TRANSMISSION & DISTRIBUTION | ELECTRICITY

SECTOR UPDATE

January 2023

TRANSMISSION & DISTRIBUTION SECTOR UPDATE

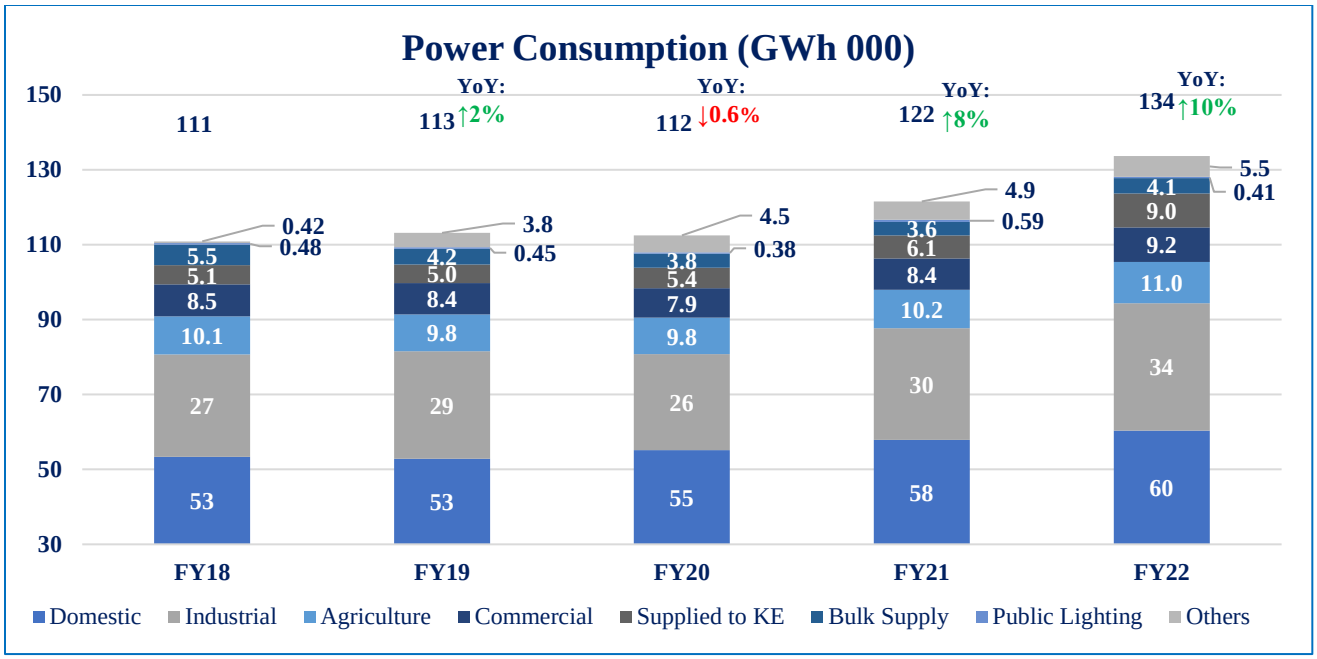
Outlook: Stable

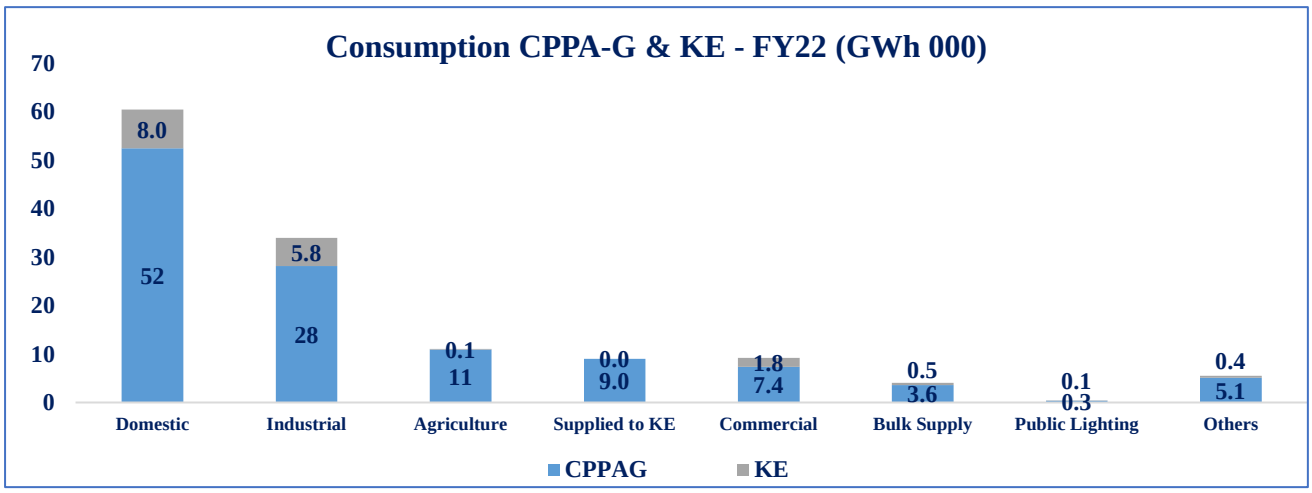
Drivers to the Outlook:

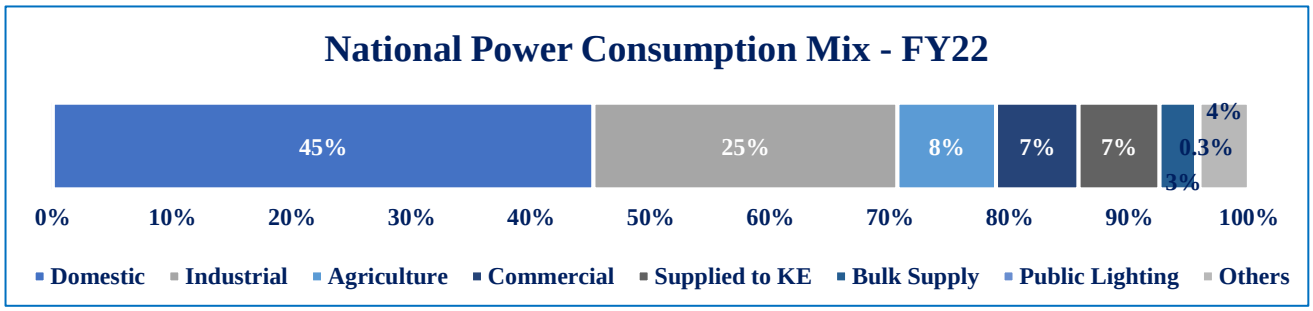
- With a direct relation with the growth in an economy, energy infrastructure serves as its backbone and the Power sector is one of its major components. Within the power sector's value chain (including Generation, Transmission and Distribution (T&D)); T&D is the downstream sector, facilitating an economy's power consumption and productivity.
- As of FY22, Pakistan's power consumption stood at ~133,665 GWh, posting a YoY growth of ~10%. Major share in power consumption was held by domestic consumers at ~45%, followed by industrial consumers at ~25% and agriculture at ~8%.
- Pakistan's overall power sector faces a multitude of deficiencies, the culmination of which is the massive FY22 end stock of PKR~2.25tln of circular debt. Although the upstream sector has its fair share of issues, but the key risks also stem from the structural and operational inefficiencies of Transmission and Distribution sector.
- In FY22, of the ~140,337 GWh of power fed into the NTDC system; ~136,641 GWh was delivered, reflecting a ~2.6% Transmission & Transformation loss; costing PKR~72bln.
- Of the ~150,570 GWh of power purchased by DISCOs in FY22, only ~124,629 GWh of power got billed, reflecting line losses and theft of ~17%. While of the PKR~2,814bln billed PKR~2,571bln were recovered, reflecting losses of 9%.

As is well-known, "Power Sector Reforms" have always been of the key agenda points of the IMF Reviews. Policy directives from the IMF in its upcoming review are aimed at tackling some major aspects of the power sector deficiencies by:

- Removing blanket subsidies for domestic consumers in favor of targeted subsidies
- Removing subsidies of export-oriented sector
- Increasing tariff to bridge the subsidy gap along with timely adjustments







NTDC | Transmission Network										
Grid Station Potential (kV)	No. of Grid Stations		Transformers Installed at Grid Stations		Transformation Capacity (MVA)		Transformers Installed at Grid Stations		Transformation Capacity (MVA)	
	FY21	FY22	FY21	FY22	FY21	FY22	FY21	FY22	FY21	FY22
			500/220kV		500/220kV		220/132 kV		220/132 kV	
500/220	16	17	44	46	24,000	25,500	34	36	6,610	7,200
220/132	46	50	-	-	-	-	129	140	25,770	28,160
Total	62	67	44	46	24,000	25,500	163	176	32,380	35,360

Transmission Line Potential (kV)	No. of Circuits		Transmission Lines (KM)	
	FY21	FY22	FY21	FY22
500/220	61	67	8,059	8,388
220/132	156	163	11,438	11,611
Total	217	230	19,497	19,999

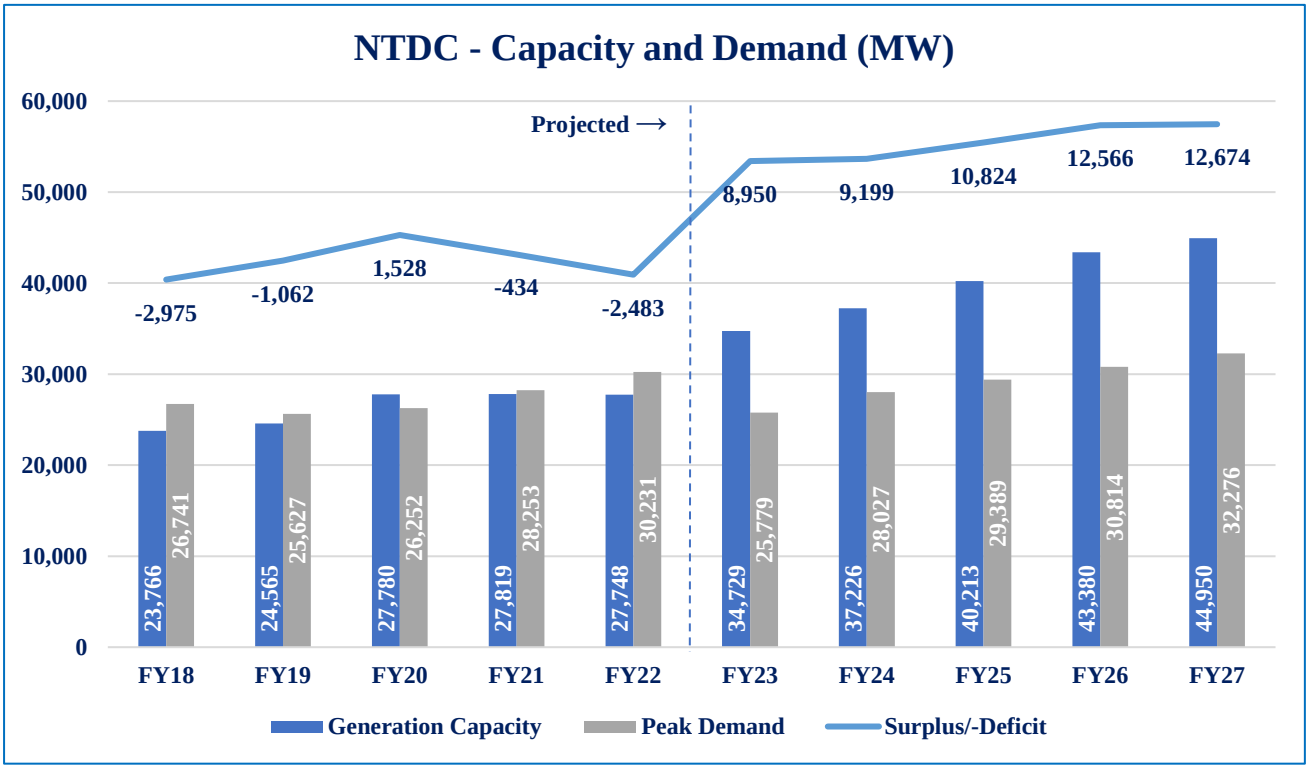
NTDC Transmission & Transformation: Of the ~150,570 GWh purchased by DISCOs in FY22, 88.1% was supplied via NTDC's system. In terms of 550/200kV and 220/132kV transformations capacity ~6.3% and ~9.2% additions were made; while ~2.6% additions in transmission line length were also made.

However, in peak demand months (summer), upward of ~65% transformers in the NTDC system get overloaded and led to higher heating effect and failure in equipment.

KE | Transmission Network								
Grid Station Potential (kV)	No. of Grid Stations		Transformers Installed at Grid Stations		Transformation Capacity (MVA)		Transmission Lines (KM)	
	FY21	FY22	FY21	FY22	FY21	FY22	FY21	FY22
220/132	11	11	13	13	4,580	4,580	365	364
132/11	69	69	168	175	7,135	7,465	833	838
Total	80	80	181	188	11,715	12,045	1,198	1,202

KE Transmission & Transformation: KE's Transmission system handled ~20,408 GWh of power in FY22 and ~2.8% capacity addition was made in its power 132/11kV transformation capacity.

Meanwhile, ~26% of its 132/11kV transformers were overloaded in the peak months.



Till FY22, there was a ~2,483 MW capacity deficit in the NTDC system vs. the peak demand. However, going forward, surplus capacity availability is projected in the system, since demand is expected to grow with a 5-year CAGR of ~1.3% while the CAGR for generation capacity is expected at ~10.1%.

Number of Circles, Divisions, Sub-Divisions, 11 kV Feeders and their Loading Position - CPPAG

	Circles	Divisions	Sub-Divisions	11 kV Feeders	Loading Position of 11 kV Feeders (Nos.)			
					80-90%	91-100%	Above 100%	Total
FY18	57	245	1,161	8,843	809	976	418	2,203
FY19	57	251	1,170	9,220	710	757	364	1,831
FY20	58	251	1,172	9,706	1,240	675	308	2,223
FY21	59	251	1,172	10,189	1,198	682	328	2,208
FY22	59	252	1,177	10,666	879	794	445	2,118

CPPA-G Feeder System: In FY22, there was a ~4.7% YoY increase in the 11kV feeders of the CPPA-G system while ~21% of its feeders were reported overloaded.

Number of IBCs, 11 kV Feeders and their Loading Position - KE						
	IBCs	11 kV Feeders	Loading Position of 11 kV Feeders (Nos.)			
			80-90%	91-100%	Above 100%	Total
FY18	29	1,729	22	6	1	29
FY19	30	1,807	28	10	10	48
FY20	30	1,890	43	7	2	52
FY21	30	1,937	17	5	2	24
FY22	30	2,001	38	13	5	56

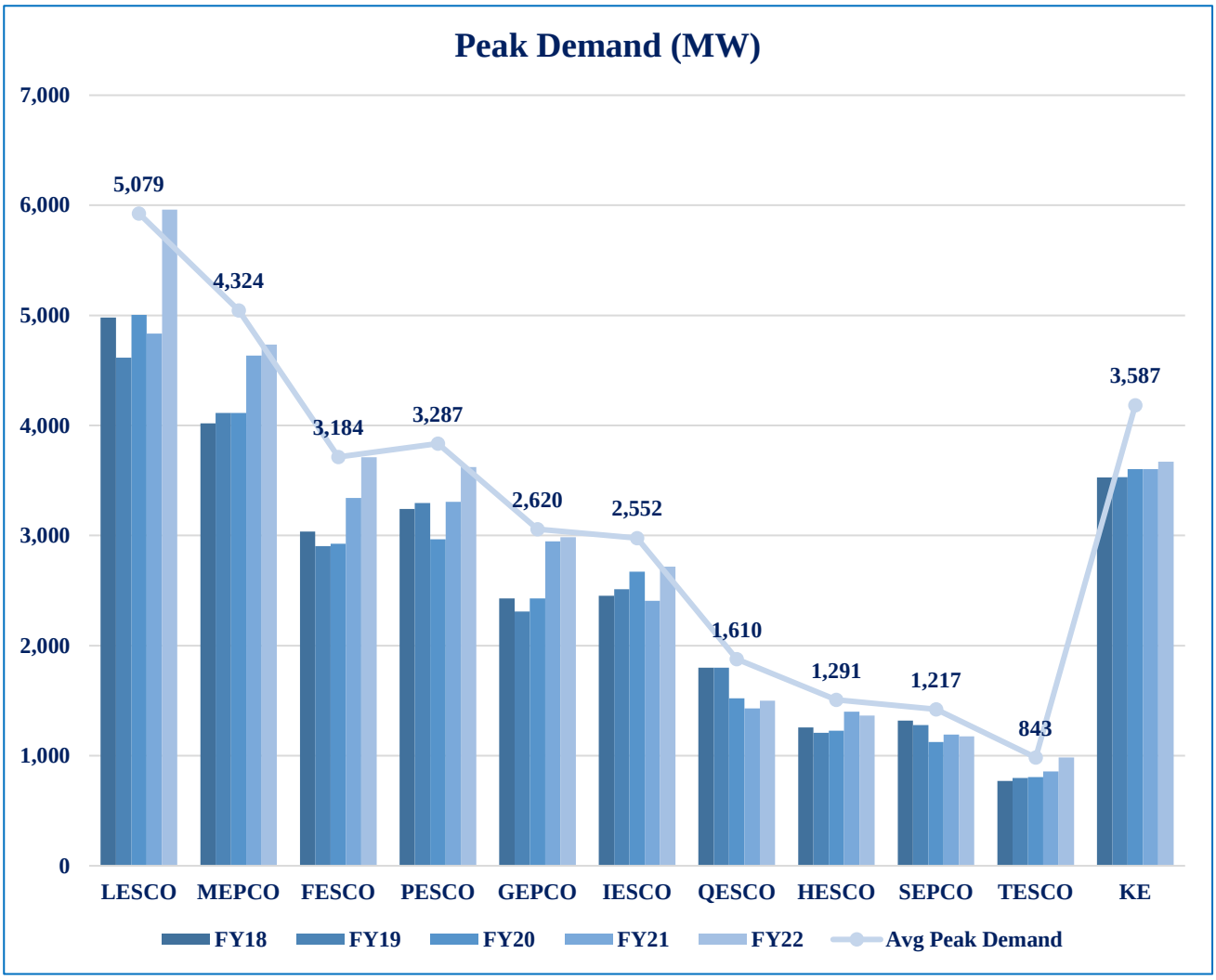
KE Feeder System: In FY22, there was a ~3.3% YoY increase in the 11kV feeders of the KE system while ~9% of its feeders were reported overloaded.

Status of Power Lines - CPPAG						
Kms	132 kV	66 kV	33 kV	11 kV	Total HT Lines	Total LT Lines (0.4 kV)
FY18	26,847	6,163	2,362	329,546	364,918	235,050
FY19	27,936	5,802	2,362	337,238	373,337	237,486
FY20	28,577	5,307	2,248	343,726	379,859	238,053
FY21	29,495	4,623	2,223	348,104	384,445	240,928
FY22	30,521	4,325	2,232	353,903	390,981	242,925

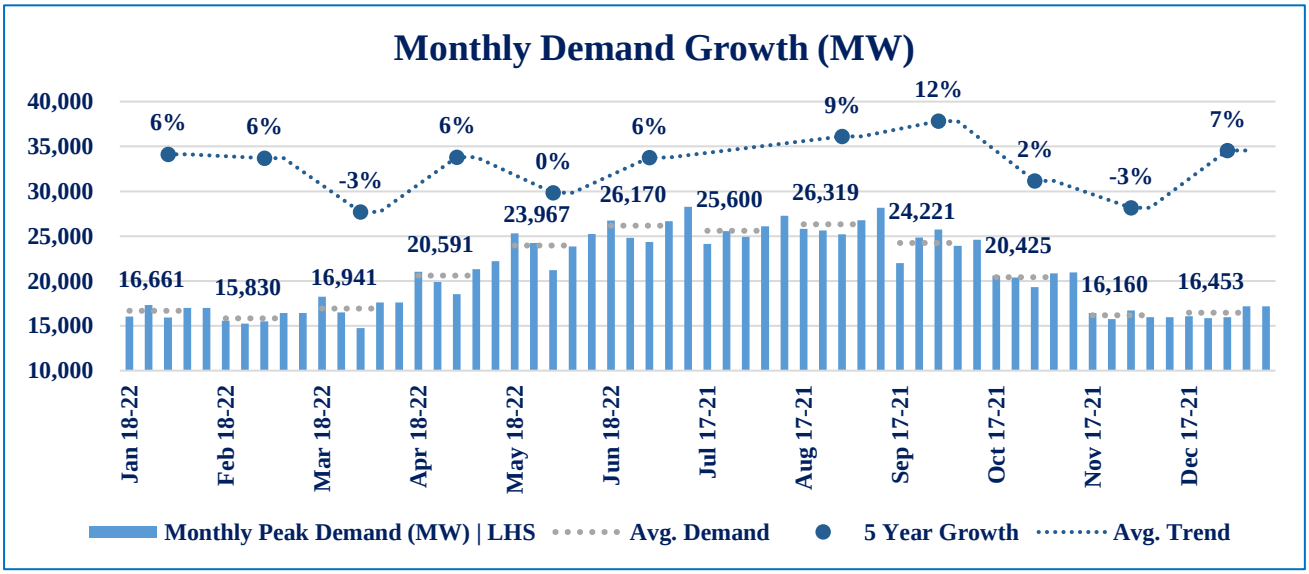
CPPA-G Distribution System: In FY22, there was a ~1.7% YoY increase in the distribution lines of the CPPA-G system.

Status of Power Lines - KE						
Kms	132 kV	66 kV	33 kV	11 kV	Total HT Lines	Total LT Lines (0.4 kV)
FY18	767	149	0	9,549	10,465	19,098
FY19	798	149	0	9,876	10,823	9,751
FY20	801	153	0	10,204	11,158	8,367
FY21	833	153	0	10,283	11,269	18,509
FY22	838	153	0	10,520	11,511	18,936

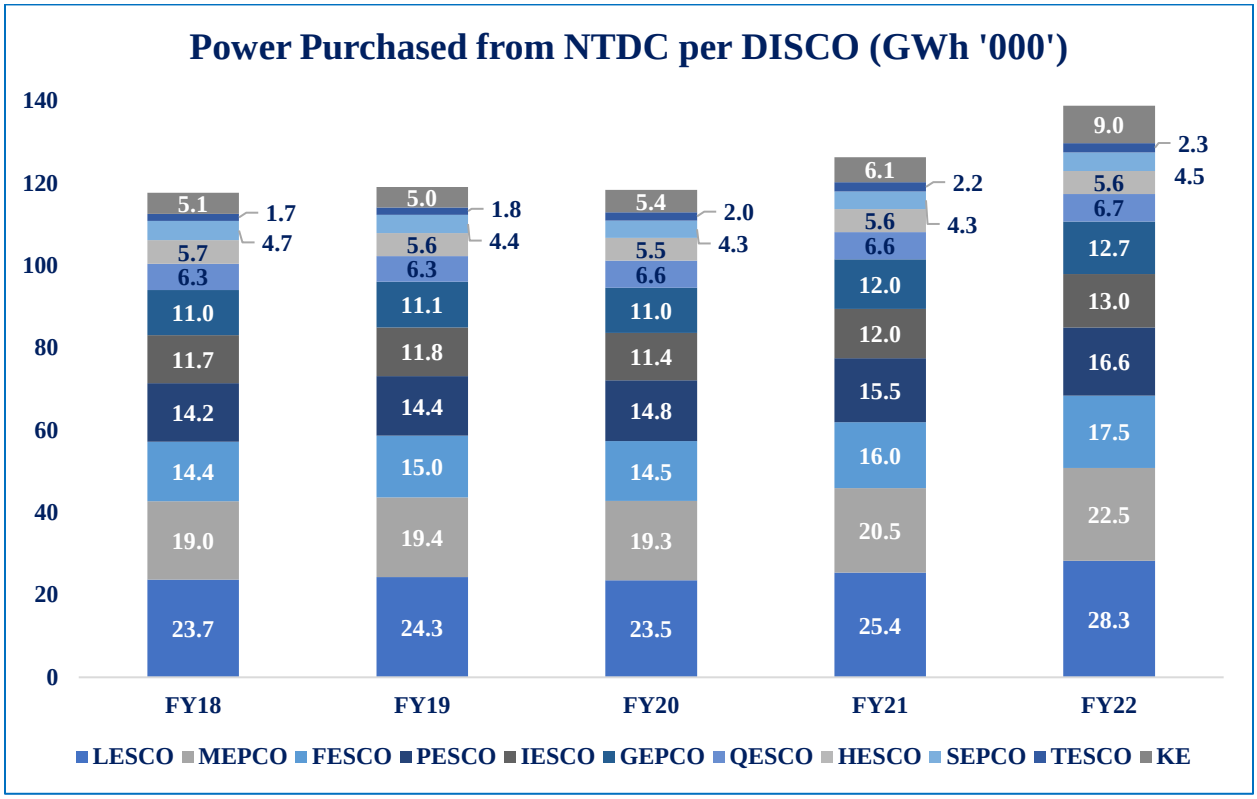
KE Distribution System: In FY22, there was a ~2.1% YoY increase in the distribution lines of the KE-system.



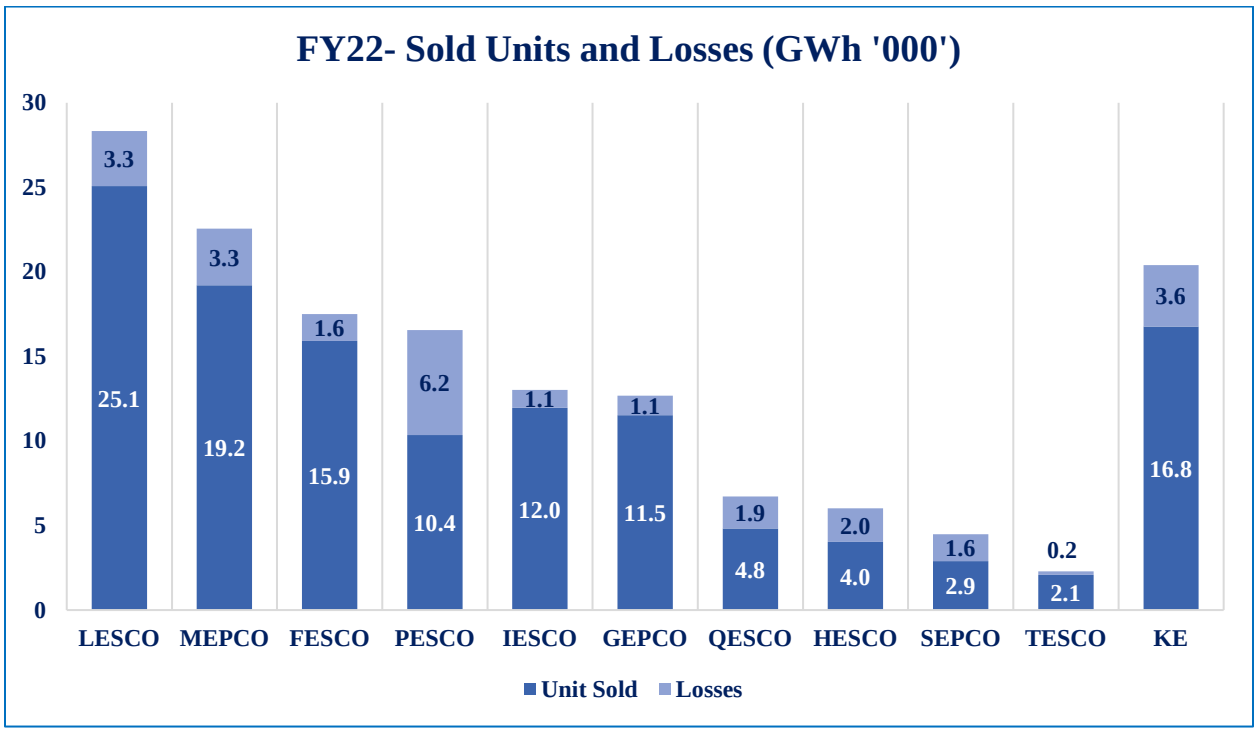
LESCO has the highest peak demand of all DISCOs with a 5-year CAGR of ~3.7%, followed by MEPCO with a CAGR of ~3.3% and KE with a CAGR of ~0.8%.

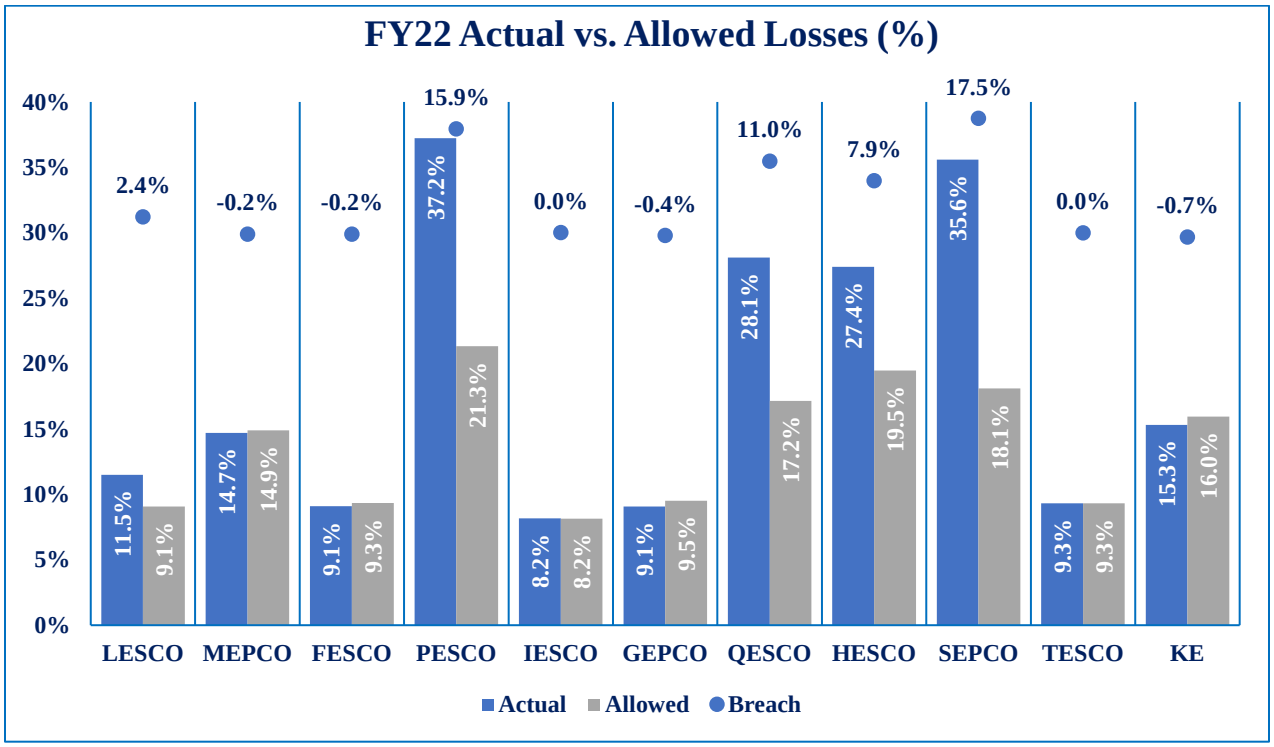


Given that ~45% of power in Pakistan is utilized by domestic consumers, power demand peaks in the summer months when the demand for indoor cooling is the highest.

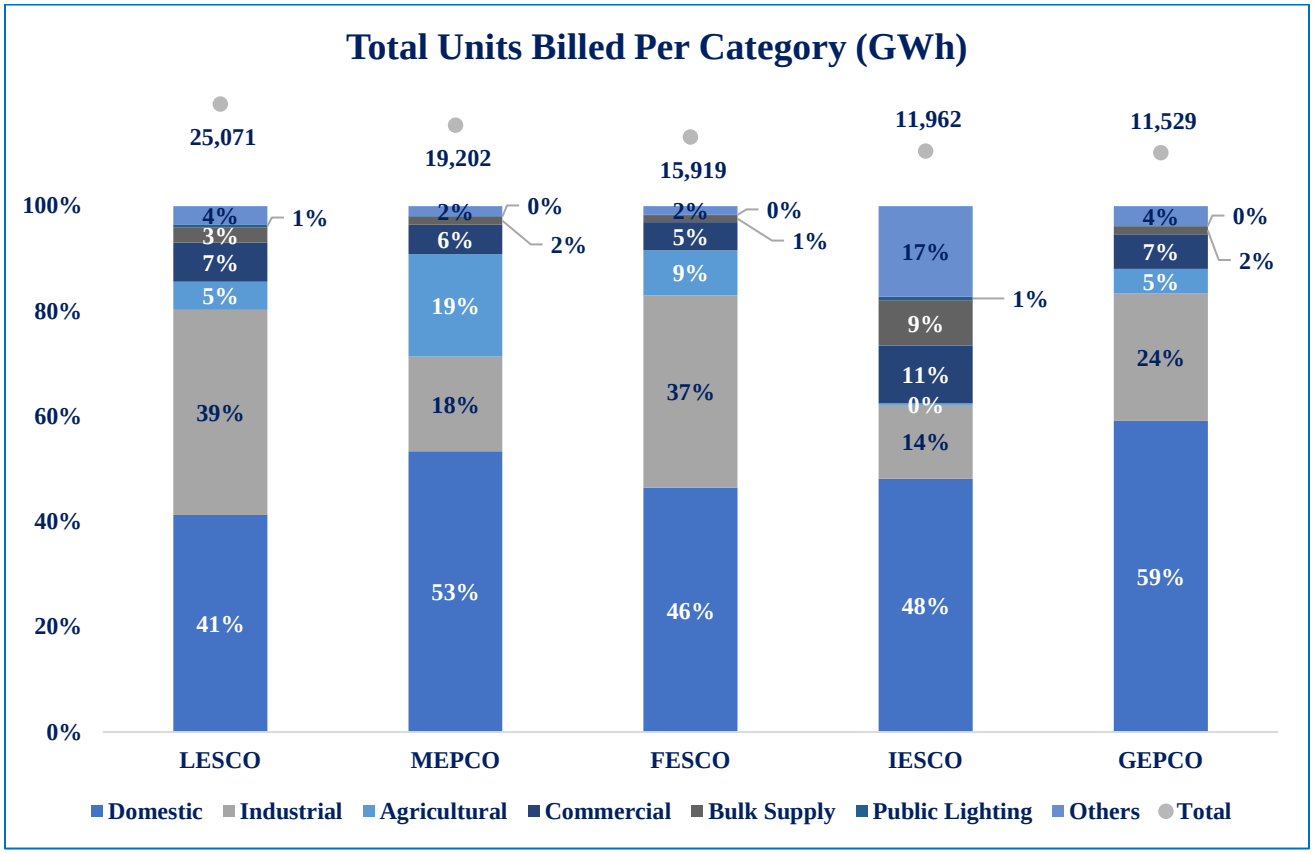


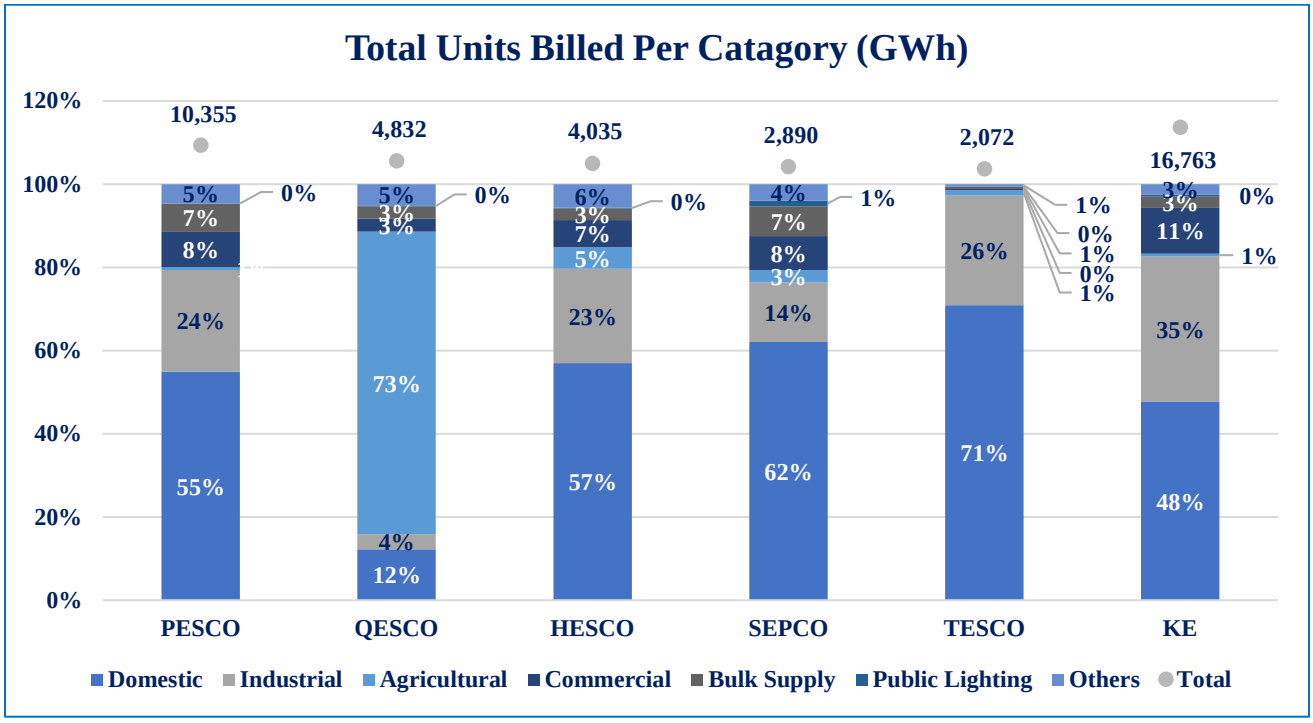
Following the demand pattern, LESCO is the largest purchaser of power, accounting for ~20% share in FY22, followed by MEPCO with a ~16% share and FESCO with a 13% share. Meanwhile, KE purchased ~6% of the NTDC's power.

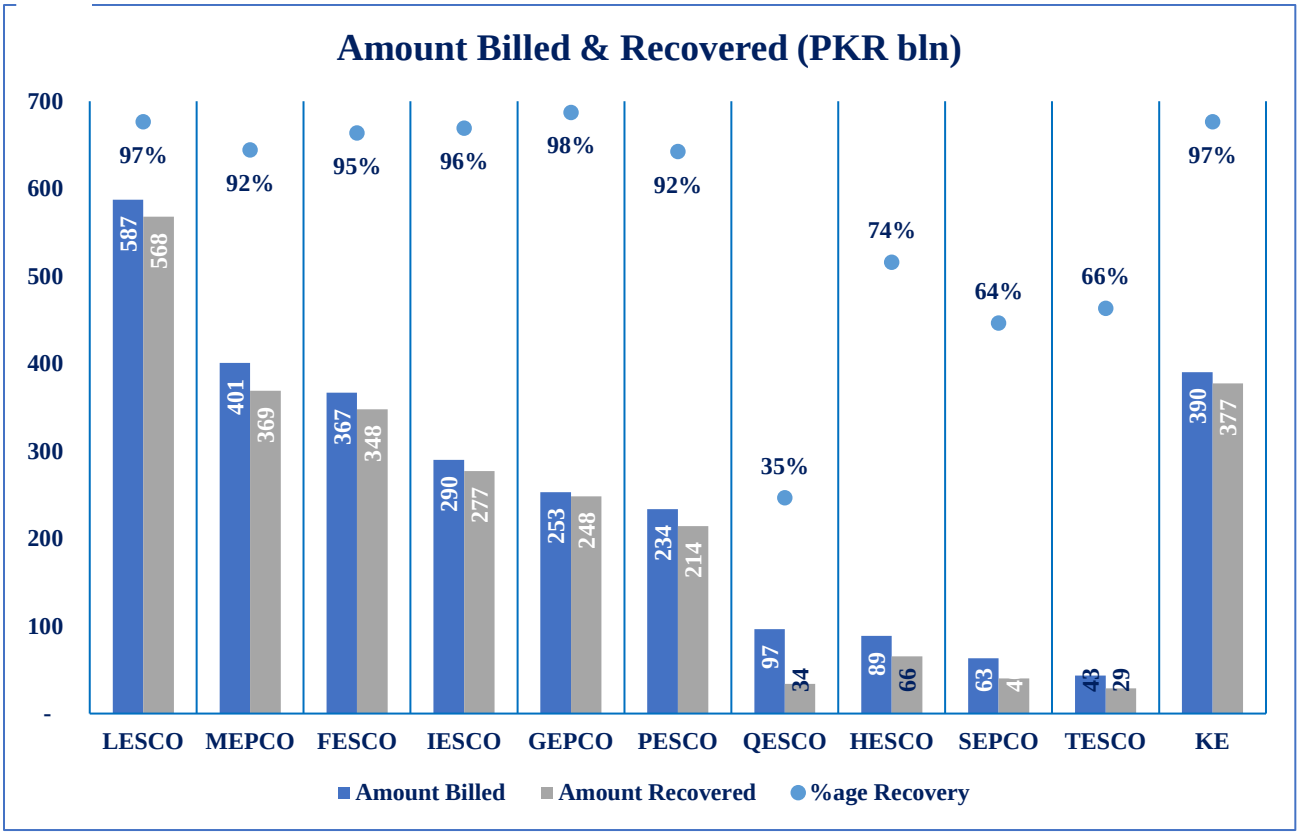




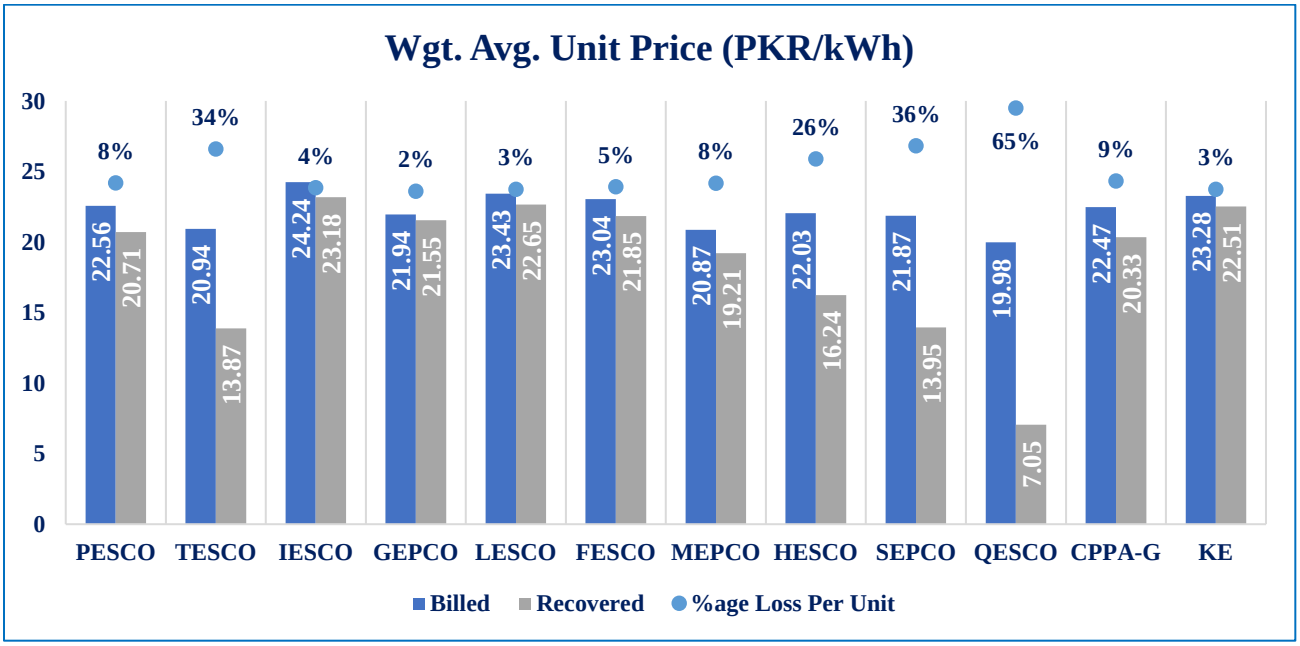
In FY22, DISCOs connected with the CPPA-G system booked average line losses of ~17.1% against an average allowable limit of ~13.8% with an average breach of ~4.8%. While KE booked no line losses for the same period. The estimated cost of these losses stands at PKR~123bln.





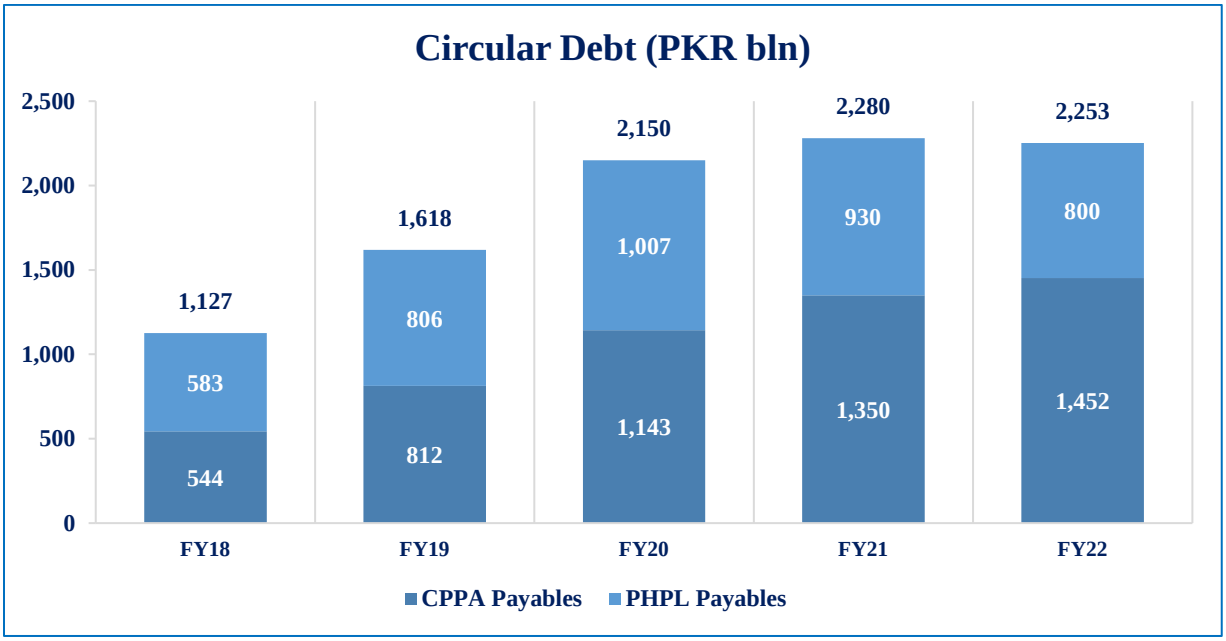


Other than distribution line losses, non-recovery of billed amounts from consumers for the DISCOs in the CPPA-G system stood at ~9% and at ~3% for KE in FY22. The cumulative cost of non-recovery stood at PKR~243bln.



DISCOs inefficiencies and delayed tariff adjustments collectively make up around ~65% of the circular debt stock. Almost ~64% of the circular debt stock is payable to IPPs. The cost of generation for FY22 stood at PKR~15.50/kWh, however after adjustment of ~19% T&D losses, generation cost per unit stood at PKR~19.13/kWh; while average amount recovered per unit sold stood at PKR~18.59/kWh.

Circular Debt and IMF Review



Causes: Long standing deficiencies in terms of delayed tariff adjustments, unbudgeted subsidies, weak operational and administrative controls, line losses in excess of ~16% and bill collection losses in excess of ~4.6% on distribution network's part have collectively led to unsustainable levels of circular debt in the power sector.

IMF in its latest review has mandated stringent power sector reforms, aimed at mitigating the power sector deficiencies by:

- Replacing blanket subsidies with targeted ones through Benazir Income Support Program
- Removing power subsidy to the export-oriented sectors.
- Bridge the power sector gap of PKR~950-1000bln via increased base tariffs and timely tariff adjustments.

In FY22, circular debt stock stood at PKR~2.25tln after decreasing by PKR~27bln due to payments of PKR~564bln to the IPPs. Volatile international energy commodity prices are expected to keep the costs of generation high which has led to a rise in circular debt historically. On the contrary, in its on-going 9th review, IMF's stringent conditions to arrest the rising misnomer of circular debt may keep its growth in check. Nevertheless, measures like increase in base tariffs and removal of blanket subsidies are ultimately going to impact the end-consumers with rising costs of electricity. This may lead to greater risks of recoveries for the distribution sector.

The IMF in its previous review (i.e., 8th) also recommended medium term cost reducing structural reform, these include:

- Renegotiation of PPAs in return for clearing up-to PKR180bln unguaranteed CPPA-G payables via 10-year floating PIBs and 5-year sukuks
- Converting PHPL government guaranteed debt to public debt.

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Asian Development Bank

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