4,507	3,628	706	361	11.97	13.75	20,509	17,318	5,371	3,364	99.59	23.96	3,545	3,326	2,933	2,715	68.72	86.08
17	4,507	3,628	665	358	12.84	14.75	20,509	17,318	5,070	3,305	103.63	24.93	3,545	3,326	2,931	2,731	67.07	84.02
18	4,507	3,628	644	256	10.33	11.86	20,509	17,318	5,478	3,458	108.04	26.00	3,545	3,326	3,068	2,584	68.63	85.98
19	4,507	3,628	614	157	11.61	13.34	20,509	17,318	5,181	3,435	104.98	25.26	3,545	3,326	2,931	2,600	66.76	83.63
20	4,507	3,628	577	358	10.40	11.94	20,509	17,318	5,314	3,789	105.96	25.50	3,545	3,326	2,833	2,646	67.52	84.58
21	4,507	3,628	616	356	11.47	13.17	20,509	17,318	5,291	3,704	105.12	25.29	3,545	3,326	2,833	2,629	66.63	83.47
22	4,507	3,628	638	356	11.36	13.05	20,509	17,318	5,077	3,704	104.16	25.06	3,545	3,326	2,832	2,828	68.24	85.49
23	4,507	3,628	641	462	12.68	14.57	20,509	17,318	5,494	3,691	109.41	26.32	3,545	3,326	2,832	2,684	67.25	84.24
24	4,507	3,628	639	462	12.08	13.87	20,509	17,318	5,809	3,702	109.10	26.25	3,545	3,326	2,833	2,633	66.77	83.64
25	4,507	3,628	638	338	12.53	14.39	20,509	17,318	4,770	3,140	97.22	23.39	3,545	3,326	3,341	2,627	73.44	92.01
26	4,507	3,628	638	338	11.91	13.68	20,509	17,318	4,876	3,155	97.96	23.57	3,545	3,326	3,340	2,739	75.68	94.80
27	4,507	3,628	639	462	12.70	14.59	20,509	17,318	5,333	3,467	106.75	25.68	3,545	3,326	2,761	2,736	66.04	82.73
28	4,507	3,628	466	358	11.08	12.73	20,509	17,318	4,525	2,794	91.97	22.13	3,545	3,326	3,042	2,753	68.30	85.56
Total	**4,507**	**3,628**	**--**	**--**	**292.63**	**12.00**	**20,509**	**17,317**	**--**	**--**	**3,222.32**	**27.69**	**3,545**	**3,326**	**--**	**--**	**1,886.97**	**84.43**

March, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	640	356	11.15	12.80	20,509	17,318	4,185	2,789	86.24	20.75	3,545	3,326	2,898	2,647	67.96	85.14
2	4,507	3,628	638	356	9.75	11.20	20,509	17,318	4,461	2,969	90.13	21.68	3,545	3,326	2,900	2,647	67.66	84.76
3	4,507	3,628	486	356	10.03	11.52	20,509	17,318	4,560	2,962	88.53	21.30	3,545	3,326	2,900	2,647	67.80	84.93
4	4,507	3,628	622	356	12.08	13.88	20,509	17,318	4,625	2,975	93.56	22.51	3,545	3,326	2,900	2,645	66.25	83.00
5	4,507	3,628	600	337	11.08	12.73	20,509	17,318	5,010	3,439	98.02	23.58	3,545	3,326	2,650	2,644	63.47	79.51
6	4,507	3,628	638	214	12.90	14.81	20,509	17,318	5,525	3,617	113.42	27.29	3,545	3,326	2,670	2,612	63.55	79.61
7	4,507	3,628	636	435	12.57	14.44	20,509	17,318	5,860	4,140	124.17	29.88	3,545	3,326	2,791	2,633	65.38	81.90
8	4,507	3,628	636	435	12.47	14.32	20,509	17,318	6,317	4,116	126.14	30.35	3,545	3,326	3,045	2,786	70.42	88.22
9	4,507	3,628	636	461	12.62	14.50	20,539	17,344	6,563	4,841	137.45	33.02	3,545	3,326	2,792	2,785	66.74	83.60
10	4,507	3,628	614	438	12.44	14.29	20,539	17,344	6,371	5,014	135.74	32.61	3,545	3,326	2,792	2,783	66.75	83.62
11	4,507	3,628	584	434	12.14	13.94	20,539	17,344	6,173	4,420	129.32	31.07	3,545	3,326	2,789	2,783	66.73	83.60
12	4,507	3,628	614	388	11.53	13.24	20,539	17,344	6,322	4,929	135.61	32.58	3,545	3,326	2,789	2,785	66.91	83.82
13	4,507	3,628	612	435	12.13	13.93	20,539	17,344	6,387	4,888	133.39	32.05	3,545	3,326	3,039	2,784	68.06	85.26
14	4,507	3,628	611	354	11.67	13.40	20,539	17,344	6,423	4,994	135.05	32.44	3,545	3,326	3,041	3,036	72.65	91.01
15	4,507	3,628	634	371	12.47	14.32	20,539	17,344	7,028	5,005	140.37	33.72	3,545	3,326	3,042	3,037	72.56	90.89
16	4,507	3,628	501	233	11.14	12.80	20,539	17,344	6,293	3,329	123.73	29.72	3,545	3,326	3,040	2,838	71.59	89.69
17	4,507	3,628	591	125	9.47	10.88	20,539	17,344	4,953	2,983	95.38	22.91	3,545	3,326	3,040	2,837	71.31	89.33
18	4,507	3,628	631	459	12.21	14.03	20,539	17,344	5,662	3,676	108.62	26.09	3,545	3,326	3,040	3,035	72.61	90.97
19	4,507	3,628	604	335	11.36	13.05	20,539	17,344	5,031	3,529	107.29	25.77	3,545	3,326	3,040	3,035	72.72	91.10
20	4,507	3,628	616	459	12.63	14.51	20,539	17,344	5,744	4,439	122.89	29.52	3,545	3,326	3,038	3,026	72.56	90.90
21	4,507	3,628	506	212	11.30	12.98	20,539	17,344	5,615	3,594	119.20	28.64	3,545	3,326	3,033	3,023	72.46	90.78
22	4,507	3,628	636	460	12.21	14.02	20,539	17,344	7,583	3,519	130.07	31.25	3,545	3,326	3,027	3,010	72.28	90.54
23	4,507	3,628	631	460	11.54	13.26	20,539	17,344	7,311	4,193	125.68	30.19	3,545	3,326	3,020	1,785	66.86	83.76
24	4,507	3,628	462	436	11.03	12.67	20,539	17,344	5,438	4,219	112.83	27.10	3,545	3,326	2,031	1,816	44.76	56.07
25	4,507	3,628	633	459	11.79	13.55	20,539	17,344	6,613	4,058	122.60	29.45	3,545	3,326	2,998	2,031	59.77	74.87
26	4,507	3,628	962	460	15.56	17.87	20,539	17,344	7,172	3,836	136.46	32.78	3,545	3,326	2,515	2,307	58.58	73.39
27	4,507	3,628	912	573	18.15	20.85	20,539	17,344	8,536	4,703	157.97	37.95	3,545	3,326	2,507	1,956	49.50	62.01
28	4,507	3,628	723	483	15.00	17.22	20,539	17,344	8,959	6,041	176.51	42.40	3,545	3,326	2,189	1,948	47.57	59.59
29	4,507	3,628	832	570	16.14	18.53	20,539	17,344	8,875	5,732	168.80	40.55	3,545	3,326	2,242	2,140	52.72	66.04
30	4,507	3,628	694	569	15.14	17.39	20,539	17,344	7,994	5,565	162.10	38.94	3,545	3,326	2,243	2,239	53.61	67.16
31	4,507	3,628	743	569	15.04	17.28	20,539	17,344	7,959	4,507	150.55	36.17	3,545	3,326	2,245	2,239	53.65	67.21
Total	**4,507**	**3,628**	--	--	**386.74**	**14.33**	**20,539**	**17,344**	--	--	**3,887.81**	**30.13**	**3,545**	**3,326**	--	--	**2,005.40**	**81.04**

April, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	723	459	13.13	15.08	20,539	17,344	7,811	4,948	155.05	37.25	3,545	3,326	2,246	2,240	53.59	67.13
2	4,507	3,628	568	299	10.59	12.17	20,539	17,344	8,119	5,126	157.19	37.76	3,545	3,326	2,248	2,242	53.72	67.29
3	4,507	3,628	568	299	8.67	9.96	20,539	17,344	7,547	4,949	149.76	35.98	3,545	3,326	2,505	2,240	56.15	70.34
4	4,507	3,628	670	460	12.31	14.14	20,539	17,344	8,343	4,874	159.88	38.41	3,545	3,326	2,729	2,500	61.37	76.88
5	4,507	3,628	632	357	10.82	12.43	20,539	17,344	7,600	5,260	158.28	38.03	3,545	3,326	2,740	2,725	65.50	82.05
6	4,507	3,628	591	326	10.62	12.20	20,539	17,344	9,392	5,304	173.98	41.80	3,545	3,326	2,734	2,525	62.04	77.72
7	4,507	3,628	593	383	11.58	13.30	20,539	17,344	9,317	5,508	178.34	42.84	3,545	3,326	2,738	2,734	65.29	81.79
8	4,507	3,628	592	308	11.25	12.93	20,539	17,344	9,929	5,839	190.69	45.81	3,545	3,326	2,738	2,735	65.52	82.08
9	4,507	3,628	584	383	12.14	13.94	20,539	17,344	10,483	6,578	197.51	47.45	3,545	3,326	2,739	2,732	65.88	82.53
10	4,507	3,628	591	381	12.95	14.87	20,539	17,344	10,580	7,473	211.33	50.77	3,545	3,326	2,737	2,733	64.92	81.33
11	4,507	3,628	656	471	13.76	15.81	20,539	17,344	10,605	7,975	216.96	52.12	3,545	3,326	2,737	2,732	65.59	82.16
12	4,507	3,628	705	581	15.80	18.15	20,539	17,344	10,246	8,114	217.26	52.19	3,545	3,326	2,736	2,731	65.58	82.15
13	4,507	3,628	705	531	15.71	18.04	20,539	17,344	10,602	7,561	211.76	50.87	3,545	3,326	2,738	2,729	65.46	82.00
14	4,507	3,628	1,045	648	18.53	21.29	20,539	17,344	10,058	7,225	207.02	49.73	3,545	3,326	2,736	2,727	65.41	81.94
15	4,507	3,628	1,062	864	22.11	25.39	20,539	17,344	10,839	7,494	209.54	50.34	3,545	3,326	2,734	2,727	65.41	81.94
16	4,507	3,628	1,031	814	20.76	23.84	20,539	17,344	10,444	7,216	207.09	49.75	3,545	3,326	2,729	2,521	61.39	76.91
17	4,507	3,628	999	648	19.19	22.04	20,539	17,344	10,187	7,241	200.67	48.21	3,545	3,326	2,736	2,579	64.60	80.93
18	4,507	3,628	986	488	15.98	18.35	20,539	17,344	8,453	5,567	172.90	41.54	3,545	3,326	2,734	2,729	65.54	82.11
19	4,507	3,628	915	705	18.82	21.61	20,539	17,344	7,886	5,709	164.30	39.47	3,545	3,326	2,736	2,732	65.52	82.08
20	4,507	3,628	798	606	16.53	18.99	20,539	17,344	7,723	5,000	150.86	36.24	3,545	3,326	2,738	2,595	64.94	81.36
21	4,507	3,628	1,002	327	12.72	14.61	20,539	17,344	8,289	4,910	153.64	36.91	3,545	3,326	2,807	2,403	63.83	79.96
22	4,507	3,628	866	343	12.95	14.87	20,539	17,344	7,604	4,921	145.03	34.84	3,545	3,326	2,934	2,799	68.35	85.62
23	4,507	3,628	865	343	12.86	14.77	20,539	17,344	7,138	4,971	142.85	34.32	3,545	3,326	2,960	2,954	70.70	88.57
24	4,507	3,628	866	622	16.36	18.79	20,539	17,344	7,587	5,606	154.88	37.21	3,545	3,326	3,044	2,955	71.95	90.13
25	4,507	3,628	676	484	14.34	16.47	20,539	17,344	7,149	5,768	155.47	37.35	3,545	3,326	3,043	3,041	72.89	91.32
26	4,507	3,628	914	484	15.78	18.12	20,539	17,344	8,068	5,241	158.20	38.00	3,545	3,326	3,045	3,043	72.91	91.34
27	4,507	3,628	917	608	19.61	22.52	20,539	17,344	6,758	5,196	141.66	34.03	3,545	3,326	3,047	2,735	72.34	90.62
28	4,507	3,628	934	605	18.59	21.35	20,539	17,344	7,223	5,738	158.02	37.96	3,545	3,326	2,605	2,177	55.23	69.19
29	4,507	3,628	1,104	707	20.63	23.70	20,539	17,344	7,621	5,810	158.71	38.13	3,545	3,326	2,285	2,282	55.99	70.14
30	4,507	3,628	1,018	701	18.44	21.18	20,539	17,344	6,590	5,621	151.39	36.37	3,545	3,326	2,286	2,284	53.38	66.87
Total	**4,507**	**3,628**	**--**	**--**	**453.55**	**16.80**	**20,539**	**17,344**	**--**	**--**	**5,210.24**	**40.38**	**3,545**	**3,326**	**--**	**--**	**1,920.97**	**77.63**

May, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	743	481	15.90	18.26	20,539	17,344	6,854	5,393	148.27	35.62	3,545	3,326	2,286	2,284	54.86	68.72
2	4,507	3,628	744	372	12.85	14.76	20,539	17,344	7,593	5,463	156.65	37.63	3,545	3,326	1,790	1,790	43.23	54.16
3	4,507	3,628	910	481	16.13	18.53	20,539	17,344	8,906	6,802	186.47	44.80	3,545	3,326	1,790	1,243	37.79	47.34
4	4,507	3,628	1,060	324	18.91	21.72	20,539	17,344	8,689	4,695	179.95	43.23	3,545	3,326	1,784	1,245	36.55	45.79
5	4,507	3,628	581	324	11.30	12.98	20,539	17,344	7,631	4,880	155.72	37.41	3,545	3,326	1,781	1,546	41.49	51.98
6	4,507	3,628	861	483	15.81	18.16	20,539	17,344	8,215	6,689	179.05	43.01	3,545	3,326	1,781	1,781	42.70	53.49
7	4,507	3,628	1,037	372	16.37	18.80	20,539	17,344	8,043	5,276	172.91	41.54	3,545	3,326	1,783	1,679	42.38	53.09
8	4,507	3,628	1,051	861	22.61	25.97	20,539	17,344	8,705	6,621	185.87	44.65	3,545	3,326	2,279	1,781	49.67	62.22
9	4,507	3,628	1,109	949	23.63	27.15	20,539	17,344	9,163	7,671	195.02	46.85	3,545	3,326	2,278	2,271	54.47	68.24
10	4,507	3,628	961	770	21.46	24.65	20,539	17,344	8,950	7,664	202.59	48.67	3,545	3,326	2,272	2,266	54.45	68.21
11	4,507	3,628	942	770	19.05	21.88	20,539	17,344	9,357	7,259	206.43	49.59	3,545	3,326	2,268	2,253	54.31	68.03
12	4,507	3,628	953	627	19.74	22.67	20,539	17,344	9,691	7,907	214.22	51.46	3,545	3,326	2,263	2,257	54.22	67.92
13	4,507	3,628	944	453	18.40	21.13	20,539	17,344	9,855	8,267	211.56	50.82	3,545	3,326	2,260	2,191	54.12	67.80
14	4,507	3,628	942	453	18.02	20.70	20,539	17,344	9,890	7,948	206.25	49.55	3,545	3,326	2,256	2,253	54.16	67.85
15	4,507	3,628	946	670	18.80	21.59	20,539	17,344	10,258	8,285	226.56	54.43	3,545	3,326	2,254	2,245	53.84	67.44
16	4,507	3,628	984	686	20.68	23.76	20,539	17,344	10,100	8,179	219.89	52.82	3,545	3,326	2,247	2,243	53.88	67.50
17	4,507	3,628	983	60	17.19	19.74	20,539	17,344	9,295	4,290	197.28	47.39	3,545	3,326	2,248	2,098	53.15	66.58
18	4,507	3,628	978	60	14.94	17.16	20,539	17,344	10,138	5,209	190.91	45.86	3,545	3,326	2,237	2,100	53.33	66.81
19	4,507	3,628	960	735	19.55	22.45	20,539	17,344	10,437	8,743	230.70	55.42	3,545	3,326	2,238	2,231	53.62	67.18
20	4,507	3,628	804	732	18.95	21.76	20,539	17,344	10,510	8,549	227.10	54.56	3,545	3,326	2,234	2,228	53.48	67.00
21	4,507	3,628	960	801	19.68	22.60	20,539	17,344	11,206	8,820	234.94	56.44	3,545	3,326	2,229	2,225	53.44	66.95
22	4,507	3,628	1,037	803	21.41	24.59	20,539	17,344	11,964	9,216	251.49	60.42	3,545	3,326	2,225	2,217	53.16	66.60
23	4,507	3,628	1,022	871	23.59	27.09	20,539	17,344	11,626	8,157	244.95	58.84	3,545	3,326	2,219	2,219	53.16	66.59
24	4,507	3,628	1,088	784	24.02	27.59	20,539	17,344	9,814	6,641	208.81	50.16	3,545	3,326	2,220	2,024	52.33	65.55
25	4,507	3,628	1,093	699	22.14	25.43	20,539	17,344	9,051	6,743	187.93	45.15	3,545	3,326	2,216	2,209	52.91	66.29
26	4,507	3,628	859	698	17.59	20.20	20,539	17,344	7,160	5,394	152.69	36.68	3,545	3,326	2,209	2,209	53.00	66.39
27	4,507	3,628	860	601	18.43	21.17	20,539	17,344	8,487	5,906	167.85	40.32	3,545	3,326	2,211	2,209	53.00	66.40
28	4,507	3,628	859	562	18.30	21.02	20,539	17,344	8,190	5,029	170.74	41.02	3,545	3,326	2,209	2,205	52.89	66.26
29	4,507	3,628	860	699	19.03	21.86	20,539	17,344	8,253	5,823	166.58	40.02	3,545	3,326	2,205	2,205	52.85	66.21
30	4,507	3,628	866	482	16.21	18.62	20,539	17,344	8,750	5,355	164.12	39.43	3,545	3,326	2,195	1,164	47.17	59.09
31	4,507	3,628	761	322	15.47	17.76	20,539	17,344	8,981	4,333	162.49	39.04	3,545	3,326	1,164	1,158	27.90	34.95
Total	**4,507**	**3,628**	--	--	**576.17**	**21.35**	**20,539**	**17,344**	--	--	**6,006.00**	**46.54**	**3,545**	**3,326**	--	--	**1,547.50**	**62.54**

June, 2023																		
Day	GENCOs						IPPs Thermal						Nuclear					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	4,507	3,628	531	247	8.83	10.15	20,539	17,344	6,409	4,339	130.99	31.47	3,545	3,326	1,160	1,158	27.81	34.84
2	4,507	3,628	533	373	11.68	13.41	20,539	17,344	8,074	5,865	165.19	39.68	3,545	3,326	1,552	1,158	31.07	38.92
3	4,507	3,628	520	370	11.37	13.06	20,539	17,344	8,235	6,613	180.77	43.43	3,545	3,326	2,164	1,582	45.58	57.10
4	4,507	3,628	581	370	11.67	13.40	20,539	17,344	8,959	6,635	186.34	44.77	3,545	3,326	2,178	2,085	51.15	64.08
5	4,507	3,628	1,281	530	17.52	20.12	20,539	17,344	10,293	8,441	217.71	52.30	3,545	3,326	2,175	2,174	52.08	65.25
6	4,507	3,628	840	472	18.26	20.97	20,539	17,344	9,787	6,428	207.66	49.89	3,545	3,326	2,174	2,158	51.93	65.05
7	4,507	3,628	858	598	17.19	19.75	20,539	17,344	10,654	7,595	216.42	51.99	3,545	3,326	2,168	2,155	51.58	64.61
8	4,507	3,628	1,013	740	20.38	23.41	20,539	17,344	11,284	8,819	237.96	57.16	3,545	3,326	2,157	2,147	51.66	64.72
9	4,507	3,628	858	596	18.62	21.38	20,539	17,344	11,387	8,976	236.65	56.85	3,545	3,326	2,151	2,132	51.41	64.41
10	4,507	3,628	653	301	12.79	14.69	20,539	17,344	11,199	5,811	230.40	55.35	3,545	3,326	2,152	1,888	50.04	62.69
11	4,507	3,628	654	408	12.70	14.59	20,539	17,344	10,405	7,902	214.91	51.63	3,545	3,326	2,655	1,889	55.48	69.50
12	4,507	3,628	658	580	14.35	16.48	20,539	17,344	11,735	9,678	256.94	61.73	3,545	3,326	2,791	2,134	62.35	78.11
13	4,507	3,628	642	489	12.78	14.67	20,539	17,344	11,732	8,205	235.04	56.46	3,545	3,326	2,140	2,133	51.26	64.22
14	4,507	3,628	489	440	10.49	12.05	20,539	17,344	10,562	9,321	241.76	58.08	3,545	3,326	2,796	2,134	58.74	73.59
15	4,507	3,628	440	282	10.24	11.76	20,539	17,344	10,196	7,561	213.78	51.36	3,545	3,326	2,859	2,825	68.22	85.47
16	4,507	3,628	440	322	10.23	11.75	20,539	17,344	9,655	8,398	214.76	51.59	3,545	3,326	3,165	2,856	73.08	91.55
17	4,507	3,628	918	440	14.11	16.20	20,539	17,344	10,983	8,007	230.68	55.42	3,545	3,326	3,164	2,806	72.76	91.15
18	4,507	3,628	770	388	17.30	19.87	20,539	17,797	10,836	6,011	218.57	51.17	3,545	3,326	3,174	2,811	73.88	92.55
19	4,507	3,628	1,019	388	17.66	20.29	20,539	17,797	9,574	6,455	207.27	48.53	3,545	3,326	3,173	3,161	75.91	95.09
20	4,507	3,628	1,026	823	22.87	26.26	20,539	17,797	10,468	9,438	236.80	55.44	3,545	3,326	3,166	3,159	75.87	95.04
21	4,507	3,628	965	815	21.07	24.20	20,539	17,714	10,948	9,175	244.19	57.44	3,545	3,326	3,166	3,140	75.48	94.56
22	4,507	3,628	967	819	22.43	25.77	20,539	17,714	11,248	9,752	252.06	59.29	3,545	3,326	3,169	3,163	75.93	95.12
23	4,507	3,628	966	697	21.53	24.73	20,539	17,714	11,235	9,901	252.02	59.28	3,545	3,326	3,171	3,163	75.80	94.96
24	4,507	3,628	919	587	20.11	23.10	20,539	17,714	11,586	9,051	252.48	59.39	3,545	3,326	3,172	3,163	76.01	95.22
25	4,507	3,628	915	439	18.52	21.27	20,539	17,714	11,568	6,616	243.25	57.22	3,545	3,326	3,166	2,989	72.83	91.23
26	4,507	3,628	699	359	11.30	12.98	20,539	17,714	8,452	5,842	172.52	40.58	3,545	3,326	3,070	2,507	66.64	83.48
27	4,507	3,628	925	543	17.30	19.88	20,539	17,714	9,116	7,526	200.60	47.18	3,545	3,326	3,004	2,993	71.78	89.92
28	4,507	3,628	927	506	15.78	18.13	20,539	17,714	8,708	6,656	181.93	42.79	3,545	3,326	3,003	2,997	71.70	89.82
29	4,507	3,628	928	553	18.25	20.96	20,539	17,714	9,610	6,609	197.52	46.46	3,545	3,326	3,003	2,997	71.64	89.74
30	4,507	3,628	927	333	14.89	17.11	20,539	17,714	8,781	5,308	171.88	40.43	3,545	3,326	2,998	2,998	72.00	90.19
Total	**4,507**	**3,628**	--	--	**472.22**	**17.49**	**20,539**	**17,714**	--	--	**6,449.04**	**48.93**	**3,545**	**3,326**	--	--	**1,861.66**	**75.23**

TABLE 98

Summary of Daily Generation Capacity (MW) and Daily Energy Generation (GWh)

Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
July, 2022												
1	13,311	13,044	8,036	6,108	168.69	53.88	26,845	24,617	14,172	12,077	314.20	53.18
2	13,311	13,044	7,627	4,834	149.01	47.60	26,845	24,617	14,530	12,599	323.64	54.78
3	13,311	13,044	7,376	4,622	144.02	46.00	26,845	24,617	14,837	13,530	343.72	58.18
4	13,311	13,044	9,151	5,133	158.36	50.58	26,845	24,617	15,065	13,085	346.94	58.72
5	13,311	13,044	8,953	5,917	166.93	53.32	26,845	24,617	14,871	13,139	340.03	57.55
6	13,311	13,044	8,357	5,884	165.80	52.96	26,845	24,617	15,332	10,776	319.90	54.15
7	13,311	13,044	8,897	5,805	176.20	56.28	26,845	24,617	14,524	11,002	312.46	52.89
8	13,311	13,044	9,104	5,945	170.05	54.32	26,845	24,617	15,128	12,246	331.85	56.17
9	13,311	13,044	9,797	5,958	179.97	57.49	26,845	24,617	14,593	9,670	283.88	48.05
10	13,311	13,044	9,012	6,262	176.09	56.25	26,845	24,617	12,807	9,179	270.57	45.80
11	13,311	13,044	10,108	6,761	196.77	62.85	26,845	24,617	12,733	9,159	270.53	45.79
12	13,311	13,044	9,567	5,889	188.58	60.24	26,845	24,617	14,023	11,393	303.59	51.38
13	13,311	13,044	8,737	5,688	165.59	52.89	26,845	24,617	13,692	10,245	286.78	48.54
14	13,311	13,044	9,465	4,755	156.73	50.06	26,701	24,503	12,383	8,156	245.78	41.79
15	13,311	13,044	10,131	5,200	185.69	59.31	26,701	24,503	10,570	7,285	214.95	36.55
16	13,311	13,044	10,291	6,117	184.85	59.04	26,701	24,503	10,798	9,051	240.03	40.82
17	13,311	13,044	9,670	5,046	179.59	57.37	26,701	24,503	12,010	8,894	252.17	42.88
18	13,311	13,044	8,726	6,501	180.20	57.56	26,701	24,503	14,178	10,884	299.23	50.88
19	13,311	13,044	9,605	5,318	179.24	57.25	26,701	24,503	14,383	11,881	320.00	54.42
20	13,311	13,044	10,423	7,383	206.52	65.97	26,701	24,503	13,806	11,263	292.35	49.71
21	13,311	13,044	9,699	7,568	211.65	67.61	26,701	24,503	11,610	8,277	235.80	40.10
22	13,311	13,044	9,663	6,285	190.32	60.79	26,701	24,503	11,344	8,026	236.40	40.20
23	13,311	13,044	9,799	5,119	175.36	56.01	26,701	24,503	11,371	9,003	254.82	43.33
24	13,311	13,044	9,525	5,620	177.02	56.55	26,701	24,503	10,570	8,731	233.24	39.66
25	13,311	13,044	9,062	5,905	184.20	58.84	26,701	24,503	10,497	8,979	235.57	40.06
26	13,311	13,044	8,949	6,250	188.10	60.08	26,701	24,503	11,271	9,104	248.53	42.26
27	13,311	13,044	9,061	6,522	190.66	60.90	26,701	24,503	11,962	9,696	262.15	44.58
28	13,311	13,044	9,908	7,299	208.50	66.60	26,701	24,503	11,019	9,110	240.90	40.97
29	13,311	13,044	10,301	7,849	216.70	69.22	26,701	24,503	10,374	8,063	220.74	37.54
30	13,311	13,044	10,314	8,257	219.56	70.13	26,701	24,503	10,605	8,623	230.77	39.24
31	13,311	13,044	10,422	7,816	219.46	70.10	26,701	24,503	10,056	7,731	249.45	42.42
Total	**13,311**	**13,044**	**--**	**--**	**5,660.43**	**58.33**	**26,701**	**24,503**	**--**	**--**	**8,560.98**	**46.96**
August, 2022												
1	13,311	13,044	10,270	7,883	217.25	69.39	26,701	24,503	11,351	7,591	221.87	37.73
2	13,311	13,044	9,943	7,668	214.20	68.42	26,701	24,503	11,645	9,340	251.95	42.84
3	13,311	13,044	9,398	7,103	196.55	62.78	26,701	24,503	12,468	9,804	271.35	46.14
4	13,311	13,220	9,277	5,061	163.25	51.45	27,031	24,326	14,608	10,893	296.47	50.78
5	13,311	13,220	8,818	4,748	164.95	51.99	27,031	24,234	14,314	11,502	316.31	54.38
6	13,311	13,220	9,214	4,907	168.06	52.97	27,031	24,234	13,323	11,859	301.89	51.91
7	13,311	13,220	8,679	6,509	183.80	57.93	27,031	24,234	13,318	11,339	295.60	50.82
8	13,311	13,220	9,006	6,771	189.13	59.61	27,031	24,234	12,973	10,666	287.93	49.50
9	13,311	13,220	9,542	6,307	188.06	59.27	27,031	24,234	12,928	9,839	274.24	47.15
10	13,311	13,220	10,190	6,461	196.59	61.96	27,031	24,234	13,231	10,506	287.35	49.40
11	13,311	13,220	9,654	6,644	190.50	60.04	27,031	24,234	12,126	10,610	280.12	48.16
12	13,311	13,220	10,189	6,376	203.69	64.20	27,031	24,234	12,973	9,491	270.61	46.53
13	13,311	13,220	8,819	6,795	186.97	58.93	27,031	24,234	13,982	10,721	295.82	50.86
14	13,311	13,220	9,012	6,893	188.04	59.26	27,031	24,234	12,863	10,644	288.34	49.58
15	13,311	13,220	8,912	6,886	187.09	58.97	27,031	24,234	12,182	9,937	271.25	46.64
16	13,311	13,080	9,155	6,272	185.68	59.15	27,031	24,234	13,054	9,943	269.39	46.32
17	13,321	13,090	9,712	6,579	191.03	60.80	27,031	24,234	12,180	7,963	243.14	41.80
18	13,321	13,090	9,840	6,827	203.46	64.76	27,031	24,234	11,328	8,366	227.25	39.07
19	13,321	13,090	9,971	6,951	202.33	64.40	27,031	24,234	12,067	7,765	234.03	40.24
20	13,321	13,090	9,474	7,166	195.54	62.24	27,031	24,234	10,804	8,766	236.57	40.67
21	13,321	13,090	9,598	7,203	198.23	63.10	27,031	24,234	10,769	8,509	229.05	39.38
22	13,321	13,090	8,969	6,154	186.32	59.31	27,031	24,234	12,542	9,329	263.59	45.32
23	13,321	13,090	8,746	6,313	182.11	57.97	27,031	24,234	12,945	10,331	277.83	47.77
24	13,321	13,090	9,566	6,205	198.20	63.09	27,031	24,234	11,021	8,544	232.88	40.04
25	13,321	13,090	9,473	6,047	194.63	61.95	27,031	24,234	10,664	8,521	231.02	39.72
26	13,321	13,090	8,892	6,147	185.70	59.11	27,031	24,234	11,045	8,789	229.61	39.48
27	13,321	13,090	9,157	6,292	185.60	59.07	27,031	24,234	11,229	8,665	233.90	40.22
28	13,321	13,090	9,320	7,047	193.55	61.61	27,031	24,234	11,675	8,702	236.00	40.58
29	13,321	13,090	8,779	6,666	187.56	59.70	26,941	24,170	11,938	9,764	253.90	43.77
30	13,321	13,090	8,242	6,409	178.12	56.70	26,941	24,170	12,630	9,990	270.29	46.60
31	13,321	13,090	8,861	6,267	184.60	58.76	26,941	24,170	12,395	10,213	399.35	68.84
Total	**13,321**	**13,090**	**--**	**--**	**5,890.78**	**60.49**	**27,031**	**24,234**	**--**	**--**	**8,278.92**	**45.92**

September, 2022												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,321	13,090	9,258	6,166	193.37	61.55	26,941	24,170	12,152	10,760	274.46	47.31
2	13,321	13,090	8,989	6,272	186.32	59.31	26,941	24,170	12,243	10,793	279.67	48.21
3	13,321	13,090	9,867	6,827	203.77	64.86	26,941	24,170	11,985	10,265	264.99	45.68
4	13,321	13,090	10,045	7,776	216.82	69.01	26,941	24,170	10,973	9,090	239.47	41.28
5	13,321	13,090	9,668	7,198	204.85	65.20	26,941	24,170	10,410	8,123	226.06	38.97
6	13,321	13,090	9,268	6,644	190.37	60.59	26,941	24,170	11,335	8,502	233.40	40.24
7	13,321	13,090	8,630	6,427	183.11	58.28	26,941	24,170	11,617	9,879	253.73	43.74
8	13,321	12,990	8,952	6,652	180.47	57.89	26,941	24,273	11,975	10,324	268.71	46.13
9	13,321	12,990	8,893	6,186	182.67	58.59	26,941	24,273	12,162	10,305	272.87	46.84
10	13,321	12,990	9,017	6,222	183.31	58.80	26,941	24,273	11,855	10,646	269.32	46.23
11	13,321	12,990	9,996	6,465	190.84	61.21	26,941	24,273	11,588	8,099	235.51	40.43
12	13,321	12,990	9,813	6,120	184.86	59.29	26,941	24,273	10,878	8,773	232.38	39.89
13	13,321	12,990	8,898	6,189	178.97	57.40	26,941	24,273	11,337	9,690	254.52	43.69
14	13,321	12,990	8,417	5,296	162.66	52.17	26,941	24,273	12,083	9,964	270.22	46.38
15	13,321	12,990	8,338	4,693	150.48	48.27	26,941	24,273	12,257	10,716	279.10	47.91
16	13,321	12,990	9,235	5,864	177.86	57.05	26,941	24,273	11,817	10,599	267.18	45.86
17	13,321	12,990	8,710	4,999	171.19	54.91	26,941	24,273	11,309	8,863	248.09	42.59
18	13,321	12,990	7,699	4,664	145.52	46.67	26,941	24,273	11,615	10,097	259.67	44.57
19	13,321	12,990	8,023	4,547	150.45	48.26	26,941	24,273	11,630	10,791	266.57	45.76
20	13,321	12,990	7,800	4,388	146.07	46.85	26,941	24,273	12,460	10,677	273.92	47.02
21	13,321	12,990	8,317	4,324	143.25	45.95	26,941	24,273	12,504	11,453	284.39	48.82
22	13,321	12,990	7,985	5,313	155.80	49.97	26,941	24,273	12,921	10,633	283.92	48.74
23	13,321	12,990	8,756	4,822	156.73	50.27	26,941	24,273	12,592	10,300	269.94	46.34
24	13,321	12,990	8,576	5,203	160.21	51.39	26,941	24,273	11,320	9,353	246.11	42.25
25	13,321	12,990	8,622	4,453	155.21	49.78	26,941	24,273	10,699	8,974	233.83	40.14
26	13,321	12,990	7,210	4,321	136.44	43.76	26,941	24,273	11,848	9,224	260.22	44.67
27	13,321	12,990	7,516	3,962	133.71	42.89	26,941	24,273	12,037	10,103	271.05	46.53
28	13,321	12,990	7,710	4,419	136.14	43.67	26,941	24,273	12,021	10,599	274.47	47.12
29	13,321	12,990	6,968	3,875	133.64	42.87	26,941	24,273	12,095	10,571	275.81	47.34
30	13,189	13,083	8,701	3,583	138.25	44.03	26,941	24,110	12,096	10,209	274.13	47.38
Total	**13,321**	**12,990**	--	--	**5,033.35**	**53.82**	**26,941**	**24,273**	--	--	**7,843.68**	**44.88**

October, 2022												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,189	13,083	8,964	5,289	168.02	53.51	26,941	24,110	11,130	9,122	246.28	42.56
2	13,189	13,083	8,875	4,410	158.59	50.51	26,941	24,110	10,676	9,593	244.17	42.20
3	13,389	13,283	8,060	4,110	145.13	45.52	26,941	24,110	11,743	10,274	264.57	45.72
4	13,389	13,283	7,293	3,553	131.46	41.24	26,941	24,110	11,801	11,452	280.34	48.45
5	13,389	13,283	6,992	3,607	130.33	40.88	26,941	24,110	12,100	11,357	280.43	48.46
6	13,389	13,283	8,240	3,513	135.33	42.45	26,941	24,110	11,882	9,726	263.58	45.55
7	13,389	13,283	7,575	3,984	133.90	42.00	26,941	24,110	11,890	8,634	258.52	44.68
8	13,389	13,283	8,059	4,080	138.02	43.30	26,941	24,110	11,960	9,605	258.17	44.62
9	13,389	13,283	7,963	3,824	133.57	41.90	26,941	24,110	10,259	9,453	235.00	40.61
10	13,389	13,283	7,311	4,032	127.52	40.00	26,941	24,110	10,929	9,339	243.85	42.14
11	13,389	13,283	7,459	3,909	128.20	40.21	26,941	24,110	10,527	8,270	233.62	40.37
12	13,389	13,283	6,846	3,753	127.46	39.98	26,941	24,110	9,894	7,707	218.91	37.83
13	13,389	13,283	8,206	3,008	121.72	38.18	26,941	24,110	10,467	2,225	158.83	27.45
14	13,389	13,283	5,090	2,148	78.96	24.77	26,941	24,110	11,246	7,912	238.33	41.19
15	13,389	13,283	4,866	2,952	92.88	29.14	26,941	24,110	11,706	8,787	251.40	43.45
16	13,389	13,283	5,441	2,517	90.76	28.47	26,941	24,110	10,614	9,250	243.40	42.06
17	13,389	13,283	5,473	2,634	89.35	28.03	26,941	24,110	11,344	8,941	246.85	42.66
18	13,389	13,283	6,495	2,697	101.38	31.80	26,941	24,110	10,812	8,336	235.25	40.66
19	13,389	13,283	5,596	2,714	94.92	29.77	26,941	24,110	10,676	8,289	238.60	41.23
20	13,389	13,283	6,391	2,382	102.75	32.23	26,941	24,110	10,219	7,639	212.10	36.66
21	13,389	13,283	6,087	3,508	112.04	35.15	26,941	24,110	9,413	7,195	197.53	34.14
22	13,389	13,283	6,001	3,067	103.68	32.52	26,941	24,110	10,195	6,883	207.63	35.88
23	13,389	13,283	5,282	2,760	92.49	29.01	26,941	24,110	9,701	7,972	212.12	36.66
24	13,389	13,283	5,776	2,665	93.19	29.23	26,941	24,110	9,717	7,911	216.96	37.50
25	13,389	13,283	6,329	3,178	105.40	33.06	26,941	24,110	9,651	7,739	209.34	36.18
26	13,389	13,283	6,028	2,225	89.40	28.04	26,941	24,110	10,209	8,207	227.52	39.32
27	13,389	13,283	5,875	2,163	92.61	29.05	26,941	24,110	10,333	8,005	224.53	38.80
28	13,389	13,283	5,372	2,471	95.46	29.95	26,941	24,110	9,847	8,005	214.58	37.08
29	13,389	13,283	5,740	2,952	102.28	32.08	26,941	24,110	9,904	6,996	207.68	35.89
30	13,389	13,283	5,842	2,474	100.73	31.60	26,941	24,110	9,996	6,650	200.64	34.67
31	13,389	13,283	6,008	1,706	97.69	30.64	26,941	24,110	10,452	7,478	108.50	18.75
Total	**13,389**	**13,283**	--	--	**3,515.22**	**35.57**	**26,941**	**24,110**	--	--	**7,079.23**	**39.47**

November, 2022												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	6,419	3,200	110.94	34.80	26,941	24,110	8,960	7,260	199.09	34.41
2	13,389	13,283	6,915	2,681	113.76	35.69	26,941	24,110	9,019	7,404	194.09	33.54
3	13,389	13,283	7,052	3,107	118.09	37.04	26,941	22,765	8,411	7,314	190.73	34.91
4	13,389	13,283	7,001	2,498	113.92	35.73	26,941	22,765	8,939	6,963	192.52	35.24
5	13,389	13,283	6,689	2,513	106.34	33.36	26,941	22,765	7,808	5,664	162.56	29.75
6	13,389	13,283	5,960	2,918	107.62	33.76	26,941	22,765	8,930	5,958	188.44	34.49
7	13,389	13,283	6,093	2,796	102.40	32.12	26,941	22,765	8,547	5,828	171.89	31.46
8	13,389	13,283	6,334	2,856	103.14	32.35	26,941	22,765	8,491	6,113	176.67	32.34
9	13,389	13,283	5,820	2,933	98.63	30.94	26,941	22,765	8,673	6,039	179.28	32.81
10	13,389	13,283	5,532	2,642	88.98	27.91	26,941	22,765	8,504	6,296	191.24	35.00
11	13,389	13,283	5,507	2,416	88.72	27.83	26,941	22,765	8,537	6,781	190.31	34.83
12	13,389	13,283	5,313	2,098	81.27	25.49	26,941	22,765	8,694	6,886	197.54	36.15
13	13,389	13,283	5,328	2,092	84.45	26.49	26,941	22,765	8,992	5,801	188.88	34.57
14	13,389	13,283	5,709	2,027	86.17	27.03	26,941	22,765	8,566	5,763	177.16	32.43
15	13,389	13,283	6,887	2,417	107.75	33.80	26,941	22,765	8,173	6,042	161.94	29.64
16	13,389	13,283	6,378	2,343	99.33	31.16	26,941	22,765	8,659	5,520	172.66	31.60
17	13,389	13,283	6,346	2,023	92.29	28.95	26,941	22,765	8,480	6,512	178.93	32.75
18	13,389	13,283	5,488	2,335	90.71	28.45	26,941	22,765	8,137	6,656	183.40	33.57
19	13,389	13,283	5,773	1,649	82.20	25.78	26,941	22,765	8,709	6,640	190.53	34.87
20	13,389	13,283	6,112	1,744	89.35	28.03	26,941	22,765	8,346	6,436	174.69	31.97
21	13,389	13,283	6,208	2,273	85.57	26.84	26,941	22,765	8,654	6,239	185.48	33.95
22	13,389	13,283	5,935	1,988	83.85	26.30	26,941	22,765	8,672	6,711	189.49	34.68
23	13,389	13,283	5,936	1,818	83.31	26.13	26,941	22,765	8,702	6,732	191.04	34.97
24	13,389	13,283	6,124	1,771	81.27	25.49	26,941	22,765	8,657	6,661	192.63	35.26
25	13,389	13,283	5,430	1,933	81.95	25.71	26,941	22,765	8,686	6,572	191.09	34.98
26	13,389	13,283	5,818	1,679	83.51	26.20	26,941	22,765	8,659	6,107	186.64	34.16
27	13,389	13,283	5,154	1,769	80.33	25.20	26,941	22,765	8,628	6,416	186.59	34.15
28	13,389	13,283	6,009	1,952	85.11	26.70	26,941	22,765	8,426	6,295	185.01	33.86
29	13,389	13,283	6,618	2,260	92.54	29.03	26,941	22,765	8,310	5,960	180.75	33.08
30	13,389	13,283	6,271	1,744	91.17	28.60	26,941	22,765	8,330	6,193	183.09	33.51
Total	**13,389**	**13,283**	**--**	**--**	**2,814.68**	**29.43**	**26,941**	**22,765**	**--**	**--**	**5,534.40**	**33.77**

December, 2022												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	6,359	1,546	90.09	28.26	26,941	22,765	8,315	6,451	190.03	34.78
2	13,389	13,283	5,466	1,241	80.48	25.24	28,261	24,085	8,392	7,094	192.68	33.33
3	13,389	13,283	5,771	1,670	88.87	27.88	28,261	24,085	8,389	6,597	188.38	32.59
4	13,389	13,283	6,394	1,714	89.35	28.03	28,261	24,085	8,303	6,276	179.89	31.12
5	13,389	13,283	5,726	2,143	87.15	27.34	28,261	24,085	8,477	6,204	185.79	32.14
6	13,389	13,283	5,902	1,678	87.68	27.50	28,261	23,971	8,527	6,465	188.61	32.78
7	13,389	13,283	5,907	1,922	86.02	26.98	28,261	23,971	8,633	6,577	192.98	33.54
8	13,389	13,283	6,130	1,756	82.79	25.97	28,261	23,971	9,381	6,865	198.91	34.57
9	13,389	13,283	6,052	1,760	83.70	26.25	28,261	23,971	9,313	6,885	195.13	33.92
10	13,389	13,283	6,432	1,640	93.89	29.45	28,261	23,971	8,759	6,190	183.71	31.93
11	13,389	13,283	6,692	2,225	102.40	32.12	28,261	23,971	8,026	5,714	168.37	29.27
12	13,389	13,283	6,322	1,967	89.88	28.19	28,261	23,971	8,664	5,778	180.72	31.41
13	13,389	13,283	6,240	1,824	96.04	30.12	28,261	23,971	8,695	5,880	177.29	30.82
14	13,389	13,283	6,529	1,890	90.89	28.51	28,261	23,971	8,633	5,945	183.24	31.85
15	13,389	13,283	5,519	1,598	78.12	24.51	28,261	23,971	9,357	6,402	197.90	34.40
16	13,389	13,283	4,901	1,368	75.83	23.79	28,261	23,971	9,363	6,143	199.16	34.62
17	13,389	13,283	5,447	1,106	77.43	24.29	28,261	23,971	9,121	6,358	194.09	33.74
18	13,389	13,283	4,194	1,020	61.36	19.25	28,261	23,971	9,748	6,930	206.80	35.95
19	13,389	13,283	4,905	1,682	69.37	21.76	28,261	23,971	9,629	6,335	200.51	34.85
20	13,389	13,283	4,381	1,324	61.39	19.26	28,261	23,971	10,078	6,643	208.47	36.24
21	13,389	13,283	5,644	1,452	67.48	21.17	28,261	23,971	10,122	5,820	198.91	34.58
22	13,389	13,283	5,206	917	58.11	18.23	28,261	23,971	9,983	6,049	202.28	35.16
23	13,389	13,283	3,517	751	38.80	12.17	28,261	23,971	10,990	6,963	231.59	40.25
24	13,389	13,283	3,139	647	34.84	10.93	28,261	23,971	10,985	7,437	233.08	40.51
25	13,389	13,283	2,793	608	32.91	10.32	28,261	23,971	11,274	7,090	233.12	40.52
26	13,389	13,283	3,694	600	42.70	13.39	28,561	24,271	11,203	6,830	224.22	38.49
27	13,389	13,283	3,827	663	37.59	11.79	28,561	24,271	11,401	7,182	235.53	40.43
28	13,389	13,283	2,859	591	26.16	8.20	28,561	24,271	11,599	7,563	246.82	42.37
29	13,389	13,283	3,518	815	38.87	12.19	28,561	24,271	10,474	7,249	223.73	38.41
30	13,389	13,283	3,342	879	41.55	13.03	28,561	24,271	10,476	6,719	221.64	38.05
31	13,389	13,283	3,111	509	26.72	8.38	28,561	24,271	11,353	7,017	237.65	40.80
Total	**13,389**	**13,283**	**--**	**--**	**2,118.43**	**21.44**	**28,561**	**24,271**	**--**	**--**	**6,301.21**	**34.89**

January, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	2,314	509	21.66	6.79	28,561	24,271	11,647	7,955	245.48	42.14
2	13,389	13,283	2,822	502	32.97	10.34	28,561	24,271	11,733	7,731	242.55	41.64
3	13,389	13,283	3,355	867	42.80	13.43	28,561	24,271	11,639	7,269	239.44	41.10
4	13,389	13,283	2,920	978	42.32	13.28	28,561	24,271	12,104	6,726	233.62	40.10
5	13,389	13,283	3,590	1,055	48.61	15.25	28,561	24,271	11,588	7,026	236.57	40.61
6	13,389	13,283	3,083	1,068	44.59	13.99	28,561	24,271	11,924	7,180	241.45	41.45
7	13,389	13,283	2,747	1,056	39.64	12.43	28,561	24,271	12,405	7,399	248.87	42.72
8	13,389	13,283	2,810	461	26.37	8.27	28,561	24,271	12,203	7,746	251.85	43.24
9	13,389	13,283	2,100	518	24.33	7.63	28,561	24,271	13,081	7,904	258.19	44.32
10	13,389	13,283	2,299	481	22.32	7.00	28,561	24,271	12,732	8,076	262.76	45.11
11	13,389	13,283	2,566	416	26.60	8.34	28,561	24,271	13,062	7,677	251.05	43.10
12	13,389	13,283	2,138	423	24.46	7.67	28,561	24,271	12,484	7,976	256.87	44.10
13	13,389	13,283	2,408	515	27.12	8.51	28,561	24,271	12,388	7,614	255.44	43.85
14	13,389	13,283	3,088	499	31.86	9.99	28,561	24,271	12,413	7,381	251.71	43.21
15	13,389	13,283	2,505	462	24.04	7.54	28,561	24,271	12,191	8,197	259.56	44.56
16	13,389	13,283	2,761	463	28.36	8.90	28,561	24,271	12,649	8,029	258.90	44.45
17	13,389	13,283	2,426	510	26.48	8.31	28,561	24,271	12,959	8,474	264.32	45.38
18	13,389	13,283	3,689	648	34.50	10.82	28,561	24,271	12,454	7,996	256.63	44.06
19	13,389	13,283	4,093	852	57.10	17.91	28,561	24,271	11,084	7,266	229.07	39.32
20	13,389	13,283	4,009	1,087	51.52	16.16	28,561	24,271	10,902	7,597	223.73	38.41
21	13,389	13,283	3,896	879	49.22	15.44	28,561	24,271	10,730	7,306	227.85	39.11
22	13,389	13,283	3,676	872	49.13	15.41	28,561	24,271	10,360	7,213	217.63	37.36
23	13,389	13,283	4,095	0	22.29	6.99	28,561	24,271	10,228	0	67.40	11.57
24	13,389	13,283	5,330	1,542	77.85	24.42	28,561	24,271	9,901	1,882	154.63	26.55
25	13,389	13,283	3,619	1,110	48.78	15.30	28,561	24,271	12,780	7,686	249.38	42.81
26	13,389	13,283	4,411	1,383	64.34	20.18	28,561	24,271	11,842	7,103	236.24	40.56
27	13,389	13,283	4,232	1,656	66.94	21.00	28,561	24,271	10,947	7,300	223.33	38.34
28	13,389	13,283	4,402	1,229	58.37	18.31	28,561	24,271	10,728	7,422	225.79	38.76
29	13,389	13,283	4,097	871	49.22	15.44	28,561	24,271	10,718	7,218	221.19	37.97
30	13,389	13,283	4,287	1,129	55.35	17.36	28,561	24,271	10,224	6,852	213.26	36.61
31	13,389	13,283	4,342	1,154	54.68	17.15	28,561	24,271	10,317	6,800	216.13	37.10
Total	**13,389**	**13,283**	**--**	**--**	**1,273.8**	**12.89**	**28,561**	**24,271**	**--**	**--**	**7,220.89**	**39.99**

February, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	3,975	1,186	56.32	17.67	28,561	24,271	10,590	7,517	227.27	39.02
2	13,389	13,283	4,301	1,091	62.52	19.61	28,561	24,271	10,359	7,652	221.42	38.01
3	13,389	13,283	4,701	1,270	68.61	21.52	28,561	24,271	10,751	6,774	213.59	36.67
4	13,389	13,283	4,272	1,709	72.62	22.78	28,561	24,271	9,321	6,432	203.35	34.91
5	13,389	13,283	4,262	1,009	58.39	18.32	28,561	24,271	9,404	6,701	205.67	35.31
6	13,389	13,283	3,894	1,512	63.16	19.81	28,561	24,271	10,215	6,475	203.74	34.98
7	13,389	13,283	3,908	1,288	64.73	20.30	28,561	24,271	10,196	6,882	210.28	36.10
8	13,389	13,283	5,022	1,469	69.13	21.69	28,561	24,271	10,043	6,967	208.45	35.78
9	13,389	13,283	5,500	2,118	86.86	27.25	28,561	24,271	9,155	6,653	192.12	32.98
10	13,389	13,283	5,960	1,721	89.92	28.21	28,561	24,271	8,812	6,579	187.00	32.10
11	13,389	13,283	5,764	1,812	86.27	27.06	28,561	24,271	8,968	6,448	188.20	32.31
12	13,389	13,283	6,001	2,010	92.38	28.98	28,561	24,271	8,056	6,376	175.98	30.21
13	13,389	13,283	5,409	1,719	81.43	25.54	28,561	24,271	9,126	6,483	191.22	32.83
14	13,389	13,283	5,018	1,865	81.61	25.60	28,561	24,271	9,534	6,715	195.03	33.48
15	13,389	13,283	5,329	2,174	91.30	28.64	28,561	24,271	9,191	6,656	190.73	32.74
16	13,389	13,283	5,676	2,645	97.81	30.68	28,561	24,271	9,010	6,440	180.28	30.95
17	13,389	13,283	5,531	2,275	94.24	29.56	28,561	24,271	8,666	6,394	183.54	31.51
18	13,389	13,283	5,319	1,989	92.99	29.17	28,561	24,271	9,190	6,298	187.00	32.10
19	13,389	9,805	4,985	2,106	90.95	38.65	28,561	24,271	8,726	6,192	183.35	31.48
20	13,389	9,805	5,646	2,025	95.51	40.59	28,561	24,271	8,724	6,793	183.88	31.57
21	13,389	13,283	5,494	1,769	92.70	29.08	28,561	24,271	8,740	6,689	183.21	31.45
22	13,389	13,283	6,081	2,192	99.64	31.26	28,561	24,271	8,547	6,888	183.76	31.55
23	13,389	13,283	5,451	1,790	91.22	28.61	28,561	24,271	8,967	6,837	189.34	32.50
24	13,389	13,283	5,647	1,984	92.57	29.04	28,561	24,271	9,281	6,797	187.94	32.26
25	13,389	13,283	5,824	2,153	90.69	28.45	28,561	24,271	8,749	6,105	183.19	31.45
26	13,389	13,283	5,575	2,493	91.78	28.79	28,561	24,271	8,854	6,232	185.55	31.85
27	13,389	13,283	6,183	1,982	94.93	29.78	28,561	24,271	8,733	6,665	185.49	31.84
28	13,389	13,283	6,157	2,258	94.23	29.56	28,561	24,271	8,033	5,905	171.36	29.42
Total	**13,389**	**13,283**	**--**	**--**	**2,344.52**	**26.27**	**28,561**	**24,271**	**--**	**--**	**5,401.92**	**33.12**

March, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	5,735	2,333	97.91	30.71	28,561	24,271	7,723	5,792	165.35	28.39
2	13,389	13,283	5,792	2,517	98.62	30.93	28,561	24,271	7,999	5,972	167.54	28.76
3	13,389	13,283	5,604	2,521	98.47	30.89	28,561	24,271	7,946	5,965	166.35	28.56
4	13,389	13,283	5,925	2,781	103.34	32.42	28,561	24,271	8,147	5,976	171.90	29.51
5	13,389	13,283	6,268	2,136	98.84	31.01	28,561	24,271	8,260	6,420	172.56	29.62
6	13,389	13,283	5,590	2,138	96.16	30.16	28,561	24,271	8,833	6,443	189.86	32.59
7	13,389	13,283	5,317	1,924	90.94	28.53	28,561	24,271	9,287	7,208	202.12	34.70
8	13,389	13,283	5,551	2,133	87.40	27.42	28,561	24,271	9,998	7,337	209.03	35.88
9	13,389	13,283	5,022	2,220	88.35	27.71	28,591	24,298	9,991	8,087	216.81	37.18
10	13,389	13,283	5,387	1,931	86.62	27.17	28,591	24,298	9,777	8,235	214.93	36.86
11	13,389	13,283	5,832	2,241	96.04	30.12	28,591	24,298	9,546	7,637	208.18	35.70
12	13,389	13,283	6,075	1,589	85.85	26.93	28,591	24,298	9,725	8,102	214.05	36.71
13	13,389	13,283	5,480	2,434	88.12	27.64	28,591	24,298	10,038	8,107	213.58	36.62
14	13,389	13,283	5,861	2,448	90.39	28.35	28,591	24,298	10,075	8,384	219.36	37.62
15	13,389	13,283	5,093	2,496	87.33	27.39	28,591	24,298	10,704	8,413	225.40	38.65
16	13,389	13,283	5,996	1,930	86.09	27.01	28,591	24,298	9,834	6,400	206.47	35.41
17	13,389	13,283	4,806	2,228	81.88	25.68	28,591	24,298	8,584	5,945	176.16	30.21
18	13,389	13,283	5,081	1,737	77.22	24.22	28,591	24,298	9,333	7,170	193.45	33.17
19	13,389	13,283	4,876	1,760	74.49	23.37	28,591	24,298	8,675	6,899	191.37	32.82
20	13,389	13,283	4,591	1,876	68.90	21.61	28,591	24,298	9,398	7,924	208.09	35.68
21	13,389	13,283	4,927	1,783	72.13	22.63	28,591	24,298	9,154	6,829	202.97	34.81
22	13,389	13,283	4,901	1,786	67.34	21.12	28,591	24,298	11,246	6,989	214.55	36.79
23	13,389	13,283	4,919	1,510	68.34	21.44	28,591	24,298	10,962	6,438	204.08	35.00
24	13,389	13,283	5,169	1,698	75.16	23.58	28,591	24,298	7,931	6,471	168.61	28.91
25	13,389	13,283	4,796	1,519	61.34	19.24	28,591	24,298	10,244	6,548	194.16	33.30
26	13,389	13,283	3,726	1,238	53.28	16.71	28,591	24,298	10,649	6,603	210.60	36.11
27	13,389	13,283	5,124	1,202	53.06	16.64	28,591	24,298	11,955	7,232	225.62	38.69
28	13,389	13,283	3,915	1,196	54.10	16.97	28,591	24,298	11,871	8,472	239.08	41.00
29	13,389	13,283	3,652	1,184	51.38	16.12	28,591	24,298	11,949	8,442	237.65	40.75
30	13,389	13,283	3,609	1,151	48.12	15.09	28,591	24,298	10,931	8,373	230.85	39.59
31	13,389	13,283	4,038	1,366	54.17	16.99	28,591	24,298	10,947	7,315	219.24	37.60
Total	**13,389**	**13,283**	**--**	**--**	**2,441.35**	**24.70**	**28,591**	**24,298**	**--**	**--**	**6,279.95**	**34.74**

April, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,389	13,283	4,045	1,339	60.45	18.96	28,591	24,298	10,780	7,647	221.77	38.03
2	13,389	13,283	4,040	1,664	62.92	19.74	28,591	24,298	10,935	7,667	221.50	37.98
3	13,389	13,283	3,971	1,551	60.13	18.86	28,591	24,298	10,620	7,488	214.58	36.80
4	13,389	13,283	3,452	1,320	52.12	16.35	28,591	24,298	11,742	7,834	233.56	40.05
5	13,390	13,283	4,414	1,251	50.63	15.88	28,591	24,298	10,972	8,342	234.61	40.23
6	13,390	13,283	2,741	1,296	44.41	13.93	28,591	24,298	12,717	8,155	246.64	42.29
7	13,390	13,283	3,318	1,208	44.88	14.08	28,591	24,298	12,648	8,625	255.20	43.76
8	13,390	13,283	3,606	1,159	49.31	15.47	28,591	24,298	13,259	8,882	267.47	45.87
9	13,390	13,283	3,876	1,196	49.31	15.47	28,591	24,298	13,806	9,693	275.53	47.25
10	13,390	13,283	3,822	1,110	50.63	15.88	28,591	24,298	13,908	10,587	289.21	49.59
11	13,390	13,283	4,643	1,188	55.88	17.53	28,591	24,298	13,998	11,178	296.30	50.81
12	13,390	13,283	5,652	1,248	67.61	21.21	28,591	24,298	13,687	11,426	298.64	51.21
13	13,390	13,283	6,541	2,343	85.91	26.95	28,591	24,298	14,045	10,821	292.93	50.23
14	13,390	13,283	6,210	2,582	95.50	29.96	28,591	24,298	13,839	10,600	290.96	49.89
15	13,390	13,283	6,511	2,701	97.36	30.54	28,591	24,298	14,635	11,085	297.06	50.94
16	13,390	13,283	6,747	2,776	102.61	32.19	28,591	24,298	14,204	10,551	289.24	49.60
17	13,390	13,283	6,717	2,982	109.85	34.46	28,591	24,298	13,922	10,468	284.47	48.78
18	13,390	13,283	7,219	2,594	112.67	35.34	28,591	24,298	12,173	8,784	254.42	43.63
19	13,390	13,283	6,556	2,995	111.69	35.04	28,591	24,298	11,537	9,146	248.64	42.64
20	13,390	13,283	6,162	2,865	102.93	32.29	28,591	24,298	11,259	8,201	232.34	39.84
21	13,390	13,283	5,195	2,475	88.90	27.89	28,591	24,298	12,098	7,640	230.19	39.47
22	13,390	13,283	4,336	1,984	68.68	21.54	28,591	24,298	11,404	8,063	226.33	38.81
23	13,390	13,283	4,050	2,015	65.06	20.41	28,591	24,298	10,963	8,268	226.41	38.83
24	13,390	13,283	4,419	2,011	67.79	21.26	28,591	24,298	11,497	9,183	243.18	41.70
25	13,390	13,283	5,955	2,309	85.29	26.75	28,591	24,298	10,868	9,293	242.71	41.62
26	13,390	13,283	7,084	2,729	102.80	32.25	28,591	24,298	12,027	8,768	246.89	42.34
27	13,390	13,283	7,924	3,266	117.94	37.00	28,591	24,298	10,722	8,539	233.61	40.06
28	13,390	13,283	7,255	3,393	111.59	35.00	28,591	24,298	10,762	8,520	231.84	39.76
29	13,390	13,283	6,827	3,080	108.05	33.89	28,591	24,298	11,010	8,799	235.33	40.36
30	13,390	13,283	7,217	3,752	115.21	36.14	28,591	24,298	9,894	8,606	223.21	38.28
Total	**13,390**	**13,283**	**--**	**--**	**2,398.11**	**25.07**	**28,591**	**24,298**	**--**	**--**	**7,584.75**	**43.35**

May, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,390	13,283	7,529	3,374	115.46	36.22	28,591	24,298	9,883	8,158	219.02	37.56
2	13,390	13,283	6,346	3,451	108.54	34.05	28,591	24,298	10,127	7,625	212.73	36.48
3	13,390	13,283	6,543	3,318	103.98	32.62	28,591	24,298	11,606	8,526	240.38	41.22
4	13,390	13,283	7,291	3,281	106.10	33.28	28,591	24,298	11,533	6,264	235.41	40.37
5	13,390	13,283	7,749	3,521	124.67	39.11	28,591	24,298	9,993	6,750	208.52	35.76
6	13,390	13,283	7,633	3,639	124.81	39.15	28,591	24,298	10,857	8,953	237.56	40.74
7	13,390	13,283	7,394	3,441	116.71	36.61	28,591	24,298	10,863	7,327	231.66	39.73
8	13,390	13,283	7,098	3,271	110.13	34.55	28,591	24,298	12,035	9,263	258.15	44.27
9	13,390	13,283	6,401	2,844	102.86	32.27	28,591	24,298	12,550	10,891	273.13	46.84
10	13,390	13,283	6,539	2,690	110.53	34.67	28,591	24,298	12,183	10,700	278.51	47.76
11	13,390	13,283	7,306	3,791	132.27	41.49	28,591	24,298	12,567	10,282	279.79	47.98
12	13,390	13,283	8,004	3,290	132.87	41.68	28,591	24,298	12,907	10,791	288.17	49.42
13	13,390	13,283	7,758	4,167	140.03	43.93	28,591	24,298	13,059	10,911	284.08	48.71
14	13,390	13,283	7,626	3,929	135.80	42.60	28,591	24,298	13,088	10,654	278.43	47.75
15	13,390	13,283	7,604	3,886	138.03	43.30	28,591	24,298	13,458	11,200	299.20	51.31
16	13,390	13,283	7,771	3,361	137.53	43.14	28,591	24,298	13,331	11,108	294.45	50.49
17	13,390	13,283	7,124	2,934	138.62	43.48	28,591	24,298	12,526	6,448	267.61	45.89
18	13,390	13,283	7,117	3,803	130.34	40.88	28,591	24,298	13,353	7,369	259.19	44.45
19	13,390	13,283	6,903	3,978	127.57	40.02	28,591	24,298	13,635	11,709	303.87	52.11
20	13,390	13,283	7,115	4,532	140.19	43.97	28,591	24,298	13,548	11,509	299.53	51.36
21	13,390	13,283	7,210	4,676	144.55	45.34	28,591	24,298	14,395	11,846	308.06	52.83
22	13,390	13,283	7,169	4,654	144.02	45.18	28,591	24,298	15,226	12,236	326.06	55.91
23	13,390	13,283	7,435	4,316	140.03	43.93	28,591	24,298	14,867	11,247	321.69	55.16
24	13,390	13,283	7,505	3,960	147.29	46.20	28,591	24,298	13,122	9,449	285.16	48.90
25	13,390	13,283	7,589	5,214	160.93	50.48	28,591	24,298	12,360	9,651	262.99	45.10
26	13,390	13,283	8,041	5,361	165.78	52.00	28,591	24,298	10,228	8,301	223.28	38.29
27	13,390	13,283	7,904	5,630	163.45	51.27	28,591	24,298	11,558	8,716	239.28	41.03
28	13,390	13,283	7,919	4,746	154.77	48.55	28,591	24,298	11,258	7,796	241.93	41.49
29	13,390	13,283	8,077	4,385	137.33	43.08	28,591	24,298	11,318	8,727	238.47	40.89
30	13,390	13,283	7,179	4,221	140.63	44.11	28,591	24,298	11,811	7,001	227.51	39.01
31	13,390	13,283	7,717	4,097	145.43	45.62	28,591	24,298	10,906	5,813	205.86	35.30
Total	**13,390**	**13,283**	**--**	**--**	**4,121.24**	**41.70**	**28,591**	**24,298**	**--**	**--**	**8,129.67**	**44.97**

June, 2023												
Day	VRE (Hydel+Wind+Solar+Bagasse)						Thermal Power Plants (GENCOs+IPPs+Nuclear)					
	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.	Capacity (MW)		Load (MW)		Gen. (GWh)	Energy (%) w.r.t. Dep. Cap.
	Inst.	Dep.	Max.	Min.			Inst.	Dep.	Max.	Min.		
1	13,390	13,283	7,564	4,697	154.42	48.44	28,591	24,298	8,100	5,744	167.63	28.75
2	13,390	13,283	7,239	4,205	136.07	42.68	28,591	24,298	10,159	7,396	207.93	35.66
3	13,390	13,283	7,486	4,007	140.95	44.22	28,591	24,298	10,919	8,565	237.72	40.77
4	13,390	13,283	7,510	3,806	140.85	44.18	28,591	24,298	11,718	9,090	249.17	42.73
5	13,390	13,283	7,496	4,323	141.22	44.30	28,591	24,298	13,749	11,145	287.31	49.27
6	13,390	13,283	7,104	4,520	143.22	44.93	28,591	24,298	12,801	9,058	277.85	47.65
7	13,390	13,283	6,901	4,369	136.28	42.75	28,591	24,298	13,680	10,348	285.19	48.90
8	13,390	13,283	7,295	4,503	143.84	45.12	28,591	24,298	14,454	11,706	310.00	53.16
9	13,390	13,283	7,988	5,370	162.47	50.96	28,591	24,298	14,396	11,704	306.67	52.59
10	13,390	13,283	7,802	3,552	153.35	48.10	28,591	24,298	14,004	8,000	293.23	50.28
11	13,390	13,283	7,282	4,200	139.59	43.79	28,591	24,298	13,714	10,199	283.08	48.54
12	13,390	13,283	8,193	3,437	135.41	42.48	28,591	24,298	15,184	12,392	333.64	57.21
13	13,390	13,283	9,035	4,520	165.37	51.87	28,591	24,298	14,514	10,827	299.07	51.29
14	13,390	13,283	8,153	4,640	153.13	48.03	28,591	24,298	13,847	11,895	310.99	53.33
15	13,390	13,283	7,617	4,846	143.69	45.07	28,591	24,298	13,495	10,668	292.25	50.12
16	13,390	13,283	7,957	4,985	152.50	47.84	28,591	24,298	13,260	11,576	298.08	51.11
17	13,390	13,283	9,476	4,327	156.23	49.01	28,591	24,298	15,065	11,253	317.54	54.45
18	13,390	13,283	9,102	5,344	170.71	53.55	28,591	24,751	14,780	9,210	309.75	52.14
19	13,390	13,283	9,446	5,596	182.15	57.14	28,591	24,751	13,766	10,004	300.84	50.64
20	13,390	13,283	8,898	5,830	183.03	57.41	28,591	24,751	14,660	13,420	335.53	56.48
21	13,390	13,283	8,977	6,707	188.28	59.06	28,591	24,668	15,079	13,130	340.74	57.55
22	13,390	13,283	8,863	6,683	189.53	59.45	28,591	24,668	15,384	13,734	350.42	59.19
23	13,390	13,283	8,973	6,818	190.81	59.85	28,591	24,668	15,372	13,761	349.35	59.01
24	13,390	13,283	8,868	7,111	191.89	60.19	28,591	24,668	15,677	12,801	348.60	58.88
25	13,390	13,283	8,918	5,516	172.82	54.21	28,591	24,668	15,649	10,044	334.60	56.52
26	13,390	13,283	9,451	6,182	187.85	58.93	28,591	24,668	12,221	8,708	250.47	42.31
27	13,390	13,283	9,218	6,573	191.31	60.01	28,591	24,668	13,045	11,062	289.68	48.93
28	13,390	13,283	9,231	6,681	192.80	60.48	28,591	24,668	12,638	10,159	269.41	45.51
29	13,390	13,283	9,990	6,621	197.91	62.08	28,591	24,668	13,541	10,159	287.40	48.55
30	13,390	13,283	9,926	4,513	190.86	59.87	28,591	24,668	12,706	8,639	258.77	43.71
Total	**13,390**	**13,283**	**--**	**--**	**4,928.6**	**51.53**	**28,591**	**24,668**	**--**	**--**	**8,782.92**	**49.45**

ACRONYMS AND ABBREVIATIONS

AEDB	Alternative Energy Development Board
AJKHEB	Azad Jammu and Kashmir Hydel Electricity Board
AMRS	Automated Meter Reading System
AQTA	Annual Quarterly Tariff Adjustments
BPC	Bulk Power Consumer
BQCCPP	Bin Qasim Combined Cycle Power Plant
BQTPS	Bin Qasim Thermal Power Station
BTPL	Bahira Town (Pvt.) Limited
CCOE	Cabinet Committee on Energy
CCPP	Combined Cycle Power Plant
CDP	Common Delivery Point
CHASNUPP	Chashma Nuclear Power Plant
COD	Commercial Operation Date
CPGCL	Central Power Generation Company Limited
CPI	Consumer Price Index
CPP	Captive Power Plant
CPPA-G	Central Power Purchasing Agency (Guarantee) Limited
CTBCM	Competitive Trading Bilateral Contract Market
DISCO	Distribution Company
DOP	Development of Power
ELR	Energy Loss Reduction
EMO	Economic Merit Order
EPP	Energy Purchase Price
EYB	Energy Year Book
FDI	Foreign Direct Investment
FESCO	Faisalabad Electric Supply Company Limited
FY	Financial Year
GDP	Gross Domestic Product
GENCO	Generation Company
GEPCO	Gujranwala Electric Power Company Limited
GOP	Government of Pakistan
GST	General Sales Tax
GTPS	Gas Turbine Power Station
GWh	Giga Watt per hour
HDIP	Hydrocarbon Development Institute of Pakistan
HESCO	Hyderabad Electric Supply Company Limited
HPP	Hydropower Project
HSE	Health, Safety and Environment
HVDC	High Voltage Direct Current
IA	Implementation Agreement
IAA	Independent Auction Administrator
IBC	Integrated Business Centre
ICB	International Competitive Bidding
IESCO	Islamabad Electric Supply Company Limited

IGCEP	Indicative Generation Capacity Expansion Plan
IPP	Independent Power Producer
ISP	Industrial Support Package
JICA	Japan International Cooperation Agency
JPCL	Jamshoro Power Company Limited
KANUPP	Karachi Nuclear Power Plant
KCCPP	Korangi Combined Cycle Power Plant
KE	K-Electric Limited
KIBOR	Karachi Interbank Offered Rate
KTGTPS	Korangi Town Gas Turbine Power Station
kV	Kilo Volt
KVA	Kilovolt Ampere
kWh	Kilowatt/hours
LD	Liquidated Damages
LESCO	Lahore Electric Supply Company Limited
LIBOR	London Interbank Offered Rate
LPGCL	Lakhra Power Generation Company Limited
MEPCO	Multan Electric Power Company Limited
MMBTU	Metric Million British Thermal Unit
MMCFT	Metric Million Cubic Feet
MTOE	Million Tonees of Oil Equivalent
MVA	Megavolt Ampere
MW	Megawatt
MWh	Megawatt/hour
MYT	Multi-year Tariff
n.a.	Not Available
n.p.	Not Provided
NCPP	New Captive Power Plant
NEECA	National Energy Efficiency and Conservation Authority
NEPRA	National Electric Power Regulatory Authority
NHP	Net Hydel Profit
NPCC	National Power Control Centre
NPGCL	Northern Power Generation Company Limited
NPMV	Non-Project Missed Volume
NTDC	National Transmission and Despatch Company Limited
O&M	Operation and Maintenance
PAEC	Pakistan Atomic Energy Commission
PEDO	Pakhtunkhwa Energy Development Organization
PEPCO	Pakistan Electric Power Company Limited
PESCO	Peshawar Electric Supply Company Limited
PLAC	Partial Loading Adjustment Charges
PMLTC	Pak Matiari-Lahore Transmission Company Limited
PPA	Power Purchase Agreement
PPDB	Punjab Power Development Board
PPIB	Private Power and Infrastructure Board

QESCO	Quetta Electric Supply Company Limited
RFO	Residual Furnace Oil
RLNG	Regasified Liquefied Natural Gas
SCADA	Supervisory Control and Data Acquisition
SCARP	Salinity Control and Reclamation Project
SEPCO	Sukkur Electric Power Company Limited
SGTPS	Site Gas Turbine Power Station
SNPC	Sindh Nooriabad Power Company Limited
SPP	Small Power Producer
SRO	Statutory Regulatory Order
STDC	Sindh Transmission and Dispatch Company Limited
STG	Secondary Transmission and Grid
SVC	Static Var Compensators
T&D	Transmission and Distribution
TDS	Tariff Differential Subsidy
TESCO	Tribal Area Electricity Supply Company Limited
TIP	Transmission Investment Plan
TSEP	Transmission System Expansion Plan
TOD	Time of Day
TOU	Time of Use
TPS	Thermal Power Station
TSEP	Transmission System Expansion Plan
WAPDA	Water and Power Development Authority
ZRIR	Zero Rated Industrial Rebate

SOURCE OF INFORMATION

The following sources of information have been used in the compilation of this State of Industry Report 2023:

(i) K-Electric Limited
(ii) All Distribution Companies
(iii) All Independent Power Producers
(iv) Public Sector Generation Companies
(v) National Power Control Centre, NTDC
(vi) Water and Power Development Authority
(vii) Central Power Purchasing Agency (Guarantee) Limited
(viii) National Transmission and Despatch Company Limited
(ix) National Energy Efficiency and Conservation Authority
(x) Pakhtunkhwa Energy Development Organization
(xi) Hydrocarbon Development Institute of Pakistan
(xii) Energy Department, Government of Balochistan
(xiii) Energy Department, Government of Sindh
(xiv) Alternative Energy Development Board
(xv) Private Power and Infrastructure Board
(xvi) Punjab Power Development Board
(xvii) Others



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