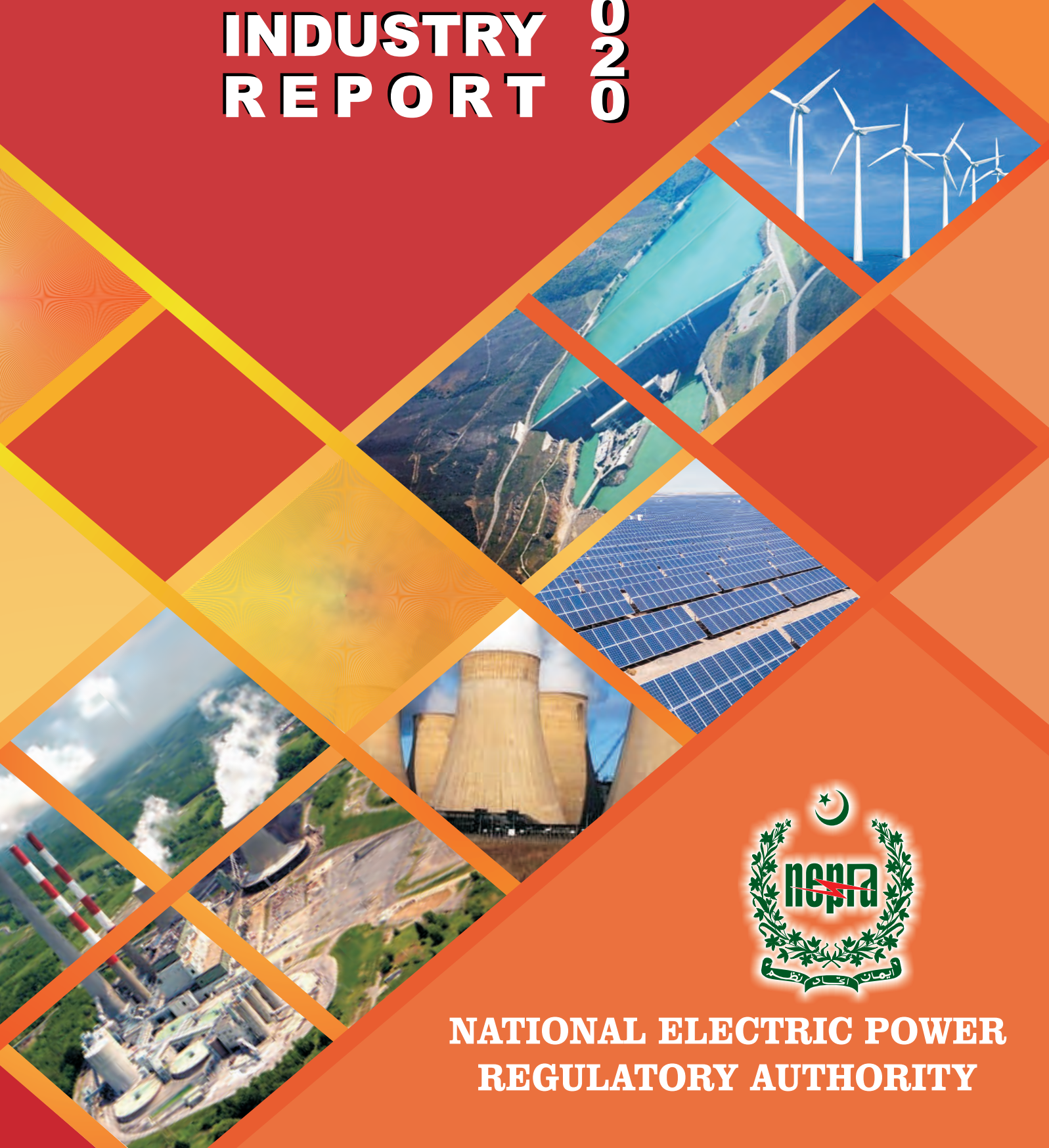


# STATE OF INDUSTRY REPORT 2020



**NATIONAL ELECTRIC POWER  
REGULATORY AUTHORITY**



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# **STATE OF INDUSTRY REPORT 2020**



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# FOREWORD

National Electric Power Regulatory Authority (NEPRA), established under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, amended from time to time, is working as the sole regulator of electric power services in the country. NEPRA performs its regulatory functions as stipulated in its Act. Cognizant of the power sector dynamics, NEPRA is providing a level playing field to all the players of the power sector to ensure the availability of affordable, reliable and sustainable electricity. The regulatory regime established under the ambit of NEPRA for its licensees has been providing directions to pursue a long term sustainable development of the power sector of Pakistan.

Being a regulator, NEPRA has been undertaking performance monitoring and evaluation of its licensees for improving delivery, enforcing rules, regulations, codes, and standards for improving the existing infrastructure, regulating tariffs and licences.

Every year, NEPRA publishes the State of Industry Report to present the latest data and facts of the power sector market, its performance, monitoring, investments, new initiatives, and regulatory developments. This year is unique in a sense that like other parts of the world, Pakistan is hit by the calamities of the COVID-19 pandemic. Drastic measures were seen to manage the epidemic situation that includes lockdowns which disrupted the conventional lifestyle and traditional economic activities, whose consequences are visible in the shape of slowing down GDP growth and electricity demand.

The State of Industry Report 2020 has encapsulated the year-long progress in the power sector, underpinned the development endeavors, and has provided a detailed insight to inform the policymakers about weaknesses in the power sector and recommends corrective measures. It is the blueprint of overall performance, achievements, and challenges of the power sector. The Report also provides details on how the sectoral players have delivered during the last one year, where they lagged, what were disconnects among them and where improvements are needed. The decision-makers, researchers, and readers will find some new facts, figures, data, and information regarding the power sector. The Report provides a picture with a long-term view to make the right decisions going forward and avoid sidetracking to ensure sustainability in the power sector.

# State of Industry Report 2020

The State of Industry Report 2020 has been published for submission to the Council of Common Interests and to the Federal Government pursuant to Section 42 of the NEPRA Act, 1997, amended from time to time. This Report mainly focuses on the state of electric power industry of Pakistan during FY 2019-20; however, to facilitate the reader, data for the last four years has also been included. The detailed statistics and data of the power sector provided in the State of Industry Report 2020, besides being a source of information, would also be useful for the decision makers.

The cooperation of all NEPRA Licensees is acknowledged for provision of required data without which compilation of this Report could not have been possible. We offer special thanks to the Private Power and Infrastructure Board, Alternative Energy Development Board, Punjab Power Development Board, Pakhtunkhwa Energy Development Organization, Energy Department (Government of Sindh) and Energy Department (Government of Balochistan) for their valuable inputs.

We hope that this Report will provide a comprehensive source of information that would enable making better decisions and undertake developmental endeavors and strategies spearheaded by the Government to address issues related to power sector.

# EXECUTIVE SUMMARY

## 01

The power sector of Pakistan, already challenged by the high cost of electricity generation and inefficiencies of transmission and distribution system, was further affected by the Pandemic COVID-19. The negative economic growth during FY 2019-20 also translated into a decrease in electric power demand in the country, resulting in a reduction of electric power generation. The negative growth of electric power demand caused under-utilization of the electric power generation capacity of power plants operating under the 'Take or Pay' regime, causing a higher per-unit cost of electricity for consumers.

The unprecedented crisis emanating from the COVID-19 pushed the Government into a perplexing situation to strike a balance between social and economic compulsions. The decision to give relief to consumers for bill payments in installments, though justified to mitigate the masses' woes, reflected badly on the recovery position of DISCOs. The overall recovery of DISCOs during FY 2019-20 remained at 88.77% of the billed amount whereas it was at 90.25% of the billed amount during the FY 2018-19. The overall recoveries of DISCOs during FY 2019-20 dropped by 1.48% in comparison with the recoveries during FY 2018-19. Given the cyclic nature of payments, the low recovery of DISCOs hampered the ability to make payments to generation and transmission companies through CPPA-G. As on 30<sup>th</sup> June, 2020, an amount of Rs. 1,042,075 million was payable by CPPA-G to power producers and NTDC.

The availability of sufficient electric power generation capacity is necessary to meet the load requirement. After facing a long period of electric power generation capacity shortages, Pakistan reached a position where the installed power generation capacity was more than sufficient to meet the total demand in the country in FY 2019-20. From 2016 till June 2020, a total of 13,298 MW electric power generation capacity was added to the power system of Pakistan. The total installed power generation capacity of Pakistan, excluding the K-Electric (KE) System, as on 30<sup>th</sup> June, 2020 was 35,735 MW. The total installed power generation capacity of KE's own power plants is 2,294 MW. In addition, some IPPs and CPPs with a total power generation capacity of 690 MW are also connected to the KE system.



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The installed electric power generation capacity can broadly be placed into two categories i.e. the Base Load Power Plants and the other large Hydro and Renewable Energy (RE) Power Plants whose capacity varies daily as well as seasonal basis. The addition of RE projects has accelerated in the power sector, bringing in the advantages of clean and indigenous resources. The rapid decline in prices, owing to improvement in technology, has made solar and wind power as the cheapest source of energy. Despite the stated advantages, the inclusion of RE power plants, being intermittent in nature, is still a big challenge due to the reasons, including but not limited to, the requirement of backup power generation capacity and added cost of transmission line due to remote locations of wind and hydropower plants. However, with better planning, based on reliable and historic data and the use of modern techniques such as hybridization of RE power, challenges in the induction of RE power plants can be managed to a larger extent. In order to take advantage of the solar potential across the country; small and medium-sized solar power plants may be installed near load centers, where the power evacuation facility (grid) already exists to minimize the transmission cost. Acknowledging the importance of RE power plants, the Federal Government has set a target of 20% RE capacity by 2025 and 30% by 2030 in the national grid.

Although the induction of electric power generation capacity on large scale has catered for the longstanding electric power shortfall, the obligation of capacity payments has increased due to the 'Take or Pay' Power Purchase Agreements (PPAs). Such types of PPAs require optimum utilization of available generation capacity to avoid the undue financial burden that emanates from capacity payments. Over a period of time, the electricity prices have been increasing for the end consumer which is a growing concern for the regulator. Besides the higher Transmission & Distribution losses, the low recoveries and under-utilization of 'Take or Pay' power plants, various other elements like currency devaluation, low sales growth rate, front-loaded tariff, operation of costlier power plants due to transmission constraints, etc. have added to the increased cost.

With regard to electric power generation system, a comprehensive plan for induction, retirement and replacement of power plants is needed to be developed and followed up with strict monitoring and continuous improvements. NTDC, according to the provisions of Grid Code, prepared a long term Indicative Generation Capacity Expansion Plan (IGCEP) and submitted it to NEPRA for approval. The Plan was evaluated by the professionals of NEPRA in consultation with all the stakeholders and returned with observations of the Authority as well as other stakeholders to NTDC for revision and resubmission. The IGCEP, once approved by the regulator, will give a clear picture of power generation outlook of the country and provide clarity for decision makers at all levels.

For effective utilization of available generation capacity, a robust and efficient transmission network is essential to transmit the electricity from its point of generation to the load centers. The existing transmission network of NTDC, subject to system constraints, is causing the under-utilization of the efficient plants. Besides some hydel and thermal power plants, the wind power plants in the South are also facing problems in evacuation of electric power that could be generated. Under the Energy Purchase Agreements (EPAs), in the event of failure to off take the available energy from RE power plants, these plants are eligible for payments on account of Non-Project Missed Volume (NPMV). Therefore, NTDC must develop a robust transmission system to ensure full evacuation of electric power for transmission across the country from South to Center and North or vice-versa; so that cheaper power from efficient power plants can be made use of.

Like generation and transmission systems, the distribution business in electric power sector is also important as it directly interacts with the electricity consumers. The distribution business could not be transformed into a competitive market as was conceived under WAPDA's Strategic Plan for the Privatization of the Pakistan's Power Sector, 1992. For smooth transition, PEPCO was incorporated in 1998 to facilitate the transition process within two years, but even after 20 years PEPCO still exists controlling the affairs of Ex-WAPDA DISCOs.

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The high cost of electricity, inefficient distribution services and load-shedding policy on high loss feeders is pushing consumers away from the DISCOs. The load-shedding policy is compelling the consumers for use of the smaller inefficient gas or diesel generators as well as Un-interrupted Power Supply (UPS) which has disrupted the efficient allocation of valuable resources in the economy. The distributed generation through solar power solutions has made a significant ingress in the domestic consumer base of DISCOs which are losing the consumers with high consumption and paying capacity. Similarly, the commercial, educational and industrial outfits are also inclined to drift away from DISCOs and opt for self-generation through solar power. So far, nearly 5,000 Net-Metering Licences with around 86 MW electric power generation capacity have been issued by NEPRA. Apart from the distributed generation, various industrial and commercial consumers of DISCOs, dissatisfied with the higher cost and poor quality of services, tend to directly purchase electricity from generation companies for reliable and cheaper electricity supply through wheeling arrangements. Although DISCOs are resisting the wheeling regime, the Regulator cannot deprive the consumers to buy cheaper electricity from the sources of their choice.

The power sector reforms envisaged a transition from monopoly structure to a competitive market; an objective which has not been achieved yet. DISCOs, which were supposed to be independent commercial entities are instead, tied centrally, having the least say in their own commercial decisions. Similarly, the Public Sector Generation Companies (GENCOs) have also been centrally tied by the creation of GENCO Holding Company Limited (GHCL). Going forward, in the wake of amendments in NEPRA Act in 2018, the competition can no longer be avoided. The NEPRA (Amendment) Act, 2018 puts a lot of emphasis on developing an electric power market and reducing regulatory oversight. Fundamental structural changes have been introduced, leading to the wholesale and retail markets. The supply of power has been excluded from the ambit of distribution and is now a distinct licenced business which will create a retail market. Similarly, the power trader licence has been introduced for wholesale trade of electricity. Provinces are also eligible to develop their own transmission system for transmission of power within the province. All of these fundamental changes, coupled with the increased interest of consumers in net-metering and wheeling of electric power, are going to lead towards a competitive environment as an unavoidable reality which the public sector entities, especially the DISCOs must realize. Any attempt to further protect the monopolistic and oligopolistic status- quo may not only hurt the power sector but also the overall economic growth of the country.

CPPA-G, already registered to act as Market Operator, has been mandated with the responsibility to design a wholesale competitive market model for the country. CPPA-G submitted a conceptual design of the Competitive Trading Bilateral Contract Market (CTBCM) model which was approved by Authority in December, 2019. Subsequently, CPPA-G submitted the detailed design model and implementation roadmap for approval of the Authority in February, 2020. An International Consultant has been engaged for the review of the proposed model. The Authority has considered the observations of the relevant stakeholders as well as the International Consultant and the same have been shared with CPPA-G for redressal.

Under the NEPRA (Amendment) Act, 2018 the Federal Government is required to prepare a National Electricity Policy for the development of power markets as well as the National Electricity Plan in accordance with the Policy. The Authority is required to perform its functions under the National Electricity Policy and National Electricity Plan. Besides the policy and plan, formulization of rules under the NEPRA Act, 2018 is now also the domain of the Federal Government. Urgent finalization of the National Electricity Policy and Plan is necessary for formulating the regulatory framework to forward the objectives of the Act in its spirit and to create certainty for all the stakeholders in the power sector.

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The present state of electric power generation, transmission and distribution in the country shows that in the existing system there is a potential to decrease the electricity cost by making efficient decisions and maintaining good governance in the power sector. The existing higher prices of electricity can be lowered by the measures, including but not limited to the following:

- (a) Operating the most efficient plants at optimal load,
- (b) Retiring the inefficient power plants specifically the ones operating in public sector GENCOs,
- (c) Improving the supply chain for RLNG,
- (d) Displacing expensive electricity with cheap electricity generation options,
- (e) Allocation of cheapest gas (pipeline quality) to the most efficient power plants,
- (f) Minimum operation of combined cycle power plants in open cycle mode,
- (g) Discouraging use of pipeline quality gas in open cycle steam turbine thermal power plants,
- (h) Inducting small and medium size solar power plants near existing grid stations,
- (i) Avoiding operation of most efficient power plants on part load,
- (j) Ensuring the availability of transmission line to evacuate electricity from most efficient power plants,
- (k) Executing Transmission Service Agreement,
- (l) Decreasing the transmission and distribution losses,
- (m) Retiring the circular debt,
- (n) Ensuring the timely payments of subsidy amounts,
- (o) Avoiding load-shedding on feeders on the basis of Aggregate Technical & Commercial losses,
- (p) Improving the billing collection ratio,
- (q) Revisiting the use of two basket system in the country,
- (r) Decreasing the levies on primary energy being used for power generation,
- (s) Avoiding recoveries of various taxes/fees/levies through electricity bills,
- (t) Adopting effective Demand Side Management,
- (u) Introducing Time-of-Use (TOU) tariff in off-peak hours for optimum utilization of 'Take or Pay' electric power generation capacity.
- (v) Inducting peak load power plants in the system, and
- (w) Encouraging Merchant plants to supply electricity in the country.



# 02

## OVERVIEW OF THE ELECTRIC POWER SECTOR

It goes without saying that the energy is the backbone and basic need of all the sectors of economy, be it industrial, agriculture, commercial, health, education, domestic or others. The energy consumption needs of a country are directly related to its GDP growth, therefore, GDP is the main factor used to estimate the energy needs growth in a country and to plan for energy supplies. The GDP growth rates of Pakistan during FY 2018-19 and FY 2019-20 remained 1.19% and -0.38% respectively.

During second half of the FY 2019-20, the global economy has been hit by the Pandemic COVID-19. This pandemic has slowed down the development and has impacted overall progress. Pakistan is also recipient of the economic crunch and recorded a negative growth of -0.38% for the FY 2019-20. The force majeure situation created as a result has negatively impacted growth in the industrial and services sectors.

The primary energy supplies and final energy consumption give an overall outlook of the energy sector of the country. The primary energy supplies are the forms of energy converted to final energy through use of different equipment. The primary energy supplies consist of oil, gas, coal, nuclear electricity net generation and conventional hydroelectricity net generation. The final energy is a form of energy available to the user following the conversion from primary energy like gasoline, diesel oil, purified coal, purified natural gas, electricity and mechanical energy.

The annual Energy Year Book (EYB) published by Hydrocarbon Development Institute of Pakistan is the main source of primary energy data which is available upto June, 2019. As per EYB 2018-19, the annual growth rate of primary energy supplies during FY 2017-18 and FY 2018-19 remained 8.44% and -2.88% respectively. Similarly, the annual growth rate of final energy consumption during FY 2017-18 and FY 2018-19 remained 9.72% and 0.005% respectively.

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## **2.1 INSTALLED POWER GENERATION CAPACITY**

The installed power generation capacity of Pakistan as on 30<sup>th</sup> June, 2020 stands at 38,719 MW as compared to 38,995 MW on 30<sup>th</sup> June, 2019 showing a net decrease of 276 MW. The said net decrease of 276 MW is due to deletion of 144 MW GTPS Kotri (GENCO-I) and 640 MW TPS Guddu (GENCO-II), addition of 330 MW Engro PowerGen. Thar, 28 MW TPS Quetta (GENCO-II), 100 MW Gulpur Hydropower Project in AJ&K and 50 MW Ghara Solar Power Project in K-Electric system.

The total installed capacity of public sector power plants in the country as on 30<sup>th</sup> June, 2020 was 19,621 MW while the installed capacity of private sector power plants, including KE, was 19,098 MW. Out of 38,719 MW, 24,817 MW is thermal, 9,861 MW hydroelectric, 1,248 MW wind, 530 MW solar, 369 MW bagasse, 1,467 MW is nuclear and 427 MW is SPPs/CPPs.

The installed capacity of power plants connected with NTDC System was 35,735 MW including 19,484 MW public sector power plants and 16,251 MW private IPPs and other power plants.

The total installed capacity of power plants connected with KE system as on 30<sup>th</sup> June, 2020 was 2,984 MW. The installed capacity of KE's own power plants was 2,294 MW. Besides its own power plants, KE also purchases electric power from external sources including 366 MW IPPs, 87 MW SPPs/CPPs, 137 MW KANUPP and 100 MW solar power plants connected with KE system. KE is also purchasing electric power from CPPA-G basket to the tune of 650 MW. In addition, CPPA-G is also supplying 150 MW electric power to KE through three dedicated wind power plants since 2019 for two years, extendable with mutual consent, under a Power Purchase and Agency Agreement between KE, CPPA-G and NTDC. These three wind power plants are now directly connected with KE system.

## **2.2 ELECTRICITY GENERATION**

The statistics show that during FY 2019-20, the total electricity generation in the country was 134,745.70 GWh compared to 136,532 GWh electricity generation during FY 2018-19 showing a decrease of 1,786.30 GWh. Further, 513.74 GWh has also been imported from Iran during FY 2019-20 as compared to 486.80 GWh imports during FY 2018-19 showing an increase of 26.94 GWh.

The total electricity generation of power plants connected with NTDC system (including imports) remained 122,157.65 GWh which included 38,987.96 GWh hydel, 68,628.16 GWh thermal, 9,704.89 GWh nuclear, 2,882.48 GWh wind, 704.97 GWh solar power, 564.46 GWh bagasse/biomass, 170.99 GWh from SPPs/CPPs and 513.74 GWh imports from Iran.

During the year under consideration, the public sector power plants generated 73,550.88 GWh while private sector power plants generated 61,194.03 GWh. The generation from public sector and private sector power plants during FY 2018-19 remained 71,946.02 GWh and 65,072.84 GWh respectively.

### **2.2.1 Electricity Generation (CPPA-G Basket):**

(a) **Hydel:** Water & Power Development Authority (WAPDA) is a public sector entity which develops, operates and controls the hydropower plants in the public sector of Pakistan. During FY 2019-20 WAPDA Hydel generated 37,425.41 GWh electricity compared to 31,167.85 GWh last year showing an increase of 6,257.56 GWh. During the same period, the hydel IPPs generated 1,562.55 GWh electricity as compared to 1,928.04 GWh during FY 2018-19 showing a decrease of 365.49 GWh. The share of hydel generation in the generation basket of CPPA-G during FY 2019-20 remained 30.77% while this share was 25.35% during FY 2018-19.

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(b) **Public Sector GENCOs:** The total electricity generation of GENCOs during FY 2019-20 remained 7,907.91 GWh as compared to 13,016.93 GWh during FY 2018-19 showing a decrease of 5,109.02 GWh. GENCO-I generated only 209.90 GWh of electricity during FY 2019-20, as compared to its last year's electricity generation of 880.09 GWh. The electricity generated by GENCO-II during FY 2019-20 has been recorded at 5,921.75 GWh while, it was 9,384 GWh during FY 2018-19. Similarly, GENCO-III generated 1,775.86 GWh electricity during FY 2019-20 as compared to its last year's generation of 2,715.79 GWh showing a decrease of 939.93 GWh. The share of GENCOs electricity generation in the generation basket of CPPA-G during FY 2019-20 remained 6.52% while this share was 10.54% during FY 2018-19.

The efficiencies of GENCO's old power plants are low and decreasing over-time. Further, the newly inducted 747 MW CCPP Guddu and TPS Nandipur are also operating at efficiencies lower than allowed in the tariff. Since the tariff of GENCO-I, II and III is on 'Take or Pay' basis; therefore, on one hand these power plants are eligible for capacity payments irrespective of the fact whether CPPA-G purchased electricity from these plants or not while on the other hand, due to lower efficiencies, operation of these power plants is not feasible and adversely affecting the electricity power generation cost of CPPA-G basket.

(c) **Thermal IPPs:** The total electricity generated by thermal IPPs for supply to CPPA-G basket during FY 2019-20 is noted as 60,720 GWh against 62,598 GWh during the FY 2018-19 showing a decrease of 1,878 GWh. All IPPs are supplying electric power to the CPPA-G on 'Take or Pay' basis thus their lower utilization factor is increasing per unit purchasing cost from these power plants. The share of IPP's electricity generation in the generation basket of CPPA-G during FY 2019-20 remained 49.71% while this share was 50.70% during FY 2018-19.

(d) **Nuclear:** The total electricity generation of the four nuclear power plants (CHASNUPP-I, II, III & IV), connected with NTDC system, during the FY 2019-20 remained 9,704.84 GWh as compared to 9,005.68 GWh generation during the FY 2018-19 showing an increase of 699.21 GWh. The share of nuclear based electricity generation in the generation basket of CPPA-G during FY 2019-20 remained 7.94% while this share was 7.29% during FY 2018-19.

(e) **Wind:** The total electricity generation from wind power plants during FY 2019-20 remained 2,882 GWh as compared to 3,231.64 GWh during FY 2018-19 showing a decrease of 349.64 GWh. Non-evacuation of available electric power from WPPs makes them eligible for payment against NPMV. The share of electricity generation of these WPPs in the generation basket of CPPA-G during FY 2019-20 remained 2.36% while this share was 2.61% during FY 2018-19.

(f) **Solar:** The total electricity generation from the solar power plants connected with NTDC System during FY 2019-20 was recorded as 704.97 GWh as compared to 714.52 GWh during FY 2018-19 showing a decrease of 9.55 GWh. The share of solar based electricity generation in the generation basket of CPPA-G during FY 2019-20 remained 0.58%.

(g) **Bagasse/Biomass:** The total electricity generation of the bagasse/biomass power plants during FY 2019-20 remained 564.46 GWh as compared to 894.43 GWh during FY 2018-19 showing a decrease of 329.97 GWh. The share of bagasse/biomass based electricity generation in the generation basket of CPPA-G during FY 2019-20 remained 0.46% while this share was 0.72% during FY 2018-19.

(h) **SPPs/CPPs:** The total electricity supply by various small/captive power plants to DISCOs on 'Take and Pay' basis during FY 2019-20 decreased to 170.99 GWh compared to 405.13 GWh supplied during FY 2018-19. The share of such power plants in the generation basket of CPPA-G during FY 2019-20 remained 0.14% while this share was 0.33% during FY 2018-19.

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## 2.2.2 Electricity Generation (K-Electric Basket):

(a) **KE Own Generation:** The total electricity generated by K-Electric (KE) through its own power plants remained 10,358 GWh during FY 2019-20 compared to the last year's electricity generation of 10,727 GWh showing a decrease of 369 GWh.

(b) **Purchases:** During FY 2019-20, KE purchased 8,169.68 GWh electricity from external sources including 1,862.68 GWh from IPPs, 193 GWh from KANUPP, 153 GWh from two solar power projects, 5,426 GWh import from NTDC system (including supply from 150 MW dedicated WPPs), and 535 GWh from other power plants connected with KE system.

During FY 2019-20, KE generated almost 56% of the total electricity consumed in its area while rest of 44% was purchased from above mentioned sources. In comparison to FY 2019-20, during FY 2018-19, KE had generated almost 58% of the total electricity consumed in its area while remaining 42% was purchased from external sources. A summary of last five years electricity generation by KE through its own power plants and purchases from external sources is given below:

Source of Electric Power (GWh)	2015-16	2016-17	2017-18	2018-19	2019-20
KE's Own Generation (A)	10,323.00	10,147.00	10,337.75	10,727.68	10,358.00
Purchases from CPPA-G (B)	5,059.00	5,077.00	5,128.20	4956.71	5,426.00
Purchases from Other Sources (C)	1,922.00	2,128.00	2,705.89	2,842.90	2,743.68
<b>Total Purchases (B+C)</b>	<b>6,981.00</b>	<b>7,205.00</b>	<b>7,834.09</b>	<b>7,799.16</b>	<b>8,169.68</b>
<b>Total units purchased by KE including own generation for Distribution (A+B+C)</b>	<b>17,304.00</b>	<b>17,352.00</b>	<b>18,171.84</b>	<b>18,526.83</b>	<b>18,527.68</b>

Source: KE

## 2.3 ELECTRICITY TRANSMISSION

### 2.3.1 Transmission System of NTDC:

The NTDC is the National Grid Company in Pakistan and its transmission network is spread all over the country except the area served by KE. As of 30<sup>th</sup> June, 2020, NTDC is maintaining 16 (sixteen) Nos. of 500 kV grid stations with a transformation capacity of 23,400 MVA. There are 43 (forty-three) Nos. of 500/220 kV transformers and 33 (thirty-three) Nos. of 220/132 kV transformers installed at these grid stations. NTDC also maintains 45 (forty-five) Nos. of 220 kV grid stations with transformation capacity of 31,900 MVA. There are 127 (one hundred and twenty-seven) Nos. of 220/132 kV transformers installed at 220 kV grid stations.

During FY 2019-20, the length of transmission lines of NTDC at 500 kV increased from 6,417 km to 7,238 km while the length of transmission line at 220 kV increased from 11,219 km to 11,281 km. Similarly during FY 2019-20, one (01) Power Transformer has been added at 500/220 kV level while 03 (three) Nos. of power transformers have been added at 220/132 kV level in NTDC system.

### 2.3.2 Loading Position of Power Transformers in NTDC System:

Out of 43 Nos. of transformers at 500/220 kV level, 21 transformers (48.84%) are loaded above 80% of their rated capacity. Similarly, out of 160 Nos. of transformers at 220/132 kV level, 91 are over-loaded representing around 56.87% over-loading in the system.

### 2.3.3 Outages on Transmission Lines of NTDC:

As reported by NTDC the number of planned outages at 500 kV and 220 kV levels during FY 2019-20 have decreased as compared to FY 2018-19. Similarly, the number of forced outages at 500 kV level in FY 2019-20 have also decreased as compared to FY 2018-19. The total duration of planned outages at 500 kV and 220 kV level decreased during FY 2019-20 as compared to FY 2018-19.



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Year	Description	Planned Outages		Forced Outages	
		500 kV	220 kV	500 kV	220 kV
2018-19	No. of Outages	723	2082	203	556
	Total duration in minutes	347040	999360	102967	282906
	Maximum duration of any single outage (Minutes)	14400	156960	17308	18228
2019-20	No. of Outages	547	1774	131	360
	Total duration in minutes	262560	851520	74446	183176
	Maximum duration of any single outage (Minutes)	18720	23040	24038	20160

Source: NTDC

## 2.3.4 Transmission System of K-Electric:

KE is a privatized vertically integrated utility possessing three separate licences of Generation, Transmission and Distribution businesses. The licence issued to KE allows it to generate, transmit and distribute the electricity to its consumers within its service area.

KE is operating under the licence issued by NEPRA to carry out electricity transmission business within its service area. KE owns, operates and maintains transmission network of 220 kV and 132 kV. The details of existing transmission network of KE at 220 kV and 132 kV level is as under:

- (a) 365 km of 220 kV Transmission Lines,
- (b) 11 Nos. of 220 kV Grid Stations with transformation capacity of 4,580 MVA
- (c) 801 km of 132 kV Transmission Lines.
- (d) 68 Nos. of 132 kV Grid Stations having transformation capacity of 6,951 MVA

During FY 2019-20, 01 No. grid station has been added at 220 kV level while 02 Nos. Grid Stations have been added at 132 kV level in KE system.

## 2.3.5 Loading Position of Power Transformers in K-Electric System:

KE has 11 Nos. grid stations of 220/132 kV level with 13 Nos. auto transformers of 4,580 MVA transformation capacity, 68 Nos. of grid stations of 132/11 kV level with 167 Nos. power transformers of 6,951 MVA transformation capacity. Operational record of 220/132 kV grid stations provided by the KE shows no over-loading during the reported period of FY 2019-20 whereas, 40 out of 167 Nos. KE's power transformers at 132/11 kV level were reported over-loaded during FY 2018-19.

## 2.3.6 Outage on Transmission Lines of K-Electric:

The following table provides a comparison of transmission outages for FY 2018-19 and FY 2019-20 as reported by KE. It is noted that at 132 kV level, number of planned and forced outages and total duration of outages have decreased during FY 2019-20 as compared to FY 2018-19:

Year	Description	Planned Outages		Forced Outages	
		220 kV	132 kV	220 kV	132 kV
2018-19	No. of Outages	0	10	0	46
	Total duration in minutes	0	13049	0	4997
	Maximum duration of any single outage (Minutes)	0	3723	0	469
2019-20	No. of Outages	0	5	2	35
	Total duration in minutes	0	3417	673	3823
	Maximum duration of any single outage (Minutes)	0	1279	558	666

Source: KE

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## 2.4 ELECTRICITY DISTRIBUTION

### 2.4.1 Distribution System of Ex-WAPDA DISCOs:

Distribution of electricity is an important function for provision of electricity to the end-consumers. As on 30<sup>th</sup> June, 2020, there were ten state owned DISCOs exclusively responsible for supply of electricity in their respective areas. These DISCOs are performing distribution function under licences granted by NEPRA. In addition KE also possesses the Distribution Licence to supply electricity in its designated area.

Prior to amendments in NEPRA Act in April, 2018 the distribution of electricity included the wire business as well as sale of electricity to the end-consumers. However, after the promulgation of NEPRA (Amendment) Act, 2018, the sale of electricity has been excluded from the ambit of distribution and for sale of electricity, a separate 'Electric Power Supply Licence' is required. The existing distribution licensees shall be deemed to hold a licence for supply of electric power for a period of five years from coming into effect of NEPRA (Amendment) Act, 2018.

Besides DISCOs and KE, Distribution Licences have also been granted to Bahria Town Rawalpindi/Islamabad, Defence Housing Authority – Lahore, Aujla Associates, Gujranwala and Lasbela Industrial Estates Development Authority to supply electricity in the territory specified in their respective distribution licences.

### 2.4.2 Over-loading Position of DISCOs Distribution Network:

Power delivery through DISCOs' networks mainly depends on the adequacy of three major components including 11 kV feeders, power transformers (mostly 132/11 kV transformers) and finally the distribution transformers. Province-wise statistics of over-loading position for FY 2019-20 is shown in the following table:

Description	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan	Total
Total No. of 11 kV Feeders	6,623	1,097	1,334	652	9,706
Over-loaded 11 kV Feeders (Nos.)	868	172	534	652	2,033
<b>Over-loaded 11 kV Feeders (%)</b>	<b>13.11</b>	<b>15.68</b>	<b>40.03</b>	<b>100</b>	<b>20.95</b>
Total No. of Power Transformers	1378	254	294	177	2103
Over-Loaded Power Transformers (Nos.)	152	42	102	51	347
<b>Over-Loaded Power Transformers (%)</b>	<b>11.03</b>	<b>16.54</b>	<b>34.69</b>	<b>28.81</b>	<b>16.50</b>
Total No. of Distribution Transformers	530,056	76,512	96,210	62,337	765,115
Over-loaded Distribution Transformers (Nos.)	35,832	3887	10,159	6,814	56,692
<b>Over-loaded Distribution Transformers (%)</b>	<b>6.76</b>	<b>5.08</b>	<b>10.56</b>	<b>10.93</b>	<b>7.41</b>

Source: DISCOs

### 2.4.3 Transmission and Distribution Losses of DISCOs:

The following table shows a comparison between the T&D losses of DISCOs for the FY 2018-19 and FY 2019-20. During the year the T&D losses of TESCO, QESCO and PESCO increased in comparison with the last year. Whereas, the T&D losses of IESCO, GEPCO, LESCO, FESCO, MEPCO, HESCO and SEPCO decreased in comparison with FY 2018-19.

Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO
2018-19	36.56	11.97	8.86	9.87	13.17	9.81	15.79	29.49	36.97	23.56
2019-20	38.69	16.19	8.69	9.51	12.40	9.62	15.23	28.82	36.27	26.68
<b>Inc./ (Dec.)</b>	<b>2.13</b>	<b>4.22</b>	<b>(0.17)</b>	<b>(0.36)</b>	<b>(0.77)</b>	<b>(0.19)</b>	<b>(0.56)</b>	<b>(0.76)</b>	<b>(0.70)</b>	<b>3.12</b>

Source: DISCOs

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## 2.4.4 Recoveries of Billed Amount in DISCOs:

A comparison of recovery percentages of DISCOs during FY 2018-19 and FY 2019-20 is given below:

Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	Overall DISCOs
2018-19	88.62	67.91	87.61	96.37	97.68	99.28	99.35	74.47	63.28	27.33	90.25
2019-20	87.65	68.16	90.27	94.36	94.48	94.18	92.94	73.19	56.54	49.25	88.77
Inc./ (Dec.)	(0.97)	0.25	2.66	(2.01)	(3.20)	(5.10)	(6.41)	(1.28)	(6.74)	21.92	(1.48)

Source: DISCOs

The combined recovery of all DISCOs during FY 2019-20 remained 88.77% as compared to 90.25% during FY 2018-19 showing an overall decrease of 1.48% in recoveries in comparison with the last year.

The receivables from public and private consumers as well as the delayed payments of subsidies are causing increase in circular debt. DISCOs are required not only to improve recovery from public and private consumers but also to actively follow-up with the relevant Governments for timely recovery of subsidy amounts.

## 2.4.5 Distribution System in K-Electric Area:

KE develops, manages, maintains and operates distribution network within its service area. The distribution assets of KE include:

- (a) 1,890 Nos. of 11 kV Feeders, 10,204 km long
- (b) 28,842 Nos. of Distribution Transformers having transformation capacity of 7,915 MVA and
- (c) 18,367 km of LT Lines

## 2.4.6 Over-loading Position of K-Electric Distribution Network:

The over-loading position of 11 kV Feeders, Power Transformers and Distribution Transformers in KE System during the FY 2019-20 and its comparison with last year's position is given below:

Description	2018-19	2019-20
Total No. of Over-Loaded 11 kV Feeders (above 80%)	48	52
Total No. of Over-Loaded Power Transformers (above 80%)	45	40
Total No. of Over-Loaded Distribution Transformers (above 80%)	808	2,250

Source: KE

As above, there has been a considerable increase in over-loaded distribution transformers which increased from 808 in FY 2018-19 to 2,250 in FY 2019-20.

## 2.4.7 Transmission and Distribution Losses in K-Electric:

KE has been granted a Multi-Year Tariff (MYT) for a control period of 07 years from FY 2016-17 to FY 2022-23. Under its MYT Determination, KE has been given a target of 17.76% T&D losses for the fourth year of its MYT i.e. 2019-20. However, for the FY 2019-20, the reported T&D losses of KE (excluding auxiliary consumption) have been 19.73%.

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## 2.4.8 Recoveries of Billed Amount in K-Electric:

The position of amount billed and realized against different consumer categories in KE area for the FY 2019-20 and its comparison with the position during FY 2018-19 is given below:

Category	Amount of Billed Units (Rs. in Million)		Amount Realized and %age Recovery to Billed Amount			
	2018-19	2019-20	(Rs. in Million)		(% )	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Domestic	104,293	107,747	92,483	99,394	88.68	92.25
Commercial	45,236	43,996	44,138	42,968	97.57	97.66
Industrial	65,080	80,796	64,998	73,470	99.87	90.93
Agricultural	1,071	975	316	279	29.51	28.62
Public Lighting	2,784	2,728	266	1,811	9.55	66.39
Bulk Supply	9,078	9,534	8,515	10,227	93.80	107.27
Others	1,098	9,109	1,041	6,706	94.81	73.62
<b>Total</b>	<b>228,640</b>	<b>254,885</b>	<b>211,757</b>	<b>234,855</b>	<b>92.62</b>	<b>92.14</b>

Source: KE

The overall recovery ratio of 92.14% has decreased over the last year ratio of 92.62%.

## 2.5 ISSUES OF POWER SECTOR

### 2.5.1 High Cost of Electricity:

The economic and social well-being of a country greatly depends on access to the affordable electricity by all segments of society. The availability of electricity and its indiscriminate access to everybody at affordable rates is hallmark of an efficient power sector. In Pakistan, a large part of the current decade was plagued with excessive load-shedding due to non-availability of sufficient affordable generation capacity and inefficient transmission and distribution services. With the induction of substantial amount of generation capacity during last few years, though the availability of electricity has improved significantly but the cost of electricity for end-consumers has increased owing to various reasons like high T&D losses, low recovery, circular debt, huge capacity payments, currency devaluation, fuel cost, under-utilization of efficient power plants etc. The situation indicates lack of integrated approach for planning and implementation of power sector expansion and demands to identify and resolve the basic issues leading to inefficiencies in the system. Some of the major issues causing the high cost of electricity are discussed in following paras.

### 2.5.2 Circular Debt:

Presently, CPPA-G is, inter-alia, undertaking the responsibility of procurement of electric power on behalf of EX-WAPDA DISCOs. It purchases electric power from generation companies for supply to DISCOs through the transmission company i.e. NTDC. In addition, CPPA-G is also supplying electricity to KE. Upon supply of electricity, CPPA-G raises invoices to all Distribution Companies for the supplied electric power as well as the Use of System Charges of the Transmission Company. The Distribution Companies are required to pay the due amount to CPPA-G within given time to enable CPPA-G to make payments to the generation and transmission companies. However, most of the Distribution Companies, for reasons, including but not limited to, the higher T&D losses, low recoveries etc., are unable to make payments within due time which in turn hinders CPPA-G in making payments to generation and transmission companies. The cycle goes on as the generation companies are unable to make payments to the fuel suppliers who face difficulty to settle the import bill; the phenomenon creates circular debt. Under the PPAs, the delayed payments to the power companies bears mark-up and increases the financial liability.



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The accumulation of circular debt is a serious issue confronting the power sector and the country as a whole. It is not only affecting the liquidity of the fuel supplier, generation, transmission and distribution companies but also increasing the cost of electricity for the end-consumer. As reported by CPPA-G, an amount of Rs. 2,150,424 million has accumulated as on 30<sup>th</sup> June, 2020 on account of circular debt of power sector.

## **2.5.3 Under-utilization of ‘Take or Pay’ Power Plants:**

Generally, the availability factor of gas/RLNG power plants is 92%, coal power plants is 85% and RFO power plants is 88%. The optimal utilization of most efficient power plants is inevitable to minimize the cost of power generation in the country. It is noted at various occasions that the efficient power plants are either not utilized or under-utilized while giving dispatch to the power plants with lesser efficiency which causes increase in the per unit electricity cost for end-consumers. The information provided by NPCC and CPPA-G reveal under-utilization of various efficient power plants as well as burning of gas in less efficient and/or open cycle power plants. Under-utilizing the efficient power plants not only deprives the country of available cheaper electricity units but it also increases the burden in the form of capacity payments for un-utilized capacity. Departure to the less efficient plants causes inefficient burning of fuel translating into expensive electricity for the consumers.

## **2.5.4 In-efficient Public Sector Power Generation (GENCOs) Plants:**

The efficiency of old GENCOs power plants has deteriorated overtime. Further, due to low efficiency, the plant utilization factors of these GENCOs have also come down to lower limits. During FY 2019-20, the total generation of GENCOs has been recorded as 7,907.91 GWh which is much lower than the previous year's generation of 13,016.93 GWh. Out of 7,907.91 GWh, two power plants i.e. 747 MW CCPP Guddu of GENCO-II and 567 MW TPS Nandipur of GENCO-III generated combined 5,791.68 GWh while the remaining power plants of GENCOs with 3,539 MW capacity only generated 2,116.23 GWh. GENCO-IV recorded nil generation for second consecutive year.

The low efficiencies of GENCOs old plants causes inefficient burning of fuel and increases the cost of generation. Since the tariffs of GENCO-I, II and III are on ‘Take or Pay’ basis; therefore, their low utilization on one hand is burdening the electricity consumers on account of capacity payment for idle capacity. On the other hand, utilization of GENCOs old power plants is increasing the cost of generation of CPPA-G basket due to their low efficiency. Further, operation of these power plants on part load also qualifies them for Partial Load Adjustment Charges (PLAC) which also adversely affects the cost of electricity. The CPPA-G has verified an amount of Rs. 177.79 million and Rs. 157.35 million on account of PLAC to GENCO-I and GENCO-III respectively for the FY 2019-20 while the PLAC for the said GENCOs during FY 2018-19 was Rs. 894.87 million and Rs. 431.23 million respectively.

The operation of inefficient GENCO power plants is a continuous burden on the country. Retaining the old inefficient steam thermal power plants, while having sufficient capacity of efficient power plants, that too on ‘Take or Pay’ basis is not desirable. It is noted that unlike the IPPs, the control period of NEPRA determined tariff of GENCOs is not too long. NEPRA has repeatedly emphasized the need to retire the older power plants of GENCOs to reduce financial burden on the sector and diversion of precious fuel to the most efficient power plants.

## **2.5.5 Operation of Power Plants on Part Load:**

Partial loading of power plants due to multiple reasons like transmission constraints, back up capacity to meet the intermittency of renewable projects, lack of demand, start-up and shutdown issues with steam power plants etc. is also contributing to the high cost of electricity. The operation of power plants on part load reduces their efficiency which results in inefficient burning of fuel. The part load operation of power plant results in Partial Loading Adjustment Charges (PLAC) to the generating company. The data shows huge amounts of 5,305.12 million, 12,963.31 million and 12,486.81 million verified to be payable by CPPA-G to power generating companies (IPPs and GENCOs) on account of PLAC during FY 2017-18, FY 2018-19 and FY 2019-20 respectively. With better management, PLAC can be reduced to minimum.

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## **2.5.6 Operation of Combined Cycle Power Plant(s) in Open Cycle Mode:**

Operation of combined cycle power plants in open cycle mode as well as burning of pipeline quality gas in open cycle steam turbines adds to the cost of electricity for the consumers and needs to be discouraged to ensure most efficient use of valuable fuel and to bring down the electricity cost. The gas based power plant of Guddu (Unit 11-13) is operating in open cycle mode which is adversely affecting the generation cost of electric power in CPPA-G basket. Further it is noted that steam turbine power plants in GENCOs and KE whose efficiency is very low, have generated electricity by using pipeline quality gas which was not desirable and has contributed to increase the cost of electricity.

## **2.5.7 Use of Cheaper Gas Fuel by In-efficient Plants:**

The pipeline quality gas is cheaper than the imported RLNG and its utilization in the most efficient power plants can minimize the cost of generation. It is noted that gas allocation and its supply to the power plants is not well coordinated between the relevant entities. At various occasions, gas was being supplied to less efficient power plants while under-utilizing or non-utilizing efficient power plants due to non-availability of gas. Further, the operation of steam turbine power plant of GENCOs and KE using pipeline quality gas is inefficient burning of gas. Similarly, the use of gas for power generation by CPPs, having much lower efficiencies as compared to the efficient gas based power plants available in CPPA-G and KE systems, is also in-efficient burning of gas. The supply of pipeline quality gas, having low price as compared to RLNG, to less efficient power plants also adversely affected the cost of electricity generation. Therefore, while allocating and supplying the pipeline quality gas, its burning in the most efficient power plants should be ensured.

## **2.5.8 Non-availability of RLNG to Power Plants:**

It is a fact that most of the gas, (including RLNG) based power plants in the power sector of Pakistan are comparatively efficient and fall under top slots of EMO. Further, it is also noted that in dual fuel (RFO and RLNG) power plants, RLNG based electricity generation is cheaper than RFO based power generation. Therefore, operations of dual fuel (RFO and RLNG) power plants on RLNG is cheaper and desirable. However, it is noted that non-availability of fuel i.e. gas/RLNG is causing the under-utilization or non-utilization of the power plants. In the wake of depletion of local gas, the country started importing RLNG for power generation in 2016. Besides induction of new most efficient RLNG based power plants, some of the existing gas based power plants of IPPs/GENCOs/KE have also been granted tariff on RLNG. As such the RLNG is an imported fuel and its availability can be ensured through better supply chain management; therefore, the uncertainty of gas supply associated with depleting local gas can be addressed while the risk of non-availability of RLNG should be borne by the power producer itself. The under-utilization of gas based power plants of KE, operating the dual-fuel (gas and RFO) power plants of KE and GENCOs on RFO and under-utilization of gas/RLNG based IPPs including two power plants of National Power Parks Management Company (Pvt.) Limited at Haveli Bahadur Shah and Balloki, Quaid-e-Azam Thermal (Pvt.) Limited, Saif Power Limited, Sapphire Electric Company Limited, Orient Power Company (Pvt.) Limited, Halmore Power Generation Company (Pvt.) Limited etc. is adversely affecting the cost of electric power in the country.

## **2.5.9 Levies on Primary Energy Used for Power Generation:**

The levies, charges and surcharges on fuel used for power generation increases the cost of generation which adversely affects the whole economy. While the imposition of levies helps raise revenues, it increases the cost of electric power generation which affects the whole economy. The affordability of electricity is inevitable for a healthy economic growth. The competitiveness of country's industrial sector in export markets greatly depends on the price of electricity. It is noted that the share of industrial sector in the total consumption of electricity in Pakistan has reduced over time. During FY 2015-16 the share of industrial sector in the total electricity consumption was 26.47% while during FY 2019-20, this share was recorded as 22.88%. This is unusual for a developing economy and requires attention of all concerned quarters.

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Therefore, a rational approach, in the broader economic perspective, is required while imposing levies on primary and final energy resources. The decrease in revenues due to levies, charges, surcharges on fuel can be offset by increasing economic activity due to affordable electricity rates.

## **2.5.10 Centralized Control of DISCOs and GENCOs:**

The increasing inefficiencies and systematic problems led to restructuring of the Power Sector. DISCOs and GENCOs were created as a result of the said plan with the aim to improve efficiency and gradual transition to a competitive power market in the country. DISCOs and GENCOs were to be prepared to act as independent corporatized entities ready to work in a competitive market environment for ultimate privatization. For this to happen smoothly, Pakistan Electric Power Company (Pvt.) Limited (PEPCO) was created in 1998 with a specific mandate to restructure and corporatize WAPDA's power function. PEPCO was tasked to unbundle WAPDA into 08 Distribution Companies (DISCOs) and 04 Generation Companies (GENCOs) and help them become self-sufficient and efficient companies ready for privatization. PEPCO was supposed to complete its task within two years which it could not do and even after twenty years of its creation, PEPCO is still there overseeing administrative matters of DISCOs.

Further, GENCO Holding Company Limited (GHCL) has also been established to oversee the affairs of Public Sector GENCOs. Though incorporated as companies, DISCOs and GENCOs have not been converted into commercially viable independent business entities. Despite having their respective Board of Directors, these companies are still tied centrally for decision making due to which they have not been able to gain confidence to act in a competitive environment and continue to show shyness to the initiatives for opening market like executing bilateral contracts for Power Purchases, 'Wheeling' etc. The absence of independence of these companies is a major reason for their inefficiencies and poor governance. There seems to be a failure in building DISCOs' and GENCOs' capacity.

The electricity distribution has immense importance for whole power industry and the overall financial health of the power sector greatly depends on efficient distribution of electricity. NEPRA always stressed the need for independence of DISCOs from a centralized control for better efficiency. The objective to develop competitive market also depends on DISCO's understanding of the whole concept and their preparedness to adapt to the challenge. Similarly, the survival of GENCOs depends upon their timely commercial decisions otherwise it would be difficult for GENCOs to survive. Therefore, NEPRA considers it extremely important to let DISCOs and GENCOs act as independent commercial entities free of centralized control to improve efficiency and embrace competition.

## **2.5.11 Non-inclusion of Small and Medium Size Solar Power Plants at Load Centre:**

Pakistan is blessed with huge potential of Alternative and Renewable Energies (ARE). Integrating large share of Variable Renewable Energies (VREs) is a challenge, however, not a new thing. Several countries have increased their reliance on clean renewable power generation with a view to indigenize the resources and minimize dependence on imported fuel. Moreover, due to price volatility of fossil fuels, burden on economy due to imports, and continuous threat to the climate, the countries are endeavoring to make their economies resilient by switching over to the clean AREs.

In development of RE power plant, the added cost of transmission is one big concern. This challenge can be overcome by induction of small and medium size solar power plants near load centers where evacuation facility (grid) already exists to minimize the transmission cost.



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## **2.5.12 Transmission Constraints:**

A robust and efficient transmission system is essential not only for continuity of electricity supply but also to have electricity from the most efficient power plants located in different regions as per Economic Merit Order (EMO).

One main reason for underutilization of efficient power plants while operating the costlier power plants transpired as the transmission and/or distribution system constraints such as over-loading of transmission lines, insufficient transformation capacity of power transformers, outages of transmission lines, faulty transformers etc.

The last five years have been marked with induction of new power plants both conventional and renewable energy. The standard PPAs/EPAs fix the responsibility of both power purchaser and the seller for construction of their respective interconnection facilities, timelines for completion of interconnection facilities and penalties in case of failure to meet the agreed timelines. Under the Grid Code, NTDC is responsible to establish a planning process that leads to the recommendations of specific transmission system reinforcements, up-gradation and expansion projects. However, in most of the cases, interconnection arrangements for evacuation of power from various power plants including wind power plants in Jhampir and Gharo, could not be completed as per the given design and the timelines. In the Southern network, the interconnection of 1,320 MW China Power Hub Power Company Limited (CPHGCL) plant could not be completed and the power plant was operating on interim arrangement. Similarly, in the North, the 147 MW Patrind Hydropower Project was also operating on interim arrangement and their interconnection facilities could not be constructed in due time.

The wind power projects located in Jhampir and Gharo area frequently complained about power evacuation issues due to inadequate power dispersal arrangements, frequent grid tripping/faults in NTDC's network especially 220 kV transmission lines from Jhampir to Gharo; and voltage fluctuations beyond the technical limits. Non-evacuation of power from the available WPPs gives rise to Non-Project Event and qualifies WPPs for payments against Non-Project Missed Volume (NPMV) that is an undesirable financial burden against an energy which is never absorbed in the system but reflected in the consumer-end price of electricity.

The persistent transmission system issues reflect lack of integrated planning and seriousness to strengthen and expand the transmission network to evacuate available power and achieve optimal utilization of available generation capacity. Immediate measures are required to address the inadequacies of transmission and distribution network causing loss to the power sector and increasing burden on the consumers. The generation facilities are spread across the country including from North to South. Accordingly, a robust National Grid system is required; the system should be capable enough to evacuate maximum available cheaper electric power from the generation plants located anywhere in the country and smoothly transmit electricity to load centers. Actions are required to remove system constraints to ensure continuous operation of the most efficient power plants at maximum capacity.

## **2.5.13 Payment on Account of Non-Project Missed Volume (NPMV):**

Non-evacuation of available electric power with wind power plants makes them eligible for payments against NPMV. The payment obligation on account of NPMV during FY 2017-18, FY 2018-19 and FY 2019-20 remained Rs. 1,945 million, Rs. 1,409.40 million and Rs. 11,168.87 million respectively. Efforts should be made to avoid payments on account of Non-Project Events.

## **2.5.14 Two Generation Basket in the Country:**

At present, CPPA-G and KE maintain two separate generation baskets in their respective areas and the Economic Merit Order (EMO) for the power plants with CPPA-G and KE are being determined separately. These two EMOs, result in the operation of in-efficient power plants despite availability of efficient generation capacity in the country. The cost-effectiveness in power generation can be achieved through one EMO in the country.



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## **2.5.15 In-adequate Infrastructure between NTDC and K-Electric System for Import/Export of Electric Power beyond 650 MW:**

In 2008, it was decided that NTDC shall treat KESC (now K-Electric) at par with Ex-WAPDA DISCO for the purpose of sale of power and shall charge KE on the basis of similar mechanism as approved for EX-WAPDA DISCOs. Thereafter, KE started getting electricity from NTDC (CPPA-G basket) to the tune of maximum 650 MW.

It is a fact that at present, there are several IPPs with accumulative capacity of more than 3,500 MW, which are located in KE territory and supplying power to CPPA-G basket. Further, it is also a fact that the 'Take or Pay' capacity of even efficient power plants, supplying electricity to CPPA-G basket, is not being fully utilized due to either less demand in the system or constraints in the transmission system. While at the same time KE is either facing capacity shortfall to meet demand of its consumers and/or its cost of generation is comparatively higher than the idle capacity in CPPA-G system. In this situation where CPPA-G has surplus cheaper power generation capacity and KE requires cheaper electric power, both KE and CPPA-G can enter into a commercial contract where CPPA-G can supply additional power to KE on rate, terms and conditions as approved by NEPRA.

However, the present interconnection infrastructure for transfer of electric power between the KE and NTDC is not sufficient to safely transfer electric power beyond 650 MW and despite availability of cheaper electricity in CPPA-G basket, KE is generating and/or purchasing comparatively costlier electricity to meet demand in its territory. It is noted that recently, the term of Generation Licences of RFO based 126 MW Tapal Energy and RFO based 136 MW Gul Ahmed Energy have been extended and tariff has been granted for extension of PPA with KE. Although the Fuel Cost Component (FCC) of coal based power plants of Port Qasim Electric Power and China Power Hub located in the territory of KE is lower than RFO based Tapal Energy and Gul Ahmed Energy, however, due to lack of interconnection infrastructure between NTDC and KE, electricity generated by Port Qasim and China Power Hub cannot be supplied to KE.

In order to facilitate supply of power from CPPA-G basket to KE, infrastructure capable to transfer the electric power to the extent of 2,000 MW or above needs to be available. Such infrastructure will not only be helpful in improving the reliability of the two systems but will also help in capturing the efficiency available in the system.

## **2.5.16 Non-Consideration of Merchant Power Plants in EMO to Compete in Supply of Electricity:**

At present, the System Operator i.e. NPCC gives Dispatch Order to the power plants as per EMO established on the basis of Specific Fuel Cost comprising of Fuel Cost Component (FCC) and the Variable O&M unless any technical constraint is observed in the system. On the stated criteria, EMO is prepared for those plants only which have executed PPA with CPPA-G. However, the merchant plants who intend to sell their electricity to CPPA-G at competitive rates are not considered while deciding EMO. In order to develop competitive electric power market and have cheaper electricity in the generation basket, criteria should also be given in EMO for Merchant Power Plants so that a level playing field could be made available to both 'Take or Pay' as well as 'Take and Pay' power plants. The current practice is not giving the required confidence to the investors and discouraging them to commission their plants on 'Take and Pay' basis without any Government Guarantees.

## **2.5.17 Load-Shedding Policy of Distribution Companies:**

Despite availability of sufficient generation capacity to meet the demand, DISCOs have adopted a policy of load-shedding on feeder level. Resultantly, despite having surplus power generation capacity, long hours of load-shedding still persist in several areas of Distribution Companies. This policy of load-shedding on feeder level at the pretext of high losses and low recovery is penalizing the genuinely law abiding and good paying consumers. It is noted that one of the main causes of theft of electricity and non-payment of electricity bill is higher electricity tariff. This load-shedding policy is causing decrease in sale of electricity from the available 'Take or Pay' power plants and thus causing higher per unit cost of electricity. Distribution Companies, therefore, need to improve governance and disconnect the individual consumers who are either defaulters or involved in electricity theft, rather than observe load-shedding on feeder having high T&D losses and low recovery.

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## **2.5.18 Ineffective Demand Side Management:**

A huge gap has been noted between peak and off-peak load during a day as well as in summer and winter season. The need to maintain adequate generation capacity to meet with the maximum demand at any point is a challenge in the wake of 'Take or Pay' compulsion which increases the burden of capacity payments and the ultimate cost of electricity. Therefore, there is a need to minimize the gap between peak and off-peak demand of the system. While concentrating on managing supply of electricity, demand side management seems to have been absent in the priorities. Effective measures for energy conservation and innovative methods like smart metering, time-of-use (TOU) pricing (hourly, working and non-working days as well as seasonal) remote devices controlling appliances, promotion/marketing of electricity use during off-peak hours and its de-marketing during peak hours etc. can be used to control the demand. With an in-depth study of load demand pattern, TOU tariff can simultaneously be used for marketing of the electricity as well as de-marketing. Effective demand side management in Pakistan can help reduce need for investment in electricity generation and make cheaper electricity available for productive sectors, specifically industries, during off peak hours. Through effective Demand Side Management techniques, the economic activity in the country can be boosted.

## **2.5.19 Higher Transmission and Distribution Losses:**

Transmission and Distribution (T&D) losses are not unusual in electrical power system but losses exceeding the acceptable limits increase the price of electricity unnecessarily for consumers. The T&D losses can be minimized through proper engineering design of the distribution system and its operation as per prudent engineering practices. The double digit losses of some DISCOs (PESCO, TESCO, LESCO, MEPCO, HESCO, SEPCO and QESCO) is a major concern and needs to be controlled by respective DISCOs. Although few DISCOs (IESCO, GEPCO and FESCO) have incurred T&D losses in single digit; however, to know the quantum of loss, the loss percentage needs to be viewed in relation to the sale volume and efforts should continue to reduce the percentage losses further. The present accumulative T&D losses of all DISCOs is still quite high and increasing the cost of electricity in the country. NEPRA has been allowing sufficient amount on account of investment to DISCOs in their respective tariffs to improve their distribution system not only to improve the reliability but also to decrease the T&D losses. However, so far distribution companies have not been able to reduce T&D losses to the limit which could provide relief to the electricity consumers. Further, the increase of T&D losses, beyond the allowed limit of NEPRA is causing increase in circular debt. Therefore, to reduce the electricity cost, effort should be made to control the T&D losses. Technical losses of the DISCOs can be reduced by designing and developing distribution system following the best engineering practices while the losses other than technical can be reduced through improved governance.

## **2.5.20 Low Recoveries of DISCOs:**

DISCOs are supposed to recover 100% cost of their sold units from consumers within given time. Any short recovery of billed amount results in increase of circular debt. It is noted that the recoveries of most of the DISCOs have remained below the desired level which is causing the circular debt to pile up with the passage of time. The recovery of DISCOs during FY 2019-20 is below 90%. The DISCOs must endeavor to ensure full recovery from the private as well as public sector consumers.

## **2.5.21 Delay in Payment of Subsidy Amount:**

The Government pays subsidy on consumer-end tariff to give relief to certain classes of consumers. After recoveries from the consumers as well as subsidy amount from the Government(s), DISCOs make payments to the Generation and Transmission Companies through CPPA-G. Delay in payment of subsidy amount seriously hampers DISCO's ability to make timely payments to CPPA-G which again causes accumulation of the circular debt. Therefore DISCOs, while making efforts to recover the billed amount from private and public sector electricity consumers, shall also enhance their efforts to recover the due amount of subsidies in timely manner to fulfill their payment obligations. The respective Governments should also ensure to pay the amount of subsidy to DISCOs in time to avoid the financial eventualities.

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## 2.5.22 Need for Timely Settlement of Claims of CPPA-G:

- (a) **Liquidated Damages:** Liquidated Damages (LDs) means damages whose amount the parties designate during the formation of a contract for the injured party to collect as compensation upon a specific breach (e.g. late performance). The CPPA-G raises LD claims against the power generation companies on non-performance under their respective PPAs. During FY 2019-20, CPPA-G raised LD claims amounting to Rs. 1,580.51 million against the power generation companies (GENCOs and IPPs). Further, from FY 2014-15 to FY 2018-19, CPPA-G imposed LDs amounting to Rs. 1.404 billion, Rs. 15.176 billion and Rs. 14.767 billion against GENCO-I, GENCO-II and GENCO-III respectively.
- (b) **Reimbursement Claims Lodged by CPPA-G with SNGPL:** CPPA-G has executed the “Reimbursement Agreements” with the Sui Northern Gas Pipelines Limited (SNGPL) in respect of RLNG based power plants setting out the circumstances under which CPPA-G shall be entitled to seek reimbursement of certain sum paid by CPPA-G under the PPA to the generation company, for reason of unexcused non-supply of gas by SNGPL under the GSA.

As per Clause 2 of the Reimbursement Agreement, Upon the occurrence of a SNGPL Non-Supply Event solely due to which the Company is not available for dispatch, SNGPL shall be liable to reimburse the Capacity Payments (or part thereof to the extent that the Company is unavailable) to CPPA-G, within a period of thirty (30) days of any notice received from it seeking such reimbursement of Capacity Payments or part thereof paid by CPPA-G to the Company under the PPA during the period of the SNGPL Non-Supply Event. Failure of SNGPL to timely reimburse the aforesaid undisputed payments shall entitle CPPA-G to deduct the undisputed amounts from the Energy Payments under the PPA, in turn, the Company shall be entitled to deduct the same amount from payments due to SNGPL under the GSA.

During FY 2018-19 and FY 2019-20, CPPA-G lodged Reimbursement Claims amounting to Rs. 4,173.07 million and Rs. 526.36 million respectively with SNGPL on account of Non-Supply Events in respect of gas supply to three RLNG based power projects.

Non-recovery of the claims of CPPA-G against the generation companies negatively affects the financial health of the power sector.

## 2.6 INDICATIVE GENERATION CAPACITY EXPANSION PLAN (IGCEP)

The integrated planning in the power sector is necessary to determine the requirement of generation capacity expansion, the type and technology induction for least cost generation keeping in view the availability of resources and concomitant strengthening of transmission and distribution networks. The Grid Code of NTDC provides an elaborate framework for integrated planning for expansion of generation capacity simultaneously with reinforcement, upgradation and expansion of transmission system of NTDC and Distribution system of DISCOs, in a coordinated manner. Pursuant to the Planning Code of Grid Code 2005, NTDC is under regulatory obligation for preparation of the IGCEP. The IGCEP inter-alia shall identify new capacity requirements, location and possible commissioning dates while considering loss of load probability criteria, load growth forecast, operating reserve requirements and other related capacity planning criteria.

In 2019, NTDC submitted ‘Generation Expansion Plan 2018-40’ which, after exhaustive consultation with all relevant stakeholders, was returned by the Authority with the observations for required improvements in the Plan. Again, in April 2020, NTDC submitted ‘IGCEP 2047’ projecting the demand and supply position till year 2047 under different GDP growth scenarios. The draft IGCEP has been evaluated by the Authority in consultation with relevant stakeholders and in this regard response was received from various stakeholders (including Federal as well as Provincial Project Implementing Agencies, Project Developers/Investors, Individual Experts and other relevant Parties) wherein serious observations were raised on the draft IGCEP-2047.



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The Authority is of considered view that IGCEP should be a dynamic plan containing as many sensitivity analyses as possible enabling the policy makers to evaluate possible options under different scenarios. These may include different GDP forecasts and resulting demands, impact of Aggregate Technical & Commercial (AT&C) load-shedding, off-grid developments and other Demand Side Management efforts. It must be an optimal generation plan fulfilling the least cost generation criteria based on realistic assessment of availability of internal and external resources. Therefore, the Authority directed the NTDC to address all the observations and submit the revised IGCEP accordingly.

## **2.7 MARKET REFORMS**

There may be no disagreement that competition is engine for efficiency. With an objective of improving efficiency of power sector through competition, accountability, managerial autonomy and profit incentives, the Federal Government embarked upon 'WAPDA's Strategic Plan for the Privatisation of the Pakistan Power Sector' in 1992 which resulted in unbundling of WAPDA in separate generation, transmission and distribution companies and creation of NEPRA as a regulator. The NEPRA Act which was at the center of reform process, provided the regulatory framework to steer the power sector to a competitive market. The applicable documents of NEPRA, including licences granted to generation and transmission companies envisaged development of a competitive market. Under the licence granted to NTDC, it was required to move towards a CTBCM. However, for reasons one or the other including unpreparedness of the relevant entities, the competitive market could not be developed, even after 23 years, as desired.

In 2018, major amendment have been made in the Act whereby an elaborate framework is laid down for developing competitive power market in the country. Fundamental structural changes have been introduced leading to wholesale and retail markets. Previously, the supply of electricity was a part of distribution business. However, the amended Act has excluded the supply from the ambit of distribution. The supply of power is now a distinct licenced activity which will create a retail market. The DISCOs have been given status of deemed supply licensees for a period of five years effective from 30<sup>th</sup> April, 2018 i.e. the date of coming into effect of the Regulation of Generation, Transmission and Distribution of Electric Power (Amendment) Act, 2018.

Till recent past, distribution companies enjoyed monopoly and survived despite serious performance gaps. However, in the wake of distributed generation, the comfort enjoyed by DISCOs is vanishing. Notwithstanding DISCOs' shyness to face competition, the technological improvement coupled with cost reduction of solar technology is posing a big challenge. The distributed generation is coming in a big way drifting the consumers away from grid. During last five years around five thousand net-metering licences have been issued. The basic advantages of low cost and un-interrupted supply of power is taking the big good paying consumers away from DISCOs. This is certainly the time to gear up for this challenge.

Consistent with the objectives of the Federal Government, a market based regime is being introduced in the power sector of Pakistan. CPPA-G has been mandated with the responsibility to design a wholesale Competitive Market Model for the country with the help of International Consultants. The Authority has already registered CPPA-G to act as Market Operator. CPPA-G has submitted a High-Level Conceptual Design of the CTBCM Model for review and approval of the Authority. After detailed deliberations and consultation process, the Authority through its determination approved the High-Level Conceptual Design of CTBCM Model and directed CPPA-G to submit the detailed design model along with its implementation roadmap for approval of Authority. CPPA-G submitted the detailed design model and timelines for approval of the Authority in February, 2020.

The Authority engaged an International Consultant to further review the above reports. The Authority reviewed the documents and noted some weaknesses. Further, the Consultant also highlighted a number of inconsistencies/ discrepancies which were communicated to CPPA-G. The approval of the submitted Model is in process and will be finalized in consultation with the stakeholders.



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## **2.8 INDEPENDENT MARKET OPERATOR**

NEPRA (Market Operator Registration, Standards & Procedure) Rules, 2015 ('Market Rules') lay down the regulatory framework for market operations under the supervision of a Market Operator. Upon notification of the Market Rules, under Rule 5 thereof, CPPA-G was deemed to be authorized and registered as the Market Operator for a period of two years. After the said period of two years, CPPA-G applied for registration as Market Operator and the Authority has granted the Certificate of Registration to CPPA-G on 16 November, 2018 to act as Market Operator under Market Rules. At present, CPPA-G is, inter-alia, undertaking two functions under Market Rules, which include a) procurement of electric power, and b) energy market development. The function of power procurement by CPPA-G as Market Operator is a conflict of interest and by doing so, CPPA-G is acting as a Market Participant rather than a Market Operator/ Regulator. The CPPA-G is, therefore, required to prepare itself to remove any conflict of interest that may impact its functioning as independent and impartial Market Operator, including but not limited to segregation, bifurcation or removal of its power procurement and agency functions from other Market Operator function.

## **2.9 NEED FOR INDEPENDENT SYSTEM OPERATOR**

Presently the National Power Control Center (NPCC), working under NTDC, is acting as System Operator (SO) and, inter-alia, is responsible for placing Dispatch Order to the power plants as per EMO established on the basis of Specific Fuel Cost comprising of Fuel Cost Component (FCC) and the Variable O&M. The role of the System Operator is very important for effective power management, optimal utilization of generation facility, and safe and reliable operations of the transmission and distribution network. NPCC is discharging its duties without SCADA System. Under the NEPRA (Amendment) Act, 2018, System Operation is a licenced activity. NTDC was deemed to be a System Operator for a period of two years from the commencement of the NEPRA (Amendment) Act, 2018 which came into effect on 30 April, 2018. The period of two years has thus expired. An Independent System Operator working on modern lines is need of the hour for developing a competitive electric power market in the country.

The role of System Operator becomes more critical in the wake of induction of Variable Renewable Energy (VRE) in the country. Keeping in view existing power sector operational management practices at part of System Operator, and the pledge of the Federal Government to increase the share of VRE, there is a dire need of enhancing the capacity of System Operator that would ensure safe and reliable grid operations under the high share of VRE. Important steps needed include equipping System Operator with the centralized state-of-the-art forecasting tools for renewable resource and electricity generation from VRE power plants, ensuring better system control and data acquisition in compliance with global best practices, imparting training to the relevant manpower, and better communication among power sellers, power purchaser and system operator to enable maximum utilization of the renewable resources as and when available. This will also help in reducing Non-Project Events and eventual payments to VRE power plants in the shape of NPMV.

## **2.10 NATIONAL ELECTRICITY POLICY AND NATIONAL ELECTRICITY PLAN**

Section 14A of NEPRA (Amendment) Act, 2018 states that '(1) The Federal Government shall, from time to time, with the approval of the Council of Common Interests, prepare and prescribe a 'National Electricity Policy for development of the Power Markets'. As per sub-section (4) of 14(A) 'The Federal Government, in consultation with the Provincial Governments, shall prepare a National Electricity Plan in accordance with the policies prepared and prescribed under sub-section (1) of NEPRA (Amendment) Act, 2018 and notify such plan once in five years'. Further, under Sub-Section (5) of Section 14(A) the Authority is obliged to perform its functions under the National Electricity Policy and National Electricity Plan.

Given the above provision of the Act, National Electricity Policy and National Electricity Plan take the central importance around which the regulatory framework shall be developed. Till the writing of this report, National Electricity Policy and subsequent Plan has not been finalized. The National Electricity Policy and subsequent Plan is inevitable to set the directions for whole power sector and clarity for the investors and decision makers to move

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forward. Logically the mid and long term system plan by the relevant agencies like IGCEP should be developed following the contours of national level Policy and Plan.

Besides Policy and Plan, formulization of Rules under the NEPRA Act, 2018 is also now the domain of the Federal Government while the Regulations being the sub-ordinate legislation shall be framed by NEPRA. As such, the National Electricity Policy and Plan now take precedence for finalizing regulatory framework; therefore, finalization of National Electricity Policy, National Electricity Plan and the Rules under NEPRA Act are necessary for formulating the regulatory framework to forward the objectives of Act in its spirit as well as to create certainty for all the stakeholders in the power sector.



# 03

## PERFORMANCE OF GENERATION SECTOR

### 3.1 GENERAL

The electric power generation sector of Pakistan comprises of the power plants set up in the Public Sector as well as Private Sector. The power generation plants of Pakistan comprise of hydropower plants, thermal power plants, Nuclear power plants, Renewable Energy including Wind, Solar and Bagasse/Biomass power plants. Besides local generation, Pakistan also imports electric power from Iran.

### 3.2 INSTALLED CAPACITY

The total installed generation capacity of Pakistan as on 30<sup>th</sup> June, 2020 was 38,719 MW, against 38,995 MW on 30<sup>th</sup> June, 2019 showing a net decrease of 276 MW. During the year, 640 MW TPS Guddu (Unit 1-4) was deleted while 28 MW TPS Quetta was added in the Generation Licence of GENCO-II on 10 July, 2019. Further, 144 MW GTPS Kotri was deleted from the Generation Licence of GENCO-I on 13 February, 2020. During the same period, 330 MW of Engro PowerGen. Thar (Pvt.) Limited and 100 MW Gulpur Hydropower Project in AJ&K have been added in the NTDC system while 50 MW Gharo Solar Power Plant has been added in KE system. Considering the addition and deletion of power generation capacity during FY 2019-20, there is a net deletion of 276 MW from the installed electric power generation capacity of the country. The following table shows source-wise installed generation capacity (MW) for the FY 2018-19 and FY 2019-20:

As on 30 <sup>th</sup> June	2019	2020	Variation	
			Capacity	%
A. CPPA-G SYSTEM				
WAPDA Hydel	9,389	9,389	0	0.00
IPPs Hydel	372	472	100	21.19
Total: Hydel	9,761	9,861	100	1.02
GENCOs	5,637	4,881	-756	-15.49
IPPs	16,946	17,276	330	1.91
SPPs/CPPs	340	340	0	0.00
Nuclear	1,330	1,330	0	0.00
Total: Thermal including Nuclear	24,253	23,827	-426	-1.79

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As on 30 <sup>th</sup> June	2019	2020	Variation	
			Capacity	%
Wind	1,248	1,248	0	0.00
Solar	430	430	0	0.00
Bagasse/Biomass	369	369	0	0.00
<b>Total: CPPA-G System</b>	<b>36,061</b>	<b>35,735</b>	<b>-326</b>	<b>-0.91</b>
<b>B. K-ELECTRIC SYSTEM</b>				
KE Own	2,294	2,294	0	0.00
IPPs	366	366	0	0.00
SPPs/CPPs	87	87	0	0.00
KANUPP	137	137	0	0.00
Solar	50	100	50	100
<b>Total: KE System</b>	<b>2,934</b>	<b>2,984</b>	<b>50</b>	<b>1.70</b>
<b>Grand Total: Installed Capacity of the Country</b>	<b>38,995</b>	<b>38,719</b>	<b>-276</b>	<b>-0.71</b>

Source: GENCOs/WAPDA/IPPs/DISCOs/KE

The total installed capacity of public sector power plants in the country as on 30<sup>th</sup> June, 2020 was 19,621 MW while the installed capacity of private sector power plants, including KE, was 19,098 MW. Out of 38,719 MW, 24,817 MW is thermal (GENCOs, IPPs and KE), 9,861 MW hydroelectric, 1,248 MW wind, 530 MW solar, 369 MW bagasse, 1,467 MW nuclear and 427 MW SPPs/CPPs.

The installed capacity of power plants connected with NTDC system was 35,735 MW including 19,484 MW public sector power plants and 16,251 MW private IPPs and other power plants.

The total installed capacity of KE's own power plants as on 30<sup>th</sup> June, 2020 was 2,294 MW while KE also purchases electric power from external sources including 366 MW IPPs, 87 MW SPPs/CPPs, 137 MW KANUPP and 100 MW solar power plants connected with KE system. In December 2019, 50 MW Gharo Solar Project achieved COD to supply electric power to KE.

The term of Generation Licence of two RFO based IPPs connected with KE, i.e. 126 MW Tapal Energy Limited and 136 MW Gul Ahmed Energy Limited expired on June 19, 2019 and August 25, 2019 respectively. The Generation Licences of Tapal Energy and Gul Ahmed have been modified to extend the term of their respective licences for 10 more years i.e. upto June 19, 2029 and August 25, 2029 respectively. NEPRA has also determined tariff on 'Take and Pay' basis for Gul Ahmed and Tapal Energy for extension of PPA with KE. The operation of older power plants that too on RFO fuel is not desirable. However, due to insufficient power generation capacity in KE system and inability of NTDC and KE transmission interface to support further export of electricity to KE, extension in the term of the referred licences was necessary.

CPPA-G is supplying 650 MW electricity to KE through its generation basket. In addition to this 650 MW, CPPA-G is also supplying electricity to KE from three dedicated wind power plants including Zephyr Power, Tenaga Generasi and HydroChina Dawood, with total 150 MW capacity since 2019 for two years, extendable with mutual consent, under a Power Purchase and Agency Agreement between KE, CPPA-G and NTDC.

## 3.3 ELECTRICITY GENERATION

The statistics show that during FY 2019-20, the total electricity generation in the country including the power plants connected with NTDC and KE systems was 134,745.70 GWh compared to 136,532 GWh electric power generation of FY 2018-19. The total electricity generation from power plants connected with NTDC system remained 121,643.99 GWh which included 38,987.96 GWh hydel, 68,799.22 GWh thermal (including generation by SPPs/CPPs), 9,704.89 GWh nuclear, 2,882.48 GWh wind, 704.97 GWh solar and 564.46 GWh bagasse/biomass. Besides local generation, 513.74 GWh has also been imported from Iran.



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During the year under consideration, the public sector power plants generated 73,550.82 GWh electricity while private sector power plants generated 61,194.03 GWh. The following table give details of source-wise electricity generation in NTDC and KE system during FY 2018-19 and FY 2019-20:

	FY 2018-19	FY 2019-20	Variation	
			Energy	%
A. CPPA-G SYSTEM				
WAPDA Hydel	31,167.85	37,425.41	6,257.56	20.07
IPPs Hydel	1,928.04	1,562.55	-365.49	-18.96
Total: Hydel	33,095.89	38,987.96	5,892.07	17.80
GENCOs	13,016.93	7,907.91	-5,109.08	-39.25
IPPs	62,597.73	60,720.33	-1877.40	-3.00
SPPs/CPPs	405.13	170.99	-234.14	-57.79
Nuclear	9,005.68	9,704.89	699.21	7.76
Total: Thermal including Nuclear	85,025.47	78,504.12	-6521.35	-7.67
Wind	3,231.64	2,882.48	-349.16	-10.80
Solar	714.52	704.97	-9.55	-1.34
Bagasse/Biomass	894.43	564.46	-329.97	-63.89
Total: RE Power Plants	4,840.59	4,151.91	-688.68	-14.22
Total: CPPA-G System	122,962.95	121,643.99	-1,318.96	-1.07
B. K-ELECTRIC SYSTEM				
KE Own	10,727.68	10,358.00	-369.68	-03.45
IPPs	2,131.72	1,862.68	-269.04	-12.62
SPPs/CPPs	523.74	535.00	11.26	2.15
KANUPP	129.99	193.00	63.01	48.47
Solar	56.92	153.00	96.08	168.80
Total: KE System	13,570.05	13,101.68	-468.37	-3.45
Total Generation (A+B)	136,532.00	134,745.70	-1,786.30	-1.30
C. IMPORT from Iran	486.80	513.74	26.94	5.53
Grand Total: (A+B+C)	137,018.80	135,259.39	-1,779.41	-1.30

Source: GENCOs/WAPDA/IPPs/DISCOs/KE

Decrease in generation from hydel IPPs, GENCOs and thermal IPPs, supplying electricity on 'Take or Pay' basis means an increase in per unit generation cost from these power plants. Further the decrease in generation from SPPs/CPPs supplying electric power on 'Take and Pay' basis is a discouraging sign for market development.

Generally the plant availability factor of RFO power plants is 88% and gas based power plants is 92%. Lower utilization of KE's comparatively efficient gas based power plants (BQPS-II, KCCPP, Site and Korangi Gas Engines) and operation of BQPS-I on RFO fuel is adversely affecting the cost of power generation from these plants. Similarly, burning of pipeline quality gas in BQPS-I steam turbine power plant of KE is uneconomic. Since RLNG is an imported fuel and its availability can be ensured through efficient supply chain management, therefore, under-utilization of efficient gas based power plants on account of non-availability of fuel is undesirable.

### 3.3.1 Hydel Power Generation:

Hydroelectricity is considered as a clean source of electricity. However, the availability of hydropower generation is dependent upon the hydrology which varies on seasonal basis. Further the remote location of hydropower plants, higher construction cost, longer transmission lines, higher tariff during debt servicing period etc. are the big challenges in development of hydropower projects in Pakistan; specially when the potential of solar and wind power is abundantly available and the tariff of wind and solar power plants has considerably decreased. The tariff of WAPDA hydel power plants (combined for all power stations) is low due to old power plants i.e. Tarbela,

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Mangla, Warsak etc. However, the tariffs of newly inducted power plants during debt servicing period is at par or higher with some thermal IPPs.

During FY 2019-20 WAPDA hydel generated 37,425.41 GWh electricity compared to 31,167.85 GWh during FY 2018-19 recording an increase of 6,257.56 GWh. During the same period, the hydel IPPs generated 1,562.55 GWh electricity as compared to 1,928.04 GWh during FY 2018-19 showing a decrease of 365.49 GWh. The increase in generation from WAPDA hydropower plants is a positive for Pakistan power sector while decrease in generation of private sector hydel IPPs is negative.

### **3.3.2 Fuel-wise Thermal Power Generation:**

The thermal power plants operating on different fuels are necessary for energy security of the country. The thermal power plants operating on various fuels are available in the generation baskets of both CPPA-G and KE. Details of electricity generation through various fuels are given in the following paras.

The total thermal electricity generation (Gas, RFO, RLNG and Coal based) in the country during FY 2019-20 has been recorded as 81,554.83 GWh as compared to 89,402.99 GWh during FY 2018-19 showing a decrease of 7,848.16 GWh. The thermal power plants connected with NTDC system (including GENCOs, IPPs and SPPs/CPPs) generated 68,799.23 GWh electricity during FY 2019-20 as compared to 76,019.79 GWh during FY 2018-19. The public sector GENCOs generated 7,907.91 GWh electricity in FY 2019-20 compared to 13,016.93 GWh during FY 2018-19. IPPs in NTDC area generated 60,720.33 GWh electricity during FY 2019-20 compared to 62,597.73 GWh during FY 2018-19. The generation from other sources (SPPs/CPPs) in the NTDC area has been recorded as 170.99 GWh.

The tariff of all thermal IPPs as well as all power plants of GENCOs, except TPS Lakhra, are on 'Take or Pay' basis; therefore, low utilization factor of thermal IPPs means higher per unit cost of electricity purchases from those power plants. Further, part load operation of these power plants also causes the obligation to pay Partial Load Adjustment Charges (PLAC), which results in higher per unit electricity cost.

The thermal electricity generation of KE's own power plants during FY 2019-20 remained 10,358 GWh compared to 10,727.68 GWh during FY 2018-19. The thermal IPPs in KE system generated 1,862.68 GWh electricity during FY 2019-20 compared to 2,131.72 GWh during FY 2018-19 while other power plants connected with KE generated 535 GWh electricity during FY 2019-20 compared to 523.74 GWh during FY 2018-19. The supply of electricity from CPPA-G to the KE during FY 2019-20 remained 5,426 GWh as compared to 4,956.71 GWh during FY 2018-19 showing an increase of 469.29 GWh.

(a) **Gas based Generation:** During FY 2019-20, a total 20,615.48 GWh electricity was generated using gas as compared to 28,010.55 GWh generation during FY 2018-19. The gas based generation during FY 2019-20 included 15,236.30 GWh generation in NTDC area while 5,379.18 GWh in KE area. The share of gas based electricity generation in total thermal generation during FY 2019-20 remained 25.28% while the share of gas based electricity generation during FY 2017-18 and FY 2018-19 was 32.24% and 31.33% respectively.

The MMBTU price of pipeline quality gas is lower than the price of RLNG. Further, it is noted that the pipeline quality gas was utilized in some of less efficient power plants of GENCOs and KE which is an un-economic burning of gas fuel. The cost of power generation can be decreased by allocating the cheaper gas fuel to efficient power plants.

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(b) **RLNG based Generation:** During FY 2019-20, total 26,816.08 GWh electricity was generated using RLNG as compared to 30,813.32 GWh generated during FY 2018-19 showing a decrease of 3,997.24 GWh. The RLNG based electricity generation included 23,830 GWh in NTDC area and 2,985.50 GWh in KE area. The share of RLNG based generation in total thermal generation during FY 2019-20 remained 32.88% while the share of the same during FY 2017-18 and FY 2018-19 was 23.01% and 34.47% respectively.

The RLNG based electricity generation is cheaper as compared to HSD or RFO based electricity generation in dual or Tri-fuel power plants. The operation of plants on RFO/HSD fuel where it can be operated on RLNG is not desirable. Further, RLNG is an imported fuel and its availability is controllable through better supply chain management.

(c) **RFO based Generation:** During FY 2019-20, total 8,156.25 GWh electricity was generated using RFO as compared to 13,825.87 GWh during FY 2018-19. The electricity generation using RFO has been showing a steady decrease over last three years. The RFO based generation of FY 2019-20 included 4,178 GWh in NTDC area and 3,978 GWh in KE area. The share of RFO based electricity generation in total thermal generation during FY 2019-20 remained 10% while the share of the same during FY 2017-18 and FY 2018-19 was 30.60% and 15.46% respectively.

Although the RFO based generation has decreased during FY 2019-20 which has positive impact on power generation cost; however, utilization of RFO plants while under-utilizing the more efficient RLNG, gas and coal based power plants is not desirable and adversely affecting the generation basket price.

(d) **HSD based Generation:** During FY 2019-20, a total of 0.67 GWh electricity has been generated using HSD fuel in NTDC area as compared to 27.74 GWh during FY 2018-19. HSD based generation in KE area remained nil during the year. The share of HSD based electricity generation in total thermal generation during FY 2019-20 remained 0.001% while the share of the same during FY 2017-18 and FY 2018-19 was 0.86% and 0.03% respectively. The use of HSD for electricity generation is not desirable at all when the coal, RLNG and RFO based electricity generation capacity is available in the system.

(e) **Coal based Generation:** During FY 2019-20, total 25,966.40 GWh electricity has been generated using coal as compared to 16,725.46 GWh during FY 2018-19 showing an increase of 9,240.40 GWh. The coal based electricity generation included 25,553.40 GWh in NTDC area and 413 GWh in KE area. The share of coal based electricity generation in total thermal generation during FY 2019-20 remained 31.84% while the share of the same during FY 2017-18 and FY 2018-19 was 13.29% and 18.71% respectively. The utilization of coal based power plants during FY 2019-20 remained almost 66% of total installed capacity of coal based power plants.

The gradual increase in coal based electricity generation is positive for lowering power generation cost; however, the capacity of cost effective coal based power plants is still not fully utilized.

### 3.3.3 **Public Sector GENCOs:**

The total electricity generation of GENCOs during FY 2019-20 remained 7,907.91 GWh as compared to 13,016.93 GWh during 2018-19 showing a decrease of 5,109.02 GWh.

(a) **Jamshoro Power Company Limited (GENCO-I):** The total electricity generation of GENCO-I during FY 2019-20 remained 209.09 GWh as compared to 880.09 GWh during FY 2018-19 showing a decrease of 671 GWh over last year. The under-utilization of 'Take or Pay' power plants results in higher per unit cost of generation from such plants. Further the use of lower efficiency power plants when higher efficiency power plants are available is not desirable as it affects the generation basket price adversely.



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(b) **Central Power Generation Company Limited (GENCO-II):** The total electricity generation of GENCO-II during FY 2019-20 has been recorded at 5,921.75 GWh as compared to 9,385 GWh during FY 2018-19 showing a decrease of 3,463.25 GWh. It is important to note that out of 5,921.75 GWh electricity generated by GENCO-II, the contribution of 747 MW CCPP Guddu was 4,315.35 GWh while all other power plants of GENCO-II i.e. TPS Guddu (Unit 5-10) and TPS Guddu (Unit 11-13) collectively generated only 1,606.4 GWh. The plant utilization factor of 747 MW CCPP during FY 2019-20 remained 68.16% but its net efficiency during the year remained 50.54% which is considerably low as compared to guaranteed efficiency of 54.40%.

It is noted that the Unit 11-12 of CPGCL are operating on open cycle mode due to fault in the steam turbine (Unit 13). Continuous operation of combined cycle power plants on open cycle is adversely affecting the cost of electric power generation through these plants.

(c) **Northern Power Generation Company Limited (GENCO-III):** The total electricity generated by GENCO-III during FY 2019-20 was 1,775.86 GWh as compared to 2,716 GWh during FY 2018-19, showing a decrease of 940 GWh. The contribution of newly inducted TPS Nandipur (567 MW) was 1,476.33 GWh while TPS Muzaffargarh having 1,350 MW capacity generated only 299.86 GWh. Whereas GTPS Faisalabad (Unit 5-9 with total capacity of 144 MW) recorded zero generation during the period.

The annual plant utilization factors of TPS Muzaffargarh, SPS Faisalabad, GTPS Faisalabad and Nandipur Power Plants have been reported as 3.23%, 0%, 0% and 33.47% respectively. The plant utilization of TPS Nandipur remained very low at 33.48%. Further, the net efficiency of TPS Nandipur also remained 46.87% which is considerably low as compared to approved efficiency of 49% on gas fuel. The under-utilization of 'Take or Pay' power plants increases per unit cost of electricity generation.

All older power plants of GENCOs are burdening the power sector of Pakistan and need to be retired or replaced with new efficient machines. Various power plants of GENCOs like NGPS Multan, Shahdara Lahore, GTPS and SPS Faisalabad, Muzaffargarh, Jamshoro, Kotri, Lakhra etc. are located near load centers with already developed infrastructure. Therefore, commissioning of new plants at these locations may require lesser cost while their locations near load center may save T&D losses during operational phase.

(d) **Lakhra Power Generation Company Limited (GENCO-IV):** During FY 2019-20, GENCO-IV recorded nil generation for second consecutive year. The tariff of GENCO-IV is on 'Take and Pay' basis. Zero generation from cheaper local coal fuel is affecting the power sector of Pakistan. Further, this plant is a burden on national exchequer as it is unable to recover its fixed costs.

### 3.3.4 Nuclear (CHASNUPP-I, II, III & IV):

The nuclear power generation is being managed by Pakistan Atomic Energy Commission (PAEC) who has been undertaking all development, execution, operation and maintenance of nuclear based power generation. The total electricity generation of the four Nuclear Power Plants connected with NTDC system during the FY 2019-20 remained 9,704.89 GWh as compared to 9,005.68 GWh during the FY 2018-19 showing an increase of 699.21 GWh.

### 3.3.5 Independent Power Producers:

The total electricity generated by thermal IPPs connected with NTDC system during the FY 2019-20 is noted as 60,720 GWh against 62,598 GWh during the FY 2018-19 showing a decrease of 1,878 GWh. Since the tariff of all IPPs are on 'Take or Pay' basis, therefore, their low utilization is affecting the cost of CPPA-G basket adversely. Further, operation of the power plants on part load is also adversely affecting the generation basket price.

### 3.3.6 Renewables:

The total electricity generation of RE power plants connected with NTDC system during FY 2019-20 has been recorded as 4,151.91 GWh compared to 4,840.59 GWh during FY 2018-19 showing a decrease of 688.68 GWh.



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(a) **Wind:** The total electricity generation of the WPPs during FY 2019-20 remained 2,882 GWh as compared to 3,231.64 GWh during FY 2018-19 showing a decrease of 349.64 GWh.

Of these 1,248 MW wind power plants, three WPPs with total 150 MW capacity namely Zephyr Power, Tenaga Generasi and HydroChina Dawood, are providing electricity to KE under a Power Purchase and Agency Agreement between KE, CPPA-G and NTDC. During FY 2019-20, these three WPPs supplied 423 GWh electric power to KE.

(b) **Solar:** The total electricity generation of the solar power projects connected with NTDC system during FY 2019-20 was recorded as 704.97 GWh as compared to 714.52 GWh during FY 2018-19 showing a decrease of 9.55 GWh.

(c) **Bagasse/Biomass:** The total electricity generation of the bagasse/biomass power plants during FY 2019-20 remained 564.46 GWh as compared to 894.43 GWh during last year showing a decrease of 329.97 GWh. Decrease in generation from cheaper indigenous source needs to be checked.

## 3.3.7 Others:

Various small power plants are providing their surplus power to respective DISCOs on 'Take and Pay' basis. During FY 2019-20, the supply of electricity from these plants to DISCOs drastically decreased to 170.99 GWh compared to 405.13 GWh supplied during FY 2018-19. The decreasing share of electricity supply from 'Take and Pay' merchant power plants with no must-run condition is a negative sign for market development.

## 3.4 ELECTRICITY GENERATION IN K-ELECTRIC BASKET

KE generated 10,358 GWh electricity through its own power plants during FY 2019-20 compared to the last year's generation of 10,727 GWh.

During FY 2019-20, KE purchased electric power from IPPs/CPPs including Gul Ahmed, Tapal Energy, Anoud Power, International Steel Limited, International Industries Limited, FFBL Power, SNPCL-I & II, Oursun Pakistan and Gharo Solar as well as from KANUPP. Further, CPPA-G is supplying 650 MW electricity to KE through its generation Basket. In addition to this 650 MW, CPPA-G is also supplying electricity to KE from three dedicated wind power plants including Zephyr Power, Tenaga Generasi, and HydroChina Dawood, with total 150 MW capacity since 2019 for two years, extendable with mutual consent, under a Power Purchase and Agency Agreement between KE, CPPA-G and NTDC .

In addition to its own generation, KE purchased 8,169.68 GWh electricity from external sources including 1,862.68 GWh from IPPs, 193 GWh from KANUPP, 153 GWh from two solar power projects, 5,426 GWh import from NTDC system (including 423 GWh import from 150 MW dedicated WPPs) and 535 GWh from other power plants connected with KE system to meet its increasing demand. The position of electricity generated by KE through its own power plants and purchases of electricity from external sources including CPPA-G during last five years is as below:

Source of Electric Power (GWh)	2015-16	2016-17	2017-18	2018-19	2019-20
KE's Own Generation (A)	10,323.00	10,147.00	10,337.75	10,727.68	10,358.00
Purchases from CPPA-G (B)	5,059.00	5,077.00	5,128.20	4956.71	5,426.00
Purchases from Other Sources (C)	1,922.00	2,128.00	2,705.89	2,842.90	2,743.68
<b>Total Purchases (B+C)</b>	<b>6,981.00</b>	<b>7,205.00</b>	<b>7,834.09</b>	<b>7,799.16</b>	<b>8,169.68</b>
<b>Total units purchased by KE including own generation for Distribution (A+B+C)</b>	<b>17,304.00</b>	<b>17,352.00</b>	<b>18,171.84</b>	<b>18,526.83</b>	<b>18,527.68</b>

Source: KE

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## 3.5 GENERATION LICENCES EXPIRING IN NEXT 5 YEARS

The Generation Licence of Habibullah Coastal Power (140 MW gas based power plant), Southern Electric Power Company (117 MW RFO based power plant) and Japan Power (120 MW RFO based power plant) have been expired on 10 September, 2019, 10 May, 2019 and 10 May, 2020 respectively. Further, the Generation Licences of 03 power plants with cumulative 2,255.23 MW capacity are due for expiry within next five years; detail are as below:

S. No.	Name of Power Plant	Capacity (MW)	Fuel	COD	Licence Issue Date	Licence Expiry Date
1	Kot Addu Power Company	1,638.00	HSD/Gas	01-12-1996	22-09-2004	21-09-2021
2	Altern Energy	31.23	Gas	06-06-2001 (Ph-I) 20-09-2008 (Ph-II)	22-09-2004	21-09-2021
3	Uch Power	586.00	Gas	18-10-2000	26-08-2003	25-08-2023

Source: NEPRA

The power plants set up in 1980s and 1990s are going to be retired. The generation licences of five plants namely Gul Ahmed Energy, Tapal Energy, Habibullah Coastal Power, Japan Power and Southern Power with accumulated capacity of 639 MW have expired. Out of these five power plants, the term of the Generation Licences of two RFO power plants namely Gul Ahmed Energy and Tapal Energy with accumulated capacity of 262 MW have been extended while extension of 140 MW Habibullah Coastal is under process. Similarly the licence granted to KAPCO with installed capacity of 1,638 MW is going to expire on 21 September, 2021.

## 3.6 INVESTMENT PLAN IN ELECTRICITY GENERATION

Expansion of electricity generation capacity to meet with the increasing electricity demand is a continuous process. Relevant agencies of the Federal and Provincial Governments facilitate private sector investments for this purpose. Investment plans for conventional power generation projects are being pursued by PPIB while the RE Projects are pursued by AEDB as well as by the government agencies working at provincial level.

## 3.7 ECONOMIC DESPATCH SYSTEM

A committee comprising of a representative of NPCC, NTDC, CPPA-G and GENCOs approves the Merit Order periodically for dispatch of power plants in the country except KE. The Merit Order is prepared on the basis of sum of fuel cost and the variable O&M cost per unit (kWh). The ranking is so that the power plant with the lower cost per kWh are at the top of the list and those with the highest cost are at the bottom.

Implementation of Merit Order is critical to ensure the optimum utilization of the available generation capacity so that the cost is minimized. However, it is noted that at various occasions the most efficient power plants are under-utilized while giving dispatch to the power plants lower in the Merit Order for technical reasons. However operation of power plants in deviation of EMO, for reasons what so ever, adversely affects the electricity generation cost.

At present, the System Operator i.e. NPCC gives Dispatch Order to the power plants as per EMO established on the basis of Specific Fuel Cost unless any technical constraint is observed in the system. On the stated criteria, EMO is prepared for those plants only which have executed PPA with CPPA-G. However, the merchant plants, if any, who intend to sell their electricity to CPPA-G at competitive rates are not considered while deciding EMO. In order to develop competitive electric power market and to have cheaper electricity in the generation basket, criteria should also be given in EMO for Merchant Power Plants so that a level playing field could be made available to both 'Take or Pay' as well as 'Take and Pay' power plants. The current practice is not giving the required confidence to the investors to commission power plants on 'Take and Pay' basis without any Government Guarantees.

# 04

## PERFORMANCE OF TRANSMISSION SECTOR

### 4.1 GENERAL

The transmission network ensures evacuation of power from the generation plants to the load centers across the country. A robust and efficient transmission system is essential not only for continuity of electricity supply but also to ensure to dispatch the most efficient power plants located in different regions as per EMO. As per NEPRA Act, there can be only one National Grid Company (NGC) at national level at a particular time. NTDC is acting as NGC under licence by NEPRA.

In addition to above, NEPRA Act also allows setting-up Special Purpose Transmission Lines. NEPRA has been considering applications from private sector for setting up special purpose transmission lines. NEPRA issued first-ever licence to Fatima Transmission Company Limited on 28 August, 2015 to establish special purpose transmission lines to evacuate power from its 120 MW cogeneration power plant. NEPRA has also granted Special Purpose Transmission Licence (SPTL) to Sindh Transmission and Dispatch Company (Pvt.) Limited on 17 December, 2015 for its Special Purpose Transmission Lines located in the province of Sindh.

NEPRA has issued another licence for setting up special purpose transmission lines to Pak Matiari-Lahore Transmission Company (Pvt.) Limited on 19 February, 2018 for constructing first-ever 878 km dedicated  $\pm 660$  kV HVDC transmission line from Matiari to Lahore with a capability to transmit 4,000 MW power. The Project is designed to have bi-pole HVDC technology, having two converter stations, one each at the ends of Matiari (Sindh) and Lahore (Punjab), three repeater stations and two grounding electrode stations.

The NEPRA (Amendment) Act, 2018 provides that the Government of a Province may construct powerhouses and grid stations and lay transmission lines for use within the Province and determine the tariff for distribution of electricity within the Province. Further, the NEPRA Act also allows the Provincial Governments to establish Provincial Grid Company (PGC). The PGCs are allowed to engage in the transmission of electric power within the territorial limits of such Province. As per NEPRA Act, there can be only one PGC in respective province at one time. Till to date, only Sindh Province has established PGC with name Sindh Transmission and Dispatch Company Limited (STDC) which secured Licence from NEPRA on 05 November, 2019.



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## 4.2 POWER BALANCES IN NTDC SYSTEM

The installed capacity does not fully contribute to energy production due to various factors like auxiliary consumption, impact of site reference conditions and seasonality effects on the renewables and large hydropower plants. After accounting for above factors, the capacity, known as the generation capability, is effectively used for meeting the electricity demand. The data about generation capability and future demand reported by NTDC is given in the following table. It may be noted that in the year 2020 and onwards, the generation capability would be more than the NTDC's projected demand during peak hours:

### A: Actual Figures

FY ending 30 <sup>th</sup> June	Generation Capability (MW)	Demand During NTDC's System Peak Hours (MW)	Surplus/ (Deficit) (MW)
2016	17,261	22,559	(5,298)
2017	19,020	25,117	(6,097)
2018	23,766	26,741	(2,975)
2019	24,565*	25,627*	(1,062)
2020	27,780*	26,252*	1,528

### B: Projected Figures

FY ending 30 <sup>th</sup> June	Planned Generation Capability as per NTDC (MW)	NTDC Projected Demand Growth Rate (%)	NTDC's Projected Demand during Peak Hours (MW)	Surplus/ (Deficit) (MW)
2021	30,582	--	29,325	1,257
2022	32,989	5.4	30,921	2,068
2023	35,896	3.3	31,953	3,943
2024	37,918	5.5	33,696	4,222
2025	39,157	5.1	35,422	3,735

\* 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

## 4.3 TRANSMISSION NETWORK OF NTDC

NTDC is the sole NGC responsible to ensure safe and reliable transmission of electric power across the country under Transmission Licence granted by NEPRA. The granted Licence required NTDC to offer a non-discriminatory open access transmission inter-connection service to any party or parties who are either connected to or intend to be connected to its transmission system.

NTDC is responsible to continuously upgrade and strengthen its network to discharge its duty for safe and reliable transmission of available electric power in the country. The Grid Code of NTDC provides an elaborate framework for integrated planning for expansion of generation capacity simultaneously with reinforcement, upgradation and expansion of transmission system of NTDC and distribution system of DISCOs, in a coordinated manner. Pursuant to the Planning Code of Grid Code 2005, NTDC is under regulatory obligation for preparation of the IGCEP for ten years. The IGCEP inter-alia shall identify new capacity requirements, location and possible commissioning dates while considering loss of load probability criteria, load growth forecast, operating reserve requirements and other related capacity planning criteria. Further, under the Planning Code of Grid Code, NTDC is also responsible to establish a planning process that leads to the recommendations of specific transmission system reinforcements, upgradation and expansion projects.

Timely completion of interconnection arrangements is also an important responsibility of NTDC to ensure evacuation of power from newly constructed power plants. The standard PPAs and EPA fix the responsibility of both power purchaser and the seller for construction of their respective interconnection facilities, timelines for completion of interconnection facilities and penalties in case of failure to meet the agreed timelines.



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The transmission line network of NTDC includes 7,238 km long transmission lines operating at 500 kV level and 11,281 km long 220 kV lines. As of 30<sup>th</sup> June, 2020, NTDC is maintaining 16 (sixteen) Nos. of 500 kV grid stations with a transformation capacity of 23,400 MVA. There are 43 (forty-three) Nos. of 500/220 kV transformers and 33 (thirty-three) Nos. of 220/132 kV transformers installed at these grid stations. NTDC also maintains 45 (forty-five) Nos. of 220 kV grid stations with transformation capacity of 31,900 MVA. There are 127 (one hundred and twenty-seven) Nos. of 220/132 kV transformers installed at 220 kV grid stations.

## 4.4 CONSTRAINTS IN NTDC NETWORK

The system constraints of NTDC's Southern network resulted in power dispersal issues, including but not limited to, power evacuation from 1,320 MW China Power Hub Generation Company Limited (CPHGCL). The actual scope of interconnection included 500 kV D/C Transmission Line from HUBCO Power Plant to 500 kV Jamshoro Grid Station (180 km). However, the said line could not be energized within due time. The power plant was operating on interim arrangement i.e. 500 kV D/C Transmission Line, 1 km for in/out with 500 kV HUBCO – Jamshoro S/C Transmission Line.

Further, in the North, the power evacuation facility to off-take electric power from 147 MW Patrind Hydropower Project was also not completed within due time. The 147 MW Patrind Hydropower Project was operating on interim arrangement due to non-completion of 132 kV D/C Patrind-Mansehra Transmission Line.

**System Constraints of NTDC and Remedial Measures:** The details of constraints in NTDC transmission system, its impact and remedial measures along with time line as provided by the NTDC area given below:

S. No.	Over-loading/ Constraint	Impact/Operation of Expensive Power Plants	Remedial Measure		Completion Date	
			Permanent	Proposed	Permanent	Proposed
PUNJAB						
1	500 kV Rewat Grid Station	156 MW Attock Gen. Limited (RFO)	500 kV Chakwal G/S	Addition of 160 MVA T/F	2023	April, 2020
2	500 kV Yousafwala Grid Station	204 MW Saif Power under- utilization of 1,320 MW Sahiwal Coal Power Plant	220 kV Arifwala G/S	Addition of 600 MVA Transformer	2023	June, 2020
3	500 kV New Ghakkar Grid Station	214 MW HUBCO Narowal	Augmentation 3x160 to 3x250 MVA		2021	
	220 kV Sialkot Grid Station		Augmentation 3x160 to 3x250 MVA	220 kV Gujranwala-II Grid Station	September, 2021	---
4	500 kV Gatti Grid Station	196 MW Liberty Power Tech. (RFO)	---	Commissioning of Trimmu Powerhouse	---	May, 2020
5	500 kV Multan Grid Station	350 MW AES Lalpir 349 MW AES Pakgen 1330 MW KAPCO	1 additional transformer at 500/220 kV	Commissioning of Trimmu Powerhouse	May, 2020	December, 2021
6	220 kV Sarfaraznagar Grid Station	196 MW Nishat Chunian 195 MW Nishat Power 124 MW KEL 97 MW Reshma	Ext. of 500/220 kV New Lahore to 500/220/132 kV & re-routing of 132 kV interlinks	220 kV Sundar Grid Station	Studies are being carried out by planning	2022
7	220 kV Kassowal G/S	151 MW Fauji Kabirwala	Addition of 160 MVA T/F		June, 2021	
	220 kV Multan (Pairangaib) Grid Station		Addition of 2x250 MVA		2022	
8	220 kV Ravi-Lahore and 220 kV Ravi-Shalamar Transmission Line	214 MW Atlas Power (RFO)	In/Out of 220 kV Kot Lakhpat – Sarfaraznagar circuit at 220 kV GIS Ghazi Road		December, 2019 Subject to settlement of court cases	
9	500 kV Bhikki-Lahore Circuit	Generation curtailment from Bhikki/Balloki	Addition of 500/132 kV T/F at Bhikki/Balloki Powerhouses to supply directly to 132 kV network		Studies to be carried out by PSP	
10	Low Voltages in summer: KSK, Ghazi Road, Shalamar, Sialkot	Forced load-shedding in LESCO	Reactive power compensation through capacitor banks at 132 kV voltage level by LESCO		---	

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S. No.	Over-loading/ Constraint	Impact/Operation of Expensive Power Plants	Remedial Measure		Completion Date	
			Permanent	Proposed	Permanent	Proposed
SINDH						
11	500 kV Jamshoro Grid Station	Curtailment of WPPs during high wind season	(a) 1x450 MVA T/F (b) 1x160 MVA T/F		February, 2020 October, 2022	
12	220 kV Tando M. Khan Grid Station	Forced load-shedding in Hyderabad during low wind season	Augmentation		October, 2022	
13	220 kV Jamshoro-Hala Rd & 220 kV Jamshoro-TM Khan T/Lines	Forced load-shedding in Hyderabad during summer	Provision of 2 <sup>nd</sup> Source		2022	
14	In adequate transmission capacity in South	Under-utilization of power plants in South	660 kV HVDC Matiari-Lahore Transmission Line		March, 2021	
KHYBER PAKHTUNKHWA						
15	500 kV Tarbella-Peshawar T/Line	300-500 MW load-shedding in PESCO	500 kV Nowshera Grid Station		2022	
16	Low Voltages at 220 kV Mardan, Bannu, Shahi Bagh & 500 kV Peshawar	Forced load-shedding in PESCO	Static Var Compensators		---	
BALOCHISTAN						
17	220 kV Shikarpur-Uch-II-Sibbi T/Line	Under-utilization of 551 MW Uch and 381 MW Uch-II in winter	220 kV Guddu-Shikarpur-Uch-Sibbi T/Line, 350 km		June, 2021	
18	Low Voltages at 220 kV Quetta Grid Station	Forced load-shedding in summer	Static Var Compensators		---	
19	220 kV Quetta Industrial Grid Station		Augmentation		October, 2022	
20	220 kV Khuzdar G/S		Augmentation		October, 2022	

Source: NTDC

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

Out of 43 Nos. of transformers at 500/220 kV level, 21 transformers (48.84%) are loaded above 80% of their rated capacity. Similarly, out of 160 Nos. of transformers at 220/132 kV level, 91 are over-loaded representing around 56.87% over-loading in the system.

## 4.6 OUTAGES OF NTDC'S 500 KV AND 220 KV NETWORK

As reported by NTDC, total 07 No. of outages were recorded on 500 kV circuits and 34 No. of outages were recorded on 220 kV circuits in South Region, during the period from January to June, 2020. Out of 34 No. of outages at 220 kV level, 25 No. of outages were noted on the transmission lines feeding the areas of Province of Balochistan (Sibbi, Dera Murad Jamali, Khuzdar, Loralai etc.).

In North Region, NTDC reported that during the period from January to June, 2020 total 30 No. of outages were recorded at 500 kV circuits, whereas total 121 No. of outages were recorded on 220 kV circuits during the same period.

## 4.7 INVESTMENT ALLOWED AND MADE BY NTDC

A summary of investments allowed (Rs. in Million) by NEPRA to NTDC and actual expenditure by NTDC during last 05 years is given below:

Description	2014-15	2015-16	2016-17	2017-18	2018-19
Allowed by NEPRA (Rs. in million)	18,600	28,222	49,810	42,336	41,380
Actual Expenditure by NTDC (Rs. in million)	22,765	28,749	44,194	42,336	47,406

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## 4.8 NTDC POWER EVACUATION PROJECTS

The following table shows interconnection arrangement to evacuate power from up-coming (Public and Private Sector) power projects carried out by NTDC:

S. No.	Name of Power Project	Plant Cap. (MW)	Expected COD	Proposed Transmission Scheme
1	K2/K3 Nuclear Power Plants	2,200	2020-21	500 kV S/C T/L for looping In/Out of Port Qasim CFPP-Matiari at K2/K3 (102 km) 500 kV S/C T/L for looping In/Out of HUBCO Coal Power Plant-Jamshoro at K2/K3 via Existing 500 kV S/C T/L HUBCO-NKI (10 km)
2	Lucky Electric Coal Fired Power Plant	660	March, 2021	500 kV S/C T/L for looping In/Out of Port Qasim CFPP-Matiari at Lucky Electric (15 km)
3	Thar Energy Coal Fired Power Plant	330	March, 2021	500 kV S/C T/L for looping In/Out of Engro CFPP-Matiari at Thar Energy CFPP (1 km)
4	Thal Nova Coal Fired Power Plant	330	March, 2021	500 kV S/C T/L for looping In/Out of Engro CFPP-Matiari at ThalNova CFPP (1 km)
5	Siddique Sons Coal Fired Power Plant	330	2021-22	500 kV S/C T/L for looping In/Out of ThalNova CFPP-Matiari at Siddique Sons CFPP (1 km)
6	Wind Power Plant at Jhampir Clusters	1,224	2021-22	220 kV Grid Station Jhampir-II with 22/132 kV 3x250 MVA Transformers 220 kV D/C T/L for In/Out of 220 kV Jhampir-I-Gharo S/C at Jhampir-II (7 km) 220 kV D/C T/L for looping In/Out of Jamshoro-KDA at Jhampir-II (18 km)
7	Coal based Power Plant at Thar	1,320	2022-23	--
8	Suki Kinari, Kohala and Mahal HPPs	2,610	2022-23	--
9	Tarbela 5 <sup>th</sup> Ext.	1,410	2023-24	--
10	Dasu HPP (Stage-I) 2160 MW	4,320	2024-25	756 kV HVAC Double Circuit Hexa-Bundle

Source: NTDC

## 4.9 INVESTMENT PLANS FOR TRANSMISSION LINES OF NTDC

Power Sector Investment Plan for Transmission Lines (as per approved PC-I) of NTDC:

S. No.	Name of Project	Transmission Lines				Expected Completion Date	Estimated Cost (Million Rs.)
		Voltage Level (kV)	Line Length (km)				
			500 kV	200 kV	HVDC		
1	Interconnection of HVDC Converter Stations at Lahore and Matiari with HVAC System	500	60	--	--	2020-21	4,806.00
2	Lalian with associated T/Line	220	--	8	--	2021-22	1,581.00
3	Gharo with associated T/Line	220	--	85	--	2022-23	3,317.00
4	Faisalabad West with associated T/Line	500/220	32	125	--	2022-23	9,380.00
5	Lahore North with associated T/Line	500/220	150	44	--	2022-23	20,732.00
6	Zhob with associated T/Line	220	--	220	--	2022-23	6,878.00
7	Mirpurkhas with associated T/Line	220	--	80	--	2022-23	3,857.00
8	Guddu-Uch-Sibbi Transmission Line	220	--	360	--	2022-23	8,624.00
9	CASA-1000	500/220 HVDC	17	2	110	2022-23	41,146.00
10	Haripur with associated T/Line	220	--	2	--	2022-23	3,424.00
11	Swabi Sub-Station with associated T/Line	220	--	55	--	2022-23	6,399.00
12	Islamabad West with associated T/Line	500/220	27	35	--	2023-24	8,288.00

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S. No.	Name of Project	Transmission Lines				Expected Completion Date	Estimated Cost (Million Rs.)
		Voltage Level (kV)	Line Length (km)				
			500 kV	200 kV	HVDC		
13	Zero Point G/Station with associated T/Line	220	--	24	--	2023-24	2,542.00
14	Punjab University with associated T/Line	220	--	4	--	2023-24	2,948.00
15	Mastung Grid Station with associated T/Line	220	--	120	--	2023-24	14,155.00
16	Chakwal with associated T/Line	500	33	-	--	2023-24	6,710.00
17	Joharabad with associated T/Line	220	--	12	--	2023-24	2,961.00
18	Nawabshah with associated T/Line	220	--	65	--	2023-24	6,292.00
19	Larkana with associated T/Line	220	--	65	--	2023-24	6,449.00
20	Head Faqiran with associated T/Line	220	--	88	--	2023-24	6,055.00
21	Daharki-RYK-Bhawalpur with associated Transmission Line	220	--	335	--	2023-24	15,796.00
22	Jamrud with associated T/Line	220	--	20	--	2023-24	2,398.00

Source: NTDC

## 4.10 DETAILS OF MAJOR POWER BREAKDOWNS IN NTDC'S SYSTEM

The following table provides a list of major power breakdowns in NTDC system during FY 2019-20 causing cascaded tripping in different parts of the country.

Date	Details of Major Happening
June 30, 2020	<p>90% of HESCO network tripped in the early hours of 30<sup>th</sup> June, 2020 due to the fire incident at 500 kV Jamshoro Grid Station of NTDC. The HESCO has total 76 Grid Stations, out of which 67 Grid Stations are fed from 500 kV Jamshoro Grid Station whereas 9 Grid Stations are supplied by 500 kV Dadu Grid Station.</p> <p>At 01:47 hours on 30<sup>th</sup> June, 2020, 3x450 MVA transformers at 500 kV Jamshoro Grid Station tripped due to the fire incident in the 132 kV Switchyard which resulted in damage of Power Transformers and line isolator of 132 kV Jamshoro-Rajputana Transmission Line. This incident resulted in tripping of 500 kV Jamshoro, 220 kV Hala Road, 220 kV Tando Muhammad Khan and 220 kV Jhimpir Grid Stations. Further, 52, 132 kV Grid Stations and 15, 66 kV Grid Stations of HESCO also tripped.</p>

## 4.11 POWER BALANCES IN K-ELECTRIC SYSTEM

The power supply and demand position in KE system based on the investment plans as submitted by KE is shown in the following table. The given data shows that throughout the period, KE was not able to meet the demand at peak times. Even the surplus expected in 2022 would not be enough to operate KE system with prudent utility practices.

### A: Actual Figures

FY ending 30 <sup>th</sup> June	Generation Capability (MW)*	Demand During KE's System Peak Hours (MW)	Surplus/(Deficit) (MW)***
2016	2,860	3,195	(335)
2017	2,920	3,270	(350)
2018	3,008	3,527	(519)
2019	3,196	3,530	(334)
2020	3,202	3,604**	(402)



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## B: Projected Figures

FY ending 30 <sup>th</sup> June	Planned Generation Capability as per KE (MW) [2] [3] [4]	KE's Projected Demand Growth Rate (%)	KE's Projected Demand during Peak hours (MW)	Surplus/ (Deficit) (MW)
2021	3,682 <sup>[1]</sup>	7.00	3,856	(174)
2022	4,086	5.00	4,049	37
2023	4,511	5.00	4,252	259
2024	4,511	5.00	4,464	47
2025	4,830	5.00	4,687	143

Explanations given by KE in respect of above data are shown under Table given in statistical portion.

Source: KE

## 4.12 TRANSMISSION NETWORK OF K-ELECTRIC SYSTEM

KE is operating under the licence issued by NEPRA to carry out electricity transmission business within its service area. KE owns, operates and maintains transmission network of 220 kV and 132 kV. The details of existing transmission network of KE at 220 kV and 132 kV level is as under:

- (a) 365 km of 220 kV Transmission Lines,
- (b) 11 Nos. of 220 kV Grid Stations with transformation capacity of 4,580 MVA
- (c) 801 km of 132 kV Transmission Lines.
- (d) 68 Nos. of 132 kV Grid Stations having transformation capacity of 6,951 MVA.

During FY 2019-20, one grid station has been added at 220 kV level while two (02) Grid Stations have been added at 132 kV level in KE system.

## 4.13 OVER-LOADING POSITION OF K-ELECTRIC TRANSMISSION NETWORK

KE has 11 Nos. of Grid Stations at 220/132 kV level, having 4,580 MVA transformation capacity, 68 Nos. of Grid Stations at 132/11 kV level, having a transformation capacity of 6,951 MVA. Operational record of 220/132 kV grid stations shows no over-loading during the reported period whereas, 23.95% of KE's power transformers (i.e. 40 out of 167) at 132/11 kV level were noted as over-loaded in the same period.

## 4.14 OUTAGES OF K-ELECTRIC SYSTEM

The following table provides a comparison of transmission outages for FY 2018-19 and FY 2019-20 as reported by KE. It is noted that at 132 kV level, number of planned and forced outages, total duration of outages and maximum duration of any single outages in FY 2019-20 have decreased as compared to FY 2018-19 data:

Year	Description	Planned Outages		Forced Outages	
		220 kV	132 kV	220 kV	132 kV
2018-19	No. of Outages	0	10	0	46
	Total Duration in Minutes	0	13049	0	4997
	Maximum Duration of any Single Outage (Min.)	0	3723	0	469
2019-20	No. of Outages	0	5	2	35
	Total Duration in Minutes	0	3417	673	3823
	Maximum Duration of any Single Outage (Min.)	0	1279	558	666

## 4.15 NEPRA PERFORMANCE STANDARDS (TRANSMISSION) RULES, 2005

In order to encourage safe, efficient and reliable transmission service, NEPRA has framed the Performance Standards (Transmission) Rules, 2005 (PSTR). Under PSTR, each transmission licensee is required to submit to NEPRA an Annual Performance Report (APR) in a manner prescribed therein.

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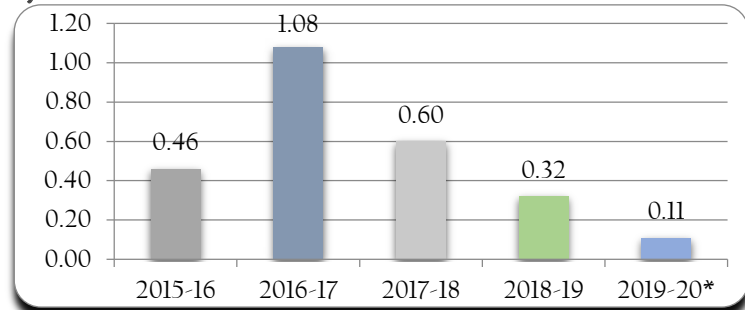
## 4.15.1 National Transmission and Despatch Company Limited:

NTDC has submitted its report upto 3<sup>rd</sup> quarter of FY 2019-20. The same was analyzed in light of the performance parameters such as System duration of interruption, System frequency of interruption, Energy Not Served, Loss of Supply Incidents, System Collapses/Splitting/Isolation, Voltage and Frequency Variations violating limits prescribed in PSTR. Highlights of the analysis/findings are given in succeeding paras.

### (A) SYSTEM RELIABILITY

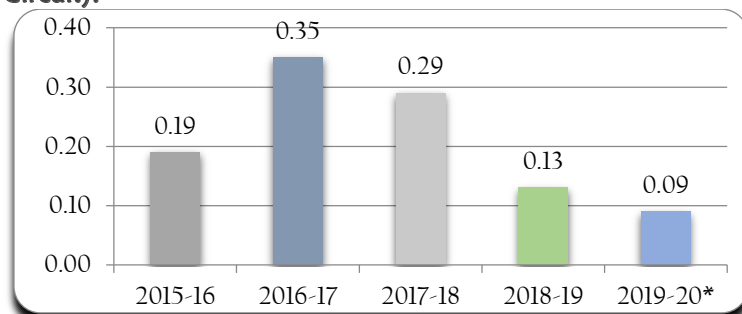
#### (i) System Duration of Interruption (Hrs/Point):

This parameter shows the average duration of outage an interconnection point experienced during a year. It was noted as 0.11 hrs. in FY 2019-20\* as shown in the figure indicating 65.63% decrease in average outage duration per interconnection point as compared to preceding year.



#### (ii) System Frequency of Interruption (Nos./Circuit):

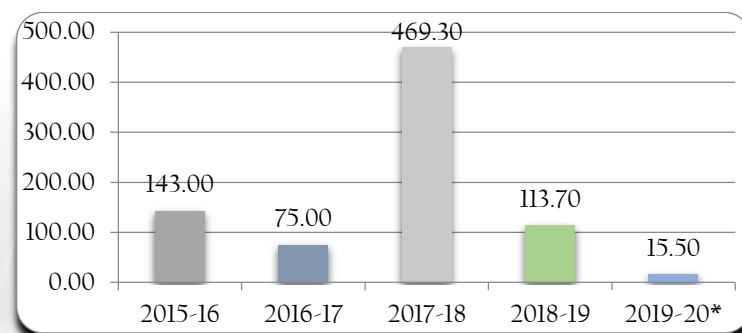
This parameter indicates the average number of outages at a circuit during a year. During FY 2019-20\* it remained 0.09 as shown in the accompanying figure indicating 30.77% decrease in average number of outages per circuit as compared to preceding year.



### (B) SYSTEM SECURITY

#### (i) Energy Not Served (ENS) (MkWh):

This parameter shows the estimates of the total ENS contributed by loss of supply incidents during the year. The ENS decreased from 113.7 GWh in FY 2018-19 to 15.5 GWh in FY 2019-20\*; a decrease by 65.37% as compared to previous year.



#### (ii) Loss of Supply Incidents, Average ENS per Incident and Average duration per Incident:

The table shows improvement in loss of supply incidents upto third quarter of FY 2019-20 over total incidents during FY 2018-19 and average energy not served per incident. NTDC is required to continue its efforts to achieve acceptable reliability levels:

\*upto 3<sup>rd</sup> quarter FY 2019-20

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Year	Loss of Supply Incidents (Nos.)	Average ENS per Incident (MWh)	Average Duration per Incident (Hrs:Min)
2015-16	87	1,644	02:24
2016-17	165	454	03:07
2017-18	142	3,304.90	02:06
2018-19	66	1,722.70	2:40
2019-20*	54.50	337	1:20

## (C) SYSTEM FREQUENCY

Rule 8 of Performance Standards (Transmission) Rules, 2005 prescribes limits for frequency. The frequency data as reported by NTDC indicated variation in frequency limits beyond the permissible limits of  $\pm 1\%$ . A gradual improvement in this area has been observed:

### (i) NTDC System Frequency

Year	Number of times Frequency remained outside the Limits			Time duration the Frequency remained outside the Limits			Maximum Continuous period of Deviation	
	in a year	average/month	average/day	days	hours	% of year	hours	minutes
2015-16	248	21	0.700	1.600	37.90	0.430	1.50	89
2016-17	35	2.9	0.096	0.175	4.20	0.048	0.25	15
2017-18	25	2.1	0.068	0.171	4.10	0.047	0.18	11
2018-19	25	2.1	0.07	0.12	2.98	0.34	--	--
2019-20*	7	0.77	0.03	--	--	--	--	--

### (ii) NTDC Monthly Highest System Frequency (Hertz)

Month	2015-16	2016-17	2017-18	2018-19	2019-20*
July	50.75	NIL	50.55	50.66	50.62
August	50.69	50.72	50.56	50.54	50.55
September	50.69	50.60	50.56	50.60	NIL
October	50.53	NIL	NIL	50.58	50.59
November	50.62	NIL	NIL	NIL	Nil
December	50.71	50.63	NIL	50.64	NIL
January	51.47	50.68	50.64	50.67	
February	NIL	50.65	NIL	NIL	NIL
March	50.64	50.61	50.54	50.59	NIL
April	NIL	50.63	50.56	50.68	
May	NIL	50.65	50.62	NIL	
June	49.49*	50.64	50.60	50.79	

### (iii) NTDC Monthly Lowest System Frequency (Hertz)

Month	2015-16	2016-17	2017-18	2018-19	2019-20*
July	49.07	NIL	50.51	50.51	NIL
August	49.15	49.36	50.51	50.51	NIL
September	49.19	50.51	50.51	50.51	NIL
October	49.21	NIL	NIL	50.51	NIL
November	49.22	NIL	NIL	NIL	NIL
December	49.32	49.44	NIL	50.51	NIL
January	45.00	49.37	NIL	49.44	NIL
February	NIL	50.53	NIL	NIL	NIL
March	50.52	50.51	NIL	50.51	NIL
April	NIL	49.32	NIL	50.52	NIL
May	NIL	50.52	NIL	NIL	NIL
June	49.35	50.51	NIL	50.51	NIL

\*upto 3<sup>rd</sup> quarter FY 2019-20





# 05

## PERFORMANCE OF DISTRIBUTION SECTOR

### 5.1 GENERAL

The unbundling of WAPDA through power sector reforms resulted in creation of DISCOs fully owned by Federal Government. These DISCOs are performing distribution function under licences granted by NEPRA. Prior to amendments in NEPRA Act in April 2018, the distribution of electricity included the wire business as well as sale of electricity to the end-consumers. However, after the promulgation of NEPRA (Amendment) Act, 2018, the sale of electricity has been excluded from the ambit of distribution while for sale of electricity, 'Electric Power Supply Licence' is required. Under NEPRA (Amendment) Act, 2018, the existing distribution licensees shall be deemed to hold a licence for supply of electric power for a period of five years from coming into effect of NEPRA (Amendment) Act, 2018.

DISCOs are responsible for the operation and maintenance of the transmission and distribution assets at 132 kV and below. These include the following:

- (a) 28,621 km of 132 kV Transmission Lines,
- (b) 860 Nos. of 132 kV G/S with 1,923 PTs having transformation capacity of 52,640 MVA,
- (c) 9,706 Nos. of 11 kV Feeders, 343,215 km long,
- (d) 765,115 Nos. of Distribution Transformers having transformation capacity of 46,921 MVA and
- (e) 238,551 km of LT Lines.

In addition to above, KE maintains and operates the following:

- (a) 801 km of 132 kV Transmission Lines,
- (b) 68 Nos. of 132 kV Grid Stations having transformation capacity of 6,951 MVA,
- (c) 1,890 Nos. of 11 kV Feeders, 10,204 km long,
- (d) 28,842 No. of Distribution Transformers having transformation capacity of 7,916 MVA and
- (e) 18,367 km of LT Lines.

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## 5.2 TRANSMISSION AND DISTRIBUTION LOSSES OF DISCOS

The following table shows a comparison between the T&D losses of DISCOs for the FY 2018-19 and FY 2019-20. During the year the T&D losses of TESCO, QESCO and PESCO increased in comparison with the last year. Whereas, the T&D losses of IESCO, GEPCO, LESCO, FESCO, MEPCO, HESCO and SEPCO decreased in comparison with FY 2018-19.

Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO
2018-19	36.56	11.97	8.86	9.87	13.17	9.81	15.79	29.49	36.97	23.56
2019-20	38.69	16.19	8.69	9.51	12.40	9.62	15.23	28.82	36.27	26.68
Inc./ (Dec.)	2.13	4.22	(0.17)	(0.36)	(0.77)	(0.19)	(0.56)	(0.76)	(0.70)	3.12

Source: DISCOs

## 5.3 RECOVERY OF BILLED AMOUNT IN DISCOS SYSTEM

A comparison of recovery percentages of DISCOs over last two years is given below:

Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	Overall DISCOs
2018-19	88.62	67.91	87.61	96.37	97.68	99.28	99.35	74.47	63.28	27.33	90.25
2019-20	87.65	68.16	90.27	94.36	94.48	94.18	92.94	73.19	56.54	49.25	88.77
Inc./ (Dec.)	(0.97)	0.25	2.66	(2.01)	(3.2)	(5.1)	(6.41)	(1.28)	(6.74)	21.92	(1.48)

Source: DISCOs

The combined recovery of all DISCOs during FY 2019-20 remained 88.77% as compared to 90.25% during FY 2018-19 showing an overall decrease of 1.48% in recoveries in comparison with the last year.

The receivables from public and private consumers as well as the delayed payments of subsidies are causing increase in circular debt. DISCOs are required not only to improve recovery from public and private consumers but also to actively follow-up with the relevant Governments for timely recovery of subsidy amounts.

## 5.4 OVER-LOADING POSITION OF 11 KV FEEDERS, POWER TRANSFORMERS AND DISTRIBUTION TRANSFORMERS IN DISCOS

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

(a) **Loading Position of 11 kV Feeders:** The following tables provide a comparison of over-loaded components in all DISCOs for FY 2018-19 and FY 2019-20.

DISCO	Total No. of 11 kV Feeders		Total No. of Over-Loaded 11 kV Feeders (Above 80%)		Percentage of Total Over-Loaded 11 kV Feeders (Above 80%)	
	2019	2020	2019	2020	2019	2020
Up to June						
PESCO	1,056	1,089	339	341	32.10	31.31
TESCO	215	245	149	193	69.30	78.77
IESCO	1,112	1,166	27	65	2.43	5.57
GEPCO	864	876	44	57	5.09	6.51
LESCO	1,821	1,923	501	458	27.51	23.82
FESCO	1,054	1,150	128	56	12.14	4.87
MEPCO	1,392	1,508	257	232	18.46	15.38
HESCO	533	556	68	69	12.76	12.41
SEPCO	531	541	118	103	22.22	19.04
QESCO	642	652	200	652	31.15	100.00
Total	9,220	9,706	1,831	2,226	19.86	22.93

Source: DISCOs

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(b) **Loading Position of Power Transformers:** The following table shows the overloading position of power transformers of DISCOs:

DISCO	Total No. of Power Transformers		Total No. of Over-Loaded Power Transformers (Above 80%)		Percentage of Total Over-Loaded Power Transformers (Above 80%)	
	2019	2020	2019	2020	2019	2020
Upto June						
PESCO	243	239	110	86	45.27	35.98
TESCO	48	55	17	16	35.42	29.09
IESCO	257	263	8	9	3.11	3.42
GEPCO	176	173	25	15	14.20	8.67
LESCO	391	404	78	66	19.95	16.34
FESCO	235	236	42	25	17.87	10.59
MEPCO	293	302	34	37	11.60	12.25
HESCO	121	122	34	26	28.10	21.31
SEPCO	130	132	24	16	18.46	12.12
QESCO	174	177	66	51	37.98	28.81
<b>Total</b>	<b>2,068</b>	<b>2,103</b>	<b>438</b>	<b>347</b>	<b>21.18</b>	<b>16.50</b>

Source: DISCOs

(c) **Loading Position of Distribution Transformers:** The following table shows the over-loading position of distribution transformers of DISCOs:

DISCO	Total No. of Distribution Transformers		Total No. of Over-Loaded Distribution Transformers (Above 80%)		Percentage of Total Over-Loaded Distribution Transformers (Above 80%)	
	2019	2020	2019	2020	2019	2020
Upto June						
PESCO	76,126	77,307	4,070	3,477	5.35	4.50
TESCO	18,730	18,903	3,977	6,682	21.23	35.35
IESCO	49,109	50,210	786	1,663	1.60	3.31
GEPCO	67,587	72,007	1,959	1,942	2.90	2.70
LESCO	110,092	116,030	26,532	25,743	24.10	22.19
FESCO	108,652	113,079	614	652	0.57	0.58
MEPCO	169,938	178,730	5,673	5,832	3.34	3.26
HESCO	37,305	37,896	1,080	1,211	2.90	3.20
SEPCO	38,196	38,616	2,588	2,676	6.78	6.93
QESCO	60,870	62,337	7,049	6,814	11.58	10.93
<b>Total</b>	<b>736,605</b>	<b>765,115</b>	<b>54,328</b>	<b>56,692</b>	<b>7.38</b>	<b>7.41</b>

Source: DISCOs

## 5.5 INVESTMENT ALLOWED AND MADE BY DISCOS DURING LAST FIVE YEARS

The details of investment allowed by NEPRA to DISCOs from FY 2013-14 to FY 2017-18 and actual expenditure against the allowed investments are given below:

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(Million Rs.)

DISCOs	Investment	2013-14	2014-15	2015-16	2016-17	2017-18
PESCO	Allowed	6,549	7,962	7,622	8,366	9,610
	Actual	8,140	5,049	7,622	8,366	11,347
TESCO	Allowed	542	613	1,013	971	770
	Actual	317	367	814	971	744
IESCO	Allowed	7,700	7,823	11,918	10,090	6,719
	Actual	4,483	4,827	5,195	5,313	6,716
GEPSCO	Allowed	4,561	5,058	2,892	2,775	3,200
	Actual	5,005	2,147	2,892	2,775	4,243
LESCO	Allowed	8,247	8,247	10,826	19,781	21,459
	Actual	4,820	7,338	8,050	9,758	12,081
FESCO	Allowed	6,700	7,573	8,970	6,540	4,935
	Actual	4,205	3,285	6,621	8,033	3,502
MEPCO	Allowed	7,492	8,697	10,546	11,416	13,000
	Actual	7,748	8,503	10,008	11,416	12,924
HESCO	Allowed	3,895	4,993	3,067	4,729	5,500
	Actual	3,607	3,413	4,048	4,729	4,804
SEPCO	Allowed	1,515	2,497	1,671	977	3,400
	Actual	2,497	2,106	1,671	977	3,062
QESCO	Allowed	3,600	3,956	4,300	3,080	8,000
	Actual	3,301	4,145	7,115	3,080	4,748
Total	Allowed	50,801	57,419	63,017	69,325	79,515
	Actual	44,123	41,180	54,036	55,418	62,280

## 5.6 TRANSMISSION AND DISTRIBUTION LOSSES IN K-ELECTRIC

KE has been granted a Multi-Year Tariff (MYT) on 5 July, 2018 for a control period of 07 years from FY 2016-17 to FY 2022-23. Under its MYT Determination, KE has been given a target of 17.76% T&D losses for the fourth year of its MYT i.e. 2019-20. However, for the FY 2019-20, KE has reported 19.73% T&D losses without auxiliary consumption.

## 5.7 RECOVERY OF BILLED AMOUNT IN K-ELECTRIC SYSTEM

The following table shows KE's recovery position for different consumer categories. The overall recovery ratio of 92.14% has decreased over the last year ratio of 92.62%. On the other hand, the recovery position in domestic sector has improved from 88.68% in FY 2018-19 to 92.25% in FY 2019-20, however considering the share of domestic sector (42.32%) in the overall billing, the recovery in domestic sector needs to be increased further.

Recovery Position of K-Electric Limited (2018-19 and 2019-20)

Category	Amount of Billed Units (Rs. in Million)		Amount Realized and %age Recovery to Billed Amount			
			(Rs. in Million)		(% )	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Domestic	104,293	107,747	92,483	99,394	88.68	92.25
Commercial	45,236	43,996	44,138	42,968	97.57	97.66
Industrial	65,080	80,796	64,998	73,470	99.87	90.93
Agricultural	1,071	975	316	279	29.51	28.62
Public Lighting	2,784	2,728	266	1,811	9.55	66.39
Bulk Supply	9,078	9,534	8,515	10,227	93.80	107.27
Others	1,098	9,109	1,041	6,706	94.81	73.62
<b>Total</b>	<b>228,640</b>	<b>254,885</b>	<b>211,757</b>	<b>234,855</b>	<b>92.62</b>	<b>92.14</b>

Source: KE



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## 5.8 OVER-LOADING POSITION OF 11 KV FEEDERS, POWER TRANSFORMERS AND DISTRIBUTION TRANSFORMERS IN K-ELECTRIC

The following table provides over-loading position of over-loaded components in KE for FY 2018-19 and FY 2019-20:

Description	2018-19	2019-20
Total No. of Over-Loaded 11 kV Feeders (above 80%)	48	52
Percentage of Total Over-Loaded 11 kV Feeders (above 80%)	2.66	2.75
Total No. of Over-Loaded Power Transformers (above 80%)	45	40
Percentage of Total Over-Loaded Power Transformers (above 80%)	28.13	23.95
Total No. of Over-Loaded Distribution Transformers (above 80%)	808	2,250
Percentage of Total Over-Loaded Distribution Transformers (above 80%)	2.87	7.80

Source: KE



# 06

## MONITORING OF THE SECTOR

### 6.1 INVESTIGATIONS UNDER SECTION 27A OF THE NEPRA ACT

Under Section 27A of the amended NEPRA Act, the Authority may conduct investigations in respect of any matter that is a violation of this Act, the rules, regulations and codes made thereunder or the conditions of a licence issued or registration granted under this Act, as the case may be. Following investigations were made against licensees under Section 27A of the NEPRA Act.

#### 6.1.1 Investigation against MEPCO regarding Fatal Accidents:

Authority took notice of fatal accident of a MEPCO employee and initiated investigation proceedings against MEPCO under Section 27A of the NEPRA Act. The Investigation Committee visited MEPCO and submitted its report before the Authority. The Authority decided to issue Show Cause Notice to MEPCO as well as its employees responsible for fatal accidents. The Authority after due process imposed a fine Rs. 10 million on MEPCO.

#### 6.1.2 Investigation against PESCO regarding Fatal Accidents:

Authority also took notice of 26 fatal accidents (11 employees and 15 public) in PESCO and initiated investigations proceedings against PESCO under Section 27A of the NEPRA Act. The Investigation Committee visited PESCO and submitted its report before the Authority. The Authority considered the investigation report and decided to issue Show Cause Notice to PESCO under Section 27B of the NEPRA Act. The proceedings are currently under progress.

#### 6.1.3 Investigation against K-Electric regarding Fatal Accidents:

The Authority took notice of 41 fatal accidents occurred in Karachi as a result of heavy rainfall during the months of July and August, 2019. Accordingly, investigation proceedings were initiated against KE under Section 27A of the NEPRA Act. The Investigation Committee visited KE and the report was presented before the Authority. The Authority decided to issue Show Cause Notice under Section 27B of NEPRA Act to KE. After due legal process, a fine of Rs. 50 Million was imposed on KE. Moreover, KE was also directed to complete earthing/grounding plan of its distribution network by 30<sup>th</sup> April, 2020 and provide compensation to bereaved families at the earliest.

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In response, KE filed review petition against the above mentioned decision of the Authority. The Authority rejected the same and maintained its earlier decision. The Authority also obtained the compliance/progress report from KE with regard to earthing/grounding status of its distribution system and details of compensation made to bereaved families. According to the report submitted by KE, it has completed 90% of earthing/grounding of its total HT/LT poles. Further, KE provided compensation to eight bereaved families. Seven bereaved families have refused to accept the compensation, whereas, the process is underway for the remaining four families.

## **6.2 LEGAL PROCEEDINGS UNDER NEPRA (FINES) RULES, 2002**

Subject to the provisions of the NEPRA (Fines) Rules 2002, the Authority may impose fines, if any person is adjudged by the Authority to be in violation of the provisions of the Act or the Applicable Documents. The details of legal proceedings made against licensees under NEPRA (Fines) Rules, 2002 are given below:

### **6.2.1 Legal Proceedings against GENCOs:**

- (a) Legal proceedings initiated against GENCO-I on account of excess auxiliary consumption and availing higher outages during FY 2014-15 and FY 2015-16 were concluded and fine of Rs. 1 million was imposed on GENCO-I.
- (b) Legal proceedings initiated against GENCO-II on account of excess auxiliary consumption and availing higher outages during FY 2014-15 and FY 2015-16 were concluded and fine of Rs. 1 million was imposed on GENCO-II.
- (c) Legal proceedings initiated against GENCO-III on account of excess auxiliary consumption and availing higher outages during FY 2014-15 and FY 2015-16 were concluded and fine of Rs. 1 million was imposed on GENCO-III. GENCO-III filed review petition, upon which the amount of fine was reduced from Rs. 1 million to Rs. 0.5 million.
- (d) Legal proceedings initiated against WAPDA for closure of Tarbela 4<sup>th</sup> Extension also concluded. The response of Show Cause Notice submitted by WAPDA was forwarded to Ministry of Water Resources as the said Ministry has already taken cognizance of matter.

### **6.2.2 Legal Proceedings against Transmission Company:**

- (a) Legal proceedings initiated against NTDC for violation of timelines as prescribed in Connection Code of Grid Code 2005 in respect of approval of Grid Interconnection Study (GIS) reports were concluded on imposition of Rs. 1 million fine on NTDC.
- (b) Legal proceedings initiated against NTDC/NPCC on account of issuing unfair instructions to GENCO-I & III for putting their units/machines on standby mode during FY 2014-15 and FY 2015-16 were also concluded and a fine of Rs. 1 million was imposed on NTDC/NPCC.
- (c) Legal proceedings against NTDC regarding its failure to operate and maintain 220 kV transmission lines associated with CHASNUPP were concluded by issuing a warning to NTDC for frequent tripping of transmission lines around CHASNUPP Generating Station. NTDC was directed to strengthen transmission system reliability around CHASNUPP Generating Station, minimize tripping of transmission lines allied with CNPGS, improve protection settings at grid stations and ensure operation of system stability equipments such as Power System Stabilizer (PSS) at CHASNUPP Generating Station as well as at other power plants in future where PSS is required and installed.

### **6.2.3 Legal Proceedings against DISCOs:**

- (a) Legal proceedings initiated against MEPCO for violation of Restoration of Power Supply, Timeframe for New Connections, Load-Shedding, Nominal Voltages, Safety, Complaint Handling Mechanism as given in the Performance Standards (Distribution) Rules 2005 (PSDR), Distribution Code and other applicable documents. The proceedings are currently under progress.
- (b) Review petitions filed by IESCO and BTPL against Authority's decisions of imposing a fine of Rs. 1 million each on these DISCOs for violating Performance Standards (Distribution) Rules, 2005 while carrying out



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load-shedding in Bahria Town were disposed of and the Authority decided to reject the review petitions filed by IESCO and BTPL and maintained its earlier decision.

## **6.2.4 Legal Proceedings against CPPA-G:**

Legal proceedings initiated against CPPA-G for non-imposition of Liquidated Damages (LDs) on GENCO-I, II & III on account of availing higher outages than allowed limit as specified in their respective PPAs during FY 2014-15 and FY 2015-16 were also concluded. The Authority accepted the response of CPPA-G as it imposed LDs on public sector GENCOs after NEPRA's proceedings.

## **6.2.5 Legal Proceedings against K-Electric:**

Review petition filed by KE against Authority's decision of Rs. 3 million fine on account of under-utilization of BQPS-I, non-commissioning of BQPS-II and KCCPP on alternate fuel despite the availability of infrastructure and violation of even its own criteria while carrying out load-shedding in different areas of Karachi were disposed of and the Authority maintained its earlier decision.

## **6.3 CONSULTATIVE SESSIONS**

In order to bring improvement in power sector, the Authority provided a platform through Consultative Sessions to all licensees to discuss and deliberate on core issues of power sector. The details of Consultative Sessions are given below:

### **6.3.1 Medium Term Energy and Load Demand Forecast of DISCOs:**

As per obligation of Grid Code, DISCOs, NTDC and CPPA-G prepared a ten year (2019-28) Medium Term Energy and Demand Forecast and the same was submitted to NEPRA.

NEPRA arranged a Consultative Session on Demand Forecast in October, 2019 at NEPRA Headquarter which was attended by relevant stakeholders and industry experts. The purpose of session was to discuss and scrutinize the submitted demand forecast. The consultative session was successfully held and the shortcomings in demand forecast were conveyed to DISCOs/NTDC to update the documents accordingly.

### **6.3.2 Transmission System Expansion Plan (TSEP):**

The TSEP is being prepared by NTDC as per obligations of clause PC 4.2 of Grid Code, 2005. In this behalf, a discussion meeting was held on 11 November, 2019 at NEPRA Headquarter to deliberate on the salient features of TSEP. During the aforesaid meeting, NTDC presented the plans/progress of power dispersal arrangement of existing and upcoming power generation projects and elimination of system constraints. The Authority directed NTDC to submit a detailed TSEP, identify the constraints in transmission and transformation system which are causing under-utilization of efficient power plants and also take immediate measures to remove its system constraints to evacuate power from available efficient power plants and optimal utilization of available generation capacity.

### **6.3.3 Amendment in Rule 4(f) of Performance Standards (Distribution) Rules, 2005:**

A Consultative Session to discuss principles and priorities of load-shedding and hazardous placement of TV/Internet cables on the distribution system was conducted in December, 2019 at NEPRA Headquarter, which was attended by the representatives of DISCOs, KE and NTDC. Based on the proceedings of session, NTDC and DISCOs were directed to submit their comments regarding amendment in Rule 4(f) of PSDR, 2005. Furthermore, DISCOs and KE were also directed to consult with each other and submit a joint proposal with respect to placement of TV/Internet cables on the distribution system.

### **6.3.4 Curtailment of Wind Power Generation:**

A Consultative Session was held in Jhampir to discuss the issue of curtailment of wind power plants (WPPs) which are established under upfront tariff regime of NEPRA and operating in Jhampir region. This Session was attended

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by NTDC/NPCC, HESCO, CPPA-G, KE and representatives of WPPs. WPPs were of the view that pursuant to RE Policy 2006 and EPA they have 'must-run' status. On other hand, System Operator emphasized that it is authorized to curtail wind power on technical considerations in the interest of security, stability and reliability of power supply. During proceedings of session, System Operator assured that it will take steps to provide at least minimum dispatch to all WPPs as per their plant factor.

## 6.3.5 Economic Merit Order:

NPCC, being the System Operator is responsible to prepare and implement Economic Merit Order (EMO) in accordance with Scheduling and Dispatch Code of Grid Code, 2005. Keeping in view the importance of EMO, Authority directed NTDC and CPPA-G to give a presentation regarding preparation and implementation of EMO. Accordingly subject presentation was given before the Authority. During the presentation NPCC stated that largely Merit Order is followed for dispatching thermal power plants, however, due to network constraints Merit Order is deviated to ensure inter-alia system integrity, reliability, security and continuity of supply etc. The Authority expressed concerns over the deviation of Merit Order and directed NPCC and CPPA-G as follows:

- (a) NTDC to submit detailed plan for removal of its system constraints and to ensure system reliability and stability. Furthermore, as a standard practice, any out of merit power plant dispatch by System Operator has to be notified to the CPPA-G and copied to NEPRA immediately.
- (b) CPPA-G, while submitting the request for Monthly Fuel Price Adjustment (FPA) before NEPRA, shall thoroughly scrutinize the generation data in all respects as provided in the applicable documents and shall submit a certificate along with its request for Monthly FPA that all plants generation data has been scrutinized and found that plants are operated as per Merit Order. Further, CPPA-G to quantify and verify the commercial impact resulted due to deviation of Merit Order and submit the same to NEPRA.

## 6.3.6 Challenges of Upcoming $\pm 660$ kV HVDC Transmission Line:

The HVDC transmission line projects ( $\pm 660$  kV) is being developed under the framework of China-Pakistan Economic Corridor. A Consultative Session of NTDC was held to discuss the operation, monitoring and control challenges as well as the plan by NTDC/NPCC for addressing the issues associated with operation of hybrid HVAC/HVDC transmission network. During the Consultative Session the emphasis was on the capacity building of NTDC/NPCC's professionals with reference to the operation of HVDC transmission lines and also operation of HVDC transmission line on full rated capacity to achieve the benefits of this project.

## 6.3.7 Additional Power Supply from National Grid to K-Electric:

800 MW are supplied to KE from national grid to meet electricity demand in KE area. However, still there is demand and supply gap in KE network, which can be catered through additional power supply from national grid as it has surplus generation capacity. The Authority convened a consultative session of NTDC, KE and CPPA-G to deliberate on the issue of additional procurement of power by KE from the national grid. During the consultative session following issues were discussed and deliberated in detail:

- (a) Enhancement of transmission network of NTDC for supply of additional power to KE,
- (b) Availability of additional power to be supplied to KE from national grid,
- (c) Extension of PPA's of Tapal Energy and Gul Ahmad Energy on 'Take and Pay' basis,
- (d) Interconnection of K-2/K-3 nuclear power plant with KE network for supply of power.

It was emphasized during the consultative session that steps must be taken by NTDC and KE for enhancement of transmission network so that additional power supply may be supplied to KE. Further, NTDC team intimated that 4,000 MW are committed for  $\pm 660$  kV Matiari-Lahore HVDC transmission line which is scheduled to be commissioned in March, 2021 therefore availability of additional power to KE also needs to be analyzed.

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## 6.4 MISCELLANEOUS

### 6.4.1 Digitized Plotting of Distribution Network of DISCOs:

As per the granted distribution licence, DISCOs and KE are required to provide digitized plotting of its distribution system on maps; the percentage progress of DISCOs regarding digitized mapping of distribution network as on 30<sup>th</sup> June, 2020 is as under:

%age Progress	PESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	KE
11 kV Feeders	90	100	100	82	97	99	100	81	53	100
Distribution Transformers	100	100	100	98	98	100	100	93	65	96

Source: DISCOs/KE

### 6.4.2 Power Factor Position of Distribution Network of DISCOs:

As per Distribution Planning Code (DPC) of Distribution Code 2005, DISCOs and KE are responsible for the maintenance of power factor within the range of 90% to 100%, DISCOs and KE were directed to submit the information regarding power factor at Common Delivery Point (CDP) and 11 kV feeders. The information provided by DISCOs transpired that the power factor position in SEPCO, QESCO and PESCO is poor. These DISCOs have been directed to submit plans for improvement of power factor.

### 6.4.3 Pending Applications for New Connections in DISCOs:

NEPRA's PSDR, 2005 as well as Consumer Service Manual 2010, require the distribution company to provide electric power services to at least 95% of new connections to its eligible consumers within the stipulated time limit which is 20 days for residential consumers after payment of Demand Notice. However, it was observed that a large number of applications for new connections were pending in all DISCOs. The Authority took a serious notice of volume of pending applications for new connections with DISCOs and directed all DISCOs to fulfil their obligations.

### 6.4.4 Progress of Power Evacuation Projects:

The updated progress of power dispersal arrangements of different projects is given as under:

S. No.	Name of Project	COD of Power Plant	Detail of Interconnection Arrangement	Physical Progress of Interconnection	Target Completion Date
1	Guddu Power (747 MW)	April, 2014	500 kV Guddu-Muzaffargarh S/C Transmission Line (266 km)	100%	Completed on 04-03-2020
2	Port Qasim (1,320 MW)	April, 2018	500 kV D/C T/L from Port Qasim Power Plant to 500 kV Matiari G/S (185 km)	98%	30-09-2020
3	Neelum Jhelum (969 MW)	May, 2018	500 kV D/C T/L Neelum-Jhelum from Domeli to Gujranwala Phase-II (125 km)	85%	01-09-2020
4	Hub Coal (1,320 MW)	August, 2019	500 kV D/C T/L from HUB Coal Power Plant to Jamshoro 500 kV Grid Station (181 km)	98%	15-09-2020
5	K2/K3 (2x1,145 MW)	2021/2022	500 kV S/C T/L for looping In/Out of Port Qasim CFPP-Matiari at K2/K3 (102 km)	97%	30-09-2020
6	Lucky Electric (660 MW)	2021	500 kV Transmission Line Interconnection of 660 MW Lucky Electric Coal with Port Qasim – Matiari Circuit (10 km)	NOCs awaited to start construction work	13-11-2020

Source: NTDC

It is to be noted here that NEPRA imposed Rs. 10 million fine on NTDC in 2018 for abnormal delay in completing the power evacuation projects.





# 07

## MAJOR REGULATORY ACTIVITIES

### 7.1 GRID CODE REVISION

The Grid Code Addendum No. 2 (Revision-1) was approved for Grid Integration of Photovoltaic (PV) and Concentrated Solar Power (CSP) Plants as an applicable document of NEPRA in November, 2019. The revision of Grid Code is being pursued with NTDC in light of NEPRA Amended Act wherein the concepts of Provincial Grid Company, System Operator, Market Operator, Traders and Suppliers have been introduced as well as technological advancements e.g. HVDC, Hybrid and others which have been introduced in the system. In this regard, NTDC has hired M/s DNV (Det Norske Veritas) GL, (B.V) Netherlands for consultancy services for review and update of the current Grid Code as per latest international practices under NTDC's National Power Transmission Modernization Project Phase-1 (NPTM-1).

### 7.2 DRAFT SAFETY MANUAL FOR DISCOS

Based on the approved Power Safety Code, the process of development of a Uniform/Standard Safety Manual for all DISCOs was initiated and the task was assigned to two DISCOs i.e. LESCO and MEPCO. Both LESCO and MEPCO submitted the Draft Safety Manual. Pursuant to decision of the Authority, the same was circulated to all other DISCOs for their input/comments. A Consultative Session was also conducted at Lahore wherein, the representatives of all DISCOs participated. During the workshop, the Draft Safety Manual prepared by LESCO and MEPCO was discussed in light of the comments already submitted by DISCOs. Keeping in view the DISCOs comments and discussions made during workshop, the final draft of Safety Manual was reshaped and prepared as a 'Master Document' for all DISCOs. The same was presented before the Authority for approval, however, the Authority decided to appoint a Health Safety & Environment (HSE) Consultant/Expert for review/comments on the draft Safety Manual in light of the NEPRA laws, working practices being carried out in NTDC/DISCOs and regional/international best practices.

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## 7.3 PROGRESS ON EASE OF DOING BUSINESS

Getting Electricity Indicator is one of the ten (10) indicators of World Bank's Doing Business Report. Board of Investment (BOI) is the Secretariat of Doing Business in Pakistan which regularly reviews progress on the implementation of reforms in all ten indicators of World Bank's Doing Business. NEPRA worked closely with BOI and World Bank for implementation of the proposed reforms and accordingly amended the Consumer Service Manual (CSM) and simplified the procedure for getting new connections. Through the said amendments, the number of days for the connection at 400 V with load above 70 kW but not exceeding 500 kW have been reduced from 73 to 58 days. Further, time frame for new connection for the consumers having load above 15 kW but not exceeding 70 kW has been reduced from 53 to 44 days. In addition to this, the steps for obtaining electric service connection has been reduced from 6 to 4 by merging different procedures and submission of the wiring test report along with the application. Further, provisions have been made in CSM for online submission of application form for obtaining connection and payment of demand note, wherever the facility is available. Pakistan's ranking in the World Bank's Doing Business Report 2019 was 108 as against 136 in the earlier report meaning thereby an improvement of 28 Nos.

## 7.4 CONSUMERS SERVICE MANUAL REVISION

The Consumer Service Manual (CSM), which includes procedure for obtaining new connection and other allied issues, was initially approved in the year 2010. Owing to various developments in the distribution business, the CSM was reviewed in consultation with all Distribution Companies and several changes were made in the document. The updated CSM was approved by the Authority and is currently in field.

## 7.5 NEPRA WHEELING REGULATIONS

In order to facilitate wheeling of power, NEPRA made NEPRA (Wheeling of Electric Power) Regulations in 2016. Under these regulations generation companies who are connected to the transmission and distribution networks or those who intend to be connected to these networks, can transport their power using transmission network of NTDC or distribution networks of DISCOs to supply power to their BPCs. A significant number of BPCs intend to pursue 'Wheeling of Power' under the Wheeling Regime. During the period under consideration, the Authority has allowed (a) Fatima Energy (Pvt.) Limited (b) Sanjwal Solar (Pvt.) Limited and (c) PEDO to supply power to their BPCs under NEPRA (Wheeling of Electric Power) Regulations, 2016.

## 7.6 LITIGATION REPORT FY 2019-20

A summary of litigations pending in different Courts of Law on 30<sup>th</sup> June, 2020 in which either a decision of NEPRA is challenged or NEPRA is made a party are given below:

Court	Pending on 30 <sup>th</sup> June, 2019	Filed in FY 2019-20	Total (No.)	Decided/Disposed in FY 2019-20	Pending on 30 <sup>th</sup> June, 2020
Supreme Court of Pakistan	290	33	323	52	271
Islamabad High Court	111	57	168	43	125
Lahore High Court Lahore	358	788	1,146	815	331
Lahore High Court Multan	160	61	221	63	158
Lahore High Court Bahawalpur	13	5	18	9	9
Lahore High Court Rawalpindi	52	3	55	6	49
Peshawar High Court	66	65	131	59	72
Peshawar High Court Abbottabad	20	8	28	0	28
High Court of Sindh Karachi	253	90	343	121	222
High Court of Sindh Hyderabad	24	3	27	17	10
High Court of Sindh Sukkur	2	2	4	3	1
High Court of Sindh Larkana	0	1	1	1	0
Balochistan High Court	2	0	2	1	1
Civil Courts	72	37	109	82	27
<b>Total</b>	<b>1,423</b>	<b>1,153</b>	<b>2,576</b>	<b>1,272</b>	<b>1,304</b>

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## 7.7 LICENSING

Prior to amendment in NEPRA Act, the electric power generation, transmission and distribution were licensed activities. Through NEPRA (Amendment) Act, 2018, in addition to the earlier categories, new license categories have been introduced: electric power supply, trade, market operations, and System Operations are now separate licensed activities. With regard to generation licences, sub-section (5) of Section 14B states that the Federal Government may, after consultation with the Authority and by notification in official gazette, provide a mechanism for the gradual cessation of the generation licences for various classes of generation licence holders, which shall not extend beyond a period of five years from the coming into effect of the Regulation of Generation, Transmission and Distribution of Electric Power (Amendment) Act, 2018 (i.e. from 30<sup>th</sup> April, 2018) and thereafter, any generation company may establish, operate and maintain a generation facility without obtaining a licence under this Act if it complies with the technical standards relating to connectivity with the grid as may be specified.

### 7.7.1 Generation Licences Granted During FY 2019-20:

During the FY 2019-20, NEPRA issued 27 No. of generation licences for accumulative installed capacity of 2,338.14 MW; details are given below:

S. No.	Name of Licensee	Licence Issuance Date
1	Enertech Quetta Solar (Pvt.) Limited	30 August, 2019
2	Lake City Management (Pvt.) Limited	01 October, 2019
3	Burj Wind Energy (Pvt.) Limited	08 October, 2019
4	ENI New Energy Pakistan (Pvt.) Limited	09 October, 2019
5	CIHC Pak Power Company Limited	13 November, 2019
6	Karachi Nuclear Power Plant-2	09 December, 2019
7	Grid Edge (Pvt.) Limited-Karachi	10 December, 2019
8	Shafi Energy (Pvt.) Limited	10 December, 2019
9	Sino Well (Pvt.) Limited	10 December, 2019
10	Asia Energy (Pvt.) Limited	10 December, 2019
11	US Apperal & Textile (Pvt.) Limited	13 December, 2019
12	Moro Power Company Limited	13 December, 2019
13	Kulachi Solar Power (Pvt.) Limited	27 December, 2019
14	FAS Energy Pakistan (Pvt.) Limited	27 December, 2019
15	Javed Solar Park (Pvt.) Limited	10 January, 2020
16	K1 Solar Power Lahore (Pvt.) Limited	10 January, 2020
17	P&G Energy (Pvt.) Limited	17 January, 2020
18	Atlas Energy Limited	17 January, 2020
19	Enertech Bostan Solar (Pvt.) Limited	17 January, 2020
20	Vision Developers (Pvt.) Limited	25 February, 2020
21	Siddiqsons Kohat Solar Limited	21 April, 2020
22	Artistic Solar Energy (Pvt.) Limited	21 April, 2020
23	Siddiqsons Nowshehra Solar Limited	27 April, 2020
24	SAIFCO Hydropower Limited	29 April, 2020
25	Jabori Hydropower Project (PEDO)	29 April, 2020
26	Solution De Energy (Pvt.) Limited	29 April, 2020
27	Shams Power (Pvt.) Limited	18 May, 2020



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## 7.7.2 Modifications Approved in the Existing Generation Licences during FY 2019-20:

During FY 2019-20, NEPRA approved 25 Nos. of Modifications in Generation Licences of generation companies as below:

S. No.	Name of Licensee	Modification Issuance Date
1	Central Power Generation Company Limited (CPGCL)	16 July, 2019
2	ICI Pakistan Limited	01 October, 2019
3	Iran-Pak Wind Power Limited	04 October, 2019
4	Liberty Wind Power 2 Limited [Formerly Noor Solar (Pvt.) Limited]	04 October, 2019
5	Indus Wind Energy Limited	07 October, 2019
6	Liberty Wind Power-1 Limited [Formerly Zulaikha Energy]	08 October, 2019
7	Master Green Energy Limited	14 October, 2019
8	Engro Powergen Thar Limited	14 October, 2019
9	Norinco International Thatta Power (Pvt.) Limited	25 October, 2019
10	Gharo Solar (Pvt.) Limited	06 December, 2019
11	China Power Hub Company Limited	10 December, 2019
12	Fimcotex Industries (Pvt.) Limited	27 December, 2019
13	Fatima Energy Limited [Modification-II]	31 December, 2019
14	Premier Industrial Chemical Limited [Modification-II]	31 December, 2019
15	Gulf Powergen (Pvt.) Limited	01 January, 2020
16	Reshma Power Generation Company Limited	01 January, 2020
17	Din Energy Limited	01 January, 2020
18	Gul Ahmed Electric Limited	01 January, 2020
19	Metro Wind Power Limited	01 January, 2020
20	Jamshoro Power Company Limited [Modification-III]	13 February, 2020
21	Lucky Cement Limited	21 February, 2020
22	Tapal Energy (Pvt.) Limited	09 March, 2020
23	Gul Ahmed Energy Limited	19 March, 2020
24	WAPDA Hydroelectric [Modification-V]	07 April, 2020
25	Northern Power Generation Company Limited [Modification-IV]	13 April, 2020
	PEDO-Pehur Hydropower Project	27 April, 2020

## 7.7.3 Licence Cancellation during FY 2019-20:

During the FY 2019-20, the Generation Licences of following eight companies were cancelled:

S. No.	Name of Licensee	Licence Cancellation Date
1	Mirpur Khas Energy Limited	22 October, 2019
2	Alliance Sugar Mills (Private) Limited	25 October, 2019
3	RYK Mills Limited	25 October, 2019
4	Digri Sugar Mills Limited	29 October, 2019
5	Shakarganj Mills Limited (08 MW)	29 October, 2019
6	Shakarganj Mills Limited (12 MW)	29 October, 2019
7	Bandhi Powergen Company	20 December, 2019
8	Tuwariqi Steel Mills Limited	24 December, 2019

## 7.7.4 Net-Metering Licences:

The NEPRA (Alternative & Renewable Energy) Distributed Generation and Net-Metering Regulations, 2015 have attracted a large number of consumers who started installation of distributed solar generation facilities. During last five years i.e. FY 2015-16 to FY 2019-20, a total of 4,959 Nos. of Net-Metering Licences with total capacity of 86.36 MW have been issued under the net-metering regime. During FY 2019-20, total 3,334 Nos. of Net-Metering Licences with total installed capacity of 56.87 MW were issued. The DISCO-wise details of the Net-Metering Licences issued during last five years are shown in the following table:



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DISCOs	2015-16		2016-17		2017-18		2018-19		2019-20	
	No. of Licence Issued	Capacity (kW)	No. of Licence Issued	Capacity (kW)	No. of Licence Issued	Capacity (kW)	No. of Licence Issued	Capacity (kW)	No. of Licence Issued	Capacity (kW)
PESCO	--	--	--	--	2	37.56	10	96.60	131	3,200.84
TESCO	--	--	--	--	--	--	--	--	--	--
IESCO	2	1,020	49	1,008.96	114	1,732.81	377	3,849.07	863	9,990.00
GEPCO	--	--	3	11	31	1190.37	56	908.64	134	4,720.00
LESCO	--	--	36	468.2	142	3,204.43	348	7,154.44	886	14,980.00
FESCO	--	--	2	305	13	217.60	24	258.17	152	3,960.00
MEPCO	--	--	10	470.57	7	251.96	47	1,129.94	166	4,300.00
HESCO	--	--	--	--	--	--	1	10.08	6	220.00
SEPCO	--	--	--	--	--	--	1	964.91	5	469.00
QESCO	--	--	--	--	--	--	1	6.18	1	20.00
KE	--	--	--	--	28	288.40	253	4,270.21	730	12,240.00
BTPL	--	--	6	52.95	13	84.79	48	490.62	204	2,140.00
DHA-XII (EME Sector)	--	--	--	--	--	--	1	10.40	56	630.00
<b>Total</b>	<b>2</b>	<b>1,020</b>	<b>106</b>	<b>2,316.68</b>	<b>350</b>	<b>7,007.92</b>	<b>1,167</b>	<b>19,149.30</b>	<b>3,334</b>	<b>56,869.80</b>

## 7.7.5 Provincial Grid Company Licence:

Under Section 18A of NEPRA (Amendment) Act, 2018, the Authority may grant a licence authorizing a company owned by a Provincial Government to engage in the transmission of electric power within the territorial limits of such Province subject to such conditions as it may impose. During FY 2019-20, the Authority granted licence to Sindh Transmission & Dispatch Company (Pvt.) Limited (ST&DCPL) to act as a Provincial Grid Company for the Province of Sindh.

## 7.7.6 Distribution Licences:

During the FY 2019-20, the distribution licences have been granted to the following two companies:

S. No.	Name of Licensee	Date of Licence Issued
1	Lasbela Industrial Estates Development Authority for its distribution facilities located at Hub, District Lasbela	18 July, 2019
2	Aujla & Associates Town Developers (Pvt.) Limited for its distribution facilities located at Gujranwala	03 October, 2019

## 7.8 TARIFF

Pursuant to Section 7(3) of NEPRA Act, NEPRA has been expressly conferred the power to determine tariff, rates, charges and other terms and conditions for the supply of electric power services by generation, transmission distribution and suppliers and to recommend these to the Federal Government for notification.

### 7.8.1 Guidelines for Tariff Determination:

Under NEPRA (Amendment) Act, 2018, the following general guidelines are applicable to the Authority in the determination, modification or revision of rates, charges, and terms and conditions for provision of electric power services:

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- (a) Tariffs should allow licensees the recovery of any and all costs prudently incurred to meet the demonstrated needs of their customers, provided that assessments of licensees' prudence may not be required where tariffs are set on other than cost-of-service basis, such as formula-based tariffs that are designed to be in place for more than one year;
- (b) Tariffs should generally be calculated by including a depreciation charge and a rate of return on the capital investment of each licensee commensurate to the earned by other investments of comparable risk;
- (c) Tariffs should allow licensees a rate of return which promotes continued reasonable investment in equipment and facilities for improved and efficient service;
- (d) Tariffs should include a mechanism to allow licensees a benefit from, and penalties for failure to achieve, the efficiencies in the cost of providing the service and the quality of service;
- (e) Tariffs should reflect marginal cost principles to the extent feasible, keeping in view the financial stability of the sector;
- (f) The Authority shall have a preference for competition rather than regulation and shall adopt policies and establish tariffs towards that end;
- (g) Tariffs may be set below the level of cost of providing the service to consumer categories consuming electric power below such consumption as may be prescribed, as long as such tariffs are financially sustainable;
- (h) Tariffs should, to the extent feasible, reflect the full cost of service to consumer categories with similar service requirements;
- (i) Tariff should seek to provide stability and predictability for consumers; and
- (j) Tariffs should be comprehensible, free of misinterpretation and shall state explicitly each component thereof.

Provided that the Authority shall strike a balance to the extent possible, among the general guidelines in order to optimize the benefits to all persons likely to be affected by the determination, modification or revision of rates, charges and terms and conditions.

The NEPRA (Amendment) Act, 2018, also requires to determine a uniform tariff for distribution licensees wholly owned and controlled by a common shareholder, on the basis of their consolidated accounts.

NEPRA determines the tariff through consultative process in transparent manners as provided in law. The tariff is determined on reference values which are subject to adjustment on actual basis at different intervals i.e. monthly, quarterly and biannually etc.

## 7.8.2 Tariff Determined during the FY 2019-20:

During FY 2019-20, following Tariff Determinations were issued:

S. No.	Title	Issuance Date
1	Determination of the Authority in the matter of Petition filed by NTDC for Determination of its Transfer/Whelling Charges for the FY 2017-18 and FY 2018-19	31 July, 2019
2	Decision of the Authority in the Matter of Approval of Jetty O&M Tariff for China Power Hub Generation Company (Pvt.) Limited	07 August, 2019
3	Determination of the Authority in the Matter of Application filed by CPPA-G for Determination of its Market Operator Fee for FY 2018-19	13 November, 2019
4	Decision of the Authority in the Matter of petition filed by NPPMCL for Modification of Tariff for RLNG based power plant at Haveli Bahadur Shah	18 November, 2019
5	Decision of the Authority in the Matter of petition filed by NPPMCL for Modification of Tariff for RLNG based power plant at Balloki	19 November, 2019
6	Decision of the Authority in the Matter of Tariff Petition filed by Tapal Energy (Pvt.) Limited for approval of Generation Tariff for RFO Based Power Plant of 126 MW (Gross) at Karachi for Term Extension of the Existing PPA	20 November, 2019

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S. No.	Title	Issuance Date
7	Decision of the Authority in the Matter of Tariff Petition filed by Gul Ahmed Energy for approval of Generation Tariff for RFO based Power Plant of 136.14 MW	21 November, 2019
8	Determination: Tariff Petition Filed by Lake City Management for Determination of Generation Tariff for its 3.76 MW RFO Based Power Plant	06 December, 2019
9	Decision of the Authority in the Matter of Tariff Petition filed by Enertech Quetta Solar (Pvt.) Limited for Determination of Reference Generation Tariff in respect of 50 MW Solar Power Project	14 January, 2020
10	Decision of the Authority in the Matter of Petition filed by Zorlu Solar Pakistan Limited for Determination of Reference Generation Tariff in respect of 100 MW Solar Power Project	15 January, 2020
11	Decision of the Authority in the Matter of Tariff Petition filed by QATPL for Modification of Tariff dated April 14, 2016 of RLNG based Power Plant of 1,180.13 MW at Bhikki, Sheikhpura	27 January, 2020
12	Decision of the Authority in the Matter of Tariff Petition filed by Enertech Bostan Solar (Pvt.) Limited for Determination of Reference Generation Tariff in respect of 50 MW Solar Power Project	11 February, 2020
13	Decision of the Authority in the Matter of Tariff Petition filed by Kandiah Hydropower (Pvt.) Limited	13 February, 2020
14	Decision of the Authority in the Matter of Modification Petition filed by Artistic Energy (Pvt.) Limited for its Wind Power Project located at Jhampir, Thatta	14 February, 2020
15	Determination of Authority in the matter of Tariff Petition of Meridian Energy (Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
16	Determination of the Authority in the Matter of Tariff Petition filed by Zhenfa Pakistan New Energy (Pvt.) Limited	21 February, 2020
17	Determination of the Authority in the Matter of Tariff Petition filed by HNDS Energy (Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
18	Determination of the Authority in the Matter of Tariff Petition filed by Helios Power (Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
19	Determination of the Authority in the Matter of Tariff Petition filed by FAS Energy (SMC-Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
20	Determination of Authority in the Matter of Tariff Petition filed by Javed Solar (Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
21	Determination of Authority in the Matter of Tariff Petition filed by Kulachi Solar Power (Pvt.) Limited for 50 MW Solar Power Project	21 February, 2020
22	Decision of Authority in the Matter of Petition for Modification of EPC Reference Tariff filed by CPPA-G for 147 MW Patrind Hydropower Project	09 June, 2020

## 7.8.3 Review Motions Decisions during the FY 2019-20:

During FY 2019-20, following Tariff Review Motion Decisions were issued:

S. No.	Title	Issuance Date
1	Decision of the Authority in the Matter for Leave for Review against Determination of the Authority in the matter of Application for Approval of Tariff by Master Hydropower (Pvt.) Limited	09 July, 2019
2	Decision of the Authority in the Matter of Suo Moto Review proceedings regarding Modification of Fuel Price Mechanism of Bagasse Based Power Projects	16 July, 2019
3	Decision of the Authority in the Matter for Leave for Review submitted by CPPA-G against the Authority's Decision dated 19 November, 2018 regarding Neelum Jhelum Hydropower Project	19 August, 2019
4	Decision of the Authority in the Matter of Motion for Leave for Review by Huaneng Shandong Ruyi (Pakistan) Energy (Pvt.) Limited for revised Fuel Price Adjustment on Account of Coal Price Variation [For the period May, 2017 to May, 2019]	22 August, 2019
5	Decision of the Authority in the Matter of Motion for Leave for Review filed by NPGCL against the Decision of the Authority dated 14 April, 2015	29 August, 2019



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S. No.	Title	Issuance Date
6	Decision of the Authority in the Matter of Motions for Leave for Review filed by K-Electric Limited	27 September, 2019
7	Decision in the Matter of Motion of Review Filed by CPPA-G against the decision of the Authority dated 23 January, 2019	31 October, 2019
8	Decision of the Authority in the Matter of Review Motion Filed by MPCL against COD Decision	05 December, 2019
9	Decision of the Authority in the Matter of Motion for Leave for Review filed by K-Electric Limited against the decision of NEPRA No. NEPRA/TRF-362/K-Electric-2016/8107 dated 9 May, 2019	01 January, 2020
10	Motion for leave for Review filed by Etihad Power Generation Limited against decision of NEPRA	01 January, 2020
11	Decision of the Authority in the matter of Review Motion filed by ST&DCPL against the Tariff Determination dated 14 June, 2018	09 January, 2020
12	Decision of the Authority in the Matter of Motion for Recalculation filed by Oursun Pakistan Limited against Decision of COD Adjustment	10 January, 2020
13	Decision of the Authority in the Matter of Motion for Leave for Review filed by Zepher Power (Pvt.) Limited against decision of the Authority dated 08 July, 2019	11 February, 2020
14	Decision of the Authority in the Matter of Motion for Leave for Review filed by NPPMCL against decision for RLNG based Power Plant at Haveli Bahadur Shah	12 February, 2020
15	Decision of the Authority in the Matter Motion for Leave for Review filed by NPPMCL against decision dated 19 November, 2019 for RLNG based Power Plant at Balloki	12 February, 2020
16	Decision of the Authority in the Matter of Leave for review filed by PQEPCL (For the period November, 2017 to January, 2020)	03 March, 2020
17	Decision of the Authority in the Matter of Motion for Recalculation of Debt Servicing Component of Tariff – Foundation Wind Power-II	13 March, 2020
18	Decision of the Authority in the Matter of Motion for Recalculation of Debt Servicing Component of Tariff – Foundation Wind Power-I	18 March, 2020
19	Decision of NEPRA in the Matter of Review Motion filed by Shaheen Renewable Energy-I (Pvt.) Limited against Determination dated 12 February, 2019	27 March, 2020
20	Decision of NEPRA in the matter of Motion for Leave for Review filed by Siachen Energy Limited for Determination of Reference Generation Tariff in respect of 100 MWp Solar Power Project	27 March, 2020
21	Decision of the Authority in the Matter of Leave for Review filed by NTDC with respect to the Determination of the Authority	31 March, 2020
22	Decision of the Authority in the Matter of Review Motion filed by NPPMCL for its project 1230.54 MW on RLNG	20 May, 2020
23	Decision of the Authority in the Matter of Review Motion filed by NPPMCL	20 May, 2020
24	Decision of the Authority in the Matter of Motion for Leave for Review filed by Gul Ahmed Energy Limited in respect of Tariff Determination regarding Generation Tariff	03 June, 2020
25	Decision of the Authority in the Matter of Motion for Leave for Review filed by Enertech Bostan Solar (Pvt.) Limited against the Authority's Determination of Generation Tariff	04 June, 2020
26	Decision of the Authority in the Matter of Motion for Leave for Review filed by M/s Enertech Quetta Solar (Pvt.) Limited against the Authority's Determination of Generation Tariff	04 June, 2020
27	Decision of the Authority in the Matter of Motion for Leave for Review filed by Tapal Energy (Pvt.) Limited in respect of Tariff Determination dated 20 November, 2019 regarding approval of Generation Tariff for Term Extension of RFO based power plant of 126 MW	09 June, 2020

## 7.8.4 COD Adjustments during the FY 2019-20:

The tariff determined for the generation companies is adjusted when these companies' achieve Commercial Operations Date (COD). These adjustments are made to actualize the approved cost as well as to reflect the change in inflation, exchange rates and interest rates occurred during the construction period of these companies. During FY 2019-20, the COD adjustments of the following companies were issued:



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S. No.	Title	Issuance Date
1	Decision of the Authority in the Matter of Tariff Adjustment at COD of Zephyr Power (Pvt.) Limited	08 July, 2019
2	Decision of the Authority in the Matter of Tariff Adjustment at COD of AJ Power (Pvt.) Limited	08 July, 2019
3	Decision of the Authority in the Matter of Tariff Adjustment at COD of Port Qasim Electric Power Company (Pvt.) Limited	27 September, 2019
4	Decision of the Authority in the matter of Tariff Adjustment at COD of Oursun Pakistan Limited	20 November, 2019
5	Decision of the Authority in the matter of Tariff Adjustments at COD of NPPMCL-Haveli Bahadur Shah	19 February, 2020
6	Decision of the Authority in the matter of Tariff Adjustments at COD of NPPMCL-Balloki	19 February, 2020

## **7.8.5 Adjustments/Indexations in Tariff of Generation Companies in Operations:**

The tariff of generation companies, once actualized at the time of their COD, is adjusted periodically during their operations to reflect the change in different indices. These adjustments are recommended in the relevant power policies and mechanisms; therefore, prescribed in the tariff determinations. These variations are allowed for change in cost of inputs, inflation, PKR devaluation and interest rates. Different tariff components are adjusted during different intervals depending upon their nature and change in cost of their inputs.

## **7.8.6 Monthly Adjustments:**

The decisions for the adjustment in the fuel cost component of the power generation companies (Coal, RLNG, RFO) is made on monthly basis on account of change in fuel prices. The decision for the change in the fuel cost component of gas based generation sources is made as and when prices are changed by the relevant organization. During FY 2019-20, a total of 229 Nos. of monthly FPA were issued in the tariff of generation companies.

## **7.8.7 Quarterly Adjustments:**

The decisions for the adjustment in the Operations & Maintenance, Return and Debt Servicing Components are made on quarterly basis. These adjustments are made due to change in local/foreign inflation, exchange rate variations and interest rates. The adjustments due to change in interest rates are also made on bi-annual basis, depending on the final terms agreed by generation sources and approved by NEPRA. During FY 2019-20, a total of 245 quarterly Adjustments were issued.

## **7.8.8 Annual Adjustments:**

The decision for the adjustment in the Insurance component of tariff is made on yearly basis. The fuel cost component of bagasse is adjusted on yearly basis.

## **7.8.9 Adjustments in Consumer-end Tariff:**

The consumer-end tariff of the distribution companies is subject to adjustment on account of fuel price variation and actual generation mix on monthly basis as per mechanism given in their respective tariff determinations.

The consumer-end tariff of the distribution companies is also subject to adjustment on account of quarterly indexation on account of capacity charge variation (US CPI, Local CPI, Exchange Rate Variation, T&D Losses Adjustments etc.).

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## 7.9 CONSUMER AFFAIRS

Consumer Affairs Department of NEPRA receives and processes complaints of electricity consumers against Distribution Company. The complaints generally pertain to excessive/detection billing, delay in provision of new connection, replacement of defective meters, low voltage problem, delay in augmentation of transformers, replacement of damaged transformers, non-receipt of electricity bills, excessive/un-scheduled load-shedding, etc. The complaints are received through various channels, i.e. manual, by post, email, online, Pakistan Citizen's Portal, etc. For consumer facilitation, NEPRA has established regional offices in different cities for receiving and processing of consumer complaints. During FY 2019-20, NEPRA established 05 more regional offices at Multan, Gujranwala, Faisalabad, Hyderabad and Sukkur, in addition to previously established offices at Lahore, Karachi, Peshawar and Quetta. The status of complaints received and processed by NEPRA at its different offices during FY 2019-20 is given below:

### 7.9.1 Status of Consumer Complaints (2019-20) (Head Office):

DISCO	Total Complaints Received/Processed	Total Complaints Disposed Off	Under Process
PESCO	245	227	18
TESCO	6	2	4
IESCO	176	169	7
GEPCO	132	126	6
LESCO	229	216	13
FESCO	180	165	15
MEPCO	294	268	26
HESCO	337	322	15
SEPCO	328	314	14
QESCO	8	3	5
WAPDA	1	0	1
KE	214	175	39
BTPL	3	0	3
Pakistan Citizen Portal	307	227	80
<b>Total</b>	<b>2,460</b>	<b>2,214</b>	<b>246</b>

Source: NEPRA

### 7.9.2 Status of Consumer Complaints (2019-20) (Regional Offices):

Regional Office	DISCO	Total Complaints Received/Processed	Total Complaints Disposed Off	Under Process
Peshawar Office	PESCO	92	38	54
	GEPCO	96	93	3
Lahore Office	LESCO	243	236	7
	FESCO	126	121	5
	MEPCO	148	144	4
	HESCO	311	311	0
Karachi Office	SEPCO	249	241	8
	KE	2,017	1,623	394
Quetta Office	QESCO	47	23	24
Multan Office	MEPCO	21	13	8
Gujranwala Office	GEPCO	6	3	3
Faisalabad Office	FESCO	11	8	3
Hyderabad Office	HESCO	72	57	15
Sukkur Office	SEPCO	5	0	5
<b>Total</b>		<b>3,444</b>	<b>2,911</b>	<b>533</b>

Source: NEPRA

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## 7.10 NEPRA APPELLATE BOARD

An Appellate Board has been established by the Authority to hear the Appeals received in NEPRA against the decision of the Provincial Offices of Inspection under Section 38 of NEPRA Act, 1997. The following table shows the status of the Appeals decided by the Appellate Board during FY 2019-20:

DISCO	Pending as on 01 July, 2019	Filed from 01 <sup>st</sup> July, 2019 To 30 <sup>th</sup> June, 2020	Total	Decided	Balance as on 30 <sup>th</sup> June, 2020
PESCO	00	05	05	04	01
IESCO	13	18	31	03	28
GEPCO	15	06	21	10	11
LESCO	58	59	117	29	88
FESCO	17	33	50	03	47
MEPCO	24	34	58	19	39
HESCO	04	01	05	03	02
SEPCO	00	09	09	09	00
KE	56	43	99	69	30
<b>Total</b>	<b>187</b>	<b>208</b>	<b>395</b>	<b>149</b>	<b>246</b>





# 08

## INITIATIVES BY STAKEHOLDERS

The Private Power and Infrastructure Board (PPIB) and Alternative Energy Development Board (AEDB) are working at Federal level as one window facilitators for investment in power sector under the relevant Power Policies of the Government. Besides the federal agencies, Punjab Power Development Board (PPDB), Pakhtunkhwa Energy Development Organization (PEDO) Energy Department of Government of Sindh, and Energy Department of Government of Balochistan are working as Provincial Government agencies to facilitate investment in power sector under the prevailing power policies of the Federal and Provincial Governments. PPIB, AEDB, PPDB, PEDO, Energy Department (Government of Sindh) and Energy Department (Government of Balochistan) have provided briefs on their respective roles, activities during FY 2019-20, initiative and planned activities etc. which are given in the following paragraphs:

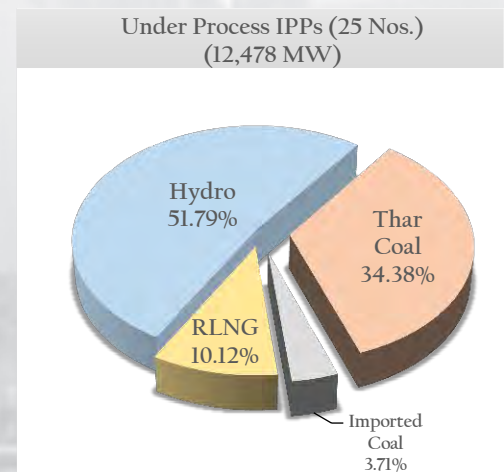
### 8.1 PPIB ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS

The PPIB, an autonomous body of the Government of Pakistan (GOP), provides a 'One Window' facility to investors in the field of power generation and related infrastructure. PPIB approves and facilitates the development and implementation of private and specified public sector power generation and transmission lines projects.

#### (A) PPIB's Current Portfolio of New Power Projects:

PPIB has informed that it is currently handling a diversified portfolio of twenty-five (Hydro, Coal and RLNG) based IPPs with cumulative capacity of around 12,478 MW, worth multi-billion dollars. PPIB is prioritizing indigenous resources of hydro and Thar Coal which jointly constitute 86% of the overall portfolio of active projects under PPIB. These projects are at different stages of implementation. Break-up is as follows:

- (a) Sixteen Hydropower based Projects: 6,462 MW
- (b) Six Thar Coal based Projects: 4,290 MW
- (c) Two Imported Coal based Projects: 463 MW
- (d) One RLNG based Project: 1,263 MW
- (e) One Transmission Line Project (Matitari-Lahore) having 4,000 MW Load carrying capacity.



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## (B) Role of PPIB in Implementing Power Projects under CPEC Program:

PPIB has stated that, having a rich experience of facilitating large number of investors in setting-up power generation and related infrastructure projects since its inception, PPIB has been accorded a pivotal role in implementing power projects included in the CPEC. Currently, PPIB's share for CPEC projects include; thirteen multiple fuel based power generation projects of 11,634 MW worth multi-billions US\$ plus the 900 km long,  $\pm 660$  kV Matiari-Lahore HVDC Project of 4,000 MW capacity. These projects are at various stages of development gradually adding new generating capacity to the National Grid and becoming major source of FDI in the country. The current status of projects under CPEC is as follows:

- Four Hydropower Projects (HPPs) of 3,414 MW including: (720 MW Karot and 870 MW Suki Kinari HPP under construction) and (700.7 MW Azad Pattan and 1,124 MW Kohala HPPs under Financial Closing).
- Five Thar Coal based Power Projects of 3,960 MW including: (660 MW Engro at Thar Block-II achieved COD), (330 MW Thar Energy Limited at Thar Block-I under construction prior to Financial Closing), (330 MW ThalNova at Thar Block-II and 1,320 MW Shanghai Project at Thar Block-I under construction prior to Financial Closing), (1,320 MW Oracle Project at Thar Block-VI under issuance of LOI/NTP).
- Four Imported Coal based Power Projects of 4,260 MW including: (3 projects of 1,320 MW each i.e. Port Qasim, Sahiwal and Hub already commissioned), (300 MW Gwadar project is under Financial Closing).
- Approximately 900 km long 4,000 MW load transmitting capacity,  $\pm 660$  kV Matiari-Lahore HVDC Transmission Line Project (under construction).

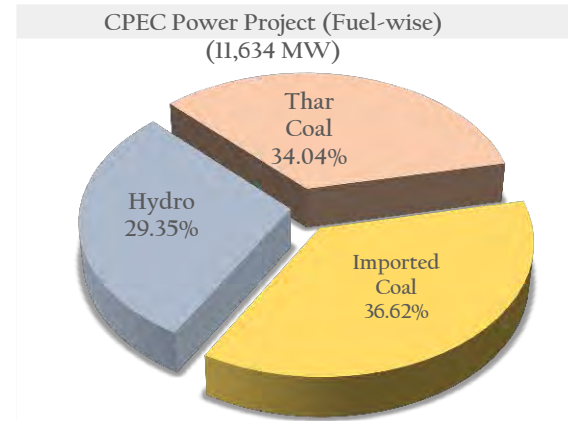


Table summarizing PPIB's portfolio of upcoming IPPs

Year	Hydel		Coal		RLNG		Total (MW)	No. of Projects
	MW	No.	MW	No.	MW	No.		
2020	-	-	-	-	1,263	1	1,263	1
2021	727	2	1,230	3	-	-	2,047	5
2022	884	1	1,290	3	-	-	2,174	4
2023	-	-	1,980*	1	-	-	1,980	1
2024	8	1	-	-	-	-	8	1
2026	2,124	3	-	-	-	-	2,124	3
2028	1,172	3	-	-	-	-	1,172	3
**	1,547	6	163	1	-	-	1,710	7
<b>Grand Total</b>	<b>6,462</b>	<b>16</b>	<b>4,753</b>	<b>8</b>	<b>1,263</b>	<b>1</b>	<b>12,478</b>	<b>25</b>

$\pm 660$  kV Matiari-Lahore HVDC Transmission Line Project is also being facilitated by PPIB which is set to come online by March, 2021.

\* Includes 2<sup>nd</sup> Units of Projects from previous year.

\*\* 1 X Coal Project under litigation, while six Hydropower Projects are to be advertised soon by PPIB hence these projects are not likely to be operational before 2028.

Source: PPIB

## (C) Highlights of some Major Activities/Achievements of PPIB during FY 2019-20:

- 102 MW Gulpur HPP located at River Poonch, AJ&K achieved COD on 10<sup>th</sup> March, 2020.
- Pakistan's 1<sup>st</sup> Thar Coal based 660 MW Engro Powergen at Thar Block-II achieved COD and started production with effect from 10<sup>th</sup> July, 2019.
- 1,320 MW Imported Coal based Power Project at Hub achieved COD on 17<sup>th</sup> August, 2019.

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- (d) Project Agreements of Pakistan's largest hydro IPP i.e. 1,124 MW Kohala comprising GOP IA, Tripartite Power Purchase Agreement (TPPA) were signed on 25<sup>th</sup> June, 2020.
- (e) The 330 MW (Thar Energy Limited) at Thar Block-II achieved Financial Close on 30<sup>th</sup> January, 2020. Construction activities had already started prior achieved of Financial Close.
- (f) PPIB, under Tripartite Letter of Support (TLOS) regime of Power Generation Policy 2015 issued 1<sup>st</sup> LOS to 7.08 MW Riali HPP on 16<sup>th</sup> October, 2019 and subsequently issued another LOS to 8 MW Kathai HPP on 20<sup>th</sup> November, 2019.
- (g) The CPEC project achieved significant milestone by signing of IA with PPIB on 16<sup>th</sup> December, 2019. The 1,320 MW Thar Coal based Shanghai Power Project is being developed at Thar Block-I which is at advance stages of achieving the Financial Close.
- (h) PPIB issued LOS to 300 MW Imported Coal based Power Project at Gwadar, Balochistan.
- (i) 884 MW Suki Kinari HPP achieved major milestone by starting construction work on embankment/dam reservoir, which was started by diverting water flow from River Kunhar on 28<sup>th</sup> September, 2019.
- (j) PPIB contributed and provided inputs on process, methodology, assumptions, basis used to workout demand projection and selection criteria and timelines of projects being evaluated under IGCEP as per the Grid Code requirements of NEPRA. During consultative process related to IGCEP, PPIB provided its full support in the form of relevant data provision related to its future power projects.

## (D) Major Activities/Proposals to be undertaken by PPIB in Future:

PPIB has conveyed that it is targeting to complete and commission another ten IPPs of 5,500 MW by 2022. Majority of these IPPs are based on indigenous hydro and coal:

Year	Hydro (MW)	Thar Coal (MW)	Imported Coal (MW)	RLNG (MW)	Total (MW)
2020	-	-	-	1,263	1,263
2021	727	1,320	-	-	2,047
2022	884	990	300	-	2,147
<b>Grand Total</b>	<b>1,611</b>	<b>2,310</b>	<b>300</b>	<b>1,263</b>	<b>5,484</b>

- (a) PPIB has recently started issuing LOS to Small HPPs having power generation capacity below 50 MW under TLOS regime of Power Generation Policy 2015. Under this initiative, PPIB tends to facilitate more such projects in the future.
- (b) PPIB is in the process of developing framework for ICB for private sector transmission line projects under the Transmission Line Policy 2015 for conduct of first-ever ICB. PPIB is arranging through CDWP's constituted Steering Committee under Member Energy (Energy Wing), Planning Commission; a list of double candidate projects, supported by relevant information/data/studies from NTDC, as per the provisions of the Transmission Line Policy 2015 for conduct of first ICB for transmission line projects through private sector.
- (c) The GOP is emphasizing development of hydro potential to produce indigenous clean, green and affordable electricity. In this regard, an agreement has been signed under which, Agence Française De Developpement (AFD) is supporting PPIB for improvement of expertise and for implementation of HPPs more efficiently. The agreed areas of support for technical assistance include preparation of mechanism for tariff based bidding for HPPs, hiring of Consultant to assist Panel of Experts on review of Feasibility Study for HPPs and capacity building of PPIB employees.

## 8.2 AEDB ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS

AEDB has been promoting and facilitating the development and deployment of alternative and renewable energy technologies in the country. The development of renewable energy based power generation projects is being pursued on IPP mode through private sector investors. AEDB has mentioned the following status of RE power projects as of 30<sup>th</sup> June, 2020:



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- (a) 24 WPPs of 1,233.37 MW cumulative capacity were operational and providing electricity to the grid.
- (b) 06 solar projects of 430.00 MW cumulative capacity were operational.
- (c) 08 sugar mill bagasse based co-generation projects of 259.10 MW capacity were operational. One project of 74.40 MW capacity was under construction.

AEDB informed that several ARE projects, initiated under the RE Policy 2006, were not able to proceed with their development due to restrictions imposed vide decisions taken by Cabinet Committee on Energy (CCOE) dated December 12, 2017. Under the vision of the current Government to exploit clean energy resources and increase the share of ARE in the energy mix, the CCOE vide its decisions in case No. CCE-12/04/2019(V) dated February 27, 2019 allowed implementation of projects that had already achieved significant milestones of project development by placing them into following three categories;

- Category-I:** 19 projects of 531 MW that have already been issued Letter of Support (LOS) subject to revision of tariff in case tariff determination has been done since more than one year or if the tariff validity period has lapsed.
- Category-II:** 24 projects of 1,339 MW that have acquired tariff and generation licence subject to revision of tariff in case tariff determination has been done since more than one year or if the tariff validity period has lapsed.
- Category-III:** 110 projects of more than 6,707 MW cumulative capacity holding Letter of Interests (LOIs) to be allowed to proceed ahead after becoming successful in a competitive bidding to be undertaken as per demand communicated by NTDC.

AEDB has stated that the following 12 Nos. of WPPs with a cumulative capacity of 610 MW have been facilitated to successfully achieve Financial Closing in November, 2019.

S. No.	Name of Wind Power Project	Capacity (MW)	Location	Expected COD
1	Master Green Energy Limited	50	Jhampir, Thatta	November, 2020
2	Tricom Wind Power (Pvt.) Limited	50	Jhampir, Thatta	February, 2021
3	Lakeside Energy (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
4	Artistic Wind Power (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
5	Liberty Wind Power 1 (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
6	Indus Wind Energy Limited	50	Jhampir, Thatta	December, 2021
7	Act2 Wind (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
8	Liberty Wind Power 2 (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
9	Metro Wind Power Limited	60	Jhampir, Thatta	December, 2021
10	NASDA Green Energy (Pvt.) Limited	50	Jhampir, Thatta	December, 2021
11	Din Energy Limited	50	Jhampir, Thatta	December, 2021
12	Gul Ahmed Electric Limited	50	Jhampir, Thatta	December, 2021

AEDB prepared the RFP packages for carrying out competitive bidding for wind and solar projects falling under Category-III after several rounds of consultations with public and private stakeholders. The Request for Proposal (RFP) packages have been submitted to NEPRA for approval. AEDB will carry out the competitive bidding once the RFP package is approved by NEPRA and quantum for bidding is communicated by NTDC.

## (A) Steps and Measures Taken by AEDB for Promotion and Development of Renewable Energy:

AEDB has mentioned the following supportive measures taken by it in order to promote ARE technologies and to attract private sector investments:



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- (a) AEDB facilitated the RE power projects in achieving their project milestones and resolution of issues and impediments faced by the project sponsors from different public sector entities.
- (b) AEDB initiated the formulation of the new draft ARE Policy 2019 as per the directions of the Government targeting a share of 20% from RE resources in the power mix by 2025 and 30% by 2030. The ARE Policy 2019 was approved in-principle by Council of Common Interests (CCI) in its meeting held on 23 December, 2019 subject to incorporating the concerns of Sindh, Punjab and Khyber Pakhtunkhwa.
- (c) AEDB facilitated the concerned stakeholders in implementation of net-metering systems under NEPRA's regulations. For mass deployment of net-metering based systems, several supportive steps were taken including trainings and capacity building of DISCOs. The total number of installations reached up to 4,858 by 30<sup>th</sup> June, 2020 with a cumulative capacity of 88.76 MW.
- (d) Assisted World Bank in study for analyzing the integration of variable renewable energy in the National Grid with the objective of increasing the share of renewable energy in the energy mix of the country.
- (e) AEDB assisted Ministry of Science & Technology and Ministry of Commerce on development of mechanism for enforcement of the solar quality standards through announcement of SRO 604(I)/2019 requiring Pre-Shipment Inspection (PSI) of solar panels and related equipment consignments imported into the country.
- (f) AEDB has engaged World Bank for developing strategy for implementation of new ARE Policy 2019 and undertaking competitive bidding for renewable power generation including localization of the manufacturing technology and advanced R&D.
- (g) AEDB collaborated with World Wind Energy Association (WWEA) and Global 100% Renewables in organizing a two-day Pakistan Renewable Energy Summit in September, 2019 inviting Policy Makers, National and International Experts, Investors, Developers and Manufacturers and other Stakeholders to enlighten them with global renewable power developments and potential for future growth in Pakistan.
- (h) Siemens, with support of AEDB organized a workshop in November, 2019 on hybrid solutions and virtual power plant and power management manifesting advanced renewable technologies and solutions to the audience.

## **(B) Planned Activities of AEDB for FY 2020-21:**

- (a) Finalization and notification of ARE Policy 2020 after incorporating the concerns of Provincial Governments.
- (b) Facilitation to projects falling under Category-I and Category-II of the CCOE decision in case No. CCE-12/04/2019(V) for their implementation.
- (c) Competitive bidding for RE projects falling under Category-III of the CCOE decision upon approval of RFP documents by NEPRA and provision of quantum by NTDC.
- (d) Development of Implementation Strategy and Action Plan for implementing of the ARE Policy 2019 to achieve the 2025 and 2030 RE targets with the support of World Bank.

## **8.3 PPDB (GOVERNMENT OF PUNJAB) ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS**

PPDB is a statutory body that performs its functions as one-window facilitator for development of IPP-based power projects in the Punjab Province. PPDB has stated that it has expanded its power project portfolio to align its energy development and investment with the national targets and so far contributed in capacity addition of 1,720 MW into National Grid. PPDB, being a provincial facilitator also maintaining a constant liaison with Federal and its Provincial entities in achievement of its goals and objectives.

### **(A) Undertaken Projects and Progress Status:**

PPDB has informed that it issued Letter of Interests (LOIs) for the development of various power projects having diversified project(s) portfolio of about 4,450 MW comprised of Thermal, Hydel, Solar, Wind and Biomass power projects. PPDB is also making efforts for realization of CPEC Energy Projects having committed contribution of 3,960 MW out of which 1,320 MW of Sahiwal CFPP is completed. PPDB is also facilitating development of 1,275 MW solar power projects, 250 MW wind power projects, 22 MW Biomass power Projects and 264 MW

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hydropower projects. The PPDB has conveyed following progress regarding key projects based on Indigenous/RE resources:

- (a) PPDB prepared RFP for competitive bidding under NEPRA's CBTR-2017 for development of 135 MW Taunsa Hydropower Project. The pre-qualification process has been completed and four sponsors have been pre-qualified. The RFP is under approval process with NEPRA. Upon approval it will be issued for bidding and carrying out further development activities. Three hydel projects of 26.40 MW have also approached PPIB for issuance of Tripartite Letter of Support (TLOS).
- (b) PPDB is extending facilitation to 100 MW Solar Power Projects by Zhenfa Pakistan New Energy Company (Pvt.) Limited at Rakh Chobara, Layyah. TLOS is expected to be signed with AEDB soon.
- (c) PPDB is also extending facilitation to 100 MW Solar Power Project by Zorlu Solar Pakistan Limited at Quaid-e-Azam Solar Park, Bahawalpur. TLOS is expected to be signed with AEDB soon.

## **(B) Issues and Bottlenecks:**

PPDB has stated that the projects facilitated by PPDB are stuck-up due to non-clarity/existence of prevailing power policies, different policy directions and current embargo on issuance of new PACs. In order to overcome these bottlenecks, the matter has also been taken up, on many occasions, with Ministry of Energy (Power Division), Joint Coordination Committee of CPEC, NEPRA, NTDC, DISCOs, CPPA-G, PPIB and AEDB. PPDB is making constant efforts in liaison with federal counterparts to achieve progress to carry out further development activities of thermal, hydro and RE initiated projects.

## **(C) Initiatives being Undertaken:**

PPDB has mentioned the following initiatives during the period under consideration:

**(i) Guidelines for development of Small Hydropower Projects in Captive Mode:** PPDB is encouraging development of small hydropower projects in captive mode for supply of generated energy for self-use of small, new and existing enterprises with the vision to enhance the development of small industries and increase rural employment. In this regard, Captive Guidelines for small hydropower projects have been developed and approved in 58<sup>th</sup> PPDB Board meeting held on 8 June, 2020. PPDB Board has also allowed initiating 10 projects with an aggregate capacity of 13.55 MW with in capacity range of 1-2 MW, mini hydropower projects, in 6 districts of Punjab in captive mode in the first phase.

**(ii) Establishment of Provincial Grid Company:** Pursuing the provision of NEPRA amended Act and in sync with other provinces, Government of Punjab is pursuing the establishment of Provincial Despatch and Transmission Company to reap the advantages of Wheeling Regulations and Turn Spare Generation Capacities of IPP plants after completion of their PPA term(s). In addition to the indigenous generation made available in captive/PPP/Public mode(s).

**(iii) RE Bulk Power Supply Guidelines:** PPDB under Punjab Generation Policy, 2009 has formulated draft RE Bulk Power Supply Guidelines with emphasis on generation of electricity from waste. The aim is to provide sustainable affordable electricity to Industry, Industrial Estates, Special Economic Zones (SEZs) located in Punjab etc. This will accelerate B2B or private sector renewable energy utilization to achieve its development goals, renewable energy potential and national targets in all energy intensive sectors.

**(iv) Facilitation by PPDB to Project:** For enhancing the socio-economic status of Sahiwal area, Energy Department/PPDB engaged Huaneng Shandong Ruyi (Pakistan) Energy (Pvt.) Limited (HSR) for Corporate Social Responsibility (CSR) initiatives to improve the lives of local community and CSR activities to be completed at its own without any financial liability to Government of Punjab. Resultantly, HSR entered the following agreements with Government of Punjab.

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- (a) **Technical Training Agreement (TTA) with Government of Punjab by HSR:** PPDB, Energy Department arranged different meetings with concerned stakeholders for establishment of Technical Training School (TTS) under TTA with Government of Punjab. TTS got registered with TEVTA with the name 'Huaneng Ruyi Technical Training School' and was formally inaugurated by Minister for Energy, Punjab on 8 August, 2019. HSR provided training to 75 graduate/non-graduate engineering students and locals during FY 2019-20 despite COVID-19 pandemic threat. The TTS shall remain functional for the 30 years for providing quality vocational training to the local students.
- (b) **Social Responsibility Agreement (SRA) with Government of Punjab:** This agreement was first of a kind which was signed in Pakistan. This SRA will hold for the complete 30 years of Sahiwal CFPP life cycle to promote strategic CSR initiatives through establishing a Trust Fund. Punjab Cabinet has approved in early 2020, for establishing a Trust Fund under SRA to carryout various activities for betterment of local people of Sahiwal. Currently, process of registration of Trust Fund is in progress.
- (v) **Facilitation to different Project Sponsors:** In order to exploit indigenous resources for the development of thermal power plants, due diligence study with the cooperation of Sahiwal Project Company, PRFTC, Sindh Energy Board, Sindh Engro Coal Mining Company and TCEB is underway for possibility of utilization of local coal for Punjab. PPDB is also facilitating different projects sponsors i.e. KAPCO and Huaneng Shandong Power Generation Company for exploring options of utilization of indigenous coal at their respective plants.

## 8.4 ENERGY DEPARTMENT (GOVERNMENT OF SINDH) ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS

Energy Department (ED), Government of Sindh (GOS) is providing one window facility to the investors to set up RE projects in the province of Sindh to add clean energy through indigenous resources. ED, GOS has stated that it submitted the progress of RE projects in IGCEP 2018-40 to the NTDC which were not adequately placed. ED, GOS has stated that it played proactive role in formulation of ARE Policy 2020 by giving its view/comments to be incorporated in ARE Policy 2020 for the promotion of RE in the country and achieve targets set by the Government. ED, GOS has conveyed the following progress in respect of development of RE projects being facilitated by it:

### (A) Wind Power Development:

ED, GOS issued 35 Nos. of LOIs to the following companies for development of wind power projects having cumulative capacity of 2,485 MW which are at different stages of development.

S. No.	Name of Project	Capacity (MW)	Location	S. No.	Name of Project	Capacity (MW)	Location
1	DHA City Karachi	50	Jhampir	18	Master Green Energy	2x50	Jamshoro
2	Harvey Energy	2x50	Jhampir	19	Unicol Limited	50	Jhampir
3	Finergy (Pvt.) Limited	50	Jhampir	20	ACT2 Wind Energy	50	Jhampir
4	New Generation Power (Pvt.) Limited	100	Jhampir	21	Power China Houdang Engg Corporation	50	Jhampir
5	Norinco International Corporation	2x50	Jhampir	22	Wuwei Aerospace New Energy Investment	2x100	Jhampir
6	Power China Chengdu Engineering Corporation	150	Jhampir	23	Muhammad Shafi Tennerries (Pvt.) Limited	50	Jhampir
7	Yunus Wind Power (YB Holdings)	50	Jhampir	24	Lucky Wind Power (YB Holdings)	50	Jhampir
8	Metro Wind Power	60	Jhampir	25	Gul Ahmed Textile	2x50	Jhampir
9	Lakeside Energy	50	Jhampir	26	Gul Ahmed Energy	50	Jhampir
10	Din Group	50	Jhampir	27	Moro Power Company	25	Jhampir
11	NASDA Green Energy	50	Jhampir	28	Western Energy	50	Jhampir
12	Harbin Electric International-II	250	Jamshoro	29	Mustaqim Dyeing & Printing Industries	50	Jhampir



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S. No.	Name of Project	Capacity (MW)	Location	S. No.	Name of Project	Capacity (MW)	Location
13	Indus Wind Energy	50	Jhampir	30	Orient Energy Systems	50	Jhampir
14	Tricom Wind Power	50	Jhampir	31	Lootah Energy (I & II)	2x50	Jhampir
15	Zulaikha Energy	50	Jhampir	32	Iran-Pak Wind Power	50	Jhampir
16	Noor Solar Energy	50	Jhampir	33	Novatex Limited	50	Jhampir
17	Artistic Milliners	50	Jhampir	34	Sindh Renewable Energy	2x50	Jhampir
					<b>Total</b>	<b>2,485 MW</b>	

## (B) Solar Power Projects:

ED, GOS issued 25 Nos. of LOIs to following companies for development of solar power projects having cumulative capacity of 1,550 MW which are at different stage of development.

S. No.	Name of Project	Capacity (MW)	Location	S. No.	Name of Project	Capacity (MW)	Location
1	New Generation Power	200	Jhampir	14	MCC Tongsin Resources Limited	100	Jamshoro
2	Meridian Energy	50	Sukkur	15	Siachen Energy	2x100	Mirpursakro /Gharo
3	HND5 Energy	50	Sukkur	16	Limited-I & II		
4	Helios Power	50	Sukkur	17	China National Power	100	Jamshoro
5	Metro Solar	50	Jhampir	18	Technomen Kinetics	100	Jamshoro
6	Technomen Kinetics/ZTE	20	Shaheed Benazirabad	19	ZTE Pakistan	100	Shaheed Benazirabad
7	MI Solar	20	Jamshoro	20	Act 2 Solar	50	Jhampir
8	Sukkur Solar Park	20	Sukkur	21	Greenewable Energy	50	Sehwan
9	Thatta Solar Park	20	Jhampir	22	IDC (Pvt.) Limited	50	Manjhand
10	Al Tariq & Laguardia	20	Jhampir	23	Siddiqsons	50	Jhampir
11	Gul Ahmed	50	Jhampir	24	Artistic Solar Energy	50	Jhampir
12	National Power & Water	50	Jamshoro	25	Sindh Renewable Energy Company	50	Manjhand
13	Tricom Solar Power	50	Jhampir		<b>Total</b>	<b>1,550 MW</b>	

## (C) Sindh Solar Energy Project:

Sindh Solar Energy Project under ADP No. 541 has been initiated with the financial support of US\$ 100 million by World Bank. The Project activities have been started in FY 2019-20 from the month of October, 2019 with the following three targets:

**Component-I (Utility Scale Solar):** 400 MW Grid-Connected Solar through Competitive Bidding. The inception report containing way forward for 400 MW Solar Park is forwarded to World Bank. The location study to identify project site has been completed and under the review of stakeholders.

**Component-II (Distributed Solar):** 20 MW Rooftop Solar on public sector buildings. The final survey report for pilot project (Sindh Assembly Building and JPMC building) has been completed. The initial survey of 400 buildings is under process. The RFQ documents finalized for Solarization of 35 hospitals.

**Component-III (Solar Home System):** 200,000 Solar Home Systems in 10 Districts of low energy access. The prices of solar power are varying in International Market. The Consultants have been hired to carryout competitive bidding to discover the solar power prices. The Household Survey firm hired for Survey of Household in 10 districts of Sindh.



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The contract has been signed for Solar Home System (SHS) Social Mobilization and Consumer Awareness Campaign. The technical evaluation sent to World Bank for review and comments for Installation Verification and Quality Control (IVQC). The 1<sup>st</sup> round of SHS Supplier has been completed.

## **(D) Hydropower Project:**

ED, GOS issued LOI to Omni (Pvt.) Limited, for development of small hydropower project with the capacity of 15 MW which is at tariff determination stage.

## **(E) Thar Projects:**

FC Block-I Mine, FC Phase-2 Block-II, COD by EPTL.

Block-VI case exclusively for surface coal gasification under CPEC in 9<sup>th</sup> JCC meeting. This will create cheaper and indigenous production of gas and urea for food security. However, the LOI under its 1<sup>st</sup> phase for 1,320 MW is pending with PPIB for past 6 months.

## **(F) Sindh Transmission and Despatch Company (STDC) Progress Report on FY 2019-20:**

**(i) Introduction:** STDC was incorporated on 7<sup>th</sup> January, 2015 under SECP Companies Ordinance, 1984 for the provision of high voltage electric power infrastructure. It is a subsidiary Company of Sindh Energy Holding Company (Pvt.) Limited. NEPRA also awarded the 1<sup>st</sup> ever Provincial Grid Company (PGC) Licence to STDC.

**(ii) Role of STDC in Power Sector:** ED, GOS has stated that the country has been facing shortage of transmission line hampering the evacuation of power by the transmission system. The Province of Sindh has taken an initiative to establish its own Transmission Line Company to support and reduce the work load of NTDC. STDC has successfully constructed and completed the 1<sup>st</sup> ever provincial Transmission Line of 132 kV Double Circuit (95.47 km) from SNPCL to K-Electric KDA-33 Grid Station, Karachi.

**(iii) Progress on Stated Goals in FY 2019-20:** ED, GOS has conveyed the following progress on its stated goals:

- (a) Improvement in the performance of Transmission Line during FY 2019-20:
  - (i) Number of tripping is only 4.
  - (ii) Number of outages hours 29 hours 05 minutes whereas NEPRA has allowed the annual outages allowance of 131.4 hours.
  - (iii) Transmission line losses are approximately 2%.
- (b) KWSB K-IV Power Project:
  - (i) 50 MW IPP (Consultancy is in progress).
  - (ii) Approximately 30 km 132 kV Double Circuit Transmission Line from Pumping Station 1 to Pumping Station 2 near Kinjhar Lake Thatta (Consultancy is in progress).
  - (iii) Construction of 02 132 kV Grid Stations (Consultancy is in progress).
- (c) Bahria Town Transmission Line Project 220 kV Double Circuit Quad-Bundle T/L of around 13 km to be loop-in loop-out with existing 220 kV Double Circuit Quad-Bundle Transmission Line of K-Electric from KDA Grid Station to Pipri West Grid Station (Consultancy is in Progress).

## **8.5 PEDO (GOVERNMENT OF KHYBER PAKHTUNKHWA) ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS**

### **(A) Hydropower Projects Completed:**

PEDO has informed that it is operating seven Hydropower Projects (HPP) in Malakand, Swabi, Kohistan, Swat, Mardan and Chitral District. The total installed capacity of these HPPs is 161.22 MW.

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S. No.	Name of Scheme	Capacity (MW)	S. No.	Name of Scheme	Capacity (MW)
1	Malakand-III HPP, Malakand	81.00	5	Machai Canal HPP, Mardan	2.60
2	Pehur HPP, Swabi	18.00	6	Ranolia HPP, Kohistan	17.00
3	Shishi HPP, Chitral	1.80	7	Daral Khwar HPP, Swat	36.60
4	Reshun HPP, Chitral	4.20	<b>Total Capacity</b>		<b>161.22</b>

## (B) Wheeling from PEDO Projects to Industrial Zone in Khyber Pakhtunkhwa:

PEDO has stated that in order to facilitate the industry in Khyber Pakhtunkhwa, the Provincial Government is committed to sell power to industry from 18 MW Pehur HPP to Gadoon Industrial State through wheeling arrangement. The supply of energy to Industrial Zones from HPPs completed by PEDO through wheeling arrangement will benefit the industry by cheap energy and also will boost industrialization in the Province and create new job opportunities.

## (C) Establishment of Provincial Transmission and Dispatch Company:

PEDO has informed that the Government of Khyber Pakhtunkhwa has taken initiative to establish its own Transmission & Dispatch Company so that it could have liberty of dispersal of power from its powerhouses either to National Grids or to Industrials Zones in Khyber Pakhtunkhwa. The Transmission Company will evacuate power from PEDO as well private sector projects located in Chitral, Dir, Swat, Kohistan and other parts of the Province. The company has been registered with SECP and will be functional soon.

## (D) Future Development Strategy (Short, Medium and Long Term Plans):

(i) **Short Term Plan:** PEDO has informed that construction of following five projects is in progress and expected to be completed in FY 2020-21:

S. No.	Name of Scheme	Location	Capacity (MW)	Target Completion
1	Koto HPP	Lower Dir	40	2020-21
2	Karora New HPP	Shangla	11	2020-21
3	Jabori HPP	Mansehra	10	2020-21
4	Construction of 356 MMHPs	8 Districts	35	2020-21
5	5 Micro Hydel Plants of Canal	Mardan and Charsadda	-	2020-21
6	Feasibility Study of 2 HPP	Swat, Chitral	-	2019-20
<b>Total Capacity</b>			<b>96</b>	

(ii) **Medium Term Plan:** The constructions of following six projects are in progress and expected to completed on date mention against each. The projects at Serial No. 5&6 are ADB funded projects for the social uplift of remote areas.

S. No.	Name of Scheme	Location	Capacity (MW)	Target Completion
1	Matiltan HPP	Swat	84.00	2021
2	Lawi HPP	Chitral	69.00	2021
3	Chapri Charkhel HPP	Kurram	10.56	2023
4	Barandu HPP	Tor Ghar	6.50	2023
5	672 MMHPs on Canal and Tributaries	-	53.13	2024
6	Solarization of 187 BHUs and 8,000 Schools	-	-	2024
<b>Total Installed Capacity</b>			<b>223.19</b>	

(c) **Long Term Plan:** The constructions of following nine projects has been included with financial assistance of Asian Development Bank (ADB), World Bank and under Public Private Partnership (PPP) and these projects are expected to be completed in FY 2027-28.

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S. No.	Name of Scheme	Location	Capacity (MW)	Source of Funding
1	Gabral Kalam HPP	Swat	88	World Bank
2	Madyan HPP	Swat	157	World Bank
3	Balakot HPP	Mansehra	300	Asian Development Bank
4	Kari Mashkur HPP	Chitral	495	Public Private Partnership
5	Spat Gah HPP	Kohistan	496	Public Private Partnership
6	Naran HPP	Mansehra	188	Public Private Partnership
7	Batakundi HPP	Mansehra	96	Public Private Partnership
8	Kalkot Patrak HPP	Dir	47	IDA
9	Patrak Shringal	Dir	22	IDA
Total Capacity			1,899	

## (E) Schemes Completed in Current FY 2019-20 and in the Next FY 2020-21:

### (i) Schemes Completed during FY 2019-20:

**Hydropower Projects:** Government of Pakistan signed a loan agreement with the ADB for the development of hydropower potential in Khyber Pakhtunkhwa. The total cost of these three projects is Rs. 14 billion.

S. No.	Name of Scheme	Capacity (MW)	Completion Status
1	Ranolia HPP, Kohistan	17.00	In Operation
2	Machai HPP, Mardan	2.60	In Operation
3	Daral HPP, Swat	36.60	In Operation
Total Capacity		56.20	

**Feasibility Studies of 3 Sites:** PEDO has informed that E&P Department has initiated 2<sup>nd</sup> Phase of Feasibility Study of potential sites in Khyber Pakhtunkhwa. In this phase the Feasibility Study of following two sites has been completed. The third site has been dropped due to technical reasons. The potential of these sites is about 583 MW (Kari-Muskhur HPP, District Chitral, 495 MW and Gabral-Kalam HPP, District Swat 88 MW).

### (ii) Schemes Due for Completion during FY 2020-21:

**Construction of 356 Mini-Micro Hydrel Projects in Khyber Pakhtunkhwa:** PEDO has conveyed that E&P Department has started work on 356 mini-micro hydrel station in remote and off-grid area 2014-15. At present 292 Mini-Micro hydrel project have been completed. These Mini-Micro hydrel projects will supply power to 85,000-90,000 households. The community will collect the revenue of these stations and look after the maintenance.

### Solarization of Chief Ministers House/Chief Minister's Secretariat/Civil Secretariat

- (a) The Chief Minister Secretariat has been solarized with the cost of Rs. 109 million.
- (b) The P&D Department of Civil Secretariat was completed as a pilot project. The Solarization of remaining Departments of Civil Secretariat has been completed with cost of Rs. 190 million.

### Electrification of 100 Villages through Solar/Alternate Energy in Central and Southern Districts (Phase-I)

Under this scheme 2,900 units of solar energy have been installed in Central and Southern Districts of Khyber Pakhtunkhwa. The scheme has been completed with the cost of Rs. 241 million.

### Electrification of 100 Villages through Solar/Alternate Energy in Northern Districts (Phase-II)

Under this scheme 2,750 units of solar energy have been installed in Chitral District with project cost of Rs. 325 million due to flood damages of Reshun HPP in 2015. The scheme has been completed in 2019.

### Solar Electrification of 4,740 Masajid in Khyber Pakhtunkhwa

- (a) The 4,000 Masajid in Khyber Pakhtunkhwa will be solarized with estimated cost of Rs. 2,414 million.
- (b) The 440 Masajid in UC of PK-10 of District Peshawar will be solarized with estimated cost of Rs. 220 million.



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- (c) The 300 Masajids in Merged Districts (Erstwhile FATA) of Khyber Pakhtunkhwa has been solarized with estimated cost of Rs. 166 million.

## Construction of 3 Hydropower Project (62.80 MW)

According to PEDO, the construction of following three projects was started in FY 2015-16 and work on these projects is in progress and will be completed in FY 2020-21:

S. No.	Name of Scheme	Location	Capacity (MW)	Target Completion
1	Koto HPP	Dir Lower	40.80	2020-21
2	Karora New HPP	Shangla	11.80	2020-21
3	Jabori HPP	Mansehra	10.20	2020-21
Total Installed Capacity			62.80	

## Construction of 13 Mini Grids 100 kW each in Merged Area

The construction of 13 Mini Grids with generating capacity of 100 kW has been started in business centers of Merged Area of Khyber Pakhtunkhwa with estimated cost of Rs. 869 million.

## Revenue Generation till date and Revenue Targets/Revenue Forecast:

S. No.	Financial Year	Receipt (Rs. Million)
1	2016-17	2,091.02
2	2017-18	2,287.21
3	2018-19	1,571.14
4	2019-20	3,457.38
	Total	9,404.47
Revenue Target for 2020-21		8,581.00

## (F) Future Initiative (Public Sector):

(i) **Construction of 300 MW Balakot HPP, District Mansehra:** PEDO has stated that the Provincial Government has agreed to construct 300 MW Balakot HPP, District Mansehra. ADB will provide loan for construction of Balakot HPP. The PC-I amounting Rs. 85 billion has been cleared by PDWP and CDWP and approved by ECNEC on 15 July, 2019. The loan agreement will be signed after the approval of project by ADB Board.

(ii) **Construction of 2 Projects through World Bank Loan (245 MW):** PEDO has informed that the World Bank will provide loan amounting to US\$ 832 million for the following three projects in public sector. The PC-II amounting to US\$ 4 million for preparatory advance has been approved from ECNEC.

S. No.	Name of Scheme	Location	Capacity (MW)
1	Gabral Kalam HPP	Swat	88
2	Madyan HPP	Swat	157
Total Installed Capacity			245

## (G) Future Initiative (Private Sector):

(i) **Projects under G2G/PPP Mode:** PEDO has stated that the Provincial Government has awarded some promising hydel potential sites to various local and foreign investors under the Khyber Pakhtunkhwa Power Policy, detail of which are as under:

- Three project namely Shogo Sin (132 MW), Shusghai Zendoli (144 MW) and Laspur Miragram (230 MW) have been awarded to FWO for implementation.
- Two projects i.e. Kalam Asrit (197 MW) and Asrit Kedam (215 MW) have been awarded to the state owned company of South Korea.



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- (c) Two cascade projects in Chitral having total potential of 610 MW have been awarded to Chinese state owned company.
- (d) The Khyber Pakhtunkhwa Government signed an MOU with Korean M/s KHNP for the implementation of 495 MW Lower Spat Gah located in District Kohistan.

## **(H) Policy Approvals etc.**

PEDO has approved Power Policy 2016 along with guidelines from the Government.

## **(I) Constraints:**

PEDO has mentioned the following constraints:

- (a) The power evacuation is the main issue, PESCO/NTDC network reinforcement is required.
- (b) Integrated Power Evacuation Study for projects located in the northern parts of Pakistan needs to be performed.
- (c) More time is required for the HPPs for completion as compared to other technologies i.e. solar and thermal.
- (d) IGCEP has envisaged most of the PEDO projects to be completed in 2045-47, due to which the investors will be discouraged.
- (e) CPPA-G is discouraging the investors by claiming that the power is surplus and no more power is required in the system.
- (f) The Ministry of Energy has failed to notify the tariff approved by NEPRA for the two PEDO Projects (102 MW Shigo-Kas and 99 MW Arkari Gol) since 2018.
- (g) The HPPs proposed by PEDO would be included in the IGCEP as per proposed completion/CODs.

## **8.6 ENERGY DEPARTMENT (GOVERNMENT OF BALOCHISTAN) ROLE, PLANNED ACTIVITIES, PROGRESS AND ACHIEVEMENTS**

The Energy Department, Government of Balochistan (ED, GOB) has apprised that mandate of Energy Department, Government of Balochistan is to electrify villages through QESCO, moreover the ED, GOB executes solar energy projects in various areas of the province to utilize available sources of renewable energy. Balochistan Energy Company has also been established to promote investment through private sector for generation of electricity from indigenous resources. ED, GOB conveyed the following activities and achievements during FY 2019-20:

### **Village Electrification:**

The ED, GOB has executed various schemes to provide electricity to villages in all districts of Balochistan. The works on the village has almost completed. Estimated cost of these village electrification schemes is Rs. 1,930.825 million.

### **Construction of New 132 kV Grid Stations:**

The ED, GOB has informed that construction of three new grid station has been included in the FY 2019-20 this schemes have been approved and work is in progress for construction of grid station in District Pishin, Killa Abdullah and Ziarat. The detail of the scheme is as under:

S. No.	Name of District	Estimated Cost (Rs. in million)
1	Pishin	628.36
2	Killa Abdullah	401.33
3	Ziarat	330.00

### **Solar Electrification:**

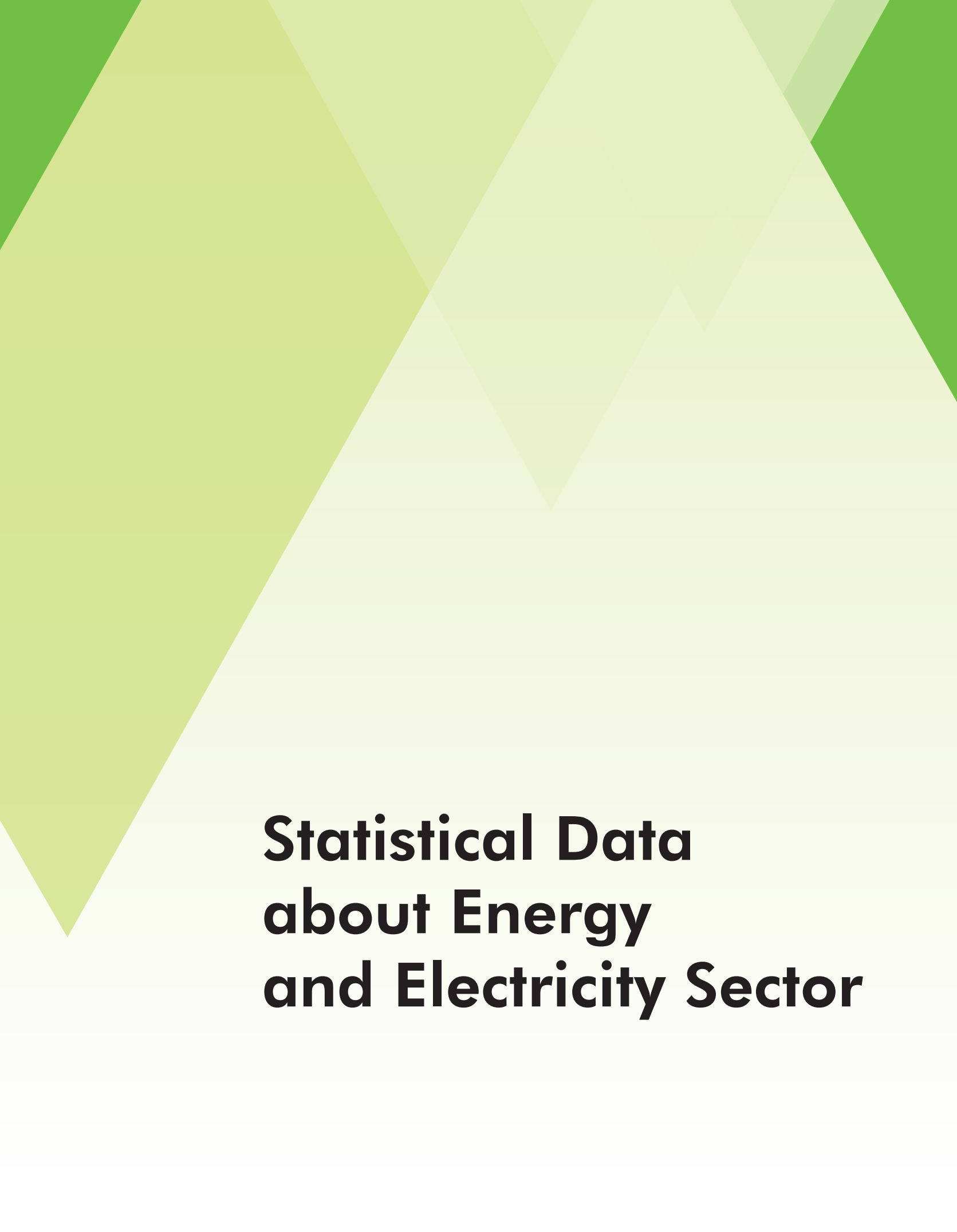
The ED, GOB has executed various schemes to provide electricity from solar energy to various villages in remote areas of Balochistan. Moreover, streets and roads have been solarized through installation of solar street lights in various areas of Balochistan. Estimated cost of these solar electrification schemes is Rs. 1,200.00 million.

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## Power Generation through Private Investors:

The ED, GOB has informed that, under Balochistan Power Generation Policy 2007, the GOB has issued LOIs to various private investors to construct solar and wind power plants at suitable sites for generation of electricity. In this regard, 16 LOIs have been issued to various firms interested in generation for power in Balochistan.

S. No.	Company/LOI Date	Name of Project	Project Location	Remarks
1	Ener Tec Holding Company (26-10-2016)	Two 50 MW Solar Power Project in Bostan	District Pishin	Land sub leased to the company. Generating Licence issued by NEPRA.
2	Nizam and Sons (28-10-2016)	50 MW Solar Power Project	District Quetta	LOI extension expired. Land not allotted yet.
3	Canadian Commercial Company (29-06-2016)	50 MW Power Plant at Anjeera.	Company has to establish 1,000 MW Plants in Balochistan.	MOU for 1,000 MW Plants signed in 2016. Letter has been written to the company for a presentation to CM for justification of delay.
4	El Passo Technology/AJS Group Company, Karachi (26-12-2016)	Two 50 MW Solar Plant at Kuchlak.	Kuchlak, Quetta	Case under process at BOR.
5	IB VoghtGmbH (23-02-2018)	Three 50 MW Solar Plants at Khuzdar, Gwadar and Lasbela.	50 MW Solar Plant at Maoza Chak Kharari, Lasbela. Land identification for 50 MW Plant at Maoza Karwat, Gwadar and 50 MW Plant at Khuzdar is underway.	Land at Lasbela at Maoza Chak Karari has been leased to the Energy Department, offer Letter for sub lease has been sent to the Company. NOC from EPA has been granted to the 50 MW Solar Plant at Gwadar. Feasibility study report for Gwadar plant is under process with ED. NOC for evacuation of power for Gwadar plant has been granted by QESCO.
6	Engro Energy (28-02-2018)	Four 50 MW Solar Plants at Kuchlak. Two 50 MW Plants at Khuzdar. One 50 MW Plant at Panjgoor.	300 MW Kuchlak site is located at 35 km from Quetta at Quetta Chaman Highway. Land identification for the solar projects at Khuzdar and Panjgoor is under process.	Land allotment case under process at BOR. Applied for the generation licence for Kuchlak Project.
7	Engro Energy (28-02-2019)	Ten 50 MW Wind Power Projects at Nokundi.	Mashkicha and Tuzgi area of Nokundi Chaghi	2x120 meters high wind masts constructed at Nokundi as below: (a) East mast Mashkicha, Nokundi, District Chaghi. (b) West mast Tozghi, Nokundi, District Chaghi. Data of these satellite centers for at least one year cycle will be compiled to carry out the feasibility.



# **Statistical Data about Energy and Electricity Sector**

# State of Industry Report 2020

**TABLE 1**  
**Primary Energy Supplies by Source (MTOE)**

Source	Unit	2014-15	2015-16	2016-17	2017-18	2018-19
Oil <sup>1</sup>	Million TOE	24.970	25.280	27.367	26.903	21.568
	% share	35.538	34.178	34.387	31.174	25.734
Gas	Million TOE	29.978	30.461	30.163	29.849	29.318
	% share	42.665	41.181	37.901	34.587	34.982
LPG <sup>2</sup>	Million TOE	0.457	0.909	1.009	1.054	0.954
	% share	0.651	1.229	1.267	1.221	1.138
Coal	Million TOE	4.953	5.067	6.482	10.925	12.933
	% share	7.049	6.850	8.145	12.659	15.431
Hydro Electricity <sup>3</sup>	Million TOE	7.751	8.267	7.682	6.665	6.526
	% share	11.031	11.176	9.652	7.723	7.786
Nuclear Electricity <sup>3</sup>	Million TOE	1.385	1.099	1.671	2.358	2.365
	% share	1.972	1.486	2.099	2.733	2.822
Renewable Electricity <sup>4</sup>	Million TOE	0.191	0.370	0.637	0.921	1.117
	% share	0.272	0.500	0.800	1.067	1.333
LNG Import <sup>4</sup>	Million TOE	0.473	2.404	4.456	7.493	8.913
	% share	0.672	3.250	5.599	8.682	10.635
Imported Electricity <sup>5</sup>	Million TOE	0.106	0.111	0.118	0.133	0.116
	% share	0.150	0.149	0.149	0.154	0.139
<b>Total</b>	<b>Million TOE</b>	<b>70.264</b>	<b>73.967</b>	<b>79.584</b>	<b>86.301</b>	<b>83.811</b>
	<b>% share</b>	<b>100.000</b>	<b>100.000</b>	<b>100.000</b>	<b>100.000</b>	<b>100.000</b>
<b>Annual Growth Rate (%)</b>		<b>5.109</b>	<b>5.270</b>	<b>7.595</b>	<b>8.440</b>	<b>-2.885</b>

<sup>1</sup> Excluding petroleum products exports and bunkering.

<sup>2</sup> Include imports and production from field plants.

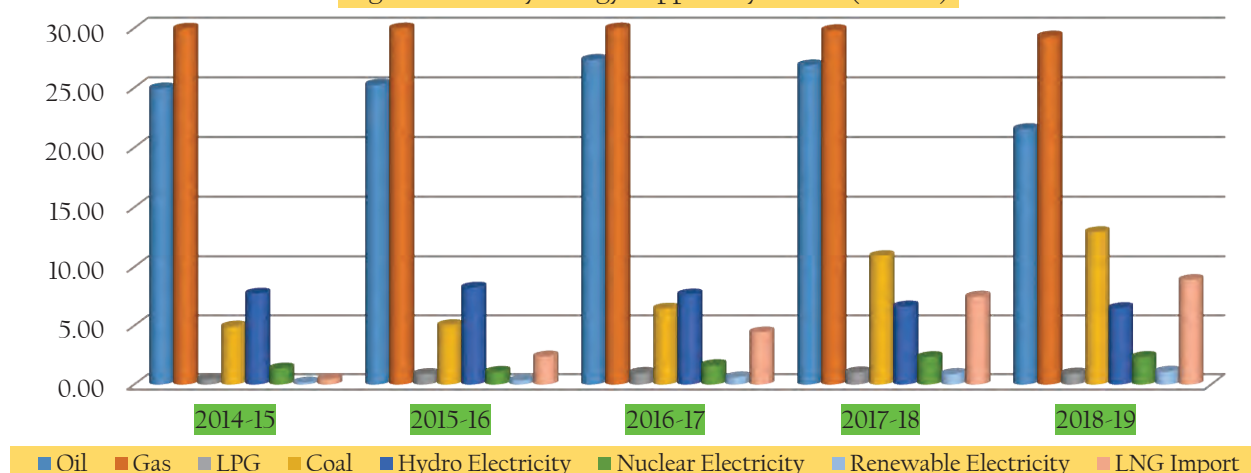
<sup>3</sup> Converted @ 10,000 Btu/kWh to represent primary energy equivalent of hydro and nuclear electricity as if this was generated by using fossil fuels.

<sup>4</sup> LNG Imports and Renewable Generation reported for the first time in FY 2014-15.

<sup>5</sup> W/APDA importing electricity from Iran since October, 2002.

Source: Pakistan Energy Yearbook, HDIP, Islamabad

**Figure 1: Primary Energy Supplies by Source (MTOE)**





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**TABLE 2**  
**Final Energy Consumption by Source (MTOE)**

Source	Unit	2014-15	2015-16	2016-17	2017-18	2018-19
Oil <sup>1</sup>	Million TOE	13.851	16.290	17.905	19.265	17.365
	% share	32.992	35.893	35.723	35.032	31.575
Gas <sup>2</sup>	Million TOE	15.756	15.544	17.031	16.694	17.275
	% share	37.528	34.250	33.979	30.356	31.412
LPG	Million TOE	0.756	1.210	1.308	1.385	1.148
	% share	1.802	2.667	2.611	2.519	2.088
Coal <sup>2</sup>	Million TOE	4.632	4.975	6.098	8.940	10.293
	% share	11.032	10.963	12.166	16.258	18.716
Electricity <sup>3</sup>	Million TOE	6.989	7.365	7.780	8.708	8.914
	% share	16.647	16.227	15.522	15.835	16.209
Total	Million TOE	41.984	45.385	50.122	54.993	54.996
	% share	100.000	100.000	100.000	100.000	100.000
Annual Growth Rate (%)		5.436	8.100	10.438	9.717	0.005

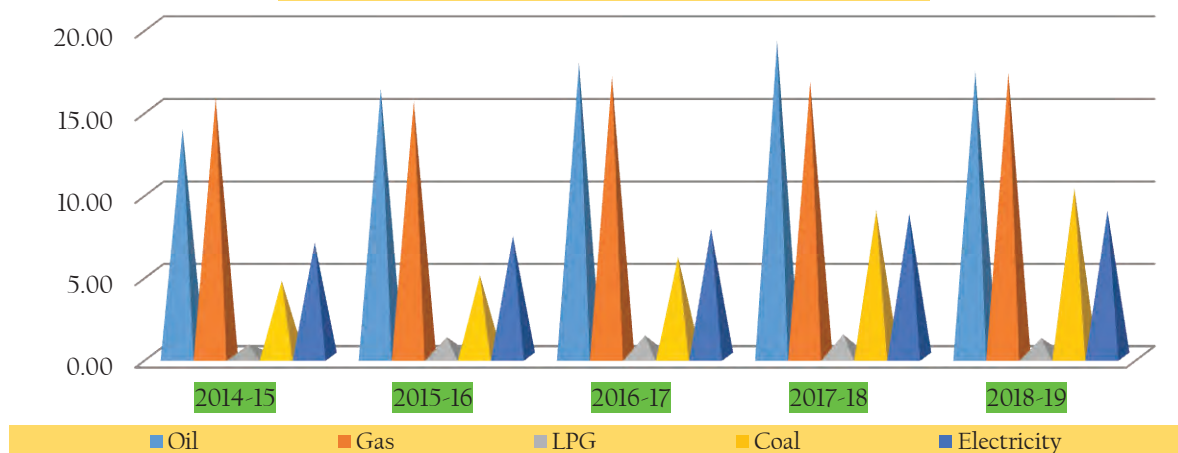
<sup>1</sup> Excluding consumption for power generation.

<sup>2</sup> Excluding consumption for power generation and feedstock.

<sup>3</sup> @ 3412 Btu/kWh being the actual energy content of electricity.

Source: Pakistan Energy Yearbook, HDIP, Islamabad

**Figure 2: Final Energy Consumption by Source (MTOE)**



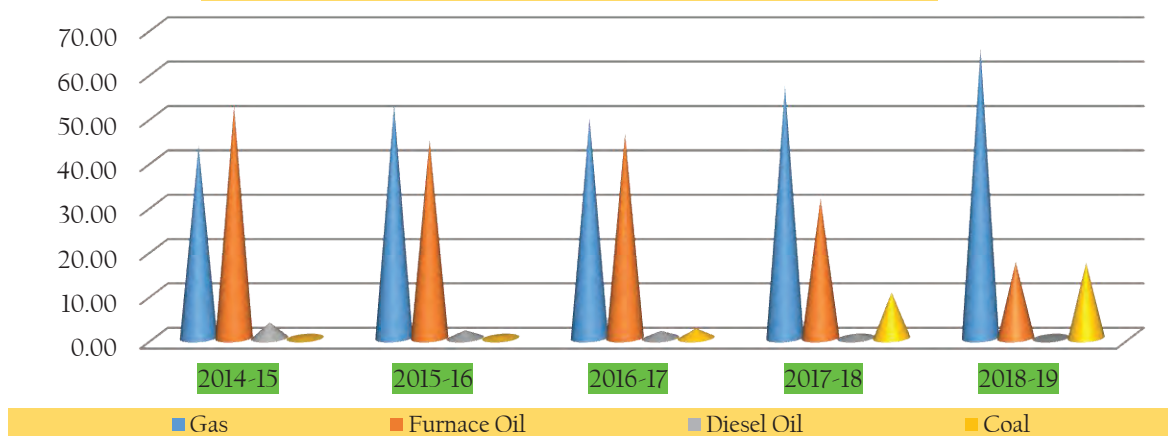
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**TABLE 3**  
**Fuel Consumption for Thermal Power Generation (TOE)**

Source	Unit	2014-15	2015-16	2016-17	2017-18	2018-19
Gas	TOE	6,847,894	8,577,146	8,643,403	10,831,662	10,050,101
	% share	43.57	52.78	49.80	56.89	65.35
Furnace Oil	TOE	8,234,479	7,288,400	8,037,139	6,029,947	2,661,528
	% share	52.40	44.85	46.30	31.67	17.31
Diesel Oil	TOE	565,953	294,755	291,841	194,033	27,383
	% share	3.60	1.81	1.68	1.02	0.18
Coal	TOE	67,638	91,463	384,585	1,984,722	2,640,347
	% share	0.43	0.56	2.22	10.42	17.17
Total	TOE	15,715,964	16,251,764	17,356,968	19,040,364	15,379,359
	% share	100.00	100.00	100.00	100.00	100.00
Annual Growth Rate (%)		1.62	3.41	6.80	9.70	-19.23

Source: Pakistan Energy Yearbook, HDIP, Islamabad

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



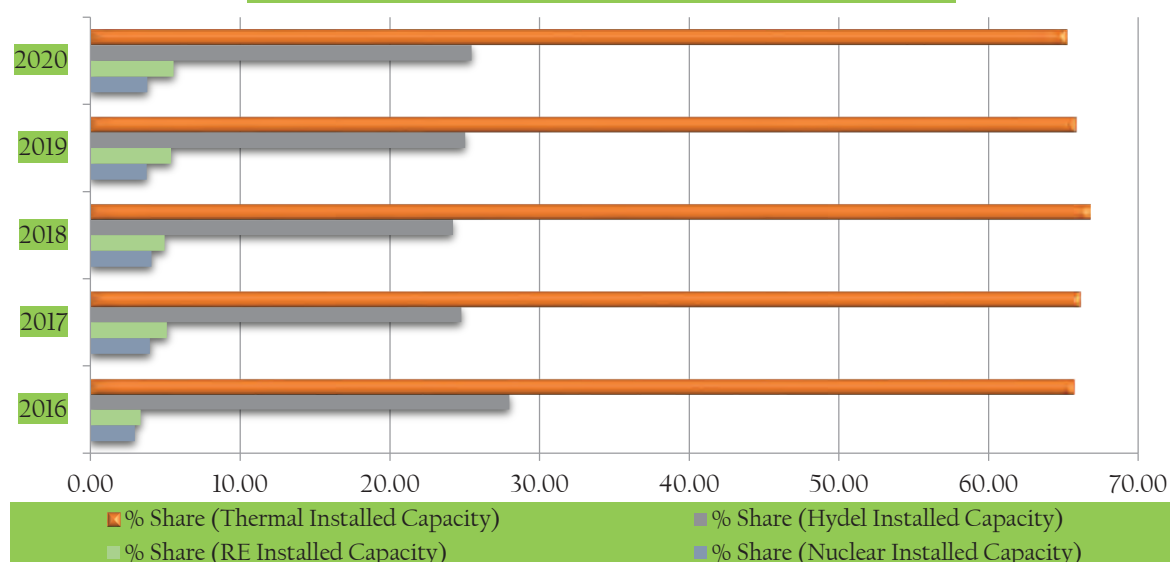
# State of Industry Report 2020

**TABLE 4**  
**Installed Capacity by Type (MW)**

As on 30 <sup>th</sup> June	2016	2017	2018	2019	2020
<b>HYDEL</b>					
WAPDA Hydel	6,902	6,902	8,341	9,389	9,389
IPPs Hydel	214	214	372	372	472
<b>Sub-Total</b>	<b>7,116</b>	<b>7,116</b>	<b>8,713</b>	<b>9,761</b>	<b>9,861</b>
% Share (Hydel Installed Capacity)	27.99	24.78	24.22	25.03	25.47
<b>THERMAL</b>					
GENCOs: CPPA-G System	5,897	5,897	5,637	5,637	4,881
KE Own	1,874	1,874	2,294	2,294	2,294
IPPs: CPPA-G System	8,643	10,566	15,297	16,946	17,276
IPPs: KE System	252	252	366	366	366
SPPs/CPPs/N-CPPs: CPPA-G System	0	313	340	340	340
SPPs/CPPs/N-CPPs connected with KE	35	87	87	87	87
<b>Sub-Total</b>	<b>16,701</b>	<b>18,989</b>	<b>24,020</b>	<b>25,670</b>	<b>25,244</b>
% Share (Thermal Installed Capacity)	65.70	66.14	66.76	65.83	65.20
<b>NUCLEAR</b>					
CHASNUPP (I, II, III and IV)	615	1,005	1,330	1,330	1,330
KANUPP	137	137	137	137	137
<b>Sub-Total</b>	<b>752</b>	<b>1,142</b>	<b>1,467</b>	<b>1,467</b>	<b>1,467</b>
% Share (Nuclear Installed Capacity)	2.96	3.98	4.08	3.76	3.79
<b>RENEWABLE ENERGY (WIND, SOLAR AND BAGASSE)</b>					
Wind Power Plants	306	785	1,048	1,248	1,248
Solar Power Plants	400	400	430	430	430
Bagasse based Power Plants	146	280	301	369	369
<b>RE Power Plants: CPPA-G System</b>	<b>852</b>	<b>1,465</b>	<b>1,779</b>	<b>2,047</b>	<b>2,047</b>
Solar Power Plants: KE System	0	0	0	50	100
<b>RE Power Plants: KE System</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>100</b>
<b>Sub-Total</b>	<b>852</b>	<b>1,465</b>	<b>1,779</b>	<b>2,097</b>	<b>2,147</b>
% Share (RE Installed Capacity)	3.35	5.10	4.94	5.38	5.55
<b>Total Installed Capacity of the Country</b>	<b>25,421</b>	<b>28,712</b>	<b>35,979</b>	<b>38,995</b>	<b>38,719</b>

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

**Figure 4: Share of Installed Generation Capacity by Type (%)**



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**TABLE 5**  
**Plant-wise Installed Capacity (MW) as on 30<sup>th</sup> June**

Power Station	Plant Location	Type of Power Station	2016	2017	2018*	2019*	2020*
<b>A1: Hydel (WAPDA)</b>							
<b>Major Hydropower Units</b>							
Tarbela	Tarbela, KPK	Reservoir	3,478	3,478	3,948	3,478	3,478
Tarbela 4 <sup>th</sup> Ext.	Tarbela, KPK	Reservoir	-	-	-	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
Golen Gol	Chitral, KPK	Run of River	-	-	-	108	108
<b>Small Hydropower Units</b>							
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
<b>Total Hydel (WAPDA)</b>			<b>6,902</b>	<b>6,902</b>	<b>8,341</b>	<b>9,389</b>	<b>9,389</b>
<b>A2: Hydel (IPPs)</b>							
Jagran (AJ&K)	Jagran, AJ&K	Hydro	30	30	30	30	30
Malakand-III (PEDO)	Malakand, KPK	Run of River/Canal	81	81	84	84	84
Pehur (PEDO)	Swabi, KPK	Canal Fall/Run of River	18	18	18	18	18
Laraib Energy (AJ&K)	Jhelum River, AJ&K	Hydro	84	84	84	84	84
Garam Chashma	Chitral, KPK	Hydro	1	1	1	1	1
Marala Hydro (PPDCL)	Sialkot, Punjab	Canal Fall/Run of River	-	-	8	8	8
Patrind Hydro (AJ&K)	Muzaffarabad, AJ&K	Run of River	-	-	147	147	147
Gulpur Hydro	Gulpur, Kotli, AJK	Run of River	-	-	-	-	100
<b>Total Hydel (IPPs)</b>			<b>214</b>	<b>214</b>	<b>372</b>	<b>372</b>	<b>472</b>
<b>Total Hydel (A1+A2)</b>			<b>7,116</b>	<b>7,116</b>	<b>8,713</b>	<b>9,761</b>	<b>9,861</b>
<b>B1: Thermal (GENCOs: CPPA-G System)</b>							
TPS Jamshoro	Jamshoro, Sindh	STs	880	880	880	880	880
GTPS Kotri	Kotri, Sindh	GTs+CCPP	144	144	144	144	0
TPS Guddu (Units 1-4)	Guddu, Sindh	STs	640	640	640	640	0
TPS Guddu (Units 5-10)	Guddu, Sindh	GTs+CCPPs	600	600	600	600	600
TPS Guddu (Units 11-13)	Guddu, Sindh	GTs+OCPPs	415	415	415	415	415
TPS Guddu (Units 14-16)	Guddu, Sindh	GTs+ST+CCPPs	747	747	747	747	747
TPS Quetta	Quetta, Balochistan	GT	28	28	0	0	28
TPS Muzaffargarh	Muzaffargarh, Punjab	STs	1,350	1,350	1,350	1,350	1,350
SPS Faisalabad	Faisalabad, Punjab	STs	132	132	0**	0	0
GTPS Faisalabad	Faisalabad, Punjab	GTs+CCPPs	244	244	144**	144**	144**
TPS Nandipur	Gujranwala, Punjab	GTs+CCPPs	567	567	567	567	567
FBC Lakhra	Lakhra, Sindh	STs	150	150	150	150	150
<b>Total Thermal (GENCOs: CPPA-G System)</b>			<b>5,897</b>	<b>5,897</b>	<b>5,637</b>	<b>5,637</b>	<b>4,881</b>



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Power Station	Plant Location	Type of Power Station	2016	2017	2018*	2019*	2020*
<b>B2: Thermal (IPPs: CPPA-G System)</b>							
Lal Pir Power	Mehmood Kot, Punjab	ST	362	362	362	362	362
Pak Gen. Power	Mehmood Kot, Punjab	ST	365	365	365	365	365
Altern Energy	Fateh Jang, Punjab	GEs	31	31	31	31	31
Fauji Kabirwala	Kabirwala, Punjab	GTs+CCPP	157	157	170	170	170
Habibullah Coastal	Quetta, Balochistan	GTs+CCPP	140	140	155	155	155
Hub Power	Hub, Balochistan	STs	1,292	1,292	1,292	1,292	1,292
Japan Power	Raiwind, Punjab	DE	135	135	120	120	120
KAPCO	Kot Addu, Punjab	GTs+CCPPs	1,600	1,600	1,600	1,600	1,600
Kohinoor Energy	Raiwind, Punjab	DEs+ST	131	131	131	131	131
Rousch Power	Sidhnai, Punjab	GTs+ST	450	450	450	450	450
Saba Power	Farooqabad, Punjab	ST	134	134	136	136	136
Southern Electric	Raiwind, Punjab	DEs	136	136	117	117	117
TNB Liberty Power	Daharki, Sindh	GTs+CCPP	235	235	235	235	235
Uch Power	Murad Jamali, Balochistan	GTs+ST	586	586	586	586	586
Attock Gen.	Attock Morgah, Punjab	DGs+ST	165	165	165	165	165
Atlas Power	Sheikhupura, Punjab	REs+ST	219	219	224	224	224
Engro Power Gen. Qadirpur	Qadirpur, Sindh	GT+ST	217	217	227	227	227
Saif Power	Sahiwal, Punjab	GTs+ST	210	210	225	225	225
Orient Power	Balloki, Punjab	GTs+ST	225	225	225	225	225
Nishat Power	Qasur, Punjab	REs+ST	200	200	202	202	202
Nishat Chunian	Qasur, Punjab	DEs+ST	200	200	202	202	202
Sapphire Electric	Muridke, Punjab	GTs+ST	235	235	235	235	235
Halmore Power	Bhikki, Punjab	GTs+ST	225	225	225	225	225
Narowal Energy	Narowal, Punjab	DEs+ST	214	214	214	214	214
Liberty Power Tech.	Faisalabad, Punjab	DEs+ST	202	202	202	202	202
Foundation Power	Daharki, Sindh	GT+ST	185	185	179	179	179
Davis Energen.	Jhang, Punjab	GEs	11	14	12	12	12
Uch-II Power	Murad Jamali, Balochistan	GTs+ST	381	381	404	404	404
Huaneng Shandong Ruyi	Sahiwal, Punjab	STs	-	660	1,320	1,320	1,320
QATPL (Bhikki)	Bhikki, Punjab	GT/HRSG/ST	0	832	1,231	1,231	1,231
NPPMCL (HBS)	HBS, Punjab	GT/HRSG/ST	0	428	1,277	1,277	1,277
NPPMCL (Balloki)	Balloki, Punjab	GT/HRSG/ST	0	0	1,276	1,276	1,276
Port Qasim Electric	Port Qasim, Sindh	ST+CB	-	-	1,320	1,320	1,320
Reshma Power	Raiwind, Punjab	RE	-	-	97	97	97
Gulf Powergen	Gujranwala, Punjab	RE	-	-	84	84	84
China Power Hub	Lasbella, Balochistan	ST+CB	-	-	-	1,320	1,320
Engro Powergen Thar	Tharparkar, Sindh	ST+CB	-	-	-	330	660
<b>Total Thermal (IPPs: CPPA-G System)</b>			<b>8,643</b>	<b>10,566</b>	<b>15,297</b>	<b>16,946</b>	<b>17,276</b>
<b>Total Thermal in CPPA-G system (B1+B2)</b>			<b>14,540</b>	<b>16,463</b>	<b>20,934</b>	<b>22,583</b>	<b>22,157</b>
<b>C: Nuclear</b>							
CHASNUPP-I	Chashma, Punjab	STs	300	325	325	325	325
CHASNUPP-II	Chashma, Punjab	STs	315	340	325	325	325
CHASNUPP-III	Chashma, Punjab	STs	-	340	340	340	340
CHASNUPP-IV	Chashma, Punjab	STs	-	-	340	340	340
KANUPP	Karachi, Sindh	STs	137	137	137	137	137
<b>Total Nuclear (C)</b>			<b>752</b>	<b>1,142</b>	<b>1,467</b>	<b>1,467</b>	<b>1,467</b>
<b>D: Renewable Energy (CPPA-G System)</b>							
<b>D1: Wind Power Projects</b>							
Zorlu Enerji Pakistan	Thatta, Sindh	WTs	56	56	56	56	56
FFC Energy	Thatta, Sindh	WTs	50	50	50	50	50
Three Gorges First Wind Farm	Thatta, Sindh	WTs	50	50	60	60	60
Foundation Wind Energy-I	Thatta, Sindh	WTs	50	50	50	50	50
Foundation Wind Energy-II	Thatta, Sindh	WTs	50	50	50	50	50
Sapphire Wind	Thatta, Sindh	WTs	50	50	53	53	53
Yunus Energy	Thatta, Sindh	WTs	-	50	50	50	50
Metro Power Company	Thatta, Sindh	WTs	-	50	50	50	50

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Power Station	Plant Location	Type of Power Station	2016	2017	2018*	2019*	2020*
Gul Ahmad Wind	Thatta, Sindh	WTs	-	50	50	50	50
Master Wind Energy	Thatta, Sindh	WTs	-	50	50	50	50
Tenaga Generasi	Thatta, Sindh	WTs	-	50	50	50	50
HydroChina Dawood	Thatta, Sindh	WTs	-	50	50	50	50
Sachal Energy	Thatta, Sindh	WTs	-	50	50	50	50
UEP Wind Power	Thatta, Sindh	WTs	-	99	99	99	99
Artistic Wind Power	Thatta, Sindh	WTs	-	30	50	50	50
Act Wind	Thatta, Sindh	WTs	-	-	30	30	30
Hawa Energy	Thatta, Sindh	WTs	-	-	50	50	50
Jhimpir Power	Thatta, Sindh	WTs	-	-	50	50	50
Three Gorges Second Wind Farm	Thatta, Sindh	WTs	-	-	50	50	50
Three Gorges Third Wind Farm	Thatta, Sindh	WTs	-	-	50	50	50
Tricon Boston Consulting-A	Thatta, Sindh	WTs	-	-	-	50	50
Tricon Boston Consulting-B	Thatta, Sindh	WTs	-	-	-	50	50
Tricon Boston Consulting-C	Thatta, Sindh	WTs	-	-	-	50	50
Zephyr Power	Thatta, Sindh	WTs	-	-	-	50	50
<b>Total Wind Power Projects</b>			<b>306</b>	<b>785</b>	<b>1,048</b>	<b>1,248</b>	<b>1,248</b>
<b>D2: Solar Power Projects</b>							
Quaid-e-Azam Solar Park	Bahawalpur, Punjab	Solar	100	100	100	100	100
Appolo Solar Development	Bahawalpur, Punjab	Solar	100	100	100	100	100
Best Green Energy	Bahawalpur, Punjab	Solar	100	100	100	100	100
Crest Energy	Bahawalpur, Punjab	Solar	100	100	100	100	100
AJ Power	Khushab, Punjab	Solar	-	-	12	12	12
Harappa Solar	Sahiwal, Punjab	Solar	-	-	18	18	18
<b>Total Solar Power Projects</b>			<b>400</b>	<b>400</b>	<b>430</b>	<b>430</b>	<b>430</b>
<b>D3: Bagasse/Biomass Power Projects</b>							
Jamal Din Wali-II	Rahim Yar Khan, Punjab	Bagasse/Biomass	26	26	26	26	26
Jamal Din Wali-III	Rahim Yar Khan, Punjab	Bagasse/Biomass	27	27	27	27	27
RYK Mills	Rahim Yar Khan, Punjab	Bagasse	30	30	30	40	40
Chiniot Power	Chiniot, Punjab	Bagasse	63	63	63	63	63
Fatima Energy	Muzaffargarh, Punjab	Biomass/Coal	-	119	120	120	120
Hamza Sugar Mills	Rahim Yar Khan, Punjab	Bagasse/Biomass	-	15	15	15	15
The Thal Industries	Layyah, Punjab	Bagasse	-	-	20	20	20
Almoiz Industries	Mianwali, Punjab	Bagasse	-	-	-	36	36
Chanar Energy	Faisalabad, Punjab	Bagasse/Biomass	-	-	-	22	22
<b>Total Bagasse/Biomass Power Projects</b>			<b>146</b>	<b>280</b>	<b>301</b>	<b>369</b>	<b>369</b>
<b>Total Renewable Energy (D1+D2+D3) (CPPA-G system) (D)</b>			<b>852</b>	<b>1,465</b>	<b>1,779</b>	<b>2,047</b>	<b>2,047</b>
<b>E1: Thermal (KE Own)</b>							
Bin Qasim TPS-I	Karachi, Sindh	STs	840	840	1,260 <sup>†</sup>	1,260	1,260
Bin Qasim TPS-II	Karachi, Sindh	GTs	572	572	572	572	572
Korangi Town GTPS-II	Karachi, Sindh	GTs	107	107	107	107	107
Site GTPS-II	Karachi, Sindh	GTs	107	107	107	107	107
Korangi CCPP	Karachi, Sindh	GTs	248	248	248	248	248
<b>Total Thermal (KE Own)</b>			<b>1,874</b>	<b>1,874</b>	<b>2,294</b>	<b>2,294</b>	<b>2,294</b>
<b>E2: Thermal (IPPs connected with KE System)</b>							
Gul Ahmed	Karachi, Sindh	DE+ST	128	128	136	136	136
Tapal Energy	Karachi, Sindh	DE+ST	124	124	126	126	126
SNPCL-I	Jamshoro, Sindh	GEs+STs	-	-	52	52	52
SNPCL-II	Jamshoro, Sindh	GEs+STs	-	-	52	52	52
<b>Total Thermal (IPPs connected with KE System)</b>			<b>252</b>	<b>252</b>	<b>366</b>	<b>366</b>	<b>366</b>

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Power Station	Plant Location	Type of Power Station	2016	2017	2018*	2019*	2020*
<b>E3: Thermal (Others connected with KE System)</b>							
Intl. Steel Limited	Karachi, Sindh	GEs+DGs	19	19	19	19	19
Intl. Ind. Limited	Karachi, Sindh	GEs+ST	4	4	4	4	4
FFBL Power	Karachi, Sindh	CFB+STs	-	52	52	52	52
<b>Total Thermal (Others connected with KE System)</b>			<b>35</b>	<b>87</b>	<b>87</b>	<b>87</b>	<b>87</b>
<b>Total Thermal KE (E1+E2+E3)</b>			<b>2,161</b>	<b>2,213</b>	<b>2,747</b>	<b>2,747</b>	<b>2,747</b>
<b>E4: Renewable Energy (KE System)</b>							
Oursun Pakistan	Gharo, Thatta	Solar	-	-	-	50	50
Gharo Solar	Thatta, Sindh	Solar	-	-	-	-	50
<b>Total RE (KE System)</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>100</b>
<b>Total KE (KE own and others connected with KE System)</b>			<b>2,161</b>	<b>2,213</b>	<b>2,747</b>	<b>2,797</b>	<b>2,847</b>
<b>F: SPPs/CPPs/N-CPPs: CPPA-G System [Contract Capacity (MW)]</b>							
<b>Total SPPs/CPPs/N-CPPs: CPPA-G System (F)</b>				<b>312.5</b>	<b>339.7</b>	<b>339.7</b>	<b>339.7</b>
<b>Grand Total (A+B+C+D+E+F)</b>			<b>25,421</b>	<b>28,712</b>	<b>35,979</b>	<b>38,995</b>	<b>38,719</b>

\* Installed Capacity as per valid Generation Licence. \*\* Licence not available, partial energy procured during July-2017 to Feb.-2018.

† As per latest modification of KE Licence, Unit 3&4 are now part of KE's generation fleet. ‡ Contract Capacity as per Tariff Determination.

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

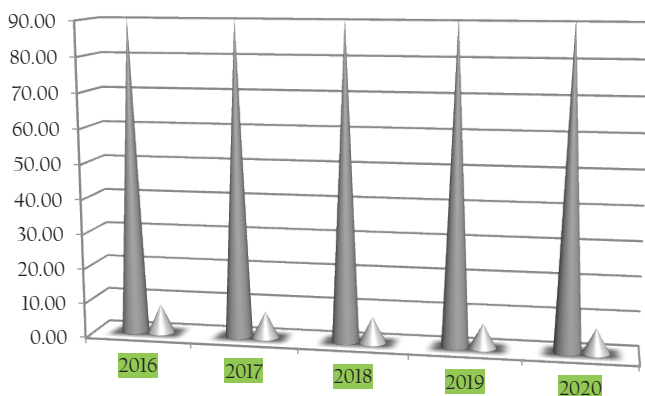
**TABLE 6**  
**Installed Capacity by Systems and by Sectors (MW)**

As on 30 <sup>th</sup> June	2016	2017	2018	2019	2020
<b>BY SYSTEM</b>					
<b>Total Installed Capacity: CPPA-G System</b>	<b>23,123</b>	<b>26,362</b>	<b>33,095</b>	<b>36,061</b>	<b>35,735</b>
% Share (Installed Capacity: CPPA-G System)	90.96	91.82	91.98	92.48	92.29
<b>Total Installed Capacity: KE System</b>	<b>2,298</b>	<b>2,350</b>	<b>2,884</b>	<b>2,934</b>	<b>2,984</b>
% Share (Installed Capacity: KE System)	9.04	8.18	8.02	7.52	7.71
<b>BY SECTOR</b>					
<b>Total Installed Capacity in Public Sector</b>	<b>13,651</b>	<b>15,301</b>	<b>19,329</b>	<b>20,377</b>	<b>19,621</b>
% Share (Installed Capacity in Public Sector)	53.70	53.29	53.72	52.26	50.68
<b>Total Installed Capacity in Private Sector</b>	<b>11,770</b>	<b>13,411</b>	<b>16,650</b>	<b>18,618</b>	<b>19,098</b>
% Share (Installed Capacity in Private Sector)	46.30	46.71	46.28	47.74	49.32
<b>Total Installed Capacity in the Country</b>	<b>25,421</b>	<b>28,712</b>	<b>35,979</b>	<b>38,995</b>	<b>38,719</b>

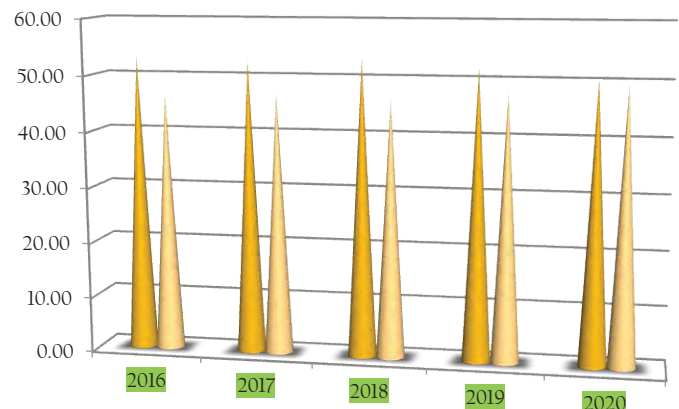
Note: See tables 4 and 5 for breakup details.

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

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



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

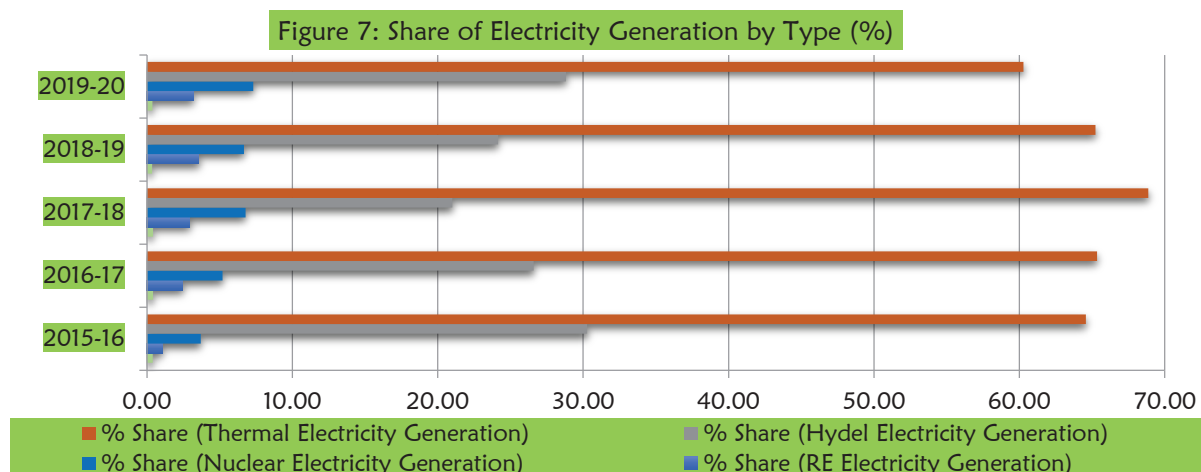


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**TABLE 7**  
**Electricity Generation by Type (GWh)**

As on 30 <sup>th</sup> June	2015-16	2016-17	2017-18	2018-19	2019-20
<b>HYDEL</b>					
WAPDA Hydel	33,433.33	31,091.29	26,951.19	31,167.85	37,425.41
IPPs Hydel	1,121.00	988.00	1,118.24	1,928.04	1,562.55
<b>Sub-Total</b>	<b>34,554.33</b>	<b>32,079.29</b>	<b>28,069.43</b>	<b>33,095.89</b>	<b>38,987.96</b>
% Share (Hydel Electricity Generation)	30.29	26.59	21.01	24.15	28.82
<b>THERMAL</b>					
GENCOs: CPPA-G System	16,391.91	18,709.99	16,199.10	13,016.99	7,907.85
KE Own	10,323.00	10,147.00	10,337.75	10,727.68	10,358.00
IPPs: CPPA-G System	45,146.42	47,972.10	62,433.73	62,597.73	60,720.31
IPPs Connected with KE	1,421.00	1,531.00	1,824.81	2,131.72	1,862.68
SPPs/CPPs/N-CPPs: CPPA-G System	251.00	271.40	665.53	405.13	170.99
SPPs/CPPs/N-CPPs connected with KE	139.00	187.00	550.49	523.74	535.00
<b>Sub-Total</b>	<b>73,672.33</b>	<b>78,818.49</b>	<b>92,011.40</b>	<b>89,402.99</b>	<b>81,554.83</b>
% Share (Thermal Electricity Generation)	64.57	65.34	68.87	65.25	60.30
<b>NUCLEAR</b>					
CHASNUPP (I, II, III and IV)	3,854.00	5,868.00	8,719.87	9,005.68	9,704.89
KANUPP	362.00	410.00	330.86	129.99	193.00
<b>Sub-Total</b>	<b>4,216.00</b>	<b>6,278.00</b>	<b>9,050.73</b>	<b>9,135.67</b>	<b>9,897.89</b>
% Share (Nuclear Electricity Generation)	3.70	5.20	6.77	6.67	7.32
<b>IMPORT</b>					
Import from Iran	463.00	496.00	554.74	486.80	513.74
<b>Sub-Total</b>	<b>463.00</b>	<b>496.00</b>	<b>554.74</b>	<b>486.80</b>	<b>513.74</b>
% Share (Imported Electricity Generation)	0.41	0.41	0.42	0.36	0.38
<b>RENEWABLE ENERGY (WIND, SOLAR AND BAGASSE)</b>					
Wind Power Plants	691.00	1,387.00	2,145.07	3,231.64	2,882.48
Solar Power Plants	225.00	635.00	702.17	714.52	704.97
Bagasse based Power Plants	271.00	928.00	1,059.88	894.43	564.46
<b>RE Power Plants: CPPA-G System</b>	<b>1,187.00</b>	<b>2,950.00</b>	<b>3,907.12</b>	<b>4,840.59</b>	<b>4,151.91</b>
Solar Power Plants: KE System	0.00	0.00	0.00	56.92	153.00
<b>RE Power Plants connected with KE</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>56.92</b>	<b>153.00</b>
<b>Sub-Total</b>	<b>1,187.00</b>	<b>2,950.00</b>	<b>3,907.12</b>	<b>4,897.51</b>	<b>4,304.91</b>
% Share (RE Electricity Generation)	1.04	2.45	2.92	3.57	3.18
<b>Total Electricity Generation of the Country</b>	<b>114,092.66</b>	<b>120,621.78</b>	<b>133,593.42</b>	<b>137,018.86</b>	<b>135,259.33</b>

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





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**TABLE 8**  
**Plant-wise Electricity Generation (GWh)**

Power Station	Primary Fuel	Alternate Fuel	2015-16	2016-17	2017-18*	2018-19*	2019-20*
<b>A1: Hydel (WAPDA)</b>							
<b>Major Hydropower Units</b>							
Tarbela	Hydel	Hydel	15,990.31	15,049.44	13,356.86	10,619.28	11,923.93
Tarbela 4 <sup>th</sup> Ext.	Hydel	Hydel	--	--	--	2,318.06	5,498.03
Ghazi Barotha	Hydel	Hydel	6,721.69	6,885.76	6,020.89	6,552.14	6,551.36
Mangla	Hydel	Hydel	6,864.40	5,347.57	4,141.86	3,860.85	4,686.36
Warsak	Hydel	Hydel	924.25	985.44	916.53	1,002.27	1,104.95
Chashma	Hydel	Hydel	897.05	890.33	756.00	767.16	751.58
Khan Khwar	Hydel	Hydel	37.64	199.06	170.90	237.74	279.12
Allai Khwar	Hydel	Hydel	568.42	396.66	275.89	462.09	475.10
Jinnah Hydel	Hydel	Hydel	296.32	292.69	230.25	225.63	182.27
Duber Khwar	Hydel	Hydel	643.07	589.47	514.83	594.42	611.55
Neelum Jhelum	Hydel	Hydel	--	--	174.08	3,964.68	4,842.30
Golen Gol	Hydel	Hydel	--	--	--	99.31	88.85
<b>Small Hydropower Units</b>							
Dargai	Hydel	Hydel	114.58	104.80	95.72	109.35	98.91
Rasul	Hydel	Hydel	95.98	93.47	65.54	71.86	36.56
Shadiwal	Hydel	Hydel	25.55	31.05	25.93	28.39	14.25
Chichoki Mallian	Hydel	Hydel	34.16	34.23	31.43	29.05	30.36
Nandipur	Hydel	Hydel	40.75	43.15	45.73	36.97	35.25
Kurram Garhi	Hydel	Hydel	23.40	18.44	17.24	14.23	15.28
Renala	Hydel	Hydel	2.03	2.20	2.31	2.19	2.08
Chitral	Hydel	Hydel	3.60	4.20	3.45	3.51	3.05
Gomal Zam	Hydel	Hydel	11.86	6.17	0.36	32.68	55.25
Malakand/Jabban	Hydel	Hydel	138.27	117.16	105.39	135.99	139.02
<b>Total Hydel (WAPDA)</b>			<b>33,433.33</b>	<b>31,091.29</b>	<b>26,951.19</b>	<b>31,167.85</b>	<b>37,425.41</b>
<b>A2: Hydel (IPPs)</b>							
Malakand-III (PEDO)	Hydel	Hydel	425.00	426.00	362.11	399.25	408.53
Pehur (PEDO)	Hydel	Hydel	40.00	45.00	32.61	35.86	50.59
Laraib Energy (AJ&K)	Hydel	Hydel	545.00	424.00	389.66	354.38	384.43
Garam Chashma	Hydel	Hydel	0.00	0.00	0.00	0.00	0.00
Marala Hydro (PPDCL)	Hydel	Hydel	--	--	0.74	527.45	32.16
Patrind Hydro (AJ&K)	Hydel	Hydel	--	--	246.20	527.45	566.25
Gulpur Hydropower Project	Hydel	Hydel	--	--	--	--	34.33
<b>Total Hydel (IPPs)</b>			<b>1,121.00</b>	<b>988.00</b>	<b>1,118.24</b>	<b>1,928.04</b>	<b>1,562.55</b>
<b>Total Hydel (A1+A2)</b>			<b>34,554.33</b>	<b>32,079.29</b>	<b>28,069.43</b>	<b>33,095.89</b>	<b>38,987.96</b>
<b>B1: Thermal (GENCOs: CPPA-G System)</b>							
TPS Jamshoro	RFO/Gas	RFO	3,246.46	3,253.56	1,792.06	880.09	209.90
GTPS Kotri	Gas	HSD	582.02	338.67	94.92	37.19	0.00
TPS Guddu (Units 1-4)	Gas	RFO	148.64	227.08	258.11	10.02	0.00
TPS Guddu (Units 5-10)	Gas	--	2,058.19	2,487.81	3,617.95	3,467.30	1,294.84
TPS Guddu (Units 11-13)	Gas	--	272.26	820.54	1,043.97	837.20	311.56
TPS Guddu (Units 14-16)	Gas	HSD	3,551.47	4,543.55	3,855.08	5,069.78	4,315.35
TPS Quetta	Gas	--	111.29	53.32	0.00	0.00	0.00
TPS Muzaffargarh	Gas	RFO	4,644.65	5,160.13	3,040.37	836.73	299.86
SPS Faisalabad	Gas	RFO	85.84	107.68	6.26	0.00	0.00
GTPS Faisalabad	Gas	HSD	275.16	214.62	105.29	149.53	0.00
TPS Nandipur	Gas	HSD	1,267.78	1,379.05	2,381.70	1,729.09	1,476.33
FBC Lakhra	Coal	Coal	148.16	123.97	3.39	0.06	0.00
<b>Total Thermal (GENCOs: CPPA-G System)</b>			<b>16,391.91</b>	<b>18,709.99</b>	<b>16,199.10</b>	<b>13,016.99</b>	<b>7,907.85</b>

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Power Station	Primary Fuel	Alternate Fuel	2015-16	2016-17	2017-18*	2018-19*	2019-20*
B2: Thermal (IPPs: CPPA-G System)							
Lal Pir Power	RFO	--	1,946.10	1,601.09	1,089.06	613.80	186.32
Pak Gen. Power	RFO	-	878.13	1,727.18	1,237.28	495.56	149.76
Altern Energy	Gas	--	184.60	198.30	145.12	22.03	3.73
Fauji Kabirwala	Gas	HSD	1,138.06	1,122.84	1,017.26	563.13	346.32
Habibullah Coastal	Gas	HSD	563.03	785.90	880.33	716.78	108.37
Hub Power	RFO	--	7,546.99	6,793.11	5,196.60	814.43	32.38
KAPCO	Gas	RFO/HSD	6,757.00	7,524.00	7,436.76	4,959.40	3,476.67
Kohinoor Energy	RFO	--	877.41	816.83	645.40	387.44	363.86
Rousch Power	Gas	HSD	2,970.66	2,459.69	2,591.64	1,035.85	217.53
Saba Power	RFO	--	70.59	510.46	465.88	225.41	50.83
TNB Liberty Power	Gas	HSD	1,491.36	1,430.23	1,041.56	1,307.61	896.74
Uch Power	Gas	HSD	4,213.96	4,406.44	4,442.99	3,895.85	4,087.33
Attock Gen.	RFO	--	1,179.30	1,135.41	912.45	532.18	320.96
Atlas Power	RFO	--	1,320.46	1,336.90	1,246.45	691.30	259.33
Engro Powergen. Qadirpur	Gas	HSD	1,222.00	1,731.00	1,668.42	1,385.13	700.74
Saif Power	Gas	HSD	1,088.78	905.44	841.56	828.20	476.28
Orient Power	Gas	HSD	1,155.62	944.68	841.39	877.80	338.00
Nishat Power	RFO	--	1,272.16	1,239.76	1,171.19	675.10	277.46
Nishat Chunian	RFO	--	1,240.16	1,350.33	1,099.67	599.74	351.23
Sapphire Electric	Gas	HSD	1,056.42	989.71	814.96	808.51	296.76
Halmore Power	Gas	HSD	916.00	553.00	871.01	612.91	347.69
Narowal Energy	RFO	--	1,161.91	1,334.18	1,199.68	636.13	338.08
Liberty Power Tech.	RFO	--	1,277.44	1,369.33	1,175.61	776.26	458.54
Foundation Power	Gas	--	1,211.48	1,382.85	1,392.39	1,330.60	777.30
Davis Energen.	Gas	--	74.00	61.05	8.82	0.00	0.00
Uch-II Power	Low BTU Gas		2,332.81	2,731.34	2,593.04	3,018.37	2,148.02
Huaneng Shandong Ruyi	Bituminous Coal		--	873.17	8,461.59	8,220.07	6,167.19
QATPL (Bhikki)	RLNG	HSD	--	502.77	3,655.62	6,149.75	5,192.50
NPPMCL (HBS)	RLNG	HSD	--	155.11	2,856.73	7,027.24	7,050.34
NPPMCL (Balloki)	RLNG	HSD	--	--	2,050.62	5,284.19	5,911.84
Port Qasim Electric Power	Bituminous Coal	HSD	--	--	3,319.02	7,553.64	8,969.74
Reshma Power	RFO/HSFO		--	--	60.86	15.11	2.07
Gulf Powergen	RFO/HSFO		--	--	2.78	0.00	0.00
China Power Hub	Imported Coal		--	--	--	260.82	6,136.20
Engro Powergen Thar	Thar Coal		--	--	--	277.42	4,280.22
Total Thermal (IPPs/SPPs/CPPs: CPPA-G System)			45,146.42	47,972.10	62,433.73	62,597.73	60,720.31
Total Thermal: CPPA-G System (B1+B2)			61,538.33	66,682.09	78,632.82	75,614.72	68,628.16
C: Nuclear							
CHASNUPP-I	NUC	NUC	1,486.00	2,118.00	2,433.42	2,141.02	2,044.64
CHASNUPP-II	NUC	NUC	2,368.00	2,315.00	2,301.74	2,262.73	2,636.12
CHASNUPP-III	NUC	NUC	--	1,435.00	2,246.55	2,484.34	2,322.85
CHASNUPP-IV	NUC	NUC	--	--	1,738.16	2,117.59	2,701.28
KANUPP	NUC	NUC	362.00	410.00	330.86	129.99	193.00
Total Nuclear (C)			4,216.00	6,278.00	9,050.73	9,135.67	9,897.89
D: Import							
Import from Iran (Tavanir)			463.00	496.00	554.74	486.80	513.74
Total Import: CPPA-G System (D)			463.00	496.00	554.74	486.80	513.74

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Power Station	Primary Fuel	Alternate Fuel	2015-16	2016-17	2017-18*	2018-19*	2019-20*
<b>E: Renewable Energy (CPPA-G System)</b>							
<b>E1: Wind Power Projects</b>							
Zorlu Enerji Pakistan	Wind	Wind	105.00	153.00	142.08	143.96	143.55
FFC Energy	Wind	Wind	125.00	123.00	120.08	115.74	118.40
Three Gorges First Wind Farm	Wind	Wind	135.00	138.00	126.06	129.21	135.62
Foundation Wind Energy-I	Wind	Wind	110.00	109.00	96.35	229.31	239.29
Foundation Wind Energy-II	Wind	Wind	116.00	120.00	112.30		
Sapphire Wind	Wind	Wind	100.00	149.00	125.94	135.00	89.70
Yunus Energy	Wind	Wind	--	101.00	127.40	128.69	89.86
Metro Power Company	Wind	Wind	--	77.00	136.31	138.46	153.06
Gul Ahmad Wind	Wind	Wind	--	82.00	121.80	127.74	91.15
Master Wind Energy	Wind	Wind	--	82.00	127.01	135.82	96.90
Tenaga Generasi	Wind	Wind	--	65.00	90.18	111.31	125.77
HydroChina Dawood	Wind	Wind	--	40.00	102.78	115.98	121.06
Sachal Energy	Wind	Wind	--	34.00	127.55	124.49	142.36
UEP Wind Power	Wind	Wind	--	18.00	227.83	243.99	179.13
Artistic Wind Power	Wind	Wind	--	96.00	90.30	192.37	132.16
Act Wind	Wind	Wind	--	--	86.38	89.60	64.76
Hawa Energy	Wind	Wind	--	--	68.31	167.41	115.45
Jhimpir Power	Wind	Wind	--	--	72.50	167.06	119.18
Three Gorges Second Wind Farm	Wind	Wind	--	--	16.48	131.12	92.77
Three Gorges Third Wind Farm	Wind	Wind	--	--	27.43	134.15	95.18
Tricon Boston Consulting-A	Wind	Wind	--	--	--	147.35	124.95
Tricon Boston Consulting-B	Wind	Wind	--	--	--	127.24	117.64
Tricon Boston Consulting-C	Wind	Wind	--	--	--	131.19	117.47
Zephyr Power	Wind	Wind	--	--	--	64.44	177.05
<b>Total Wind Power Projects</b>			<b>691.00</b>	<b>1,387.00</b>	<b>2,145.07</b>	<b>3,231.64</b>	<b>2,882.48</b>
<b>E2: Solar Power Projects</b>							
Quaid-e-Azam Solar Park	Solar	Solar	154.00	158.00	163.08	164.34	164.99
Appolo Solar Development	Solar	Solar	51.00	145.00	167.93	166.64	163.02
Best Green Energy	Solar	Solar	10.00	166.00	168.40	165.69	162.92
Crest Energy	Solar	Solar	10.00	166.00	169.80	167.56	165.31
AJ Power	Solar	Solar	--	--	11.52	18.66	18.03
Harappa Solar	Solar	Solar	--	--	21.43	31.63	30.69
<b>Total Solar Power Projects</b>			<b>225.00</b>	<b>635.00</b>	<b>702.17</b>	<b>714.52</b>	<b>704.97</b>
<b>E3: Bagasse/Biomass Power Projects</b>							
Jamal Din Wali-II	Bagasse/Biomass		44.00	178.00	180.96	187.80	161.88
Jamal Din Wali-III	Bagasse/Biomass		44.00	166.00	196.59	181.18	129.21
RYK Mills	Bagasse		14.00	122.00	155.61	141.31	73.67
Chiniot Power	Bagasse		169.00	296.00	346.02	194.67	80.45
Fatima Energy	Coal	Bagasse	--	143.00	20.87	0.00	0.00
Hamza Sugar Mills	Bagasse/Biomass		--	23.00	72.75	61.20	45.03
The Thal Industries	Bagasse	FO	--	--	87.08	65.75	36.79
Almoiz Industries	Bagasse	Bagasse	--	--	--	48.92	15.10
Chanar Energy	Bagasse	Bagasse	--	--	--	13.61	22.34
<b>Total Bagasse/Biomass Power Projects</b>			<b>271.00</b>	<b>928.00</b>	<b>1,059.88</b>	<b>894.43</b>	<b>564.46</b>
<b>Total Renewable Energy (E1+E2+E3) (CPPA-G System) (E)</b>			<b>1,187.00</b>	<b>2,950.00</b>	<b>3,907.12</b>	<b>4,840.59</b>	<b>4,151.91</b>
<b>F1: Thermal (KE Own)</b>							
Bin Qasim TPS-I	Dual	RLNG	3,958.00	4,329.00	4,764.70	4,646.94	4,195.00
Bin Qasim TPS-II	Dual	RLNG	4,119.00	3,921.00	3,750.79	4,065.71	4,278.00
Korangi Town GTPS-II	Gas	RLNG	500.00	389.00	323.11	390.33	313.00
Site GTPS-II	Gas	RLNG	382.00	384.00	498.14	368.02	414.00
Korangi CCPP	Gas	RLNG	1,364.00	1,124.00	1,001.01	1,256.68	1,158.00
<b>Total Thermal (KE Own)</b>			<b>10,323.00</b>	<b>10,147.00</b>	<b>10,337.75</b>	<b>10,727.68</b>	<b>10,358.00</b>

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Power Station	Primary Fuel	Alternate Fuel	2015-16	2016-17	2017-18*	2018-19*	2019-20*
<b>F2: Thermal (IPPs connected with KE System)</b>							
Gul Ahmed	RFO	--	688.00	788.00	712.71	675.54	496.00
Tapal Energy	RFO	--	733.00	743.00	752.38	645.02	627.00
SNPCL-I	Gas	--	--	--	179.59	410.25	371.86
SNPCL-II	Gas	--	--	--	180.13	400.91	367.82
<b>Total Thermal (IPPs connected with KE System)</b>			<b>1,421.00</b>	<b>1,531.00</b>	<b>1,824.81</b>	<b>2,131.72</b>	<b>1,862.68</b>
<b>F3: Thermal (Others connected with KE System)</b>							
Anoud Power	RFO/Gas	DO	69.00	55.00	44.00	51.58	60.00
Intl. Steel Limited	Gas	--	60.00	57.00	56.00	46.00	51.00
Intl. Ind. Limited	Gas	--	10.00	13.00	12.00	12.65	11.00
FFBL Power	Imported/Local Coal		--	62.00	438.49	413.51	413.00
<b>Total Thermal (Others connected with KE System)</b>			<b>139.00</b>	<b>187.00</b>	<b>550.49</b>	<b>523.74</b>	<b>535.00</b>
<b>Total Thermal KE (F1+F2+F3)</b>			<b>11,883.00</b>	<b>11,865.00</b>	<b>12,713.05</b>	<b>13,383.14</b>	<b>12,755.68</b>
<b>F4: Renewable Energy (connected with KE System)</b>							
Oursun Pakistan	Solar	Solar	--	--	--	56.92	88.00
Gharo Solar	Solar	Solar	--	--	--	--	65.00
<b>Total RE (connected with KE System)</b>			<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>56.92</b>	<b>153.00</b>
<b>Total KE (KE Own and others connected with KE System)</b>			<b>11,883.00</b>	<b>11,865.00</b>	<b>12,713.05</b>	<b>13,440.06</b>	<b>12,908.68</b>
<b>G: SPPs/CPPs/N-CPPs: CPPA-G System</b>							
<b>Total SPPs/CPPs/N-CPPs: CPPA-G System (G)</b>			<b>251.00</b>	<b>271.40</b>	<b>665.53</b>	<b>405.13</b>	<b>170.99</b>
<b>Grand Total (A+B+C+D+E+F+G)</b>			<b>114,092.66</b>	<b>120,621.78</b>	<b>133,593.42</b>	<b>137,018.86</b>	<b>135,259.33</b>

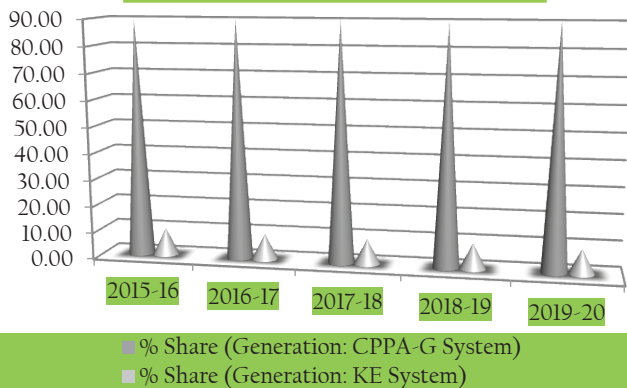
\* Net Electricity Generation during FY 2017-18, 2018-19 and 2019-20. Source: WAPDA/GENCOs/IPPs/KE/CPPA-G

**TABLE 9**  
**Electricity Generation by Systems and by Sectors (GWh)**

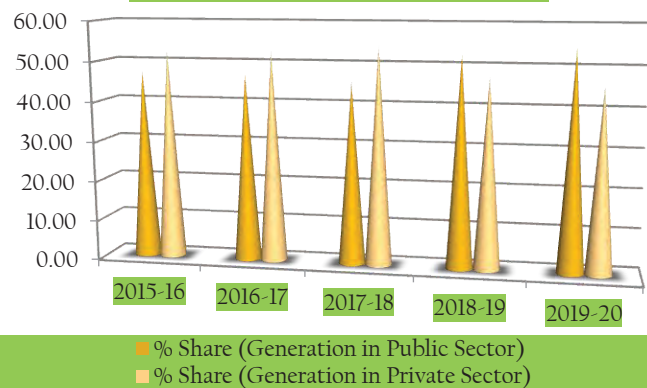
As on 30 <sup>th</sup> June	2015-16	2016-17	2017-18	2018-19	2019-20
<b>BY SYSTEM</b>					
<b>Total Electricity Generation: CPPA-G System</b>	<b>101,847.66</b>	<b>108,346.78</b>	<b>120,549.51</b>	<b>123,448.81</b>	<b>122,157.65</b>
% Share (Generation: CPPA-G System)	89.27	89.82	90.24	90.10	90.31
<b>Total Electricity Generation: KE System</b>	<b>12,245.00</b>	<b>12,275.00</b>	<b>13,043.91</b>	<b>13,570.05</b>	<b>13,101.68</b>
% Share (Generation: KE System)	10.73	10.18	9.76	9.90	9.69
<b>BY SECTOR</b>					
<b>Total Electricity Generation in Public Sector</b>	<b>54,195.24</b>	<b>56,895.16</b>	<b>60,927.08</b>	<b>71,946.02</b>	<b>73,550.82</b>
% Share (Generation in Public Sector)	47.50	47.17	45.61	52.51	54.38
<b>Total Electricity Generation in Private Sector</b>	<b>59,897.42</b>	<b>63,726.62</b>	<b>72,666.34</b>	<b>65,072.84</b>	<b>61,708.51</b>
% Share (Generation in Private Sector)	52.50	52.83	54.39	47.49	45.62
<b>Total Electricity Generation of the Country</b>	<b>114,092.66</b>	<b>120,621.78</b>	<b>133,593.42</b>	<b>137,018.86</b>	<b>135,259.33</b>

Note: See tables 7 and 8 for details and explanations. Source: WAPDA/GENCOs/KE/IPPs/CPPA-G

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



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





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TABLE 10  
Month-wise CPPA-G Electricity Generation Data (GW/h) (2019-20)

Power Producer	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
WAPDA Hydro	3,022.42	3,837.75	3,650.63	1,823.56	2,215.27	1,382.48	688.48	1,765.15	946.10	1,521.24	2,803.67	3,152.36
Tarbela 4 <sup>th</sup> Ext.	874.20	1,028.22	924.93	341.78	382.88	109.93	18.04	238.60	23.98	100.59	718.53	723.98
Neelum Jhelum	582.69	643.70	342.90	181.70	205.70	151.91	122.30	169.05	367.77	664.46	717.18	692.94
Jagran	8.58	8.70	8.44	3.36	2.84	2.63	1.86	1.71	3.70	9.67	18.45	16.32
Pehur	4.92	5.16	7.26	7.13	4.96	5.80	1.68	0.06	1.28	3.77	4.40	4.17
Malakand-III	42.96	50.60	45.41	29.21	22.95	15.61	9.80	18.27	--	73.85	48.98	50.88
Larab Energy	18.58	8.77	26.64	22.35	40.26	35.00	8.73	47.35	33.80	44.20	51.32	47.43
Marala Hydro	2.88	2.35	3.66	3.73	2.31	1.82	0.11	2.07	2.46	2.90	3.81	4.06
Patind Hydro	72.25	82.27	42.98	25.98	22.82	18.11	16.74	15.46	28.17	61.02	90.30	90.17
Gulpur Hydropower	--	--	--	--	--	--	--	--	--	--	--	34.33
Block 1 (Unit-1)	RFO	--	--	--	--	--	0.19	--	--	--	--	12.66
Block 2 (Unit-2)	Gas	10.24	18.13	--	--	--	--	--	--	--	--	--
	RLNG	19.07	0.02	--	--	--	--	--	--	--	--	--
Block 2 (Unit-3)	RFO	29.13	16.26	--	--	--	--	--	--	--	--	--
	Gas	8.17	--	--	--	--	--	--	--	--	--	--
Block 2 (Unit-4)	RFO	22.89	15.91	--	--	--	--	--	--	--	--	8.99
	Gas	15.12	22.98	--	--	--	--	--	--	--	--	--
Guddu Block 1	Gas	89.63	64.63	45.50	12.00	2.88	57.74	14.90	8.01	0.80	--	15.46
Guddu Block-2 (CC)	Gas	170.93	64.63	92.04	110.55	52.95	311.83	76.21	52.02	0.45	33.82	104.56
Guddu Block-2 (OC)	Gas	75.27	32.45	27.80	4.12	1.46	15.23	4.19	3.94	1.18	1.76	5.66
Guddu 747 (CC)	Gas	267.68	446.25	425.55	479.64	415.52	439.32	195.02	405.40	305.43	256.70	429.84
Northern-1 Unit 1	RFO	9.99	55.64	--	--	--	0.88	--	--	--	--	11.98
Northern-1 Unit 2	RFO	6.26	49.38	--	--	--	--	--	--	--	--	20.98
Northern-1 Unit 3	RFO	21.38	74.51	--	--	--	4.16	--	--	--	--	27.89
Northern-2 Unit 4	Gas	(0.42)	(0.30)	--	--	--	(0.05)	--	--	--	--	(0.17)
Northern-3 Unit 5	RFO	--	--	--	--	--	--	--	--	--	--	5.93
	Gas	(0.13)	13.65	--	--	--	(0.13)	--	--	--	--	(0.12)
Northern-3	RFO	--	--	--	--	--	--	--	--	--	--	(0.04)
Unit 6	Gas	(0.13)	2.22	--	--	--	(0.13)	--	--	--	--	(0.20)
Nandipur	RLNG	287.67	276.58	165.95	--	--	--	10.08	97.87	12.59	114.24	225.42
Kot Addu	RFO	65.02	--	--	--	78.39	158.69	14.53	1.86	14.76	22.72	98.35
(Block-1)	RLNG	173.40	254.29	3.48	--	--	--	--	--	--	197.94	114.43
Kot Addu	RFO	44.59	--	157.21	--	67.09	170.63	0.20	--	--	1.63	57.02
(Block-2)	RLNG	426.11	472.71	285.58	25.32	--	--	--	--	--	135.29	206.23
Kot Addu (B-3)	RLNG	93.99	51.49	68.79	--	--	--	--	--	--	4.50	2.51
Hub Power	RFO	32.38	--	--	--	--	--	--	--	--	--	--
Kohinoor	RFO	65.79	40.00	73.13	4.26	24.75	45.06	4.31	--	2.32	34.22	70.02
Lalpir Power	RFO	44.89	30.15	43.91	--	6.16	21.43	--	--	--	0.21	39.56
Pak Gen Power	RFO	47.29	37.55	--	--	4.89	35.43	--	--	--	--	24.60
Habibullah	Gas	41.72	36.34	27.55	2.76	--	--	--	--	--	--	--
Fauji Kabirwala	Gas	73.10	78.56	79.24	1.02	--	--	--	--	--	29.26	85.13
Roush Power	RLNG	87.86	21.26	57.26	42.97	--	--	--	--	--	--	8.17
Saba Power	RFO	11.35	--	--	--	1.23	30.77	3.36	--	--	--	4.13
Uch-I Power	Gas	380.25	374.12	371.01	166.47	209.69	403.17	375.81	395.61	325.37	362.80	349.77
Altern Energy	Gas	1.45	0.73	0.51	--	--	--	--	--	--	--	1.03
Liberty Power	Gas	108.36	103.02	108.95	102.17	63.31	68.30	3.44	64.76	73.89	98.14	102.39
Davis Energen.	RLNG	--	--	--	--	--	--	--	0.03	--	--	--

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Power Producer	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
CHASNUPP-I	184.86	216.58	215.97	199.72	219.28	29.64	--	108.09	217.12	216.51	222.25	214.62
CHASNUPP-II	194.60	213.64	221.55	225.83	211.06	226.60	229.02	213.74	229.90	221.97	229.01	219.20
CHASNUPP-III	217.56	--	90.25	229.42	214.32	219.86	220.25	218.11	232.77	223.79	231.75	224.80
CHASNUPP-IV	229.63	224.77	221.51	228.26	213.78	223.63	231.68	218.01	233.13	223.70	231.80	221.39
Tavanir Iran (Import)	53.47	52.45	49.97	43.05	35.57	32.55	28.73	32.39	34.45	43.85	53.95	53.30
Attock Gen.	46.83	15.59	14.48	12.63	--	41.36	62.51	12.61	--	10.39	42.30	62.27
Atlas Power	52.78	26.35	30.54	--	--	34.36	71.83	18.38	--	--	--	25.10
Nishat Power	68.78	75.47	52.87	2.31	--	23.10	16.23	--	--	--	--	38.70
Foundation Power	100.15	96.79	95.03	81.30	24.41	39.33	92.58	41.56	57.84	27.25	42.69	78.37
Orient Power	100.43	80.80	95.66	9.61	--	--	28.23	2.27	--	--	0.82	19.85
Nishat Chunian	78.52	94.27	58.09	0.07	--	25.30	44.76	9.32	--	2.96	4.24	33.71
Saif Power	108.21	96.60	105.17	1.42	--	--	--	--	--	7.99	70.23	86.54
Engro Energy	112.27	98.15	98.14	59.16	24.70	43.82	91.17	39.70	41.10	27.23	19.70	45.61
Sapphire Power	90.29	90.14	35.83	51.31	--	--	1.07	0.33	--	--	0.39	27.17
Narawal Energy	60.84	63.97	71.98	--	--	27.36	66.86	7.02	--	--	--	40.05
Liberty Power	73.73	95.92	83.56	--	--	34.30	72.35	8.54	--	--	24.58	65.56
Halmore Power	83.68	61.25	93.37	43.08	--	--	--	0.34	--	--	23.53	42.44
Uch-II Power	240.57	231.60	228.76	145.78	71.80	148.63	243.56	168.30	152.98	127.90	168.84	219.31
China Hub	162.90	456.19	636.25	702.46	460.22	416.97	393.10	544.92	691.44	696.83	565.96	408.96
Engro Power Gen.	364.50	298.24	345.02	349.16	384.95	363.04	428.03	389.12	274.30	252.21	427.62	404.04
QATPL	658.24	598.16	657.90	654.32	35.43	97.90	--	0.12	545.55	568.59	687.12	689.17
HBS	726.17	673.92	464.12	722.55	587.09	755.06	780.72	--	168.18	679.37	770.02	723.15
Sahiwal Coal	733.76	508.25	411.88	425.90	446.39	621.60	818.07	608.58	392.79	228.53	442.46	528.97
Reshman	0.94	0.98	--	--	--	--	0.14	--	--	--	--	--
Balokli	680.68	538.84	710.93	712.72	61.54	281.89	147.80	580.18	181.15	605.32	730.03	680.77
Port Qasim	777.77	611.23	839.29	879.39	738.67	769.45	861.59	544.82	734.28	646.11	753.24	813.90
TPS-Quetta (Gas)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)	--	(0.03)	--	--
Zorlu Enerji Pakistan	23.24	14.24	7.05	6.12	10.20	12.01	11.49	8.55	7.68	9.06	17.78	16.12
FFC Energy	19.40	10.50	4.82	4.60	9.69	11.98	11.24	7.83	5.93	6.62	13.71	12.09
Three Gorges First Wind	23.36	12.33	5.92	5.93	10.62	12.53	11.88	8.69	6.92	7.42	15.42	14.63
Foundation Wind Energy	42.78	20.92	15.08	9.93	15.36	20.68	20.46	11.94	13.39	16.58	32.58	19.59
Sapphire Wind Power	24.87	11.91	4.26	4.80	2.78	1.00	1.91	1.23	1.60	7.62	12.75	14.98
Younus Energy	23.29	11.45	4.38	5.46	3.16	1.22	2.34	1.43	1.79	8.36	12.62	14.38
Metro Power Company	23.77	13.11	6.48	7.81	12.55	15.08	13.89	10.87	8.52	9.37	16.47	15.15
Gul Ahmad Wind	23.09	11.81	4.44	5.82	3.40	1.30	2.36	1.50	1.85	8.33	12.84	14.41
Master Wind Energy	25.40	12.93	4.48	5.14	3.18	2.97	2.33	1.34	1.60	7.98	13.88	15.68
Tenaga Generasi	21.66	10.41	7.48	5.67	9.14	11.48	11.16	6.76	7.19	8.44	16.50	9.88
HydroChina Dawood	21.53	10.97	7.39	5.30	8.39	10.01	10.24	6.57	6.60	8.20	15.58	10.28
Sachal Energy Development	22.67	11.96	5.87	6.77	12.05	14.57	13.23	9.64	7.78	8.61	15.48	13.72
UEP Wind	46.04	23.19	9.48	10.17	5.73	1.93	4.24	2.65	4.02	17.75	26.51	27.42
Artistic Wind Power	28.58	18.07	7.72	8.52	4.29	1.75	3.93	2.29	3.00	13.54	20.15	20.33
Act Wind	15.77	8.67	3.91	3.76	1.81	0.70	1.46	1.01	1.27	6.20	10.22	9.99
Hawa Wind	26.62	16.22	5.37	7.23	4.73	1.86	3.85	2.04	2.22	9.88	15.53	19.90
Jhimpir Wind	27.35	16.97	5.75	6.90	4.20	1.83	3.35	1.96	2.37	10.65	16.79	21.07
Three Gorges Second Wind	24.09	11.21	4.79	5.86	3.27	1.24	2.35	1.54	2.01	8.56	13.24	14.61
Three Gorges Third Wind	24.14	11.09	4.91	6.15	3.48	1.35	2.57	1.55	2.06	8.89	13.71	15.28
Tricon Boston Consulting-A	27.99	16.48	7.29	7.83	3.30	1.33	2.78	1.77	3.59	13.03	19.03	20.52

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Power Producer	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
Tricon Boston Consulting-B	26.99	15.51	6.75	7.36	3.40	1.39	2.93	1.77	2.67	11.99	17.56	19.33
Tricon Boston Consulting-C	26.98	15.20	6.56	7.55	3.63	1.47	3.08	1.89	2.78	11.80	17.28	19.24
Zephyr Power	26.59	17.27	9.50	8.36	13.47	15.93	14.49	10.22	10.47	12.71	22.35	15.69
Quid-e-Azam Solar Park	14.02	14.20	14.35	14.51	11.58	10.23	10.51	14.60	15.05	15.73	15.47	14.74
Appollo Solar Development	13.97	14.20	14.27	14.42	11.55	10.33	10.48	14.04	14.72	15.34	15.09	14.60
Best Green Energy	13.78	14.36	14.20	14.28	11.47	10.29	10.51	14.02	14.89	15.47	15.23	14.43
Crest Energy	13.94	14.53	14.40	14.43	11.67	10.40	10.57	14.14	15.11	15.78	15.54	14.80
AJ Power	1.60	1.59	1.56	1.51	1.23	0.93	1.20	1.49	1.46	1.87	1.86	1.73
Harappa Solar	2.85	2.92	2.83	2.43	1.68	1.19	1.56	2.36	2.54	3.44	3.57	3.31
Jamal Din Wali-II	17.82	17.98	15.11	--	6.02	13.94	14.05	13.59	14.57	17.42	17.89	13.48
Jamal Din Wali-III	17.69	--	--	--	7.65	14.02	13.90	12.92	17.28	16.86	11.73	17.16
RYK Mills	--	--	--	--	0.74	13.94	14.95	12.99	13.25	9.60	6.67	--
Chiniot Power	--	--	--	--	1.49	25.46	18.54	22.53	9.53	--	--	--
Hamza Sugar Mills	--	--	--	--	0.64	9.04	8.90	8.30	9.16	8.99	--	--
The Thal Industries	--	--	--	--	0.62	7.47	7.32	12.34	9.04	--	--	--
Al-Moiz Industries	--	--	--	--	0.28	1.89	2.96	6.99	2.98	--	--	--
Chanaar Energy	--	--	--	--	--	5.16	3.84	9.95	3.39	--	--	--
SPPs (Mixed)	10.18	10.02	10.01	13.07	14.16	2.81	15.61	10.33	37.72	9.51	33.19	4.39

Source: CPPA-G

TABLE 11  
Month-wise KE Electricity Generation Data (GWh) (2019-20)

	July	August	Sept.	Oct.	Nov.	Dec.	January	Feb.	March	April	May	June
BQPS-I (RFO) Unit-1	84.20	63.54	67.41	55.44	21.07	--	--	50.08	10.24	7.61	58.62	--
BQPS-I (RFO) Unit-2	84.70	56.11	78.45	59.44	31.45	--	12.66	36.69	11.86	11.32	56.54	--
BQPS-I (RFO) Unit-3	68.71	57.46	60.43	61.89	22.52	0.84	25.63	8.31	4.94	3.52	42.95	--
BQPS-I (RFO) Unit-4	67.31	57.71	57.49	55.84	9.22	0.95	1.70	7.23	--	--	51.53	--
BQPS-I (RFO) Unit-5	65.24	53.65	52.71	54.76	34.04	14.31	--	24.63	25.35	29.16	38.57	--
BQPS-I (RFO) Unit-6	75.78	57.58	71.24	39.03	16.89	2.35	35.67	1.15	26.35	14.80	23.41	--
BQPS-I (Gas) Unit-1	10.53	8.85	10.87	13.75	5.35	--	--	3.92	3.43	2.70	17.87	--
BQPS-I (Gas) Unit-2	14.33	18.78	6.99	13.51	3.56	--	9.59	3.99	0.78	2.11	21.08	--
BQPS-I (Gas) Unit-3	0.79	1.15	0.65	0.88	0.21	0.13	1.02	0.25	0.55	0.65	5.10	--
BQPS-I (Gas) Unit-4	7.35	6.44	4.89	1.99	0.60	0.17	0.20	0.20	--	--	5.64	--
BQPS-I (Gas) Unit-5	28.85	25.44	31.44	19.86	12.33	0.60	--	2.81	10.21	12.03	39.45	--
BQPS-I (Gas) Unit-6	16.39	12.03	23.70	34.95	18.35	0.17	9.08	0.78	13.18	52.96	60.39	--
BQPS-I (LNG) Unit-1	4.65	4.05	6.38	9.84	3.36	--	--	6.55	2.08	1.15	5.88	--
BQPS-I (LNG) Unit-2	6.33	8.60	4.10	9.66	2.24	--	30.93	6.65	0.47	0.90	6.93	--
BQPS-I (LNG) Unit-3	0.35	0.53	0.38	0.63	0.13	0.16	3.29	0.42	0.33	0.28	1.68	--
BQPS-I (LNG) Unit-4	3.24	2.95	2.87	1.42	0.38	0.22	0.66	0.34	--	--	1.86	--
BQPS-I (LNG) Unit-5	10.97	11.65	18.45	14.20	7.74	0.76	--	4.69	6.19	5.13	12.97	--
BQPS-I (LNG) Unit-6	7.24	5.51	13.91	24.99	11.52	0.22	29.29	1.30	7.98	22.60	19.86	--
BQPS-II (Gas)	231.15	229.32	219.34	216.15	210.80	172.95	78.09	113.74	226.20	240.29	265.21	--
BQPS-II (LNG)	108.13	114.46	120.12	140.61	142.83	201.87	125.67	174.90	146.46	106.48	91.57	--
KGTPS-II (Gas)	31.03	19.36	23.18	12.25	5.70	1.17	0.22	--	9.90	31.22	40.60	--
KGTPS-II (LNG)	14.32	8.41	12.58	8.54	3.57	1.04	0.71	--	4.83	13.75	13.97	--
SGTPS-II (Gas)	34.96	33.31	30.29	23.78	9.12	2.99	2.17	3.91	25.27	34.85	39.61	--
SGTPS-II (LNG)	16.23	16.21	16.54	15.64	5.81	2.71	7.12	4.80	14.30	15.41	13.50	--
Korangi CCPP (Gas)	95.68	87.27	72.59	65.42	49.60	19.47	--	3.09	54.41	80.38	93.77	--
Korangi CCPP (LNG)	44.81	42.98	39.81	42.55	32.69	18.65	--	2.70	32.87	35.49	32.11	--
KANUPP	11.24	--	--	--	18.71	19.54	44.08	17.10	29.73	19.76	7.93	--

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	July	August	Sept.	Oct.	Nov.	Dec.	January	Feb.	March	April	May	June
Tapal Energy	80.56	66.33	76.57	70.35	32.76	23.59	27.09	34.23	25.55	48.99	70.06	--
Gul Ahmed	74.37	47.82	78.34	61.56	17.16	12.75	10.58	14.64	10.31	31.23	64.80	--
CPPA-G	--	386.87	428.81	444.97	461.38	391.13	373.54	392.41	404.99	369.72	425.86	--
Anoud Power	5.20	4.59	3.98	5.41	5.65	4.26	4.21	5.09	5.35	5.58	5.05	--
ISL and IIL	5.25	4.96	4.35	5.84	7.24	6.37	4.53	5.99	6.21	3.02	4.21	--
FFBL	39.08	32.09	32.84	39.96	33.47	34.73	16.77	30.02	39.06	39.32	37.86	--
SNPCL	61.09	63.24	68.51	69.60	64.18	55.84	45.03	47.00	62.86	65.79	57.78	--
Oursun Pakistan	6.99	4.09	7.00	7.48	6.58	6.68	7.31	7.81	8.61	8.82	8.90	--
CPPA-G 150 MW	69.77	38.60	24.23	19.18	30.89	37.34	35.79	23.47	24.16	29.31	54.43	--
Gharo Solar	--	--	--	--	--	4.64	7.59	8.63	10.28	11.22	11.72	0.00

Source: KE

**TABLE 12**  
Monthly Variation in Maximum Hydel Generating Capability (MW)

Month	Year	Tarbela	Mangla	Ghazi Barotha	Warsak	Chashma Hydel	Jinnah Hydel	Allai Khwar	Khan Khwar	Duber Khwar	Small Hydels	Neelum Jhelum	Tarbela 4 <sup>th</sup> Ext.	Golen Gol	Total
July	2015	3,352	1,085	981	144	80	13	95	35	127	65	--	--	--	5,977
	2016	3,252	423	989	168	83	29	67	27	125	60	--	--	--	5,223
	2017	3,449	274	1,450	214	130	44	121	72	130	73	--	--	--	5,957
	2018	2,402	239	1,056	186	91	30	65	41	127	60	542	9	--	4,848
	2019	3,348	346	1,032	147	90	11	63	33	125	65	783	n.p.	8	6,051
August	2015	3,547	777	972	156	53	16	82	0	121	66	--	--	--	5,790
	2016	3,386	638	998	175	132	28	52	28	118	67	--	--	--	5,622
	2017	3,478	1,105	1,450	213	121	24	140	72	130	69	--	--	--	6,802
	2018	3,445	239	1,038	198	85	22	64	37	113	58	590	--	--	5,889
	2019	4,774	275	1,024	181	72	10	58	34	106	56	865	n.p.	--	7,455
September	2015	3,197	943	1,019	141	143	40	40	1	64	64	--	--	--	5,652
	2016	3,191	1,109	1,002	133	142	30	38	17	73	65	--	--	--	5,800
	2017	3,453	1,115	1,450	214	124	32	0	75	130	71	--	--	--	6,664
	2018	3,602	445	1,042	126	104	35	36	19	58	60	301	513	--	6,341
	2019	4,308	570	1,052	152	114	10	26	12	77	69	477	n.p.	23	6,890
October	2015	1,156	1,000	721	91	110	51	41	6	40	56	--	--	--	3,272
	2016	1,577	781	900	85	127	34	21	10	36	45	--	--	--	3,616
	2017	3,453	1,115	1,450	177	179	45	121	72	65	71	--	--	--	6,748
	2018	1,382	402	777	71	86	43	31	16	32	49	234	519	11	3,653
	2019	1,474	313	784	93	107	28	22	12	38	45	245	n.p.	24	3,185
November	2015	995	987	650	105	125	45	70	0	57	67	--	--	--	3,101
	2016	1,593	978	995	48	132	45	15	6	18	37	--	--	--	3,867
	2017	2,508	1,115	1,160	142	158	46	121	72	65	51	--	--	--	5,438
	2018	1,353	527	972	59	100	52	26	15	30	48	271	579	15	4,047
	2019	1,658	604	989	78	118	54	35	19	33	40	286	n.p.	16	3,930
December	2015	828	650	561	85	98	36	29	0	19	47	--	--	--	2,353
	2016	771	537	619	61	86	35	11	5	3	33	--	--	--	2,161
	2017	2,144	822	1,450	178	130	44	100	72	130	45	--	--	--	5,115
	2018	523	387	434	50	68	33	16	8	18	37	155	90	11	1,830
	2019	725	523	511	69	80	28	21	2	23	30	204	n.p.	11	2,227



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Month	Year	Tarbela	Mangla	Ghazi Barotha	Warsak	Chashma Hydel	Jinnah Hydel	Allai Khwar	Khan Khwar	Duber Khwar	Small Hydels	Neelum Jhelum	Tarbela 4 <sup>th</sup> Ext.	Golen Gol	Total
January	2016	442	147	296	80	67	6	12	0	20	13	--	--	--	1,083
	2017	208	106	163	73	51	7	7	11	12	19	--	--	--	657
	2018	320	192	0	40	79	12	0	0	0	15	--	--	--	658
	2019	232	38	178	51	44	5	1	10	11	23	16	--	7	616
	2020	400	94	279	77	52	4	-	11	18	13	162	n.p.	8	1,118
February	2016	1,075	1,005	721	72	96	36	15	0	21	29	--	--	--	3,070
	2017	741	470	598	84	89	28	40	29	27	37	--	--	--	2,143
	2018	1,774	634	1,375	240	117	36	121	72	65	35	--	--	--	4,469
	2019	751	375	632	61	100	20	25	24	18	34	134	178	7	2,359
	2020	1,109	727	7,783	65	101	16	30	23	25	24	243	n.p.	6	10,152
March	2016	746	684	533	97	103	43	89	0	57	62	--	--	--	2,414
	2017	511	327	466	72	71	31	54	32	41	51	--	--	--	1,656
	2018	1,061	311	1,160	142	91	48	61	72	65	48	--	--	--	3,059
	2019	416	528	384	72	78	26	67	36	30	60	329	--	7	2,033
	2020	234	492	176	104	47	26	72	61	47	54	494	n.p.	6	1,813
April	2016	1,198	785	719	76	115	42	104	0	109	59	--	--	--	3,207
	2017	741	689	646	138	104	44	103	40	103	70	--	--	--	2,678
	2018	1,945	638	1,450	221	122	46	121	72	130	65	--	--	--	4,810
	2019	468	480	389	138	93	24	122	38	115	69	934	55	6	2,931
	2020	549	747	368	164	72	30	112	69	95	64	923	n.p.	6	3,199
May	2016	2,434	664	1,033	76	133	42	114	0	128	69	--	--	--	4,693
	2017	1,914	796	1,037	154	104	49	79	38	120	65	--	--	--	4,356
	2018	2,020	638	1,450	280	122	44	121	130	130	70	--	--	--	5,005
	2019	1,389	753	1,030	185	106	10	102	44	125	66	954	591	10	5,365
	2020	2,217	893	993	205	88	15	118	64	117	67	964	n.p.	7	5,748
June	2016	2,858	673	984	139	105	36	84	9	129	69	--	--	--	5,086
	2017	2,681	485	1,016	157	100	42	58	29	129	65	--	--	--	4,762
	2018	3,054	721	1,450	218	127	52	121	72	130	72	--	--	--	6,017
	2019	1,085	705	1,039	171	100	10	76	35	130	72	955	658	35	5,071
	2020	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	--

Source: National Power Control Centre, Islamabad

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**TABLE 13**  
**Auxiliary Consumption and other Factors (Hydel Power Stations)**

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
Tarbela	2015-16	16.79	0.10	3,606	50.48	103.68	52.34
	2016-17	16.16	0.11	3,539	48.41	101.75	49.40
	2017-18	17.33	0.13	3,453	43.47	99.28	43.16
	2018-19	16.32	0.15	3,461	35.03	99.51	34.86
	2019-20	15.60	0.13	3,506	38.72	100.81	39.03
Tarbela 4 <sup>th</sup> Ext.	2018-19	2,318.06	0.28	1,276	20.73	90.49	18.76
	2019-20	5,498.03	0.22	1,410	44.51	100.00	44.51
Ghazi Barotha	2015-16	9.92	0.15	1,450	52.77	100.00	58.25
	2016-17	9.64	0.14	1,450	54.21	100.00	59.61
	2017-18	10.28	0.16	1,450	47.27	100.00	47.27
	2018-19	9.49	0.14	1,450	51.58	100.00	51.58
	2019-20	6.63	0.10	1,450	51.44	100.00	51.44
Mangla	2015-16	11.81	0.26	1,115	52.77	111.50	78.15
	2016-17	90.30	1.69	1,115	54.60	111.50	61.05
	2017-18	11.40	0.28	1,115	42.29	128.75	47.15
	2018-19	58.07	1.50	920	47.91	115.00	55.09
	2019-20	97.04	2.07	915	58.31	114.38	66.69
Warsak	2015-16	1.65	0.18	205	51.33	84.37	43.31
	2016-17	4.73	0.48	213	52.67	87.67	52.67
	2017-18	3.03	0.33	221	47.21	90.96	43.06
	2018-19	1.01	0.10	216	52.97	88.90	47.09
	2019-20	1.17	0.11	220	57.17	90.17	51.77
Chashma	2015-16	6.33	0.70	174	58.70	58.69	55.50
	2016-17	5.74	0.64	158	64.15	85.87	82.23
	2017-18	4.76	0.63	129	66.90	70.11	46.77
	2018-19	5.29	0.69	122	71.78	66.30	69.05
	2019-20	4.42	0.59	122	70.13	66.30	72.03
Khan Khwar	2015-16	0.89	2.36	68	6.32	5.97	5.97
	2016-17	4.01	2.01	72	31.47	31.56	31.56
	2017-18	3.40	1.99	72	27.02	27.02	27.02
	2018-19	4.52	1.90	72	37.69	37.69	37.69
	2019-20	4.76	1.70	72	44.25	44.25	44.25
Allai Khwar	2015-16	0.80	0.14	121	53.33	53.33	53.33
	2016-17	0.86	0.22	121	37.42	37.42	37.42
	2017-18	0.71	0.26	121	25.96	26.03	25.96
	2018-19	0.87	0.19	121	43.59	43.59	43.59
	2019-20	0.96	0.20	121	44.70	44.70	44.70
Jinnah	2015-16	6.67	2.25	66	51.27	68.54	35.14
	2016-17	2.88	0.98	63	52.89	34.71	34.71
	2017-18	2.99	1.30	52	50.41	54.17	27.30
	2018-19	3.37	1.49	64	40.43	26.83	69.00
	2019-20	3.08	1.69	69	30.24	21.67	65.58
Duber Khwar	2015-16	0.73	0.11	130	57.36	100.00	57.36
	2016-17	0.71	0.12	130	51.62	100.00	51.76
	2017-18	3.90	0.76	130	45.08	45.20	45.08
	2018-19	2.41	0.68	130	57.20	51.95	57.20
	2019-20	2.17	0.35	130	53.55	53.55	53.55
Golen Gol	2018-19	1.68	1.67	108	110.59	31.75	31.75
	2019-20	2.42	2.72	72	14.08	9.39	9.39

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Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
Dargai	2015-16	0.42	0.36	18	71.67	78.11	65.22
	2016-17	0.28	0.27	18	67.03	81.50	59.82
	2017-18	0.27	0.28	18	61.22	89.00	54.48
	2018-19	0.30	0.28	18	69.62	89.00	61.96
	2019-20	0.28	0.33	18	90.05	89.00	80.14
Rasul	2015-16	2.59	3.99	18	60.71	62.61	38.15
	2016-17	3.66	4.23	15	65.83	68.18	44.88
	2017-18	1.58	2.41	15	49.74	68.18	33.92
	2018-19	0.68	0.94	15	56.57	65.91	37.28
	2019-20	0.52	1.41	13	32.02	59.09	18.92
Shadiwal	2015-16	0.63	2.25	5	63.24	35.75	21.50
	2016-17	0.46	1.60	6	62.01	34.79	27.81
	2017-18	0.46	1.77	6	53.67	31.84	21.09
	2018-19	0.42	1.47	5	69.41	31.97	24.83
	2019-20	0.32	2.25	5	34.52	34.81	12.01
Chichoki Malian	2015-16	0.58	1.21	7	55.54	56.82	51.99
	2016-17	0.35	0.78	8	48.71	60.61	29.63
	2017-18	0.32	0.82	7	51.11	53.03	27.52
	2018-19	0.35	1.01	7	51.03	49.24	25.13
	2019-20	0.34	0.98	7	49.51	53.03	26.25
Nandipur	2015-16	0.67	1.64	9	58.10	53.08	33.63
	2016-17	0.54	1.25	11	46.35	61.86	38.89
	2017-18	0.55	1.29	9	56.58	66.67	37.18
	2018-19	0.50	1.36	9	45.87	66.67	30.58
	2019-20	0.51	1.51	6	56.02	46.07	29.09
Kurram Garhi	2015-16	0.65	2.81	4	66.61	98.25	61.36
	2016-17	0.36	1.94	4	55.25	95.00	52.63
	2017-18	0.15	0.92	4	51.66	95.00	49.08
	2018-19	0.15	1.02	4	40.62	100.00	40.62
	2019-20	0.15	0.99	4	47.01	79.07	43.18
Renala	2015-16	0.04	1.93	1	54.92	33.94	20.99
	2016-17	0.00	2.11	1	41.82	38.83	24.88
	2017-18	0.05	1.99	1	43.78	37.50	26.27
	2018-19	0.05	2.14	1	60.78	33.86	22.65
	2019-20	0.05	2.28	1	43.08	50.00	21.54
Chitral	2015-16	0.01	0.19	1	49.90	82.03	40.95
	2016-17	0.01	0.20	1	59.83	47.99	69.96
	2017-18	0.01	0.24	1	49.13	39.42	39.30
	2018-19	0.01	0.17	1	50.70	40.05	40.05
	2019-20	0.01	0.21	1	48.16	34.82	84.93
Gomal Zam	2015-16	0.05	0.95	17	9.41	10.03	9.43
	2016-17	0.05	0.91	17	4.04	9.75	4.13
	2017-18	0.00	0.07	8	0.52	0.53	0.24
	2018-19	0.08	0.26	8	43.89	49.30	21.64
	2019-20	0.09	0.16	9	74.00	49.88	36.91
Malakand/ Jabban	2015-16	1.49	0.83	22	71.55	71.36	71.55
	2016-17	1.19	0.96	22	64.41	64.41	64.41
	2017-18	1.18	1.12	22	54.68	54.68	54.68
	2018-19	1.32	0.97	22	70.56	70.56	70.56
	2019-20	1.35	1.14	22	76.20	71.20	71.20

Source: WAPDA

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TABLE 14  
Month-Wise WAPDA Hydroelectric Invoice for Capacity Charges and Cost Data (2019-20)

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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEO+Rate×GST Rate) (Mln. Rs.)
<b>Mangla: (Installed Capacity: 1,000 MW) (Variable Energy Rate-Rs./kWh: 0.056) (Capacity Rate-Rs./kWh: 626.71) (Water Use/NHP Rate-Rs./kWh: 0.15) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 0.00)</b>											
July	507.02	251.60	255.42	14.30	626.71	38.31	1.28	0.00	0.00	0.00	2.43
August	531.54	328.54	203.01	11.37	626.71	30.45	1.02	0.00	0.00	0.00	1.93
September	622.26	328.56	398.70	22.33	626.71	59.80	1.99	0.00	0.00	0.00	3.80
October	359.20	134.56	224.64	12.58	626.71	33.70	1.12	0.00	0.00	0.00	2.14
November	544.01	119.77	424.24	23.76	626.71	63.64	2.12	0.00	0.00	0.00	4.04
December	431.14	46.92	384.23	21.52	626.71	57.63	1.92	0.00	0.00	0.00	3.66
January	211.18	142.32	68.86	3.86	626.71	10.33	0.34	0.00	0.00	0.00	0.66
February	545.13	49.76	495.37	27.74	626.71	74.31	2.48	0.00	0.00	0.00	4.72
March	402.82	41.02	361.80	20.26	626.71	54.27	1.81	0.00	0.00	0.00	3.44
April	576.01	46.66	529.34	29.64	626.71	79.40	2.65	0.00	0.00	0.00	5.04
May	797.18	147.76	649.42	36.37	626.71	97.41	3.25	0.00	0.00	0.00	6.18
June	794.65	200.34	594.30	33.28	626.71	89.15	2.97	0.00	0.00	0.00	5.66
<b>Gomal Zam: (Installed Capacity: 17 MW) (Variable Energy Rate-Rs./kWh: 1.384) (Capacity Rate-Rs./kWh: 6,393.383) (Water Use/NHP Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 0.00)</b>											
July	2.93	0.03	2.90	4.01	111.24	0.00	0.01	0.00	0.00	0.00	0.68
August	2.99	0.03	2.96	4.10	111.24	0.00	0.01	0.00	0.00	0.00	0.70
September	5.73	0.00	5.73	7.93	111.24	0.00	0.03	0.00	0.00	0.00	1.35
October	6.09	0.00	6.09	8.42	111.24	0.00	0.03	0.00	0.00	0.00	1.43
November	5.66	0.00	5.66	7.83	111.24	0.00	0.03	0.00	0.00	0.00	1.33
December	5.59	0.00	5.58	7.73	111.24	0.00	0.03	0.00	0.00	0.00	1.31
January	3.48	0.06	3.42	4.73	111.24	0.00	0.02	0.00	0.00	0.00	0.80
February	0.98	0.10	0.89	1.23	111.24	0.00	0.00	0.00	0.00	0.00	0.21
March	4.75	0.00	4.75	6.57	111.24	0.00	0.02	0.00	0.00	0.00	1.12
April	5.20	0.00	5.20	7.20	111.24	0.00	0.03	0.00	0.00	0.00	1.22
May	5.61	0.00	5.60	7.76	111.24	0.00	0.03	0.00	0.00	0.00	1.32
June	5.64	0.00	5.64	7.80	111.24	0.00	0.03	0.00	0.00	0.00	1.33
<b>Tarbela (1-14): (Installed Capacity: 3,478 MW) (Variable Energy Rate-Rs./kWh: 0.30) (Capacity Rate-Rs./kWh: 307.035) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 189.00)</b>											
July	0.00	0.00	1,607.11	48.21	1,067.87	1,856.21	8.04	0.00	658.73	658.73	8.20
August	0.00	0.00	2,500.81	75.02	1,067.87	2,888.43	12.50	0.00	658.73	658.73	12.75
September	0.00	0.00	2,158.54	64.76	1,067.87	2,493.11	10.79	0.00	658.73	658.73	11.01
October	0.00	0.00	751.11	22.53	1,067.87	867.53	3.76	0.00	658.73	658.73	3.83
November	0.00	0.00	804.96	24.15	1,067.87	929.73	4.02	0.00	658.73	658.73	4.11
December	0.00	0.00	429.91	12.90	1,067.87	496.55	2.15	0.00	658.73	658.73	2.19
January	0.00	0.00	281.38	8.44	1,067.87	324.99	1.41	0.00	658.73	658.73	1.44
February	0.00	0.00	530.70	15.92	1,067.87	612.96	2.65	0.00	658.73	658.73	2.71
March	0.00	0.00	150.18	4.51	1,067.87	173.46	0.75	0.00	658.73	658.73	0.77
April	0.00	0.00	293.90	8.82	1,067.87	339.46	1.47	0.00	658.73	658.73	1.50
May	0.00	0.00	923.05	27.69	1,067.87	1,066.12	4.62	0.00	658.73	658.73	4.71
June	0.00	0.00	1,426.05	42.78	1,067.87	1,647.08	7.13	0.00	658.73	658.73	7.27



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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
<b>Tarbela 4<sup>th</sup> Extension: (Installed Capacity: 1,410 MW) (Variable Energy Rate-Rs./kWh: 0.152) (Capacity Rate-Rs./kWh: 322.654) (Water Use/NHP Rate-Rs./kWh: 1.155)</b>											
July	0.00	0.00	874.20	132.88	454.94	1,009.70	4.37	0.00	0.00	0.00	22.59
August	0.00	0.00	1,028.22	156.29	454.94	1,187.59	5.14	0.00	0.00	0.00	26.57
September	0.00	0.00	924.93	140.59	454.94	1,068.29	4.62	0.00	0.00	0.00	23.90
October	0.00	0.00	341.78	51.95	454.94	394.76	1.71	0.00	0.00	0.00	8.83
November	0.00	0.00	382.88	58.20	454.94	442.23	1.91	0.00	0.00	0.00	9.89
December	0.00	0.00	109.93	16.71	454.94	126.97	0.55	0.00	0.00	0.00	2.84
January	0.00	0.00	18.04	2.74	454.94	20.83	0.09	0.00	0.00	0.00	0.47
February	0.00	0.00	238.60	36.27	454.94	275.58	1.19	0.00	0.00	0.00	6.17
March	0.00	0.00	23.98	3.65	454.94	27.70	0.12	0.00	0.00	0.00	0.62
April	0.00	0.00	100.59	15.29	454.94	116.18	0.50	0.00	0.00	0.00	2.60
May	0.00	0.00	718.53	109.22	454.94	829.91	3.59	0.00	0.00	0.00	18.57
June	0.00	0.00	723.98	110.04	454.94	836.20	3.62	0.00	0.00	0.00	18.71
<b>Warsak: (Installed Capacity: 243 MW) (Variable Energy Rate-Rs./kWh: 0.072) (Capacity Rate-Rs./kWh: 572.424) (Water Use/NHP Rate-Rs./kWh: 1.155)</b>											
July	109.56	0.71	108.85	7.84	139.08	125.72	0.54	0.00	46.02	46.02	1.33
August	133.24	0.09	133.15	9.59	139.08	153.79	0.67	0.00	46.02	46.02	1.63
September	108.27	0.04	108.23	7.79	139.08	125.01	0.54	0.00	46.02	46.02	1.32
October	70.36	2.30	68.06	4.90	139.08	78.61	0.34	0.00	46.02	46.02	0.83
November	56.93	0.96	55.97	4.03	139.08	64.65	0.28	0.00	46.02	46.02	0.69
December	52.86	2.05	50.80	3.66	139.08	58.68	0.25	0.00	46.02	46.02	0.62
January	58.88	1.88	57.01	4.10	139.08	65.84	0.29	0.00	46.02	46.02	0.70
February	46.26	1.66	44.60	3.21	139.08	51.52	0.22	0.00	46.02	46.02	0.55
March	77.29	0.29	77.00	5.54	139.08	88.94	0.39	0.00	46.02	46.02	0.94
April	117.57	0.22	117.35	8.45	139.08	135.54	0.59	0.00	46.02	46.02	1.44
May	151.21	0.03	151.19	10.89	139.08	174.62	0.76	0.00	46.02	46.02	1.85
June	123.29	0.04	123.25	8.87	139.08	142.35	0.62	0.00	46.02	46.02	1.51
<b>Duber Khawar: (Installed Capacity: 130 MW) (Variable Energy Rate-Rs./kWh: 0.339) (Capacity Rate-Rs./kWh: 2,686.269) (Water Use/NHP Rate-Rs./kWh: 1.155)</b>											
July	92.68	0.00	92.67	31.42	349.21	107.04	0.46	0.00	24.62	24.62	5.34
August	78.99	0.54	78.45	26.60	349.21	90.61	0.39	0.00	24.62	24.62	4.52
September	55.23	0.00	55.23	18.72	349.21	63.79	0.28	0.00	24.62	24.62	3.18
October	28.40	0.00	28.40	9.63	349.21	32.80	0.14	0.00	24.62	24.62	1.64
November	23.86	0.02	23.84	8.08	349.21	27.53	0.12	0.00	24.62	24.62	1.37
December	17.30	0.02	17.27	5.86	349.21	19.95	0.09	0.00	24.62	24.62	1.00
January	13.81	0.20	13.62	4.62	349.21	15.73	0.07	0.00	24.62	24.62	0.78
February	17.49	0.39	17.10	5.80	349.21	19.75	0.09	0.00	24.62	24.62	0.99
March	35.41	0.43	34.98	11.86	349.21	40.40	0.17	0.00	24.62	24.62	2.02
April	68.67	0.19	68.48	23.21	349.21	79.09	0.34	0.00	24.62	24.62	3.95
May	86.67	0.00	86.67	29.38	349.21	100.10	0.43	0.00	24.62	24.62	4.99
June	92.68	0.00	92.68	31.42	349.21	107.05	0.46	0.00	24.62	24.62	5.34

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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEOxRate+GST Rate) (Mln. Rs.)
<b>Allai Khawar: (Installed Capacity: 121 MW) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 189.00)</b>											
July	46.81	0.11	46.70	11.86	250.60	53.94	0.23	0.00	22.92	22.92	2.02
August	42.87	0.10	42.77	10.86	250.60	49.40	0.21	0.00	22.92	22.92	1.85
September	18.49	0.08	18.41	4.68	250.60	21.27	0.09	0.00	22.92	22.92	0.80
October	16.33	0.06	16.27	4.13	250.60	18.79	0.08	0.00	22.92	22.92	0.70
November	24.90	0.05	24.85	6.31	250.60	28.70	0.12	0.00	22.92	22.92	1.07
December	15.75	0.04	15.71	3.99	250.60	18.14	0.08	0.00	22.92	22.92	0.68
January	0.00	0.04	-0.04	-0.01	250.60	-0.05	0.00	0.00	22.92	22.92	0.00
February	21.20	0.05	21.15	5.37	250.60	24.43	0.11	0.00	22.92	22.92	0.91
March	131.76	79.61	52.15	13.25	250.60	60.23	0.26	0.00	22.92	22.92	2.25
April	193.51	113.52	80.00	20.32	250.60	92.39	0.40	0.00	22.92	22.92	3.45
May	215.59	129.26	86.33	21.93	250.60	99.72	0.43	0.00	22.92	22.92	3.73
June	182.78	117.61	65.17	16.55	250.60	75.27	0.33	0.00	22.92	22.92	2.81
<b>Khan Khawar: (Installed Capacity: 72 MW) (Variable Energy Rate-Rs./kWh: 0.375) (Capacity Rate-Rs./kWh: 2,316.349) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 189.00)</b>											
July	24.85	0.43	24.42	9.16	166.78	28.21	0.12	0.00	13.64	13.64	1.56
August	57.68	33.24	24.43	9.16	166.78	28.22	0.12	0.00	13.64	13.64	1.56
September	34.03	25.54	8.49	3.18	166.78	9.80	0.04	0.00	13.64	13.64	0.54
October	21.20	12.24	8.96	3.36	166.78	10.34	0.04	0.00	13.64	13.64	0.57
November	23.01	9.45	13.57	5.09	166.78	15.67	0.07	0.00	13.64	13.64	0.86
December	9.71	8.49	1.22	0.46	166.78	1.41	0.01	0.00	13.64	13.64	0.08
January	13.91	5.88	8.03	3.01	166.78	9.28	0.04	0.00	13.64	13.64	0.51
February	22.44	6.49	15.95	5.98	166.78	18.42	0.08	0.00	13.64	13.64	1.02
March	57.16	12.65	44.51	16.69	166.78	51.40	0.22	0.00	13.64	13.64	2.84
April	74.08	24.92	49.16	18.43	166.78	56.78	0.25	0.00	13.64	13.64	3.13
May	83.82	37.14	46.68	17.51	166.78	53.92	0.23	0.00	13.64	13.64	2.98
June	68.97	40.49	28.47	10.68	166.78	32.89	0.14	0.00	13.64	13.64	1.82
<b>Golen Goli: (Installed Capacity: 108 MW) (Variable Energy Rate-Rs./kWh: 0.228) (Capacity Rate-Rs./kWh: 1,370.61) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	10.19	4.21	6	1.36	148.03	6.91	0.03	0.00	0.00	0.00	0.23
August	5.19	5.27	0	-0.02	148.03	-0.10	0.00	0.00	0.00	0.00	0.00
September	18.02	1.72	16	3.72	148.03	18.84	0.08	0.00	0.00	0.00	0.63
October	17.25	0.01	17	3.93	148.03	19.92	0.09	0.00	0.00	0.00	0.67
November	11.20	0.00	11	2.55	148.03	12.94	0.06	0.00	0.00	0.00	0.43
December	7.70	0.00	8	1.76	148.03	8.89	0.04	0.00	0.00	0.00	0.30
January	5.36	0.00	5	1.22	148.03	6.19	0.03	0.00	0.00	0.00	0.21
February	4.13	0.00	4	0.94	148.03	4.78	0.02	0.00	0.00	0.00	0.16
March	4.14	0.00	4	0.94	148.03	4.78	0.02	0.00	0.00	0.00	0.16
April	4.17	0.00	4	0.95	148.03	4.81	0.02	0.00	0.00	0.00	0.16
May	4.69	0.00	5	1.07	148.03	5.42	0.02	0.00	0.00	0.00	0.18
June	5.29	0.00	5	1.21	148.03	6.11	0.03	0.00	0.00	0.00	0.20

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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEO+Rate+GST Rate) (Mln. Rs.)
<b>Jabban: (Installed Capacity: 22 MW) (Variable Energy Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 0.00) and (NHP Current Rate for 12 Months-Rs./kWh: 1.155)</b>											
July	15.29	0.00	15.29	5.08	65.15	17.66	0.08	0.00	4.17	4.17	0.86
August	15.08	0.00	15.08	5.01	65.15	17.42	0.08	0.00	4.17	4.17	0.85
September	14.76	0.00	14.76	4.90	65.15	17.04	0.07	0.00	4.17	4.17	0.83
October	10.14	0.00	10.14	3.37	65.15	11.71	0.05	0.00	4.17	4.17	0.57
November	8.90	0.00	8.90	2.95	65.15	10.28	0.04	0.00	4.17	4.17	0.50
December	6.92	0.00	6.92	2.30	65.15	7.99	0.03	0.00	4.17	4.17	0.39
January	3.81	0.04	3.78	1.25	65.15	4.36	0.02	0.00	4.17	4.17	0.21
February	6.60	0.00	6.60	2.19	65.15	7.63	0.03	0.00	4.17	4.17	0.37
March	12.78	0.00	12.78	4.24	65.15	14.76	0.06	0.00	4.17	4.17	0.72
April	14.09	0.00	14.09	4.68	65.15	16.28	0.07	0.00	4.17	4.17	0.80
May	15.03	0.00	15.03	4.99	65.15	17.36	0.08	0.00	4.17	4.17	0.85
June	14.31	0.00	14.31	4.75	65.15	16.53	0.07	0.00	4.17	4.17	0.81
<b>Dargai: (Installed Capacity: 20 MW) (Variable Energy Rate-Rs./kWh: 0.094) (Capacity Rate-Rs./kWh: 836.555) (Water Use/NHP Rate-Rs./kWh: 1.155)</b>											
July	11.99	0.00	11.99	1.13	16.73	13.85	0.06	0.00	3.79	3.79	0.19
August	4.71	0.03	4.68	0.44	16.73	5.40	0.02	0.00	3.79	3.79	0.07
September	10.53	0.00	10.53	0.99	16.73	12.16	0.05	0.00	3.79	3.79	0.17
October	7.63	0.00	7.63	0.72	16.73	8.81	0.04	0.00	3.79	3.79	0.12
November	7.17	0.00	7.17	0.67	16.73	8.28	0.04	0.00	3.79	3.79	0.11
December	5.18	0.00	5.18	0.49	16.73	5.99	0.03	0.00	3.79	3.79	0.08
January	1.66	0.14	1.52	0.14	16.73	1.75	0.01	0.00	3.79	3.79	0.02
February	4.68	0.01	4.67	0.44	16.73	5.40	0.02	0.00	3.79	3.79	0.07
March	10.37	0.00	10.37	0.97	16.73	11.98	0.05	0.00	3.79	3.79	0.17
April	11.37	0.00	11.37	1.07	16.73	13.14	0.06	0.00	3.79	3.79	0.18
May	11.90	0.00	11.90	1.12	16.73	13.75	0.06	0.00	3.79	3.79	0.19
June	11.40	0.00	11.40	1.07	16.73	13.17	0.06	0.00	3.79	3.79	0.18
<b>Kurram Garhi: (Installed Capacity: 4 MW) (Variable Energy Rate-Rs./kWh: 0.273) (Capacity Rate-Rs./kWh: 1.823.76) (Water Use/NHP Rate-Rs./kWh: 1.155)</b>											
July	3.15	1.59	1.56	0.43	7.30	1.80	0.01	0.00	0.76	0.76	0.07
August	3.13	1.55	1.59	0.43	7.30	1.83	0.01	0.00	0.76	0.76	0.07
September	2.30	1.34	0.96	0.26	7.30	1.10	0.00	0.00	0.76	0.76	0.04
October	2.17	0.71	1.47	0.40	7.30	1.69	0.01	0.00	0.76	0.76	0.07
November	2.81	1.30	1.51	0.41	7.30	1.74	0.01	0.00	0.76	0.76	0.07
December	3.68	2.19	1.49	0.41	7.30	1.73	0.01	0.00	0.76	0.76	0.07
January	3.75	3.35	0.40	0.11	7.30	0.47	0.00	0.00	0.76	0.76	0.02
February	3.41	3.24	0.17	0.05	7.30	0.19	0.00	0.00	0.76	0.76	0.01
March	3.20	2.03	1.17	0.32	7.30	1.35	0.01	0.00	0.76	0.76	0.05
April	2.99	1.67	1.32	0.36	7.30	1.52	0.01	0.00	0.76	0.76	0.06
May	4.33	2.58	1.75	0.48	7.30	2.02	0.01	0.00	0.76	0.76	0.08
June	4.75	3.03	1.72	0.47	7.30	1.99	0.01	0.00	0.76	0.76	0.08

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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEOxRatexGST Rate) (Mln. Rs.)
<b>Chitral: (Installed Capacity: 1 MW) (Variable Energy Rate-Rs./kWh: 0.655) (Capacity Rate-Rs./kWh: 0.000) and (NHP Current Rate for 12 Months-Rs./kWh: 189.00)</b>											
July	0.30	0.00	0.30	0.20	4.24	0.35	0.00	0.00	0.19	0.19	0.03
August	0.32	0.00	0.32	0.21	4.24	0.37	0.00	0.00	0.19	0.19	0.04
September	0.28	0.00	0.28	0.18	4.24	0.33	0.00	0.00	0.19	0.19	0.03
October	0.20	0.00	0.20	0.13	4.24	0.24	0.00	0.00	0.19	0.19	0.02
November	0.23	0.00	0.23	0.15	4.24	0.27	0.00	0.00	0.19	0.19	0.03
December	0.27	0.00	0.27	0.17	4.24	0.31	0.00	0.00	0.19	0.19	0.03
January	0.27	0.00	0.27	0.18	4.24	0.32	0.00	0.00	0.19	0.19	0.03
February	0.28	0.00	0.28	0.18	4.24	0.32	0.00	0.00	0.19	0.19	0.03
March	0.27	0.00	0.27	0.18	4.24	0.31	0.00	0.00	0.19	0.19	0.03
April	0.21	0.00	0.21	0.14	4.24	0.24	0.00	0.00	0.19	0.19	0.02
May	0.18	0.00	0.18	0.12	4.24	0.21	0.00	0.00	0.19	0.19	0.02
June	0.23	0.00	0.23	0.15	4.24	0.27	0.00	0.00	0.19	0.19	0.03
<b>Ghazi Barotha: (Installed Capacity: 1.450 MW) (Variable Energy Rate-Rs./kWh: 0.089) (Capacity Rate-Rs./kWh: 769.975) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	1,424.84	665.30	759.54	67.60	1,116.46	877.27	3.80	1,000.88	4,173.60	5,174.48	11.49
August	2,009.60	1,255.25	754.34	67.14	1,116.46	871.27	3.77	1,000.88	4,173.60	5,174.48	11.41
September	1,784.81	1,035.02	749.79	66.73	1,116.46	866.01	3.75	1,000.88	4,173.60	5,174.48	11.34
October	850.69	273.09	577.60	51.41	1,116.46	667.12	2.89	1,000.88	4,173.60	5,174.48	8.74
November	974.77	268.64	706.13	62.85	1,116.46	815.58	3.53	1,000.88	4,173.60	5,174.48	10.68
December	680.92	305.81	375.11	33.38	1,116.46	433.25	1.88	1,000.88	4,173.60	5,174.48	5.68
January	749.00	545.36	203.64	18.12	1,116.46	235.20	1.02	1,000.88	4,173.60	5,174.48	3.08
February	690.72	151.47	539.25	47.99	1,116.46	622.84	2.70	1,000.88	4,173.60	5,174.48	8.16
March	348.04	219.85	128.20	11.41	1,116.46	148.07	0.64	1,000.88	4,173.60	5,174.48	1.94
April	378.43	116.84	261.59	23.28	1,116.46	302.14	1.31	1,000.88	4,173.60	5,174.48	3.96
May	1,172.41	440.86	731.55	65.11	1,116.46	844.94	3.66	1,000.88	4,173.60	5,174.48	11.07
June	1,320.11	624.64	695.47	61.90	1,116.46	803.27	3.48	1,000.88	4,173.60	5,174.48	10.52
<b>Chashma: (Installed Capacity: 184 MW) (Variable Energy Rate-Rs./kWh: 0.146) (Capacity Rate-Rs./kWh: 1,418.173) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	68.69	2.14	66.55	9.72	260.94	76.86	0.33	127.01	529.62	656.62	1.65
August	55.42	2.32	53.10	7.75	260.94	61.32	0.27	127.01	529.62	656.62	1.32
September	81.81	0.20	81.61	11.91	260.94	94.26	0.41	127.01	529.62	656.62	2.03
October	80.62	1.75	78.87	11.52	260.94	91.10	0.39	127.01	529.62	656.62	1.96
November	85.01	0.11	84.89	12.39	260.94	98.05	0.42	127.01	529.62	656.62	2.11
December	59.59	0.64	58.95	8.61	260.94	68.09	0.29	127.01	529.62	656.62	1.46
January	39.40	0.65	38.75	5.66	260.94	44.75	0.19	127.01	529.62	656.62	0.96
February	70.49	0.71	69.78	10.19	260.94	80.60	0.35	127.01	529.62	656.62	1.73
March	38.77	4.32	34.45	5.03	260.94	39.79	0.17	127.01	529.62	656.62	0.86
April	52.98	1.37	51.62	7.54	260.94	59.62	0.26	127.01	529.62	656.62	1.28
May	64.96	0.21	64.76	9.45	260.94	74.79	0.32	127.01	529.62	656.62	0.98
June	63.90	0.07	63.83	9.32	260.94	73.73	0.32	127.01	529.62	656.62	0.97



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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEOxRate+GST Rate) (Mln. Rs.)
<b>Jinnah: (Installed Capacity: 96 MW) (Variable Energy Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	11.43	3.33	8.10	1.85	176.77	9.35	0.04	66.27	276.32	342.59	0.32
August	10.80	4.12	6.68	1.53	176.77	7.71	0.03	66.27	276.32	342.59	0.26
September	9.66	2.56	7.10	1.63	176.77	8.20	0.04	66.27	276.32	342.59	0.28
October	20.37	0.09	20.28	4.64	176.77	23.43	0.10	66.27	276.32	342.59	0.79
November	38.03	0.01	38.03	8.71	176.77	43.92	0.19	66.27	276.32	342.59	1.48
December	20.62	0.46	20.17	4.62	176.77	23.29	0.10	66.27	276.32	342.59	0.79
January	6.42	3.56	2.87	0.66	176.77	3.31	0.01	66.27	276.32	342.59	0.11
February	14.24	3.21	11.03	2.53	176.77	12.74	0.06	66.27	276.32	342.59	0.43
March	19.08	0.00	19.08	4.37	176.77	22.03	0.10	66.27	276.32	342.59	0.74
April	20.81	0.00	20.81	4.77	176.77	24.04	0.10	66.27	276.32	342.59	0.81
May	10.48	0.00	10.48	2.40	176.77	12.11	0.05	66.27	276.32	342.59	0.26
June	11.97	0.00	11.97	2.74	176.77	13.82	0.06	66.27	276.32	342.59	0.30
<b>Rasul: (Installed Capacity: 22 MW) (Variable Energy Rate-Rs./kWh: 0.079) (Capacity Rate-Rs./kWh: 791.065) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	5.40	0.22	5.18	0.41	17.40	5.99	0.03	15.19	63.32	78.51	0.07
August	7.18	0.28	6.90	0.54	17.40	7.97	0.03	15.19	63.32	78.51	0.09
September	5.94	0.77	5.17	0.41	17.40	5.97	0.03	15.19	63.32	78.51	0.07
October	3.74	3.92	-0.18	-0.01	17.40	-0.21	0.00	15.19	63.32	78.51	0.00
November	1.93	2.11	-0.17	-0.01	17.40	-0.20	0.00	15.19	63.32	78.51	0.00
December	1.82	2.00	-0.18	-0.01	17.40	-0.21	0.00	15.19	63.32	78.51	0.00
January	1.91	2.09	-0.18	-0.01	17.40	-0.21	0.00	15.19	63.32	78.51	0.00
February	1.61	1.78	-0.17	-0.01	17.40	-0.20	0.00	15.19	63.32	78.51	0.00
March	2.91	0.86	2.05	0.16	17.40	2.37	0.01	15.19	63.32	78.51	0.03
April	6.67	1.44	5.23	0.41	17.40	6.04	0.03	15.19	63.32	78.51	0.07
May	6.09	0.04	6.05	0.48	17.40	6.99	0.03	15.19	63.32	78.51	0.24
June	4.44	0.08	4.36	0.34	17.40	5.04	0.02	15.19	63.32	78.51	0.17
<b>Nandipur: (Installed Capacity: 14 MW) (Variable Energy Rate-Rs./kWh: 0.228) (Capacity Rate-Rs./kWh: 1,126.76) (Water Use/NHP Rate-Rs./kWh: 1.155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	4.44	0.00	4.44	1.01	15.55	5.13	0.02	9.66	40.30	49.96	0.17
August	3.93	0.00	3.93	0.90	15.55	4.54	0.02	9.66	40.30	49.96	0.15
September	4.61	0.00	4.61	1.05	15.55	5.33	0.02	9.66	40.30	49.96	0.18
October	3.36	0.00	3.36	0.77	15.55	3.88	0.02	9.66	40.30	49.96	0.13
November	2.03	0.00	2.02	0.46	15.55	2.34	0.01	9.66	40.30	49.96	0.08
December	1.00	0.04	0.96	0.22	15.55	1.11	0.00	9.66	40.30	49.96	0.04
January	0.02	0.07	-0.04	-0.01	15.55	-0.05	0.00	9.66	40.30	49.96	0.00
February	1.97	0.01	1.96	0.45	15.55	2.26	0.01	9.66	40.30	49.96	0.08
March	3.49	0.00	3.49	0.80	15.55	4.03	0.02	9.66	40.30	49.96	0.14
April	2.84	0.00	2.84	0.65	15.55	3.28	0.01	9.66	40.30	49.96	0.11
May	2.90	0.00	2.90	0.66	15.55	3.35	0.01	9.66	40.30	49.96	0.04
June	3.36	0.00	3.36	0.77	15.55	3.88	0.02	9.66	40.30	49.96	0.05

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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.)	NHP Arrear Charges (Mln. Rs.)	NHP Current Charges (Mln. Rs.)	Total NHP (Arrear+Current) (Mln. Rs.)	GST @ 17% (NEO+Rate+GST Rate) (Mln. Rs.)
<b>Shaditwari: (Installed Capacity: 14 MW) (Variable Energy Rate-Rs./kWh: 0.234) (Capacity Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	2.25	0.00	2.25	0.53	13.41	2.60	0.01	9.66	40.30	49.96	0.09
August	2.19	0.00	2.19	0.51	13.41	2.53	0.01	9.66	40.30	49.96	0.09
September	2.08	0.01	2.07	0.48	13.41	2.39	0.01	9.66	40.30	49.96	0.08
October	0.02	0.04	-0.03	-0.01	13.41	-0.03	0.00	9.66	40.30	49.96	0.00
November	0.01	0.04	-0.03	-0.01	13.41	-0.03	0.00	9.66	40.30	49.96	0.00
December	0.01	0.06	-0.04	-0.01	13.41	-0.05	0.00	9.66	40.30	49.96	0.00
January	0.01	0.05	-0.04	-0.01	13.41	-0.04	0.00	9.66	40.30	49.96	0.00
February	0.01	0.02	-0.01	0.00	13.41	-0.02	0.00	9.66	40.30	49.96	0.00
March	1.23	0.01	1.22	0.29	13.41	1.41	0.01	9.66	40.30	49.96	0.05
April	1.63	0.01	1.62	0.38	13.41	1.87	0.01	9.66	40.30	49.96	0.06
May	2.62	0.00	2.62	0.61	13.41	3.02	0.01	9.66	40.30	49.96	0.10
June	1.86	0.00	1.86	0.44	13.41	2.15	0.01	9.66	40.30	49.96	0.07
<b>Chichokli: (Installed Capacity: 13 MW) (Variable Energy Rate-Rs./kWh: 0.207) (Capacity Rate-Rs./kWh: 926.84) (Water Use/NHP Rate-Rs./kWh: 1,155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	3.54	0.66	2.88	0.60	12.23	3.33	0.01	8.97	37.42	46.39	0.10
August	3.48	0.31	3.17	0.66	12.23	3.66	0.02	8.97	37.42	46.39	0.11
September	3.96	0.08	3.87	0.80	12.23	4.47	0.02	8.97	37.42	46.39	0.14
October	3.51	0.17	3.34	0.69	12.23	3.85	0.02	8.97	37.42	46.39	0.12
November	2.34	0.15	2.18	0.45	12.23	2.52	0.01	8.97	37.42	46.39	0.08
December	2.00	0.88	1.12	0.23	12.23	1.29	0.01	8.97	37.42	46.39	0.04
January	1.76	1.86	-0.10	-0.02	12.23	-0.11	0.00	8.97	37.42	46.39	0.00
February	2.03	0.41	1.62	0.34	12.23	1.87	0.01	8.97	37.42	46.39	0.06
March	3.49	0.00	3.49	0.72	12.23	4.03	0.02	8.97	37.42	46.39	0.12
April	2.80	0.08	2.73	0.56	12.23	3.15	0.01	8.97	37.42	46.39	0.10
May	2.78	0.26	2.52	0.52	12.23	2.91	0.01	8.97	37.42	46.39	0.10
June	3.27	0.54	2.73	0.56	12.23	3.15	0.01	8.97	37.42	46.39	0.11
<b>Renala Khurd: (Installed Capacity: 1 MW) (Variable Energy Rate-Rs./kWh: 0.676) (Capacity Rate-Rs./kWh: 3,303.75) (Water Use/NHP Rate-Rs./kWh: 1,155) (IRSA Rate-Rs./kWh: 0.005) (NHP Arrear Rate-Rs./kWh: 690.264) and (NHP Current Rate for 12 Months-Rs./kWh: 2,878.00)</b>											
July	0.28	0.00	0.28	0.19	3.63	0.32	0.00	0.69	2.88	3.57	0.03
August	0.28	0.00	0.28	0.19	3.63	0.33	0.00	0.69	2.88	3.57	0.03
September	0.26	0.00	0.26	0.17	3.63	0.29	0.00	0.69	2.88	3.57	0.03
October	0.11	0.01	0.11	0.07	3.63	0.13	0.00	0.69	2.88	3.57	0.01
November	0.11	0.00	0.11	0.08	3.63	0.13	0.00	0.69	2.88	3.57	0.01
December	0.12	0.00	0.12	0.08	3.63	0.14	0.00	0.69	2.88	3.57	0.01
January	0.02	0.02	-0.01	-0.01	3.63	-0.01	0.00	0.69	2.88	3.57	0.00
February	0.09	0.00	0.08	0.05	3.63	0.09	0.00	0.69	2.88	3.57	0.01
March	0.03	0.01	0.02	0.01	3.63	0.03	0.00	0.69	2.88	3.57	0.00
April	0.21	0.00	0.21	0.14	3.63	0.25	0.00	0.69	2.88	3.57	0.02
May	0.30	0.00	0.30	0.20	3.63	0.35	0.00	0.69	2.88	3.57	0.01
June	0.27	0.00	0.27	0.18	3.63	0.31	0.00	0.69	2.88	3.57	0.01

Source: WAPDA

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**TABLE 15**  
**Thermal Electricity Generation by Sector and by Fuel (GWh)**

			2015-16	2016-17	2017-18*	2018-19*	2019-20*
Thermal Generation by:							
GENCOs (I, II, III and IV)			16,391.91	18,709.99	16,199.10	13,016.99	7,907.85
KE Own Power Plants			10,323.00	10,147.00	10,337.75	10,727.68	10,358.00
IPPs: CPPA-G System			45,146.42	47,972.10	62,436.23	62,597.73	60,720.31
IPPs: KE System			1,421.00	1,531.00	1,824.81	2,131.72	1,862.68
Others (SPPs/CPPs/N-CPPs): CPPA-G System			251.00	271.40	665.53	405.13	170.99
Others (SPPs/CPPs/N-CPPs): KE System			139.00	187.00	550.49	523.74	535.00
Total Thermal Generation			73,672.33	78,818.49	92,013.90	89,402.99	81,554.83
Thermal Generation using:							
Gas	CPPA-G System**	Generation on Gas (GWh)	29,497.42	31,520.24	23,291.97	22,439.40	15,236.30
		Share of Gas Generation (%)	40.04	39.99	25.31	25.10	18.68
	KE System†	Generation on Gas (GWh)	8,065.00	6,768.50	6,374.93	5,571.15	5,379.18
		Share of Gas Generation (%)	10.95	8.59	6.93	6.23	6.60
	Total	Generation on Gas (GWh)	37,562.42	38,288.74	29,666.90	28,010.55	20,615.48
Share of Gas Generation (%)		50.99	48.58	32.24	31.33	25.28	
RLNG	CPPA-G System	Generation on RLNG (GWh)	0.00	657.88	20,678.32	28,148.92	23,830.58
		Share of RLNG Generation (%)	0.00	0.83	22.47	31.49	29.22
	KE System	Generation on RLNG (GWh)	0.00	0.00	496.34	2,664.40	2,985.50
		Share of RLNG Generation (%)	0.00	0.00	0.54	2.98	3.66
	Total	Generation on RLNG (GWh)	0.00	657.88	21,174.66	30,813.32	26,816.08
		Share of RLNG Generation (%)	0.00	0.83	23.01	34.47	32.88
RFO	CPPA-G System	Generation on RFO (GWh)	30,631.47	32,073.70	22,755.88	9,091.79	4,178.25
		Share of RFO Generation (%)	41.58	40.69	24.73	10.17	5.12
	KE System**	Generation on RFO (GWh)	3,818.00	5,034.50	5,403.30	4,734.08	3,978.00
		Share of RFO Generation (%)	5.18	6.39	5.87	5.30	4.88
	Total	Generation on RFO (GWh)	34,449.47	37,108.20	28,159.18	13,825.87	8,156.25
		Share of RFO Generation (%)	46.76	47.08	30.60	15.46	10.00
HSD	CPPA-G System	Generation on HSD (GWh)	1,512.28	1,704.54	788.18	27.74	0.67
		Share of HSD Generation (%)	2.05	2.16	0.86	0.03	0.00
	KE System	Generation on HSD (GWh)	0.00	0.00	0.00	0.00	0.00
		Share of HSD Generation (%)	0.00	0.00	0.00	0.00	0.00
	Total	Generation on HSD (GWh)	1,512.28	1,704.54	788.18	27.74	0.67
		Share of HSD Generation (%)	2.05	2.16	0.86	0.03	0.00
Coal	CPPA-G System	Generation on Coal (GWh)	148.16	997.14	11,786.50	16,312.01	25,553.34
		Share of Coal Generation (%)	0.20	1.27	12.81	18.25	31.33
	KE System	Generation on Coal (GWh)	0.00	62.00	438.49	413.51	413.00
		Share of Coal Generation (%)	0.00	5.85	3.59	2.47	1.59
	Total	Generation on Coal (GWh)	148.16	1,059.14	12,224.99	16,725.52	25,966.34
		Share of Coal Generation (%)	0.20	1.34	13.29	18.71	31.84
Total Thermal Generation			73,672.33	78,818.50	92,013.91	89,402.99	81,554.82

\* Net Electricity Generation during FY 2017-18, 2018-19 and 2019-20.

\*\* Including generation of SPPs/CPPs/N-CPPs in CPPA-G System.

† Including generation of IPPs in KE System.

\*\* Including generation of IPPs/CPPs in KE System.

Source: GENCOs/IPPs/KE

TABLE 16  
Fuel Consumption and Cost of Generation Data (GENCOs)

Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Gen. on RFO (GWh)	RFO Consumption (000 M.Ton)	RFO Consumption (Kg/kWh)		Gen. on RLNG (GWh)	RLNG Consumption		Cost of Generation (Paisa/kWh)	Overall Fuel Cost of Gen. (Rs. Million)
			Total (MMCF)	Cft/kWh (Average)						Total (MMCF)	Cft/kWh (Average)		
TPS Jamshoro (GENCO-I)	2015-16	2,413.73	31,095.57	12.88	832.73	252.68	0.30					878.00	28,509.57
	2016-17	1,141.37	14,085.16	12.34	2,112.19	619.53	0.29					975.00	31,727.31
	2017-18	525.80	8,782.00	12.33	1,088.24	328.59	0.30		178.01	0.00	0.00	1,130.00	20,252.92
	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	42.37	0.33		0.00	0.00	0.00	2,059.20	4,015.26
SPS Faisalabad (GENCO-III)	2015-16	85.84	1,328.00	13.79	0.00	0.00	0.00					1,016.00	871.90
	2016-17	62.25	971.18	13.77	45.43	15.55	0.30					1,266.80	1,279.21
	2017-18	6.26	85.13	11.86	0.00	0.00	0.00		0.00	0.00	0.00	4,094.50	41.29
	2018-19	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
	2019-20	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
GTPS Faisalabad (GENCO-III)	2015-16	275.16	3,631.00	12.54								858.00	2,360.82
	2016-17	214.62	2,718.97	12.04								772.21	1,371.20
	2017-18	14.68	1,297.21	11.71				n.p.				1,780.89	1,609.00
	2018-19	0.00	0.00	0.00	0.00	149.528	1801.87	11.47				2,027.71	2,805.00
	2019-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00				0.00	0.00
TPS Muzaffargarh (GENCO-III)	2015-16	344.38	4,641.00	12.23	4,300.27	1,285.00	0.27					986.00	45,786.78
	2016-17	0.00	11.00	0.00	5,160.13	1,552.16	0.27					1,108.43	59,029.58
	2017-18	28.56	384.13	10.62	2,892.01	8,799.58	0.27		119.79	1,575.75	12.44	1,372.18	41,731.74
	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	92,801.55	0.28		0.00	0.00	0.00	2,090.83	7,015.71
TPS Nandipur (GENCO-III)	2015-16	0.00	0.00	0.00	1,265.52	296.00	0.22					825.00	10,458.84
	2016-17	550.59	4,822.60	8.47	828.37	181.92	0.21		2.26	711.00	n.p.	831.00	11,919.62
	2017-18*	2,381.70	2,133.61	8.57	0.00	0.00	0.00		0.00	0.00	0.00	898.00	22,138.18
	2018-19*	1,729.09	14,299.31	8.01	0.00	0.00	0.00		0.00	0.00	0.00	1,128.05	20,127.64
	2019-20*	1,476.33	12,030.47	7.88	0.00	0.00	0.00		0.00	0.00	0.00	1,108.49	16,933.94



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Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Cost of Generation (Paisa/kWh)	Overall Fuel Cost of Generation (Rs. Million)
			Total (MMCF)	Cft/kWh (Average)		
GTPS Kotri (GENCO-I)	2015-16	582.02	7,139.00	12.27	824.00	4,794.77
	2016-17	338.67	4,203.28	12.41	730.00	2,473.40
	2017-18	94.92	1,258.87	13.26	677.60	643.16
	2018-19	37.19	552.03	14.89	936.20	347.06
	2019-20	0.00	0.00	0.00	0.00	0.00
TPS Guddu (Units 1-4) (GENCO-II)	2015-16	148.64	2,501.43	16.34	864.78	1,427.51
	2016-17	227.08	3,395.32	14.95	837.55	1,901.92
	2017-18	258.11	4,209.89	14.81	609.80	1,733.15
	2018-19	10.02	171.43	14.63	599.89	70.29
	2019-20	0.00	0.00	0.00	0.00	0.00
TPS Guddu (Units 5-10) (GENCO-II)	2015-16	2,058.19	24,331.59	11.82	613.61	12,629.19
	2016-17	2,487.81	29,803.46	11.98	536.72	13,352.60
	2017-18	3,617.95	43,758.57	11.89	461.37	16,980.30
	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
TPS Guddu (Units 11-13) (GENCO-II)	2015-16	272.26	4,460.30	16.38	901.88	2,455.43
	2016-17	820.54	11,919.67	14.53	716.82	5,881.82
	2017-18	1,043.97	16,311.50	15.56	605.51	6,348.11
	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
TPS Guddu (Units 14-16) (GENCO-II)	2015-16	3,551.47	32,113.09	9.04	510.55	17,812.35
	2016-17	4,543.55	40,375.55	17.53	446.01	20,264.78
	2017-18	3,855.08	39,464.48	10.04	413.31	16,242.95
	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	713.15	31,501.33
TPS Quetta (Isolated Generation) (GENCO-II)	2015-16	111.29	1,914.49	17.20	1,169.98	1,302.07
	2016-17	53.32	934.52	17.53	1,162.89	620.09
	2017-18	0.00	0.00	0.00	0.00	0.16
	2018-19	0.00	0.00	0.00	0.00	0.00
	2019-20	0.00	0.00	0.00	0.00	0.00

FBC Lakhara (GENCO-IV)					
Year	Generation on Coal (GWh)	Coal Consumption (000 M. Tons)	Coal Consumption (kg/kWh)	Cost of Generation (Paisa/kWh)	Overall Fuel Cost of Gen. (Rs. Million)
2015-16	148.16	152.22	1.03	1,171.80	612.30
2016-17	123.97	123.90	0.99	1,359.21	500.54
2017-18	3.39	5.30	1.01	2,023.72	22.50
2018-19**	0.06	0.26	4.04	2,373.65	1.45
2019-20**	0.00	0.00	0.00	0.00	0.00

Note: Net Electricity Generation during FY 2017-18, 2018-19 and 2019-20. \* TPS Nandipur Electricity Generation on RLNG.

\*\* 150 MW Lakhara Power Plant is under shutdown mode from July, 2017 for want of Major Rehabilitation of which PC-II, for Feasibility Study is under consideration at GOP level, and also the Concept Clearance Paper for installation of a new 330 MW Power Plant is under process of approval.

Source: GENCOs

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TABLE 17  
Auxiliary Consumption and other Factors (GENCOs)

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
TPS Jamshoro (GENCO-I)	2015-16	354.02	9.83	740	79.86	48.22	83.24
	2016-17	356.17	9.87	690	83.22	48.48	58.04
	2017-18	214.07	10.67	650	79.17	26.94	32.25
	2018-19	117.16	11.88	550	91.24	57.38	71.06
	2019-20	22.69	10.17	480	67.07	45.34	1.24
GTPS Kotri (GENCO-I)	2015-16	21.20	3.51	118	58.20	47.82	57.23
	2016-17	13.63	3.87	105	38.30	27.93	33.51
	2017-18	6.89	6.77	102	11.39	59.86	8.07
	2018-19	3.73	9.14	81	5.75	56.20	3.23
TPS Guddu (Units 1-4) (GENCO-II)	2015-16	12.49	8.42	210	12.05	65.63	54.06
	2016-17	16.06	7.07	150	17.28	60.61	12.34
	2017-18	25.43	8.95	150	21.63	71.43	19.09
	2018-19	1.69	14.45	110	1.22	52.38	0.79
TPS Guddu (Units 5-10) (GENCO-II)	2015-16	50.50	2.45	367	63.84	39.05	65.89
	2016-17	55.41	2.23	608	46.71	100.00	47.33
	2017-18	62.49	1.70	608	69.10	101.33	79.27
	2018-19	64.89	1.84	582	69.28	97.00	76.08
	2019-20	25.46	0.63	468	32.12	78.00	28.36
TPS Guddu (Units 11-13) (GENCO-II)	2015-16	0.97	0.36	190	16.31	11.48	70.96
	2016-17	4.41	0.54	272	34.44	65.54	36.03
	2017-18	4.43	0.42	252	47.49	96.92	46.03
	2018-19	6.13	0.73	252	38.20	96.92	37.02
	2019-20	2.78	0.13	252	14.20	96.92	13.76
TPS Guddu (Units 14-16) (GENCO-II)	2015-16	72.24	2.03	740	54.64	54.27	80.00
	2016-17	103.93	2.29	765	67.80	100.00	69.43
	2017-18	74.90	1.91	769	58.34	102.95	62.24
	2018-19	116.50	2.25	798	72.52	106.83	80.29
	2019-20	101.87	1.80	795	61.80	106.43	68.16
TPS Quetta (GENCO-II)	2015-16	1.57	1.41	25	50.68	100.00	50.68
	2016-17	0.99	1.85	22	27.67	88.00	24.35
TPS Muzaffargarh (GENCO-III)	2015-16	502.85	9.77	1,100	52.94	82.22	43.53
	2016-17	540.74	9.49	1,100	59.16	81.48	48.21
	2017-18	342.22	10.15	1,100	34.99	81.48	28.51
	2018-19	113.75	12.06	1,105	9.74	81.85	7.97
	2019-20	51.44	0.60	660	5.79	48.89	3.23
SPS Faisalabad (GENCO-III)	2015-16	10.90	11.31	45	24.37	34.09	11.42
	2016-17	14.77	12.10	45	30.97	34.09	14.52
	2017-18	0.93	13.00	42	1.95	31.82	0.86
GTPS Faisalabad (GENCO-III)	2015-16	15.92	5.52	160	20.60	65.57	15.70
	2016-17	13.10	5.80	160	16.11	65.57	12.27
	2017-18	7.18	6.48	118	10.72	48.36	6.02
	2018-19	9.74	4.86	119	15.08	48.77	15.74
	2019-20	5.06	0.00	0	0.00	0.00	0.00
TPS Nandipur (GENCO-III)	2015-16	63.22	4.12	479	31.41	112.71	35.40
	2016-17	55.56	3.87	457	35.82	107.53	38.52
	2017-18	82.30	3.34	526	53.47	114.35	61.15
	2018-19	52.70	2.95	561	36.31	36.05	39.10
	2019-20	52.10	2.89	541	32.23	30.87	33.47
FBC Lakhra (GENCO-IV)	2015-16	43.18	29.15	36	46.86	38.46	18.02
	2016-17	35.90	28.96	34	41.63	54.49	22.68
	2017-18	3.90	74.25	32	1.87	51.28	0.96
	2018-19	35.67	58.47	15	0.05	24.04	0.01

Source: GENCOs

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**TABLE 18**  
**Heat Rate and Plant Efficiency Data (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)	2015-16	11,352.00	12,590.00	30.07	27.12
	2016-17	10,823.00	12,008.00	31.53	28.42
	2017-18	11,099.13	12,424.96	30.75	27.46
	2018-19	11,271.12	12,774.07	30.28	26.71
	2019-20	11,619.05	13,291.26	29.37	25.67
GTPS Kotri (GENCO-I)	2015-16	11,682.00	12,107.00	29.21	28.18
	2016-17	12,124.00	12,612.00	28.15	27.06
	2017-18	12,627.00	13,549.00	27.03	25.19
	2018-19	13,405.16	14,752.95	25.46	23.13
TPS Guddu (Units 1-4) (GENCO-II)	2015-16	13,728.00	14,975.00	24.86	22.79
	2016-17	12,357.00	13,297.00	27.62	25.67
	2017-18	12,196.00	13,395.00	27.98	25.48
	2018-19	11,998.00	14,023.00	28.45	24.34
TPS Guddu (Units 5-10) (GENCO-II)	2015-16	9,042.00	9,269.00	37.75	36.82
	2016-17	9,262.00	9,473.00	36.85	36.03
	2017-18	9,227.00	9,387.00	36.99	36.36
	2018-19	8,874.00	9,267.00	38.46	36.83
	2019-20	10,075.00	10,280.00	33.88	33.20
TPS Guddu (Units 11-13) (GENCO-II)	2015-16	12,763.00	12,808.00	26.74	26.65
	2016-17	11,281.00	11,342.00	30.25	30.09
	2017-18	12,110.00	12,161.00	28.18	28.06
	2018-19	11,019.00	12,299.00	30.97	27.75
	2019-20	13,844.00	13,977.00	24.65	24.42
TPS Guddu (Units 14-16) (GENCO-II)	2015-16	7,404.00	7,558.00	46.10	45.16
	2016-17	6,848.00	7,008.00	49.84	48.70
	2017-18	7,070.00	7,205.00	48.27	47.37
	2018-19	6,798.00	6,901.00	50.21	49.46
	2019-20	6,571.00	6,753.00	51.94	50.54
TPS Quetta (GENCO-II)	2015-16	16,571.00	16,808.00	20.60	20.31
	2016-17	16,792.00	17,109.00	20.32	19.95
TPS Muzaffargarh (GENCO-III)	2015-16	11,494.14	12,738.54	29.69	26.79
	2016-17	10,378.41	11,465.99	32.88	29.76
	2017-18	10,584.33	11,780.40	32.24	28.97
	2018-19	10,729.67	12,202.05	31.81	27.97
	2019-20	10,683.58	11,037.73	31.94	30.92
SPS Faisalabad (GENCO-III)	2015-16	12,751.04	14,377.28	26.77	23.74
	2016-17	12,574.45	14,305.59	27.14	23.86
	2017-18	11,442.72	13,152.91	29.83	25.95
GTPS Faisalabad (GENCO-III)	2015-16	11,588.03	12,264.72	29.45	28.00
	2016-17	11,320.61	12,018.19	30.15	28.40
	2017-18	11,412.37	12,202.53	29.91	27.96
	2018-19	11,678.00	11,331.00	30.12	29.02
TPS Nandipur (GENCO-III)	2015-16	9,106.00	9,498.00	37.48	35.93
	2016-17	8,280.00	8,614.00	41.22	39.62
	2017-18	7,505.00	7,764.00	45.47	43.95
	2018-19	7,187.00	7,416.00	47.48	46.02
	2019-20	7,032.00	7,281.00	48.52	46.87
FBC Lakhra (GENCO-IV)	2015-16	13,623.54	19,228.02	25.05	17.75
	2016-17	13,219.06	18,609.02	25.82	18.34
	2017-18	13,424.00	n.p.	25.42	n.p.
	2018-19	53,628.60	0.00	6.36	0.00

Source: GENCOs

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**TABLE 19**  
**Fuel Consumption and Cost of Generation Data (IPPs)**

(Residual Furnace Oil based Power Plant)					
Power Station	Year	Units Generated (GWh)	Quantity of RFO used (000 M. Tons)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Lal Pir Power	2015-16	1,946.10	438.43	6.79	8.87
	2016-17	1,601.09	364.37	8.42	10.98
	2017-18	1,089.06	269.53	10.16	13.70
	2018-19	613.80	153.27	13.74	20.95
	2019-20	186.32	48.24	15.25	n.p.
Pak Gen. Power	2015-16	878.13	199.26	5.75	10.17
	2016-17	1,727.18	394.61	8.33	10.72
	2017-18	1,237.28	305.85	10.11	13.25
	2018-19	495.56	125.04	14.14	22.99
	2019-20	149.76	38.39	15.49	n.p.
Hub Power	2015-16	7,546.99	1,803.39	7.06	9.06
	2016-17	6,793.11	1,635.36	8.77	10.99
	2017-18	5,196.60	1,245.89	11.58	16.08
	2018-19	814.43	204.13	16.43	n.p.
	2019-20	32.38	9.62	17.10	n.p.
Saba Power	2015-16	70.59	17.16	7.68	9.84
	2016-17	510.46	123.88	10.63	11.85
	2017-18	465.88	120.21	12.59	14.12
	2018-19	225.41	59.82	17.76	22.38
	2019-20	50.83	14.25	18.23	40.06
Kohinoor Energy	2015-16	877.41	164.44	7.23	8.54
	2016-17	816.83	153.15	7.70	9.09
	2017-18	645.40	124.92	9.44	11.35
	2018-19	387.44	75.05	12.98	17.90
	2019-20	363.86	70.11	12.16	17.26
Attock Gen.	2015-16	1,179.30	216.41	5.20	9.77
	2016-17	1,135.41	209.54	6.92	10.95
	2017-18	912.45	174.29	8.95	14.25
	2018-19	532.18	97.21	12.89	20.86
	2019-20	320.96	58.53	10.12	20.26
Atlas Power	2015-16	1,320.46	261.81	n.p.	n.p.
	2016-17	1,336.90	262.56	n.p.	n.p.
	2017-18	1,246.45	245.18	n.p.	n.p.
	2018-19	691.30	132.07	n.p.	n.p.
	2019-20	259.33	48.96	n.p.	n.p.
Nishat Power	2015-16	1,272.16	250.24	6.52	6.52
	2016-17	1,239.76	243.87	7.55	7.55
	2017-18	1,171.19	230.38	9.29	9.29
	2018-19	675.10	132.80	13.04	13.04
	2019-20	277.46	54.59	13.83	13.83
Nishat Chunian	2015-16	1,240.16	243.94	7.44	8.97
	2016-17	1,350.33	265.61	8.71	9.76
	2017-18	1,099.67	221.80	10.41	11.73
	2018-19	599.74	117.97	13.64	19.04
	2019-20	351.23	69.09	14.19	19.38
Liberty Power Tech.	2015-16	1,277.44	235.39	n.p.	n.p.
	2016-17	1,369.33	255.20	n.p.	n.p.
	2017-18	1,175.61	224.14	n.p.	n.p.
	2018-19	776.26	148.78	n.p.	n.p.
	2019-20	458.54	88.12	n.p.	n.p.
Altern Energy	2015-16	184.60	1736978	6.35	7.56
	2016-17	198.30	1868543	5.91	6.99
	2017-18	145.12	n.p.	n.p.	n.p.



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(Gas based Power Plant)					
Power Station	Year	Units Generated (GWh)	Quantity of Gas used (MMBTU)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Narowal Energy	2015-16	1,161.91	229.65	6.68	11.75
	2016-17	1,334.18	262.33	7.96	12.78
	2017-18	1,199.68	234.04	9.39	12.88
	2018-19	636.13	125.03	12.90	17.09
	2019-20	338.08	67.32	13.42	18.33
Fauji Kabirwala	2015-16	1,138.06	1419944	6.53	7.26
	2016-17	1,122.84	709502	8.34	9.09
	2017-18	1,017.26	404931	9.16	9.94
	2018-19	563.13	259336	12.19	13.10
	2019-20	346.32	59,271	11.15	12.81
Habibullah Coastal	2015-16	563.03	4889875	6.04	9.28
	2016-17	785.90	6533436	n.p.	n.p.
	2017-18	880.33	7416480	3.37	4.48
	2018-19	716.78	6231700	4.93	7.28
	2019-20	108.37	1006228	n.p.	n.p.
Rousch Power	2015-16	2,970.66	23833821	5.94	7.44
	2016-17	2,459.69	19781549	7.61	9.53
	2017-18*	2,591.64	21012425	8.58	10.20
	2018-19*	1,035.85	8699965	11.98	15.92
	2019-20*	217.53	1,901,263	13.21	28.13
TNB Liberty Power	2015-16	1,491.36	12003012	6.06	7.82
	2016-17	1,430.23	11611024	4.79	5.81
	2017-18	1,041.56	8776938	6.47	8.49
	2018-19	1,307.61	10910993	10.15	12.40
	2019-20	896.74	7946696	12.26	15.63
Engro Power Gen. Qadirpur	2015-16	1,222.00	10196067	5.69	8.99
	2016-17	1,731.00	13923051	5.04	10.66
	2017-18	1,668.42	13221041	4.16	9.02
	2018-19	1,385.13	11258742	5.58	6.22
	2019-20	700.74	6077764	7.68	8.99
Davis Energen.	2015-16	74.00	691918	6.49	10.10
	2016-17	61.05	516629	8.04	9.11
	2017-18*	8.82	85456	15.46	16.15
	2018-19	Complex stopped due to gas stoppage (non-payment)			
	2019-20	Complex stopped due to gas stoppage (non-payment)			

Power Station	Year	Gas		RFO		HSD Gen. (GWh)	Average Fuel Cost (Rs./kWh)	Overall Gen. Cost (Rs./kWh)
		Units Gen. (GWh)	Quantity of Gas used (MMBTU)	Units Gen. (GWh)	Quantity of RFO used (000 M.Tons)			
KAPCO (Dual Fuel)	2015-16	1,069.33	9322082	5,462.31	1,073.38	225.33	6.81	7.71
	2016-17	2,571.00	22502701	4,713.00	917.99	240.00	8.46	9.23
	2017-18*	4,101.22	36631183	3,272.72	631.95	62.81	9.82	10.56
	2018-19*	3,514.06	30440566	1,442.41	285.93	2.92	12.90	14.24
	2019-20*	2,523.98	21678499	952.69	187.51	-	n.p.	n.p.

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Power Station	Year	Gas		HSD Generation (GWh)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
		Units Generated (GWh)	Quantity of Gas used (MMBTU)			
Sapphire Electric	2015-16	727.26	5409221	329.17	7.48	7.80
	2016-17	595.64	4414191	394.07	9.18	9.49
	2017-18*	643.89	4883647	171.07	9.70	10.02
	2018-19*	806.02	6252321	2.49	10.76	11.14
	2019-20*	296.54	2337975	0.22	12.03	13.33
Saif Power	2015-16	845.07	6392115	243.71	7.59	8.09
	2016-17	499.64	3805865	405.81	11.82	13.13
	2017-18*	681.27	5146932	160.28	10.35	15.67
	2018-19*	825.43	6403632	2.77	12.26	17.44
	2019-20*	476.16	3738827	0.12	12.03	21.68
Orient Power	2015-16	840.14	6421294	315.48	7.38	8.50
	2016-17	568.57	4366253	376.11	10.21	11.62
	2017-18*	697.51	5270563	143.88	9.98	12.19
	2018-19*	874.43	6795121	3.37	11.10	12.85
	2019-20*	337.67	2735769	0.33	12.07	16.83
Foundation Power	2015-16	1,211.26	9539800	0.22	5.49	7.98
	2016-17	1,382.65	9830259	0.20	4.69	7.25
	2017-18	1,392.39	10818257	0.00	3.97	4.995
	2018-19	1,330.60	10526917	-	n.p.	n.p.
	2019-20	777.30	6578836	-	n.p.	n.p.
Halmore Power	2015-16	540.00	4087127	376.00	13.34	20.97
	2016-17	274.00	2172844	279.00	13.80	5.53
	2017-18*	624.87	4953062	246.14	10.26	15.24
	2018-19*	609.66	4849884	3.25	11.50	13.54
	2019-20*	347.69	2846605	0.00	11.62	15.72
Uch Power	2015-16	4,210.83	32101860	3.13	2.94	3.99
	2016-17	4,404.46	33657865	1.98	3.07	4.04
	2017-18	4,442.99	33721523	0.00	3.19	4.09
	2018-19	3,895.85	29954223	0.00	3.38	4.33
	2019-20	4,087.33	31456577	0.00	3.99	5.05
Uch-II Power	2015-16	2,315.84	17423515	16.98	3.83	5.14
	2016-17	2,724.06	20340852	7.28	3.88	5.22
	2017-18	2,593.04	19524716	0.00	3.83	5.23
	2018-19	3,018.37	22553022	0.00	5.12	6.78
	2019-20	2,148.02	16349080	0.00	4.58	6.33

Note: Net Electricity Generation during FY 2017-18, 2018-19 and 2019-20.

\* During FY 2017-18, 2018-19 and 2019-20 Electricity Generated on RLNG instead of Gas at Roush Power, Davis Energen, KAPCO, Sapphire Electric, Saif Power, Orient Power and Halmore Power Plants.

Source: IPPs

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**TABLE 20**  
**Auxiliary Consumption and other Factors (IPPs)**

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
Lal Pir Power	2015-16	128.27	6.59	350	70.78	60.11	59.30
	2016-17	107.17	6.69	350	63.27	49.40	n.p.
	2017-18	76.29	6.55	350	58.61	35.52	n.p.
	2018-19	42.78	6.52	350	54.25	20.02	n.p.
	2019-20	15.34	7.61	350	44.60	6.08	n.p.
Pak Gen. Power	2015-16	54.11	6.16	350	66.72	27.25	26.88
	2016-17	111.56	6.46	350	63.92	53.43	n.p.
	2017-18	86.89	6.56	350	58.95	40.35	n.p.
	2018-19	35.96	6.77	350	50.65	16.16	n.p.
	2019-20	11.62	7.20	350	48.71	4.88	n.p.
Altern Energy	2015-16	9.58	5.19	30	94.80	96.40	94.81
	2016-17	10.46	5.27	30	95.30	96.70	94.70
Fauji Kabirwala	2015-16	30.41	2.67	157	95.60	84.70	88.72
	2016-17	29.72	2.65	155	94.30	83.80	89.71
	2017-18	31.42	3.00	156	92.09	78.16	87.14
	2018-19	18.01	3.10	153	54.71	43.81	44.67
	2019-20	11.67	3.26	141	36.56	27.27	28.21
Habibullah Coastal	2015-16	14.41	2.56	124	65.49	63.34	76.00
	2016-17	19.69	2.51	125	82.19	79.41	84.51
	2017-18	17.81	1.97	126	81.71	79.72	99.42
	2018-19	21.48	2.91	124	74.69	65.15	93.85
	2019-20	6.62	5.78	75	45.93	39.04	99.09
Hub Power	2015-16	524.11	6.49	1,200	71.60	71.60	81.88
	2016-17	484.77	6.66	1,200	64.45	64.45	81.81
	2017-18	375.34	6.73	1,200	49.48	49.48	53.28
	2018-19	71.55	7.96	1,200	7.87	7.87	9.45
	2019-20	4.00	10.06	1,200	0.34	0.34	0.37
KAPCO	2015-16	174.00	2.60	1,521	56.00	81.90	68.20
	2016-17	189.00	2.50	1,520	62.40	84.30	74.00
	2017-18	171.00	2.30	1,579	63.30	86.00	73.60
	2018-19	120.00	2.40	1,506	42.20	91.80	46.00
	2019-20	88.00	2.50	1,449	29.50	88.90	33.20
Kohinoor Energy	2015-16	26.41	3.01	124	93.80	78.12	83.15
	2016-17	24.68	3.02	124	92.60	72.93	78.10
	2017-18	20.45	3.07	124	91.87	59.42	64.31
	2018-19	12.45	3.11	124	85.82	35.67	39.06
	2019-20	11.55	3.08	124	86.89	33.41	36.16
Rousch Power	2015-16	53.16	1.79	461	85.67	97.26	88.09
	2016-17	46.93	1.91	451	83.75	88.86	94.25
	2017-18	49.99	1.93	454	76.81	74.90	85.46
	2018-19	28.41	2.74	418	41.52	29.94	45.32
	2019-20	11.73	5.39	411	7.41	6.29	7.06
Saba Power	2015-16	4.52	6.41	126	61.54	5.99	5.99
	2016-17	34.39	6.74	134	48.30	43.29	43.29
	2017-18	30.75	6.17	134	48.21	42.51	42.51
	2018-19	16.33	6.73	134	23.73	20.57	20.57
	2019-20	4.08	7.40	126	5.13	4.63	4.63
TNB Liberty Power	2015-16	25.32	1.67	288	80.51	79.68	96.56
	2016-17	25.15	1.72	224	79.48	76.76	93.32
	2017-18	19.66	1.85	221	58.66	56.00	89.38
	2018-19	31.62	2.35	226	81.04	70.30	85.74
	2019-20	25.46	2.75	215	67.70	48.08	71.56

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Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
Uch Power	2015-16	69.10	1.61	548	87.50	88.38	93.95
	2016-17	70.57	1.57	548	91.77	93.26	97.30
	2017-18	71.30	1.57	551	92.05	93.56	96.84
	2018-19	62.84	1.58	549	80.96	82.02	96.79
	2019-20	72.87	1.75	551	84.41	85.32	94.06
AttockGen.	2015-16	26.36	2.19	157	85.00	86.00	100.00
	2016-17	31.98	2.74	158	82.06	82.99	99.85
	2017-18	23.55	2.52	158	66.03	66.69	91.77
	2018-19	15.51	2.90	158	37.48	37.94	52.93
	2019-20	8.97	2.77	158	22.66	22.92	32.92
Atlas Power	2015-16	47.99	3.63	215	70.29	70.29	75.69
	2016-17	51.06	3.82	214	71.36	71.36	77.76
	2017-18	48.37	3.88	215	66.54	66.54	71.82
	2018-19	24.61	3.68	215	35.66	35.66	39.31
	2019-20	9.11	3.51	215	13.82	13.82	15.40
Engro Power Gen. Qadirpur	2015-16	36.08	2.95	219	67.56	96.98	70.32
	2016-17	47.00	3.00	220	96.00	96.00	100.00
	2017-18	46.00	3.00	220	91.00	93.00	98.00
	2018-19	43.20	3.12	220	79.17	96.11	82.79
	2019-20	28.99	4.14	218	38.79	95.81	40.39
Saif Power	2015-16	31.67	2.83	224	66.08	58.99	60.39
	2016-17	28.95	3.10	220	52.45	48.87	50.36
	2018-19	22.94	2.65	224	50.50	45.98	46.98
	2018-19	23.16	2.72	224	47.90	44.76	45.96
	2019-20	14.09	2.87	206	28.55	25.79	26.47
Orient Power	2015-16	30.59	2.65	218	60.65	62.02	73.95
	2016-17	26.79	2.84	221	48.69	50.70	63.92
	2017-18	22.47	2.67	219	43.86	45.16	56.05
	2018-19	23.81	2.71	218	45.98	47.11	59.48
	2019-20	12.82	3.79	210	18.41	18.14	27.51
Nishat Power	2015-16	35.13	2.69	195	80.83	72.41	80.83
	2016-17	35.57	2.79	195	80.51	70.76	80.51
	2017-18	32.42	2.69	195	77.62	68.70	77.62
	2018-19	18.71	2.70	195	41.88	39.60	41.88
	2019-20	8.22	2.88	195	17.29	16.27	17.29
Nishat Chunian	2015-16	31.53	2.54	196	93.67	70.49	73.84
	2016-17	34.46	2.55	196	95.70	76.60	80.20
	2017-18	27.93	2.47	196	92.90	64.14	79.60
	2018-19	15.69	2.55	196	92.90	64.14	79.60
	2019-20	9.79	2.71	196	54.73	20.43	21.84
Sapphire Electric Power	2015-16	30.78	2.92	223	58.68	55.00	58.76
	2016-17	29.61	2.99	228	55.02	51.00	53.51
	2017-18	33.59	3.97	224	56.77	43.88	45.69
	2018-19	24.44	2.94	222	46.73	43.51	44.70
	2019-20	13.22	4.28	208	17.90	16.12	16.62
Halmore Power	2015-16	29.70	3.14	218	55.42	54.13	31.30
	2016-17	20.43	3.57	213	39.05	33.06	37.11
	2017-18	26.61	3.05	221	50.49	49.13	51.23
	2018-19	20.68	3.37	214	37.36	37.36	39.09
	2019-20	14.27	4.10	204	20.04	20.04	19.99
Narowal Energy	2015-16	23.75	2.04	215	61.77	61.77	70.81
	2016-17	25.70	1.93	216	71.23	71.15	79.21
	2017-18	22.35	1.83	216	64.05	64.05	68.89
	2018-19	12.95	2.00	214	33.96	33.96	35.75
	2019-20	7.11	2.07	214	n.p.	18.00	18.65



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Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)	Utilization Factor (%)
		(GWh)	(%)				
Liberty Power Tech.	2015-16	27.53	2.16	196	97.65	72.55	75.93
	2016-17	29.60	2.16	196	98.64	77.97	80.80
	2017-18	25.55	2.13	196	96.50	68.42	71.02
	2018-19	17.33	2.18	196	96.20	45.18	47.11
	2019-20	10.65	2.27	196	95.20	26.61	28.11
Foundation Power	2015-16	32.45	2.67	198	87.00	83.14	81.45
	2016-17	36.10	2.46	195	85.97	89.38	88.11
	2017-18	34.97	2.46	198	94.48	94.10	99.37
	2018-19	34.51	2.51	198	n.p.	90.87	89.70
	2019-20	27.43	3.01	195	n.p.	52.74	51.60
Davis Energen.	2015-16	1.65	2.17	11	82.39	65.54	82.39
	2016-17	1.64	2.68	11	76.50	51.24	67.00
	2017-18	0.54	6.00	8	15.10	11.30	59.30
Uch-II Power	2015-16	94.30	3.90	381	69.82	71.38	77.41
	2016-17	63.62	2.27	375	83.04	84.62	87.46
	2017-18	60.88	2.28	375	79.13	80.71	87.34
	2018-19	67.81	2.19	367	94.01	94.66	95.60
	2019-20	55.12	2.49	355	68.83	69.29	72.87

Source: IPPs

**TABLE 21**  
**Heat Rate and Plant Efficiency Data (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	2015-16	8,653.83	9,264.47	39.43	36.83
	2016-17	8,760.34	9,388.78	38.95	36.35
	2017-18	8,945.63	9,572.25	38.15	35.65
	2018-19	9,053.00	9,684.00	37.69	35.24
	2019-20	9,274.86	10,038.39	36.79	33.99
Pak Gen. Power	2015-16	8,694.26	9,265.19	39.25	36.83
	2016-17	8,794.96	9,402.24	38.80	36.29
	2017-18	8,933.40	9,560.79	38.20	35.69
	2018-19	9,124.72	9,786.82	37.40	34.87
	2019-20	9,224.70	9,940.67	36.99	34.33
Fauji Kabirwala	2015-16	7,533.61	7,763.67	45.29	43.95
	2016-17	7,613.45	7,821.97	44.82	43.62
	2017-18	7,608.51	7,843.99	44.84	43.50
	2018-19	7,608.93	7,852.21	44.84	43.45
	2019-20	7,685.32	7,944.45	44.40	42.95
Altern Energy	2015-16	9,407.00	9,921.70	36.27	34.39
	2016-17	9,422.80	9,947.30	36.20	34.30
Habibullah Coastal	2015-16	8,465.04	8,746.99	40.33	39.03
	2016-17	8,039.25	8,410.80	42.47	40.59
	2017-18	8,035.62	8,394.52	42.47	40.66
	2018-19	8,454.51	8,666.81	40.37	39.38
	2019-20	8,755.07	9,251.66	38.98	36.89
Hub Power	2015-16	8,462.62	9,118.46	40.32	37.42
	2016-17	8,466.82	9,053.14	40.30	37.69
	2017-18	8,382.94	9,152.16	40.70	37.28
	2018-19	8,222.22	8,934.61	41.50	38.19
	2019-20	7,951.73	8,842.00	42.91	38.59
KAPCO	2015-16	7,977.00	8,189.00	45.10	44.00
	2016-17	8,028.00	8,236.00	44.80	43.70
	2017-18	7,997.00	8,181.00	45.00	44.00
	2018-19	7,996.00	8,179.00	45.00	44.00
	2019-20	7,920.00	8,102.00	45.50	44.40

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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
Kohinoor Energy	2015-16	7,745.98	7,986.85	44.05	42.72
	2016-17	7,745.53	7,986.85	44.05	42.72
	2017-18	7,741.54	7,986.85	44.08	42.72
	2018-19	7,738.19	7,986.85	44.08	42.72
	2019-20	7,741.12	7,986.85	44.08	42.72
Rousch Power	2015-16	7,100.91	7,227.99	48.10	47.25
	2016-17	7,109.65	7,245.30	48.04	47.14
	2017-18	7,166.19	7,304.41	47.66	46.76
	2018-19	7,364.59	7,566.55	46.38	45.14
	2019-20	7,471.42	7,874.21	45.71	43.38
Saba Power	2015-16	9,754.00	10,422.00	34.98	32.47
	2016-17	9,737.00	10,441.00	35.04	32.68
	2017-18	9,680.00	10,317.00	35.25	33.07
	2018-19	9,896.00	10,610.00	34.48	32.16
	2019-20	10,376.00	11,205.00	32.88	30.45
TNB Liberty Power	2015-16	7,920.75	8,077.18	43.13	42.29
	2016-17	7,956.73	8,118.30	42.88	42.03
	2017-18	8,288.26	8,467.86	41.17	40.29
	2018-19	8,123.67	8,344.21	42.00	40.89
	2019-20	8,589.48	8,861.71	39.72	38.50
Uch Power	2015-16	6,737.93	6,874.33	50.64	49.63
	2016-17	6,754.82	6,891.14	50.51	49.51
	2017-18	6,712.85	6,847.25	50.83	49.83
	2018-19	6,797.38	6,936.25	50.20	49.19
	2019-20	6,820.72	6,950.81	50.02	49.09
AttockGen.	2015-16	7,412.00	7,582.00	46.05	45.00
	2016-17	7,368.00	7,582.00	46.32	45.00
	2017-18	7,386.00	7,582.00	46.21	45.00
	2018-19	7,356.00	7,582.00	46.40	45.00
	2019-20	7,366.00	7,582.00	46.33	45.00
Atlas Power	2017-18	7,400.00	7,584.00	46.10	45.00
	2018-19	7,400.00	7,584.00	46.10	45.00
	2019-20	7,400.00	7,584.00	46.10	45.00
Engro Power Gen. Qadirpur	2015-16	n.p.	7,710.00	n.p.	44.26
	2016-17	7,260.00	7,625.00	47.00	45.00
	2017-18	7,260.00	7,625.00	47.00	45.00
	2018-19	7,260.00	7,705.51	47.00	44.28
	2019-20	7,260.00	7,741.26	47.00	44.08
Nishat Power	2015-16	7,378.00	7,582.00	46.21	45.00
	2016-17	7,371.00	7,582.00	46.26	45.00
	2017-18	7,378.00	7,582.00	46.21	45.00
	2018-19	7,378.00	7,582.00	46.21	45.00
	2019-20	7,364.00	7,582.00	46.29	45.00
Nishat Chunian	2015-16	n.p.	7,582.00	n.p.	45.00
	2016-17	n.p.	7,582.00	n.p.	45.00
	2017-18	7,402.00	7,582.00	46.10	45.00
	2018-19	7,402.00	7,582.00	46.10	45.00
	2019-20	7,402.00	7,582.00	46.10	45.00
Narowal Energy	2016-17	7,344.00	7,584.00	46.46	45.00
	2017-18	7,451.00	7,451.00	46.64	45.80
	2018-19	7,737.44	7,885.59	46.53	45.66
	2019-20	7,749.92	7,887.43	46.45	45.65

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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
Liberty Power Tech.	2015-16	7,417.70	7,582.54	46.00	45.00
	2016-17	7,417.70	7,582.54	46.00	45.00
	2017-18	7,417.70	7,582.54	46.00	45.00
	2018-19	7,417.70	7,582.54	n.p.	45.00
	2019-20	n.p.	7,582.54	n.p.	45.00
Foundation Power	2015-16	6,919.00	7,107.00	49.31	48.00
	2016-17	6,819.95	7,011.71	49.92	48.66
	2017-18	6,834.21	7,005.66	49.91	48.69
	2018-19	6,938.53	7,146.12	49.18	47.75
	2019-20	7,314.41	7,569.29	46.64	45.08
Davis Energen.	2016-17	8,462.10	9,210.95	25.30	25.00
	2017-18	9,426.00	9,685.00	28.90	28.10
Uch-II Power	2015-16	6,520.58	6,784.16	52.33	50.29
	2016-17	6,554.25	6,739.34	52.06	50.63
	2017-18	6,607.62	6,794.74	51.64	50.22
	2018-19	6,567.20	6,747.54	51.96	50.57
	2019-20	6,679.56	6,880.32	51.08	49.59

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/FO	HSD	Gas/FO	HSD	Gas/FO	HSD	Gas/FO	HSD
Saif Power	2015-16	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2016-17	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	2017-18	6,466.00	6,825.00	6,666.00	7,037.00	52.78	50.01	51.20	48.50
	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
Orient Power	2015-16	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2016-17	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	2017-18	6,504.00	6,866.00	6,666.00	7,037.00	52.48	49.71	51.20	48.50
	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
Sapphire Electric Power	2015-16	6,477.00	6,837.00	6,666.00	7,037.00	52.68	49.90	51.20	48.50
	2016-17	6,472.00	6,833.00	6,666.00	7,037.00	52.72	49.94	51.20	48.50
	2017-18	6,411.00	6,788.00	6,666.00	7,037.00	53.22	50.41	51.20	48.50
	2018-19	6,470.00	6,830.00	6,666.00	7,037.00	52.74	49.96	51.20	48.50
	2019-20	6,470.00	6,830.00	6,666.00	7,037.00	52.74	49.96	51.20	48.50
Halmore Power	2015-16	6,499.00	6,861.00	6,666.00	7,037.00	52.52	49.74	n.p.	n.p.
	2016-17	6,499.00	6,861.00	6,666.00	7,037.00	52.52	49.74	n.p.	n.p.
	2017-18	6,479.00	6,840.00	6,666.00	7,037.00	52.68	49.90	47.54	
	2018-19	6,479.00	6,840.00	6,666.00	7,037.00	52.68	49.90	47.49	
	2019-20	6,478.00	6,839.00	6,666.00	7,037.00	52.62	49.91	n.p.	n.p.

Source: IPPs

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**TABLE 22**  
**Monthly Source-wise Power Sent Out and Fuel Cost (2019-20)**

		July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Total
Hydel	Gener- ation	4,629.48	5,667.51	5,052.84	2,438.80	2,900.01	1,723.29	867.74	2,257.72	1,407.26	2,481.69	4,456.64	4,816.65	38,699.63
		%	40.33	37.09	25.48	39.01	22.80	11.13	32.25	20.36	29.58	37.09	36.25	31.76
Coal	Gener- ation	2,038.94	1,873.91	2,232.44	2,356.91	2,030.23	2,171.05	2,500.78	2,087.44	2,092.81	1,823.68	2,189.28	2,155.87	25,553.34
		%	14.33	13.34	16.39	24.62	27.31	32.09	29.81	30.28	21.74	18.22	16.22	20.97
	Fuel	10,779.21	10,401.41	11,916.03	13,789.80	11,751.38	12,518.44	14,873.16	14,092.08	13,702.94	11,665.80	15,102.72	14,586.58	155,179.55
	Cost	5.29	5.55	5.34	5.85	5.79	5.77	5.95	6.75	6.55	6.40	6.90	6.77	6.07
HSD	Gener- ation	--	--	--	--	--	--	0.67	--	--	--	--	--	0.67
		%	--	--	--	--	--	0.01	--	--	--	--	--	0.00
	Fuel	--	--	--	--	--	--	15.22	--	--	--	--	--	15.22
	Cost	--	--	--	--	--	--	22.72	--	--	--	--	--	22.72
RFO	Gener- ation	783.08	505.92	817.24	19,26	(1.68)	366.69	800.94	77.96	1.86	30.43	129.90	646.64	4,178.24
		%	5.50	3.60	6.00	0.20	4.85	10.28	1.11	0.03	0.36	1.08	4.87	3.43
	Fuel	11,629.80	6,249.82	6,220.96	258.95	--	4,977.19	10,667.76	923.62	23.94	320.45	1,200.56	8,066.78	50,539.83
	Cost	14.85	12.35	7.61	13.44	--	13.57	13.32	11.85	12.87	10.53	9.24	12.47	12.10
Gas	Gener- ation	1,680.92	1,668.49	1,614.71	1,164.94	694.55	1,146.03	1,653.58	919.09	1,181.66	889.46	1,013.72	1,436.40	15,063.55
		%	11.81	11.87	11.85	12.17	9.34	15.17	13.13	17.10	10.60	8.44	10.81	12.36
	Fuel	10,716.70	11,517.65	10,016.97	8,419.14	4,763.78	7,333.40	9,580.67	6,218.01	7,582.43	5,608.30	6,289.90	9,844.41	97,891.36
	Cost	6.38	6.90	6.20	7.23	6.86	6.40	5.79	6.77	6.42	6.31	6.20	6.85	6.50
RLNG	Gener- ation	3,516.71	3,216.04	2,868.46	2,432.73	684.06	1,134.85	957.82	593.33	992.78	1,873.85	2,734.10	2,825.86	23,830.59
		%	24.71	22.89	21.06	25.41	9.20	15.02	8.47	14.37	22.33	22.75	21.27	19.55
	Fuel	38,773.06	36,430.32	28,611.67	24,044.52	6,879.15	11,085.77	9,139.07	6,145.17	10,135.78	17,338.91	20,222.65	18,289.31	227,095.38
	Cost	11.03	11.33	9.97	9.88	10.06	9.77	9.54	10.36	10.21	9.25	7.40	6.47	9.53
Nuclear	Gener- ation	826.64	654.99	749.28	883.23	858.43	699.72	680.95	757.95	912.92	885.96	914.81	880.01	9,704.89
		%	5.81	4.66	5.50	9.23	11.55	8.74	10.83	13.21	10.56	7.61	6.62	7.96
	Fuel	844.70	580.87	707.49	895.09	867.39	718.50	701.28	857.43	1,012.52	883.36	912.29	877.26	9,858.18
	Cost	1.02	0.89	0.94	1.01	1.01	1.03	1.03	1.13	1.11	1.00	1.00	1.00	1.02
Import	Gener- ation	53.47	52.45	49.97	43.05	35.57	32.55	28.73	32.39	34.45	43.85	53.95	53.30	513.73
		%	0.38	0.37	0.37	0.45	0.48	0.37	0.46	0.50	0.52	0.45	0.40	0.42
	Fuel	618.73	606.87	578.24	498.11	411.60	376.66	332.47	374.83	398.57	507.37	624.25	616.77	5,944.47
	Cost	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57	11.57
Mixed	Gener- ation	10.18	10.02	10.01	13.07	14.16	2.81	15.61	10.33	37.72	9.51	33.19	4.39	171.00
		%	0.07	0.07	0.07	0.14	0.19	0.04	0.15	0.55	0.11	0.28	0.03	0.14
	Fuel	70.39	69.60	66.93	88.85	92.84	8.81	102.60	63.39	260.55	59.01	214.75	19.52	1,117.24
	Cost	6.91	6.95	6.69	6.80	6.56	3.14	6.57	6.14	6.91	6.21	6.47	4.45	6.53
Wind	Gener- ation	596.17	322.43	149.69	153.05	151.82	145.60	157.55	105.03	107.30	231.59	387.97	374.29	2,882.49
		%	4.19	2.29	1.10	1.60	2.04	1.93	1.50	1.55	2.76	3.23	2.82	2.37
	Fuel	60.15	61.81	61.61	61.58	49.18	43.36	44.84	60.64	63.77	67.63	66.77	63.62	704.96
	Cost	0.42	0.44	0.45	0.64	0.66	0.57	0.58	0.87	0.92	0.81	0.56	0.48	0.58
Solar	Gener- ation	35.51	17.98	15.11	5.43	17.43	90.91	84.45	99.62	78.21	52.87	36.29	30.64	564.45
		%	0.25	0.13	0.11	0.06	0.23	1.08	1.42	1.13	0.63	0.30	0.23	0.46
	Fuel	220.50	111.66	93.81	17.94	95.09	543.85	505.21	595.94	467.86	316.31	217.08	183.30	3,368.55
	Cost	6.21	6.21	6.21	3.30	5.46	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.97
Bagasse	Gener- ation	14,231.25	14,051.55	13,621.66	9,572.05	7,433.76	7,556.86	7,793.66	7,001.50	6,910.74	8,390.52	12,016.62	13,287.67	121,867.54
		%	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	73,653.09	65,968.20	58,212.10	48,012.40	24,861.23	37,562.62	45,917.44	29,270.47	33,584.59	36,699.51	44,784.20	52,483.93	551,009.78
	Cost	5.18	4.69	4.27	5.02	3.34	4.97	5.89	4.18	4.86	4.37	3.73	3.95	4.52

Note: As per data provided by CPPA-G



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**TABLE 23**  
**Electricity Statistics of K-Electric Limited**

1	Units Generated by KE Own (GWh)						
	Name of Plant	Year	Units Generated	Auxiliary Consumption		Units Sent Out	
				GWh	%		
1.1	Bin Qasim Thermal Power Station-I (BQTPS-I)	2015-16	3,958.00	372.00	9.40	3,586.00	
		2016-17	4,329.00	412.00	9.52	3,917.00	
		2017-18	4,764.70	430.58	9.04	4,334.12	
		2018-19	4,646.94	429.17	9.24	4,217.77	
		2019-20	4,195.00	370.00	8.82	3,825.00	
1.2	Bin Qasim Thermal Power Station-II (BQTPS-II)	2015-16	4,119.00	254.00	6.17	3,865.00	
		2016-17	3,921.00	243.00	6.20	3,678.00	
		2017-18	3,750.79	241.75	6.45	3,509.04	
		2018-19	4,065.70	249.75	6.14	3,815.95	
		2019-20	4,278.00	247.00	5.77	4,031.00	
1.3	Korangi Town Gas Turbine Power Station-II (KTGTPS-II)	2015-16	500.00	14.00	2.80	486.00	
		2016-17	389.00	14.00	3.60	375.00	
		2017-18	323.11	13.21	4.09	309.90	
		2018-19	390.33	14.71	3.77	375.62	
		2019-20	313.00	13.00	4.15	300.00	
1.4	Site Gas Turbine Power Station-II (SGTPS-II)	2015-16	382.00	12.00	3.14	370.00	
		2016-17	384.00	13.00	3.39	371.00	
		2017-18	498.14	16.28	3.27	481.86	
		2018-19	368.02	12.78	3.47	355.24	
		2019-20	414.00	17.00	4.11	397.00	
1.5	Korangi Combined Cycle Power Plant	2015-16	1,364.00	108.00	7.92	1,256.00	
		2016-17	1,124.00	91.00	8.10	1,033.00	
		2017-18	1,001.01	78.93	7.88	922.08	
		2018-19	1,256.68	92.34	7.35	1,164.34	
		2019-20	1,158.00	81.00	6.99	1,077.00	
1.6	Total Units Generated from KE's Own Power Plants	2015-16	10,323.00	760.00	7.36	9,563.00	
		2016-17	10,147.00	773.00	7.62	9,374.00	
		2017-18	10,337.75	780.76	7.55	9,556.99	
		2018-19	10,727.67	798.76	7.45	9,928.91	
		2019-20	10,358.00	728.00	7.03	9,630.00	
2	Units Purchased by KE (GWh)						
		2015-16	2016-17	2017-18	2018-19	2019-20	
2.1	KANUPP	362.00	410.00	330.86	129.99	193.00	
2.2	Gul Ahmed	688.00	788.00	712.71	675.54	496.00	
2.3	Tapal Energy	733.00	743.00	752.38	645.02	627.00	
2.4	NTDC (Mixed Generation)	5,059.00	5,077.00	5,128.20	4,936.71	5,003.00	
2.6	Anoud Power	69.00	55.00	43.73	51.58	60.00	
2.7	International Steel Limited	60.00	57.00	56.00	46.00	51.00	
2.8	International Industries Limited	10.00	13.00	12.00	12.65	11.00	
2.9	FFBL Power	0.00	62.00	438.49	413.51	413.00	
2.10	SNPCL-I	0.00	0.00	179.59	410.25	371.86	
2.11	SNPCL-II	0.00	0.00	180.13	400.91	367.82	
2.12	Oursun Pakistan	0.00	0.00	0.00	57.00	88.00	
2.13	NTDC (150 MW Wind)	0.00	0.00	0.00	20.00	423.00	
2.14	Gharo Solar	0.00	0.00	0.00	0.00	65.00	
2.15	Total	6,981.00	7,205.00	7,834.09	7,799.16	8,169.68	
3	Total Units Purchased by KE + Own Gen. (GWh)		17,304.00	17,352.00	18,171.84	18,526.83	18,527.68
4	Units Available for Distribution (GWh)		16,544.00	16,579.00	17,391.08	17,728.07	17,799.68
5	Units Sold (GWh)		12,864.00	12,981.00	13,860.32	14,318.11	14,276.00
6	T&D Losses (excluding Auxiliary Consumption)	GWh	3,680.00	3,598.00	3,530.76	3,409.96	3,523.68
		%	22.24	21.70	20.30	19.23	19.73

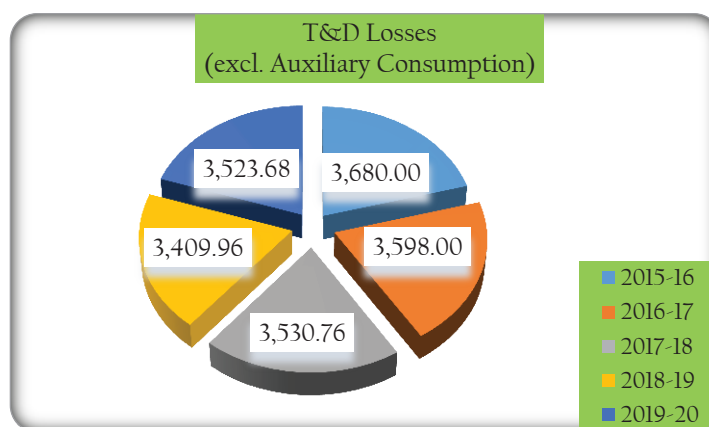
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		2015-16	2016-17	2017-18	2018-19	2019-20
<b>7</b>	<b>Average Fuel Price</b>					
7.1	Gas (Rs./MMBtu)	580.34*	511.00*	400.00*	559.00*	824.00*
7.2	RLNG (Rs./MMBtu)	--	--	1,401.30	1,605.70	1,561.00
7.3	Furnace Oil (Rs./M. Ton.)	27,550.00	35,067.00	45,591.00	69,641.62	62,130.00
<b>8</b>	<b>Cost of Fuel in KE Own System</b>					
8.1	Cost of Fuel (Rs. in Million)	57,266.00	61,466.00	71,870.00	120,614.57	116,186.00
8.2	Cost of Fuel (Paisa/kWh)**	599.00	656.00	752.00	1,214.88	1,207.00

\* Excluding GIDC which is under litigation.

\*\* Based on per unit sent out.

Source: KE



**TABLE 24**  
**Fuel Consumption and Cost of Generation Data (K-Electric and IPPs)**

Year	Gen. on Gas (GWh)	Gas Consumption		Residual Furnace Oil		Gen. on RLNG (GWh)	RLNG Consumption		Overall Gen. Cost (Rs./kWh)**
		Total MMCF	CFT/kWh (Average)	Gen. on RFO (GWh)	Quantity of RFO used (000 M. Tons)		Total MMCF	CFT/kWh (Average)	
Bin Qasim TPS-I									
2015-16	1,630.00	16,353.00	10.03	2,328.00	623.00				7.51
2016-17	880.50	8,867.00	10.07	3,448.50	913.00				9.43
2017-18*	783.18	7,710.67	9.85	3,894.21	1,015.57	87.32	847.74	9.71	11.72
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	834.00	8,552.00	10.25	2,795.00	n.p.	566.00	5,821.00	10.28	16.03
(Gas+RLNG based Power Plant)									
Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Gen. on RLNG (GWh)	RLNG Consumption		Overall Generation Cost (Rs./kWh)**	
			Total MMCF	CFT/kWh (Average)		Total MMCF	CFT/kWh (Average)		
Bin Qasim TPS-II	2015-16	4,119.00		31,577.00	7.67				5.00
	2016-17	3,921.00		30,153.00	7.69				4.38
	2017-18*	3,523.55		25,928.49	7.36	227.24	1,690.91	7.44	3.85
	2018-19*	2,510.24		19,118.21	7.62	1,555.47	11,868.60	7.63	8.17
	2019-20	2,533.50		19,729.00	7.79	1,744.50	13,554.00	7.77	9.51
Korangi Town GTPS-II	2015-16	500.00		4,769.00	9.54				5.54
	2016-17	389.00		3,631.00	9.33				5.01
	2017-18*	286.66		2,699.01	9.42	36.45	336.99	9.25	4.91
	2018-19*	259.12		2,418.98	9.34	131.21	1,222.94	9.32	8.63
	2019-20	205.00		1,900.00	9.27	108.00	1,006.00	9.31	9.75
Site GTPS-II	2015-16	382.00		3,659.00	9.58				5.73
	2016-17	384.00		3,517.00	9.16				4.97
	2017-18*	456.75		3,953.32	8.66	41.39	353.68	8.55	4.48
	2018-19*	253.70		2,174.20	8.57	114.32	980.14	8.57	7.86
	2019-20	265.00		2,283.00	8.62	149.00	1,292.00	8.67	9.91
Korangi CCPP	2015-16	1,364.00		10,525.00	7.72				4.94
	2016-17	1,124.00		8,848.00	7.87				4.55
	2017-18*	897.07		6,562.04	7.31	103.94	748.04	7.20	4.22
	2018-19*	823.28		6,325.76	7.68	433.40	3,334.39	7.69	7.92
	2019-20	740.00		5,593.00	7.56	418.00	3,161.00	7.56	8.99

\* Firm quantity of 60 MMCFD RLNG is being supplied to KE on co-mingled basis by SGC along with supply of indigenous Natural Gas on as and when available basis with effect from April, 2018.

\*\* Based on Units Sent Out

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(Residual Furnace Oil based Power Plant)					
Power Station	Year	Gen. on RFO (GWh)	Quantity of RFO used (000 M. Tons)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Gul Ahmed	2015-16	688.00	n.p.	n.p.	9.52
	2016-17	788.00	186.26	7.86	10.38
	2017-18	712.71	170.46	9.88	12.70
	2018-19	675.54	153.18	14.69	18.18
	2019-20	496.00	106.87	12.94	15.97
Tapal Energy	2015-16	733.00	n.p.	n.p.	9.62
	2016-17	743.00	164.66	7.57	8.91
	2017-18	752.38	166.70	9.46	10.76
	2018-19	645.02	142.91	14.45	15.91
	2019-20	627.00	135.85	12.78	13.84

(Gas based Power Plant)					
Power Station	Year	Gen. on Gas (GWh)	Quantity of Gas used (MMBTU)	Average Fuel Cost (Rs./kWh)	Overall Generation Cost (Rs./kWh)
Sindh Nooriabad-I	2017-18	179.59	1412024	3.91	4.61
	2018-19	410.25	3274096	5.25	6.04
	2019-20	371.86	2999996	7.22	8.16
Sindh Nooriabad-II	2017-18	180.13	1426212	3.91	4.61
	2018-19	400.91	3137925	5.25	6.04
	2019-20	367.82	2978275	7.22	8.16

Source: KE/IPPs

**TABLE 25**  
Auxiliary Consumption and other Factors (K-Electric and their IPPs)

Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)*	Utilization Factor (%)*
		(GWh)	(%)				
Bin Qasim TPS-I	2015-16	372.00	9.40	985	n.p.	n.p.	78.20
	2016-17	412.00	9.52	960	51.00	64.00	76.00
	2017-18	430.58	9.04	1,005	54.00	73.00	79.76
	2018-19	429.17	9.24	1,015	52.47	65.11	80.56
	2019-20	370.00	8.82	1,060	50.03	54.09	84.13
Bin Qasim TPS-II	2015-16	254.00	6.17	557	n.p.	n.p.	99.50
	2016-17	243.00	6.20	563	82.00	94.00	98.00
	2017-18	241.75	6.45	571	75.00	85.00	99.71
	2018-19	249.75	6.14	555	85.31	95.27	96.91
	2019-20	247.00	5.77	570	88.58	97.13	99.53
Korangi Town GTPS-II	2015-16	14.00	2.80	97	n.p.	n.p.	96.70
	2016-17	14.00	3.60	97	48.00	50.00	91.00
	2017-18	13.21	4.09	97	42.00	40.00	90.47
	2018-19	14.71	3.77	97	58.67	47.27	90.47
	2019-20	13.00	4.15	97	60.08	41.90	90.28
Site GTPS-II	2015-16	12.00	3.14	88	n.p.	n.p.	97.80
	2016-17	13.00	3.39	97	57.00	49.00	91.00
	2017-18	16.28	3.27	97	60.00	59.00	90.47
	2018-19	12.78	3.47	97	72.61	72.96	90.47
	2019-20	17.00	4.11	97	67.11	50.05	90.28
Korangi CCPP	2015-16	108.00	7.92	239	n.p.	n.p.	96.70
	2016-17	91.00	8.10	233	64.00	69.00	94.00
	2017-18	78.93	7.88	230	56.00	54.00	92.95
	2018-19	92.34	7.35	234	70.79	74.24	94.41
	2019-20	81.00	6.99	233	70.10	60.59	94.13
Gul Ahmed Energy	2016-17	22.92	1.99	128	97.06	70.89	88.71
	2017-18	21.10	1.83	128	97.50	64.87	84.94
	2018-19	23.63	3.37	128	95.40	60.62	88.32
	2019-20	17.45	3.41	128	96.38	50.60	52.23

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Power Station	Year	Auxiliary Consumption		Maximum Load (MW)	Load Factor (%)	Capacity Factor (%)*	Utilization Factor (%)*
		(GWh)	(%)				
Tapal Energy	2016-17	12.37	1.64	124	69.84	70.02	66.94
	2017-18	13.07	1.71	124	70.75	70.14	68.46
	2018-19	11.13	1.70	124	60.65	59.62	57.74
	2019-20	9.94	1.56	124	58.69	57.78	56.41
Sindh Nooriabad-I	2017-18	2.88	1.60	51	91.64	88.85	100.00
	2018-19	7.18	1.75	51	91.06	91.24	100.00
	2019-20	6.78	1.82	51	93.34	84.01	98.40
Sindh Nooriabad-II	2017-18	2.89	1.60	51	91.92	91.92	100.00
	2018-19	6.21	1.55	51	89.17	89.34	100.00
	2019-20	6.31	1.72	51	90.17	83.10	99.10

Note: Low Capacity Factors due to gas supply/pressure issues at Korangi Town GTPS-II, Site GTPS-II and Korangi CCPP.

\* Calculations for Capacity and Utilization Factors differ from PEPCO's calculations.

Source: KE/PPs

**TABLE 26**  
**Heat Rate and Plant Efficiency Data (K-Electric and their IPPs)**

Power Station	Year	Heat Rate (Btu/kWh) - HHV		Plant Efficiency (%)	
		On Gross Basis	On Net Basis	On Gross Basis	On Net Basis
Bin Qasim TPS-I	2016-17	10,675.00	11,799.00	31.96	28.92
	2017-18	10,499.69	11,542.81	32.50	29.56
	2018-19*	9,905.00	10,913.00	34.45	31.27
	2019-20*	9,777.00	10,724.00	34.90	31.82
Bin Qasim TPS-II	2016-17	8,130.00	8,668.00	41.97	39.37
	2017-18	7,792.00	8,328.89	43.79	40.97
	2018-19*	7,149.00	7,617.00	47.73	44.80
	2019-20*	7,077.00	7,511.00	48.22	45.43
Korangi Town GTPS-II	2016-17	9,301.00	9,638.00	36.69	35.40
	2017-18	9,226.00	9,619.10	36.98	35.47
	2018-19*	8,246.00	8,569.00	41.38	39.82
	2019-20*	7,988.00	8,341.00	42.72	40.91
Site GTPS-II	2016-17	9,370.00	9,701.00	36.42	35.17
	2017-18	8,977.00	9,280.52	38.01	36.77
	2018-19*	7,961.00	8,248.00	42.86	41.37
	2019-20*	7,832.00	8,163.00	43.56	41.80
Korangi CCPP	2016-17	8,108.00	8,821.00	42.08	38.68
	2017-18	7,721.00	8,382.19	44.19	40.71
	2018-19*	7,246.00	7,821.00	47.09	43.63
	2019-20*	6,932.00	7,455.00	49.22	45.77
Gul Ahmed Energy	2016-17	9,289.62	9,606.68	36.72	35.51
	2017-18	9,334.93	9,668.78	36.54	35.29
	2018-19	8,966.59	9,280.32	38.05	36.76
	2019-20	8,490.07	8,789.46	40.19	38.82
Tapal Energy	2016-17	8,802.15	8,948.70	38.76	38.13
	2017-18	8,795.87	8,948.67	38.79	38.13
	2018-19	8,796.88	8,948.64	38.79	38.13
	2019-20	8,613.24	8,749.90	39.62	39.00
Sindh Nooriabad-I	2017-18	7,862.68	7,990.77	43.40	42.70
	2018-19	7,980.73	8,122.74	42.75	42.01
	2019-20	7,923.36	8,067.49	43.06	42.29
Sindh Nooriabad-II	2017-18	7,917.82	8,046.83	43.09	42.40
	2018-19	7,827.01	7,950.09	43.59	42.92
	2019-20	7,960.82	8,097.06	42.86	42.14

\* Since most of the IPPs report heat rates on LHV basis, hence KE is also reporting on LHV for like to like comparison.

Source: KE/PPs



**TABLE 27**  
**K-Electric (Source-wise Own Generation and Fuel Cost Adjustments) (2019-20)**

Description	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
Fuel Cost - Gas (Rs./MMBTU)	824.00	824.00	824.00	824.00	824.00	824.00	824.00	824.00	824.00	824.00	824.00	824.00
Fuel Cost - FO (Rs./M.ton)	73,128.42	76,207.41	67,766.11	66,518.77	57,890.51	57,776.88	57,877.33	59,703.14	56,988.00	52,019.48	38,848.37	47,203.39
Fuel Cost - FO (Rs./MMBTU)	1,812.31	1,888.61	1,679.42	1,648.50	1,434.67	1,431.86	1,434.35	1,479.60	1,412.31	1,289.17	962.76	1,169.82
Fuel Cost - RLNG (Rs./MMBTU)	1,815.60	1,748.35	1,574.56	1,676.09	1,705.42	1,682.39	1,623.53	1,733.10	1,810.60	1,579.30	1,248.71	1,040.08
<b>Bin Qasim Thermal Power Station - I</b>												
Units Sent Out (Mln kWh)	552.94	452.01	512.36	471.99	200.95	20.88	159.71	159.99	123.91	166.91	470.33	569.51
Fuel Cost (Rs./kWh)	17.86	18.15	16.33	15.97	14.20	14.70	15.11	15.59	13.89	11.87	10.05	11.20
Fuel Cost (Mln Rs.)	9,874.24	8,205.40	8,364.39	7,537.13	2,853.17	306.88	2,412.87	2,494.23	1,721.49	1,980.88	4,725.11	6,377.02
<b>Bin Qasim Thermal Power Station - II</b>												
Units Sent Out (GWh)	339.28	343.77	339.46	356.77	353.63	374.82	203.76	288.64	372.65	346.77	356.78	340.08
Fuel Cost (Rs./kWh)	9.53	9.46	9.11	9.69	9.86	10.78	11.04	11.52	10.16	8.85	7.82	7.78
Fuel Cost (Mln Rs.)	3,232.95	3,251.98	3,091.62	3,458.65	3,487.83	4,040.68	2,249.18	3,325.88	3,784.38	3,068.75	2,789.76	2,646.72
<b>Korangi Town Gas Turbine Power Station - II</b>												
Units Sent Out (GWh)	45.35	27.77	35.75	20.79	9.26	2.21	0.93	0.00	14.74	44.98	54.57	48.86
Fuel Cost (Rs./kWh)	9.94	9.65	9.51	10.26	10.17	10.76	12.57	0.00	10.03	9.22	8.15	8.12
Fuel Cost (Mln Rs.)	450.64	267.85	339.91	213.3	94.16	23.77	11.69	0.00	147.78	414.61	444.74	396.68
<b>Site Gas Turbine Power Station - II</b>												
Units Sent Out (GWh)	51.19	49.52	46.83	39.42	14.93	5.69	9.29	8.71	39.57	50.26	53.11	35.56
Fuel Cost (Rs./kWh)	9.96	9.85	9.53	10.16	10.21	10.79	12.57	11.58	10.33	9.23	8.15	8.13
Fuel Cost (Mln Rs.)	509.72	487.92	446.07	400.67	152.39	61.37	116.75	100.89	408.58	464.01	432.86	289.24
<b>Korangi Combined Cycle Power Plant</b>												
Units Sent Out (GWh)	140.49	130.25	112.41	107.96	82.29	38.12	0.00	5.78	87.28	115.88	125.87	131.09
Fuel Cost (Rs./kWh)	9.69	9.59	9.26	9.86	9.98	10.57	0.00	10.61	10.16	8.97	7.92	7.90
Fuel Cost (Mln Rs.)	1,361.22	1,249.50	1,040.94	1,063.95	820.96	402.88	0.00	61.33	886.71	1,039.08	997.18	1,035.86
<b>Total</b>												
Units Sent Out (GWh)	1129.25	1003.32	1046.81	996.93	661.06	441.72	373.69	463.12	638.15	724.80	1060.66	1125.10
Fuel Cost (Rs./kWh)	13.66	13.42	12.69	12.71	11.21	10.95	12.82	12.92	10.89	9.61	8.85	9.55
Fuel Cost (Mln Rs.)	15,428.77	13,462.65	13,282.93	12,673.70	7,408.51	4,835.58	4,790.49	5,982.33	6,948.94	6,967.33	9,389.65	10,745.52

Source: KE

**TABLE 28**  
**K-Electric (Source-wise Power Purchase and Fuel Costs) (2019-20)**

	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
<b>CPPA-G</b>												
Generation												
GWh	386.87	428.81	444.97	461.38	391.13	373.54	392.41	404.99	369.72	425.86	450.99	472.49
%	52.25	62.10	60.07	62.29	64.36	64.48	65.91	67.61	62.47	61.82	58.29	58.78
Fuel Cost												
Mil Rs.	1,990.68	2,206.48	2,368.06	2,245.07	1,825.65	1,988.51	2,088.97	2,155.94	1,968.21	2,267.07	2,400.86	2,515.29
Rs./kWh	5.15	5.15	5.32	4.87	4.67	5.32	5.32	5.32	5.32	5.32	5.32	5.32
<b>Tapal Energy (Pvt.) Limited</b>												
Generation												
GWh	80.56	66.33	76.57	70.35	32.76	23.59	27.09	34.23	25.55	48.99	70.06	70.70
%	10.88	9.61	10.34	9.50	5.39	4.07	4.55	5.71	4.32	7.11	9.05	8.79
Fuel Cost												
Mil Rs.	1,202.36	1,105.42	1,103.53	1,096.06	378.25	263.72	292.49	435.47	332.59	588.50	578.08	651.36
Rs./kWh	14.93	16.66	14.41	15.58	11.55	11.18	10.80	12.72	13.02	12.01	8.25	9.21
<b>Gul Ahmed Energy Limited</b>												
Generation												
GWh	74.37	47.82	78.34	61.56	17.16	12.75	10.58	14.64	10.31	31.28	64.80	72.54
%	10.04	6.93	10.58	8.31	2.82	2.20	1.78	2.44	1.74	4.54	8.38%	9.02
Fuel Cost												
Mil Rs.	1,127.75	813.04	1,235.63	1,048.68	207.91	144.43	118.99	181.64	136.40	413.35	610.61	681.82
Rs./kWh	15.17	17.00	15.77	17.04	12.12	11.33	11.24	12.41	13.23	13.22	9.42	9.40

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		July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
<b>KANUPP</b>													
Generation	GW/h	11.24	0.00	0.00	0.00	18.71	19.54	44.08	17.10	29.73	19.76	7.93	25.03
	%	1.52	0.00	0.00	0.00	3.08	3.37	7.40	2.85	5.02	2.87	1.03%	3.11
Fuel Cost	Mil Rs.	161.09	0.00	0.00	0.00	215.18	213.97	598.51	227.23	330.28	194.92	72.70	245.61
	Rs./kW/h	14.33	0.00	0.00	0.00	11.50	10.95	13.58	13.29	11.11	9.86	9.16	9.81
<b>Anoud Power Generation Limited</b>													
Generation	GW/h	5.20	4.59	3.98	5.41	5.65	4.26	4.21	5.09	5.35	5.58	5.05	5.15
	%	0.70	0.67	0.54	0.73	0.93	0.74	0.71	0.85	0.90	0.81	0.65	0.64
Fuel Cost	Mil Rs.	70.79	66.75	51.12	71.48	61.09	45.04	46.86	60.94	61.41	51.73	40.80	49.78
	Rs./kW/h	13.61	14.53	12.84	13.21	10.82	10.57	11.13	11.98	11.48	9.28	8.08	9.67
<b>International Industries Limited &amp; International Steel Limited</b>													
Generation	GW/h	5.25	4.96	4.35	5.84	7.24	6.37	4.53	5.99	6.21	3.02	4.21	3.92
	%	0.71	0.72	0.59	0.79	1.19	1.10	0.76	1.00	1.05	0.44	0.54	0.49
Fuel Cost	Mil Rs.	52.57	49.64	43.51	58.46	72.43	63.81	45.32	60.00	62.15	30.19	42.15	39.20
	Rs./kW/h	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.01	10.01
<b>Sindh Norelbad Power Company Limited (I &amp; II)</b>													
Generation	GW/h	61.09	63.24	68.51	69.60	64.18	55.84	45.03	47.00	62.86	65.79	57.78	61.97
	%	8.25	9.16	9.25	9.40	10.56	9.64	7.56	7.85	10.62	9.55	7.47	7.71
Fuel Cost	Mil Rs.	448.06	463.81	502.46	510.42	470.68	409.51	330.14	345.55	463.29	484.87	425.89	456.74
	Rs./kW/h	7.33	7.33	7.33	7.33	7.33	7.33	7.33	7.35	7.37	7.37	7.37	7.37
<b>FFBL Power Company Limited</b>													
Generation	GW/h	39.08	32.09	32.84	39.96	33.47	34.73	16.77	30.02	39.06	39.32	37.86	37.72
	%	5.28	4.65	4.43	5.39	5.51	6.00	2.82	5.01	6.60	5.71	4.89	4.69
Fuel Cost	Mil Rs.	317.89	210.80	215.75	262.52	242.25	251.39	121.37	217.30	295.35	297.30	286.28	285.22
	Rs./kW/h	8.13	6.57	6.57	6.57	7.24	7.24	7.24	7.24	7.56	7.56	7.56	7.56
<b>Oursun Pakistan Limited</b>													
Generation	GW/h	6.99	4.09	7.00	7.48	6.58	6.68	7.31	7.81	8.61	8.82	8.90	7.96
	%	0.94	0.59	0.94	1.01	1.08	1.15	1.23	1.30	1.46	1.28	1.15	0.99
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./kW/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>CPPA-G (150 MW)</b>													
Generation	GW/h	69.77	38.60	24.23	19.18	30.89	37.34	35.79	23.47	24.16	29.31	54.43	35.82
	%	9.42	5.59	3.27	2.59%	5.08	6.45	6.01	3.92	4.08	4.25	7.03	4.46
Fuel Cost	Mil Rs.	359.02	198.61	128.93	93.33	144.17	198.79	190.54	124.94	128.63	156.05	289.77	190.67
	Rs./kW/h	5.15	5.15	5.32	4.87	4.67	5.32	5.32	5.32	5.32	5.32	5.32	5.32
<b>Gharo Solar</b>													
Generation	GW/h	0.00	0.00	0.00	0.00	0.00	4.64	7.59	8.63	10.28	11.22	11.72	10.61
	%	0.00	0.00	0.00%	0.00	0.00	0.80	1.27	1.44	1.74	1.63	1.51	1.32
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./kW/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>													
Generation	GW/h	740.42	690.53	740.77	740.75	607.76	579.28	595.39	598.96	591.83	688.93	773.74	803.89
	%	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.	5,730.20	5,114.55	5,648.98	5,386.02	3,617.60	3,579.17	3,833.18	3,809.02	3,778.30	4,483.98	4,747.13	5,115.67
	Rs./kW/h	7.74	7.41	7.63	7.27	5.95	6.18	6.44	6.36	6.38	6.51	6.14	6.36

Source: KE

TABLE 29  
K-Electric (Fuel-wise Own Generation and Fuel Costs) (2019-20)

	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
<b>Gas</b>												
<b>Generation</b>	GW/h	470.93	451.68	429.62	336.83	210.55	107.22	141.45	365.97	486.41	627.74	451.82
	%	43.74	40.20	40.13	47.57	44.71	26.74	28.49	53.75	62.96	55.23%	37.39
<b>Fuel Cost</b>	Mil Rs.	3,379.32	3,079.18	2,936.85	2,251.73	1,369.85	728.42	939.64	2,436.70	3,295.93	4,351.64	3,167.11
	Rs./kWh	6.80	6.82	6.84	6.69	6.51	6.79	6.64	6.66	6.78	6.93	7.01
<b>RFO</b>												
<b>Generation</b>	GW/h	484.72	421.42	354.76	146.90	20.01	82.20	139.27	85.44	72.06	295.36	316.27
	%	39.99	34.94	33.14	20.75	4.25	20.50	28.05	12.55	9.33%	25.99	26.17
<b>Fuel Cost</b>	Mil Rs.	8,607.75	6,964.34	6,932.27	5,743.94	2,057.98	1,148.57	2,023.43	1,161.47	894.09	2,798.38	3,667.61
	Rs./kWh	17.76	18.51	16.45	16.19	14.01	13.68	14.53	13.59	12.41	9.47	11.60
<b>RLNG</b>												
<b>Generation</b>	GW/h	230.22	229.48	250.60	286.19	224.37	211.53	215.77	229.41	214.05	213.56	440.35
	%	18.99	21.32	22.30	26.73	31.69	51.04	43.46	33.70	27.71	18.79	36.44
<b>Fuel Cost</b>	Mil Rs.	3,441.70	3,299.11	3,271.47	3,992.91	3,098.80	2,913.50	3,019.25	3,350.75	2,777.31	2,239.63	3,910.80
	Rs./kWh	14.95	14.38	13.05	13.95	13.81	13.28	13.77	13.99	12.98	10.49	8.88
<b>Total</b>												
<b>Generation</b>	GW/h	1,212.21	1,076.56	1,123.69	1,070.57	708.10	400.95	496.48	680.82	772.52	1,136.65	1,208.44
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
<b>Fuel Cost</b>	Mil Rs.	15,428.77	13,462.64	13,282.93	12,673.70	7,408.52	4,835.58	5,982.32	6,948.93	6,967.32	9,389.65	10,745.52
	Rs./kWh	12.73	12.51	11.82	11.84	10.46	10.27	11.95	10.21	9.02	8.26	8.89

Source: KE

TABLE 30  
K-Electric (Fuel-wise Power Purchase and Fuel Costs) (2019-20)

	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
<b>CPPA-G</b>												
<b>Generation</b>	GW/h	386.87	428.81	444.97	461.38	391.13	373.54	404.99	369.72	425.86	450.99	472.49
	%	52.25	62.10	60.07	62.29	64.36	64.48	65.91	62.47	61.82	58.29	58.77
<b>Fuel Cost</b>	Mil Rs.	1,990.68	2,206.48	2,368.06	2,245.07	1,825.65	1,988.51	2,155.94	1,968.21	2,267.07	2,400.86	2,515.29
	Rs./kWh	5.15	5.15	5.32	4.87	4.67	5.32	5.32	5.32	5.32	5.32	5.32
<b>Coal</b>												
<b>Generation</b>	GW/h	39.08	32.09	32.84	39.96	33.47	34.73	16.77	39.06	39.32	37.86	37.72
	%	5.28	4.65	4.43	5.39	5.51	6.00	2.82%	6.60	5.71	4.89%	4.69
<b>Fuel Cost</b>	Mil Rs.	317.89	210.80	215.75	262.52	242.25	251.39	121.37	295.35	297.30	286.28	285.22
	Rs./kWh	8.13	6.57	6.57	6.57	7.24	7.24	7.24	7.56	7.56	7.56	7.56
<b>RFO</b>												
<b>Generation</b>	GW/h	165.37	123.71	163.23	143.16	62.80	46.97	46.41	47.42	88.86	144.12	152.31
	%	22.33	17.92	22.04	19.33	10.33	8.11	7.79	8.01	12.90	18.63	18.95
<b>Fuel Cost</b>	Mil Rs.	2,453.46	2,034.85	2,433.79	2,274.68	719.67	517.01	503.65	592.54	1,083.78	1,271.64	1,422.15
	Rs./kWh	14.84	16.45	14.91	15.89	11.46	11.01	10.85	12.31	12.50	8.82	9.34
<b>Gas</b>												
<b>Generation</b>	GW/h	61.09	63.24	68.51	69.60	64.18	55.84	45.03	62.86	65.79	57.78	61.97
	%	8.25	9.16	9.25	9.40	10.56	9.64	7.56	10.62	9.55	7.47	7.71
<b>Fuel Cost</b>	Mil Rs.	448.06	463.81	502.46	510.42	470.68	409.51	330.14	463.29	484.87	425.89	456.74
	Rs./kWh	7.33	7.33	7.33	7.33	7.33	7.33	7.33	7.37	7.37	7.37	7.37

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	July	August	Sept.	Oct.	Nov.	Dec.	January	February	March	April	May	June
<b>Nuclear</b>												
Generation	GW/h	11.24	0.00	0.00	18.71	19.54	44.08	17.10	29.73	19.76	7.93	25.03
	%	1.52	0.00	0.00	3.08	3.37	7.40	2.85	5.02	2.87	1.03	3.11
Fuel Cost	Mil Rs.	161.09	0.00	0.00	215.18	213.97	598.51	227.23	330.28	194.92	72.70	245.61
	Rs./kW/h	14.33	0.00	0.00	11.50	10.95	13.58	13.29	11.11	9.86	9.16	9.81
<b>CPPA-G (150 MW)</b>												
Generation	GW/h	69.77	38.60	24.23	19.18	37.34	35.79	23.47	24.16	29.31	54.43	35.82
	%	9.42	5.59	3.27	2.59	6.45	6.01	3.92	4.08	4.25	7.03	4.46
Fuel Cost	Mil Rs.	359.02	198.61	128.93	93.33	198.79	190.54	124.94	128.63	156.05	289.77	190.67
	Rs./kW/h	5.15	5.15	5.32	4.87	5.32	5.32	5.32	5.32	5.32	5.32	5.32
<b>Solar</b>												
Generation	GW/h	6.99	4.09	7.00	7.48	6.58	11.32	16.45	18.89	20.03	20.62	18.57
	%	0.94	0.59	0.94	1.01	1.08	1.95	2.50	3.19	2.91	2.66	2.31
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
	Rs./kW/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>												
Generation	GW/h	740.42	690.54	740.77	740.75	607.76	579.28	595.39	591.84	688.93	773.74	803.90
	%	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.	5,730.20	5,114.55	5,648.98	5,386.01	3,617.60	3,579.18	3,833.18	3,778.30	4,483.99	4,747.13	5,115.67
	Rs./kW/h	7.74	7.41	7.63	7.27	5.95	6.18	6.44	6.38	6.51	6.14	6.36

Source: KE

TABLE 31

## Capacity and Energy Invoiced by Generators

S. No.	Fuel Type	FY 2017-18 (Rs. in Million)	FY 2018-19 (Rs. in Million)	FY 2019-20 (Rs. in Million)
		Capacity Charges <sup>1</sup>	Energy Charges <sup>1</sup>	Capacity Charges <sup>2</sup>
1	WAPDA Hydel	125,596	2,349	160,710
2	Thermal	57,942	219,465	60,470
3	Coal	37,369	73,916	81,675
4	Nuclear	67,351	9,135	70,929
5	IPP Hydel *	10,642	533	14,461
6	RFO	50,332	159,998	58,669
7	RLNG/Gas/HSD	62,679	208,798	109,305
8	Baggasse	3,100	7,908	1,345
9	Wind	793	40,313	5,012
10	Solar	29	12,900	595
11	Import	0	0	0
12	Mixed	1,815	10,885	5,123
<b>Total</b>		<b>417,648</b>	<b>746,200</b>	<b>568,294</b>
				<b>766,553</b>
				<b>856,095</b>
				<b>639,375</b>

Source: CPPA-G

<sup>1</sup> Capacity and Energy Charges invoiced by Generators

<sup>2</sup> Capacity and Energy Charges verified of Generators

\* IPP Hydel includes Neelum Jhelum, Loraib Energy, Star Hydro, Mira Power, Jagran and Malakand.

Note: The amount of EPP of wind and solar power plants have been included in CPP as per Regulatory requirement.

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**TABLE 32**  
**Energy Purchase Price (EPP) and Capacity Purchase Price (CPP) Data**  
**Amount verified on account of EPP and CPP (Rs. in Million)**

Power Plant	FY 2017-18			FY 2018-19			FY 2019-20		
	Energy Deliv. (GWh)	EPP	CPP	Energy Deliv. (GWh)	EPP	CPP	Energy Deliv. (GWh)	EPP	CPP
WAPDA	26,775.27	2,355.17	57,681.82	24,706.23	2,056.37	62,445.31	26,809.11	2,023.70	55,169.24
Tarbela 4th Ext.	--	--	--	2,489.40	378.39	5,513.08	5,485.66	833.82	5,459.31
Neelum Jhelum	--	--	--	3,928.26	--	35,819.46	4,843.09	--	44,161.25
Jagran	--	--	--	31.67	82.03	--	86.25	223.38	--
Pehur	--	--	--	4.80	18.83	--	47.04	176.07	--
Malakand-III	362.11	2,865.02	--	399.25	2,689.83	--	413.53	1,754.27	--
Larab Energy	380.90	148.95	4,712.24	354.38	178.03	5,409.85	384.43	179.10	6,209.82
Marala Hydro	266.57	46.65	4,444.25	527.45	92.30	7,153.05	566.25	99.09	5,062.31
Gulpur Hydropower	--	--	--	--	--	--	183.18	35.56	1,898.62
GENCO-I	1,799.92	21,264.97	4,331.71	917.28	13,876.28	4,241.65	192.46	3,925.20	3,986.20
GENCO-II	8,783.73	42,534.97	16,094.29	9,379.88	50,950.76	17,123.41	5,921.76	41,159.16	22,554.17
GENCO-III	5,529.28	79,916.62	17,471.59	2,714.38	35,892.63	13,866.42	1,776.19	28,159.37	12,880.19
GENCO-IV	3.39	16.36	23.88	--	--	--	--	--	--
Lalpur Power	1,089.06	12,032.96	3,984.30	613.80	9,124.00	4,646.44	186.32	2,894.08	5,782.66
Pak Gen Power	1,237.28	13,600.54	4,006.64	495.56	7,590.60	4,678.33	149.76	2,358.61	5,776.11
Altern Energy	145.12	1,301.61	274.45	22.03	358.02	43.84	3.73	60.42	10.27
Fauji Kabirwala	1,017.26	10,157.99	1,407.34	563.13	7,400.89	1,185.29	346.32	4,300.74	1,557.29
Habibullah Coastal	880.33	3,284.81	1,746.10	716.48	3,718.31	2,076.26	108.37	807.74	461.94
Hub Power	5,196.60	55,963.11	14,823.06	813.26	12,682.21	17,153.53	32.38	565.97	20,973.24
KAPCO	7,436.04	73,863.58	26,450.53	4,955.67	64,612.17	24,122.59	3,476.67	45,730.84	27,808.83
Kohinoor Energy	645.40	6,852.41	1,164.93	387.44	5,592.34	1,356.14	363.86	5,016.01	1,628.64
Roush Power	2,663.01	24,335.16	6,434.05	1,035.85	12,693.73	5,559.70	209.35	2,844.62	6,079.49
Saba Power	465.88	5,100.14	1,572.85	225.41	3,465.50	1,829.46	50.83	758.63	2,244.46
TNB Liberty Power	1,041.56	7,359.31	1,375.56	1,307.61	15,037.86	2,313.51	896.74	12,079.92	2,517.19
Uch Power	4,442.99	16,788.13	8,581.90	3,895.85	17,893.55	9,852.13	4,087.33	21,388.35	7,459.58
Davis Energen.	8.82	78.74	51.78	--	--	--	--	--	--
Attock Gen.	912.45	9,382.54	3,174.41	519.02	7,263.88	2,941.10	252.11	3,023.79	1,755.33
Atlas Power	1,246.45	12,979.30	4,789.80	668.01	9,379.30	5,396.42	234.47	3,430.80	4,178.76
Engro Powergen.	1,668.42	7,704.87	3,911.61	1,384.11	8,601.26	4,448.13	732.03	6,998.15	3,580.78
Saif Power	841.56	8,968.98	4,353.02	828.20	9,678.59	4,871.37	480.99	5,681.55	4,727.14
Orient Power	841.35	8,710.26	3,627.13	877.58	10,073.47	4,257.93	338.00	4,485.75	4,465.20
Nishat Power	1,171.19	12,076.17	4,374.54	775.99	9,670.45	4,965.24	222.54	3,461.52	4,540.12
Nishat Chunian	1,099.67	11,444.57	4,637.47	599.74	8,869.10	5,229.58	310.32	4,920.57	5,202.37
Sapphire Electric	814.96	8,619.89	4,059.93	808.51	9,347.40	5,043.12	286.89	3,941.33	5,240.47
Halmore Power	870.99	9,396.29	4,596.08	612.91	7,116.98	4,833.91	347.69	4,375.31	5,756.04
Narowal Energy	1,199.68	12,465.16	5,120.15	636.13	9,091.54	5,823.43	338.04	5,135.34	6,801.46
Liberty Power Tech.	392.96	5,764.66	4,613.50	676.18	9,529.90	4,831.53	1,275.70	13,759.02	6,060.39
Foundation Power	1,392.39	6,083.91	3,522.19	1,328.95	7,907.81	4,210.22	769.68	6,716.13	5,656.04
Uch-II Power	2,593.04	13,718.34	8,410.13	3,016.91	18,629.75	10,296.42	2,146.98	16,542.76	11,802.25
Sahiwal Imported Coal	6,558.18	41,033.37	28,868.60	8,210.76	63,218.34	48,253.68	5,627.56	43,118.40	56,721.66
Quaid-e-Azam Thermal	983.30	10,974.41	1,839.12	6,149.75	57,579.63	15,896.34	5,192.50	49,541.04	17,007.32
NPPMCL – HBS	1,295.24	13,218.62	1,940.64	7,127.24	68,069.83	13,200.39	7,050.30	66,170.08	14,285.99
NPPMCL – Balloki	--	--	--	4,914.95	46,992.17	9,224.68	5,911.84	55,389.13	15,102.33
Port Qasim Electric	1,511.13	7,758.65	1,551.36	7,551.36	44,511.22	47,488.63	8,967.35	51,561.88	57,843.23



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Power Plant	FY 2017-18			FY 2018-19			FY 2019-20		
	Energy Deliv. (GWh)	Epp	Cpp	Energy Deliv. (GWh)	Epp	Cpp	Energy Deliv. (GWh)	Epp	Cpp
China Power Hub	--	--	--	--	--	--	5,641.50	33,965.36	37,794.93
Thar Energy	--	--	--	--	--	--	3,766.40	40,514.30	25,915.96
Reshma Powergen	49.81	599.90	60.51	15.11	265.96	19.18	2.07	37.96	6.45
CHASNUPP-I	2,433.42	2,519.57	9,993.39	2,141.02	2,020.62	10,196.25	2,044.64	1,912.55	10,939.25
CHASNUPP-II	2,301.74	1,943.15	15,224.88	2,262.73	1,563.17	16,661.51	2,636.12	2,559.68	19,050.07
CHASNUPP-III	2,246.55	2,515.46	21,566.07	2,484.34	3,443.79	24,914.93	2,322.85	2,300.13	29,862.04
CHASNUPP-IV	1,763.09	1,816.16	13,604.66	2,117.59	2,189.02	24,676.71	2,701.28	3,053.53	29,461.62
Tavanir-Iran (Import)	555.78	31.89	--	486.81	31.13	--	513.74	30.54	--
Zorlu Enerji Pakistan	156.05	2,500.15	--	158.98	3,124.00	--	107.61	2,499.77	--
FFC Energy	115.37	2,430.03	34.84	115.75	2,702.80	55.25	118.40	3,481.67	80.69
Three Gorges First	127.66	2,948.59	--	129.21	2,654.73	--	135.62	3,163.78	--
Foundation Wind-I	144.00	2,427.00	--	145.00	3,138.00	--	121.00	3,048.00	1.00
Foundation Wind-II	141.89	2,398.16	--	143.41	2,758.29	--	119.80	3,206.27	--
Sapphire Wind	131.23	2,409.04	--	138.62	3,085.83	--	115.54	3,106.92	--
Yunus Energy	127.40	2,590.75	49.91	128.69	2,863.99	87.25	89.83	3,321.62	65.95
Metro Power	140.12	2,061.83	3.63	138.46	2,654.48	29.52	153.06	3,229.75	46.21
Gul Ahmed Wind	129.71	2,438.28	--	130.66	2,938.05	--	111.88	3,018.89	--
Master Wind	127.01	2,530.39	--	135.82	2,881.43	--	96.90	3,631.79	--
Tenaga Generasi	105.08	1,954.61	--	115.67	2,610.31	--	131.29	3,504.11	--
HydroChina Dawood	110.09	2,036.78	--	119.65	2,702.24	--	111.04	2,998.93	--
Sachal Energy	134.44	2,421.47	--	136.28	3,245.90	--	116.60	3,160.55	--
UEP Wind	273.51	4,880.00	--	249.21	5,609.65	--	222.15	5,999.98	--
Artistic Wind	77.82	1,217.63	--	198.55	3,086.96	--	154.05	2,740.02	--
Act Wind	90.15	1,496.80	--	91.35	1,875.22	--	74.74	2,003.33	--
Hawa Energy	61.75	789.88	--	170.10	3,007.71	--	115.97	2,489.95	--
Jhimpir Wind	65.16	823.95	--	169.73	3,061.77	--	99.17	2,202.24	--
Three Gorges Second	16.49	125.50	--	137.96	1,633.86	--	135.48	3,261.28	--
Three Gorges Third	27.44	248.20	--	140.99	1,669.79	--	138.19	3,349.93	--
Tricon Bostan-A	--	--	--	133.95	2,467.95	23.81	124.95	3,268.26	71.44
Tricon Bostan-B	--	--	--	106.93	2,000.55	24.69	117.64	3,262.77	74.07
Tricon Bostan-C	--	--	--	109.52	2,050.28	24.09	117.47	3,137.95	72.27
Zephyr Wind	--	--	--	57.48	722.57	--	179.82	3,719.65	--
Quaid-e-Azam Solar	162.20	3,061.84	--	164.47	3,623.15	--	164.97	4,278.99	--
Appolo Solar	167.31	2,719.60	--	166.83	3,619.26	--	148.53	3,806.20	--
Best Green Energy	167.68	2,864.45	--	165.87	3,747.02	--	162.97	4,367.55	--
Crest Solar	233.34	3,883.96	--	181.50	4,110.32	--	151.38	4,155.61	--
AJ Power	10.27	161.84	--	18.66	352.62	--	18.03	356.60	--
Harappa Solar	20.66	332.09	--	31.75	564.26	--	27.45	554.77	--
Jamal Din Wali-II	180.96	1,746.95	--	187.80	1,731.48	--	130.50	1,472.25	--
Jamal Din Wali-III	196.59	2,087.90	--	181.18	1,726.18	--	100.32	1,247.45	--
RYK Mills	155.60	1,490.35	--	141.31	1,148.84	--	73.67	1,005.71	--
Chiniot Power	346.02	4,154.33	--	194.67	1,639.33	--	166.24	1,106.20	--
The Thal Industries	55.99	638.58	--	65.84	795.66	--	36.79	495.16	--
Almoiz Industries	--	--	--	48.92	636.45	--	15.10	201.24	--
Chanar Energy	--	--	--	8.47	108.16	--	22.34	304.92	--

Source: CPPA-G

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**TABLE 33**  
Merit Order for Power Generation Plants (CPPA-G System)  
(Based on the revised fuel prices effective from 22-06-2020)

Order in Merit	Plant Groups	Fuel Type	As on 20 <sup>th</sup> June, 2020		
			Fuel Cost (Rs./kWh)	O&M Cost (Rs./kWh)	Specific Cost (Rs./kWh)
1	Uch (upto 152.375 GWh)	Gas	0.76960	0.38231	2.12521
2	Liberty (upto 61.904 GWh)	Gas	1.85117	0.53053	2.38170
3	Engro Power Thar	Coal	2.14090	1.07840	3.21930
4	Uch (+ 152.375 GWh)	Gas	3.40788	0.38231	4.76349
5	NPPMC - HBS (CC)	RLNG	5.64571	0.19520	5.84091
6	NPPMC - Baloki (CC)	RLNG	5.69007	0.21780	5.90787
7	QATPL - Bhikki (CC)	RLNG	5.70020	0.54670	6.24690
8	Port Qasim	Coal	6.11260	0.19280	6.30540
9	China Power Hub Gen Co.	Coal	5.93380	0.50220	6.43600
10	Guddu 747 (CCP)	Gas	6.40990	0.54910	6.95900
11	Uch-II	Gas	6.86717	0.35400	7.22117
12	Orient Power	RLNG	6.98099	0.36750	7.34849
13	Halmore Power	RLNG	6.96717	0.62810	7.59527
14	Sapphire Electric	RLNG	6.98099	0.61840	7.59939
15	Saif Power	RLNG	6.98635	0.62530	7.61165
16	Nandipur (CC)	RLNG	7.07920	0.62070	7.69990
17	KAPCO B-I (CC)	RLNG	7.29261	0.42471	7.71732
18	KAPCO B-I (CC)	Gas	7.34081	0.42471	7.76552
19	Sahiwal Power	Coal	7.69170	0.17980	7.87150
20	Guddu B-I (CCP) (Unit 11-13)	Gas	7.88440	0.06890	7.95330
21	Foundation Power	Gas	7.40125	0.61050	8.01175
22	Rousch Power	RLNG	7.69017	0.44827	8.13844
23	GTPS Faisalabad B-IV (Unit 5-9)	RLNG	8.32130	0.14900	8.47030
24	Engro Power Gen.	Gas	7.93447	0.53930	8.47377
25	KAPCO B-II (CC)	RLNG	7.99877	0.49679	8.49556
26	GTPS Faisalabad B-IV (CC) (Unit 5-9)	Gas	8.37640	0.14900	8.52540
27	KAPCO B-II (CC)	Gas	8.05164	0.49679	8.54843
28	Guddu B-II (CCP) (Unit 5-10)	Gas	8.76020	0.06890	8.82910
29	Engro Power Gen.	Mix <sup>3</sup>	8.63660	0.54490	9.18150
30	FKPCL	RLNG	7.99185	1.20371	9.19556
31	KAPCO B-III (CC)	RLNG	8.27272	0.95758	9.23030
32	KAPCO B-III (CC)	Gas	8.32741	0.95758	9.28499
33	HCPC	Gas	6.71361	0.81270	9.35701
34	Altern Energy (Phase-II)	RLNG	8.26584	1.09765	9.36349
35	Jamshoro B-II (Unit 4)	RLNG	9.66000	0.09250	9.75250
36	Liberty (+ 61.904 GWh)	Gas	9.25585	0.53053	9.78638
37	Jamshoro B-II (Unit 3)	RLNG	9.86490	0.09250	9.95740
38	Attock Gen.	RFO	8.63660	1.50140	10.13800
39	Jamshoro B-II (Unit 2)	RLNG	10.12980	0.09250	10.22230
40	Muzaffargarh B-II (Unit 4)	RLNG	10.14220	0.14900	10.29120
41	Muzaffargarh B-I (Unit 3)	RLNG	10.15660	0.14900	10.30560
42	Davis Energen	RLNG	9.54920	0.82324	10.37244
43	Muzaffargarh B-I (Unit 1)	RLNG	10.37300	0.14900	10.52200
44	Guddu B-III (Unit 3-4)	Gas	10.51200	0.06890	10.58090
45	Muzaffargarh B-I (Unit 2)	RLNG	10.50970	0.14900	10.65870
46	Muzaffargarh B-II (Unit 4)	Gas	10.51640	0.14900	10.66540
47	Muzaffargarh B-I (Unit 3)	Gas	10.53220	0.14900	10.68120
48	Jamshoro B-II (Unit 4)	Gas	10.72990	0.09250	10.82240
49	Muzaffargarh B-I (Unit 1)	Gas	10.76350	0.14900	10.91250
50	Muzaffargarh B-III (Unit 5)	RLNG	10.77910	0.14900	10.92810

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Order in Merit	Plant Groups	Fuel Type	As on 20 <sup>th</sup> June, 2020		
			Fuel Cost (Rs./kWh)	O&M Cost (Rs./kWh)	Specific Cost (Rs./kWh)
51	Jamshoro B-II (Unit 3)	Gas	10.96540	0.09250	11.05790
52	Muzaffargarh B-I (Unit 2)	Gas	10.90950	0.14900	11.05850
53	Muzaffargarh B-III (Unit 6)	RLNG	11.06420	0.14900	11.21320
54	Guddu B-IV (Unit 1-2)	Gas	11.26270	0.06890	11.33160
55	Muzaffargarh B-III (Unit 5)	Gas	11.19790	0.14900	11.34690
56	Jamshoro B-II (Unit 2)	Gas	11.26480	0.09250	11.35730
57	KAPCO B-I (S/Cycle)	RLNG	10.93892	0.42471	11.36363
58	KAPCO B-I (S/Cycle)	Gas	11.01122	0.42471	11.43593
59	Muzaffargarh B-III (Unit 6)	Gas	11.50420	0.14900	11.65320
60	Altern (Phase-I)	RLNG	10.62078	1.09765	11.71843
61	Guddu B-I (W/O CCP) (Unit 11-13)	Gas	11.82660	0.06890	11.89550
62	Gulf PowerGen	RFO	9.84620	0.94750	12.00560
63	Liberty Power Tech.	RFO	10.51717	1.62680	12.14397
64	Jamshoro B-II (Unit 4)	Mix <sup>5</sup>	12.05450	0.09250	12.14700
65	Jamshoro B-II (Unit 3)	Mix <sup>5</sup>	12.32950	0.09250	12.42200
66	KAPCO B-II (S/Cycle)	RLNG	11.99816	0.49679	12.49495
67	KAPCO B-II (S/Cycle)	Gas	12.07746	0.49679	12.57425
68	GTPS Faisalabad B-IV (S/cycle))	Gas	12.56460	0.14900	12.71360
69	Jamshoro B-II (Unit 2)	Mix <sup>5</sup>	12.66550	0.09250	12.75800
70	Lal Pir Power	RFO	12.83009	0.27432	13.10441
71	Jamshoro B-II (Unit 4)	Mix <sup>4</sup>	13.03835	0.09250	13.13085
72	KAPCO B-I (CC)	RFO	12.45573	0.73672	13.19245
73	Guddu B-II (W/O CCP) (Unit 5-10)	Gas	13.14030	0.06890	13.20920
74	Guddu B-III (Unit 3-4)	Mix <sup>2</sup>	13.23320	0.06890	13.30210
75	Sapphire Electric	HSD	12.45230	0.89250	13.34480
76	KAPCO B-III (S/Cycle)	RLNG	12.40908	0.95758	13.36666
77	Jamshoro B-II (Unit 3)	Mix <sup>4</sup>	13.31740	0.09250	13.40990
78	KAPCO B-III (S/Cycle)	Gas	12.49112	0.95758	13.44870
79	KEL	RFO	12.60174	0.95767	13.55941
80	Jamshoro B-II (Unit 4)	Mix <sup>2</sup>	13.57330	0.09250	13.66580
81	Jamshoro B-II (Unit 2)	Mix <sup>4</sup>	13.68205	0.09250	13.77455
82	Atlas Power	RFO	12.29540	1.48080	13.77620
83	Jamshoro B-II (Unit 3)	Mix <sup>2</sup>	13.86765	0.09250	13.96015
84	Nishat Chunian	RFO	12.60730	1.47720	14.08450
85	Jamshoro B-II (Unit 2)	Mix <sup>2</sup>	14.24955	0.09250	14.34205
86	Narowal Energy	RFO	13.07770	1.33090	14.40860
87	Pak Gen. Power	RFO	14.32747	0.27432	14.60179
88	KAPCO B-II (CC)	RFO	13.67037	1.03702	14.70739
89	Saba Power	RFO	14.67817	0.2744	14.95257
90	Muzaffargarh B-II (Unit 4)	Mix <sup>4</sup>	15.12235	0.14900	15.271350
91	Muzaffargarh B-I (Unit 3)	Mix <sup>4</sup>	15.14450	0.14900	15.29350
92	Jamshoro B-I (Unit 1)	RFO	15.34610	0.09250	15.43860
93	Muzaffargarh B-II (Unit 4)	Mix <sup>2</sup>	15.30945	0.14900	15.45845
94	Muzaffargarh B-I (Unit 3)	Mix <sup>2</sup>	15.33230	0.14900	15.48130
95	Muzaffargarh B-I (Unit 1)	Mix <sup>4</sup>	15.47390	0.14900	15.62290
96	Muzaffargarh B-I (Unit 1)	Mix <sup>2</sup>	15.66915	0.14900	15.81815
97	Muzaffargarh B-I (Unit 2)	Mix <sup>4</sup>	15.68160	0.14900	15.83060
98	Guddu B-III (CCP) (Unit 3-4)	RFO	15.95440	0.06890	16.02330
99	Muzaffargarh B-I (Unit 2)	Mix <sup>2</sup>	15.88150	0.14900	16.03050
100	Muzaffargarh B-III (Unit 5)	Mix <sup>4</sup>	16.09210	0.14900	16.24110

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Order in Merit	Plant Groups	Fuel Type	As on 20 <sup>th</sup> June, 2020		
			Fuel Cost (Rs./kWh)	O&M Cost (Rs./kWh)	Specific Cost (Rs./kWh)
101	Nishat Power	RFO	14.86150	1.48070	16.34220
102	Muzaffargarh B-III (Unit 5)	Mix <sup>2</sup>	16.30150	0.14900	16.45050
103	Jamshoro B-II (Unit 4)	RFO	16.41670	0.09250	16.50920
104	Muzaffargarh B-III (Unit 6)	Mix <sup>4</sup>	16.52740	0.14900	16.67640
105	Jamshoro B-II (Unit 3)	RFO	16.76990	0.09250	16.86240
106	Muzaffargarh B-III (Unit 6)	Mix <sup>2</sup>	16.74740	0.14900	16.89640
107	Jamshoro B-II (Unit 2)	RFO	17.23430	0.09250	17.32680
108	HUBCO	RFO	17.14180	0.24180	17.38360
109	KAPCO B-I (S/Cycle)	RFO	18.68360	0.73672	19.42032
110	Halmore Power	HSD	18.97603	0.90670	19.88273
111	Muzaffargarh B-II (Unit 4)	RFO	20.10250	0.14900	20.25150
112	Muzaffargarh B-I (Unit 3)	RFO	20.13240	0.14900	20.28140
113	Saif Power	HSD	19.41400	0.90250	20.31650
114	Muzaffargarh B-I (Unit 1)	RFO	20.57480	0.14900	20.72380
115	Reshma Power	RFO	18.21890	1.15450	20.76920
116	Engro Power Gen.	HSD	20.39110	0.55050	20.94160
117	Muzaffargarh B-I (Unit 2)	RFO	20.85350	0.14900	21.00250
118	KAPCO B-I (CC)	HSD	20.64501	0.42707	21.07208
119	NPPMC - HBS (CC)	HSD	20.98115	0.25320	21.23435
120	NPPMC - Balloki (CC)	HSD	21.14197	0.27640	21.41837
121	QATPL - Bhikki (CC)	HSD	20.65729	0.78880	21.44609
122	KAPCO B-II (S/Cycle)	RFO	20.50556	1.03702	21.54258
123	Muzaffargarh B-III (Unit 5)	RFO	21.40510	0.14900	21.55410
124	Muzaffargarh B-III (Unit 6)	RFO	21.99060	0.14900	22.13960
125	KAPCO B-II (CC)	HSD	22.65814	0.57418	23.23232
126	Orient Power	HSD	22.67850	0.60260	23.28110
127	KAPCO B-III (CC)	HSD	23.43335	1.44996	24.88331
128	KAPCO B-I (S/Cycle)	HSD	30.96752	0.42707	31.39459
129	KAPCO B-II (S/Cycle)	HSD	33.98721	0.57418	34.56139
130	KAPCO B-III (S/Cycle)	HSD	35.15003	1.44996	36.59999

<sup>(2)</sup> Mixed [50% RFO & 50% Gas] <sup>(3)</sup> Mixed [50% HSD & 50% Gas] <sup>(4)</sup> Mixed [50% RFO & 50% RLNG] <sup>(5)</sup> Mixed [Gas & RLNG]

Source: National Power Control Centre, Islamabad

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TABLE 34  
Economic Merit Order Ranking of Generation Plants (January to June, 2020)

Name of Plant	Fuel	06 Jan.	21 Jan.	06 Feb.	24 Feb.	04 Mar.	19 Mar.	03 Apr.	21 Apr.	06 May	21 May	08 Jun.	22 Jun.
Uch (upto 152,375 MWh)	Gas	1	1	1	1	1	1	1	1	1	1	1	1
Liberty (upto 61,904 MWh)	Gas	2	2	2	2	2	2	2	2	2	2	2	2
Engro Power Thar	Coal	3	3	3	3	3	3	3	3	3	3	3	3
Uch (above 152,375 MWh)	Gas	4	4	4	4	4	4	4	4	4	4	4	4
Port Qasim Electric	Coal	5	5	5	6	5	6	6	6	5	6	6	6
China Power Hub	Coal	6	6	6	5	6	5	5	5	6	7	7	8
747 MW Guddu (CCP)	Gas	8	8	8	7	7	7	7	7	7	10	10	10
Sahiwal Power	Coal	9	9	9	8	8	12	12	14	15	18	17	26
Uch-II Power	Gas	10	10	10	9	9	8	8	9	8	12	12	11
KAPCO B-I (CC)	Gas	11	11	11	10	10	9	9	10	9	14	14	20
Guddu (CCP) B-I (11-13)	Gas	12	12	12	11	11	10	10	11	10	15	15	21
Foundation Power	Gas	13	13	13	12	12	11	11	13	11	16	16	22
Engro PowerGen	Gas	14	14	14	13	13	13	13	15	12	19	18	28
KAPCO B-II (CC)	Gas	15	15	15	15	15	15	15	17	14	21	20	30
GTPS Faisalabad B-IV (5-9)	Gas	16	16	16	14	14	14	14	16	13	20	19	29
Guddu (CCP) B-II (5-10)	Gas	17	17	17	16	16	16	16	18	17	23	22	31
Habibullah Coastal Power	Gas	18	18	19	18	18	18	19	20	22	29	29	36
KAPCO B-III (CC)	Gas	19	19	18	17	17	17	17	19	21	28	28	35
NPPMCL - HBS (CC)	RLNG	21	21	20	21	21	21	22	28	18	9	9	5
NPPMCL - Ballloki (CC)	RLNG	22	22	22	22	22	22	24	31	19	11	11	7
QATPL - Bhikki (CC)	RLNG	23	23	23	23	23	23	25	32	20	13	13	9
Attock Gen.	RFO	24	33	55	36	36	41	21	12	23	8	8	24
Liberty (above 61,904 MWh)	Gas	25	24	25	20	20	20	20	21	24	31	31	38
Guddu B-III (3-4)	Gas	26	25	27	24	24	24	23	22	26	34	34	46
KAPCO B-III (SC)	Gas	56	55	62	55	55	57	57	52	58	72	72	77
Muzaffargarh B-II (Unit-4)	Gas	27	26	28	25	25	25	26	23	27	36	37	47
Muzaffargarh B-I (Unit-3)	Gas	28	27	29	28	26	26	27	24	28	37	38	48
Jamshoro B-II (Unit-4)	Gas	29	28	31	27	27	27	28	25	29	39	40	50
Muzaffargarh B-I (Unit-1)	Gas	30	29	32	28	28	28	29	27	30	41	42	51
Jamshoro B-II (Unit-3)	Gas	31	30	33	29	29	29	30	29	32	43	43	53
Muzaffargarh B-I (Unit-2)	Gas	32	31	34	30	30	30	31	30	33	44	44	54
Nandipur (CC)	RLNG	33	32	30	34	34	34	38	42	25	17	26	18
Guddu B-IV (1-2)	Gas	34	34	35	31	31	31	32	33	37	45	45	56
Muzaffargarh B-III (Unit-5)	Gas	35	36	38	33	33	33	34	35	39	47	47	58
Jamshoro B-II (Unit-2)	Gas	36	35	37	32	32	32	33	34	38	46	46	57
KAPCO B-I (SC)	Gas	37	37	39	35	35	35	35	36	40	48	48	59
Muzaffargarh B-III (Unit-6)	Gas	38	38	43	37	37	36	36	37	42	50	50	61
Orient Power	RLNG	39	39	40	41	36	40	43	51	31	22	21	12
Guddu (w/o CCP) B-I (11-13)	Gas	40	41	46	38	38	37	37	38	40	52	52	62
Gulf Power	RFO	41	42	48	39	39	38	39	39	44	53	53	63
Sapphire Electric	RLNG	42	43	41	43	43	43	50	54	35	25	24	16
Halmore Power	RLNG	43	44	42	42	42	42	49	53	34	25	23	15
Saif Power	RLNG	44	45	44	44	44	44	51	55	36	24	25	17



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Name of Plant	Fuel	06 Jan.	21 Jan.	06 Feb.	24 Feb.	04 Mar.	19 Mar.	03 Apr.	21 Apr.	06 May	21 May	08 Jun.	22 Jun.
KAPCO B-I	RLNG	46	47	47	56	49	50	55	60	41	27	27	19
KAPCO B-II (SC)	Gas	48	49	52	46	46	46	42	43	48	61	62	68
GTPS F/bad B-IV (5-9) (SC)	Gas	49	50	58	47	47	47	44	45	50	63	64	69
KEL	RFO	51	56	54	62	62	62	48	26	66	42	35	14
Roush	RLNG	53	52	53	54	54	56	51	66	46		30	23
Guddu (w/o CCP) B-II (5-10)	Gas	54	53	60	52	52	53	53	49	56	68	22	74
GTPS Faisalabad B-IV (5-9)	RLNG	60	61	63	64	64	64	68	73	54	33	33	25
KAPCO B-I	RFO	61	47	65	56	56	48	45	44	49	90	61	65
FKPCL	RLNG	62	63	69	67	67	88	65	64	69	35	36	32
Jamshoro B-I (Unit-1)	RFO	63	69	73	74	74	74	71	70	73	86	87	91
KAPCO B-II	RLNG	58	59	59	61	51	61	67	68	52	32	32	27
KAPCO B-III	RLNG	65	59	67	70	70	72	74	77	60	38	39	33
Liberty Power Tech.	RFO	66	40	57	50	50	51	47	47	53	68	66	78
Altern Energy (Ph-II)	RLNG	67	66	70	72	72	73	75	79	64	40	41	34
Atlas Power	RFO	69	58	45	58	58	59	59	58	62	75	75	82
Narowal Energy	RFO	70	68	26	63	63	67	85	63	68	81	82	86
Nishat Chunian	RFO	71	92	24	59	59	55	56	56	59	77	81	85
Nishat Power	RFO	72	93	79	80	80	80	70	69	88	96	96	100
Jamshoro B-II (Unit-4)	RFO	73	77	85	82	82	82	80	80	90	98	98	102
KAPCO B-II (CC)	RFO	76	59	74	73	73	63	62	61	65	107	77	81
Jamshoro B-II (Unit-3)	RFO	77	80	91	84	84	84	81	81	93	102	101	104
Jamshoro B-II (Unit 2)	RFO	80	89	96	90	90	90	84	83	97	105	104	106
Lalpir Power	RFO	83	86	104	51	51	52	52	48	55	67	108	71
Jamshoro B-II (Unit-4)	RLNG	84	79	78	85	85	85	87	89	72	49	49	37
Davis Engeren.	RLNG	86	82	82	87	87	87	88	86	80	54	54	43
Guddu (CCP) B-III (3-4)	RFO	87	74	80	78	78	78	77	75	82	92	92	97
Saba Power	RFO	88	75	36	71	71	71	69	67	71	85	86	88
Pakgen Power	RFO	90	99	50	68	68	69	66	65	70	82	83	87
Jamshoro B-II (Unit-3)	RLNG	91	85	84	89	89	89	90	91	76	51	51	39
Muzaffargarh B-II (Unit-4)	RLNG	92	87	86	91	91	91	91	92	77	56	56	41
Muzaffargarh B-I (Unit-3)	RLNG	93	88	87	92	92	92	92	93	78	57	57	42
Jamshoro B-II (Unit-2)	RLNG	95	94	90	95	95	95	94	95	83	58	58	40
Muzaffargarh B-I (Unit-1)	RLNG	96	95	92	96	96	96	93	94	85	60	60	44
Muzaffargarh B-I (Unit-2)	RLNG	97	96	94	97	97	97	96	99	87	62	63	45
HUBCO	RFO	98	97	98	94	94	93	83	84	98	103	105	107
Muzaffargarh B-III (Unit-5)	RLNG	99	98	97	98	98	98	99	104	92	65	67	49
Muzaffargarh B-III (Unit-6)	RLNG	100	100	99	101	101	102	102	109	95	89	69	52
KAPCO B-I (SC)	RLNG	101	101	100	102	102	103	105	111	96	71	71	55
Altern Energy (Ph-I)	RLNG	103	102	101	103	103	104	107	113	99	73	74	60
KAPCO B-I (CC)	HSD	106	106	107	118	118	120	117	116	119	100	120	120
Orient Power Company	HSD	108	108	110	106	106	107	101	96	107	110	109	109
Reshma Power	RFO	110	109	111	109	109	116	113	112	117	118	117	117
Halmore Power	HSD	111	111	112	107	107	108	103	100	109	111	110	110
Sapphire Electric	HSD	112	112	113	108	108	109	104	101	110	112	111	111
Saif Power	HSD	113	113	115	112	112	111	108	102	112	114	112	112
KAPCO B-II (SC)	RLNG	114	114	109	117	117	118	121	124	105	83	84	66

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Name of Plant	Fuel	06 Jan.	21 Jan.	06 Feb.	24 Feb.	04 Mar.	19 Mar.	03 Apr.	21 Apr.	06 May	21 May	08 Jun.	22 Jun.
Muzaffargarh B-II (Unit-4)	RFO	116	116	117	113	113	112	109	105	113	115	113	114
Muzaffargarh B-I (Unit-3)	RFO	117	117	118	114	114	113	110	106	114	116	114	115
KAPCO B-I (SC)	RFO	118	128	116	111	111	99	95	90	103	126	107	108
Muzaffargarh B-I (Unit-1)	RFO	119	118	120	116	116	115	112	110	116	117	116	116
Engro PowerGen	HSD	120	119	121	119	119	119	115	115	118	119	118	118
Muzaffargarh B-I (Unit-2)	RFO	121	120	122	120	120	121	118	117	120	120	119	119
KAPCO B-II (CC)	HSD	122	121	123	128	128	128	126	125	126	109	126	126
KAPCO B-III (SC)	RLNG	123	122	119	125	125	126	125	126	111	89	90	73
Muzaffargarh B-III (Unit-5)	RFO	124	123	125	122	122	123	120	120	124	124	124	124
QATPL - Bhikki (CC)	HSD	125	124	124	121	121	122	119	119	122	122	123	123
NPPMCL - HBS (CC)	HSD	126	125	126	123	123	124	122	121	121	121	121	121
NPPMCL - Balloki (CC)	HSD	127	126	127	124	124	125	123	122	123	123	122	122
Muzaffargarh B-III (Unit-6)	RFO	128	127	128	126	126	127	124	123	125	125	125	125
KAPCO B-III (CC)	HSD	129	129	130	129	129	129	127	127	127	113	127	127
KAPCO B-II (SC)	RFO	130	130	129	127	117	117	114	108	115	128	115	113
KAPCO B-I (SC)	HSD	131	131	131	130	130	130	128	128	128	127	128	128
KAPCO B-II (SC)	HSD	132	132	132	131	131	131	129	129	129	129	129	129
KAPCO B-III (SC)	HSD	133	133	133	132	132	132	130	130	130	130	130	130

Source: National Power Control Centre, Islamabad

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**TABLE 35**  
**Monthly Utilization Factor of Power Plants (%)**

Power Plant	Fuel	Dep. Cap. (MW)	2019						2020						FY 2019-20 (GWh)		Annual Utiliz. Factor (%)
			July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	Apr.	May	June	Max. Possible Gen.	Actual Gen.	
Uch Power	Gas	551	92.76	91.31	93.52	42.02	52.86	91.05	98.35	98.00	96.50	82.01	88.50	88.17	4826.76	4087.34	84.68
Liberty Power	Gas	212	68.70	65.55	71.38	67.16	41.48	43.31	0.00	2.33	41.06	48.41	62.22	67.08	1857.12	896.73	48.29
Engro Powergen	Coal	660	74.23	73.36	72.60	92.15	81.01	73.93	87.17	84.71	55.86	53.07	87.09	85.03	5781.60	4280.23	74.03
HCPCL	Gas	129	43.47	60.45	29.66	6.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1130.04	108.37	9.59
HBS (CC)	RLNG	1230	79.35	73.76	52.41	122.37	66.29	82.51	85.31	0.00	18.38	76.71	84.14	81.66	10774.80	7050.35	65.43
Balloki (CC)	RLNG	1320	69.31	63.74	74.80	75.10	6.48	28.70	15.05	63.15	18.45	63.69	74.34	71.63	11563.20	5438.52	47.03
Bhikki	RLNG	1180	74.98	68.20	77.44	77.01	4.17	11.15	0.00	0.01	62.14	66.92	78.27	81.12	10336.80	5235.41	50.65
Port Qasim	Coal	1320	79.20	62.51	88.31	92.53	77.72	78.35	87.73	59.30	74.77	67.98	76.70	85.64	11563.20	8969.74	77.57
China Power	Coal	1320	0.00	46.45	66.95	74.11	48.42	42.46	40.03	59.31	70.41	73.32	57.63	43.03	11563.20	5973.30	51.66
747 Guddu CC	Gas	721	49.90	83.95	81.98	97.75	47.97	77.46	81.90	38.86	75.57	58.84	47.85	82.80	6315.96	4315.47	68.33
Uch-II	Gas	381	84.87	82.18	83.39	53.32	26.17	52.43	85.92	63.47	53.97	46.42	59.56	79.95	3337.56	2148.03	64.36
Orient	RLNG	213	63.37	52.06	62.38	6.27	0.00	0.00	17.82	1.53	0.00	0.00	0.52	12.94	1865.88	337.67	18.10
Halmore	RLNG	199	56.52	41.71	65.17	30.09	0.00	0.00	0.00	0.25	0.00	0.00	15.89	29.62	1743.24	347.69	19.95
Sapphire	RLNG	203	59.79	59.69	24.52	73.25	0.00	0.00	0.71	0.24	0.00	0.00	0.26	18.59	1778.28	296.53	16.68
Saif Power	RLNG	204	71.29	63.65	71.60	0.97	0.00	0.00	0.00	0.00	0.00	5.44	46.27	58.92	1787.04	476.16	26.65
Nandipur	RLNG	411	94.08	90.45	96.62	56.08	0.00	0.00	0.00	3.52	32.01	4.25	37.36	76.18	3600.36	1476.31	41.00
KAPCO B-I	RLNG	325	71.71	105.17	3.39	2.41	0.00	0.00	0.00	0.00	0.00	0.00	81.86	48.90	2847.00	751.48	26.40
KAPCO B-II	RLNG	762	75.16	83.38	52.05	4.62	0.00	0.00	0.00	0.00	0.00	0.00	23.86	37.59	6675.12	1551.24	23.24
KAPCO B-III	RLNG	249	50.73	27.79	38.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.43	1.40	2181.24	221.28	10.14
Sahiwal Coal	Coal	1320	74.72	51.76	43.34	87.48	46.97	63.29	83.30	66.24	40.00	24.05	45.05	55.66	11563.20	6167.18	53.33
Foundation	Gas	171	78.72	77.46	77.18	66.03	19.82	30.92	72.77	34.92	45.47	22.14	33.55	63.65	1497.96	777.30	51.89
Roush	RLNG	395	29.90	9.85	20.13	19.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87	3460.20	217.52	6.29
Engro Powergen	Gas	213	70.84	61.94	63.99	38.58	16.11	27.65	57.53	26.78	25.93	17.75	12.43	29.74	1865.88	700.75	37.56
Guddu (CPP)	Gas	530	62.44	26.29	24.12	44.75	13.57	13.80	82.94	21.79	14.19	0.43	9.02	28.88	4642.80	1267.05	27.29
B-II (Units 5-10)	RLNG	151	65.06	70.08	72.89	0.96	0.00	0.00	0.00	0.00	0.00	0.00	26.05	78.30	1322.76	346.31	26.18
FKPCL	Gas	27	7.22	3.66	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	236.52	2.69	1.14
Attock Gen.	RFO	156	40.35	13.43	12.89	11.24	0.00	35.64	53.86	11.61	0.00	9.25	36.44	55.44	1366.56	278.67	20.39
KAPCO B-I	RFO	325	26.89	0.00	0.00	0.00	0.00	32.42	65.63	6.43	0.77	6.31	9.40	42.03	2847.00	454.32	15.96
KAPCO B-II	RFO	762	7.86	0.00	28.66	0.00	0.00	11.83	30.10	0.04	0.00	0.00	0.29	10.39	6675.12	498.37	7.47
Liberty Power	RFO	196	50.56	65.78	59.21	0.00	0.00	23.52	49.62	6.26	0.00	0.00	16.86	46.46	1716.96	458.54	26.71
Nishat Power	RFO	195	47.41	52.02	37.65	1.64	0.00	15.92	11.19	0.00	0.00	0.00	0.00	27.56	1708.20	277.46	16.24
Nishat Chunian	RFO	196	53.84	64.65	41.16	0.05	0.00	17.35	30.69	6.83	0.00	2.10	2.91	23.89	1716.96	351.24	20.46
Nishat Power	RFO	214	33.15	16.55	19.82	0.00	0.00	21.58	45.11	12.34	0.00	0.00	0.00	16.29	1874.64	259.34	13.83
Lal Pir Power	RFO	350	17.24	11.58	17.43	0.00	0.00	2.37	8.23	0.00	0.00	0.00	0.08	15.70	3066.00	186.31	6.08
Kohinoor Energy	RFO	124	71.31	43.35	81.91	4.78	0.00	26.83	48.84	4.99	0.00	2.60	37.09	78.43	1086.24	359.60	33.11
Pak Gen.	RFO	349	18.21	14.46	0.00	0.00	0.00	1.88	13.64	0.00	0.00	0.00	0.00	9.79	3057.24	149.76	4.90
Saba Power	RFO	126	12.10	0.00	0.00	0.00	0.00	1.31	32.82	3.83	0.00	0.00	0.00	4.56	1103.76	50.84	4.61
HUBCO	RFO	1200	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10512.00	32.38	0.31
Narawal Energy	RFO	214	38.21	0.00	46.72	0.00	0.00	17.18	41.99	4.71	0.00	0.00	0.00	25.99	1874.64	346.08	18.46
Reshma Power	RFO	97	1.30	1.36	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	849.72	2.06	0.24

Note: The maximum possible generation has been calculated at 100% plant factor.

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**TABLE 36**  
**Detail of Liquidated Damages against Power Plants**

S. No.	Name of Companies	Amount Verified on account of EPP and CPP (Rs. in Million)		
		FY 2017-18	FY 2018-19	FY 2019-20
1	GENCO-I	213.75	749.18	--
2	GENCO-II	4,043.01	2,199.70	--
3	GENCO-III	1,599.81	2,842.79	--
4	KAPCO	0.54	--	--
5	Hub Power	107.60	1.46	--
6	Rousch Power <sup>1</sup>	857.00	--	--
7	TNB Liberty Power	1.24	1,777.86	549.17
8	HydroChina Dawood <sup>2</sup>	--	--	77.50
9	Appolo Solar Development <sup>2</sup>	--	--	251.17
10	Best Green Energy <sup>2</sup>	--	--	351.33
11	Crest Energy <sup>2</sup>	--	--	351.33
12	Hamza Sugar Mills	--	27.20	--

<sup>1</sup> LD for 2018-19 and 2019-20 will be treated as OFME.

<sup>2</sup> LD charged due to late commissioning.

Source: CPPA-G

**TABLE 37**  
**Reimbursement Claims Lodged by CPPA-G with SNGPL (Rs. in Million)**

S. No.	IPP Name	FY 2018-19	FY 2019-20
1	NPPMCL – Haveli Bahadur Shah	1,224.80	22.55
2	NPPMCL – Balloki	1,403.24	503.81
3	Quaid-e-Azam Thermal Power	1,545.03	--
Total		4,173.07	526.36

Source: CPPA-G

**TABLE 38**  
**Detail of Partial Load Adjustment Charges**

S. No.	Name of Company	Verified Charges on account of Partial Load Adjustment (Rs. in Million)		
		FY 2017-18	FY 2018-19	FY 2019-20
1	GENCO-I	1,418.12	894.87	177.74
2	GENCO-III	1,582.59	431.23	157.35
3	KAPCO	23.00	77.25	139.17
4	Hub Power	747.36	578.02	70.13
5	Attock Gen.	408.71	161.74	69.13
6	Foundation Power	19.63	151.70	552.27
7	Engro Powergen.	-4.83	43.64	275.48
8	Narowal Energy	90.36	100.46	87.50
9	Liberty Power Tech.	100.01	75.96	38.34
10	Uch-II Power	159.56	90.55	281.48
11	Quaid-e-Azam Thermal	378.94	3,681.59	3,182.22
12	NPPMCL – Haveli Bahadur Shah	381.67	3,863.69	3,591.32
13	NPPMCL – Balloki	--	2,812.61	3,864.68

Claimed of PLA of June-2020 needs to be verified from CPPA-G

Source: CPPA-G

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**TABLE 39**  
**Verified Amount on Account of Non-Project Missed Volume (Rs. in Million)**

S. No.	Company Name	FY 2017-18	FY 2018-19	FY 2019-20
1	Zorlu Enerji Pakistan	73.48	13.57	54.98 <sup>1</sup>
2	FFC Energy	58.63	10.53	21.25 <sup>2</sup>
3	Three Gorges First Wind	80.09	13.67	13.75
4	Foundation Wind Energy-I	7.00	4.00	1.00 <sup>2</sup>
5	Foundation Wind Energy-II	98.77	69.57	3.15 <sup>2</sup>
6	Sapphire Wind	91.80	63.98	1,034.58
7	Yunus Energy	167.43	65.55	939.81
8	Metro Power Company	71.18	71.91	7.96 <sup>2</sup>
9	Gul Ahmed Wind	142.57	49.33	934.43 <sup>2</sup>
10	Master Wind Energy	166.38	31.54	1,004.10
11	Tenaga Generasi	209.80	88.85	179.55 <sup>2</sup>
12	HydroChina Dawood	204.73	79.45	7.21 <sup>2</sup>
13	Sachal Energy Development	136.43	76.80	--
14	UEP Wind Power	364.43	111.86	1,845.59 <sup>2</sup>
15	Artistic Wind Power	0.58	77.93	681.68
16	Act Wind	43.35	21.22	540.03 <sup>2</sup>
17	Hawa Energy	0.42	42.89	11.16
18	Jhampir Power	0.56	43.07	9.86
19	Three Gorges Second Wind	0.12	105.58	813.89
20	Three Gorges Third Wind	1.31	104.60	819.38
21	Tricon Bostan Consulting-A	--	93.95	699.51 <sup>2</sup>
22	Tricon Bostan Consulting-B	--	68.29	818.42 <sup>2</sup>
23	Tricon Bostan Consulting-C	--	77.18	706.14 <sup>2</sup>
24	Zephyr Power	--	4.24	9.63 <sup>2</sup>
25	Quaid-e-Azam Solar Park	6.39	3.07	2.12
26	Appolo Solar Development	4.58	4.42	2.71 <sup>2</sup>
27	Best Green Energy	7.05	4.38	1.31
28	Crest Energy	6.24	5.09	2.72
29	AJ Power	--	0.75	1.42
30	Harappa Solar	1.76	2.13	1.54

<sup>1</sup> For FY 2019-20 NPMV taken till Apr-2020, May and Jun invoices are pending due to non-active status of IPP on FBR.

<sup>2</sup> 2019-20 does not include the figures for June, 2020 as the same is under process in CPPA-G.

Source: CPPA-G

**TABLE 40**  
**Year-wise Details of the Circular Debt (Provisional) (Rs. in Million)**

S. No.	Description	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Due for Payments against verified invoices of Power Generation Companies	223,730	288,053	441,412	694,261	994,035
2	Payable to GENCOs (Invoices based)	--	--	16,419	17,464	48,040
3	Payable s to Fuel Suppliers by GENCOs	97,305	90,975	86,067	100,677	105,092
	<b>Total (Payables to IPPs/GENCOs)</b>	<b>321,035</b>	<b>379,028</b>	<b>543,898</b>	<b>812,402</b>	<b>1,147,167</b>
4	Energy Payable Swap by GOP through Loan from Commercial Banks by Power Holding (Pvt.) Limited	367,961	438,961	582,863	805,787	1,003,258
	<b>Grand Total (Circular Debt)</b>	<b>688,995</b>	<b>817,989</b>	<b>1,126,761</b>	<b>1,618,189</b>	<b>2,150,424</b>

Source: CPPA-G



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**TABLE 41**  
**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	Gulpur Hydropower Project	102	317.17	Achieved COD on 10 <sup>th</sup> March, 2020	Plant is under operation after achieving COD.
2	Rialli-II Hydropower Project	7.08	18.00	April, 2021	LOS issued. Financial Closing in progress.
3	Karot Hydel Project	720	1698.26	December, 2021	Plant is under construction.
4	Suki Kinari Hydropower Project	870	1707.00	December, 2022	Plant is under construction.
5	Kathi-II Hydropower Project	8	20.00	April, 2024	LOS issued. Financial Closing in progress.
6	Kohala Hydropower Project	1124	2364.05	June, 2026	
7	Azad Pattan Hydel Project	700	1357.16	June, 2026	
8	Ashkot Hydel Project	300	450.00	December, 2026	The project has been transferred by Govt. of AJ&K to PPIB for further processing. The project is currently under evaluation.
9	Mahl Hydropower Project	640	1472.00	June, 2028	LOI issued. LOS in progress. Financial Study completed and approved by POE. Tariff determined by NEPRA.
10	Turtonas-Uzghor Hydropower Project	58	165.00	December, 2028	LOI issued. Feasibility Study of the project has been approved. Tariff Petition has been filed with NEPRA for determination/approval.
11	Athmuqam Hydropower Project	350	900.00	December, 2028	LOI issued. Feasibility Study completed and approved by POE. Sponsors have initiated Tariff determination process through CPPA-G.
12	Kaigah Hydel Project	548	1260.40	COD will be assessed after issuance of LOI.	Projects will be advertised.
13	Chakothi-Hattian Project	500	1150.00		
14	Rajdhani Hydropower Project	132	303.60		
15	Neckeherdm-Paur HPP	80	184.00		
16	Madian Hydropower Project	157	361.10		
17	Sehra Hydel Project	130	299.00		
B: COAL					
1	Engro Powergen. Thar Coal Power Project	660	995.40	Achieved COD on 10 <sup>th</sup> July, 2019	Plant is under operation after achieving COD.
2	HUBCO Imported Coal Power Project	1320	1912.20	Achieved COD on 17 <sup>th</sup> August, 2019	Plant is under operation after achieving COD.
3	Thal Nova Power Thar Coal Power Project	330	497.70	March, 2021	LOS issued. Financial Closing in progress.
4	Thar Energy Limited (HUBCO Project)	330	497.70	March, 2021	Financial Close acheived. Plant is under construction.
5	Lucky Electric Thar Coal Power Project	660	1080.90	March, 2021	
6	Siddiqsons Energy Thar Coal Power	330	410.19	March, 2022	LOS issued. Financial Closing in progress.
7	Gwadar Imported Coal Power Project	300	435.00	March, 2022	
8	Shanghai Electric Thar Coal Power	1320	1912.20	February, 2023	Issuance of NTP & LOI in progress.
9	Oracle Thar Coal Power Project	1320	1640.76	June, 2023	
10	Grange Imported Coal Power Project	163	331.40	Project is under Litigation.	
C: PIPELINE QUALITY GAS/DUAL FUEL/RLNG					
1	Punjab Thermal Power Project	1263	707.75	March, 2021	Project is in the process of achieving Financial Close. Construction work is also in progress in parallel.
D: TRANSMISSION LINE PROJECT					
1	660 kV HVDC Matiari-Lahore Transmission Line Proejct	4000 MW Load Carrying Capacity	1658.00	March, 2021	Financial Close acheived. Project is under construction.

Source: Private Power and Infrastructure Board, Islamabad

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**TABLE 42**  
**Investment Plan for Power Generation Projects (K-Electric) (2020-21 to 2024-25)**

S. No.	Name of Project	Proposed Location	Capacity Addition/ (Deletion) (MW)	Expected Commissioning Year	Estimated Cost (US\$ Million)*
KE's Own Programme					
1	Addition of BQPS-III 900 MW RLNG Plant (P-I)	Bin Qasim	450	2020-21	658.00**
2	Addition of BQPS-III 900 MW RLNG Plant (P-II)	Bin Qasim	450	2021-22	
Plan to induct IPPs/Additional Supply from National Grid in KE system					
1	Addition of Captive Power Producers	-	11	2020-21	CPPs
2	Additional supply from National Grid - Existing interconnection (for 18 months) <sup>[3]</sup>	-	350/150*** (FY 2021-22)	2020-21	-
3	220 kV 5 <sup>th</sup> Interconnection (Dhabeji) <sup>[3]</sup>	-	450/600*** (FY 2022-23)	2021-22	-
4	KANUPP-II / KANUPP-III Project <sup>[3]</sup>	Karachi West	800	2022-23	-
5	Solar Projects at Uthal, Bela and Vindar	-	100	2022-23	63.90 <sup>[1]</sup>
6	Wind Project	Dhabeji	50	2022-23	62.00 <sup>[2]</sup>
7	Other Solar Projects	-	200	2022-23	127.80 <sup>[1]</sup>
8	Coal IPP	-	350	2024-25	387.00

\* These are estimates and are subject to change. \*\* Including simultaneous investment in the associated transmission projects.

\*\*\* Total supply from existing interconnections will be increased to 1,100 MW for a temporary period of 18 months, which will be reverted to existing power withdrawal subsequent to energization of Dhabeji interconnection.

<sup>[1]</sup> Based on latest NEPRA Determination for P&G Energy dated July 8, 2020.

<sup>[2]</sup> Based on NEPRA Tariff Determination of Metro Wind Power Limited dated November 19, 2018.

<sup>[3]</sup> This is subject to relevant government and regulatory approvals along with finalization of contractual modalities.

Source: KE

**TABLE 43**  
**Status of Renewable Energy Projects**

<b>A: Existing Projects (in-operation and under construction)</b>					
S. No.	Name of Project	Capacity (MW)	COD/ Expected COD	Estimated Cost (US\$ Million)	Latest Status of the Project
<b>Wind Power Projects:</b>					
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	July, 2018	106.42	
21	Tricon Boston Consulting Corporation (Pvt.) Limited (A)	49.60	September, 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	

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S. No.	Name of Project	Capacity (MW)	COD/ Expected COD	Estimated Cost (US\$ Million)	Latest Status of the Project
24	Zephyr Power (Pvt.) Limited	48.30	November, 2018	106.50	Under Construction
25	Master Green Energy Limited	50.00	November, 2020	63.91	
26	Tricom Wind Power (Pvt.) Limited	50.00	February, 2021	63.91	
27	Lakeside Energy (Pvt.) Limited	50.00	December, 2021	63.91	
28	Artistic Wind Power (Pvt.) Limited	50.00	December, 2021	62.95	
29	Liberty Wind Power-1 (Pvt.) Limited	50.00	December, 2021	63.91	
30	Indus Wind Energy Limited	50.00	December, 2021	64.07	
31	Act 2 Wind (Pvt.) Limited	50.00	December, 2021	62.95	
32	Liberty Wind Power-2 (Pvt.) Limited	50.00	December, 2021	63.91	
33	Metro Wind Power Limited	50.00	December, 2021	73.93	
34	NASDA Green Energy (Pvt.) Limited	50.00	December, 2021	63.91	
35	Din Energy Limited	50.00	December, 2021	63.91	
36	Gul Ahmed Electric Limited	50.00	December, 2021	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	
Bagasse/Biomass Co-Generation Projects:					
43	JDW Sugar Mills Limited (Unit-II)	26.35	June, 2014	26.24	In Operation
44	JDW Sugar Mills Limited (Unit-III)	26.35	October, 2014	26.24	
45	RYK Mills Limited	30.00	March, 2015	29.88	
46	Chiniot Power Limited	62.40	November, 2015	62.15	
47	Hamza Sugar Mills Limited	15.00	March, 2017	14.94	
48	Layyah Sugar Mills	41.00	December, 2017	40.84	
49	Almoiz Industries Limited	36.00	February, 2019	35.86	
50	Chanar Energy Limited	22.00	February, 2019	21.91	
51	Etihad Power Generation Limited	74.40	2022	74.10	LOS Stage
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	Shaheen Foundation, PAF	50.00	2022	64.15	Generation Licence Acquired. Tariff in Review.
2	Western Energy (Pvt.) Limited	50.00	2022	63.12	
3	Trans Atlantic Energy (Pvt.) Limited	50.00	2022	62.87	
Solar PV Power Projects:					
4	Access Solar (Pvt.) Limited	11.52	2021	12.29	LOS Stage. Tariff in Review.
5	Buksh Solar (Pvt.) Limited	10.00	2021	10.67	
6	Safe Solar Power (Pvt.) Limited	10.28	2021	10.97	
7	Access Electric (Pvt.) Limited	11.52	2021	12.29	
8	Zorlu Solar Pakistan (Pvt.) Limited	100.00	2022	53.11	Tariff and Generation Licence Acquired.
9	Helios Power (Pvt.) Limited	50.00	2022	30.34	
10	HNDS Energy (Pvt.) Limited	50.00	2022	30.34	
11	Meridian Energy (Pvt.) Limited	50.00	2022	30.34	
12	Zhenfa Pakistan New Energy Company (Pvt.) Limited	100.00	2022	57.39	
13	Siachen Energy Limited	100.00	2022	75.17	Generation Licence Acquired. Tariff in Review.

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S. No.	Name of Project	Capacity (MW)	COD/ Expected COD	Estimated Cost (US\$ Million)	Latest Status of the Project
<b>Bagasse/Biomass Co-Generation Projects:</b>					
14	Shahtaj Sugar Mills Limited	32.00	2022	31.87	LOS Stage
15	Hunza Power (Pvt.) Limited	49.80	2022	49.60	
16	Bahawalpur Energy Limited	31.20	2022	31.08	
17	Indus Energy Limited	31.00	2022	30.88	
18	Ittefaq Power (Pvt.) Limited	31.20	2022	31.08	
19	Kashmir Power (Pvt.) Limited	40.00	2022	39.84	
20	Alliance Sugar Mills Limited	30.00	2022	29.88	
21	RYK Energy Limited	25.00	2022	24.90	
22	Two Star Industries (Pvt.) Limited	48.90	2022	48.70	
23	Mirpur Khas Energy Limited	26.00	2022	25.90	
24	TAY Powergen Company (Pvt.) Limited	30.00	2022	29.88	
25	Hamza Sugar Mill Limited (Unit-II)	30.00	2022	29.88	
26	Faran Power (Pvt.) Limited	26.50	2022	26.39	
27	Sheikhoo Power Limited	30.00	2022	29.88	
28	Mehran Energy Limited	26.50	2022	26.39	
29	Habib Sugar Mills Limited	26.50	2022	26.39	
30	Sadiqabad Power (Pvt.) Limited	45.00	2022	44.82	
31	Gothki Power (Pvt.) Limited	45.00	2022	44.82	
					Tariff and Generation Licence Acquired.

\* Expected COD of Bagasse based Power Projects is subject to the outcomes of the Court decision as the projects are sub-judice and subject to review of the Tariff Determination by NEPRA.

Source: Alternative Energy Development Board, Islamabad

**TABLE 44**  
**Unit Received, Delivered and Transmission Losses in NTDC System (500/220 kV) (GWh)**

	Unit	2015-16	2016-17	2017-18	2018-19	2019-20
Unit Received by NTDC	GWh	101,150.00	106,798.00	120,062.00	122,302.00	125,941.00
Unit Delivered by NTDC	GWh	98,550.00	104,331.00	117,139.00	118,838.00	122,471.00
Unit Losses (Transmission)	GWh	2,600.00	2,467.00	2,923.00	3,464.00	3,470.00
	%	2.57	2.31	2.43	2.83	2.76

Source: NTDC

**TABLE 45**  
**Grid Stations and Transmission Lines with NTDC**

<b>A: Number of Grid Stations in NTDC System</b>						
As on 30 <sup>th</sup> June	500/220 kV		220/132 kV		Total No. of Grid Stations and MVA Capacity	
	No. of Grid Stations	MVA Capacity	No. of Grid Stations	MVA Capacity	Grid Stations	MVA Capacity
2016	14	18,150	36	24,040	50	42,190
2017	14	18,150	38	25,610	52	43,760
2018	16	20,850	42	22,500	58	43,350
2019	16	22,950	45	30,970	61	53,920
2020	16	23,400	45	31,900	61	55,300
<b>B: Length of Transmission Lines in NTDC System (km)</b>						
As on 30 <sup>th</sup> June	500 kV		220 kV		Total Transmission Lines and No. of Circuits	
	No. of Circuits	TL (km)	No. of Circuits	TL (km)	No. of Circuits	Total km
2016	32	5,113	96	9,632	128	14,745
2017	36	5,127	111	10,063	147	15,190
2018	45	5,618	122	10,478	167	16,096
2019	48	6,417	149	11,219	197	17,636
2020	53	7,238	152	11,281	205	18,519

Source: NTDC

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**TABLE 46**  
**Loading Position of Transmission Lines and Power Transformers in NTDC System**

<b>A: Loading Position of Transmission Lines</b>		<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>
Overloaded Transmission Lines/Circuits (Nos.) (>80%)	500 kV	2	2	9	16	12
	220 kV	16	19	43	54	36
Underutilized Transmission Lines/Circuits (Nos.) (<30%)	500 kV	33	34	39	32	40
	220 kV	96	95	120	92	101
<b>B: Loading Position of Power Transformers</b>		<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>
Overloaded Power Transformers (Nos.) (>80%)	500 kV	4	14	22	16	19
	220 kV	45	63	60	57	82
Underutilized Power Transformers (Nos.) (<30%)	500 kV	25	18	17	18	17
	220 kV	63	69	64	68	46

Source: NTDC

**TABLE 47**  
**Grid Stations and Transmission Lines with K-Electric Limited**

		2015-16		2016-17		2017-18		2018-19		2019-20	
A: Number of Grid Stations in KE Transmission System											
		2015-16		2016-17		2017-18		2018-19		2019-20	
		No.	MVA	No.	MVA	No.	MVA	No.	MVA	No.	MVA
KE's Owned Grid Stations	220 kV	7	3000	7	3000	7	3000	9	3500	10	4500
	132 kV	54	5131	54	5196	54	5550	56	6109	57	6373
	66 kV	3	69	3	69	3	69	3	69	3	79
Consumers Owned Grid Stations	220 kV	1	80	1	80	1	80	1	80	1	80
	132 kV	9	452	9	452	9	512	10	538	11	578
	66 kV	0	0	0	0	0	0	0	0	0	0
Total No. of Grid Stations		74	8732	74	8797	74	9211	79	10296	82	11610
B: Length of Transmission Lines in KE System (km)											
Overhead Lines	220 kV	323		323		323		322		323	
	132 kV	611		613		614		640		650	
	66 kV	149		149		149		149		152	
Underground Lines	220 kV	15		15		15		14		42	
	132 kV	151		153		153		158		151	
	66 kV	1		1		1		1		1	

Source: KE

**TABLE 48**  
**Investment details in Transmission System of K-Electric Limited**

<b>A. Amount Injected to Reinforce/Expand 220 kV and 132 kV Transmission System of K-Electric Limited (Million Rs.)</b>						
Description	During FY 2018-19 <sup>[1]</sup>			During FY 2019-20 <sup>[2]</sup>		
	FC	LC	Total	FC	LC	Total
Grid Stations	1,429	2,061	3,490	2,132	2,629	4,761
Transmission	3,070	3,765	6,835	2,639	4,635	7,274
SCADA	976	92	1,068	174	96	270
Reinforcement	2,674	3,277	5,951	1,926	2,208	4,134
<b>Total</b>	<b>8,149</b>	<b>9,195</b>	<b>17,344</b>	<b>6,871</b>	<b>9,568</b>	<b>16,439</b>
<b>B. Investment Plan in Transmission Line (220 kV and 132 kV) of K-Electric Limited (Million US\$)*</b>						
Description	2020-21			2021-22		
	FC	LC	Total	FC	LC	Total
Grid Stations	37	31	68	70	42	112
Transmission	13	14	27	17	15	32
SCADA	2	1	3	4	2	6
Reinforcement	16	14	30	25	25	50
<b>Total</b>	<b>68</b>	<b>60</b>	<b>128</b>	<b>116</b>	<b>84</b>	<b>200</b>

<sup>[1]</sup> As per Financial Statements 2019. <sup>[2]</sup> Provisional and unaudited.

FC: Foreign Currency

LC: Local Currency

\* These are estimates and are subject to change.

Source: KE



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**TABLE 49**  
**Surplus/Deficit in Demand and Supply during NTDC's System Peak Hours**

A: Actual Figures				
FY ending 30 <sup>th</sup> June	Generation Capability (MW)	Demand During NTDC's System Peak Hours (MW)		Surplus/ (Deficit) (MW)
2016	17,261	22,559		-5,298
2017	19,020	25,117		-6,097
2018	23,766	26,741		-2,975
2019	24,565*	25,627*		-1,062
2020	27,780*	26,252*		1,528
B: Projected Figures				
FY ending 30 <sup>th</sup> June	Planned Generation Capability as per NTDC (MW)	NTDC Projected Demand Growth Rate (%)	NTDC's Projected Demand during Peak Hours (MW)	Surplus/ (Deficit) (MW)
2021	30,582	-	29,325	1,257
2022	32,989	5.4	30,921	2,068
2023	35,896	3.3	31,953	3,943
2024	37,918	5.5	33,696	4,222
2025	39,157	5.1	35,422	3,735
2026	42,075	2.2	36,206	5,869
2027	40,433	5.6	38,227	2,206
2028	44,639	5.5	40,324	4,315
2029	45,437	5.4	42,519	2,918
2030	47,127	5.7	44,958	2,169

\* 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 50**  
**Surplus/Deficit in Demand and Supply during K-Electric's System Peak Hours**

A: Actual Figures				
FY ending 30 <sup>th</sup> June	Generation Capability (MW)*	Demand During KE's System Peak Hours (MW)		Surplus/(Deficit) (MW)***
2016	2,860	3,195		(335)
2017	2,920	3,270		(350)
2018	3,008	3,527		(519)
2019	3,196	3,530		(334)
2020	3,202	3,604**		(402)
B: Projected Figures				
FY ending 30 <sup>th</sup> June	Planned Generation Capability as per KE (MW) [2] [3] [4]	KE's Projected Demand Growth Rate (%)	KE's Projected Demand during Peak hours (MW)	Surplus/ (Deficit) (MW)
2021	3,682 [1]	7.00	3,856	(174)
2022	4,086	5.00	4,049	37
2023	4,511	5.00	4,252	259
2024	4,511	5.00	4,464	47
2025	4,830	5.00	4,687	143

\* Based on maximum supply achieved in KE's system (including IPPs+NTDC). \*\* Peak Demand recorded on July 03, 2020.

\*\*\* Deficit based on Peak Demand and Maximum Supply achieved during the year. Delays in required approvals for KE's planned generation additions, including 700 MW coal project, has had a consequential impact on demand-supply gap. However, loss reduction initiatives and COVID-19 situation resulted in increased LS exemption during the year. As a result, units' load-shed reduced from 1,571 GWh in FY 2019 to 1,035 GWh in FY 2020 (34% reduction).

<sup>[1]</sup> This includes supply from KANUPP and WPPs totaling to around 108 MW, which if excluded will result in increase in deficit to around 282 MW.

<sup>[2]</sup> Including own generation / import from all sources.

<sup>[3]</sup> In addition to KE's planned capacity additions, to bridge deficit and given the surplus in the National Grid. KE has been granted principle approval for additional power supply of upto 1,400 MW from the National Grid, for which related interconnection works would be undertaken. Further, based on recent discussions with GOP, additional supply from National Grid of upto 350 MW is proposed to be provided to KE from the existing interconnection points between KE and NTDC, for which discussion with relevant stakeholders are in progress to expedite the completion of necessary rehabilitation works for timely commencement of power withdrawal by KE.

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<sup>[4]</sup> This is subject to NEPRA's timely approval/confirmation of revision in USD indexation based on actual exchange rate variation on the project cost of KE's 900 MW BQPS-III requested through KE's letter dated March 5, 2019 and June 21, 2019; request for which has been further reiterated through KE's mid term tariff review petition dated March 11, 2020. Further, NEPRA's timely approval for necessary cost of interconnection girds have also been requested through KE's mid-term review petition dated March 11, 2020. In case, of further delays in approval/confirmation, the same will have consequential impact on consumers through increased load management.

Source: KE

TABLE 51

Over-loading (above 80% load) of 500 kV and 220 kV Power Transformers installed at 500 kV Grid Stations (2019-20)

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload
Islamabad	Rawat	T-1	500/220	450	1125	960	85.33
		T-2	500/220	450	1125	960	85.33
		T-3	500/220	450	1125	960	85.33
		T-4	500/220	750	1968	1610	81.81
		T-5	220/132	250	1093	960	87.83
		T-6	220/132	250	1093	960	87.83
		T-7	220/132	250	1093	960	87.83
Lahore	Nokhar	T-1	500/220	600	1575	1390	88.25
		T-2	500/220	600	1575	1390	88.25
		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	160	700	680	97.14
	Gatti	T-1	500/220	450	1181	1070	90.60
		T-2	500/220	450	1181	1090	92.29
		T-3	500/220	450	1181	1048	88.74
		T-4	500/220	450	1181	1048	88.74
		T-5	500/220	600	1575	1510	95.87
	Sheikhupura	TB-1	500/220	600	1575	1520	96.51
		TB-2	500/220	600	1575	1520	96.51
		TB-3	500/220	600	1575	1520	96.51
		TB-4	500/220	600	1575	1520	96.51
		T-6	220/132	160	700	600	85.71
		T-7	220/132	160	700	650	92.86
		T-8	220/132	160	700	645	92.14
		T-9	220/132	160	700	645	92.14
	Yousafwala	T-1	500/220	600	1575	1550	98.41
		T-2	500/220	600	1575	1550	98.41
		T-3	220/132	160	700	658	98.41
		T-4	220/132	160	700	658	94.00
		T-5	220/132	160	700	658	94.00
		T-6	220/132	160	700	658	94.00
Multan	Multan	T-1	525/231/22	450	1125	1080	96.00
		T-2	525/231/22	450	1125	1044	92.80
		T-3	220/132	160	700	646	92.29
		T-4	220/132	160	700	646	92.29
		T-5	220/132	160	700	646	92.29
	Muzaffargarh	ATB-1	525/231/23	600	1500	1440	96.00
		ATB-2	525/231/23	600	1500	1480	98.67
Hyderabad	Jamshoro	T-3	220/132	160	700	595	85.00
		T-7	220/132	160	700	595	85.00
	Dadu	T-3	220/132	160	700	650	92.86

Source: NTDC

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**TABLE 52**  
**Over-loading (above 80% load) of 220 kV Power Transformers installed at 220 kV Grid Stations (2019-20)**

Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload
Islamabad	Mardan	T-1	220/132	250	1093	950	86.92
		T-2	220/132	250	1093	950	86.92
		T-3	220/132	250	1093	950	86.92
	Daud Khail	T-1	220/132	160	700	616	88.00
		T-2	220/132	160	700	616	88.00
	Burhan	T-1	220/132	250	1093	800	73.19
		T-2	220/132	250	1093	800	73.19
		T-3	220/132	250	1093	800	73.19
		T-4	220/132	250	1093	800	73.19
	Sang Jani	T-1	220/132	160	700	610	87.14
		T-2	220/132	160	700	610	87.14
		T-3	220/132	160	700	630	90.00
		T-4	220/132	160	700	630	90.00
	University Islamabad	T-1	220/132	250	1093	1130	103.39
		T-2	220/132	250	1093	1080	98.81
Lahore	Nishatabad	T-1	220/132	160	700	565	80.71
		T-2	220/132	160	700	565	80.71
		T-3	220/132	160	700	650	92.86
		T-5	220/132	160	700	565	80.71
	JWR	T-1	220/132	160	700	635	90.71
		T-2	220/132	160	700	637	91.00
		T-3	220/132	160	700	621	88.71
		T-4	220/132	160	700	649	92.71
	S/Road	T-2	220/132	160	700	615	87.86
		T-3	220/132	160	700	640	91.43
	Ludewala	T-1	220/132	160	700	710	101.43
		T-2	220/132	250	1093	1030	94.06
		T-3	220/132	250	1093	1030	94.06
	TT Singh	T-1	220/132	250	1093	950	86.92
		T-2	220/132	250	1093	950	86.92
	Gakkhar	T-1	220/132	160	700	600	85.71
		T-3	220/132	160	700	640	91.43
		T-4	220/132	160	700	670	95.71
	Kala Shah Kaku	T-1	220/132	160	700	640	91.43
		T-2	220/132	160	700	640	91.43
		T-3	220/132	160	700	670	95.71
		T-4	220/132	160	700	670	95.71
	New Kot Lakhpat	T-1	220/132	250	1093	1095	100.18
		T-2	220/132	250	1093	1095	100.18
		T-3	220/132	250	1093	1095	100.18
	Ravi	T-1	220/132	250	1093	960	87.83
		T-2	220/132	250	1093	1060	96.98
		T-3	220/132	250	1093	1060	96.98
	Sarfaraz Nagar	T-1	220/132	160	700	690	98.57
		T-2	220/132	160	700	690	98.57
		T-3	220/132	160	700	690	98.57
		T-6	220/132	160	700	690	98.57
	WAPDA Town	T-1	220/132	160	700	679	97.00
		T-2	220/132	160	700	679	97.00
		T-3	220/132	160	700	679	97.00
	Kassowal	T-1	220/132	160	700	702	100.29
		T-2	220/132	160	700	702	100.29
Hyderabad	Hala Road	T-1	220/132	160	700	630	90.00
		T-2	220/132	160	700	630	90.00
		T-3	220/132	250	1093	890	81.39
	TM Khan	T-1	220/132	160	700	650	92.86
		T-2	220/132	160	700	650	92.86
	Shikarpur	T-2	220/132	250	1093	960	87.27

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Region	Name of Grid Station	Auto and Power T/F	Voltage Level	Capacity (MVA)	Capacity (Ampere)	Load (Ampere)	Overload
Multan	Vehari	T-1	220/132	125/160	700	743	96.57
		T-2	220/132	125/160	700	743	141.71
		T-3	220/132	250	1093	1107	101.28
	Bahawalpur	T-1	220/132	160	700	622	88.86
		T-2	220/132	250	1093	930	85.09
		T-3	220/132	250	1093	930	85.09
	Muzaffar Garh	T-1	220/132	160	700	650	92.86
		T-2	220/132	160	700	650	92.86
	Chistian	T-1	220/132	160	700	650	87.86
		T-2	220/132	160	700	676	96.57
Quetta	Quetta	T-1	220/132	160	700	620	88.57
		T-2	220/132	160	700	610	87.14
		T-3	220/132	250	1095	900	82.19
	Sibbi	T-1	220/132	160	700	562	80.29
		T-2	220/132	160	700	562	80.29

Source: NTDC

**TABLE 53**  
**Outages of NTDC's 500 kV and 220 kV Network**

S. No.	Name of Circuit	June, 2020	Jan.-June, 2020	S. No.	Name of Circuit	June, 2020	Jan.-June, 2020
<b>500 kV Transmission Lines (South Region)</b>							
1	CPHGC – Jamshoro	0	3	3	Shikarpur – Dadu-II	0	1
2	Guddu – Shikarpur-II	2	3				
<b>220 kV Transmission Lines (South Region)</b>							
1	Jamshoro – KDA33-I	0	1	8	Uch – Sibbi-I	0	2
2	Jamshoro – KDA33-II	0	1	9	Uch – DM Jamali	0	1
3	Jamshoro – TM Khan Road-I	0	1	10	DM Jamali – Sibbi	0	1
4	Guddu – Sibbi (Direct Ckt)	0	2	11	Shikarpur – Rohri-I	0	2
5	Guddu – Shikarpur-I	0	2	12	Dadu – Khuzdar-I	0	10
6	Guddu – Shikarpur-II	0	2	13	Dadu – Khuzdar-II	0	4
7	Shikarpur – Uch-I	0	2	14	DG Khan – Loralai-I	1	3
<b>500 kV Transmission Lines (North Region)</b>							
1	Tarbela – Barotha-1	0	1	9	Rawat – Nokhar-I	0	4
2	Barotha – Gatti-2	0	1	10	Rawat – Neelum Jhelum	0	2
3	Gatti – Rousch	1	5	11	Multan – M/Garh-I	0	2
4	Gatti – HB Shah-2	0	1	12	Multan – M/Garh-II	0	2
5	Multan – Yousafwala	0	2	13	M/Garh – Dera Ghazi Khan	1	2
6	Tarbela – Sheikh Muhammadi	0	1	14	M/Garh – Guddu Old	1	2
7	Tarbela – Rawat	0	2	15	DG Khan – Guddu	1	1
8	Barotha – Rawat-I	0	2				
<b>220 kV Transmission Lines (North Region)</b>							
1	Gatti – NBD-1	0	2	35	Yousaf Wala – Okara-I	0	1
2	Gatti – NBD-2	1	2	36	Yousaf Wala – Okara-II	0	1
3	Gatti – JWR-1	0	4	37	NKLP – New Lhr (South)-I	0	1
4	Gatti – JWR-2	0	4	38	NKLP – New Lhr (South)-II	0	2
5	Gatti – L/Wala-1	0	1	39	Ghazi Road – New Lahore	3	3
6	Gatti – L/Wala-2	0	1	40	Tarbela – Mardan-II	0	1
7	Multan – TT Singh-1	1	3	41	Daudkhel – Sheikh Muhammadi-II	0	1
8	SRD – NBD-1	0	1	42	Daudkhel – CHASNUPP-II	0	1
9	SRD – NBD-2	0	3	43	Sheikh Muhammadi – Shahi Bagh	0	2
10	KS Kaku – Bandala-I	1	1	44	Chakdara – Shahi Bagh	0	1
11	KS Kaku – Bandala-II	1	1	45	ISPR – Mansehra-I	0	1
12	Bund Road – Sheikhpura-II	0	1	46	ISPR – Mansehra-II	0	1

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S. No.	Name of Circuit	June, 2020	Jan.-June, 2020	S. No.	Name of Circuit	June, 2020	Jan.-June, 2020
13	Bund Road – KS Kaku-I	0	4	47	Tarbela – Burhan-I	0	1
14	Bund Road – KS Kaku-II	0	2	48	Tarbela – Burhan-II	0	2
15	Bund Road – NKLP-I	2	4	49	Tarbela – Burhan-III	0	1
16	Bund Road – NKLP-II	0	1	50	Burhan – ISPR	0	1
17	Ghakar – Mangla	1	1	51	Rawat – ISPR	0	3
18	New Gakkar – Gakkar	1	2	52	Rawat – Bahria Town	0	1
19	Gujrat – Managla-II	0	1	53	Bahria Town – ISPR	1	3
20	KS Kaku – Sialkot	1	4	54	Rawat – University-I	0	1
21	KS Kaku – Mangla-I	1	3	55	Mangla – Rawat-I	0	2
22	KS Kaku – Mangla-III	0	1	56	Barotha – Nowsehra-II	0	1
23	KS Kaku – Ravi	0	2	57	Mardan – Nowsehra	0	1
24	KS Kaku – Ghazi	1	2	58	Multan – NGPS-I	0	1
25	Shalamar – Ghazi	1	3	59	Multan – NGPS-II	0	2
26	Ravi – Shalamar	1	2	60	Multan – TT Singh (Sidhnai-I)	1	3
27	Ravi – Atlas Power	0	1	61	Multan – TT Singh (Sidhnai-II)	0	1
28	Sheikhupura – Atlas Power	0	2	62	TPS M/Garh (Ph-1) – Multan-IV	1	1
29	NKLP – Lahore (SKP)	0	1	63	TPS M/Garh (Ph-2) – Multan-III	0	1
30	WAPDA Town – Sheikhupura	0	1	64	M/Garh – Multan-II	0	2
31	NKLP – Sarfaraz Nagar	1	2	65	M/Garh – TPS M/Garh (Ph-2)	0	1
32	Sarfaraz Nagar – New Okara-I	0	1	66	KAPCO – Multan-IV	0	2
33	Sarfaraz Nagar – New Okara-II	0	1	67	KAPCO – Multan-VI	0	1
34	Kassowal – Yousafwala-II	0	1	68	Vehari – Kassowal-I	0	7

Source: NTDC

**TABLE 54**  
**Main Electricity Statistics of the Country**

	2015-16	2016-17	2017-18	2018-19	2019-20
<b>1: Maximum Energy Demand (MW)</b>					
CPPA-G System*	23,267	24,290	25,303	24,839	25,068
KE System	3,195	3,270	3,527	3,530	3,604
<b>2: Auxiliary Consumption and System Losses (in percentage)</b>					
<b>CPPA-G System</b>					
Auxiliary Consumption	n.p.	n.p.	n.p.	n.p.	n.p.
Transmission Losses	2.57	2.57	2.57	2.57	2.57
Distribution Losses	18.14	17.93	18.32	17.61	17.90
<b>KE System</b>					
Auxiliary Consumption (KE Own)	7.36	7.62	7.55	7.45	7.03
T&D Losses (excluding Auxiliary Consumption)	22.24	21.70	20.30	19.23	19.80
<b>3: Average Sales Price (Rs./kWh)</b>					
CPPA-G System	12.20	12.20	13.06	15.54	n.p.
KE System	12.97	12.84	15.90	15.88 <sup>[1]</sup>	18.13 <sup>[1] [2]</sup>
<b>4: Per Capita Electricity Consumption</b>					
<b>CPPA-G System</b>					
Energy Sale (GWh)	81,489.76	86,634.70	97,030.39	98,824.06	97,793.75
Per Capita Electricity Consumption (kWh)	457	475	526	529	n.p.
Average Sale/ Consumer (kWh)	3,117.50	3,189.36	3,404.22	3,297.41	3,097.43
<b>KE System</b>					
Energy Sale (GWh)	12,864.00	12,981.00	13,860.32	14,318.11	14,276.00
Per Capita Electricity Consumption (kWh)	547	871	863	892	889
Average Sale/ Consumer (kWh)	5,777.22	5,350.79	5,365.07	5,098.92	4,824.44

\* Based on un-diversified power demand indicated by DISCOs in Table 62. <sup>[1]</sup> Billed to consumers including taxes.

<sup>[2]</sup> This includes impact of FCA for the July, 2016 to June, 2019 allowed through SRO 1621(I)/2019 dated December 27, 2019 and withdrawal of ISPA relief of PkRs. 3/kWh on off-peak and normal hours through SRO 810(I)/2019 dated July 12, 2019.

Source: NTDC/DISCOs/KE



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**TABLE 55**  
**Hourly System Demand (MW) (January to December, 2019)**

Hours of the day	Maximum Demand (MW)		System Demand for a Typical day in Summer		System Demand for a Typical Day in Winter	
	Summer (11-09-2019)	Winter (30-01-2019)	Working day (17-07-2019)	Non-working day (27-07-2019)	Working day (15-01-2019)	Non-working day (26-01-2019)
1	22,246	11,848	19,696	21,787	11,594	10,997
2	21,790	11,528	19,328	21,450	11,458	10,481
3	21,226	11,200	18,933	20,938	11,087	10,446
4	20,939	11,559	18,911	20,667	10,984	10,452
5	21,262	11,337	19,064	20,921	11,276	10,681
6	21,628	12,184	18,934	20,740	12,496	11,546
7	21,678	12,441	19,283	20,551	14,254	13,140
8	21,691	13,251	19,924	20,553	14,471	13,125
9	23,204	13,817	20,864	21,229	14,959	13,903
10	23,565	14,205	21,045	21,806	14,295	14,043
11	24,190	14,778	21,642	21,890	14,880	14,107
12	24,206	15,265	21,981	21,846	14,770	13,584
13	24,252	15,744	22,591	22,056	14,523	13,616
14	24,874	15,796	22,644	22,103	14,518	13,460
15	<b>26,252</b>	15,712	<b>23,467</b>	<b>22,330</b>	14,720	13,813
16	25,450	15,808	23,402	22,226	15,168	13,940
17	25,214	16,239	23,079	21,372	14,929	13,842
18	24,337	16,708	22,034	20,136	15,586	14,798
19	24,953	<b>17,320</b>	20,875	19,159	<b>15,788</b>	<b>14,801</b>
20	25,038	16,369	22,142	20,474	15,204	14,552
21	25,342	15,665	22,345	21,048	14,397	13,055
22	25,358	14,882	22,359	20,955	13,777	13,367
23	25,430	13,870	22,043	20,736	13,036	12,423
24	24,652	13,054	21,970	20,911	12,389	11,782

\* Highlighted area indicates maximum demand of the day.

Source: National Power Control Centre, Islamabad

**TABLE 56**  
**Monthly System Peak Load Demand (MW)**

Month	2016-17	2017-18	2018-19	2019-20
July	22,460	24,128	25,575	24,927
August	22,733	25,810	<b>25,627</b>	25,198
September	22,293	22,001	24,838	<b>25,753</b>
October	21,832	20,592	20,395	19,328
November	15,575	16,410	15,760	16,704
December	15,736	16,081	15,859	15,973
January	15,058	16,022	17,320	15,938
February	<b>14,499</b>	<b>15,567</b>	<b>15,230</b>	15,489
March	17,914	18,246	16,480	<b>14,746</b>
April	19,895	21,019	19,885	18,516
May	24,481	25,315	24,233	21,191
June	<b>25,717</b>	<b>26,741</b>	24,827	24,349

Note: Highlighted area are indicated the minimum and maximum load demand.

Source: National Power Control Centre, Islamabad

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**TABLE 57**  
**Number of Circles, Divisions, Sub-Divisions, 11 kV Feeders and their Loading Position**

DISCO	As on 30 <sup>th</sup> June	Circles	Divisions	Sub-Divisions	11 kV Feeders	Loading Position of 11 kV Feeders (Nos.)				%age
						80-90%	91-100%	Above 100%	Total	
PESCO	2016	7	34	158	907	103	126	167	396	43.66
	2017	8	39	172	946	84	183	218	485	51.27
	2018	8	39	187	1,012	155	139	118	412	40.71
	2019	8	39	187	1,056	82	110	147	339	32.10
	2020	8	39	187	1,089	99	118	124	341	31.31
TESCO	2016	1	6	18	195	71	103	0	174	89.23
	2017	1	7	20	199	14	185	0	199	100.00
	2018	1	7	20	207	17	190	0	207	100.00
	2019	1	9	18	215	21	128	0	149	69.30
	2020	1	9	18	245	193	0	0	193	78.78
IESCO	2016	5	19	108	1,036	41	19	12	72	6.95
	2017	5	19	108	1,058	11	12	4	27	2.55
	2018	5	19	109	1,068	17	8	0	25	2.34
	2019	5	19	109	1,112	5	13	9	27	2.43
	2020	5	19	109	1,166	28	20	17	65	5.57
GEPSCO	2016	5	24	115	779	111	50	6	167	21.44
	2017	5	24	118	805	49	32	7	88	10.93
	2018	5	24	118	835	32	23	4	59	7.07
	2019	5	24	118	864	29	13	2	44	5.09
	2020	5	24	118	876	37	20	0	57	6.51
LESCO	2016	7	33	192	1,580	123	189	38	350	22.15
	2017	7	33	192	1,650	133	315	100	548	33.21
	2018	8	36	196	1,741	197	259	85	541	31.07
	2019	8	39	199	1,821	226	206	69	501	27.51
	2020	8	39	199	1,923	205	195	58	458	23.82
FESCO	2016	4	24	130	936	91	83	15	189	20.19
	2017	4	24	130	998	94	63	2	159	15.93
	2018	4	25	138	1,023	105	43	1	149	14.57
	2019	4	26	140	1,054	74	48	6	128	12.14
	2020	5	26	140	1,150	40	14	2	56	4.87
MEPCO	2016	9	37	170	1,165	194	130	104	428	36.74
	2017	9	37	174	1,241	210	142	81	433	34.89
	2018	9	37	174	1,324	156	157	60	373	28.17
	2019	9	37	179	1,392	139	105	13	257	18.46
	2020	9	37	181	1,508	94	127	11	232	15.38
HESCO	2016	4	15	67	435	21	61	21	103	23.68
	2017	4	15	68	479	33	54	34	121	25.26
	2018	4	15	68	502	18	38	13	69	13.75
	2019	4	15	69	533	26	32	10	68	12.76
	2020	4	15	69	556	45	23	1	69	12.41
SEPCO	2016	7	29	96	453	64	46	69	179	39.51
	2017	7	29	96	462	47	41	79	167	36.15
	2018	7	29	96	490	56	45	56	157	32.04
	2019	7	29	96	531	52	28	38	118	22.22
	2020	7	29	96	541	47	28	28	103	19.04
QESCO	2016	6	14	54	613	47	67	107	221	36.05
	2017	6	14	55	628	51	71	111	233	37.10
	2018	6	14	55	641	56	74	81	211	32.92
	2019	6	14	55	642	56	74	70	200	31.15
	2020	6	14	55	652	455	130	67	652	100.00
Total in CPPA-G System	2016	55	235	1,108	8,099	866	874	539	2,279	28.14
	2017	56	241	1,133	8,466	726	1,098	636	2,460	29.06
	2018	57	245	1,161	8,843	809	976	418	2,203	24.91
	2019	57	251	1,170	9,220	710	757	364	1,831	19.86
	2020	58	251	1,172	9,706	1,243	675	308	2,226	22.93

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KE	As on 30 <sup>th</sup> June	IBCs	11 kV Feeders	Loading Position of 11 kV Feeders (Nos.)				%age
				80-90%	91-100%	Above 100%	Total	
	2016	29	1,524	76	20	8	104	6.82
	2017	29	1,653	70	15	6	91	5.51
	2018	29	1,729	22	6	1	29	1.68
	2019	30	1,807	28	10	10	48	2.66
	2020	30	1,890	43	7	2	52	2.75

Source: Distribution Companies / KE

**TABLE 58**  
**Status of Distribution Lines (km)**

DISCO	As on 30 <sup>th</sup> June	132 kV	66 kV	33 kV	11 kV	Total HT Lines	Total LT Lines (0.4 kV)
PESCO	2016	2,209	841	312	33,785	37,147	44,330
	2017	2,245	802	312	35,751	39,110	44,574
	2018	2,318	802	312	36,227	39,659	44,954
	2019	2,661	714	312	36,679	40,365	45,120
	2020	2,764	494	75	36,935	40,269	45,204
TESCO	2016	359	383	0	7,765	8,507	6,532
	2017	359	402	0	7,768	8,529	6,532
	2018	359	402	0	8,023	8,784	6,590
	2019	382	442	0	9,705	10,529	6,590
	2020	452	445	0	9,805	10,702	6,782
IESCO	2016	2,897	581	153	24,607	28,238	26,286
	2017	2,897	581	69	24,833	28,380	26,499
	2018	2,897	581	69	25,156	28,703	26,775
	2019	2,897	581	69	25,457	29,004	27,041
	2020	3,030	528	69	25,804	29,431	27,299
GEPCO	2016	2,349	447	0	22,604	25,400	18,320
	2017	2,354	447	0	22,718	25,519	18,446
	2018	2,425	179	0	23,458	26,062	18,410
	2019	2,425	179	0	23,743	26,347	18,410
	2020	2,611	179	0	24,231	27,021	18,381
LESCO	2016	2,425	429	0	27,921	30,775	14,819
	2017	2,554	410	0	28,079	31,043	14,819
	2018	2,864	410	0	28,775	32,049	14,952
	2019	2,879	410	0	29,309	32,598	15,000
	2020	3,012	410	0	30,005	33,427	15,000
FESCO	2016	2,014	1,260	0	39,266	42,540	28,036
	2017	2,242	1,280	0	42,083	45,605	29,702
	2018	2,402	1,174	0	42,773	46,349	30,203
	2019	2,402	1,174	0	43,896	47,472	30,583
	2020	2,288	1,130	0	44,397	47,815	30,695
MEPCO	2016	3,305	1,048	0	71,971	76,324	47,204
	2017	3,538	977	0	72,899	77,414	47,723
	2018	3,749	935	0	74,061	78,745	48,560
	2019	3,929	872	0	76,057	80,858	49,992
	2020	4,031	702	0	78,309	83,042	50,110
HESCO	2016	2,158	957	0	27,850	30,965	14,833
	2017	2,445	899	0	28,055	31,399	14,892
	2018	2,496	687	0	28,154	31,337	14,959
	2019	2,709	687	0	28,306	31,702	15,005
	2020	2,771	687	0	28,413	31,871	15,049

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DISCO	As on 30 <sup>th</sup> June	132 kV	66 kV	33 kV	11 kV	Total HT Lines	Total LT Lines (0.4 kV)
SEPCO	2016	2,017	733	0	23,880	26,630	13,348
	2017	2,135	733	0	24,449	27,317	13,497
	2018	2,137	733	0	25,140	28,010	13,492
	2019	2,232	637	0	25,400	28,269	13,341
	2020	2,241	687	0	25,571	28,499	13,350
QESCO	2016	4,299	502	985	35,086	40,872	14,958
	2017	4,963	472	1,981	36,088	43,504	15,577
	2018	5,200	260	1,981	37,779	45,220	16,155
	2019	5,420	106	1,981	38,686	46,193	16,404
	2020	5,420	106	1,981	39,745	47,252	16,681
Total in CPPA-G System	2016	24,032	7,181	1,450	314,735	347,398	228,666
	2017	25,732	7,003	2,362	322,723	357,820	232,261
	2018	26,847	6,163	2,362	329,546	364,918	235,050
	2019	27,936	5,802	2,362	337,238	373,337	237,486
	2020	28,621	5,369	2,125	343,215	379,330	238,551
KE	2016	762	149	0	9,247	10,158	18,000
	2017	766	149	0	9,363	10,278	19,962
	2018	767	149	0	9,549	10,465	19,098
	2019	798	149	0	9,876	10,823	19,751
	2020	801	153	0	10,204	11,158	18,367

Source: Distribution Companies / KE

**TABLE 59**  
**Status of Grid Stations (Nos.)**

DISCO	As on 30 <sup>th</sup> 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	2016	67	9	76	17	0	17	5	0	5	98
	2017	69	9	78	16	0	16	7	0	7	101
	2018	73	9	82	16	0	16	6	0	6	104
	2019	78	10	88	14	0	14	6	0	6	108
	2020	81	12	93	11	0	11	2	0	2	106
TESCO	2016	8	0	8	8	0	8	0	0	0	16
	2017	8	0	8	8	0	8	0	0	0	16
	2018	9	0	9	9	0	9	0	0	0	18
	2019	10	0	10	9	0	9	0	0	0	19
	2020	10	0	10	9	0	9	0	0	0	19
IESCO	2016	77	22	99	4	1	5	3	0	3	107
	2017	77	24	101	4	1	5	3	0	3	109
	2018	78	25	103	4	1	5	2	0	2	110
	2019	78	26	104	3	1	4	2	0	2	110
	2020	82	26	108	1	1	2	2	0	2	112
GEPCO	2016	54	0	54	4	0	4	0	0	0	58
	2017	55	0	55	4	0	4	0	0	0	59
	2018	59	0	59	1	0	1	0	0	0	60
	2019	59	0	59	1	0	1	0	0	0	60
	2020	59	0	59	1	0	1	0	0	0	60
LESCO	2016	93	35	128	7	0	7	0	0	0	135
	2017	98	38	136	5	0	5	0	0	0	141
	2018	108	42	150	0	0	0	0	0	0	150
	2019	110	44	154	0	0	0	0	0	0	154
	2020	116	46	162	0	0	0	0	0	0	162
FESCO	2016	64	18	82	22	0	22	0	0	0	104
	2017	67	18	85	21	0	21	0	0	0	106
	2018	74	19	93	14	0	14	0	0	0	107
	2019	77	19	96	14	0	14	0	0	0	110
	2020	78	20	98	15	0	15	0	0	0	113

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DISCO	As on 30 <sup>th</sup> 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	
MEPCO	2016	98	8	106	20	0	20	0	0	0	126
	2017	104	9	113	16	0	16	0	0	0	129
	2018	104	9	113	16	0	16	0	0	0	129
	2019	114	9	123	10	0	10	0	0	0	133
	2020	120	10	130	7	0	7	0	0	0	137
HESCO	2016	54	6	60	18	0	18	0	0	0	78
	2017	59	6	65	15	0	15	0	0	0	80
	2018	61	7	68	15	0	15	0	0	0	83
	2019	61	8	69	15	0	15	0	0	0	84
	2020	61	9	70	15	0	15	0	0	0	85
SEPCO	2016	54	1	55	11	1	12	0	0	0	67
	2017	54	1	55	12	1	13	0	0	0	68
	2018	55	1	56	9	1	10	0	0	0	66
	2019	55	1	56	9	1	10	0	0	0	66
	2020	57	1	58	9	1	10	0	0	0	68
QESCO	2016	64	0	64	8	0	8	23	0	23	95
	2017	65	0	65	9	0	9	30	0	30	104
	2018	69	0	69	5	0	5	32	0	32	106
	2019	71	1	72	3	0	3	32	0	32	107
	2020	71	1	72	3	0	3	32	0	32	107
Total in CP&A-G System	2016	633	99	732	119	2	121	31	0	31	884
	2017	656	105	761	110	2	112	40	0	40	913
	2018	690	112	802	89	2	91	40	0	40	933
	2019	713	118	831	78	2	80	40	0	40	951
	2020	735	125	860	71	2	73	36	0	36	969
KE	2016	54	9	63	3	0	3	0	0	0	66
	2017	54	9	63	3	0	3	0	0	0	66
	2018	54	9	63	3	0	3	0	0	0	66
	2019	56	10	66	3	0	3	0	0	0	69
	2020	57	11	68	3	0	3	0	0	0	71

Source: Distribution Companies / KE

**TABLE 60**  
Category-wise Number of Consumers

DISCO	As on 30 <sup>th</sup> June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others/General	Total
PESCO	2016	2703406	309919	31204	23371	1057	863	76	3069896
	2017	2805422	321802	32023	23289	1088	904	48	3184576
	2018	2908414	337386	29872	23083	1096	925	30131	3330907
	2019	3029784	349985	26582	22896	1083	887	41228	3472445
	2020	3193810	362183	26919	22968	1119	886	42245	3650130
TESCO	2016	401234	28277	4142	8031	0	55	0	441739
	2017	402521	28382	4236	6741	0	61	0	441941
	2018	402209	28625	4268	6118	5	57	1119	442401
	2019	402027	28688	4243	6187	5	65	1367	442582
	2020	402004	28790	4271	6194	5	67	1434	442765
IESCO	2016	2174389	362837	15480	8293	1713	876	149	2563737
	2017	2270874	374610	15979	8436	1742	892	149	2672682
	2018	2405253	394381	16053	7182	1761	886	11722	2837238
	2019	2528865	411219	16272	7087	1829	960	13758	2979990
	2020	2649394	426132	16359	7068	1914	845	18477	3120189
GEPCO	2016	2621619	324937	63705	43055	532	153	16	3054017
	2017	2726893	334915	66845	43594	549	157	16	3172969
	2018	2860915	349789	70063	44749	578	164	16	3326274
	2019	3021760	366047	73133	46887	580	152	20393	3528952
	2020	3192199	379270	74244	50460	590	150	20930	3717843



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DISCO	As on 30 <sup>th</sup> June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others/ General	Total
LESCO	2016	3403443	561030	79588	59136	2338	490	241	4106266
	2017	3556800	576691	81640	59664	2424	496	246	4277961
	2018	3848417	602268	84183	60621	2547	499	249	4598784
	2019	4108067	623529	84703	61547	2554	494	8968	4889862
	2020	4374998	643245	86138	63671	2564	488	16090	5187194
FESCO	2016	3141713	356032	47909	39995	1566	227	123	3587565
	2017	3280658	368321	49350	40580	1640	229	128	3740906
	2018	3457159	383451	49314	40772	1719	232	20485	3953132
	2019	3651710	399688	50027	42763	1782	223	25216	4171409
	2020	3861027	413352	50911	45978	1860	226	28110	4401464
MEPCO	2016	4746997	494523	52845	78399	1448	437	124	5374773
	2017	5050877	514327	54176	79965	1470	451	124	5701390
	2018	5398111	536876	54772	80944	1494	460	126	6072783
	2019	5748493	559213	56121	85977	1501	454	33673	6485432
	2020	6090985	579011	57541	93884	1592	457	37840	6861310
HESCO	2016	825409	150786	14784	16786	533	334	99	1008731
	2017	861184	156200	15313	17286	540	335	98	1050956
	2018	877263	159627	14924	13730	540	337	14293	1080714
	2019	907377	163791	15250	14434	540	342	13926	1115660
	2020	933377	166213	14852	15522	572	344	13800	1144680
SEPCO	2016	590240	117093	12405	12503	414	504	19	733178
	2017	593355	117824	12606	12145	412	507	19	736868
	2018	589884	119384	12674	9221	421	519	13205	745308
	2019	603885	121776	12930	9270	425	527	13319	762132
	2020	628208	123808	13133	9346	442	532	13347	788816
QESCO	2016	432262	108797	3754	31504	251	244	4	576816
	2017	442895	112445	3877	31824	254	253	4	591552
	2018	453232	116267	3730	29580	265	261	5669	609004
	2019	463332	120311	3688	29608	268	266	7128	624601
	2020	477757	123504	3719	29599	274	271	7852	642976
Total in CPPA-G System	2016	21040712	2814231	325816	321073	9852	4183	851	24516718
	2017	21991479	2905517	336045	323524	10119	4285	832	25571801
	2018	23200857	3028054	339853	316000	10426	4340	97015	26996545
	2019	24465300	3144247	342949	326656	10567	4370	178976	28473065
	2020	25803759	3245508	348087	344690	10932	4266	200125	29957367
KE	2016	1758467	444687	20626	2623	72	201	1	2226677
	2017	1945721	456517	20868	2619	73	199	1	2425998
	2018	2096451	463670	20647	2398	74	194	1	2583435
	2019	2298616	474626	20842	2329	93	188	11375	2808069
	2020	2447129	470777	22553	2271	90	175	16104	2959099

Source: Distribution Companies / KE

TABLE 61  
Category-wise Sanctioned Load (MW)

DISCO	As on 30 <sup>th</sup> June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	2016	3649.69	690.88	1377.96	170.92	52.78	198.62	55.07	6195.92
	2017	3870.45	726.79	1460.72	169.04	52.90	256.27	3.62	6539.79
	2018	4015.16	766.87	1510.76	166.92	53.12	282.78	208.33	7003.94
	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
TESCO	2016	758.00	35.00	102.00	90.00	0.00	4.00	0.00	989.00
	2017	795.00	45.00	132.00	100.00	0.00	5.00	0.00	1077.00
	2018	801.00	65.00	156.00	200.00	0.00	8.00	0.00	1230.00
	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

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DISCO	As on 30 <sup>th</sup> June	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
IESCO	2016	3889.96	1078.30	995.53	90.48	99.70	502.30	290.14	6946.41
	2017	4083.11	1115.34	1034.46	93.29	100.01	554.40	290.27	7270.88
	2018	4258.00	1170.00	1065.00	69.00	100.00	543.00	481.00	7686.00
	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
GEPCO	2016	3761.73	680.89	1605.40	301.12	33.11	89.20	0.74	6472.20
	2017	3968.27	717.26	1685.37	305.40	32.40	91.26	1.22	6801.18
	2018	4215.95	774.77	1769.90	317.48	32.73	98.99	93.04	7302.86
	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
LESCO	2016	5225.00	1558.00	4112.00	607.00	113.00	200.00	41.00	11856.00
	2017	5525.57	1638.61	4294.52	615.92	113.11	217.88	42.25	12447.86
	2018	6074.75	1735.78	4521.90	637.46	115.45	253.24	42.36	13380.95
	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
FESCO	2016	7638.00	805.00	2006.00	454.00	11.00	199.00	7.00	11120.00
	2017	8024.00	856.00	2118.00	462.00	10.00	204.00	7.00	11681.00
	2018	8492.00	916.00	2221.00	459.00	11.00	216.00	149.00	12464.00
	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
MEPCO	2016	6657.42	959.06	2251.58	1193.60	14.33	112.96	24.02	11212.97
	2017	7124.70	1003.99	2291.82	1210.08	14.20	117.80	23.69	11786.28
	2018	7895.99	1095.65	2494.57	1253.41	14.99	136.42	24.38	12915.41
	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
HESCO	2016	1104.19	281.22	816.79	233.02	23.93	47.76	8.29	2515.20
	2017	1161.14	298.80	854.15	236.85	24.02	47.29	8.46	2630.71
	2018	1151.18	302.40	863.55	182.26	24.02	57.50	154.50	2735.41
	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
SEPCO	2016	661.68	196.44	379.85	171.75	12.57	70.02	2.75	1495.06
	2017	667.88	200.42	409.58	167.65	12.56	61.40	2.24	1521.73
	2018	625.26	206.91	426.26	109.72	12.67	68.67	119.68	1569.17
	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
QESCO	2016	642.31	178.40	163.17	875.75	5.49	53.18	0.02	1918.32
	2017	656.20	184.81	171.74	885.65	5.54	54.49	0.02	1958.46
	2018	657.65	191.68	176.26	826.34	5.72	60.59	87.27	2005.52
	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
Total in CPPA-G System	2016	33987.98	6463.19	13810.28	4187.65	365.90	1477.04	429.04	60721.07
	2017	35876.32	6787.02	14452.37	4245.88	364.75	1609.79	378.77	63714.89
	2018	38186.95	7225.06	15205.21	4221.59	369.70	1725.19	1359.56	68293.25
	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
KE	2016	4450.00	1625.00	1751.00	43.00	1.00	147.00	0.00	8017.00
	2017	5047.00	1709.00	1847.00	43.00	1.00	189.00	0.00	8836.00
	2018	5659.16	1831.01	2035.40	44.00	1.43	190.10	0.00	9761.10
	2019	6297.76	1888.21	2169.88	44.06	1.60	191.20	135.73	10728.44
	2020	6458.00	1938.00	2378.00	42.00	2.00	183.00	247.00	11248.00

Source: Distribution Companies / KE

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**TABLE 62**  
**Peak Demand of Distribution Companies (MW)**

DISCO	2015-16	2016-17	2017-18	2018-19	2019-20
PESCO	2,809	3,110	3,242	3,296	2,967
Peak Demand Growth Rate over Last Year	0.39	10.72	4.24	1.67	(9.98)
TESCO	570	609	772	799	805
Peak Demand Growth Rate over Last Year	(14.67)	6.84	26.77	3.50	0.75
IESCO	2,297	2,314	2,452	2,512	2,671
Peak Demand Growth Rate over Last Year	0.88	0.74	5.96	2.45	6.33
GEPCO	2,321	2,413	2,429	2,309	2,429
Peak Demand Growth Rate over Last Year	(2.72)	3.96	0.66	(4.94)	5.20
LESCO	4,404	4,765	4,980	4,616	5,004
Peak Demand Growth Rate over Last Year	(12.29)	8.20	4.51	(7.31)	8.41
FESCO	3,056	3,053	3,036	2,904	2,925
Peak Demand Growth Rate over Last Year	(1.13)	(0.10)	(0.56)	(4.35)	0.72
MEPCO	3,495	3,663	4,018	4,115	4,115
Peak Demand Growth Rate over Last Year	20.85	4.81	9.69	2.41	0.00
HESCO	1,172	1,234	1,256	1,209	1,228
Peak Demand Growth Rate over Last Year	0.43	5.29	1.78	(3.74)	1.57
SEPCO	1,378	1,359	1,318	1,279	1,124
Peak Demand Growth Rate over Last Year	1.55	(1.38)	(3.02)	(2.96)	(12.12)
QESCO	1,765	1,770	1,800	1,800	1,800
Peak Demand Growth Rate over Last Year	0.17	0.28	1.69	0.00	0.00
<b>Peak Demand in CPPA-G System</b>	<b>23,267</b>	<b>24,290</b>	<b>25,303</b>	<b>24,839</b>	<b>25,068</b>
<b>Peak Demand Growth Rate over Last Year</b>	<b>(0.65)</b>	<b>4.40</b>	<b>4.17</b>	<b>(1.83)</b>	<b>0.92</b>
KE	3,195	3,270	3,527	3,530	3,604
Peak Demand Growth Rate over Last Year	4.55	2.35	7.86	0.09	2.10

Source: Distribution Companies / KE

**TABLE 63**  
Energy Volume Consumed by Demand

S. No.	DISCO	FY 2015-16		FY 2016-17		FY 2017-18		FY 2018-19		FY 2019-20	
		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 (%)
1	PESCO	11,802.00	12.00	12,511.00	12.00	14,209.00	12.10	14,427.00	12.10	14,792.33	13.00
2	TESCO	1,269.00	1.30	1,451.00	1.40	1,696.00	1.40	1,821.00	1.50	2,001.22	2.00
3	IESCO	9,650.00	9.80	10,583.00	10.01	11,672.00	9.90	11,838.00	9.90	11,435.47	10.00
4	GEPCO	9,045.00	9.20	9,779.00	9.30	10,987.00	9.30	11,100.00	9.30	10,991.33	10.00
5	LESCO	20,152.00	20.40	20,622.00	19.70	23,731.00	20.10	24,338.00	20.40	23,528.33	21.00
6	FESCO	11,920.00	12.10	12,858.00	12.30	14,446.00	12.30	14,970.00	12.60	14,510.32	13.00
7	MEPCO	14,770.00	15.00	15,952.00	15.20	19,006.00	16.10	19,367.00	16.20	19,324.88	17.00
8	HESCO	5,085.00	5.20	5,359.00	5.10	5,743.00	4.90	5,557.00	4.70	5,470.78	5.00
9	SEPCO	4,197.00	4.30	4,489.00	4.30	4,679.00	4.00	4,412.00	3.70	4,252.76	4.00
10	QESCO	5,547.00	5.60	5,789.00	5.50	6,339.00	5.40	6,257.00	5.20	6,603.99	6.00
11	KE	5,059.00	5.10	5,077.00	4.90	5,128.00	4.40	4,957.00	4.20	--	--
12	IPPs	54.00	0.10	135.00	0.10	167.09	0.10	201.54	0.02	--	--
<b>Total</b>		<b>98,550.00</b>	<b>--</b>	<b>104,605.00</b>	<b>--</b>	<b>117,803.09</b>	<b>--</b>	<b>119,245.54</b>	<b>--</b>	<b>112,911.40</b>	<b>--</b>

Source: CPPA-G

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**TABLE 64**  
**Maximum Demand and Energy Data of all DISCOs (FY 2018-19)**

	FESCO		GEPSCO		HESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2018	1,706,087,562	3,254,807	1,318,831,799	2,837,969	654,152,484	1,475,032
August, 2018	1,770,658,189	3,571,549	1,334,732,376	2,700,847	583,887,204	1,579,382
September, 2018	1,554,900,247	3,539,944	1,153,316,407	2,721,479	548,625,267	1,527,689
October, 2018	1,173,143,588	3,227,440	866,400,524	2,105,706	490,918,681	1,379,765
November, 2018	886,335,343	2,655,344	622,167,749	1,642,965	353,693,624	1,165,686
December, 2018	885,639,460	2,415,784	627,523,771	1,683,643	302,323,598	1,137,600
January, 2019	860,817,015	2,446,898	608,916,297	1,593,849	283,063,975	998,090
February, 2019	751,754,516	2,505,002	524,766,959	1,557,700	262,997,673	1,224,451
March, 2019	947,077,302	2,668,405	638,409,532	1,908,005	346,817,290	1,180,577
April, 2019	1,241,889,003	3,305,907	931,704,741	2,301,830	481,100,557	1,443,367
May, 2019	1,579,383,623	3,556,937	1,189,144,815	2,739,387	617,569,481	1,675,112
June, 2019	1,615,907,914	3,346,092	1,284,051,211	2,595,358	631,605,802	1,869,373

	SEPCO		IESCO		LESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2018	558,982,239	1,156,297	1,356,297,363	2,548,179	2,709,672,998	5,398,963
August, 2018	538,002,122	1,124,867	1,350,875,886	2,340,917	2,823,450,551	5,297,051
September, 2018	483,439,522	1,095,298	1,208,354,559	2,373,516	2,487,182,325	5,435,834
October, 2018	377,256,928	877,702	853,678,689	2,090,513	1,914,440,029	4,530,373
November, 2018	257,461,886	713,816	707,293,522	1,978,436	1,462,258,440	3,608,685
December, 2018	239,238,399	611,777	769,468,299	1,725,595	1,459,390,637	4,278,192
January, 2019	220,815,386	1,067,327	806,405,669	1,870,982	1,475,485,524	4,503,276
February, 2019	185,755,055	659,317	695,742,008	1,751,819	1,310,337,966	3,897,947
March, 2019	225,986,956	851,256	736,158,546	1,687,025	1,557,795,192	4,469,885
April, 2019	336,944,847	1,093,023	886,663,217	1,921,659	2,025,980,983	5,142,737
May, 2019	477,476,899	1,246,872	1,153,619,427	2,374,850	2,516,810,376	5,592,059
June, 2019	510,209,244	1,260,706	1,313,246,586	2,629,747	2,595,640,210	5,380,103

	MEPCO		PESCO		TESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2018	2,369,452,223	4,691,214	1,536,002,414	3,209,907	138,798,822	195,677
August, 2018	2,486,338,497	4,596,164	1,562,736,819	3,135,883	143,524,575	257,023
September, 2018	2,172,366,339	4,692,535	1,360,900,732	2,759,283	140,751,591	323,316
October, 2018	1,531,300,581	4,320,694	1,006,409,318	2,460,273	149,647,336	240,810
November, 2018	1,067,952,944	3,466,244	948,269,432	2,477,650	144,808,714	337,491
December, 2018	1,034,092,230	3,305,657	1,078,678,042	2,874,067	162,111,301	285,220
January, 2019	1,009,791,853	3,266,223	1,140,127,743	2,750,246	157,600,842	221,432
February, 2019	852,246,466	2,884,678	971,112,665	2,586,167	150,888,659	279,805
March, 2019	1,095,724,323	3,524,847	968,643,622	2,599,217	155,203,402	259,408
April, 2019	1,540,158,281	3,981,802	1,015,219,783	2,552,421	137,132,163	256,582
May, 2019	2,037,325,778	4,248,948	1,378,250,219	3,103,321	186,385,582	259,486
June, 2019	2,166,224,772	4,491,064	1,460,988,194	3,357,838	153,875,303	257,356

QESCO	Month	Energy (kWh)	MDI (kW)	Month	Energy (kWh)	MDI (kW)
	July, 2018	589,834,864	1,380,014	January, 2019	479,699,504	1,335,412
	August, 2018	608,464,203	1,382,236	February, 2019	397,397,351	1,355,276
	September, 2018	544,700,584	1,152,670	March, 2019	412,254,418	1,367,648
	October, 2018	528,263,216	1,163,497	April, 2019	470,472,697	1,340,230
	November, 2018	494,718,785	1,322,870	May, 2019	621,374,235	1,538,450
	December, 2018	510,150,518	1,346,024	June, 2019	599,805,532	1,406,182



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Maximum Demand and Energy Data of all DISCOs (FY 2019-20)

	FESCO		GEPSCO		HESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2019	1,748,289,307	3,511,448	1,340,746,399	2,838,070	580,268,803	1,314,362
August, 2019	1,778,335,270	3,546,995	1,384,588,625	2,925,936	541,582,467	1,485,661
September, 2019	1,696,183,490	3,566,368	1,291,298,812	2,698,185	569,814,321	1,766,243
October, 2019	1,175,046,462	3,026,141	851,714,886	2,296,693	468,230,083	1,484,147
November, 2019	884,048,286	2,660,400	643,905,041	1,633,022	326,808,803	1,257,413
December, 2019	853,359,092	2,707,017	641,559,912	1,736,119	277,730,077	1,341,063
January, 2020	820,129,330	2,530,034	632,708,032	1,615,592	294,358,962	1,262,815
February, 2020	795,391,556	2,808,543	584,249,584	1,948,512	268,014,225	1,148,992
March, 2020	755,214,061	2,460,778	594,751,122	1,772,687	362,275,197	1,279,894
April, 2020	931,407,386	2,593,537	691,250,932	2,159,244	502,602,996	1,463,287
May, 2020	1,445,206,090	3,311,809	1,072,406,806	2,371,976	662,322,684	1,529,478
June, 2020	1,627,710,414	3,424,601	1,261,874,691	2,483,628	616,772,389	1,587,393

	SEPCO		IESCO		LESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2019	509,022,263	1,090,127	1,443,164,529	2,737,935	2,769,332,487	5,582,055
August, 2019	511,185,888	1,216,820	1,350,092,404	2,510,461	2,795,044,196	5,754,809
September, 2019	483,994,904	1,123,178	1,280,821,716	2,647,341	2,716,146,534	5,615,956
October, 2019	341,215,667	1,027,863	865,586,339	1,920,493	1,904,332,004	4,646,783
November, 2019	220,101,045	842,403	685,919,984	1,642,337	1,480,386,369	3,468,762
December, 2019	212,840,785	757,049	759,857,398	1,644,075	1,465,705,820	4,024,323
January, 2020	206,798,240	602,615	796,089,496	2,052,802	1,507,601,856	3,934,872
February, 2020	179,885,863	710,153	680,901,696	1,921,612	1,338,048,526	3,682,666
March, 2020	212,775,477	486,997	670,270,061	2,059,901	1,269,202,657	3,204,321
April, 2020	357,664,317	1,118,720	680,979,345	1,558,030	1,438,984,214	3,602,385
May, 2020	523,395,448	1,145,503	990,388,256	2,054,471	2,201,201,571	4,938,878
June, 2020	493,881,807	1,041,818	1,231,396,255	2,553,725	2,642,338,483	5,865,959

	MEPCO		PESCO		TESCO	
Month	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)	Energy (kWh)	MDI (kW)
July, 2019	2,465,354,472	4,851,038	1,616,549,535	3,321,792	153,652,726	245,320
August, 2019	2,481,773,811	4,696,042	1,613,387,215	3,496,751	160,173,927	223,283
September, 2019	2,358,690,183	4,890,784	1,537,231,850	3,414,560	167,770,177	270,418
October, 2019	1,429,918,783	3,899,359	1,057,307,607	2,874,899	164,844,976	284,944
November, 2019	1,009,918,769	3,089,651	923,471,958	2,655,161	157,880,978	244,062
December, 2019	944,458,004	2,956,528	1,077,848,951	2,996,358	176,893,548	272,637
January, 2020	920,343,224	2,608,923	1,143,642,025	3,241,260	169,445,739	290,111
February, 2020	928,517,464	2,968,251	944,234,624	2,915,481	166,188,245	303,009
March, 2020	893,930,859	2,799,957	941,707,875	2,591,209	166,115,238	301,105
April, 2020	1,473,547,848	3,990,468	1,005,859,137	2,673,982	152,981,246	282,020
May, 2020	2,128,644,657	4,442,515	1,410,365,408	3,150,994	196,059,615	284,794
June, 2020	2,289,784,041	4,689,468	1,520,721,414	3,308,814	169,211,864	235,296

QESCO	Month	Energy (kWh)	MDI (kW)	Month	Energy (kWh)	MDI (kW)
	July, 2019	705,703,711	1,376,462	January, 2020	413,052,015	1,367,482
	August, 2019	686,301,582	1,340,398	February, 2020	436,064,936	1,370,209
	September, 2019	654,210,492	1,412,069	March, 2020	479,616,107	1,376,458
	October, 2019	557,844,515	1,339,602	April, 2020	508,550,626	1,354,583
	November, 2019	451,247,463	1,467,253	May, 2020	612,427,992	1,266,170
	December, 2019	488,358,017	1,404,842	June, 2020	610,612,013	1,388,912

Source: CPPA-G

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**TABLE 65**  
Detail of Units Purchased, Sold and Losses in all DISCOs

DISCO	Year	Unit Purchased (GWh)			Unit Sold (GWh)	Losses	
		Through NTDC	Through CPPs, SPPs etc.	Total Unit Purchased		GWh	%age
PESCO	2015-16	11751.00	0.00	11751.00	7782.91	3968.09	33.77
	2016-17	12510.96	0.00	12510.96	8432.03	4078.93	32.60
	2017-18	14220.30	0.00	14220.30	8795.53	5424.77	38.15
	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
TESCO	2015-16	1269.00	0.00	1269.00	1028.48	240.52	18.95
	2016-17	1450.58	0.00	1450.58	1227.13	223.45	15.40
	2017-18	1692.82	0.00	1692.82	1481.85	210.97	12.46
	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
IESCO	2015-16	9652.00	0.00	9652.00	8774.00	878.00	9.10
	2016-17	10582.64	0.00	10582.64	9627.55	955.09	9.03
	2017-18	11672.97	0.00	11672.97	10605.94	1067.03	9.14
	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
GEPSCO	2015-16	9045.48	0.00	9045.48	8088.83	956.65	10.58
	2016-17	9778.56	0.00	9778.56	8777.78	1000.78	10.23
	2017-18	10986.45	0.00	10986.45	9886.84	1099.61	10.01
	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
LESCO	2015-16	20151.92	0.00	20151.92	17341.98	2809.94	13.94
	2016-17	20621.54	0.00	20621.54	17782.81	2838.73	13.77
	2017-18	23731.24	0.00	23731.24	20448.50	3282.74	13.83
	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
FESCO	2015-16	11920.35	0.00	11920.35	10700.29	1220.06	10.24
	2016-17	12857.80	0.00	12857.80	11498.76	1359.04	10.57
	2017-18	12548.87	1897.54	14446.41	12924.57	1521.84	10.53
	2018-19	13889.66	1079.09	14968.75	13499.68	1469.07	9.81
	2019-20	13879.33	640.00	14519.33	13123.24	1396.09	9.62
MEPCO	2015-16	13328.75	1441.50	14770.25	12340.67	2429.58	16.45
	2016-17	12156.93	3794.65	15951.58	13253.20	2698.38	16.92
	2017-18	14928.56	4077.41	19005.97	15853.22	3152.75	16.59
	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
HESCO	2015-16	3245.50	1839.86	5085.36	3739.17	1346.19	26.47
	2016-17	3298.98	2057.46	5356.44	3718.13	1638.31	30.59
	2017-18	3815.59	1927.43	5743.02	4026.96	1716.06	29.88
	2018-19	3567.80	1987.35	5555.15	3916.68	1638.47	29.49
	2019-20	3853.27	1612.09	5465.36	3890.00	1575.36	28.82
SEPCO	2015-16	4168.17	20.24	4188.41	2414.59	1773.82	42.35
	2016-17	4457.32	25.33	4482.65	2787.73	1694.92	37.81
	2017-18	4653.40	25.33	4678.73	2962.81	1715.92	36.67
	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
QESCO	2015-16	5538.01	0.00	5538.01	4219.84	1318.17	23.80
	2016-17	5788.76	0.00	5788.76	4452.58	1336.18	23.08
	2017-18	6338.40	0.00	6338.40	4915.97	1422.43	22.44
	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
Total in CPPIA-G System	2015-16	90070.18	3301.60	93371.78	76430.76	16941.02	18.14
	2016-17	93504.07	5877.44	99381.51	81557.70	17823.81	17.93
	2017-18	104588.60	7927.71	112516.31	91902.19	20614.12	18.32
	2018-19	104988.76	8963.82	113952.58	93887.35	20065.23	17.61
	2019-20	106417.99	6604.21	113022.20	92790.75	20231.44	17.90

KE	As on 30 <sup>th</sup> June	Unit Purchased (GWh)				Unit Sold (GWh)	Losses	
		KEL Own	Through NTDC	Through CPPs + Others	Total Unit Purchased		GWh	%age
	2015-16	10323.00	5059.00	1922.00	17304.00	12864.00	4440.00	25.66
	2016-17	10147.00	5077.00	2128.00	17352.00	12981.00	4371.00	25.19
	2017-18	10337.75	5128.20	2705.89	18171.84	13860.32	4311.52	23.73
	2018-19	10727.67	4956.71	2842.45	18526.83	14318.11	4208.72	22.72
	2019-20	10358.00	5426.00	2743.68	18527.68	14276.00	4251.68	22.95

Source: Distribution Companies / KE

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**TABLE 66**  
**Units Billed and Amount Realized in DISCOs (2019-20)**

DISCO	Unit	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	Units Billed	5099.18	774.96	2008.00	69.27	12.93	651.58	427.13	9043.05
	Amount of Units Billed	Rs. Mln.	22217.71	44047.71	786.16	354.01	15068.03	10773.30	160627.92
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	22025.39	41785.76	695.71	302.74	12095.51	10138.10	140798.07
		%	99.13	94.86	88.49	85.52	80.27	94.10	87.65
TESCO	Units Billed	1415.14	4.90	329.71	32.50	0.00	10.30	10.23	1802.76
	Amount of Units Billed	Rs. Mln.	18819.15	137.68	7567.98	433.95	272.72	267.36	27498.84
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	12999.45	70.51	5008.63	284.25	191.33	189.70	18743.87
		%	69.08	51.21	66.18	65.50	70.16	70.95	68.16
IESCO	Units Billed	5028.18	1098.90	1487.49	26.92	77.35	919.43	1803.76	10442.03
	Amount of Units Billed	Rs. Mln.	71468.20	32885.24	32702.37	322.98	2142.21	39144.88	200957.67
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	67429.79	33417.10	32463.86	320.43	22326.92	24597.90	181405.15
		%	94.35	101.62	99.27	99.21	100.16	62.84	90.27
GEPSCO	Units Billed	5944.20	593.84	2397.03	474.66	7.29	156.82	371.79	9945.63
	Amount of Units Billed	Rs. Mln.	79051.99	17791.49	54256.05	4437.39	3978.77	8397.69	168126.13
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	74191.50	18096.72	51544.83	4161.84	3821.10	6632.37	158644.76
		%	93.85	101.72	95.00	93.79	96.04	78.98	94.36
LESICO	Units Billed	9259.00	1563.00	7381.00	1116.00	117.00	627.00	547.00	20610.00
	Amount of Units Billed	Rs. Mln.	139430.00	47086.00	156509.00	10737.00	15956.00	14501.00	387402.00
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	128462.00	47051.00	150061.00	9333.00	15663.00	12890.00	366018.00
		%	92.13	99.93	95.88	86.92	98.16	88.89	94.48
FESCO	Units Billed	6656.34	712.71	4133.46	1138.95	10.47	255.43	215.88	13123.24
	Amount of Units Billed	Rs. Mln.	87632.67	21207.81	96075.47	12236.84	6243.84	5588.42	229297.65
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	81947.94	21033.35	91202.59	10350.50	5911.49	5227.30	215959.01
		%	93.51	99.18	94.93	84.58	94.68	93.54	94.18
MEPCO	Units Billed	9469.57	903.24	2509.25	2916.57	18.04	275.93	289.33	16381.93
	Amount of Units Billed	Rs. Mln.	122400.73	26854.98	59590.92	30936.35	6714.42	7108.82	254068.83
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	105074.38	27055.59	65273.06	24685.02	6847.98	6748.83	236131.14
		%	85.84	100.75	109.54	79.79	101.99	94.94	92.94
HESCO	Units Billed	2394.05	261.82	717.34	214.13	3.49	106.62	192.55	3890.00
	Amount of Units Billed	Rs. Mln.	30423.35	7888.33	17071.51	2819.56	2818.53	4989.44	66125.21
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	15500.60	7793.38	18562.88	1995.53	2203.66	2314.54	48396.38
		%	50.95	98.80	108.74	70.77	78.18	46.39	73.19
SEPCO	Units Billed	1765.85	209.33	365.13	81.11	16.41	159.78	112.49	2710.10
	Amount of Units Billed	Rs. Mln.	23916.00	6210.35	9020.75	1057.46	4139.89	3050.80	47837.21
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	8401.69	6112.10	8380.21	554.14	2791.94	777.62	27049.54
		%	35.13	98.42	92.90	52.40	67.44	25.49	56.54
QESCO	Units Billed	611.92	136.78	160.63	3572.06	9.60	126.94	224.08	4842.01
	Amount of Units Billed	Rs. Mln.	8343.50	4051.61	3909.82	36010.68	3206.54	5851.18	61644.58
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	4835.35	3859.38	4337.69	12282.43	3170.09	1838.91	30361.85
		%	57.95	95.26	110.94	34.11	98.86	31.43	49.25
Total in System	Units Billed	47643.43	6259.48	21489.04	9642.17	272.58	3289.83	4194.24	92790.75
	Amount of Units Billed	Rs. Mln.	648866.59	186331.20	480751.58	99778.37	80690.53	99672.89	1603586.04
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	552597.56	186514.52	468620.51	64662.85	75023.02	71355.27	1423507.77
		%	85.16	100.10	97.48	64.81	92.98	71.59	88.77
KE	Units Billed	7489.00	1615.00	4158.00	116.00	112.00	468.00	318.00	14276.00
	Amount of Units Billed	Rs. Mln.	107747.00	43996.00	80796.00	975.00	2728.00	9109.00	254885.00
	Amount Realized and %age Recovery to Billed Amount	Rs. Mln.	99394.00	42968.00	73470.00	279.00	10227.00	6706.00	234855.00
		%	92.25	97.66	90.93	28.62	107.27	73.62	92.14

Source: Distribution Companies / KE

# State of Industry Report 2020

TABLE 67  
Category-wise Electricity Sold (GWh)

DISCO	Year	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Total
PESCO	2015-16	4481.63	702.62	1955.74	82.43	12.87	279.85	267.77	7782.91
	2016-17	4882.80	739.50	2131.50	83.10	13.24	579.70	2.19	8432.03
	2017-18	4928.26	769.93	2321.87	78.90	13.47	642.50	40.60	8795.53
	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
TESCO	2015-16	881.16	7.49	88.16	44.17	0.00	7.50	0.00	1028.48
	2016-17	1017.69	6.86	145.26	49.72	0.00	7.60	0.00	1227.13
	2017-18	1195.16	5.93	227.68	42.01	0.00	8.59	2.48	1481.85
	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
IESCO	2015-16	4093.00	932.00	1663.00	98.00	71.00	1078.00	839.00	8774.00
	2016-17	4557.10	1073.10	1744.10	106.10	72.10	951.05	1124.00	9627.55
	2017-18	5035.44	1200.07	1861.61	96.35	72.58	2283.58	56.31	10605.94
	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
GEPCO	2015-16	4563.95	478.00	2371.17	341.80	6.64	326.16	1.12	8088.83
	2016-17	5081.33	544.74	2424.36	363.50	7.50	355.46	0.89	8777.78
	2017-18	5757.44	615.06	2696.34	400.60	7.91	381.88	27.61	9886.84
	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
LESCO	2015-16	7219.80	1402.25	6896.16	1203.48	97.59	514.39	8.31	17341.98
	2016-17	8159.96	1578.03	6173.45	1196.52	95.18	572.30	7.37	17782.81
	2017-18	9021.27	1792.33	7587.38	1259.50	119.05	660.91	8.06	20448.50
	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
FESCO	2015-16	5037.06	562.72	3938.90	790.02	8.06	358.80	4.73	10700.29
	2016-17	5709.59	657.89	3844.79	929.97	11.09	341.21	4.22	11498.76
	2017-18	6506.58	737.86	4220.72	1066.69	12.39	338.75	41.58	12924.57
	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
MEPCO	2015-16	6626.63	730.06	2855.18	1880.00	16.37	224.10	8.33	12340.67
	2016-17	7567.44	846.06	2289.66	2271.17	19.72	252.38	6.77	13253.20
	2017-18	8945.73	967.10	2960.58	2659.32	20.37	293.19	6.93	15853.22
	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
HESCO	2015-16	2094.92	279.54	812.63	420.38	35.73	92.32	3.65	3739.17
	2016-17	2155.02	307.88	721.33	400.33	35.31	94.45	3.81	3718.13
	2017-18	2342.17	315.19	759.07	372.78	37.64	104.59	95.52	4026.96
	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
SEPCO	2015-16	1349.54	201.99	430.72	238.62	42.54	149.67	1.51	2414.59
	2016-17	1650.48	235.63	439.06	245.32	39.24	176.65	1.35	2787.73
	2017-18	1759.45	218.81	465.88	245.18	27.29	177.99	68.21	2962.81
	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
QESCO	2015-16	593.60	114.76	136.09	3263.37	3.84	108.11	0.07	4219.84
	2016-17	637.07	124.94	153.09	3417.43	4.92	115.02	0.11	4452.58
	2017-18	672.30	131.05	173.04	3762.35	8.25	122.16	46.82	4915.97
	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
Total in CPPA-G System	2015-16	36941.29	5411.43	21147.75	8362.27	294.64	3138.90	1134.49	76430.76
	2016-17	41418.48	6114.63	20066.60	9063.16	298.30	3445.82	1150.71	81557.70
	2017-18	46163.80	6753.33	23274.17	9983.68	318.95	5014.14	394.12	91902.19
	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
KE	2015-16	6596.00	1685.00	3830.00	163.00	163.00	412.00	15.00	12864.00
	2016-17	6643.00	1655.00	3885.00	159.00	187.00	433.00	19.00	12981.00
	2017-18	7169.68	1758.22	4123.85	151.49	156.54	471.10	29.44	13860.32
	2018-19	7298.83	1780.58	4402.12	134.30	160.48	477.22	64.58	14318.11
	2019-20	7489.00	1615.00	4158.00	116.00	112.00	468.00	318.00	14276.00

Source: Distribution Companies / KE

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**TABLE 68**  
**Category-wise Energy Sales in CPPA-G and K-Electric System**

		2015-16	2016-17	2017-18	2018-19	2019-20
<b>CPPA-G System</b>						
Domestic	GWh	36,941.29	41,418.48	46,163.80	45,590.34	47,643.43
Percentage share	%	45.33	47.81	47.58	46.13	48.72
Commercial	GWh	5,411.43	6,114.63	6,753.33	6,601.50	6,259.48
Percentage share	%	6.64	7.06	6.96	6.68	6.40
Industrial	GWh	21,147.75	20,066.60	23,274.17	24,284.57	21,489.04
Percentage share	%	25.95	23.16	23.99	24.57	21.97
Agricultural	GWh	8,362.27	9,063.16	9,983.68	9,675.51	9,642.17
Percentage share	%	10.26	10.46	10.29	9.79	9.86
Public Lighting	GWh	294.64	298.30	318.95	289.38	272.58
Percentage share	%	0.36	0.34	0.33	0.29	0.28
Bulk Supply	GWh	3,138.90	3,445.82	5,014.14	3,711.75	3,289.83
Percentage share	%	3.85	3.98	5.17	3.76	3.36
Others	GWh	1,134.49	1,150.71	394.12	3,734.30	4,194.24
Percentage share	%	1.39	1.33	0.41	3.78	4.29
Supplied to KE	GWh	5,059.00	5,077.00	5,128.20	4,936.71	5,003.00
Percentage share	%	6.21	5.86	5.29	5.00	5.12
<b>Total in CPPA-G area</b>	<b>GWh</b>	<b>81,489.76</b>	<b>86,634.70</b>	<b>97,030.39</b>	<b>98,824.06</b>	<b>97,793.75</b>
<b>Percentage share</b>	<b>%</b>	<b>86.37</b>	<b>86.97</b>	<b>87.50</b>	<b>87.35</b>	<b>87.26</b>
<b>KE System</b>						
Domestic	GWh	6,596.00	6,643.00	7,169.68	7,298.83	7,489.00
Percentage share	%	51.27	51.17	51.73	50.98	52.46
Commercial	GWh	1,685.00	1,655.00	1,758.22	1,780.58	1,615.00
Percentage share	%	13.10	12.75	12.69	12.44	11.31
Industrial	GWh	3,830.00	3,885.00	4,123.85	4,402.12	4,158.00
Percentage share	%	29.77	29.93	29.75	30.75	29.13
Agricultural	GWh	163.00	159.00	151.49	134.30	116.00
Percentage share	%	1.27	1.22	1.09	0.94	0.81
Public Lighting	GWh	163.00	187.00	156.54	160.48	112.00
Percentage share	%	1.27	1.44	1.13	1.12	0.78
Bulk Supply	GWh	412.00	433.00	471.10	477.22	468.00
Percentage share	%	3.20	3.34	3.40	3.33	3.28
Others	GWh	15.00	19.00	29.44	64.58	318.00
Percentage share	%	0.12	0.15	0.21	0.45	2.23
<b>Total in KE area</b>	<b>GWh</b>	<b>12,864.00</b>	<b>12,981.00</b>	<b>13,860.32</b>	<b>14,318.11</b>	<b>14,276.00</b>
<b>Percentage share</b>	<b>%</b>	<b>13.63</b>	<b>13.03</b>	<b>12.50</b>	<b>12.65</b>	<b>12.74</b>
<b>Country</b>						
Domestic	GWh	43,537.29	48,061.48	53,333.48	52,889.17	55,132.43
Percentage share	%	46.14	48.25	48.10	46.75	49.19
Commercial	GWh	7,096.43	7,769.63	8,511.55	8,382.08	7,874.48
Percentage share	%	7.52	7.80	7.68	7.41	7.03
Industrial	GWh	24,977.75	23,951.60	27,398.02	28,686.69	25,647.04
Percentage share	%	26.47	24.04	24.71	25.35	22.88
Agricultural	GWh	8,525.27	9,222.16	10,135.17	9,809.81	9,758.17
Percentage share	%	9.04	9.26	9.14	8.67	8.71
Public Lighting	GWh	457.64	485.30	475.49	449.86	384.58
Percentage share	%	0.49	0.49	0.43	0.40	0.34
Bulk Supply	GWh	3,550.90	3,878.82	5,485.24	4,188.97	3,757.83
Percentage share	%	3.76	3.89	4.95	3.70	3.35
Others	GWh	1,149.49	1,169.71	423.56	3,798.88	4,512.24
Percentage share	%	1.22	1.17	0.38	3.36	4.03
Supplied to KE by CPPA-G	GWh	5,059.00	5,077.00	5,128.20	4,936.71	5,003.00
Percentage share	%	5.36	5.10	4.62	4.36	4.46
<b>Total in the Country</b>	<b>GWh</b>	<b>94,353.76</b>	<b>99,615.70</b>	<b>110,890.71</b>	<b>113,142.17</b>	<b>112,069.75</b>
<b>Percentage share</b>	<b>%</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: DISCOs/KE



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**TABLE 69**  
**Category-wise Consumers and their Electricity Consumption (%)**

		2015-16	2016-17	2017-18	2018-19	2019-20
<b>CPPA-G Area (Consumers and Consumption in percentage to the total)</b>						
Domestic	Consumers	85.82	86.00	85.94	85.92	86.13
	Consumption	45.33	47.81	47.58	46.13	48.72
Commercial	Consumers	11.48	11.36	11.22	11.04	10.83
	Consumption	6.64	7.06	6.96	6.68	6.40
Industrial	Consumers	1.33	1.31	1.26	1.20	1.16
	Consumption	25.95	23.16	23.99	24.57	21.97
Agricultural	Consumers	1.31	1.27	1.17	1.15	1.15
	Consumption	10.26	10.46	10.29	9.79	9.86
Public Lighting	Consumers	0.04	0.04	0.04	0.04	0.04
	Consumption	0.36	0.34	0.33	0.29	0.28
Bulk Supply	Consumers	0.02	0.02	0.02	0.02	0.01
	Consumption	3.85	3.98	5.17	3.76	3.36
Others	Consumers	0.00	0.00	0.36	0.63	0.67
	Consumption	1.39	1.33	0.41	3.78	4.29
Supplied to KE	Consumption	6.21	5.86	5.29	5.00	5.12
<b>KE Area (Consumers and Consumption in percentage to the total)</b>						
Domestic	Consumers	78.97	80.20	81.15	81.86	82.70
	Consumption	51.27	51.17	51.73	50.98	52.46
Commercial	Consumers	19.97	18.82	17.95	16.90	15.91
	Consumption	13.10	12.75	12.69	12.44	11.31
Industrial	Consumers	0.93	0.86	0.80	0.74	0.76
	Consumption	29.77	29.93	29.75	30.75	29.13
Agricultural	Consumers	0.12	0.11	0.09	0.08	0.08
	Consumption	1.27	1.22	1.09	0.94	0.81
Public Lighting	Consumers	0.00	0.00	0.00	0.00	0.00
	Consumption	1.27	1.44	1.13	1.12	0.78
Bulk Supply	Consumers	0.01	0.01	0.01	0.01	0.01
	Consumption	3.20	3.34	3.40	3.33	3.28
Others	Consumers	0.00	0.00	0.00	0.41	0.54
	Consumption	0.12	0.15	0.21	0.45	2.23
<b>Country (Consumers and Consumption in percentage to the total)</b>						
Domestic	Consumers	85.25	85.50	85.52	85.56	85.83
	Consumption	46.14	48.25	48.10	46.75	49.19
Commercial	Consumers	12.19	12.01	11.80	11.57	11.29
	Consumption	7.52	7.80	7.68	7.41	7.03
Industrial	Consumers	1.30	1.27	1.22	1.16	1.13
	Consumption	26.47	24.04	24.71	25.35	22.88
Agricultural	Consumers	1.21	1.16	1.08	1.05	1.05
	Consumption	9.04	9.26	9.14	8.67	8.71
Public Lighting	Consumers	0.04	0.04	0.04	0.03	0.03
	Consumption	0.49	0.49	0.43	0.40	0.34
Bulk Supply	Consumers	0.02	0.02	0.02	0.01	0.01
	Consumption	3.76	3.89	4.95	3.70	3.35
Others	Consumers	0.00	0.00	0.33	0.61	0.66
	Consumption	1.22	1.17	0.38	3.36	4.03
Supplied to KE by CPPA-G	Consumption	5.36	5.10	4.62	4.36	4.46

Source: DISCOs/KE

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**TABLE 70**  
**Annual Growth Rate of Electricity Consumption**

		2015-16	2016-17	2017-18	2018-19	2019-20
<b>CPPA-G Area</b>						
Domestic	GWh	36,941.29	41,418.48	46,163.80	45,590.34	47,643.43
	%	8.09	12.12	11.46	-1.24	4.50
Commercial	GWh	5,411.43	6,114.63	6,753.33	6,601.50	6,259.48
	%	11.86	12.99	10.45	-2.25	-5.18
Industrial	GWh	21,147.75	20,066.60	23,274.17	24,284.57	21,489.04
	%	0.35	-5.11	15.98	4.34	-11.51
Agricultural	GWh	8,362.27	9,063.16	9,983.68	9,675.51	9,642.17
	%	6.53	8.38	10.16	-3.09	-0.34
Public Lighting	GWh	294.64	298.30	318.95	289.38	272.58
	%	-24.70	1.24	6.92	-9.27	-5.81
Bulk Supply	GWh	3,138.90	3,445.82	5,014.14	3,711.75	3,289.83
	%	-18.39	9.78	45.51	-25.97	-11.37
Others	GWh	1,134.49	1,150.71	394.12	3,734.30	4,194.24
	%	3336.18	1.43	-65.75	847.50	12.32
Supplied to KE	GWh	5,059.00	5,077.00	5,128.20	4,936.71	5,003.00
	%	-6.78	0.36	1.01	-3.73	1.34
<b>Total</b>	<b>GWh</b>	<b>81,489.76</b>	<b>86,634.70</b>	<b>97,030.39</b>	<b>98,824.06</b>	<b>97,793.75</b>
<b>Percentage change</b>	<b>%</b>	<b>4.96</b>	<b>6.31</b>	<b>12.00</b>	<b>1.85</b>	<b>-1.04</b>
<b>KE Area</b>						
Domestic	GWh	6,596.00	6,643.00	7,169.68	7,298.83	7,489.00
	%	7.25	0.71	7.93	1.80	2.61
Commercial	GWh	1,685.00	1,655.00	1,758.22	1,780.58	1,615.00
	%	5.31	-1.78	6.24	1.27	-9.30
Industrial	GWh	3,830.00	3,885.00	4,123.85	4,402.12	4,158.00
	%	-0.36	1.44	6.15	6.75	-5.55
Agricultural	GWh	163.00	159.00	151.49	134.30	116.00
	%	-1.81	-2.45	-4.72	-11.35	-13.63
Public Lighting	GWh	163.00	187.00	156.54	160.48	112.00
	%	48.18	14.72	-16.29	2.52	-30.21
Bulk Supply	GWh	412.00	433.00	471.10	477.22	468.00
	%	0.49	5.10	8.80	1.30	-1.93
Others	GWh	15.00	19.00	29.44	64.58	318.00
	%	15.38	26.67	54.95	119.36	392.41
<b>Total</b>	<b>GWh</b>	<b>12,864.00</b>	<b>12,981.00</b>	<b>13,860.32</b>	<b>14,318.11</b>	<b>14,276.00</b>
<b>Percentage change</b>	<b>%</b>	<b>4.64</b>	<b>0.91</b>	<b>6.77</b>	<b>3.30</b>	<b>-0.29</b>
<b>Country</b>						
Domestic	GWh	43,537.29	48,061.48	53,333.48	52,889.17	55,132.43
	%	7.96	10.39	10.97	-0.83	4.24
Commercial	GWh	7,096.43	7,769.63	8,511.55	8,382.08	7,874.48
	%	10.23	9.49	9.55	-1.52	-6.06
Industrial	GWh	24,977.75	23,951.60	27,398.02	28,686.69	25,647.04
	%	0.24	-4.11	14.39	4.70	-10.60
Agricultural	GWh	8,525.27	9,222.16	10,135.17	9,809.81	9,758.17
	%	6.35	8.17	9.90	-3.21	-0.53
Public Lighting	GWh	457.64	485.30	475.49	449.86	384.58
	%	-8.71	6.04	-2.02	-5.39	-14.51
Bulk Supply	GWh	3,550.90	3,878.82	5,485.24	4,188.97	3,757.83
	%	-16.57	9.23	41.42	-23.63	-10.29
Others	GWh	1,149.49	1,169.71	423.56	3,798.88	4,512.24
	%	2398.02	1.76	-63.79	796.89	18.78
Supplied to KE by CPPA-G	GWh	5,059.00	5,077.00	5,128.20	4,936.71	5,003.00
	%	-6.78	0.36	1.01	-3.73	1.34
<b>Total</b>	<b>GWh</b>	<b>94,353.76</b>	<b>99,615.70</b>	<b>110,890.71</b>	<b>113,142.17</b>	<b>112,069.75</b>
<b>Percentage change</b>	<b>%</b>	<b>4.92</b>	<b>5.58</b>	<b>11.32</b>	<b>2.03</b>	<b>-0.95</b>

Source: Distribution Companies / KE

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TABLE 71  
Average Annual Electricity Consumption per Connection (kWh)

DISCO	Year	Domestic	Commercial	Industrial	Agricultural	Public Lighting	Bulk Supply	Others	Overall
PESCO	2015-16	1657.77	2267.11	62675.94	3527.02	12175.97	324275.78	3523289.47	2535.24
	2016-17	1740.49	2298.00	66561.53	3568.21	12169.12	641261.06	45625.00	2647.77
	2017-18	1694.48	2282.04	77727.30	3418.10	12290.15	694594.59	1347.45	2640.58
	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
TESCO	2015-16	2196.12	264.88	21284.40	5499.94	0.00	136363.64	0.00	2328.25
	2016-17	2528.29	241.70	34291.78	7375.76	0.00	124590.16	0.00	2776.68
	2017-18	2971.49	207.16	53345.83	6866.62	0.00	150701.75	2216.26	3349.56
	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
IESCO	2015-16	1882.37	2568.65	107428.94	11817.20	41447.75	1230593.61	5630872.48	3422.35
	2016-17	2006.76	2864.58	109149.51	12577.05	41389.21	1066199.55	7543624.16	3602.21
	2017-18	2093.52	3042.92	115966.49	13415.48	41215.22	2577404.06	4803.79	3738.12
	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
GEPCO	2015-16	1740.89	1471.04	37221.13	7938.68	12479.32	2131732.03	69937.50	2648.59
	2016-17	1863.41	1626.50	36268.38	8338.30	13661.20	2264076.43	55625.00	2766.42
	2017-18	2012.45	1758.37	38484.51	8952.16	13685.12	2328536.59	1725625.00	2972.35
	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
LESCO	2015-16	2121.32	2499.42	86648.24	20351.06	41740.80	1049775.51	34481.33	4223.30
	2016-17	2294.19	2736.35	75617.96	20054.30	39265.68	1153830.65	29959.35	4156.84
	2017-18	2344.15	2975.97	90129.60	20776.63	46741.26	1324468.94	32369.48	4446.50
	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
FESCO	2015-16	1603.28	1580.53	82216.29	19752.97	5146.87	1580616.74	38455.28	2982.61
	2016-17	1740.38	1786.19	77908.61	22916.95	6762.20	1490000.00	32968.75	3073.79
	2017-18	1882.06	1924.26	85588.68	26162.32	7207.68	1460129.31	2029.78	3269.45
	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
MEPCO	2015-16	1395.96	1476.29	54029.33	23979.90	11305.25	512814.65	67177.42	2296.04
	2016-17	1498.24	1644.98	42263.36	28402.05	13414.97	559600.89	54596.77	2324.56
	2017-18	1657.20	1801.35	54052.80	32853.82	13634.54	637369.57	55000.00	2610.54
	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
HESCO	2015-16	2538.04	1853.89	54966.86	25043.49	67035.65	276407.19	36868.69	3706.81
	2016-17	2502.39	1971.06	47105.73	23159.20	65388.89	281940.30	38877.55	3537.86
	2017-18	2669.86	1974.54	50862.37	27150.76	69703.70	310356.08	6682.99	3726.20
	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
SEPCO	2015-16	2286.43	1725.04	34721.48	19085.02	102753.62	296964.29	79473.68	3293.32
	2016-17	2781.61	1999.85	34829.45	20199.26	95242.72	348422.09	71052.63	3783.21
	2017-18	2982.71	1832.83	36758.72	26589.31	64821.85	342947.98	5165.47	3975.28
	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
QESCO	2015-16	1373.24	1054.81	36252.00	103585.89	15298.80	443073.77	17500.00	7315.75
	2016-17	1438.42	1111.12	39486.72	107385.31	19370.08	454624.51	27500.00	7526.95
	2017-18	1483.35	1127.15	46391.42	127192.36	31132.08	468045.98	8258.95	8072.15
	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
Total in CPPA-G System	2015-16	1755.71	1922.88	64907.04	26044.76	29906.52	750393.26	1333124.56	3117.50
	2016-17	1883.39	2104.49	59714.03	28013.87	29479.20	804158.69	1383064.90	3189.36
	2017-18	1989.75	2230.25	68483.05	31593.92	30591.79	1155331.80	4062.46	3404.22
	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
KE	2015-16	3750.99	3789.18	185687.97	62142.58	2263888.89	2049751.24	15000000.00	5777.22
	2016-17	3414.16	3625.28	186170.21	60710.19	2561643.84	2175879.40	19000000.00	5350.79
	2017-18	3419.91	3791.96	199731.20	63173.48	2115405.41	2428350.52	29440000.00	5365.07
	2018-19	3175.32	3751.54	211213.90	57664.23	1725591.40	2538404.26	5677.36	5098.92
	2019-20	3060.32	3430.50	184365.72	51078.82	1244444.44	2674285.71	19746.65	4824.44

Source: Distribution Companies / KE

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**TABLE 72**  
**Distribution Losses (voltage category-wise)**

DISCO	Losses of	2015-16		2016-17		2017-18		2018-19		2019-20	
		GWh	%	GWh	%	GWh	%	GWh	%	GWh	%
PESCO	132 kV system (including 66 & 33 kV)	431.70	3.70	385.00	3.10	393.00	2.80	221.80	1.60	273.70	1.90
	11 kV and below system	3536.40	31.20	3693.50	30.50	5031.80	36.40	5006.40	35.60	5433.50	37.50
	Overall system	3968.09	33.77	4078.93	32.60	5424.77	38.15	5228.24	36.56	5707.25	38.69
TESCO	132 kV system (including 66 & 33 kV)	48.86	3.85	44.95	3.10	45.00	2.66	40.79	2.24	87.76	4.08
	11 kV and below system	191.62	15.10	177.92	12.27	166.03	10.07	177.21	9.96	260.24	12.61
	Overall system	240.52	18.95	223.45	15.40	210.97	12.46	217.94	11.97	348.24	16.19
IESCO	132 kV system (including 66 & 33 kV)	162.15	1.68	201.00	1.90	215.00	1.84	212.00	1.79	199.00	1.74
	11 kV and below system	715.53	7.54	754.00	7.26	850.00	7.42	837.00	7.20	795.00	7.07
	Overall system	878.00	9.10	955.09	9.03	1067.03	9.14	1048.74	8.86	993.49	8.69
GEPCO	132 kV system (including 66 & 33 kV)	141.65	1.57	147.55	1.51	142.10	1.29	138.17	1.24	120.87	1.10
	11 kV and below system	814.99	9.15	853.38	8.86	957.50	8.83	957.50	8.73	924.71	8.51
	Overall system	956.65	10.58	1000.78	10.23	1099.61	10.01	1095.62	9.87	1045.56	9.51
LESCO	132 kV system (including 66 & 33 kV)	275.54	1.37	233.93	1.10	236.66	1.00	228.67	0.90	114.91	0.50
	11 kV and below system	2534.41	12.80	2604.85	12.80	3046.04	13.00	2977.77	12.40	2802.65	12.00
	Overall system	2809.94	13.94	2838.73	13.77	3282.74	13.83	3206.45	13.17	2918.33	12.40
FESCO	132 kV system (including 66 & 33 kV)	178.80	1.48	244.28	1.90	285.83	1.98	254.47	1.70	218.42	1.50
	11 kV and below system	1044.97	8.82	1109.92	8.80	1235.87	8.73	1214.76	8.26	1168.66	8.20
	Overall system	1220.06	10.24	1359.04	10.57	1521.84	10.53	1469.07	9.81	1396.09	9.62
MEPCO	132 kV system (including 66 & 33 kV)	436.05	2.91	433.15	2.70	443.91	2.30	352.88	1.80	294.78	1.51
	11 kV and below system	1993.54	13.90	2265.24	14.60	2708.85	14.60	2704.17	14.20	2650.66	13.90
	Overall system	2429.58	16.45	2698.38	16.92	3152.75	16.59	3057.04	15.79	2942.75	15.23
HESCO	132 kV system (including 66 & 33 kV)	177.74	3.60	206.10	3.70	213.00	3.71	212.90	3.83	157.64	2.88
	11 kV and below system	1168.45	23.80	1448.90	27.20	1502.90	27.18	1425.90	25.67	1423.22	26.04
	Overall system	1346.19	26.47	1638.31	30.59	1716.06	29.88	1638.47	29.49	1575.36	28.82
SEPCO	132 kV system (including 66 & 33 kV)	130.38	3.11	147.64	3.29	115.21	2.46	104.89	2.38	76.03	1.79
	11 kV and below system	1436.84	35.53	1518.95	35.27	1518.95	35.27	1485.99	34.83	1423.4	34.44
	Overall system	1773.82	42.35	1694.92	37.81	1715.92	36.67	1631.02	36.97	1542.38	36.27
QESCO	132 kV system (including 66 & 33 kV)	104.59	1.89	114.96	1.99	117.09	1.85	99.54	1.60	127.10	1.90
	11 kV and below system	1213.60	22.30	1220.70	21.50	1301.21	20.90	1373.18	22.30	1634.91	25.20
	Overall system	1318.17	23.80	1336.18	23.08	1422.43	22.44	1472.64	23.56	1762.00	26.68
<b>Total Distribution Losses in CPPA-G System</b>		<b>16941.02</b>	<b>18.14</b>	<b>17823.81</b>	<b>17.93</b>	<b>20614.12</b>	<b>18.32</b>	<b>20065.23</b>	<b>17.61</b>	<b>20231.44</b>	<b>17.90</b>
KE	132 kV system (including 66 & 33 kV)	218.41	1.32	250.00	1.51	159.48	0.92	214.93	1.21	198.00	1.11
	11 kV and below system	3462.00	21.20	3349.00	20.51	3398.88	19.69	3163.78	18.10	3311.00	18.83
	Overall system	4440.00	25.66	4371.00	25.19	4311.52	23.73	4208.72	22.72	4251.68	22.95

Source: Distribution Companies / KE

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**TABLE 73**  
**Province-wise Electricity Consumption by Economic Groups of the Country (GWh)**

Category	Year	Punjab*	Sindh**	Khyber Pakhtunkhwa#	Balochistan##	K-Electric	Total
Domestic	2015-16	27540.44	3444.46	5362.79	593.60	6596.00	43537.29
	2016-17	31075.42	3805.50	5900.49	637.07	6643.00	48061.48
	2017-18	35266.46	4101.62	6123.42	672.30	7169.68	53333.48
	2018-19	35239.00	3752.41	6041.45	557.48	7298.83	52889.17
	2019-20	36357.29	4159.90	6514.32	611.92	7489.00	55132.43
Commercial	2015-16	4105.03	481.53	710.11	114.76	1685.00	7096.43
	2016-17	4699.82	543.51	746.36	124.94	1655.00	7769.63
	2017-18	5312.42	534.00	775.86	131.05	1758.22	8511.55
	2018-19	5172.76	504.39	796.91	127.44	1780.58	8382.08
	2019-20	4871.69	471.15	779.86	136.78	1615.00	7874.48
Industrial	2015-16	17724.41	1243.35	2043.90	136.09	3830.00	24977.75
	2016-17	16476.36	1160.39	2276.76	153.09	3885.00	23951.60
	2017-18	19326.63	1224.95	2549.55	173.04	4123.85	27398.02
	2018-19	20269.96	1173.08	2669.79	171.74	4402.12	28686.69
	2019-20	17908.23	1082.47	2337.71	160.63	4158.00	25647.04
Agricultural	2015-16	4313.30	659.00	126.60	3263.37	163.00	8525.27
	2016-17	4867.26	645.65	132.82	3417.43	159.00	9222.16
	2017-18	5482.46	617.96	120.91	3762.35	151.49	10135.17
	2018-19	5630.87	374.09	103.15	3567.40	134.30	9809.81
	2019-20	5673.10	295.24	101.77	3572.06	116.00	9758.17
Public Lighting	2015-16	199.66	78.27	12.87	3.84	163.00	457.64
	2016-17	205.59	74.55	13.24	4.92	187.00	485.30
	2017-18	232.30	64.93	13.47	8.25	156.54	475.49
	2018-19	219.37	47.90	13.03	9.08	160.48	449.86
	2019-20	230.15	19.90	12.93	9.60	112.00	384.58
Bulk Supply	2015-16	2501.45	241.99	287.35	108.11	412.00	3550.90
	2016-17	2472.40	271.10	587.30	115.02	433.00	3878.82
	2017-18	3958.31	282.58	651.09	122.16	471.10	5485.24
	2018-19	2618.18	289.65	677.20	126.72	477.22	4188.97
	2019-20	2234.61	266.40	661.88	126.94	468.00	3757.83
Others	2015-16	861.49	5.16	267.77	0.07	15.00	1149.49
	2016-17	1143.25	5.16	2.19	0.11	19.00	1169.71
	2017-18	140.49	163.73	43.08	46.82	29.44	423.56
	2018-19	2584.54	555.77	375.09	218.90	64.58	3798.88
	2019-20	3227.76	305.04	437.36	224.08	318.00	4512.24
Total	2015-16	57245.77	6153.76	8811.39	4219.84	12864.00	89294.76
	2016-17	60940.10	6505.86	9659.16	4452.58	12981.00	94538.70
	2017-18	69719.07	6989.77	10277.38	4915.97	13860.32	105762.51
	2018-19	71734.68	6697.29	10676.62	4778.76	14318.11	108205.46
	2019-20	70502.83	6600.10	10845.81	4842.01	14276.00	107066.75

\* Islamabad Capital Territory is included

# FATA is included

Source: Distribution Companies / KE

\*\* Consumption in KE Area is not included

## Area served by KE is excluded



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**TABLE 74**  
**Province-wise Electricity Consumption by Economic Groups of the Country (%)**

Category	Year	Punjab*	Sindh**	Khyber Pakhtunkhwa#	Balochistan##	K-Electric	Total
Domestic	2015-16	48.11	55.97	60.86	14.07	51.27	48.76
	2016-17	50.99	58.49	61.09	14.31	51.17	50.84
	2017-18	50.58	58.68	59.58	13.68	51.73	50.43
	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
Commercial	2015-16	7.17	7.82	8.06	2.72	13.10	7.95
	2016-17	7.71	8.35	7.73	2.81	12.75	8.22
	2017-18	7.62	7.64	7.55	2.67	12.69	8.05
	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
Industrial	2015-16	30.96	20.20	23.20	3.23	29.77	27.97
	2016-17	27.04	17.84	23.57	3.44	29.93	25.34
	2017-18	27.72	17.52	24.81	3.52	29.75	25.91
	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
Agricultural	2015-16	7.53	10.71	1.44	77.33	1.27	9.55
	2016-17	7.99	9.92	1.38	76.75	1.22	9.75
	2017-18	7.86	8.84	1.18	76.53	1.09	9.58
	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
Public Lighting	2015-16	0.35	1.27	0.15	0.09	1.27	0.51
	2016-17	0.34	1.15	0.14	0.11	1.44	0.51
	2017-18	0.33	0.93	0.13	0.17	1.13	0.45
	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
Bulk Supply	2015-16	4.37	3.93	3.26	2.56	3.20	3.98
	2016-17	4.06	4.17	6.08	2.58	3.34	4.10
	2017-18	5.68	4.04	6.34	2.48	3.40	5.19
	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
Others	2015-16	1.50	0.08	3.04	0.00	0.12	1.29
	2016-17	1.88	0.08	0.02	0.00	0.15	1.24
	2017-18	0.20	2.34	0.42	0.95	0.21	0.40
	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
Total	2015-16	100.00	100.00	100.00	100.00	100.00	100.00
	2016-17	100.00	100.00	100.00	100.00	100.00	100.00
	2017-18	100.00	100.00	100.00	100.00	100.00	100.00
	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

\* Islamabad Capital Territory is included \*\* Consumption in KE Area is not included # FATA is included ## Area served by KE is excluded  
Source: Distribution Companies / KE

**TABLE 75**  
**Safety (No. of Fatal Accidents for both Employees and Public)**

DISCO	2015-16	2016-17	2017-18	2018-19	2019-20
PESCO	23	20	10	16	31
TESCO	00	00	00	00	06
IESCO	19	15	20	29	18
GEPCO	12	16	29	12	08
LESCO	24	29	21	09	07
FESCO	15	15	07	08	13
MEPCO	20	10	17	14	15
HESCO	24	03	15	12	08
SEPCO	17	20	17	12	13
QESCO	5	11	06	09	06
KE	13	08	10	54	43
<b>Total</b>	<b>172</b>	<b>147</b>	<b>152</b>	<b>175</b>	<b>168</b>

Source: Distribution Companies / KE

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**TABLE 76**  
**Details of Subsidies to Electricity Consumers (Rs. in Million)**

		TDS	ISP	AQTA	ZRIR	Others	Total
<b>PESCO</b>							
2015-16	Accrued	27,911.55	387.60				28,299.15
	Paid	29,618.10					29,618.10
2016-17	Accrued	29,466.56	1,759.67				31,226.23
	Paid	35,611.49	1,172.00				36,783.49
2017-18	Accrued	32,265.10	2,419.66				34,684.76
	Paid	18,595.27	7,642.00				26,237.27
2018-19	Accrued	51,590.89	6,785.36		257.00		58,633.25
	Paid	46,048.05					46,048.05
2019-20	Accrued	50,303.41	921.68	11,253.43	384.80		62,863.32
	Paid	41,059.52	830.82				41,890.34
<b>IESCO</b>							
2015-16	Accrued	(9,949.89)	451.08				(9,498.81)
	Paid	(8,913.43)					(8,913.43)
2016-17	Accrued	(11,640.26)	1,465.12				(10,175.14)
	Paid	(14,067.71)	1,046.00				(13,021.71)
2017-18	Accrued	(10,418.09)	1,864.50				(8,553.59)
	Paid	(8,219.71)	5,908.00				(2,311.71)
2018-19	Accrued	(2,577.77)	5,098.60		489.03		3,009.86
	Paid	(3,125.00)					(3,125.00)
2019-20	Accrued	(6,067.12)	559.02	848.39	544.30		(4,115.41)
	Paid	(5,753.48)	514.27				(5,239.21)
<b>GEPCO</b>							
2015-16	Accrued	23,418.68	509.58				23,928.26
	Paid	25,752.94					25,752.94
2016-17	Accrued	26,148.49	2,135.25				28,283.74
	Paid	31,601.46	1,444.00				33,045.46
2017-18	Accrued	21,424.37	2,995.01				24,419.38
	Paid	17,709.39	8,868.00				26,577.39
2018-19	Accrued	7,577.45	7,534.46		279.24		15,391.15
	Paid	2,555.94					2,555.94
2019-20	Accrued	15,550.44	643.84	2,090.92	382.45		18,667.65
	Paid	12,800.52	553.83				13,354.35
<b>LESCO</b>							
2015-16	Accrued	(20,553.74)	1,798.39				(18,755.35)
	Paid	(20,342.14)					(20,342.14)
2016-17	Accrued	(17,517.36)	5,532.03				(11,985.33)
	Paid	(21,170.41)	4,001.00				(17,169.41)
2017-18	Accrued	(19,716.64)	8,790.85				(10,925.79)
	Paid	(13,334.09)	25,329.00				11,994.91
2018-19	Accrued	5,917.36	21,054.59		4,769.85		31,741.80
	Paid	(2,464.48)					(2,464.48)
2019-20	Accrued	17,897.17	1,628.96	2,478.84	5,349.81		27,354.78
	Paid	14,137.95	1,341.73				15,479.68
<b>FESCO</b>							
2015-16	Accrued	(3,327.13)	957.82				(2,369.31)
	Paid	(1,713.12)					(1,713.12)
2016-17	Accrued	(489.48)	3,255.30				2,765.82
	Paid	(591.55)	2,300.00				1,708.45
2017-18	Accrued	3,215.71	4,714.36				7,930.07
	Paid	(88.00)	13,411.00				13,323.00
2018-19	Accrued	28,741.62	10,904.45		5,437.47		45,083.54
	Paid	19,597.64					19,597.64
2019-20	Accrued	35,916.94	922.55	3,680.16	5,745.73		46,265.38
	Paid	28,924.05	799.03				29,723.08

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		TDS	ISP	AQTA	ZRIR	Others	Total
<b>MEPCO</b>							
2015-16	Accrued	16,098.72	860.02				16,958.74
	Paid	19,941.24					19,941.24
2016-17	Accrued	22,181.23	2,126.91				24,308.14
	Paid	26,806.88	1,602.00				28,408.88
2017-18	Accrued	30,711.83	3,956.99				34,668.82
	Paid	16,134.29	10,043.00				26,177.29
2018-19	Accrued	62,405.43	7,914.87		1,971.45		72,291.75
	Paid	50,625.69					50,625.69
2019-20	Accrued	68,130.80	659.38	10,273.49	1,301.03		80,364.70
	Paid	55,230.93	548.88				55,779.81
<b>HESCO</b>							
2015-16	Accrued	1,628.79	248.16				1,876.95
	Paid	1,961.49					1,961.49
2016-17	Accrued	1,521.89	771.15				2,293.04
	Paid	1,839.26	556.00				2,395.26
2017-18	Accrued	6,254.79	953.89				7,208.68
	Paid	2,053.96	2,671.00				4,724.96
2018-19	Accrued	22,369.08	2,162.48		156.80		24,688.36
	Paid	21,026.01					21,026.01
2019-20	Accrued	17,656.85	218.74	2,915.41	261.40		21,052.40
	Paid	14,671.89	167.71				14,839.60
<b>SEPCO</b>							
2015-16	Accrued	6,133.86	183.78				6,317.64
	Paid	6,303.23					6,303.23
2016-17	Accrued	5,578.62	476.98				6,055.60
	Paid	6,741.98	317.00				7,058.98
2017-18	Accrued	6,208.19	661.28				6,869.47
	Paid	2,899.12	1,594.00				4,493.12
2018-19	Accrued	10,077.43	1,238.80				11,316.23
	Paid	10,070.71					10,070.71
2019-20	Accrued	7,083.57	194.67	1,609.01			8,887.25
	Paid	5,858.41	188.65				6,047.06
<b>TESCO</b>						<b>Fata Receivables</b>	
2015-16	Accrued	5,378.26	40.00			9,753.13	15,171.39
	Paid	5,511.06				18,868.00	24,379.06
2016-17	Accrued	6,252.72	152.13			11,193.61	17,598.46
	Paid	7,556.65	105.00			9,900.00	17,561.65
2017-18	Accrued	6,506.53	258.23			12,308.49	19,073.25
	Paid	4,577.12	977.00			8,123.70	13,677.82
2018-19	Accrued	3,344.12	951.45			16,144.67	20,440.24
	Paid	3,602.39				10,961.27	14,563.66
2019-20	Accrued	2,797.11	102.51	(32,245.41)		14,637.02	(14,708.77)
	Paid	2,155.58	97.26			15,571.40	17,824.24
<b>QESCO</b>						<b>QESCO 40%</b>	
2015-16	Accrued	13,378.82	37.47			7,205.95	20,622.24
	Paid	13,880.63				10,621.00	24,501.63
2016-17	Accrued	13,863.82	139.18			7,216.78	21,219.78
	Paid	16,754.96	95.70			1,680.00	18,530.66
2017-18	Accrued	11,535.14	177.49			7,293.99	19,006.62
	Paid	8,419.66	567.00				8,986.66
2018-19	Accrued	3,993.51	507.72			6,931.00	11,432.23
	Paid	1,655.56				4,860.00	6,515.56
2019-20	Accrued	10,278.93	76.52	414.19		3,542.97	14,312.61
	Paid	8,124.64	70.31			3,542.97	11,737.92

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		TDS	ISP	AQTA	ZRIR		Total
<b>KE</b>						<b>KE 40%</b>	
2015-16	Accrued	31,272.17	4,884.10			325.45	36,481.72
	Paid	53,400.00					53,400.00
2016-17	Accrued	10,510.98	11,469.52			362.41	22,342.91
	Paid	10,924.36	4,655.00			600.00	16,179.36
2017-18	Accrued	12,096.92	12,369.58			191.86	24,658.36
	Paid	10,980.77	2,084.00			292.56	13,357.33
2018-19	Accrued	11,377.59	12,410.34			514.00	24,301.93
	Paid	10,849.52				493.38	11,342.90
2019-20	Accrued	(3,247.39)					(3,247.39)
	Paid	25,000.00					25,000.00
		<b>Total TDS</b>	<b>Total ISP</b>	<b>Total AQTA</b>	<b>Total ZRIR</b>	<b>Total (FATA Receivable, QESCO 40% and KE 40%)</b>	<b>Grand Total</b>
2015-16	Accrued	91,390.09	10,358.00	-	-	17,284.53	119,032.62
	Paid	125,400.00	-	-	-	29,489.00	154,889.00
2016-17	Accrued	85,877.21	29,283.24	-	-	18,772.80	133,933.25
	Paid	102,007.37	17,293.70	-	-	12,180.00	131,481.07
2017-18	Accrued	100,083.85	39,161.84	-	-	19,794.34	159,040.03
	Paid	59,727.78	79,094.00	-	-	8,416.26	147,238.04
2018-19	Accrued	204,816.71	76,563.12	-	13,360.84	23,589.67	318,330.34
	Paid	160,442.03	-	-	-	16,314.65	176,756.68
2019-20	Accrued	216,300.71	5,927.87	3,318.43	13,969.52	18,179.99	257,696.52
	Paid	202,210.01	5,112.49	-	-	19,114.37	226,436.87

Note: Paid amount is inclusive of previous year(s) dues.

Source: Ministry of Energy (Power Division), Islamabad

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**TABLE 77**  
**Applications of New Connections Received, Energized and Pending**

DISCO	Year	Applications Received (Nos.)	Connection		Applications Pending (Nos.)
			Sanctioned (Nos.)	Load (kW)	
PESCO	2015-16	127,476	109,693	260,302	17,783
	2016-17	132,615	113,460	286,783	19,155
	2017-18	145,351	136,322	322,728	9,029
	2018-19	177,557	154,946	362,637	22,611
	2019-20	198,456	180,789	454,197	17,667
TESCO	2015-16	722	722	793	0
	2016-17	322	24	702	298
	2017-18	685	685	7,520	0
	2018-19	701	601	8,025	100
	2019-20	44	44	664	0
IESCO	2015-16	131,842	106,462	215,332	25,380
	2016-17	139,665	109,675	266,940	29,990
	2017-18	170,522	158,303	379,853	12,219
	2018-19	174,627	146,873	814,407	27,754
	2019-20	159,133	134,510	784,476	24,623
GEPSCO	2015-16	155,317	130,749	295,808	24,568
	2016-17	157,741	119,443	265,263	38,298
	2017-18	197,055	178,431	471,122	18,624
	2018-19	240,045	186,313	441,455	53,732
	2019-20	233,962	183,495	434,495	50,467
LESCO	2015-16	262,030	202,715	617,966	59,315
	2016-17	269,096	175,820	535,978	93,276
	2017-18	373,934	315,557	961,958	58,377
	2018-19	380,128	301,210	886,319	78,918
	2019-20	379,851	287,736	985,887	92,115
FESCO	2015-16	146,262	129,310	411,525	16,952
	2016-17	237,548	136,309	474,474	101,239
	2017-18	330,695	261,795	714,631	68,900
	2018-19	269,017	231,178	695,740	37,839
	2019-20	231,535	208,040	727,937	23,495
MEPCO	2015-16	274,755	271,735	625,712	3,020
	2016-17	303,128	297,447	682,824	5,681
	2017-18	432,931	372,907	1,129,124	60,024
	2018-19	425,683	355,023	1,006,082	70,660
	2019-20	426,571	359,506	106,792	67,065
HESCO	2015-16	27,915	31,825	94,710	-3,910
	2016-17	28,595	28,504	115,520	91
	2017-18	28,412	28,377	104,687	35
	2018-19	31,766	34,946	124,898	-3,180
	2019-20	27,376	29,020	148,070	-1,644
SEPCO	2015-16	13,484	10,786	36,254	2,698
	2016-17	9,316	7,511	25,982	1,805
	2017-18	8,818	8,440	47,439	378
	2018-19	17,976	16,824	52,030	1,152
	2019-20	29,081	26,684	62,547	2,397
QESCO	2015-16	14,939	11,929	1,832	3,010
	2016-17	17,321	13,739	1,952	3,582
	2017-18	18,417	17,452	26,198	965
	2018-19	16,780	15,597	32,124	1,183
	2019-20	n.p.	n.p.	n.p.	-
KE	2015-16	17,956	14,075	300,391	3,881
	2016-17	26,532	25,497	319,913	1,035
	2017-18	162,658	237,779	667,475	-75,121
	2018-19	193,125	252,483	881,408	-59,358
	2019-20	162,112	209,747	800,119	-47,635

Source: Distribution Companies / KE



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TABLE 78  
DISCOs' Number of Power Transformers, Capacities and their Loading Position

DISCO	As on 30 <sup>th</sup> 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	2016	180	32	8	220	4,929.80	305.95	29.50	5,265.25	104	16	4	124	56.36
	2017	189	31	10	230	5,449.50	286.25	37.50	5,773.25	93	16	4	113	49.13
	2018	198	30	8	236	5,768.50	286.25	32.00	6,086.75	107	12	6	125	52.97
	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
TESCO	2016	18	17	0	35	500.30	205.40	0.00	705.70	8	6	0	14	40.00
	2017	17	18	1	36	391.00	208.00	6.90	605.90	10	3	1	14	38.89
	2018	25	20	0	45	501.30	242.80	0.00	744.10	8	8	0	16	35.56
	2019	27	21	0	48	540.30	242.30	0.00	782.60	8	9	0	17	35.42
	2020	31	24	0	55	545.02	243.23	0.00	788.25	8	8	0	16	29.09
IESCO	2016	173	14	7	194	4,218.80	133.60	30.00	4,382.40	34	2	1	37	19.07
	2017	185	9	8	202	4,663.10	91.30	33.00	4,787.40	24	0	0	24	11.88
	2018	232	11	5	248	5,832.00	150.00	20.00	6,002.00	14	0	2	16	6.45
	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
GEPCO	2016	145	9	0	154	4,016.80	103.00	0.00	4,119.80	55	8	0	63	40.91
	2017	150	10	0	160	4,330.80	103.00	0.00	4,433.80	26	8	0	34	21.25
	2018	172	2	0	174	4,820.80	26.00	0.00	4,846.80	50	1	0	51	29.31
	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
LESCO	2016	316	17	0	333	8,972.00	215.30	0.00	9,187.30	139	12	0	151	45.35
	2017	337	14	0	351	9,673.00	176.30	0.00	9,849.30	117	10	0	14	3.99
	2018	370	3	0	373	11,053.50	39.00	0.00	11,092.50	60	0	0	60	16.09
	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
FESCO	2016	150	38	0	188	4,033.00	425.60	0.00	4,458.60	85	22	0	107	56.91
	2017	160	35	0	195	4,506.00	401.10	0.00	4,907.10	82	18	0	100	51.28
	2018	200	25	0	225	5,318.00	278.70	0.00	5,596.70	35	7	0	42	18.67
	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
MEPCO	2016	234	35	0	269	6,210.80	378.34	0.00	6,589.14	97	21	0	118	43.87
	2017	253	29	0	282	7,179.30	292.84	0.00	7,472.14	65	10	0	75	26.60
	2018	262	30	0	292	7,514.91	322.91	0.00	7,837.82	64	1	0	65	22.26
	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	119.00	0.00	8,364.00	16	21	0	37	12.25
HESCO	2016	87	22	0	109	1,833.40	211.10	0.00	2,044.50	67	7	0	74	67.89
	2017	102	17	0	119	2,264.90	146.10	0.00	2,411.00	54	5	0	59	49.58
	2018	105	16	0	121	2,430.40	133.10	0.00	2,563.50	45	4	0	49	40.50
	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

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DISCO	As on 30 <sup>th</sup> 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
SEPCO	2016	91	24	1	116	1,989.30	237.40	6.30	2,233.00	28	5	0	33	28.45
	2017	90	27	1	118	2,073.80	269.80	6.30	2,349.90	41	12	0	53	44.92
	2018	106	19	1	126	2,534.30	215.40	6.30	2,756.00	42	7	0	49	38.89
	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
QESCO	2016	102	14	9	125	2,294.00	85.00	114.00	2,493.00	57	9	0	66	52.80
	2017	110	14	36	160	2,631.00	122.00	144.00	2,897.00	65	10	0	75	46.88
	2018	126	9	40	175	3,092.00	78.00	160.00	3,330.00	50	5	0	55	31.43
	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
Total in CP&A-System	2016	1,496	222	25	1,743	38,998.20	2,300.69	179.80	41,478.69	674	108	5	787	45.15
	2017	1,593	204	56	1,853	43,162.40	2,096.69	227.70	45,486.79	577	92	5	561	30.28
	2018	1,796	165	54	2,015	48,865.71	1,772.16	218.30	50,856.17	475	45	8	528	26.20
	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	52,640.32	1,387.08	207.00	54,234.40	294	52	1	347	16.50
KE	2016	132	3	0	135	5,053.50	69.00	0.00	5,122.50	31	0	0	31	22.96
	2017	135	3	0	138	5,195.50	69.00	0.00	5,264.50	56	1	0	57	41.30
	2018	144	3	0	147	5,449.50	69.00	0.00	5,518.50	47	1	0	48	32.65
	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

Source: Distribution Companies / KE

TABLE 79

DISCOs' Number of Distribution Transformers, Capacities and their Loading Position

DISCO	As on 30 <sup>th</sup> 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	2016	60,365	5,219,525	15,221	5,321	4,090	19,311	31.99
	2017	72,078	5,594,115	11,235	5,321	4,477	21,033	29.18
	2018	74,104	5,741,775	3,183	924	2,076	6,183	8.34
	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
TESCO	2016	15,634	1,200,000	71	103	0	174	1.11
	2017	18,198	1,214,960	0	0	0	0	0.00
	2018	18,475	1,259,110	2,738	1,643	103	4,484	24.27
	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
IESCO	2016	45,438	3,754,000	1,990	1,051	64	3,105	6.83
	2017	46,359	3,832,000	1,830	990	48	2,868	6.19
	2018	47,830	3,934,000	2,516	996	258	3,770	7.88
	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
GEPCO	2016	60,080	3,730,820	905	428	215	1,548	2.58
	2017	61,661	3,828,990	863	410	202	1,475	2.39
	2018	64,344	4,087,000	908	606	227	1,741	2.71
	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

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DISCO	As on 30 <sup>th</sup> June	No. of Distribution Transformers	Capacity of Distribution Transformers (kVA)	Loading Position of Distribution Transformers (Nos.)				Total	%age
				80-90%	91-100%	Above 100%	Total		
LESCO	2016	97,048	7,476,000	16,426	9,240	16,286	41,952	43.23	
	2017	100,718	7,796,585	14,649	9,448	6,253	30,350	30.13	
	2018	105,185	8,230,625	13,674	9,471	5,259	28,404	27.00	
	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	
FESCO	2016	97,761	6,493,910	1,478	1,183	624	3,285	3.36	
	2017	100,276	6,626,000	1,176	540	127	1,843	1.84	
	2018	104,058	6,874,000	199	165	28	392	0.38	
	2019	108,652	7,084,000	497	99	18	614	0.57	
	2020	113,079	7,291,000	473	133	46	652	0.58	
MEPCO	2016	152,806	7,587,225	2,984	1,990	2,131	7,105	4.65	
	2017	156,460	7,799,800	3,540	2,530	2,058	8,128	5.19	
	2018	161,197	8,034,290	2,337	1,630	1,877	5,844	3.63	
	2019	169,938	8,383,000	2,269	1,588	1,816	5,673	3.34	
	2020	178,730	8,735,000	3,499	1,750	583	5,832	3.26	
HESCO	2016	35,334	1,729,350	3,540	3,438	1,358	8,336	23.59	
	2017	35,996	1,761,620	2,004	1,336	0	3,340	9.28	
	2018	36,670	1,807,275	711	447	224	1,382	3.77	
	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	
SEPCO	2016	35,029	1,947,465	3,707	1,814	922	6,443	18.39	
	2017	35,875	2,004,370	3,885	1,942	1,597	7,424	20.69	
	2018	37,562	2,097,125	1,980	993	763	3,736	9.95	
	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	
QESCO	2016	53,646	2,643,795	4,081	2,725	1,937	8,743	16.30	
	2017	55,770	2,752,000	4,191	2,735	1,947	8,873	15.91	
	2018	59,336	3,049,830	4,042	2,193	859	7,094	11.96	
	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	
Total in CP&A-C System	2016	653,141	41,782,090	50,403	21,972	27,627	100,002	15.31	
	2017	683,391	43,210,440	43,373	25,252	16,709	85,334	12.49	
	2018	708,761	45,115,030	32,288	19,068	11,674	63,030	8.89	
	2019	736,605	45,370,685	27,179	17,684	9,465	54,328	7.38	
	2020	765,115	46,921,296	28,975	20,140	7,577	56,692	7.41	
KF	2016	23,321	6,302,340	416	165	67	648	2.78	
	2017	25,667	7,230,425	354	140	57	551	2.15	
	2018	27,388	7,463,855	318	126	34	478	1.75	
	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	

Source: Distribution Companies / KF

**TABLE 80**  
**Feeders Outages Statistics of DISCOs (2019-20)**

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	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)
PESCO	Planned	303	89634	29	8620	1	235	13833	2258104	14166	2356593					
	Forced	311	43076	94	7531	7	5360	28724	2132235	29136	2188202					
	Total	614	132710	123	16151	8	5595	42557	4390339	43302	4544795					
TESCO	Planned	9	301	39	1350	5	143	2856	55782	3836	57576					
	Forced	71	5123	78	5713	107	1300	3783	32114	3112	44250					
	Total	80	5424	117	7063	112	1443	6639	87896	6948	101826					
IESCO	Planned	204	228000	10	4200	8	3360	17202	3271016	17424	3274590					
	Forced	0	0	0	0	0	0	578	26587	578	26587					
	Total	204	228000	10	4200	8	3360	17780	3297603	18002	3301177					
GEPSCO	Planned	42	8961	1	360	0	0	1579	103652	1622	103695					
	Forced	49	19497	4	36	0	0	1216	45905	1269	65438					
	Total	91	28458	5	396	0	0	2795	149557	2891	169133					
LESCO	Planned	409	146887	0	0	0	0	26687	6575824	27096	6722711					
	Forced	3033	76678	0	0	0	0	24442	762058	27475	838736					
	Total	3442	223565	0	0	0	0	51129	7337882	54571	7561447					
FESCO	Planned	253	53882	93	21706	0	0	9106	1555331	9452	1630919					
	Forced	61	2499	29	1897	0	0	58371	705635	58461	710031					
	Total	314	56381	122	23603	0	0	67477	2260966	67913	2340950					
MEPCO	Planned	1255	338678	77	15219	0	0	11061	1620485	12393	1974382					
	Forced	634	44402	71	4598	0	0	404832	3055645	405537	3104645					
	Total	1889	383080	148	19817	0	0	415893	4676130	417930	5079027					
HESCO	Planned	38	15804	32	9846	0	0	0	0	0	25650					
	Forced	380	92311	51	22888	0	0	53761	463648	54192	578847					
	Total	418	108115	83	32734	0	0	53761	463648	54262	604497					
SEPCO	Planned	793	300465	117	44127	0	0	2727	900683	3637	1245275					
	Forced	35	17685	10	2834	0	0	58133	20564097	58178	20584616					
	Total	828	318150	127	46961	0	0	60860	21464780	61815	21829891					
QESCO	Planned	146	53216	24	3600	160	15762	1166	175824	1496	248402					
	Forced	290	32112	31	2125	712	112608	35312	2985840	36345	3132685					
	Total	436	85328	55	5725	872	128370	36478	3161664	37841	3381087					
KE	Planned	5	3417	0	0	0	0	154772	8504889	154777	8508306					
	Forced	35	3823	0	0	0	0	38174	3829428	38209	3833251					
	Total	40	7240	0	0	0	0	192946	12334317	192986	12341557					

Source: Distribution Companies / KE

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**TABLE 81**  
**Village Electrification in all Distribution Companies**

DISCO	As on 30 <sup>th</sup> June	Total Number of Villages in DISCO	Total Villages Electrified in DISCO	Remaining Villages in DISCO	Percentage of Total Electrified Villages in DISCO
PESCO	2016	28,844	22,202	6,642	76.97
	2017	30,098	23,664	6,434	78.62
	2018	31,559	24,688	6,871	78.23
	2019	31,689	25,789	5,900	81.38
	2020	32,940	26,492	6,448	80.43
TESCO	2016	397	30	367	7.56
	2017	452	200	252	44.25
	2018	452	250	202	55.31
	2019	463	257	206	55.51
	2020	483	277	206	57.35
IESCO	2016	700	266	434	38.00
	2017	586	271	315	46.25
	2018	1,863	941	922	50.51
	2019	922	387	535	41.97
	2020	816	260	556	31.86
GEPSCO	2016	7,070	7,013	57	99.19
	2017	7,070	7,013	57	99.19
	2018	7,550	7,508	42	99.44
	2019	7,578	7,322	256	96.62
	2020	7,854	7,608	246	96.87
LESCO	2016	4,159	2,976	1,183	71.56
	2017	4,159	2,976	1,183	71.56
	2018	246	195	51	79.27
	2019	246	207	39	84.15
	2020	246	212	34	86.18
FESCO	2016	25,325	22,499	2,826	88.84
	2017	26,069	22,890	3,179	87.81
	2018	26,213	25,465	748	97.15
	2019	26,830	25,770	1,060	96.05
	2020	27,916	26,661	1,255	95.50
MEPCO	2016	28,618	24,595	4,023	85.94
	2017	31,651	26,315	5,336	83.14
	2018	37,400	30,364	7,036	81.19
	2019	39,518	30,660	8,858	77.58
	2020	41,579	31,858	9,721	76.62
HESCO	2016	23,803	17,643	6,160	74.12
	2017	23,803	18,147	5,656	76.24
	2018	23,803	18,634	5,169	78.28
	2019	23,803	18,940	4,863	79.57
	2020	23,803	19,181	4,622	80.58
SEPCO	2016	23,263	16,949	6,314	72.86
	2017	23,263	17,365	5,898	74.65
	2018	23,263	17,961	5,302	77.21
	2019	23,263	18,280	4,983	78.58
	2020	23,263	18,423	4,840	79.19
QESCO	2016	23,819	19,559	4,260	82.12
	2017	23,819	21,586	2,233	90.63
	2018	26,243	24,806	1,437	94.52
	2019	27,932	25,812	2,120	92.41
	2020	29,692	26,231	3,461	88.34



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DISCO	As on 30 <sup>th</sup> June	Total Number of Villages in DISCO	Total Villages Electrified in DISCO	Remaining Villages in DISCO	Percentage of Total Electrified Villages in DISCO
Total in CPPA-G System	2016	165,998	133,732	32,266	80.56
	2017	170,970	140,427	30,543	82.14
	2018	178,592	150,812	27,780	84.44
	2019	182,244	153,424	28,820	84.19
	2020	188,592	157,203	31,389	83.36
KE	2016	889	747	142	84.03
	2017	889	821	68	92.35
	2018	889	883	6	99.33
	2019	913	912	1	99.89
	2020	954	913	41	95.70

Source: Distribution Companies / KE

**TABLE 82 (A)**  
**Indexed/Adjusted Tariff of WAPDA Hydroelectric**

S. No.	Power Stations	Province	Current FY 2017-18			12 Months
			Capacity (MW)	Variable Rate (Rs./kWh)	Fixed Rate (Rs./kW/Month)	Fixed Rate-Revenue Gap (Rs./kW/Month)
1	Mangla	AJK	1,000	0.056	626.710	103.428
2	Gomal Zam	FATA	17	1.384	6,393.383	103.428
3	Tarbela	KPK	3,478	0.030	307.035	103.428
4	Warsak	KPK	243	0.072	572.424	103.428
5	Chitral	KPK	1	0.655	4,240.658	103.428
6	Kurram Garhi	KPK	4	0.273	1,823.760	103.428
7	Dargai	KPK	20	0.094	836.555	103.428
8	Jabban	KPK	22	0.332	2,961.172	103.428
9	Khan Khwar	KPK	72	0.375	2,316.349	103.428
10	Allai Khwar	KPK	121	0.254	2,071.091	103.428
11	Dubair Khwar	KPK	130	0.339	2,686.269	103.428
12	Tarbela 4 <sup>th</sup> Ext.	KPK	1,410	0.152	322.654	--
13	Golen Gol	KPK	106	0.228	1,370.610	--
14	Ghazi Barotha	Punjab	1,450	0.089	769.975	103.428
15	Chashma	Punjab	184	0.146	1,418.173	103.428
16	Jinnah	Punjab	96	0.229	1,841.312	103.428
17	Shadiwal	Punjab	14	0.234	993.012	103.428
18	Nandipur	Punjab	14	0.228	1,126.760	103.428
19	Chichoki	Punjab	13	0.207	926.840	103.428
20	Renala	Punjab	1	0.676	3,303.750	103.428
21	Rasul	Punjab	22	0.079	791.065	103.428

Source: NEPRA

**TABLE 82 (B)**  
**WAPDA Hydel Levies Tariff**

S. No.	Power Stations	Province	Capacity (MW)	Current FY 2017-18				12 Months	July, 2018 – June, 2019	July, 2019 – June, 2020
				NHP Arrears (Rs./kW/Month)	WUC/NHP (Rs./kWh)	(Rs. in million)	IRSA (Rs./kWh)			
1	Mangla	AJK	1,000	--	0.150	29.960	0.005	--	--	--
2	Gomal Zam	FATA	17	--	-	0.250	0.005	--	--	--
3	Tarbela	KPK	3,478	305.549	1.155	76.420	0.005	189.399	305.549	--
4	Warsak	KPK	243	305.549	1.155	5.105	0.005	189.399	305.549	--
5	Chitral	KPK	1	305.549	1.155	0.020	0.005	189.399	305.549	--
6	Kurram Garhi	KPK	4	305.549	1.155	0.080	0.005	189.399	305.549	--
7	Dargai	KPK	20	305.549	1.155	0.500	0.005	189.399	305.549	--
8	Jabban	KPK	22	305.549	1.155	0.600	0.005	189.399	305.549	--
9	Khan Khwar	KPK	72	305.549	1.155	1.345	0.005	189.399	305.549	--
10	Allai Khwar	KPK	121	305.549	1.155	2.975	0.005	189.399	305.549	--
11	Dubair Khwar	KPK	130	305.549	1.155	3.135	0.005	189.399	305.549	--
12	Tarbela 4 <sup>th</sup> Ext.	KPK	1,410	--	1.155	3.550	0.005	--	--	--
13	Golen Gol	KPK	106	--	1.155	0.750	0.005	--	--	--
14	Ghazi Barotha	Punjab*	1,450	--	1.155	34.550	0.005	2,878.344	690.264	690.264
15	Chashma	Punjab*	184	--	1.155	5.275	0.005	2,878.344	690.264	690.264
16	Jinnah	Punjab*	96	--	1.155	2.315	0.005	2,878.344	690.264	690.264
17	Rasul	Punjab*	22	--	1.155	0.610	0.005	2,878.344	690.264	690.264
18	Shadiwal	Punjab*	14	--	1.155	0.170	0.005	2,878.344	690.264	690.264
19	Nandipur	Punjab*	14	--	1.155	0.300	0.005	2,878.344	690.264	690.264
20	Chichoki	Punjab*	13	--	1.155	0.165	0.005	2,878.344	690.264	690.264
21	Renala	Punjab*	1	--	1.155	0.015	0.005	2,878.344	690.264	690.264

Source: NEPRA

\*This include 1<sup>st</sup> and 2<sup>nd</sup> instalment of Rs 38.1 billion and Rs 14.86 billion respectively pertaining to Punjab NHP arrear payment.

**TABLE 83**

**Indexed/Adjusted Tariff of Hydel IPPs**

As on		Larab Energy (Rs./kWh)	Malakand-III (Rs./kWh)
1 <sup>st</sup> July, 2018	CPP	11.2989	5.5365
	EPP (FCC)	-	-
1 <sup>st</sup> October, 2018	CPP	11.6362	5.3297
	EPP (FCC)	-	-
1 <sup>st</sup> January, 2019	CPP	12.0108	5.2730
	EPP (FCC)	-	-
1 <sup>st</sup> April, 2019	CPP	12.2379	5.6293
	EPP (FCC)	-	-
1 <sup>st</sup> July, 2019	CPP	13.4606	5.5365
	EPP (FCC)	-	-
1 <sup>st</sup> October, 2019	CPP	13.9960	5.3297
	EPP (FCC)	-	-
1 <sup>st</sup> January, 2020	CPP	13.4866	5.2730
	EPP (FCC)	-	-
1 <sup>st</sup> April, 2020	CPP	13.5123	5.6293
	EPP (FCC)	-	-

Source: NEPRA

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TABLE 84 (A)  
Indexed/Adjusted Tariff on Quarterly Basis (Public Sector Generation Companies) (Rs./kWh) As on 1<sup>st</sup> of

Block and Unit		Fuel	Ref. Gen. Tariff	2018-19 (Rs./kWh)			2019-20 (Rs./kWh)					
				July	October	January	April	July	October	January	April	
Jamshoro Power Company Limited (JPCL)	Block-1 (Unit-1)	RFO	19.5519	18.7740	18.7740	17.7032	18.9021	22.5502	21.4749	--	--	
	Block-2 (Unit-2)	RFO	21.9576	21.0840	21.0840	19.8814	21.2279	25.3248	24.1173	--	--	
		Gas	6.9505	--	7.1713	--	6.9505	10.9179	12.6090	--	--	
	Block-2 (Unit-3)	RLNG	19.0945	20.1809	19.9122	--	19.0945	--	--	17.5867	--	
		RFO	21.3659	20.5159	20.5159	19.3457	20.6558	24.6423	23.4674	--	--	
	Gas	6.7688	--	5.9336	--	6.7688	10.6325	--	--	--		
	Block-2 (Unit-4)	RLNG	18.5952	19.6445	19.3915	--	18.5952	--	17.1193	--	--	
		RFO	20.9160	20.0839	20.0839	18.9383	20.2209	24.1234	22.9732	--	--	
	Gas	6.8282	--	5.8062	--	6.8282	10.4117	--	--	--		
	Block-3 (Kotri 3-7)	RLNG	18.2090	19.2227	18.9887	--	18.2090	--	16.7517	--	--	
		Gas	6.0217	--	14.7675	--	6.0217	9.4590	14.7675	--	--	
	JPCL Capacity Charges – (Rs./kWh/Month)	Block-1 (CC 11-13)	HSD	7.6778	--	16.5429	--	--	--	16.5429	--	--
RLNG			16.5429	16.9458	--	16.5429	--	--	--	--	--	
Block-3 (Kotri 3-7) (w/d CC)		Gas	9.0326	--	--	--	--	14.1885	--	--	--	
		JPCL Capacity Charges – (Rs./kWh/Month)			--	438.3800	--	438.3800	--	0.0000	--	--
Central Power Generation Company Limited (CPGCL)		Block-1 (CC 11-13)	Gas	1.9537	4.7479	6.2347	--	6.2347	7.8844	4.2665	--	--
		Block-2 (CC 5-10)	Gas	2.1707	5.2752	6.9272	--	6.9272	8.7602	4.7403	--	--
		Block-3 (Steam 3-4)	Gas	2.6048	6.3302	8.3125	--	8.3125	10.5120	5.6883	--	--
		Block-4 (Steam 1-2)	Gas	2.7908	6.7822	8.9060	--	8.9060	11.2627	6.0945	--	--
		747 Guddu-CCPP	Gas	4.0806	3.8599	5.0686	--	5.0686	6.4099	3.5771	--	--
			Guddu Capacity Charges – (Rs./kWh)			1.1088	1.0446	1.1658	1.3269	1.5141	1.1920	1.4508
CPGCL Capacity Charges – (Rs./kWh/Month)		CPGCL Capacity Charges – (Rs./kWh/Month)			--	233.3483	--	239.4639	--	240.7830	--	--
		Block-1 (Unit-1)	RFO	10.6378	17.6944	17.5701	14.2669	19.3678	--	--	17.5701	20.5748
	Gas		6.6472	--	0.2379	--	8.2379	10.4415	--	15.6073	--	--
	RLNG		16.3940	16.8701	--	--	--	--	--	--	--	--
	Block-1 (Unit-2)	RFO	10.7819	17.9341	17.8081	14.4602	19.6301	--	--	17.8081	20.8535	--
		Gas	6.7348	--	8.3465	--	8.3465	10.5791	--	15.8189	--	--
		RLNG	16.6101	17.0989	--	--	--	--	--	--	--	--
	Block-1 (Unit-3)	RFO	10.4091	17.3140	17.1924	13.9602	18.9514	--	--	17.1924	20.1324	--
		Gas	6.5085	--	8.0661	--	8.0661	10.2236	--	15.2718	--	--
		RLNG	16.0520	16.5075	--	--	--	--	--	--	--	--
	Block-2 (Unit-4)	RFO	10.3936	--	17.1668	13.9394	18.9232	--	--	17.1668	--	--
		Gas	6.4993	--	8.0547	--	8.0547	10.2092	--	15.2491	--	--
RLNG		16.0293	16.4829	--	--	--	--	--	--	--	--	
Block-3 (Unit-5)	RFO	11.0671	18.4085	18.2792	14.8427	20.1494	--	--	18.2792	21.4051	--	
	Gas	6.9075	--	8.5605	--	8.5605	10.8504	--	16.2371	--	--	
	RLNG	17.0359	17.5509	--	--	--	--	--	--	--	--	
Block-3 (Unit-6)	RFO	11.3698	18.9119	18.7791	15.2486	20.7005	--	--	18.7791	21.9906	--	
	Gas	7.0902	--	8.7870	--	8.7870	11.1374	--	16.6813	--	--	
	RLNG	17.4865	18.0310	--	--	--	--	--	--	--	--	
Block-4 (GTPS FSD 5-9)	Gas	5.3325	--	6.6085	--	6.6086	8.3764	--	13.1186	--	--	
	RLNG	13.1515	--	--	--	--	--	--	--	--	--	
	NPGCL Capacity Charges – (Rs./kWh)			0.4353	0.4617	--	0.4706	0.4706	0.4815	0.4984	--	

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Block and Unit	Fuel	Ref. Gen. Tariff	2018-19 (Rs./kWh)				2019-20 (Rs./kWh)			
			July	October	January	April	July	October	January	April
Nandipur Power Project	Gas/RFO/HSD	0.1996	--	0.2337	--	0.2748	--	0.2337	--	--
Nandipur Capacity Charges – (Rs./kWh)	RLNG	6.6636	11.1689	9.3295	--	10.3804	12.4094	11.6407	--	11.1630
		0.1996	0.2453	0.2506	0.2711	0.2748	0.3106	0.3053	0.3073	0.3239

Source: NEPRA

TABLE 84 (B)

Indexed/Adjusted Tariff on Quarterly Basis (IPPs) (Rs./kWh) As on 1<sup>st</sup> of

S. No.	Name of Power Plant	Fuel	Year	July				October				January				April			
				FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	FCC	VOM	CPP	FCC	VOM	FCC	VOM	CPP
1	Saif Power	RLNG	2018-19	10.693	0.445	2.301	10.640	0.454	2.367	10.470	0.508	10.470	0.508	2.529	9.936	0.516	9.936	0.516	2.555
			2019-20	11.841	0.611	2.765	11.150	0.583	2.720	--	0.579	--	0.579	2.708	10.660	0.625	10.660	0.625	2.780
		HSD	2018-19	--	0.64	2.332	--	0.656	2.402	--	0.734	--	0.734	2.571	--	0.744	--	0.744	2.599
			2019-20	--	0.881	2.816	--	0.841	2.773	--	0.836	--	0.836	2.760	--	0.903	--	0.903	2.824
2	Sapphire Electric	RLNG	2018-19	10.692	0.438	2.212	10.640	0.449	2.282	10.470	0.503	10.470	0.503	2.651	9.935	0.510	9.935	0.510	2.482
			2019-20	11.840	0.604	2.704	11.150	0.576	2.664	10.800	0.573	10.800	0.573	2.651	--	0.618	--	0.618	2.714
		HSD	2018-19	--	0.633	2.243	--	0.649	2.319	--	0.725	--	0.725	2.498	--	0.736	--	0.736	2.528
			2019-20	--	0.872	2.757	--	0.832	2.720	--	0.827	--	0.827	2.706	--	0.893	--	0.893	2.760
3	Orient Power	RLNG	2018-19	10.692	0.261	2.062	10.640	0.267	2.122	10.470	0.299	10.470	0.299	2.279	9.935	0.303	9.935	0.303	2.306
			2019-20	11.840	0.359	2.520	11.170	0.343	2.478	10.800	0.341	10.800	0.341	2.472	8.018	0.368	8.018	0.368	2.370
		HSD	2018-19	19.005	0.427	2.094	18.930	0.438	2.158	19.030	0.490	19.030	0.490	2.322	--	0.497	--	0.497	2.351
			2019-20	--	0.589	2.572	--	0.562	2.534	22.68	0.558	22.68	0.558	2.527	--	0.603	--	0.603	2.417
4	Halmore Power	RLNG	2018-19	10.693	0.446	2.598	10.640	0.456	2.695	10.470	0.511	10.470	0.511	2.918	9.935	0.518	9.935	0.518	2.958
			2019-20	11.841	0.614	3.241	11.150	0.585	3.204	10.800	0.582	10.800	0.582	3.188	10.660	0.628	10.660	0.628	3.238
		HSD	2018-19	--	0.643	2.635	--	0.659	2.738	18.980	0.737	18.980	0.737	2.970	--	0.748	--	0.748	3.012
			2019-20	--	0.886	3.303	--	0.845	3.270	--	0.840	--	0.840	3.253	--	0.961	--	0.961	3.293

Source: NEPRA

TABLE 84 (C)

Indexed/Adjusted Tariff on Quarterly Basis (IPPs) (Rs./kWh) As on 1<sup>st</sup> of

S. No.	Name of Power Plant	Year	July				October				January				April			
			FCC	VOM	CPP	FCC	VOM	CPP	FCC	VOM	FCC	VOM	CPP	FCC	VOM	FCC	VOM	CPP
1	Attok Gen.	2018-19	12.341	1.1056	2.4018	13.163	1.1309	2.4487	10.999	1.2408	10.999	1.2408	2.5701	13.645	1.2581	13.645	1.2581	1.1765
		2019-20	13.668	1.4506	1.3436	15.590	1.408	1.3014	9.8771	1.4098	9.8771	1.4098	1.2997	6.4667	1.5014	6.4667	1.5014	1.3788
2	Atlas Power	2018-19	12.264	1.0889	2.5074	13.038	1.1138	2.5874	11.661	1.223	11.661	1.223	2.7659	11.667	1.2401	11.667	1.2401	2.7969
		2019-20	14.048	1.4313	3.0178	--	1.3884	2.9841	11.518	1.3897	11.518	1.3897	1.4986	--	1.4808	--	1.4808	1.5496
3	Nishat Power	2018-19	12.277	1.0888	2.4917	13.962	1.1138	2.5803	14.047	1.2229	14.047	1.2229	2.7631	11.003	1.240	11.003	1.240	2.7959
		2019-20	14.863	1.4313	3.0115	14.250	1.3884	2.9916	15.523	1.3897	15.523	1.3897	2.9783	--	1.4807	--	1.4807	3.0056
4	Nishat Chunian	2018-19	12.553	1.0864	2.6391	14.191	1.1111	2.7315	14.586	1.2201	14.586	1.2201	2.9211	10.922	1.2371	10.922	1.2371	2.9552
		2019-20	14.743	1.428	3.1776	13.742	1.3851	3.1559	13.881	1.3864	13.881	1.3864	3.1416	11.698	1.4772	11.698	1.4772	3.1712
5	Narowal Energy	2018-19	12.037	1.0122	2.7721	13.599	1.034	2.8854	12.988	1.116	12.988	1.116	3.1475	12.359	1.1312	12.359	1.1312	3.191
		2019-20	14.577	1.2736	3.5188	13.700	1.255	3.4801	12.510	1.2646	12.510	1.2646	3.4553	--	1.3309	--	1.3309	3.4858
6	Liberty Power Tech.	2018-19	12.952	1.2068	2.7555	12.938	1.234	2.8644	12.174	1.3489	12.174	1.3489	3.093	11.121	1.3676	11.121	1.3676	3.1368
		2019-20	13.244	1.5684	3.4128	13.246	1.5275	3.3905	11.543	1.5316	11.543	1.5316	3.3749	--	1.6268	--	1.6268	3.4032
7	Udh-II Power	2018-19	5.7251	0.2589	2.6678	6.0442	0.2649	2.7269	6.4987	0.2917	6.4987	0.2917	3.0528	6.7063	0.2957	6.7063	0.2957	3.0851
		2019-20	7.0797	0.3426	3.5735	7.5721	0.3315	3.393	7.468	0.3315	7.468	0.3315	3.4049	7.4676	0.354	7.4676	0.354	3.6116
8	Foundation Power	2018-19	3.8680/5.5639	0.4467	2.4081	--	0.4569	2.4357	--	0.503	--	0.503	2.6733	--	0.5101	--	0.5101	2.6893
		2019-20	7.1480	0.5909	2.9345	--	0.5718	2.8883	--	0.5718	--	0.5718	2.8871	--	0.6105	--	0.6105	2.9682

Source: NEPRA

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**TABLE 84 (D)**  
**Indexed/Adjusted Tariff on Quarterly Basis (Wind Power Projects) (Rs./kWh) As on 1<sup>st</sup> of**

S. No.	Name of Power Plant	Year	July	October	January	April
1	Zorlu Enerji Pakistan	2018-19	17.9667	18.1441	20.4187	20.5278
		2019-20	23.6034	23.1985	22.2882	22.9707
2	FFC Energy	2018-19	17.2546	17.3951	19.5463	19.6342
		2019-20	21.5151	21.2441	21.0670	21.5756
3	Three Gorges First Wind	2018-19	20.3083	20.4662	23.2130	23.3118
		2019-20	27.0625	26.6905 26.5770	25.1033	25.6821
4	Foundation Wind Energy-I	2018-19	17.8443	18.0284	19.7688	19.8838
		2019-20	25.1473	24.7601	23.8942	24.6497 24.9775
5	Foundation Wind Energy-II	2018-19	17.8796	18.0704	19.7522	19.8706
		2019-20	25.0368	24.5439 24.8512	24.0837	24.8866
6	Sapphire Wind Power	2018-19	20.6839	21.1323	23.7910	23.8683
		2019-20	27.5397	26.0614	24.9046	27.1724
7	Younus Energy	2018-19	20.4896	21.6008	24.0252	24.3956
		2019-20	27.2397	27.1671	26.8452	26.2986
8	Metro Power Company	2018-19	17.2393	17.4052	19.9974	20.1004
		2019-20	22.7522	22.3284	22.3023	22.9764
9	Gul Ahmad Wind Power	2018-19	20.6718	21.4669	24.0531	24.2742
		2019-20	27.5522	26.7696	26.4118	26.8439
10	Master Wind Energy	2018-19	20.6718	21.4669	24.0531	24.2742
		2019-20	27.5522	26.7696	26.4118	26.8439
11	Tenaga Generasi	2018-19	20.7503	21.3769	24.0266	24.1695
		2019-20	27.6482	26.5027	26.1287	27.0693
12	HydroChina Dawood	2018-19	20.8985	21.3613	24.1010	24.1596
		2019-20	27.8426	26.3196	25.9214	27.3539
13	Sachal Energy Development	2018-19	20.4905	20.6191	23.0006	24.3846
		2019-20	27.9771	27.6142	25.5704	26.1775
14	UEP Wind Power	2018-19	20.8985	21.3613	24.1010	24.1596
		2019-20	27.8426	26.3196	25.9214	27.3539
15	Artistic Wind Power	2018-19	14.0035	14.3652	15.3666	15.5158
		2019-20	17.0711	16.7807	16.6594	16.9378
16	Act Wind	2018-19	20.5150	21.6469	24.1057	24.4835
		2019-20	27.3604	27.3036	26.9783	26.3928
17	Hawa Energy	2018-19	15.5386	15.8990	18.0347	18.0709
		2019-20	20.9067	19.7179	19.4016	20.4823
18	Jhimpir Power	2018-19	15.5386	15.8990	18.0347	18.0709
		2019-20	20.9067	19.7179	19.4016	20.4823
19	Three Gorges Second Wind	2018-19	14.7793	15.1150	16.9769	17.1334
		2019-20	20.0007	19.0053	18.8088	20.1121
20	Three Gorges Third Wind	2018-19	14.7793	15.1150	16.9769	17.1334
		2019-20	20.0007	19.0053	18.8088	20.1121
21	Tricon Boston-A	2018-19	15.8113	16.1806	18.3656	18.3990
		2019-20	21.2793	20.064	19.7380	20.8233
22	Tricon Boston-B	2018-19	15.8113	16.1806	18.3656	18.3990
		2019-20	21.2793	20.064	19.7380	20.8233
23	Tricon Boston-C	2018-19	15.8113	16.1806	18.3656	18.3990
		2019-20	21.2793	20.0640	19.7380	20.8233
24	Zephyr Wind	2018-19	--	--	18.3682	18.5435
		2019-20	21.1715	20.5759	20.2719	20.4752

Source: NEPRA



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**TABLE 84 (E)**  
Indexed/Adjusted Tariff on Quarterly Basis (Solar Power Projects) (Rs./kWh) As on 1<sup>st</sup> of

S. No.	Name of Power Plant	Year	July	October	January	April
1	Quid-e-Azam Solar Park	2018-19	20.5368	21.544	23.7915	24.0997
		2019-20	26.7641	26.6133	26.2788	25.8459
2	Appolo Solar Development	2018-19	20.0387	20.4683	23.0035	23.1445
		2019-20	26.8675	25.492	25.1847	26.7818
3	Best Green Energy	2018-19	21.0837	21.5567	24.3449	24.4158
		2019-20	28.2253	26.6872	23.1985	27.8027
4	Crest Energy	2018-19	21.2023	21.6779	24.4575	24.5484
		2019-20	28.4075	26.8817	26.5052	28.0628
5	AJ Power	2018-19	16.3362	16.6052	18.0382	18.108
		2019-20	20.0734	19.38	19.2428	20.0325
6	Harappa Solar	2018-19	16.6206	16.8906	18.3356	18.4048
		2019-20	20.3902	19.687	19.5482	20.3437

Source: NEPRA

**TABLE 84 (F)**  
Indexed/Adjusted Tariff on Quarterly Basis (Bagasse based Power Projects) (Rs./kWh) As on 1<sup>st</sup> of

S. No.	Name of Power Plant	Year	FCC	July	October	January	April
1	JDW-II	2018-19	6.2089	5.9616	6.2841	6.9219	7.0255
		2019-20		7.7188	7.7694	7.7055	7.4705
2	JDW-III	2018-19	6.2089	5.9616	6.2841	6.9219	7.0255
		2019-20		7.7188	7.7694	7.7055	7.4705
3	RYK	2018-19	6.2089	5.9616	6.2841	6.9219	7.0255
		2019-20		7.7188	7.7694	7.7055	7.4705
4	Chiniot	2018-19	6.2089	5.9414	6.2746	6.9308	7.0384
		2019-20		7.7498	7.8095	7.7439	7.4873
5	Hamza Sugar Mills	2018-19	6.2089	5.8962	6.2533	6.9508	7.0673
		2019-20		7.8181	7.8978	7.8302	7.5251
6	The Thal Industries	2018-19	Upfront	5.8721	6.2418	6.9612	7.0824
		2019-20		7.8549	7.9454	7.8758	7.5451
7	Almoiz Industries	2018-19	Upfront	--	--	6.9739	7.1008
		2019-20		7.8985	8.0018	7.9306	7.5691

Source: NEPRA

Note: FCC was issued for the period October, 2017 to September, 2018

**TABLE 84 (G)**  
Indexed/Adjusted Tariff on Quarterly Basis (Nuclear and Coal based Power Projects) (Rs./kWh)

As on		CHASNUPP-I	CHASNUPP-II	CHASNUPP-III	CHASNUPP-IV	Huaneng Shandong	Port Qasim Electric Power
1 <sup>st</sup> July, 2018	CPP	3.3626	5.6667	8.5248	8.3868	3.9112	3.9157
	EPP (FCC)	1.0354	0.6869	1.3862	1.0301	7.2913	5.1523
1 <sup>st</sup> October, 2018	CPP	3.3626	5.6667	8.5248	8.3868	4.0674	4.063
	EPP (FCC)	0.9354	0.6869	1.3862	1.0301	7.4181	5.6865
1 <sup>st</sup> January, 2019	CPP	3.4501	6.0162	9.5274	9.3631	4.6941	4.6843
	EPP (FCC)	0.9354	0.6869	1.3862	1.0301	7.7737	5.7548
1 <sup>st</sup> April, 2019	CPP	3.4501	6.0162	9.5274	9.3631	4.7003	4.6787
	EPP (FCC)	0.9354	0.6869	1.3862	1.0301	7.4475	4.562
1 <sup>st</sup> July, 2019	CPP	3.5544	6.4568	10.7541	10.5581	5.3408	5.3306
	EPP (FCC)	0.9354	0.9710	1.1677	1.1304	6.5686	5.083
1 <sup>st</sup> October, 2019	CPP	3.5544	6.4568	10.7541	10.5581	5.0783	5.0631
	EPP (FCC)	0.9354	0.9710	1.1677	1.1304	6.7649	5.1502
1 <sup>st</sup> January, 2020	CPP	3.7192	6.4477	10.5531	10.3633	5.0439	5.0379
	EPP (FCC)	0.9538	0.0971	0.9493	1.1304	7.3452	5.4197
1 <sup>st</sup> April, 2020	CPP	3.7192	6.4477	10.5531	10.3633	5.2825	5.2507
	EPP (FCC)	0.9538	0.0971	0.9493	1.1304	8.1808	5.575

Source: NEPRA

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**TABLE 85**  
**Insurance Cost Component**

S. No.	Company Name	Insurance Premium (Rs.)		Insurance Component (Rs./kWh)		Period
		Reference	Revised	Reference	Revised	
1	Laraib Energy	118,735,071	78,654,380	0.2526	0.1673	23 March 2017 to 22 March 2018
		118,735,071	99,473,733	0.2526	0.2116	23 March 2018 to 22 March 2019
		118,735,071	110,877,212	0.2526	0.2359	23 March 2019 to 22 March 2020
2	Attock Gen.	67,500,000	90,229,890	0.0494	0.0660	01 April 2017 to 31 March 2018
		67,500,000	105,524,232	0.0494	0.0772	01 April 2018 to 31 March 2019
		67,500,000	113,653,538	0.0494	0.0828	01 April 2019 to 31 March 2020
3	Atlas Power	235,724,802	181,314,263	0.1258	0.0967	18 Dec. 2016 to 17 Dec. 2017
		235,724,802	189,706,746	0.1258	0.1012	18 Dec. 2017 to 17 Dec. 2018
		235,724,802	239,843,006	0.1258	0.1280	18 Dec. 2018 to 17 Dec. 2019
		235,724,802	240,026,119	0.1258	0.1278	18 Dec. 2019 to 17 Dec. 2020
4	Engro Powergen Qadirpur (Gas)	119,908,673	165,662,761	0.0630	0.0870	23 April 2017 to 23 April 2018
		119,908,673	216,841,506	0.0630	0.1139	23 April 2018 to 23 April 2019
		119,908,673	222,235,121	0.0630	0.1164	23 April 2019 to 23 April 2020
5	Engro Powergen Qadirpur (HSD)	119,908,673	165,662,761	0.0643	0.0888	23 April 2017 to 23 April 2018
		119,908,673	216,841,506	0.0643	0.1163	23 April 2018 to 23 April 2019
		119,908,673	222,235,121	0.0643	0.1189	23 April 2019 to 23 April 2020
6	Saif Power	171,410,026	132,462,633	0.0933	0.0721	30 April 2017 to 29 April 2018
		171,410,026	141,013,683	0.0933	0.0768	30 April 2018 to 29 April 2019
		171,410,026	181,020,898	0.0933	0.0985	30 April 2019 to 29 April 2020
7	Orient Power Company	74,544,969	91,429,482	0.0400	0.0491	24 May 2017 to 23 May 2018
		74,544,969	110,406,473	0.0400	0.0592	24 May 2018 to 23 May 2019
		74,544,969	145,065,087	0.0400	0.0778	24 May 2019 to 23 May 2020
8	Nishat Power	208,757,119	165,965,029	0.1220	0.0970	01 July 2017 to 30 June 2018
		208,757,119	208,176,026	0.1220	0.1217	01 July 2018 to 30 June 2019
		208,757,119	266,518,257	0.1220	0.1554	01 July 2019 to 30 June 2020
9	Nishat Chunian	158,990,519	162,428,229	0.0927	0.0947	01 July 2017 to 30 June 2018
		158,990,519	212,726,450	0.0927	0.1240	01 July 2018 to 30 June 2019
		158,990,519	245,302,147	0.0927	0.1427	01 July 2019 to 30 June 2020
10	Sapphire Electric	162,781,000	115,821,899	0.0876	0.0623	05 Oct. 2016 to 04 Oct. 2017
		162,781,000	122,752,930	0.0876	0.0661	05 Oct. 2017 to 04 Oct. 2018
		162,781,000	153,439,471	0.0876	0.0826	05 Oct. 2018 to 04 Oct. 2019
11	Halmore Power Generation Company	179,889,000	153,678,630	0.0983	0.0840	15 June 2017 to 14 June 2018
		179,889,000	166,662,180	0.0983	0.0911	15 June 2018 to 14 June 2019
		179,889,000	246,654,180	0.0983	0.1344	15 June 2019 to 14 June 2020
12	Narowal Energy	153,870,314	175,374,383	0.0821	0.0936	01 July 2017 to 30 June 2018
		153,870,314	206,934,071	0.0821	0.1104	01 July 2018 to 30 June 2019
		153,870,314	273,267,183	0.0821	0.1455	01 July 2019 to 30 June 2020
13	Liberty Power Tech.	137,879,149	165,975,457	0.0802	0.0965	13 Jan. 2017 to 12 Jan. 2018
		137,879,149	180,781,941	0.0802	0.1052	13 Jan. 2018 to 12 Jan. 2019
		137,879,149	225,983,778	0.0802	0.1314	13 Jan. 2019 to 12 Jan. 2020
		137,879,149	260,294,685	0.0802	0.1511	13 Jan. 2020 to 12 Jan. 2021
14	Foundation Power (Daharki)	107,954,000	59,842,150	0.0684	0.0379	01 July 2017 to 30 June 2018
		107,954,000	66,204,893	0.0684	0.0419	01 July 2018 to 30 June 2019
		107,954,000	98,788,755	0.0684	0.0624	01 July 2019 to 30 June 2020
15	Uch-II Power	297,178,000	339,310,911	0.0891	0.1015	04 April 2015 to 03 April 2016
		297,178,000	253,162,965	0.0891	0.0759	04 April 2016 to 03 April 2017
		297,178,000	252,011,972	0.0891	0.0756	04 April 2017 to 03 April 2018
		297,178,000	312,387,823	0.0891	0.0937	04 April 2018 to 03 April 2019
		297,178,000	358,130,500	0.0891	0.1071	04 April 2019 to 03 April 2020
16	Port Qasim	759,999,292	961,932,263	0.0698	0.0881	30 March 2019 to 29 March 2020
17	Zorlu Enerji		11,830,337		0.2232	01 Aug. 2017 to 01 Dec. 2017
			43,672,848		0.2747	02 Dec. 2017 to 01 Dec. 2018

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S. No.	Company Name	Insurance Premium (Rs.)		Insurance Component (Rs./kWh)		Period
		Reference	Revised	Reference	Revised	
18	FFC Energy	47,222,940	40,765,115		0.2840	01 Jan. 2017 to 31 Dec. 2017
		46,794,341	40,351,585		0.2811	01 Jan. 2018 to 31 Dec. 2018
			50,702,241		0.3532	01 Jan. 2019 to 31 Dec. 2019
19	Three Gorges First Wind		73,709,892		0.5314	26 Nov. 2016 to 25 Nov. 2017
			62,300,731		0.4492	26 Nov. 2017 to 25 Nov. 2018
			62,705,666		0.4521	26 Nov. 2018 to 25 Nov. 2019
20	Foundation Wind Energy-I		54,912,508		0.3800	01 July 2019 to 30 June 2020
21	Foundation Wind Energy-II		54,050,719		0.3761	01 July 2019 to 30 June 2020
22	Metro Power		65,915,939		0.4632	16 Sept. 2017 to 15 Sept. 2018
			60,682,096		0.4264	16 Sept. 2018 to 15 Sept. 2019
23	Sachal Energy		63,216,025		0.4631	11 April 2018 to 10 April 2019
			56,613,175		0.4147	11 April 2019 to 10 April 2020
24	Artistic Energy		63,642,270		0.4210	16 March 2019 to 15 March 2020
			64,059,299		0.4238	16 March 2020 to 15 March 2021
25	Hawa Energy		37,184,548		0.2439	15 March 2018 to 14 March 2019
			53,632,401		0.3517	15 March 2019 to 14 March 2020
26	Jhampir Power		27,623,964		0.1812	16 March 2018 to 15 March 2019
			52,295,478		0.3429	16 March 2019 to 15 March 2020
27	TG Second Wind		34,159,694		0.2251	20 June 2018 to 20 June 2019
28	TG Third Wind		34,337,658		0.2262	09 June 2018 to 09 June 2019
29	Tricon Boston-A		38,335,420		0.2514	16 August 2018 to 15 August 2019
30	Tricon Boston-B		38,460,365		0.2522	14 Sept. 2018 to 13 Sept. 2019
31	Tricon Boston-C		38,326,063		0.2513	11 Sept. 2018 to 10 Sept. 2019
32	Zephyr Power		59,500,977		0.3881	28 March 2019 to 27 March 2020
33	Appolo Solar		68,250,588		0.4452	31 May 2017 to 30 May 2018
34	Best Green	18,518,492	15,986,056		0.1042	01 August 2017 to 31 July 2018
35	Crest Energy	17,619,457	15,209,966		0.0992	01 August 2017 to 31 July 2018
36	AJ Power		6,195,934		0.3467	14 Dec. 2018 to 13 Dec. 2019
37	Harappa Solar		15,560,160		0.5805	14 Oct. 2018 to 13 Oct. 2019
			14,974,360		0.5586	14 Oct. 2019 to 13 Oct. 2020

Source: NEPRA

**TABLE 86**  
**NTDC Use of System Charges**

Description	Rs./kW/Month
FY 2014-15	126.75
FY 2015-16	133.18
FY 2016-17	148.33
FY 2017-18	159.08
FY 2018-19	176.16

Source: NEPRA

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**TABLE 87**  
**National Average Uniform Tariff with PYA 2018**

DISCOs												K-Electric							
Description	Fixed Charges	Variable Charges										Uniform Tariff		Determined Tariff		Applicable Tariff			
		PESCO	TESCO	IESCO	GEPCO	LESCO	FEPCO	MEPCO	HEPCO	SEPCO	QESCO	Rs./AW/M	Rs./AWh	Rs./AW/M	Rs./KWh	Fixed Charges	Variable Charges	Rs./AW/M	Rs./KWh
<b>Residential</b>																			
Up to 50 Units		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00			2.00	
For peak load requirement less than 5 kW		17.25	11.18	10.87	11.19	12.09	13.35	15.45	18.80	14.37	17.13	13.85			9.10		5.79		
01-100 Units		20.44	13.34	14.00	13.15	13.54	16.72	16.00	20.45	16.51	19.58	15.86			10.70		8.11		
101-200 Units		20.95	14.36	15.58	14.60	15.27	17.47	17.07	21.85	19.21	20.03	16.83			12.25		10.20		
201-300 Units		22.29	14.60	16.85	17.54	16.91	18.03	19.81	23.10	21.06	21.03	18.54			13.95		17.60		
301-700 Units		24.05	15.68	18.95	18.67	19.24	19.47	20.79	24.75	23.45	24.27	20.94			16.30		20.70		
Above 700 Units																			
For peak load requirement exceeding 5 kW		23.32	15.68	17.59	18.14	18.81	19.10	20.76	24.75	23.46	24.48	19.33			16.50		20.70		
Time of Use (TOU) - Peak		15.89	11.18	10.11	11.64	12.50	13.30	15.08	19.25	17.51	18.10	12.80			12.27		14.38		
Time of Use (TOU) - Off-Peak		23.33	15.68	22.68	18.14	18.15	20.12	20.17	24.65	21.11	24.50	20.84			14.00		20.84		
Temporary Supply																			
<b>Commercial - A2</b>																			
For peak load requirement less than 5 kW		23.32	15.75	17.00	17.14	19.08	18.12	19.23	23.65	23.36	15.20	19.26			13.25		18.00		
For peak load requirement exceeding 5 kW		18.79	13.75	14.00	13.64	16.81	17.87	17.59	21.65	21.36	15.05	18.01			12.50		19.68		
Regular	400	24.33	15.75	17.90	18.14	19.18	19.12	20.40	24.75	23.46	19.10	20.09		400	16.50		21.60		
Time of Use (TOU) - Peak		18.09	11.25	10.50	11.64	12.26	13.32	14.47	19.29	17.51	12.68	13.48			12.27		15.63		
Time of Use (TOU) - Off-Peak		23.33	15.75	17.00	17.11	18.47	19.12	20.07	23.65	23.36	19.10	18.39			15.00		18.39		
Temporary Supply																			
<b>General Services-A3</b>																			
For peak load requirement less than 5 kW		20.99	14.28	18.90	13.94	17.60	16.97	18.72	21.30	19.00	16.37	17.56			13.45		17.56		
For peak load requirement exceeding 5 kW		18.83	11.68	18.20	16.14	14.70	17.60	16.92	25.15	20.66	19.08	18.32			13.50		12.28		
Regular		20.85	13.68	16.00	14.64	17.59	18.14	19.07	21.15	22.86	15.88	20.14			16.50		15.84		
B1 Peak		23.33	15.68	17.90	18.14	19.68	19.64	20.17	24.74	23.47	19.06	20.14			12.50		10.28		
B1 Off Peak	400	17.78	11.18	10.20	12.05	12.03	12.03	14.47	19.25	17.51	12.64	13.46			12.65		11.78		
B2		23.33	15.68	17.90	18.14	19.35	19.57	20.17	24.75	23.46	19.03	15.79		400	16.50		15.78		
B2 - TOU (Peak)		117.58	10.98	10.30	9.33	12.64	13.20	14.27	19.05	17.31	12.48	13.23			12.00		10.07		
B2 - TOU (Off-peak)		22.89	15.68	17.90	18.14	20.58	19.33	20.64	24.75	23.47	19.08	20.39			16.50		15.78		
B3 - TOU (Peak)		17.48	10.88	10.10	11.74	11.61	13.12	13.17	18.85	16.21	12.38	12.61			11.50		9.98		
B3 - TOU (Off-peak)	380	23.33	15.68	18.20	16.14	20.25	19.12	20.17	24.75	23.46	19.08	20.27			16.50		15.78		
B4 - TOU (Peak)		17.85	10.78	10.50	11.24	12.00	13.02	14.07	18.75	17.11	12.28	13.25			11.25		9.88		
B4 - TOU (Off-peak)	360														16.50		15.78		
B5 - TOU (Peak)															10.50		9.00		
B5 - TOU (Off-peak)															15.05		16.36		
Temporary Supply																			
<b>Single Point Supply for further Distribution</b>																			
C1(a) Supply at 400 Volts-less than 5 kW		21.34	13.18	17.50	17.14	16.20	18.14	16.57	22.67	23.76	16.08	21.32			13.50		18.68		
C1(b) Supply at 400 Volts-exceeding 5 kW	400	20.84	12.68	17.00	16.64	15.70	17.64	18.07	22.15	22.21	15.58	20.13			12.50		18.18		
Time of Use (TOU) - Peak		23.33	15.68	19.98	21.14	19.00	20.62	21.10	24.75	23.46	20.08	21.52			16.50		21.60		
Time of Use (TOU) - Off-Peak	400	20.09	11.48	10.50	14.64	12.50	14.72	12.91	19.25	17.51	12.66	14.99			12.00		15.00		
C2 Supply at 11 kV	380	18.64	11.48	13.83	15.44	15.21	16.42	16.02	20.95	20.66	14.39	15.61			12.50		17.98		
Time of Use (TOU) - Peak		24.27	15.68	18.04	21.14	19.00	20.62	18.15	24.75	23.46	19.08	19.73			16.50		21.60		
Time of Use (TOU) - Off-Peak	380	17.58	10.98	8.27	14.44	12.10	14.52	14.12	19.05	17.31	12.46	12.57			11.50		14.80		
C3 Supply above 11 kV	360	18.54	11.36	13.70	15.34	13.97	18.34	15.92	20.85	20.56	14.28	14.42			12.00		17.88		
Time of Use (TOU) - Peak		23.33	15.68	16.21	21.14	19.00	18.24	20.17	24.75	23.46	19.08	18.49			16.50		21.60		
Time of Use (TOU) - Off-Peak	360	17.48	10.88	10.38	14.34	12.00	12.49	14.07	18.85	17.21	12.38	11.59			11.25		14.70		

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Description	Fixed Charges	Variable Charges										Uniform Tariff		Determined Tariff		Applicable Tariff	
		PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	Fixed Charges	Variable Charges	Fixed Charges	Variable Charges	Fixed Charges	Variable Charges
Rs./kWh																	
Agricultural Tube-wells - Tariff D																	
SCARP		17.39	11.68	17.90	16.44	19.10	15.89	16.12	25.34	22.40	14.83		23.17		11.22		5.35
Time of Use (TOU) - Peak		23.33	15.66	22.26	20.94	22.00	20.07	20.67	24.75	23.31	19.64	200	20.87	200	16.50	200	5.35
Time of Use (TOU) - Off-Peak		16.63	10.88	13.10	14.14	12.02	11.27	14.64	18.85	17.06	12.88		14.03		10.80		5.35
Agricultural Tube-wells	200	17.49	11.18	15.85	15.44	19.10	15.89	16.52	20.65	19.36	14.21	200	14.56	200	10.80	200	5.35
Time of Use (TOU) - Peak		23.33	15.86	17.90	20.94	20.50	20.12	19.75	24.75	23.31	19.08	200	20.27	200	10.80	200	5.35
Time of Use (TOU) - Off-Peak		16.63	10.88	13.10	14.10	13.46	13.21	12.22	18.85	15.96	12.68		13.04				
Public Lighting - Tariff G																	
Resid. Col. attached to ind. premises		19.14	11.68	15.95	12.50	19.78	15.32	17.47	22.60	20.46	14.18		18.78		13.90		18.68
Railway Traction		19.14	11.68	15.18	12.64	20.39	15.47	17.90	22.60	20.46	14.18		18.42		14.00		18.68
Tariff K - A/JK	380	18.62	13.55	15.21	15.21	17.90						360	17.90				
Time of Use (TOU) - Peak		23.37	17.28	18.12	18.12							360	13.55				
Time of Use (TOU) - Off-Peak		17.57	16.24	16.24	16.24							360	18.56				
Tariff K - Rawat Lab	360												12.20				
Special Contract - Tariff J																	
J-1 For Supply at 66 kV & above	380	19.24	11.73	14.16	10.48	11.77	14.79	17.65	25.15	22.69	13.75	360	16.14	360	12.00	360	17.88
Time of Use (TOU) - Peak		24.04	16.03	16.36	18.28	18.60	19.07	21.05	29.05	25.59	18.55		20.66		16.50		21.60
Time of Use (TOU) - Off-Peak		18.19	11.83	10.51	9.48	11.62	12.97	14.95	23.14	19.34	11.65	360	14.33	360	11.25	360	14.70
J-2 (a) For Supply at 11.33 kV	380	19.34	11.83	14.26	10.56	14.10	14.89	17.75	25.25	22.79	13.85	380	16.46	380	12.50	380	17.98
Time of Use (TOU) - Peak		24.04	16.03	18.36	16.28	18.60	19.07	21.05	29.05	25.59	18.55		20.86		16.50		21.60
Time of Use (TOU) - Off-Peak		18.29	11.73	10.63	9.58	11.72	13.07	15.05	23.34	19.44	11.95	380	14.44	380	11.50	380	14.80
J-2 (b) For Supply at 66 kV & above	360	19.24	11.73	14.16	10.48	14.00	14.79	17.65	25.15	22.69	13.75	360	16.36	360	12.00	360	17.88
Time of Use (TOU) - Peak		24.04	16.03	18.36	16.28	18.60	19.07	21.05	29.05	25.59	18.55		20.66		16.50		21.60
Time of Use (TOU) - Off-Peak		18.19	11.23	10.51	9.48	11.62	12.97	14.95	23.14	19.34	11.85	360	14.33	360	11.25	360	14.70
J-3 (a) For Supply at 11.33 kV	380	19.34	11.83	14.26	10.58	14.10	14.89	17.75	25.25	22.79	13.85	380	16.46	380	12.50	380	17.98
Time of Use (TOU) - Peak		24.04	16.03	18.36	16.28	18.60	19.07	21.05	29.05	25.59	18.55		20.66		16.50		21.60
Time of Use (TOU) - Off-Peak		18.29	11.33	10.63	9.58	11.72	13.07	15.05	23.34	19.44	11.95	380	14.44	380	11.50	380	14.80
J-3 (b) For Supply at 66 kV & above	360	19.24	11.73	14.16	10.48	14.00	14.79	17.65	25.15	22.89	13.75	360	16.36	360	12.00	360	17.88
Time of Use (TOU) - Peak		24.04	16.03	18.36	15.28	18.60	19.07	21.05	29.05	25.59	18.55		20.66		16.50		21.60
Time of Use (TOU) - Off-Peak		18.19	11.23	10.51	9.48	11.62	12.97	14.95	23.14	19.34	11.85	360	14.33	360	11.25	360	14.70

Source: NEPRA

TABLE 88  
Monthly Fuel Price Adjustments in respect of DISCOs and K-Electric

Month	DISCOs Increase/(Decrease) Rs./kWh					K-Electric Increase/(Decrease) Rs./kWh				
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2015-16	2016-17	2017-18	2018-19
July	(2.1374)	(2.4934)	(1.7094)	0.3525	1.7799	(0.7797)	(0.7797)	0.2629	(0.2212)	0.6148
August	(2.6016)	(2.5648)	(1.8198)	1.1635	1.6615	(0.9155)	(0.9155)	0.2287	0.0366	0.5516
September	(2.8800)	(2.7734)	(2.1941)	0.1999	1.5777	(0.1167)	(0.1167)	0.1935	(0.2892)	0.7511
October	(1.8147)	(2.6096)	(2.2548)	0.4741	1.5656	0.5600	0.5600	(0.0387)	0.4349	1.5876
November	(1.9784)	(3.6084)	(3.1143)	(0.3396)	0.9824	0.4400	0.4400	(0.1850)	(0.1200)	0.5801
December	(3.8361)	(2.2195)	(2.9844)	0.5688	1.8779	0.0500	0.0500	0.9982	(0.2399)	0.6583
January	(4.0434)	(3.3086)	(3.2421)	1.7197	1.1108	0.5200	0.5200	(0.0838)	1.1475	(0.0379)
February	(4.3646)	(2.1501)	(2.2866)	0.8090	1.2051	(0.7574)	(0.7574)	(0.8359)	0.9673	(0.9319)
March	(2.8373)	(2.1484)	(1.8851)	(0.0429)	0.1069	(0.1221)	(0.1221)	(0.1088)	2.0895	(1.2186)
April	(3.9413)	(1.9624)	(0.6898)	0.5508	(0.7040)	(0.3266)	(0.3266)	(0.2483)	0.3651	0.6569
May	(3.3218)	(1.7522)	1.2212	0.0999	(1.2517)	0.0500	0.0500	(0.3769)	1.1952	1.4327
June	(2.3386)	(2.2359)	0.5084	(0.1308)	(1.0581)	0.3600	0.3600	(0.4198)	1.0080	1.4748

Source: NEPRA



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**TABLE 89**  
**CPI (General/US), Exchange Rate, KIBOR and LIBOR**

Quarter	CPI (General)	CPI (US)	PKR/USD	KIBOR (3 Month)	LIBOR (3 Month)
July – September, 2017	216.330	244.733	105.00	6.14%	1.30%
October – December, 2017	216.610	245.519	105.45	6.15%	1.34%
January – March, 2018	220.420	246.669	110.50	6.16%	1.69%
April – June, 2018	219.580	248.991	115.40	6.50%	2.31%
July – September, 2018	225.400	251.588	121.60	6.92%	2.34%
October – December, 2018	229.270	252.146	124.30	8.32%	2.40%
January – March, 2019	234.750	252.038	139.10	10.55%	2.81%
April – June, 2019	237.610	252.776	140.70	10.99%	2.60%
July – September, 2019	245.940	256.092	164.50	12.97%	2.32%
October – December, 2019	255.940	256.558	156.70	13.85%	2.09%
January – March, 2020	263.590	257.208	155.35	13.55%	1.91%
April – June, 2020	266.200	258.678	166.75	11.22%	1.45%

Source: NEPRA

**TABLE 90**  
**CPPA-G Market Operator Fee**

Description	FY 2016-17	FY 2017-18	FY 2018-19
Revenue Requirement (Rs. in Million)	581.70	451.87	391.92
Average Monthly MDI (MW)	19,243.00	22,695.00	23,507.00
Market Operator Fee (Rs./kW/Month)	2.52	1.66	1.39

Source: NEPRA

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## 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
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 Thermal Power Station
GWh	Giga Watt per hour
HDIP	Hydrocarbon Development Institute of Pakistan
HESCO	Hyderabad Electric Supply Company Limited
HPP	Hydropower Project
HVDC	High Voltage Direct Current
IA	Implementation Agreement
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
JPCL	Jamshoro Power Company Limited
KANUPP	Karachi Nuclear Power Plant
KE	K-Electric Limited
KIBOR	Karachi Interbank Offered Rate
kV	Kilo Volt

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KVA	Kilovolt Ampere
kWh	Kilowatt per hours
LD	Liquidated Damages
LESCO	Lahore Electric Supply Company Limited
LIBOR	London Interbank Offer Rate
MEPCO	Multan Electric Power Company Limited
MMBTU	Million British Thermal Unit
MMCFT	Million Cubic Feet
MTOE	Million Tonees of Oil Equivalent
MVA	Megavolt Ampere
MW	Megawatt
MWh	Megawatt per hour
MYT	Multi-year Tariff
n.a. & n.p.	Not available and not provided
NCPP	New Captive Power Plant
NEPRA	National Electric Power Regulatory Authority
NHP	Net Hydel Profit
NPCC	National Power Control Centre
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
PPA	Power Purchase Agreement
PPDB	Punjab Power Development Board
PPIB	Private Power and Infrastructure Board
QESCO	Quetta Electric Supply Company Limited
RE	Reciprocating Engine
RFO	Residue 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
SPP	Small Power Producer
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
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

# State of Industry Report 2020

## SOURCE OF INFORMATION

The following sources of information have been used in the compilation of this State of Industry Report 2020:

- i) K-Electric Limited
- ii) 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
- viii) National Transmission and Despatch Company Limited
- ix) Pakistan Energy Yearbook, Hydrocarbon Development Institute of Pakistan
- x) Power System Statistics, Planning Power, NTDC
- xi) Pakhtunkhwa Energy Development Organization
- xii) Energy Department, Government of Sindh
- xiii) Energy Department, Government of Balochistan
- xiv) Alternative Energy Development Board
- xv) Private Power and Infrastructure Board
- xvi) Punjab Power Development Board
- xvii) Others



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