POWER TRANSMISSION & DISTRIBUTION

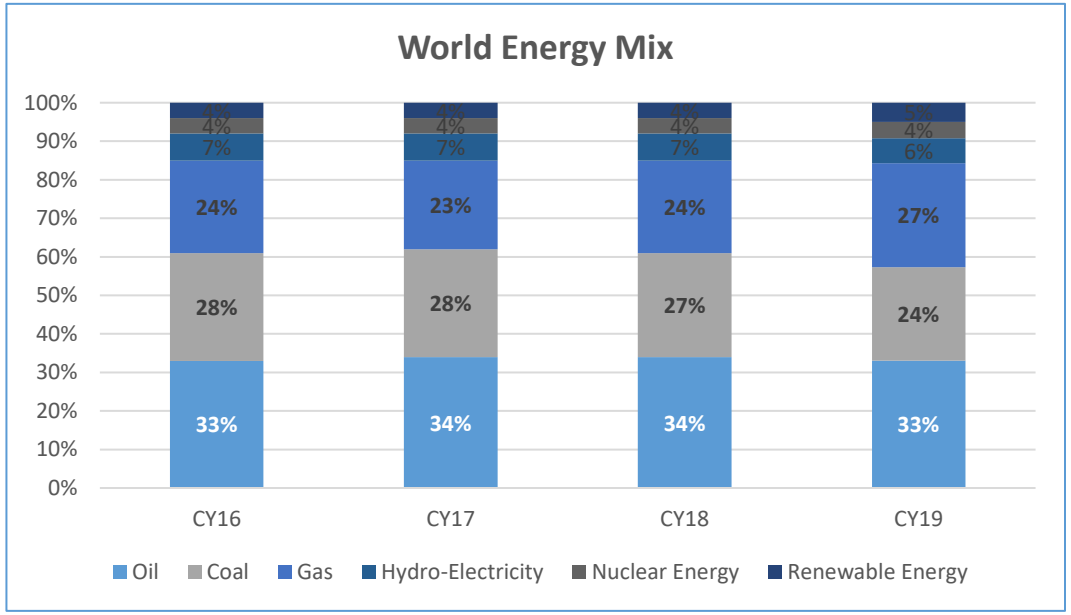
An Overview

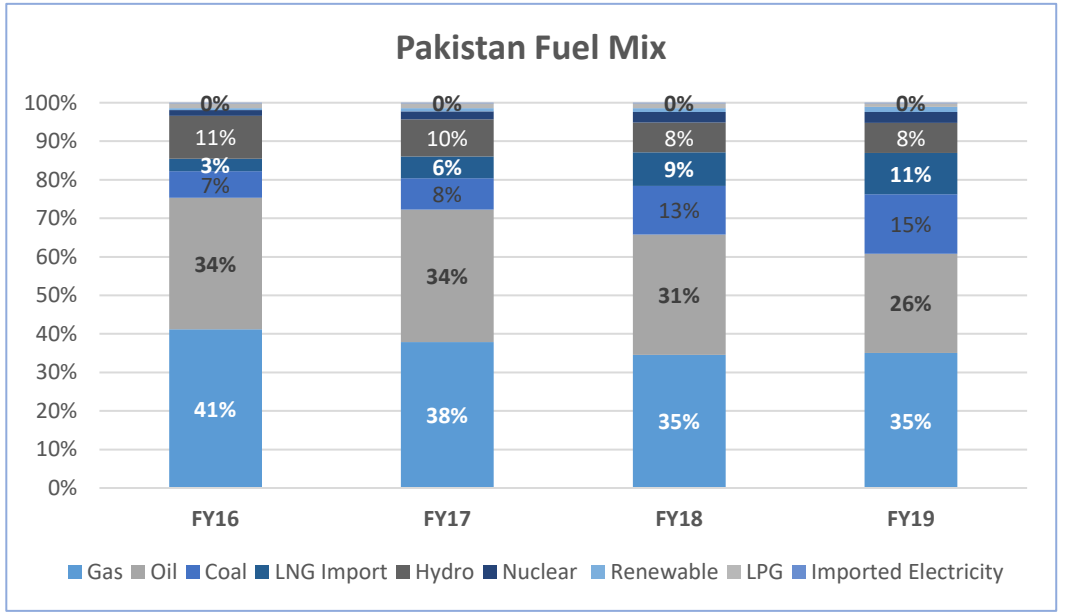
January 2021

TABLE OF CONTENTS

POWER TRANSMISSION & DISTRIBUTION

ENERGY MIX | A Comparison





- World Energy Mix is dominated by fossil fuels, particularly oil (~33%) coal (~24%) and natural gas (27%), despite increasing need to shift towards cleaner fuels for environment safety and depleting world oil reserves.

- Pakistan fuel mix is diversified. Though fossil fuels dominate Pakistan's fuel mix too, it consists a fair share of hydel energy (~8%). Moreover, Pakistan has lately been relying on imported LNG for meeting its energy demand whose share has increased to a prominent 11% in total fuel mix of the country.

Source: BP Statistical Review of World Energy - 2020

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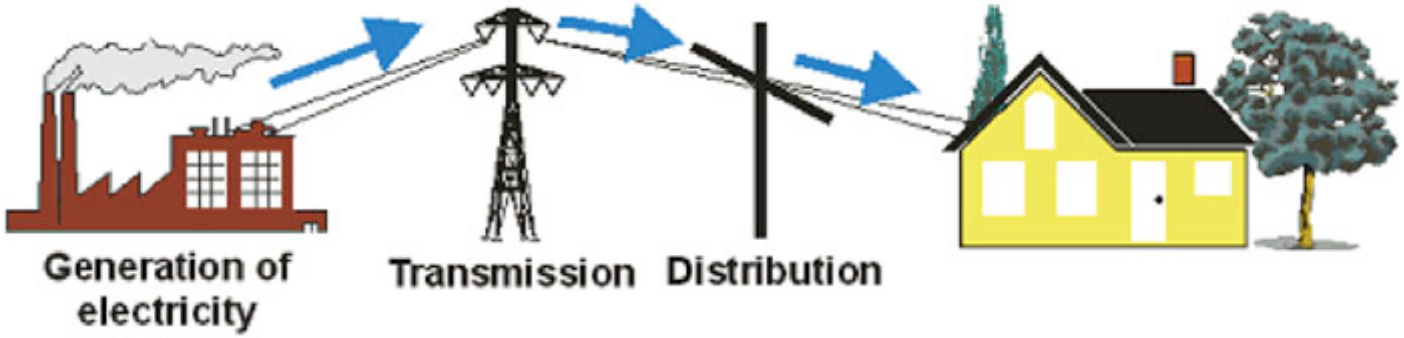
Overview

- 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 contracted by ~0.4% in FY20, owing to the unprecedented outbreak of Covid-19 pandemic (~1.2% growth in FY19).
- 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 statistics and analysis of the **Power Transmission and Distribution System**.
- Transmission refers to the movement of electricity from power generation plants to various substations (grid stations) at a high voltage level. Distribution system carries electricity from the substation to the end consumer at a low voltage level.



Source: Pakistan Energy Year Book and Pakistan Economic Survey

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Transmission - Structure

- A transmission grid is a network of power stations, transmission lines and substations. The transmission network ensures evacuation of power from the generation plants to the load centers across the country.

- 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 by NEPRA. NEPRA Act also allows setting up Special Purpose Transmission Lines, for which licenses are granted to private sector entities too. Alongside NTDC, K-Electric (KE) also operates under the license issued by NEPRA to carry out electricity transmission business within its service area.

- 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.

NTDC – 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.

NTDC | Transmission Network | June'20

No. of Grid Stations	Grid Station Potential (kV)	Transformation Capacity (MVA)	Transmission Lines (km)	Transformers Installed at Grid Stations	
				500/220kV	220/132kV
16	500	22,350	5,970	43	33
45	220	31,060	11,322	-	127
61	-	**53,410**	**17,292**	**43**	**160**

Source: NEPRA, NTDC

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Transmission | NTDC & KE

- Up till recently, Pakistan's installed capacity was not sufficient to fully meet 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. The generation capability on NTDC network has surpassed demand needs during peak hours in FY20, while KE projects are expected to achieve generation capability surplus in FY22.

NTDC			
Year	Generation capability (MW)	Demand during peak hours (MW)	Surplus / (Deficit) (MW)
Actual			
FY16	17,261	22,559	-5,298
FY17	19,020	25,117	-6,097
FY18	23,766	26,741	-2,975
FY19	24,565*	25,627*	-1,062
FY20	27,780*	26,252*	1,528
Projected			
FY21	30,582	29,325	1,257
FY22	32,989	30,921	2,068
FY23	35,896	31,953	3,943
FY24	37,918	33,696	4,222
FY25	39,157	35,422	3,735

KE			
Year	Generation capability (MW)	Demand during peak hours (MW)	Surplus / (Deficit) (MW)
Actual			
FY16	2,860	3,195	-335
FY17	2,920	3,270	-350
FY18	3,008	3,527	-519
FY19	3,196	3,530	-334
FY20	3,202	3,604	-402
Projected			
FY21	3,682	3,856	-174
FY22	4,086	4,049	37
FY23	4,511	4,252	259
FY24	4,511	4,464	47
FY25	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.*

Source : NEPRA 'State of the Industry Report' 2020

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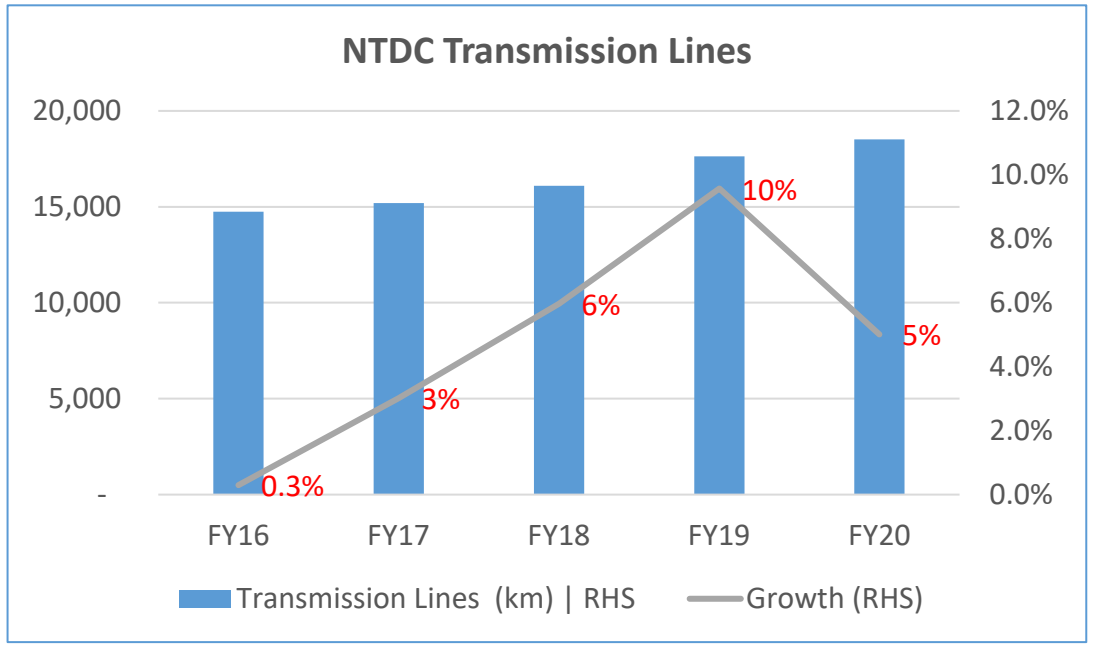
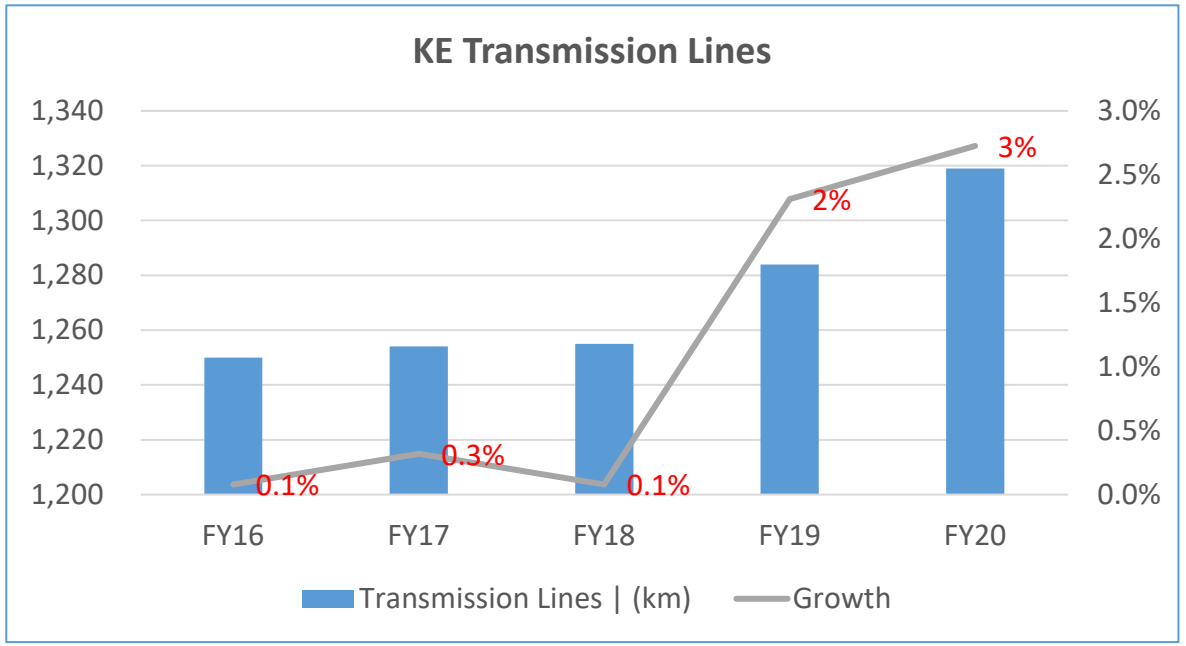
Transmission | An Overview of Assets

Grid Stations	FY16	FY17	FY18	FY19	FY20
NTDC	50	52	58	61	61
KE	74	74	74	79	82
TOTAL	**124**	**126**	**132**	**140**	**143**

Grid Station Capacity (MVA)	FY16	FY17	FY18	FY19	FY20
NTDC	42,190	43,760	43,350	53,920	55,300
KE	8,732	8,797	9,211	10,296	11,610
TOTAL	**50,922**	**52,557**	**52,561**	**64,216**	**66,910**





Source : NEPRA State of the Industry Report

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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 FY20, 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 (FY19 and FY20) is given below.

Year	Description	NTDC				K-Electric			
		Planned Outages		Forced Outages		Planned Outages		Forced Outages	
		500kV	220kV	500kV	220kV	220kV	132kV	220kV	132kV
FY19	No. of Outages	723	2,082	203	556	-	10	0	46
	Total duration in minutes	347,040	999,360	102,967	282,906	-	13,049	0	4,997
	Maximum duration of any single outage (Minutes)	14,400	156,960	17,308	18,228	-	3,723	0	469
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

Overloading: >80%, Underutilization: <30%

Source : NEPRA 'State of the Industry Report' 2020

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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 FY20, transmission loss in NTDC Network of 500/220kV Grid Power was recorded at 3,470 GWh (~2.8% of the Units received by the System).

Transmission Losses (500/220kV) (GWh)	FY16	FY17	FY18	FY19	FY20
Units Received	101,150	106,798	120,062	122,302	125,941
Units Delivered	98,550	104,331	117,139	118,838	122,471
Units Loss (R - D)	**2,600**	**2,467**	**2,923**	**3,464**	**3,470**
% Loss in Transmission	**2.57%**	**2.31%**	**2.43%**	**2.83%**	**2.76%**

**This table refers to NTDC Losses only*

Source : NEPRA State of the Industry Report

Distribution – An Overview

- Distribution is one of the key functions for provision of electricity to the end consumers. As at End-June'20, there were ten State Owned Distribution Companies (DISCOs) exclusively responsible for 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.

Source : NEPRA State of the Industry Report, WAPDA

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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 as at End-June'20.

DISCOs
1) Peshawar Electric Supply Company (PESCO)
2) Tribal Areas Electric Supply Co. (TESCO)
3) Islamabad Electric Supply Co. (IESCO)
4) Gujranwala Electric Power Co. (GEPCO)
5) Lahore Electric Supply Co. (LESCO)
6) Faisalabad Electric Supply Co. (FESCO)
7) Multan Electric Power Co. (MEPCO)
8) Hyderabad Electric Supply Co. (HESCO)
9) Sukkur Electric Power Co. (SEPCO)
10) Quetta Electric Supply Co. (QESCO)
K-Electric (KE)

Assets	NTDC	KE	Total
Transmission lines – 132kV (km)	28,621	801	29,422
Grid stations – 132 kV	860	68	928
Grid stations transformation capacity (MVA)	52,640	6,951	59,591
Feeders – 11 kV	9,706	1,890	11,596
Feeders length (km)	343,215	10,204	353,419
Distribution Transformers (DTs) (No.)	765,115	28,842	793,957
Transformation capacity of DTs (MVA)	46,921	7,916	54,837
DTs Low-tension LT lines (km)	238,551	18,367	256,918

*Others include import from Iran and mixed fuels

Source : NEPRA 'State of the Industry Report

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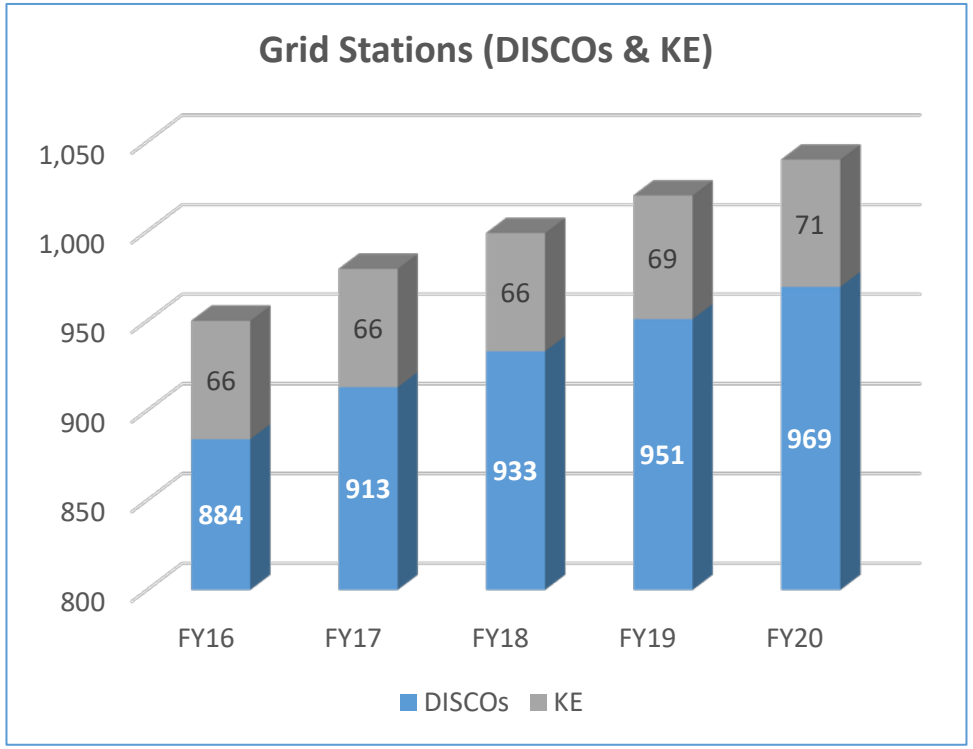
Distribution | Assets (Lines & Grid Stations)

- The Country's Distribution Network is classified into DISCOs, KE and Small & Captive Power Producers. DISCOs purchase power from NTDC through CPPA-G. Therefore, separate information of distribution network for DISCOs and KE is presented.

Distribution Lines DISCOs (km)	FY16	FY17	FY18	FY19	FY20
High Tension (HT) Lines	347,398	357,820	364,918	373,337	379,330
Low Tension (HT) Lines	228,666	232,261	235,050	237,486	238,551
TOTAL (A)	**576,064**	**590,081**	**599,968**	**610,823**	**617,881**

Distribution Lines KE (km)	FY16	FY17	FY18	FY19	FY20
High Tension (HT) Lines	10,158	10,278	10,465	10,823	11,158
Low Tension (HT) Lines	18,000	19,962	19,098	19,751	18,367
TOTAL (B)	**28,158**	**30,240**	**29,563**	**30,574**	**29,525**

GRAND TOTAL (A+B)	**604,222**	**620,321**	**629,531**	**641,397**	**647,406**

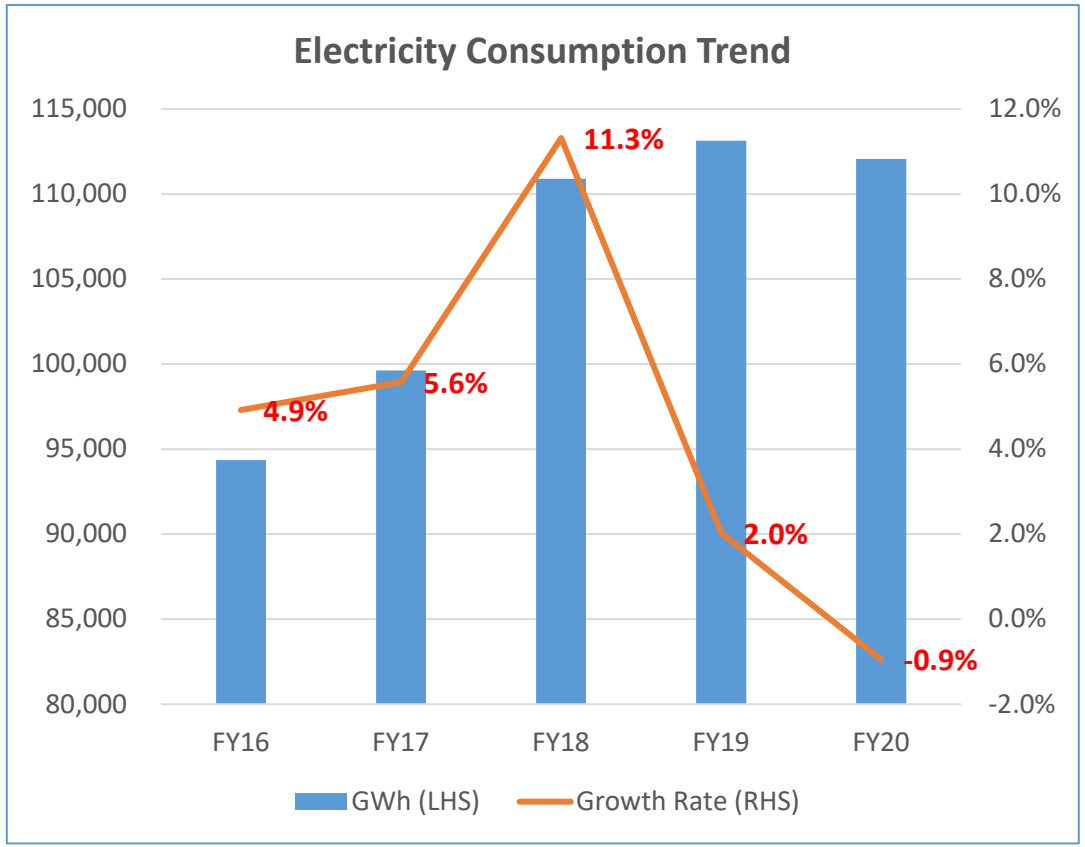


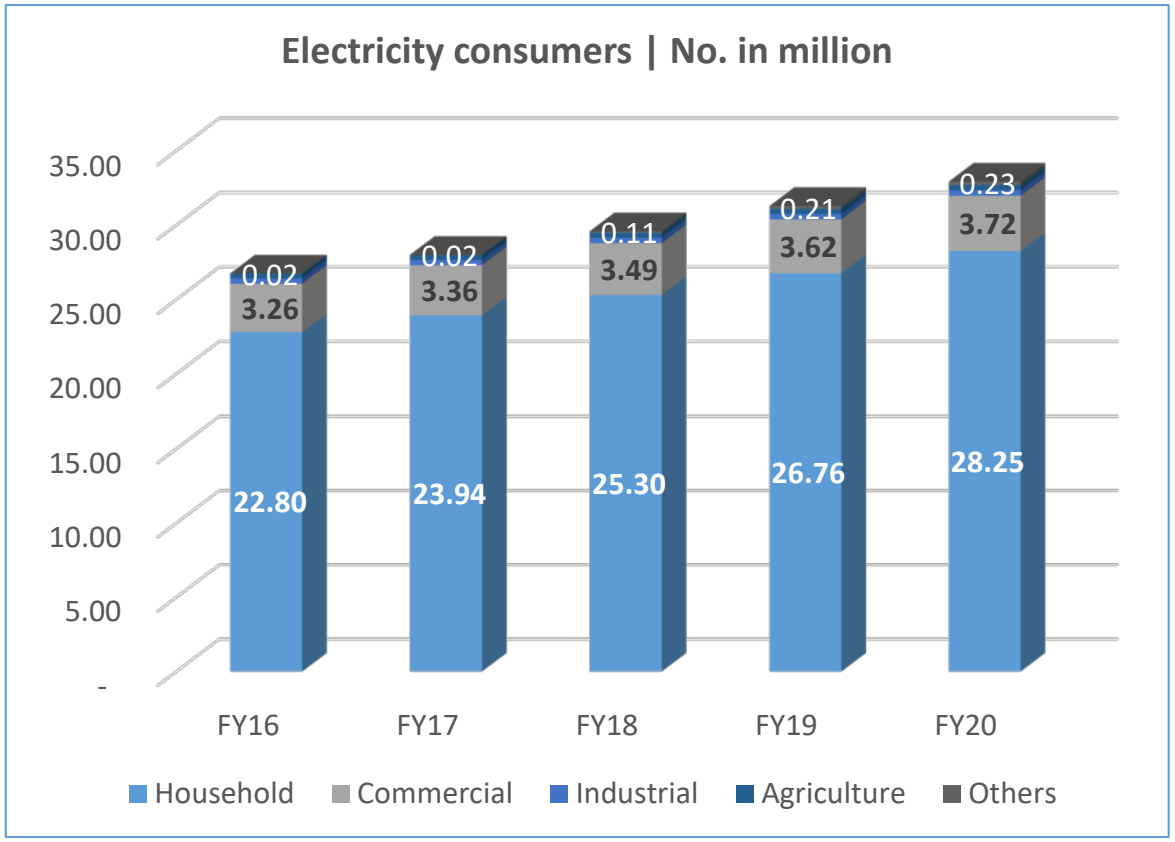
*High Tension Lines carry high voltage (11kV, 33kV etc.), and are used to transmit power to long distances. LT lines carry low voltage (till 1kV) and are used for shorter distances, e.g., household

Source: NEPRA State of the Industry Report

POWER TRANSMISSION & DISTRIBUTION

Electricity Consumption Trend



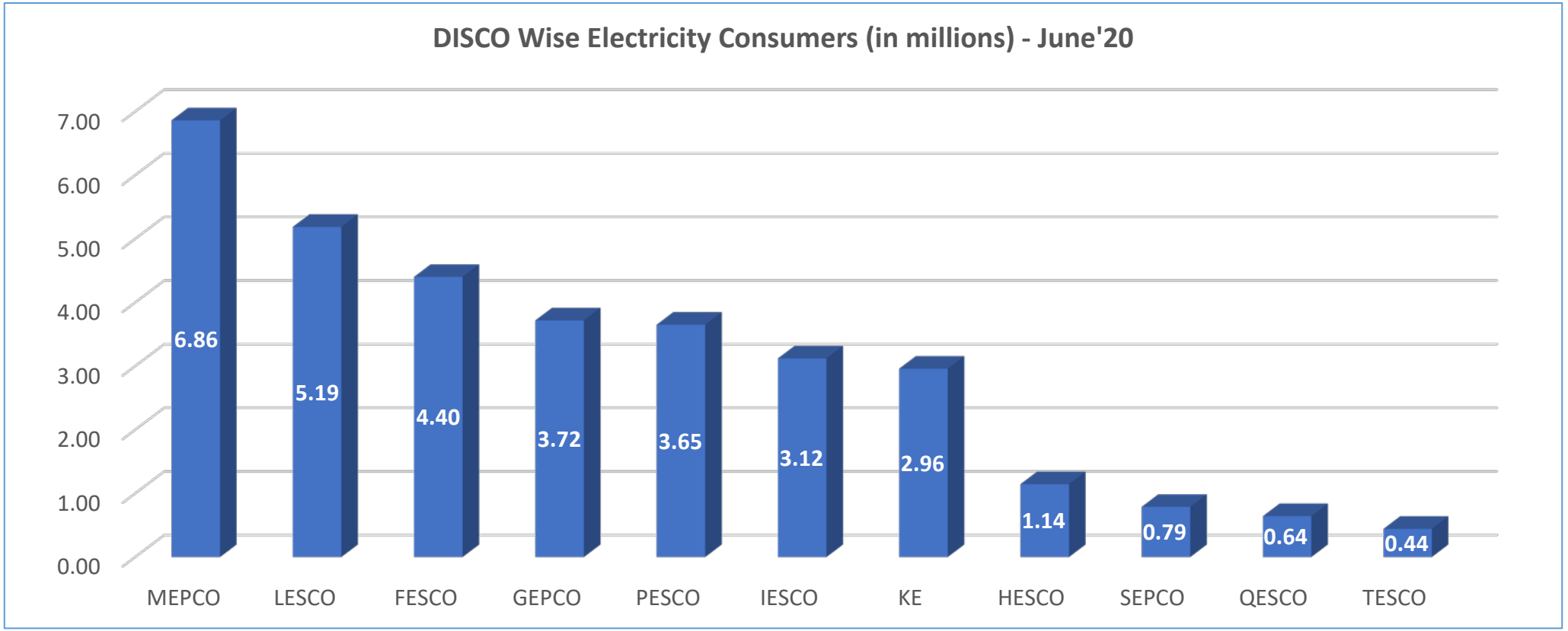


- Pakistan's electricity consumption was recorded at ~112,070GWh in FY20 (down ~0.9% YoY).
- Household/domestic consumers make up ~86% of the market share followed by commercial and Industrial connections (in Nos).

Electricity consumers refers to the number of electricity 'connections' and not individuals.

Source : NEPRA State of the Industry Report

Electricity Distribution – DISCO Wise



- Total number of electricity consumers as at End-June'20 was recorded at ~33mln. The largest consumer base is served by MEPCO, followed by LESCO, FESCO and GEPCO.

Source : NEPRA State of the Industry Report

POWER TRANSMISSION & DISTRIBUTION

DISCOs 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 (pls explain in a line how?).
- 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.

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.

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.

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.

Source : NEPRA State of the Industry Report, NEPRA Performance Evaluation Report for DISCOs

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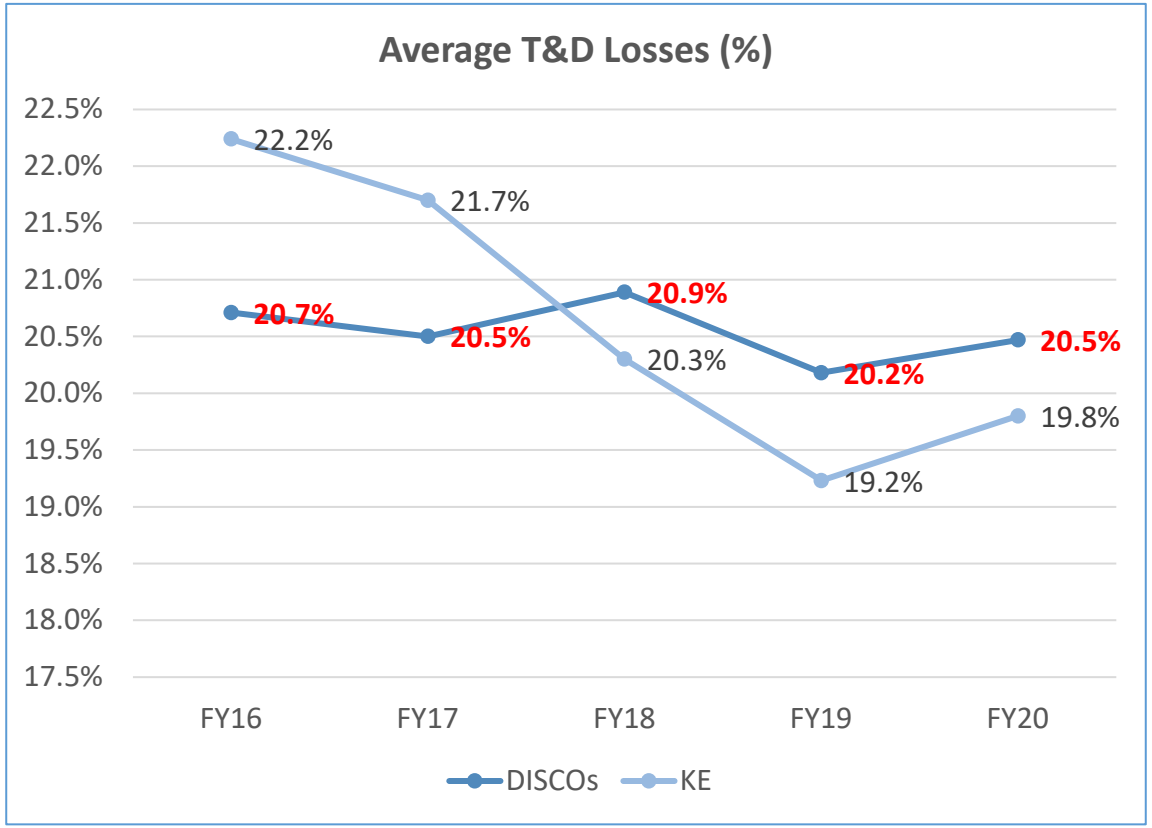
T&D Losses

Transmission & Distribution Losses:

- Average T&D Losses of the DISCOs and KE were recorded at ~21% and ~20%, respectively, in FY20.
- 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 17.76% T&D losses for the fourth year of its MYT i.e. 2019-20. However, for FY20, the reported T&D losses of KE (excluding auxiliary consumption) have been ~20%.
- 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 to the national exchequer.



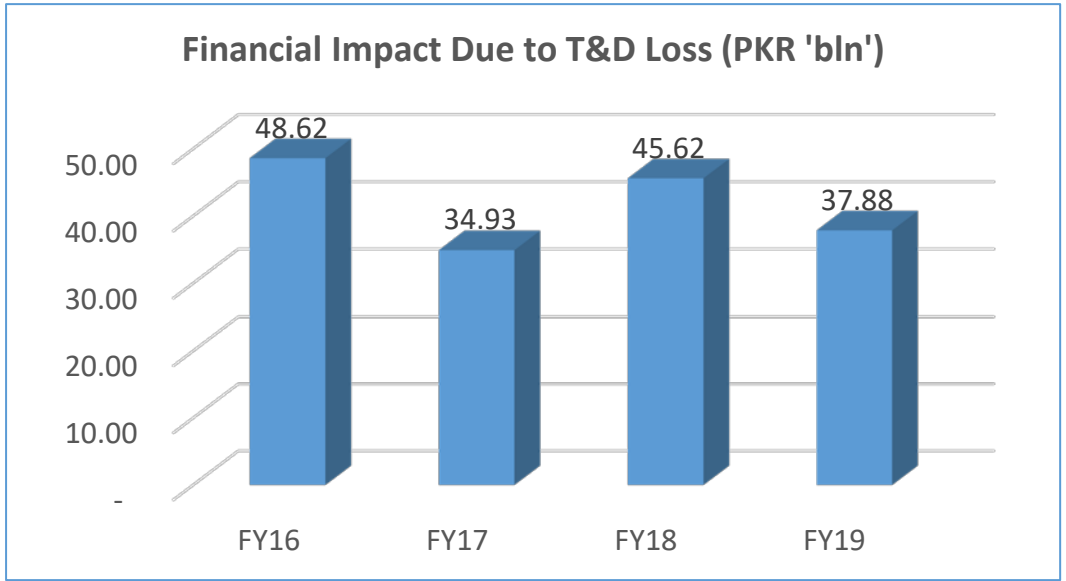
Source : NEPRA State of the Industry Report

POWER TRANSMISSION & DISTRIBUTION

T&D Losses | Actual Vs Allowed

FY19										
DISCO	PESCO	IESCO	GEPCO	FESCO	LESCO	MEPCO	QESCO	SEPCO	HESCO	KE
Actual Reported Loss (%)	36.6%	8.9%	9.9%	9.8%	13.2%	15.8%	23.6%	37.0%	29.5%	19.1%
Loss % Allowed in Tariff by NEPRA	32.0%	8.7%	10.0%	10.2%	11.8%	15.0%	17.5%	29.8%	22.6%	18.8%
Loss Exceeding/(Less than) Allowance	4.7%	0.2%	-0.2%	-0.4%	1.4%	0.8%	6.1%	7.3%	6.9%	0.4%

- During FY19, Only GEPCO and FESCO'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~38bln was recorded in FY19 (down by ~17% from FY18).



Note: Data available till FY19

Source : NEPRA State of the Industry Report, NEPRA Performance Evaluation Report for DISCOs

POWER TRANSMISSION & DISTRIBUTION

DISCOs Average Recoveries

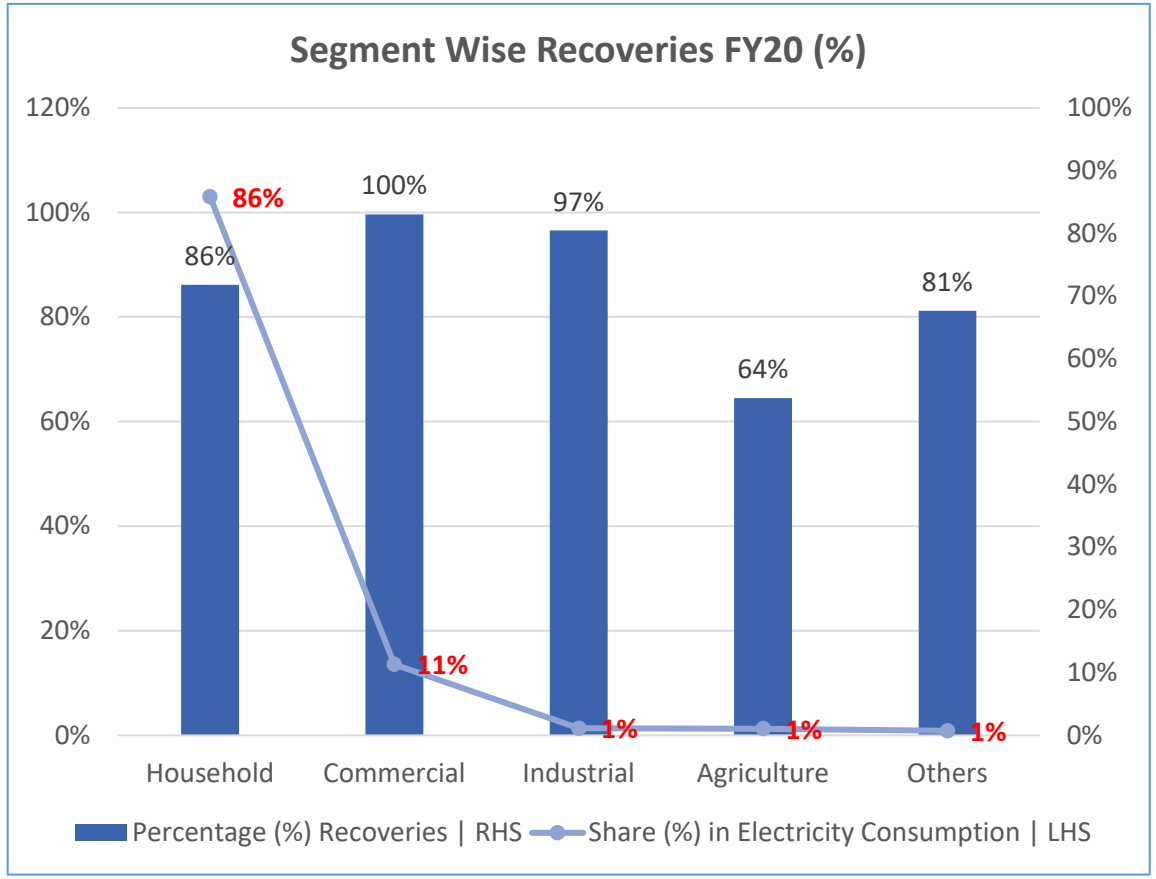
Percentage Recoveries of Billed Amounts | DISCOs											
Year	PESCO	TESCO	IESCO	GEPCO	LESCO	FESCO	MEPCO	HESCO	SEPCO	QESCO	Overall DISCOs
FY16	89.29	82.9	91.87	95.99	99.2	97.24	96.21	93.68	109.98	43.55	92.65
FY17	88.6	66.61	89.75	96.07	95.93	97.93	94.58	75.41	59.72	25.01	87.71
FY18	89.55	66.28	90.36	97.26	97.8	99.6	97.27	76.75	59.79	25.57	90.07
FY19	88.62	67.91	87.61	96.37	97.68	99.28	99.35	74.47	63.28	27.33	90.25
FY20	87.65	68.16	90.27	94.36	94.48	94.18	92.94	73.19	56.54	49.25	**88.77**

- 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 FY20 remained at 88.77% of the billed amount, whereas it was at 90.25% of the billed amount during the FY19.
- Given the circular 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, 2020, an amount of Rs. 1,042,075 million was payable by CPPA-G to power producers and NTDC.

Source: NEPRA State of the Industry Report

Segment Wise Electricity Recoveries

- Average Recovery rate for FY20 was recorded at ~89% down by ~1.5% YoY. The decline was majorly witnessed due to the unprecedented Covid-19 crisis, due to which household consumers were given relief to defer their bill payments.
- Lowest recovery rate was, therefore, witnessed in agricultural recoveries (~64%) and recoveries from the household segment (~86%).
- Highest recovery ratio was recorded from commercial and industrial consumers (100% and 97%, respectively).



Source: NEPRA State of the Industry Report

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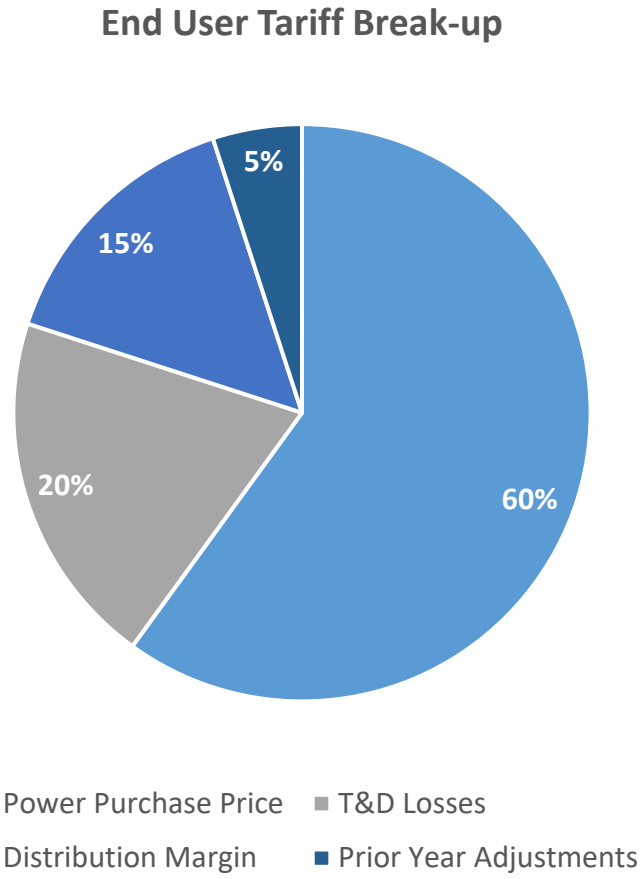
The Build Up of End User Tariffs

Components of End User Tariff

- Power purchase price constitutes on average 65 percent of the end-user tariff determined by NEPRA. 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.
- 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.
- 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.



Note: Percentages are estimates and can vary according to DISCOs

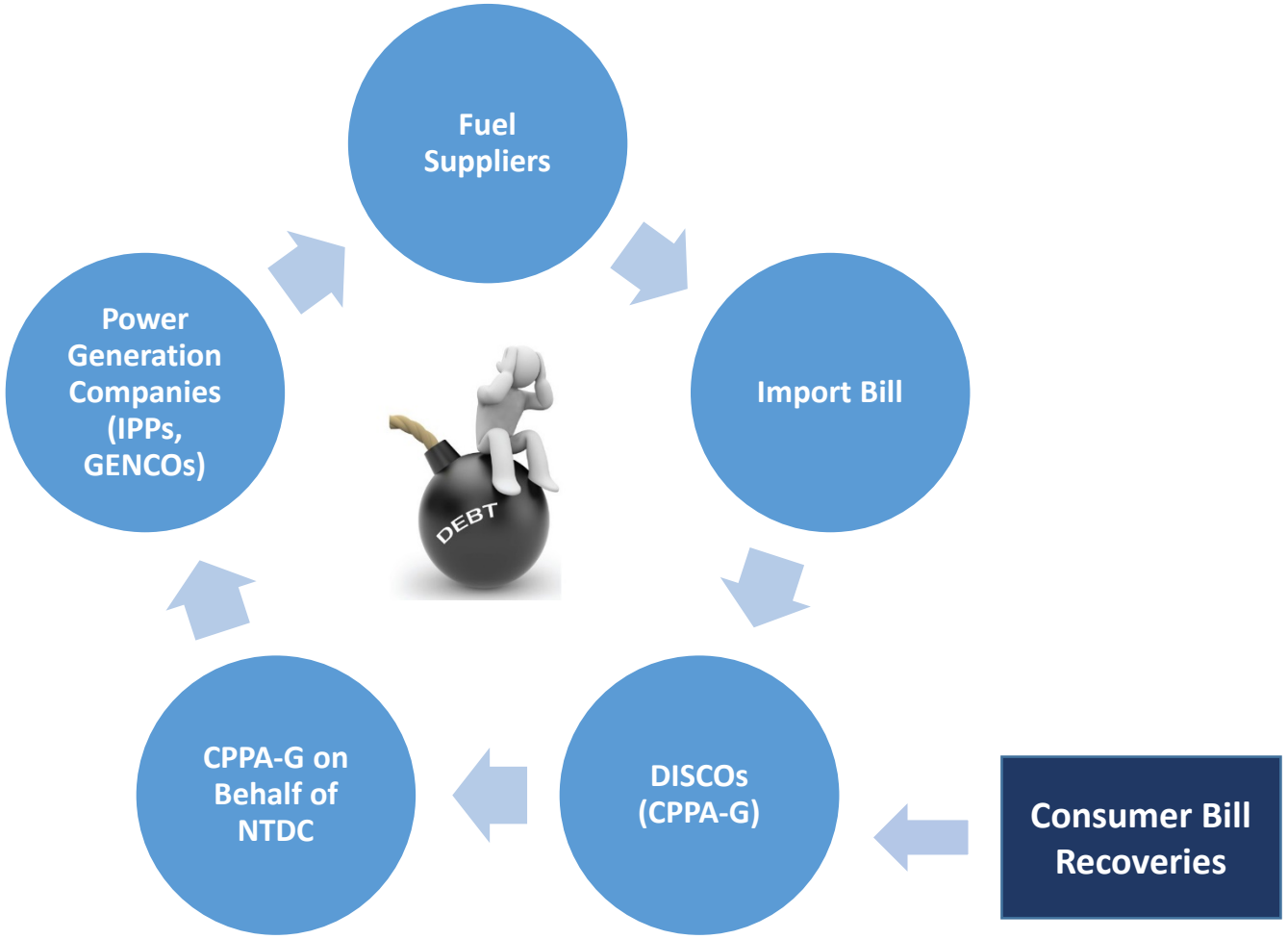
Source : https://www.sbp.org.pk/reports/quarterly/fy19/Third/Special-Section-1.pdf

POWER GENERATION

CIRCULAR DEBT | THE UNFORTUNATE MENACE

What is Circular Debt?

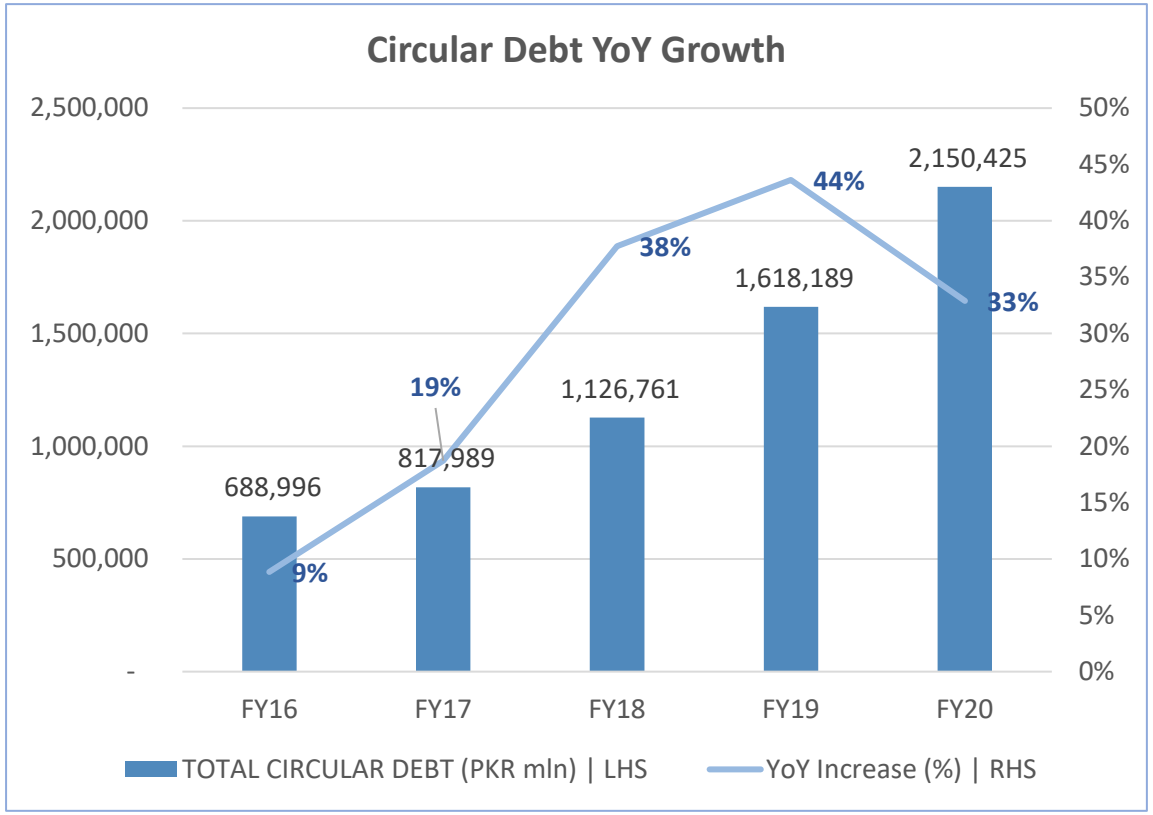
- The Power Generation Companies produce electric power which is sold to CPPA-G on behalf of DISCOs through the transmission Company – NTDC. The DISCOs supply the electric power to the end consumers.
- The CPPA-G has to make payments to the power producing Companies and NTDC on behalf of DISCOs within 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.

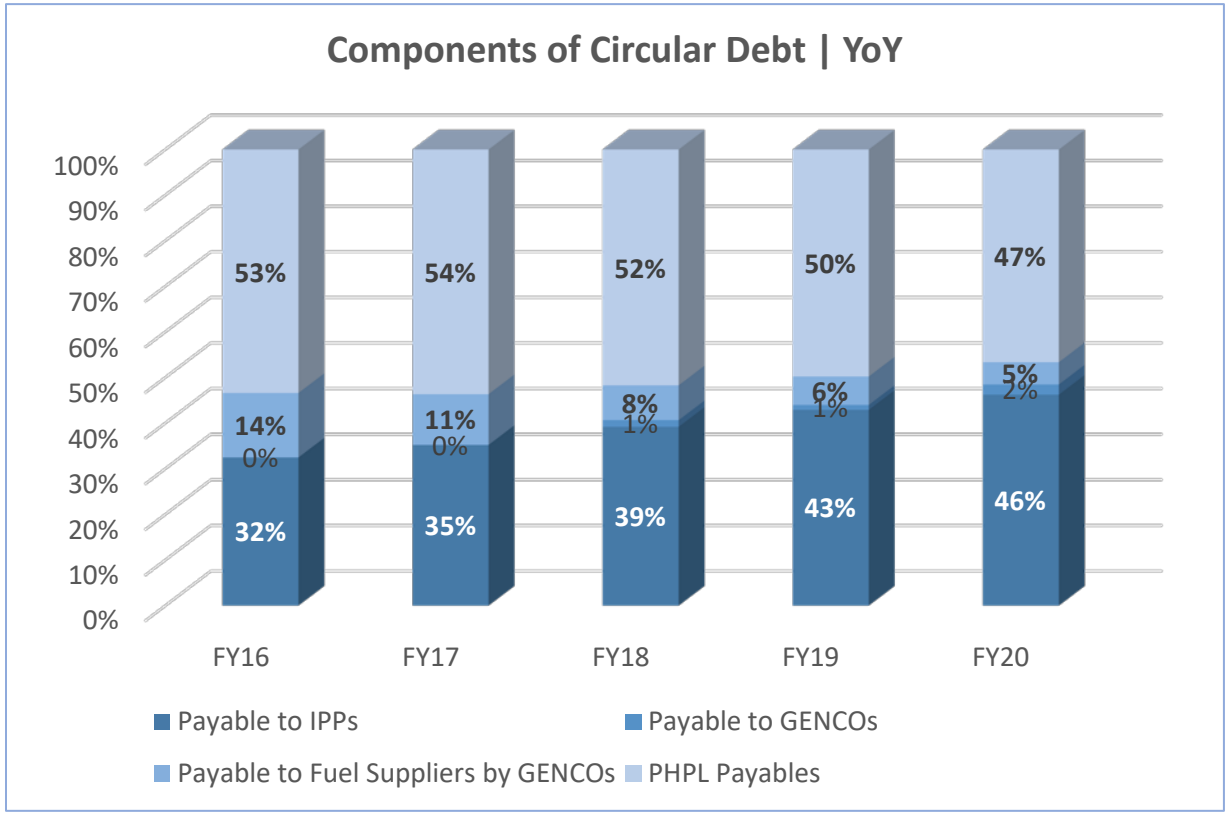


Source: NEPRA State of the Industry Report

POWER GENERATION

Accumulation of Circular Debt





- The total amount of circular debt is estimated at PKR~2.3trn as at End-Nov'20, representing an increase of PKR~156bln in 5MFY21, a monthly run rate of PKR~32bln.

Source: NEPRA State of the Industry Report

POWER TRANSMISSION & DISTRIBUTION

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
Operational Inefficiencies	752
Non-Payment by QESCO Agriculture Tubewell	306
Limitations & Delays in Regulatory Approval	270
Non-payment of subsidies	260
Non-Payment by K-Electric	212
Outstanding Amounts by AJK	144
Others	140
Interest Payment on Power Sector Debt by PHPL	66
Total Debt	**2,150**

Issue	Way Forward
Excess/expensive generation capacity	-Negotiation with IPPs -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

Source : NEPRA State of the Industry Report

POWER TRANSMISSION & DISTRIBUTION

Investment plan for Transmission Lines of NTDC

S.No	Name of Project	Transmission Lines				Expected Completion Date	Estimated Cost (In PKRMln)
		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
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	220	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 : NEPRA, NTDC

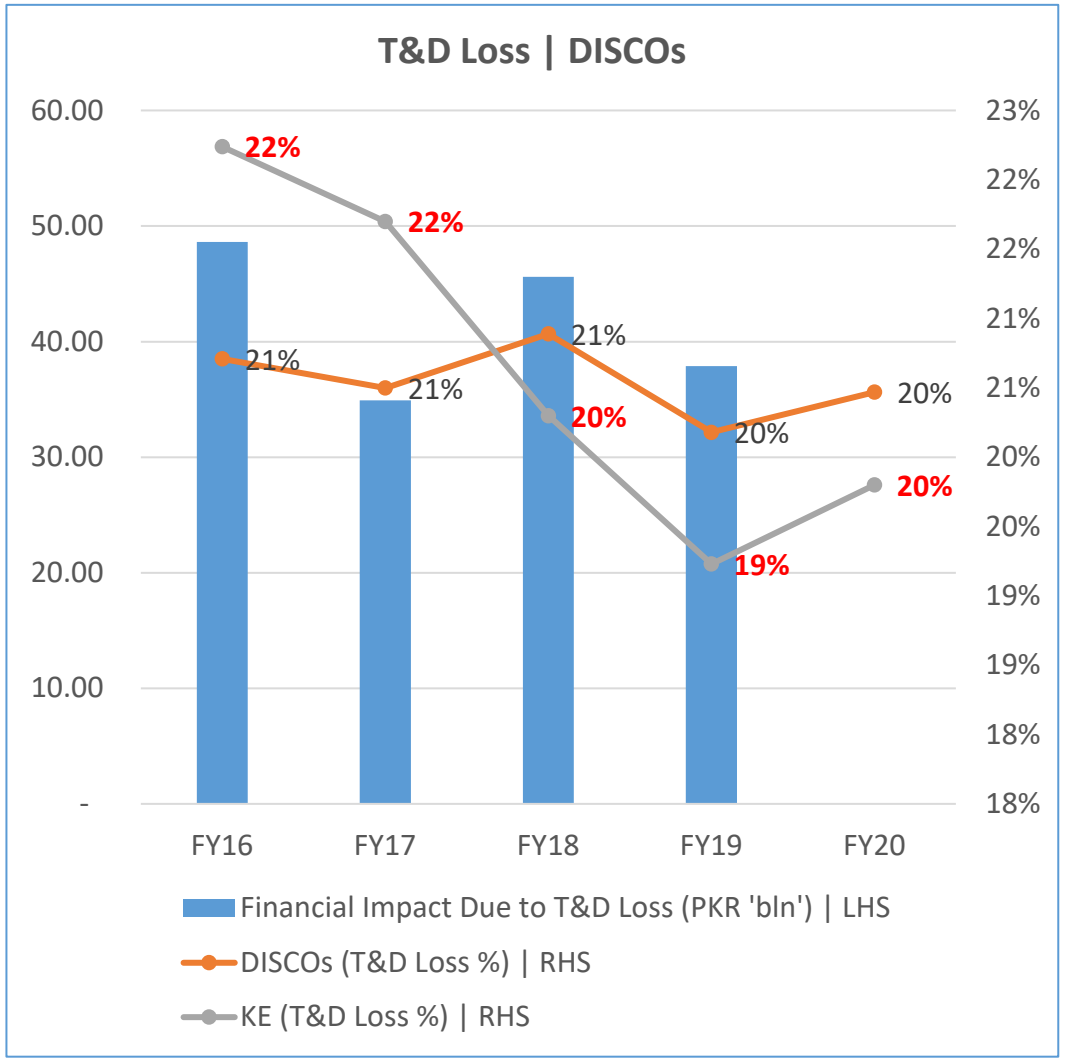
POWER TRANSMISSION & DISTRIBUTION

Business Risk

- The Business Risk of DISCOs and NTDC is different from the regular Corporates due to a number of factors including:
  - ❖ 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 (i) 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.



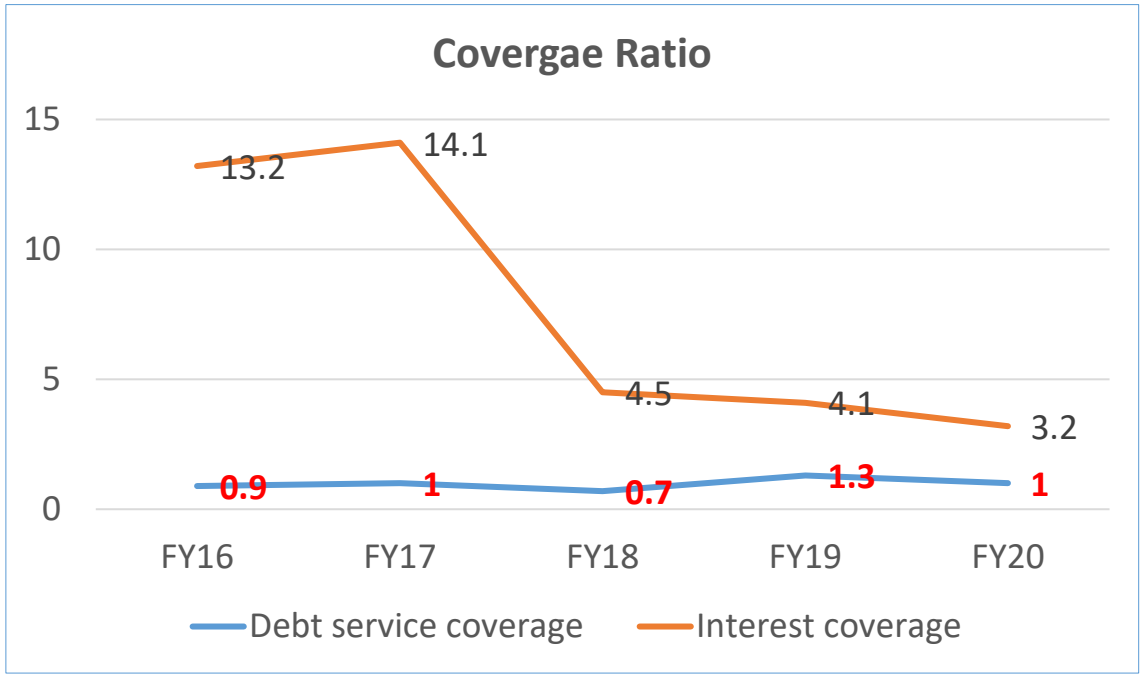
Note: Data for Financial Impact available till FY19

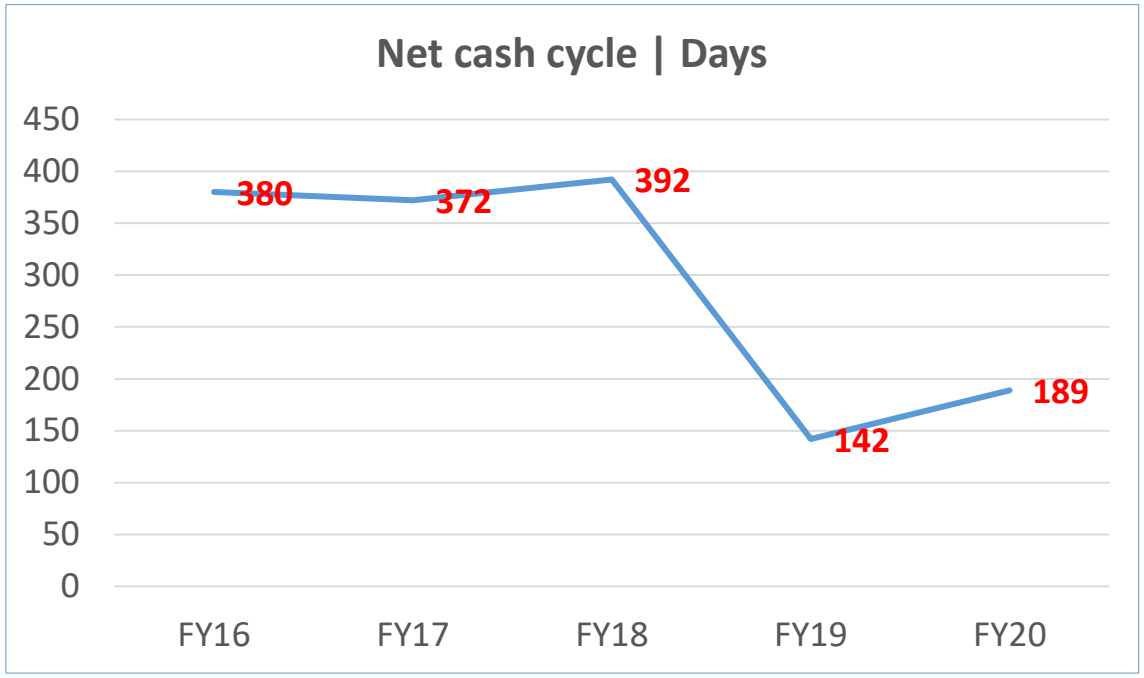
Source : NEPRA State of the Industry Report, NEPRA Performance Evaluation Report for DISCOs

POWER TRANSMISSION & DISTRIBUTION

Financial Risk

- The Distribution Sector is equally financed through debt and equity, with capital structure ratio fluctuating in the range between 48 percent to 52 percent over the past five years.
- Interest coverage ratio has declined significantly over the last five years, inline with the immensely increasing circular debt.
- Net cash cycle improved slightly over the last year, however it is still higher as compared to the industry norms and currently stands at approx. 189 days





Source: PACRA Database

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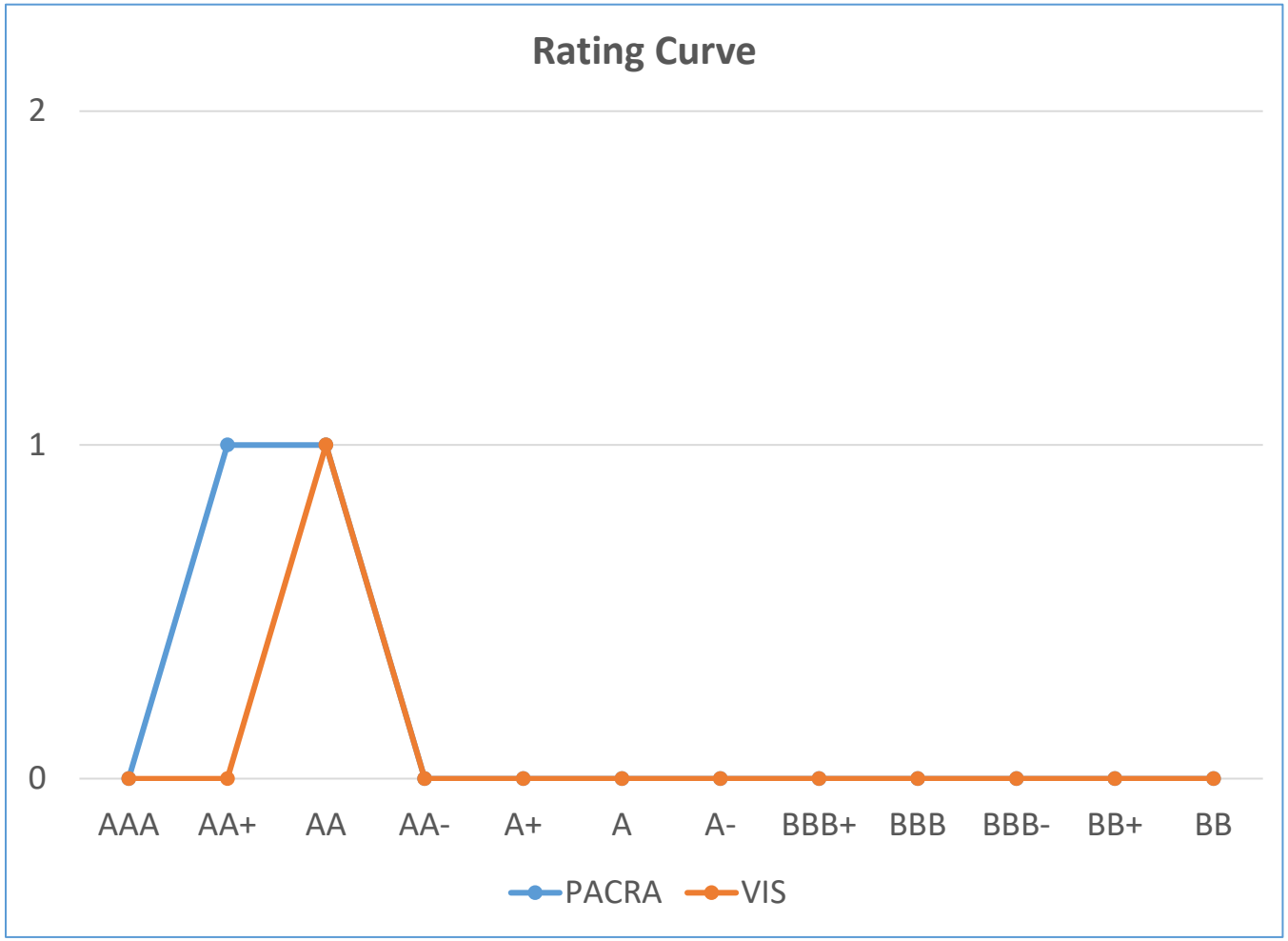
Rating Curve



- Ratings stand between AA+ and AA due to state ownership and very strong prospects of support
- PACRA rates 2 entities in the Power Transmission & Distribution namely NTDC and K-Electric

POWER TRANSMISSION & DISTRIBUTION

SWOT Analysis

- Power Sector is the backbone of the Economy
- Players operate in a regulated environment.
- Low Business Risk due to Risk Mitigants such as Sovereign Ownership and guaranteed purchase price (Transfer Price Mechanism) determined by NEPRA.
- Fixed Distribution Margins.
- Regulator allowance for T&D Loss Limits.

- Centralized Control of PEPCO over DISCOs despite unbundling of WAPDA
- Power Structural reforms as envisaged could not be achieved due to DISCOs not becoming entirely independent autonomous entities
- Inefficiency in Distribution System leading to power outages despite available capacity, T&D losses and fatalities.
- Lack of investment in T&D infrastructure

- Rising Circular Debt
- Increased T&D Losses weakening the financial discipline of power supply chain (Power Purchase Price accounts for only ~65% of the end-consumer tariff).
- Low Recoveries from end consumers.

- Revival in Industrial Activity resulting in increased demand.
- Amendment to PPAs in process to revise the payment and tariff structure for power purchase from IPPs. This would improve the financial discipline of the Sector as a whole.
- Exploration of Coal reserves leading to significant coal based power projects and investments in Hydel and Renewable Energy Power plants.

POWER TRANSMISSION & DISTRIBUTION

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 remains 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.
- Industrial activity has picked up in various sectors with the Large Scale Manufacturing Industries output increasing ~5.46% YoY during the first four months of FY21. The sectors which have contributed to this growth are textiles, food & beverages, pharmaceuticals and chemicals.
- 19 IPPs out of the 47 who signed the MoUs in Aug'20 have agreed to enter into the legally binding contracts with the GoP, the first of which were Solar and Bagasse IPPs. The development may still take time to become fully effective in shape of new agreements. Meanwhile, payment of circular debt related dues under this agreement will improve liquidity position of IPPs.
- The tariff increase sought by DISCOs in FY20 was approved by NEPRA on Dec 31, 2020 (an increase of PKR~3.30/unit). The total impact of such an increase would have landed to PKR~280bln. The GoP considering the current financial scenario of the consumers has, therefore, decided to increase the base tariff in phases. In the first phase, the base price will go up from PKR~13.35/unit to PKR~15.25/unit. The total impact of such an increase would amount to PKR~177bln.
- 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 has lowered the finance costs incurred by power distributors for financing availed to bridge liquidity gap.
- The inflation level in the country has also declined. The average inflation rate during the 1HFY21 stood at ~8.74% as compared to an average inflation rate of ~10.7% during FY20. Moreover, the exchange rate is also expected to remain stable in the near future.
- 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.

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