



Sector Study

© The Pakistan Credit Rating Agency Limited.

January 2022



Contents	Page No.	Contents	Page No.	Contents	Page No.
Electricity Mix A Comparison	1	Performance Parameters	15	Business Risk – An Overview	27
Power – An Overview	2	Transmission & Distribution Losses	16	Profit Margins – NTDC	28
GDP & Electricity Distribution	3	Transmission & Distribution Losses	17	& KE	
Transmission – An Overview	4	Actual vs Allowed		Profit Margins – DISCOs	29
Industry Structure	5	DISCOs' Average Recoveries	18	Financial Risk – An Overview	30
	6	Distribution – Segment Wise Recoveries	19	Working Capital	31
	-	Duild Up of End Lloop Tariff	20	Borrowings	32
Assets	/	Build Op of End User Tariff	20	SWOT Analysis	33
Issues NTDC & KE	8	Circular Debt	21		24
Losses	9	Accumulation of Circular Debt	22	Rating Curve	34
Distribution – An Overview	10		22	Outlook	35
Industry Spanshot	11	Accumulation of	23		
industry Shapshot	11	Investment Plans - Transmission Lines NTDC	24		
Assets	12		24		
Consumer Trend	13	IGCEP	25		
DISCO Wise Consumers	14	National Electricity Policy	26		



1

Electricity Mix | Global Vs Pakistan



- World electricity mix is dominated by fossil fuels, particularly coal (~34%) oil & gas (~27%), despite increasing trend to shift towards cleaner fuels for environment safety and declining world oil reserves. The "clean" electricity boom still is not keeping up with fast-rising electricity demand.
- Pakistan's electricity mix is also diversified similar to the global mix, with fossil fuels dominating the market. Pakistan's generation mix also contains a fair share of hydel energy (~27%). Moreover, Pakistan has lately been relying on imported RLNG for meeting its electricity demand as country's own gas resources are rapidly depleting.

Power – An Overview

- Energy is the engine of all sectors of the economy. Energy consumption needs are directly related to the GDP growth of a country.
- Pakistan's GDP recovered and grew by ~3.9% in FY21 since the contraction by ~0.4% in FY20, owing to the unprecedented outbreak of COVID-19 pandemic.
- Pakistan's primary energy supplies (forms of energy converted to final energy) comprise of oil, gas, coal, nuclear electricity and hydro-electricity net generation, while final energy products (converted from primary energy supplies) consist of gasoline, diesel, purified coal, purified gas, electricity and mechanical energy.
- The Country's Power Sector is classified into three verticals (i) Generation, (ii) Transmission and (iii) Distribution. This Sector Study shall focus on the analysis of the Power Generation System.

The Electric Utility Network





2



3

GDP & Electricity Distribution





The growth of economy along with its global competitiveness hinges on the availability of reliable and affordable power to all consumers throughout the country. As an emerging economy, Pakistan's demand for electricity is enormous and its GDP is positively related with the sale of electricity.

Transmission – An Overview

- Power transmission is the vital link between power generation and power distribution. Transmission lines carry electricity at high voltages over long distances from power plants to distribution companies which bring the power to homes and workplaces.
- As per NEPRA Act, there can be only one National Grid Company (NGC) at national level at a particular time. National Transmission & Dispatch Company Limited (NTDC) is acting as NGC under license issued by NEPRA. In addition, NEPRA Act also allows setting up Special Purpose Transmission Lines, for which licenses are granted to private sector entities too.
- On Provincial Scale, the NEPRA (Amendment) Act, 2018 provides Provincial Governments the right to establish Provincial Grid Companies (PGCs). There can be only one PGC in a respective province at one time. So far, only Sindh Province has established a PGC – Sindh Transmission & Dispatch Company (STDC) which secured license from NEPRA in Nov, 2019. Additionally, K-Electric (KE) is operating under the license issued by NEPRA to carry out electricity transmission business within its service area.
- For last many years, the main reason for under-utilization of efficient power plants has been the constraints of transmission and distribution networks such as over-loading of transmission lines, insufficient transformation capacity of power transformers, outages of transmission lines, etc. The Transmission & Transformation losses as a result of energy received (~132,299GWh) and delivered (~128,620GWh) were ~2.8% during FY21. The financial cost of losses over and above NEPRA target losses is PKR~120mln in FY21.







Transmission | Industry Structure

NTDC & KE – An Overview:

- NTDC was incorporated as a Public Limited Company in Nov, 1998 after unbundling of WAPDA. It commenced its commercial operations in March, 1999 and was
 granted Transmission License by NEPRA in December, 2002 to engage in the exclusive transmission business for a period of thirty years. NTDC is responsible for
 evacuation of power from all types of power plants including hydro-electric power plants (mainly in the North), Thermal Public GENCOs and Private IPPs (mainly in
 the South) and supply to the Power Distribution Companies through primary (EHV) Network.
- KE is the only vertically-integrated power utility in Pakistan, which means the organization manages all three key areas Generation, Transmission and Distribution of producing and delivering energy to consumers.

NTDC Transmission Network (FY21)										
No. of Grid Stations	Grid Station Potential (kV)	/) Transformation Capacity (MVA) Transmission Lines (km) Transformer		Transformers In Stati	stalled at Grid ons					
				500/220kV	220/132kV					
16	500	30,610	8,059	44	34					
46	220	25,770	11,322	-	129					
62	-	56,380	17,292	44	163					
		KE Transmission Network (F	Y21)							
No. of Grid Stations	Grid Station Potential (kV)	Transformation Capacity (MVA)	Transmission Lines (km)	Transformers In Statio	stalled at Grid ons					
				220/132kV	132/11kV					
11	200	4,580	365	13	-					
69	132	7,135	833	-	168					
80	_	11,715	1,198	13	168					



Transmission | NTDC & KE

 Up till FY21, Pakistan's installed capacity was not sufficient to fully contribute to the maximum demand of the country for a particular point in time. It was due to reasons such as auxiliary consumption, impact of site reference conditions and seasonality effects on the renewable and large hydropower plants. After accounting for these factors, the capacity known as 'generation capability' is effectively used for meeting the electricity demand. FY20 was, however, an exception when the electricity demand became drastically low, putting up a surplus situation for the NTDC Network. With the expected peak demand for FY22, Pakistan is expected to achieve a surplus generation capability on NTDC Network from FY22 onwards. For KE system, the surplus is expected to come by FY23.

	NT	.DC				КЕ			
Year	Generation Capability (MW)	Demand During Peak Hours (MW)	Surplus/(Deficit) MW	Year	Generation Capability (MW)	Demand During Peak Hours (MW)	Surplus/(Deficit) MWh		
Actual					А	ctual			
FY17	19,020	25,117	(6,097)	FY17	2,860	3,195	(335)		
FY18	23,766	26,741	(2,975)	FY18	2,920	3,270	(350)		
FY19	24,565	25,627	(1,062)	FY19	3,008	3,527	(519)		
FY20	27,780	26,252	1,528	FY20	3,196	3,530	(334)		
FY21	27,819	28,253	(434)	FY21	3,202	3,604	(402)		
	Proje	ected		Projected					
FY22	29,761	25,101	4,660	FY22	3,682	3,856	(174)		
FY23	31,868	25,715	6,153	FY23	4,086	4,049	37		
FY24	34,151	27,311	6,840	FY24	4,511	4,252	259		
FY25	34,885	28,322	6,563	FY25	4,511	4,464	47		
FY26	38,574	29,398	9,176	FY26	4,830	4,687	143		

*'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.



Transmission | Assets

Grid Stations	FY17	FY18	FY19	FY20	FY21
NTDC	52	58	61	61	62
KE	74	74	79	82	83
TOTAL	126	132	140	143	145

Grid Station Capacity (MVA)	FY17	FY18	FY19	FY20	FY21
NTDC	43,760	43,350	53,920	55,300	56,380
KE	8,797	9,211	10,296	11,610	11,794
TOTAL	52,557	52,561	64,216	66,910	68,174





8

Transmission | Issues | NTDC and KE

Overloading of Power Transformers at Grid Stations:

 One of the key issues of Power Transmission System is the overloading of transformers against their rated capacity. This leads to forced outages on transmission lines. During FY21, the NTDC Network reflected overloading (~above 80% load) of around ~49% of 500/220kV transformers and ~57% of 220/132kV transformers.

Outages on Transmission Lines:

 Another issue pertaining to the transmission system is the outage or suspension of electricity transmission. Outages can be planned (due to maintenance, inspection, load management) or forced (emergency reasons or unanticipated disruptions). A summary of outages in transmission networks for NTDC and KE (FY20 and FY21) is given below.

			NT	DC DC		K-Electric			
Year	Description	Planned	Outages	Forced	Outages	Planned	Outages	Forced Outages	
		500kV	220kV	500kV	220kV	220kV	132kV	220kV	132kV
FY20	No. of Outages	547	1,774	131	360	-	5	2	35
	Total duration in minutes	262,560	851,520	74,446	183,176	-	3,417	673	3,823
	Maximum duration of any single outage (Minutes)	18,720	23,040	24,038	20,160	-	1,279	558	666
	No. of Outages	533	1,442	87	271	-	4	-	16
EV21	Total duration in minutes	280,697	671,452	60,058	109,795	-	2,050	-	1,101
FY21	Maximum duration of any single outage (Minutes)	18,567	43,573	12,663	31,629	-	1,153	_	164

PACRA

Transmission | Losses

- Transmission Loss refers to the loss of electricity during movement from a powerplant or power station to different substations.
- Transmission refers to the movement of electricity at high voltage. Losses during transmission are generally lower than those during distribution which carries electricity at lower voltage and larger distances to the end consumers.
- During FY21, transmission loss in NTDC Network of 500/220kV Grid Power was recorded at ~3,697GWh (~2.8% of the Units received by the System).

Transmission Losses (500/220kV) (GWh)	FY17	FY18	FY19	FY20	FY21
Units Received	106,798	120,062	122,302	125,941	132,299
Units Delivered	104,331	117,139	118,838	122,471	128,620
Units Loss (R - D)	2,467	2,923	3,464	3,470	3,679
% Loss in Transmission	2.3%	2.4%	2.8%	2.8%	2.8%

*This table refers to NTDC Losses only





Distribution – An Overview

- Distribution is one of the key functions for the provision of electricity to the end consumers. As at End-June'21, there were ten State Owned Distribution Companies (DISCOs) exclusively responsible for the supply of electricity in their respective areas. These DISCOs are licensed by NEPRA. In addition, KE is also licensed to supply electricity in its designated areas. Following amendments in NEPRA Act in April 2018, separate licenses are required to be obtained for the *supply* of electricity and *sale* of electricity.
- Besides DISCOs and KE, some other local authorities such as DHA, Bahria Town and Industrial Estates Development Authority have also been granted the license to supply electricity in the territory specified in their respective distribution licenses.

A Brief Background:

- DISCOs and GENCOs were created in Pakistan as a result of WAPDA unbundling in order to restructure the power sector to improve efficiency and transform gradually into a competitive market. For this process to occur smoothly, the Pakistan Electric Company Pvt. Ltd. (PEPCO) was created in 1998 and assigned with the task to unbundle WAPDA into 8 DISCOs then, 4 GENCOs and NTDC. PEPCO is responsible for the management of all the affairs of Corporatized DISCOs, GENCOs and NTDC.
- From 2007 onwards, the Ministry of Water & Power notified NEPRA approved tariff for all DISCOs replacing unified WAPDA tariff.



PACRA

Distribution | Industry Snapshot

• DISCOs are responsible for the operations & maintenance of the transmission and distribution assets at 132kV and below. Power Delivery through DISCOs' networks mainly depends on the adequacy of three major components; (i) 11 kV feeders, (ii) Power Transformers and (iii) Distribution Transformers. Following is a list of DISCOs and their asset structure in FY21.

Assets	DISCOs
Transmission lines – 132kV (km)	Peshawar Electric Supply Company (PESCO)
	Tribal Areas Electric Supply Co. (TESCO)
Grid stations – 132 kV	Islamabad Electric Supply Co. (IESCO)
Grid stations transformation capa	Gujranwala Electric Power Co. (GEPCO)
(MVA)	Lahore Electric Supply Co. (LESCO)
Feeders – 11 kV	Faisalabad Electric Supply Co. (FESCO)
Feeders length (km)	Multan Electric Power Co. (MEPCO)
Distribution Transformers (DTs) (N	Hyderabad Electric Supply Co. (HESCO)
	Sukkur Electric Power Co. (SEPCO)
Transformation capacity of DTs (N	Quetta Electric Supply Co. (QESCO)
DTs Low-tension LT lines (km)	
Consumers	K-Electric (KE)

Assets	NTDC	KE	Total
Transmission lines – 132kV (km)	29,495	833	30,328
Grid stations – 132 kV	882	69	951
Grid stations transformation capacity (MVA)	55,063	7,135	62,198
Feeders – 11 kV	10,188	1,937	12,125
Feeders length (km)	349,197	10,283	359,480
Distribution Transformers (DTs) (No.)	803,882	29,702	833,584
Transformation capacity of DTs (MVA)	51,555	8,153	59,709
DTs Low-tension LT lines (km)	240,931	18,509	259,440
Consumers	31,569,589	3,185,332	34,754,921

PACRA

Distribution | Assets (Lines & Grid Stations)

• The Country's Distribution Network is classified into DISCOs, KE and Small & Captive Power Producers. DISCOs purchase power from NTDC through CPPA-G.

Distribution Lines DISCOs (km)	FY17	FY18	FY19	FY20	FY21
High Tension (HT) Lines	357,820	364,918	373,337	379,859	385,933
Low Tension (HT) Lines	232,261	235,050	237,486	238,053	240,931
TOTAL (A)	590,081	599,968	610,823	617,912	626,864
Distribution Lines KE (km)	FY17	FY18	FY19	FY20	FY21
High Tension (HT) Lines	10,278	10,465	10,823	11,158	11,269
Low Tension (HT) Lines	19,962	19,098	19,751	18,367	18,509
TOTAL (B)	30,240	29,563	30,574	29,525	29,778
GRAND TOTAL (A+B)	620.321	629.531	641.397	647 437	656 642

*High Tension Lines carry high voltage (11kV, 33kV etc.), and are used to transmit power to long distances. LT lines carry low voltage (till 1kV) and are used for shorter distances, e.g., household



Distribution | Consumer Trend



- Household/Domestic consumers make up ~86% of the market share followed by commercial and Industrial connections.
- The number of Household consumers have increased from ~28.3mln in FY20 to ~29.9mln in FY21 registering a growth of ~6% YoY. The second largest consumer base in the country is commercial users which stood at ~3.8mln connections in FY21 (~3.7mln in FY20).
- Electricity is a vital engine for development and economic growth. Industrial connection grew at a CAGR of 2% over the last 6 years and made up only 1% of the total connections currently issued within the country in FY21.





14

Distribution | DISCO Wise



- Total number of electricity consumers as at End-FY21 was recorded at ~35mln (FY20~33mln). The largest consumer base is served by MEPCO, followed by LESCO, FESCO and GEPCO.
- According to the World Bank statistics, Pakistan is amongst the countries with a high-level population without electricity. Only ~74% of
 its population had access to electric power in CY19. Globally, the country ranks 149 out of 196 countries, positioning even behind
 Afghanistan and Bangladesh.



15

Performance Parameters

Transmission & Distribution Losses:

- T&D losses are a vital parameter in measuring the performance of DISCOs.
- NEPRA has set targets for the DISCOs to maintain their losses to a certain level. Breaching these targets leads to a significant loss to the national exchequer.
- The performance of DISCOs is benchmarked with their actual losses as against the targets set by NEPRA. The more the actual losses exceed the target, the worse its performance is considered to be.

Load Shedding:

 Although load shedding has reduced significantly over the years, it is still not eliminated completely as DISCOs' are carrying out load management as per AT&C criteria which is still not in line with the requirements of NEPRA Performance Standards.

Recoveries:

- DISCOs are ideally required to realize the maximum amount of recoveries against their billing.
- Lower recoveries of DISCOs is the root cause of the crumbling financial issues of the power sector.
- Rising circular debt also stems from the inefficiency of the DISCOs to fully recover their billed amounts and clear their dues to the NTDC and Power Producers in the given time frame.
- Historically, no significant improvement has been observed on the recovery ratios of the sector.

Safety:

• Safety is also one of the very important features in evaluating the quality of infrastructure and maintenance standards of the DISCOs. Increasing number of fatalities for both employees and public on account of electricity accidents is a concern.

Transmission & Distribution Losses

Transmission & Distribution Losses:

- Average T&D Losses of the DISCOs and KE were recorded at ~20% and ~18% respectively in FY21.
- KE has been granted a Multi-Year Tariff (MYT) for a period of 7 years from FY17 to FY23. Under its MYT Determination, KE has been given a target of 16.8% T&D losses for the fourth year of its MYT i.e. FY20. However, for FY21, the reported T&D losses of KE (excluding auxiliary consumption) have been ~18%.
- NEPRA has allowed a certain percentage of T&D Losses in tariff structure of DISCOs. Any loss above the allowed limit results in financial loss the national exchequer.











17

Transmission & Distribution Losses | Actual Vs Allowed

FY21											
DISCO	PESCO	IESCO	GEPCO	FESCO	LESCO	ΜΕΡϹΟ	QESCO	SEPCO	HESCO	TESCO	KE
Actual Reported Loss (%)	38.2%	8.6%	9.2%	9.3%	12.0%	14.9%	27.9%	35.3%	38.6%	9.6%	17.5%
Loss % Allowed in Tariff by NEPRA in FY19/20	27.9%	8.5%	9.8%	9.8%	10.0%	15.0%	17.4%	25.1%	21.3%	12.2%	16.8%
Loss Exceeding/(Less than) Allowance	10.3%	0.1%	-0.6%	-0.5%	2.0%	-0.1%	10.5%	10.2%	17.3%	-2.6%	0.7%

- During FY21, Only GEPCO, MEPCO, FESCO and TESCO's T&D losses were lower than their allowed limits by NEPRA, while SEPCO, HESCO, PESCO and QESCO's losses were significantly higher than their allocated limits.
- T&D losses result in a significant financial loss to the national exchequer as is witnessed from the adjacent chart. A financial impact of PKR~83bln was recorded in FY21 (up by ~41% from FY20).





DISCOs Average Recoveries

	Percentage Recoveries of Billed Amounts DISCOs											
Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	ΜΕΡϹΟ	HESCO	SEPCO	QESCO	Overall DISCOs	
FY17	88.6	66.6	89.8	96.1	95.9	97.9	94.6	75.4	59.7	25.0	87.7	
FY18	89.6	66.3	90.4	97.3	97.8	99.6	97.3	76.8	59.8	25.6	90.1	
FY19	88.6	67.9	87.6	96.4	97.7	99.3	99.4	74.5	63.3	27.3	90.3	
FY20	87.7	68.2	90.3	94.4	94.5	94.2	92.9	73.2	56.5	49.3	88.8	
FY21	101.9	83.3	116.9	105.1	98.7	97.2	102.2	75.6	64.5	39.8	97.3	

 The overall recovery of DISCOs improved during FY21 and reached 97.3% of the billed amount whereas it was at 88.8% of the billed amount during FY20. A key reason behind improvement in FY21 was recoveries on account of receipt of installments of the bills related to COVID-19 period.

- 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 in FY20.
- 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 30th June, 2021, the total receivables at DISCO's level stood at PKR~1,266bln representing an increase of PKR~64bln from end of FY20 (PKR~1,202bln).



Distribution – Segment Wise Recoveries Trend

- Average Recovery rate for FY21 was recorded at ~97.3% up by ~10% YoY (FY20 ~88.8%). The dip in FY20 was majorly witnessed due to the unprecedented COVID-19 crisis, due to which household consumers were given relief to defer their bill payments.
- In FY21, lowest recovery rate was, therefore, witnessed in agricultural recoveries ~57% (FY20 ~64%) and recoveries from the household segment 97% (FY20 ~86%).
- Recovery rate is highest among the industrial consumers with ~98%.





The Build Up of End User Tariffs

- Power purchase price constitutes on average 65 percent of the end-user tariff determined by NEPRA.
- It is important to note that the tariff notified by the government to subsidize households consuming up to 200 units, is even lower than the price at which DISCOs procure electricity from the CPPA-G.
- The highest contribution to power purchase price comes from the capacity charge. Rising capacity payments recently have been the major contributing factor to the consistently high end-user tariffs.
- T&D losses average around ~20% of the power tariff component, a significant share. The rest of the tariff component is majorly reflected by Distribution Margins of DISCOs and prior period adjustments.





CIRCULAR DEBT | THE UNFORTUNATE MENACE

What is Circular Debt?

- The Power Generation Companies produce electric power which is sold to CPPA-G on behalf of DISCOs through the transmission Company – NTDC. The DISCOs supply the electric power to the end consumers.
- The CPPA-G has to make payments to the power producing Companies and NTDC on behalf of DISCOs within a given timeframe.
- The problem stems from the DISCOs being unable to make timely payments due to reasons including low recoveries from end consumers and T&D losses. This in turn hinders CPPA-G in making payments to power producing Companies and transmission Companies. The cycle goes on as the power producing Companies are unable to make payments to fuel suppliers. Under the PPAs, the delayed payments to power companies bears mark-up and increases financial liability.







22

Accumulation of Circular Debt



Pakistan's total circular debt soared to PKR~2.4trn as at End-Oct'21 (up ~6% from End-June'21). The total amount of circular debt was
recorded at PKR~2.3trn as at End-FY21, representing an increase of PKR~130bln, a monthly run rate of PKR~11bln addition to the
misnomer pile. This, although still large, is reflecting a slowdown in the accumulation of Circular debt, whose growth went exorbitantly
high in FY19 by ~44% but then slowed to ~33% in FY20 and declined to just ~6% in FY21.



23

Circular Debt – Initiatives to stop accumulation

- In recent years, the major build-up in the circular debt has been caused by capacity payments to large power projects set up since 2015, primarily as part of the multibillion-dollar CPEC initiative, with Chinese money.
- Circular debt 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.
- Higher T&D losses, low recoveries from DISCO's, delay is subsidy payments, increasing receivables from public and private consumers are some of the major reasons contributing to mounting circular debt.
- The strategies listed in the adjacent table are in consideration by the GoP to address the circular debt menace.

Major Components of Circular Debt - PKR'bln	FY20	FY21
Operational Inefficiencies	752	846
Non-Payment by QESCO Agriculture Tube well	306	306
Limitations & Delays in Regulatory Approval	270	270
Non-payment of subsidies	260	332
Non-Payment by K-Electric	212	294
Outstanding Amounts by AJK	144	144
Others	140	(7)
Interest Payment on Power Sector Debt by PHPL	66	95
Total Debt	2,150	2,280

lssue	Way Forward			
Excess/expensive generation -Negotiation with IPPs				
capacity	-Reduction of RoE of govt. owned power plants			
	-Shut down of inefficient GENCOs			
	-CPEC projects			
Non-payment by K-Electric	Early signing of PPA by K-Electric based on commercially viable			
	terms			
Outstanding amount of AJK	Removal of GaP of AJ&K tariff differential-summary initiated			
Delay tariff determinations	Tariff rebasing to be announced by NEPRA to reduce the gap			
Quetta Agriculture tube wells Provincial govt. support required for recovery drive and				
	installation			
Non-payment of subsidies	Full amount of summary to be budgeted and released			
PHPL interest charges	Amendments of NEPRA Act			



Investment plan for Transmission Lines of NTDC

	Name of Project	Transmission Lines				Expected	
S.No		Voltage Level	el Line Length (km))	MVS Capacity	Completion
		(kV)	500 kV	220 kV	HVDC		Date
1	220 kV Mirpur Khas Grid Station	220	-	70	-	2x250	2021-22
2	220 kV Zero Point Grid Station	220	-	24	-	3x250	2021-22
3	220 kV Gharo Grid Station	220	-	85	20	2x250	2021-22
4	New 220 kV Guddu-Uch-Sibbi S/C T/Line	220	-	360	-	-	2021-22
5	Evacuation of Power from K2/K3 Nuclear Power Plants	-	-	116	-	-	2021-22
6	Installation of Series Compensation for Enhancement in Transmission Capacity	-	-	-	-	-	2021-22
7	Procurement of 5 No 220 kV Mobile Grid Stations	220	-	-	-	-	2019-20
8	Evacuation of Power from 1224 MW Wind Power Plants at Jhimpir Clusters	-	-	35	220	1250	2021-22
9	Installation of Pilot Battery Energy Storage System (BESS) at 220 kV Jhimpir-I Grid Station	220	-	-	-	-	2019-20
10	500 kV Chakwal Grid Station	500	33		-	2x450+4x160	2020-21
11	220 kV Mastung Grid Station	220	-	120	-	2x250	2020-21
12	Evacuation of Power from Karot and Azad Pattan HPPs	-	-	-	10	-	2020-21
13	Evacuation of Power from Tarbela 5th Extension	-	-	-	53	-	2020-21
14	Evacuation of Power from 350 MW Siddiqsons Ltd	-	-	-	40	-	2020-21
15	Evacuation of Power from 660 MW Lucky Electric Power Company	-	-	-	13	-	2020-21
16	500 kV HVAC T/Lines for Interconnection of HVDC Converter Station at Lahore & Matiari with existing HVAC System	500	60	-	-	-	2020-21
17	500 kV Islamabad West Grid Station	500	27	35	-	2x750+3x250	2021-22
18	500 kV Peshawar New (Nowshera) Grid Station, CASA-1000	500	15	24	-	2x750	2021-22
19	220 kV Arif wala G/S	220	-	-	-	2 X 250	30.06.2023
20	2nd source of supply to 220kV Jaranwala Road Substation	220	-	35	-	-	30.06.2022
21	500kV Allama Iqbal Industrial City for 600MW Demand of the Special Economic Zone in the FIEDMC area	500	-	-	-	2 X 750	2023-24
22	220 kV Sundar Industrial Estate Grid Station	220	-	-	_	160 MVA	June, 2023
23	Enterprise Resource Planning System. (ERP)	-	-	-	-	-	2021-22



Indicative Generation Capacity Expansion Policy (IGCEP 2021-30)

The **IGCEP** 2021-30, developed by NTDC, deals with long-term energy security with timely investments to supply energy in line with economic developments and environmental needs. Salient Features of the IGCEP:

- □ Significant Induction of REs (clean and indigenous)
- □ Tapping of indigenous coal-based power
- □ Balancing the overall basket price with increased share of hydro power
- □ Optimal indigenization: less reliance on imported fuel i.e. coal, RFO, RLNG etc.
- □ Substantial reduction in carbon emission owing to induction of REs and hydro

Pakistan ranks 99th among 110 countries in terms of energy security by the World Energy Council for CY20. Pakistan imports nearly one third of its energy resources in the form of oil, coal, and RLNG, and currently 47% of existing installed capacity relies on imported fuel for energy generation.

According to the IGCEP, the highly skewed energy mix of the country towards imported fuels including coal, furnace oil and RLNG, would be substituted with indigenous resources including hydel, local coal, bagasse, wind and solar on least cost basis.

The use of furnace oil would be reduced to 2% only from the current usage of 19%. Similarly, the use of RLNG and imported coal would be decreased to 13% and 9% from their current usage of 17% and 12%, respectively.

The policy envisions massive increase in the contribution of hydropower and other renewable energy resources, including bagasse, wind and solar. The contribution of hydel, wind and solar, which currently stands at 29 percent, 3 percent and 1 percent, respectively would be increased to 43%, 7% and 4%, thereby increasing the total share of RE to the tune of more than ~55%.





25



National Electricity Policy 2021

National Electricity Policy

The Prime Minister Imran Khan in June, 2021 chaired the 47th meeting of the Council of Common Interest (CCI) and approved the National Electricity Policy 2021 for the next 10 years.

- The *vision* of the policy is to ensure universal access of electricity through a self-sustainable power sector, developed and premised on: optimal utilization of indigenous resources; integrated planning approach; efficient, liquid and competitive market design; and affordable & environment friendly outcome for the consumers.
- The *key guiding principles* included efficiency, transparency, competition, financial viability, indigenization, research & development and environmental responsibility. These principles are used to formulate sub-policies about generation, transmission, renewable energy, market operations, cost of service, energy efficiency & conservation, integrated planning and governance etc. that are a part of the National Electricity Plan.

National Electricity Plan

NEP is broad-based involving six objectives – sustainability; energy equity and financial viability; security of supply; governance and stakeholders' input; research, development and indigenization; market and risks.

De-carbonization: NEP would attempt to handle climate change and carbonization of energy mix.

Indigenization: Indigenization, to be viewed in terms of both fuel and equipment as the country is lagging behind many developing countries in terms of local content, which increases the dependence, cost and drain of foreign exchange.

Provincial Issues: In energy discussion ensuring participations and satisfactions of all provinces and associated stakeholders.

Demand/Supply: NEP will attempt to handle demand management issues

Universal Access: The NEP objective mix, includes universal access/ rural electrification which involves providing energy in remote areas of the country. **Financial Viability:** NEP objectives include financial viability in terms of cost and affordability.

Business Risk | An Overview



State Ownership

- Management of Affairs vesting with PEPCO, though the Companies are administratively autonomous.
- Regulated Power Purchase Price (PPP) through Transfer Price Mechanism.
- Fixed Distribution Margins on Single Year Tariff basis or Multi-Year Tariff basis (in a few cases including KE).
- DISCOs and GENCOs were established as part of the GoP's mandate to reform the power sector into a competitive market. The core purpose was to reduce the inefficiencies and systematic problems of the power value chain. However, DISCOs have not even till now been able to achieve this. The inefficiencies of Distribution System remains a key operating challenge for the DISCOs.
- On the demand side, DISCOs have been continually facing two major issues

 low recoveries on billed amounts and (ii) T&D losses. These two
 problems also arise as a result of inefficiencies in the distribution system.
 Lower recoveries are the leading cause of the mounting Circular Debt in
 the Power Sector. On the other hand, T&D Losses exceeding an acceptable
 limit cause significant financial loss to the national exchequer.







Business Risk | Profit Margins – KE & NTDC



- KE is involved in all 3 verticals of Power sector while NTDC is involved in transmission only.
- In FY21, reduction in transmission losses contributed to improved margins within the industry.



Business Risk | Profit Margins – DISCOs



- The gross profit margins of DISCOs have remained stable despite increase in the revenues in FY21 after a dip in FY20 on account of decline in demand and consumption of electricity resulting from the nation wide lockdown imposed due to COVID-19 outbreak.
- Furthermore, better recoveries and reduction in distribution losses also contributed to improved operating and net margins within the industry.

DISCO's Margins are indictive of 4 DISCOs: MEPCO, GEPCO, IESCO & FESCO and data available till FY20.



Financial Risk – An Overview



- The capital structure of NTDC & KE is a mix of debt and equity, with leverage ratio fluctuating between ~36% to ~48% over the past five years.
- Overall debt for DISCOs has reduced on a timeline basis, however, DISCOs (based on sample) recorded a negative equity in on their books due to accumulated losses over the years.
- Interest coverage ratio of DISCOs has improved significantly over the last five years, which in line with the lowering debt in capital structure.



Financial Risk – Working Capital



*KE is involved in all 3 verticals of Power sector while NTDC is involved in transmission only.

244 228 229 250 194 200 138 130 129 116 122 127 150 100 50 FY16 (6) FY17 FY18 FY20 FY19 (50) (64)(100)(99) (101)(106)(150)Receivable Days Payable Days Net Working Capital Days

Working Capital (Days) | DISCO's

*Working Capital Days are averages of 4 Discos (MEPCO, GEPCO, IESCO & FESCO)

 Net working capital days of NTDC have increased in FY21 after reducing in FY20. On the contrary Net working capital days of KE have further dipped from ~(163) days in FY20 to ~(235) days in FY21.

300

- Net cash cycle of DISCOs improved slightly over the last few years, however it is still off-balance as compared to the industry norms and currently stands at ~(106) days due to longer payback period to creditors.
- Negative working capital days are a result of low recoveries/line losses by electricity distribution and transmission companies as well as delay in receipts of subsidies from the government which results in payment delays to creditors.

The total borrowing of *"Electric Power Generation, Transmission and Distribution"* (as per SBP) stood at PKR~584,284mln as on 30th Nov'21 (PKR~485,930mln Nov'20), up ~20% YoY.

- The largest component of borrowing is fixed long term loans which constitutes 56% of total borrowing and stood at PKR~243,025mln (PKR~190,630mln Nov'20). Working Capital component is 42% of the total borrowing and stood at PKR~243,025mln as on 30th Nov'21.
- The SBP has introduced several concessionary schemes for prospective sponsors, desirous of setting up renewable energy power projects in the country with mark up rate ranging up to 6%.
- The total outstanding loans in the renewable power sector (excluding Hydel) stood at PKR~73,818mln as at 30th Nov'21. This is 13% of the total outstanding loan in the power sector.

POWER GENERATION

Financial Risk – Borrowing







SWOT Analysis





Rating Curve



- PACRA rates 2 entities in the Pakistan Electricity (Distribution) industry namely NTDC and K-Electric.
- Ratings fluctuate between AA+ and AA.



Outlook: Stable

- Pakistan's Power Sector is confronting deep-routed issues since long. The key risks being weak financial discipline and inefficiencies in all three verticals of the System. The Sector is, however, considered the backbone of economy and the GoP is keen on developing long term sustainable solutions to the ingrained power issues. Apart from the rising circular debt, some positive developments have surfaced on the economic and power sector level in the recent times including development of first long term National Electricity Policy and the subsequent National Electricity Plan.
- Industrial activity has picked up in various sectors with the Large Scale Manufacturing Industries output increasing by ~5.2% during 1QFY22. The sectors which have contributed to this growth are textiles, food & beverages, pharmaceuticals and chemicals.
- All IPPs which signed the MoUs in Aug'20 have agreed to enter into the legally binding contracts with the GoP, according to which the government would pay dues worth PKR~450bln, owed to the IPPs in two installments. Payment of circular debt related dues under this agreement will improve liquidity position of IPPs.
- An amount of PKR~69.5bln was earmarked for various projects of NTDC/PEPCO under the PSDP for FY22 out of which the government has released a sum of PKR~18.2bln for various projects so far. These include enabling NTDC to boost transmission before summer by easing of bottleneck in the national grid, due to which NTDC will be able to supply around ~27,000MW of power by June 2022 against earlier volume of ~25,000MW.
- The decision taken by the State Bank of Pakistan (SBP) to lower the policy rate by 625bps to 7% in the last quarter of FY20 lowered the finance costs incurred by power distributors for financing availed to bridge liquidity gap FY21. However, State Bank of Pakistan (SBP) has since revised the policy rate by 275 basis points to counter growing inflation and preserve stability with growth, thereby raising the policy rate to 9.75%.
- The average inflation rate during FY21 stood at ~8.9% as compared to an average inflation rate of ~10.7% during FY20. Till December 2021, the inflation level in the country has risen to 12.3%. Moreover, the PKR has depreciated by 12.8% during the ongoing fiscal year FY22 till December 2021.
- Although Pakistan's generation capability is now sufficient to meet its demand, it is equally essential to strengthen and expand the T&D network of the country in order to achieve optimal utilization of the generation capacity. Immediate measures are required for an Integrated planning and investment in the National Grid System to remove the T&D constraints and ensure smooth transmission of cheaper electricity to the end consumers.

Bibliography

- State Bank of Pakistan (SBP)
- Water & Power Development Authority (WAPDA)
- National Electric Power Regulatory Authority (NEPRA)
- Ministry of Energy
- Ministry of Finance
- NTDC State of the Industry Report 2021
- E-tribune, The News
- Private Power and Infrastructure Board (PPIB)
- Ember Global Electric Review 2021
- Pakistan Energy Year Book
- Pakistan Economic Survey
- PACRA Database

Research Team	Saniya Tauseef	Ali Abdul Rehman		
	Asst. Manager R&P	Research Analyst		
	saniya.tauseef@pacra.com	ali.abdulrehman@pacra.com		
	Contact Number: +92 42	35869504		

DISCLAIMER

PACRA has used due care in preparation of this document. Our information has been obtained from sources we consider to be reliable but its accuracy or completeness is not guaranteed. The information in this document may be copied or otherwise reproduced, in whole or in part, provided the source is duly acknowledged. The presentation should not be relied upon as professional advice.

