



POWER

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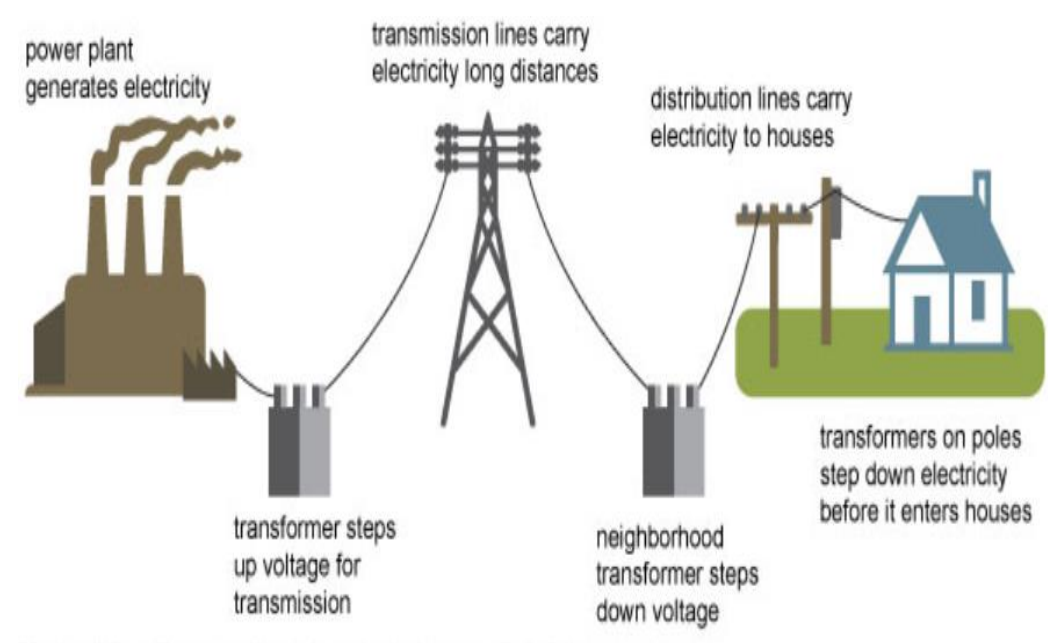


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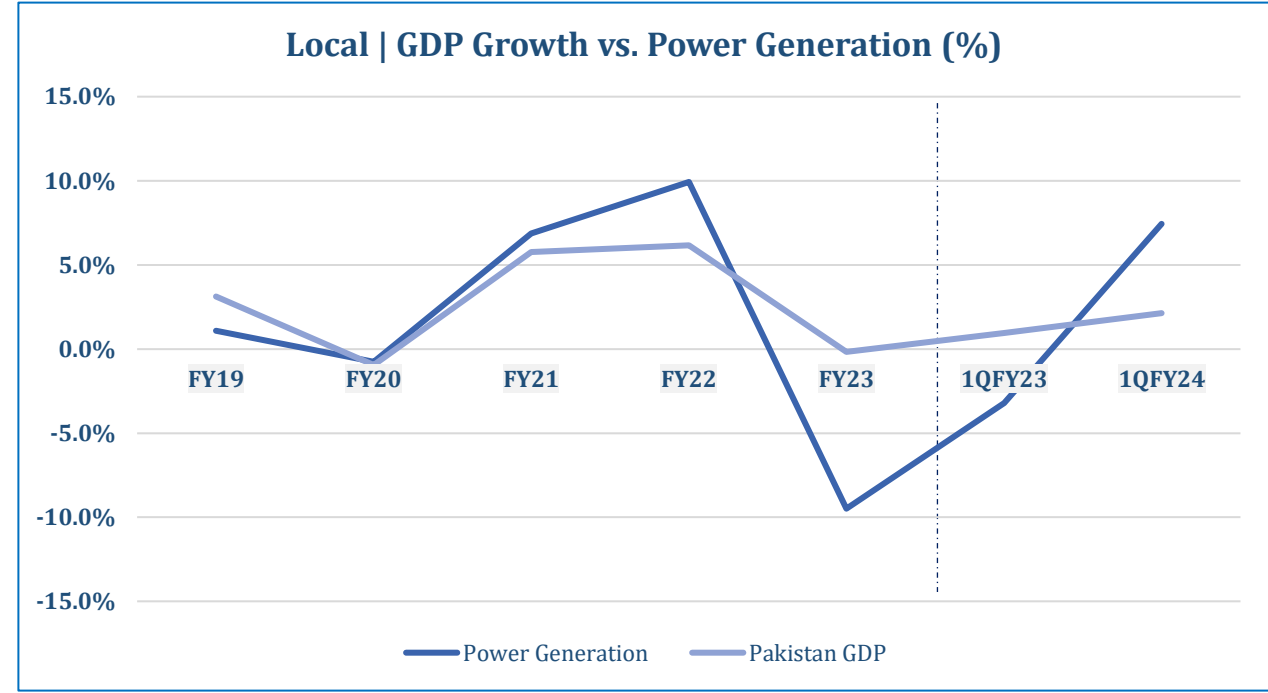
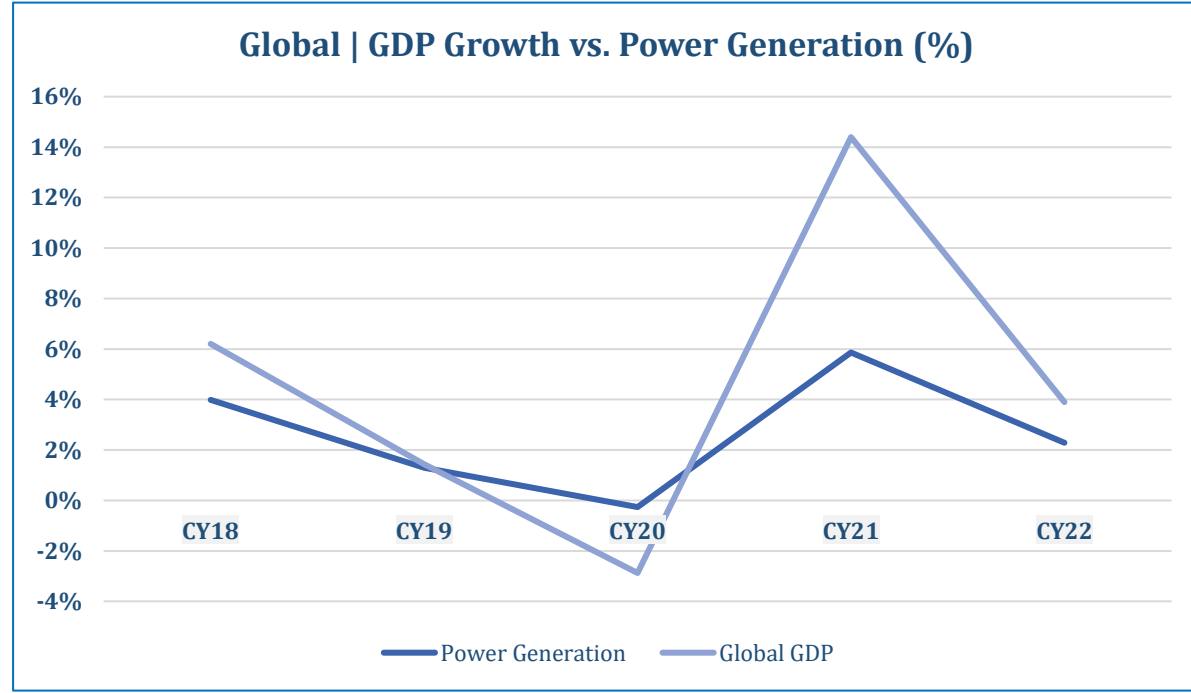
Introduction

- Based on derivation, energy sources can be bifurcated into Primary and Secondary sources. Electricity, a subset of Power, is a secondary energy source, meaning thereby that it is produced through conversion of other energy sources such as coal, natural gas, oil, nuclear power, among others. These are known as primary energy sources. Primary energy sources are renewable or non-renewable energy.
- Since the 1660s, scientists and inventors, including the likes of Benjamin Franklin, Thomas Edison and Nikola Tesla, have contributed significantly in shaping up our understanding and use of electricity.
- In the late 1800s, Nikola Tesla pioneered the generation, transmission, and use of alternating current (AC) electricity, which reduced the cost of transmitting electricity over long distances.
- Electricity is generated at power plants and moves through a complex system, sometimes called the grid, of electricity substations, transformers, and power lines that connect electricity producers and consumers. This study shall focus on **power generation system**.



GDP and Power Generation | Global vs. Local

- The global power (or electricity) generation in CY22 was recorded at ~28,636 TWh, a slower increase of ~2.3% YoY (SPLY: ~6.1%). The growth rate was pulled by China (~3.7%), India (~9.7%) and the USA (~3.2%). Meanwhile, global GDP growth in CY22 slowed down to ~4% (SPLY: ~14%). Global capacity for power generation stood at ~70,632 TWh in CY22, a YoY increase of ~4.7% (SPLY: ~67,443 TWh).
- Pakistan’s power generation stood at ~129,592 GWh in FY23, marking a YoY decline of ~9.5%. In line with that, Pakistan’s GDP growth in FY23 fell by ~0.17% YoY.
- Pakistan’s GDP growth and power generation exhibit a strong correlation over a 5-year horizon (FY19-23) with a Pearson coefficient of ~0.83, indicating a strong positive correlation between the two variables. At a global level, this recorded at ~0.9 during CY18-22 indicating an almost perfect positive correlation between Global GDP and Power Generation.

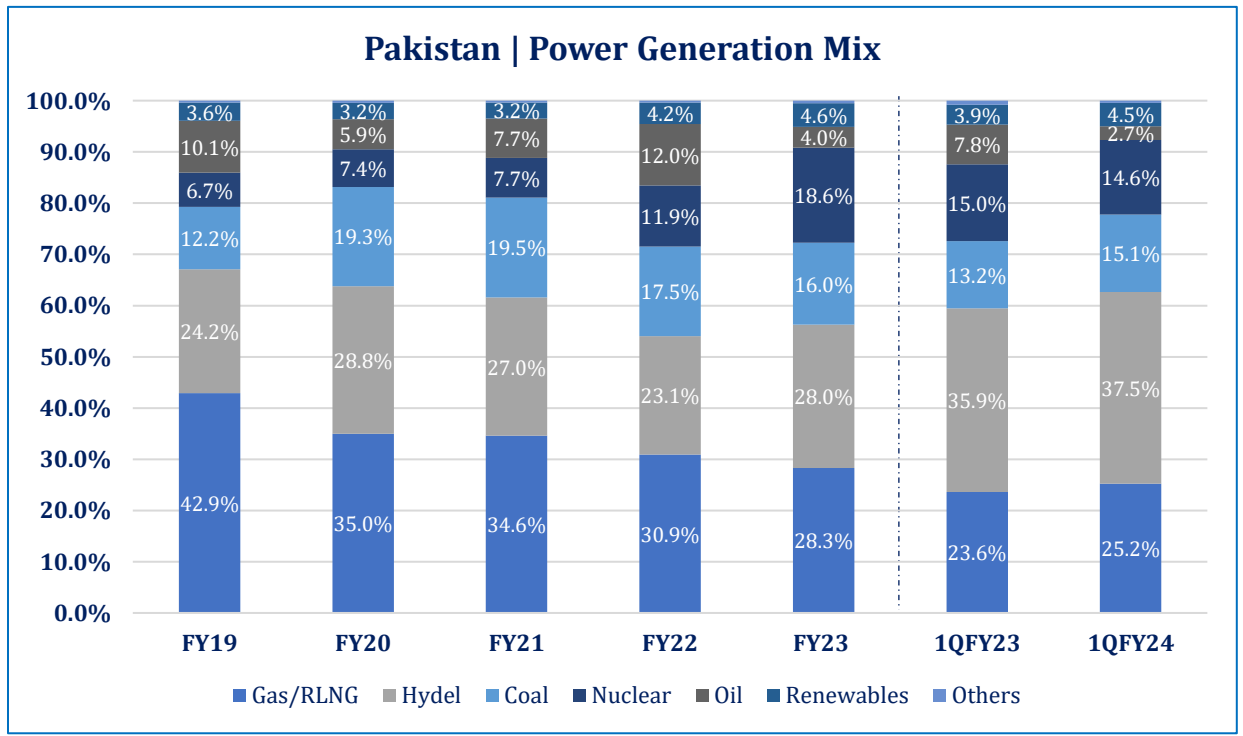
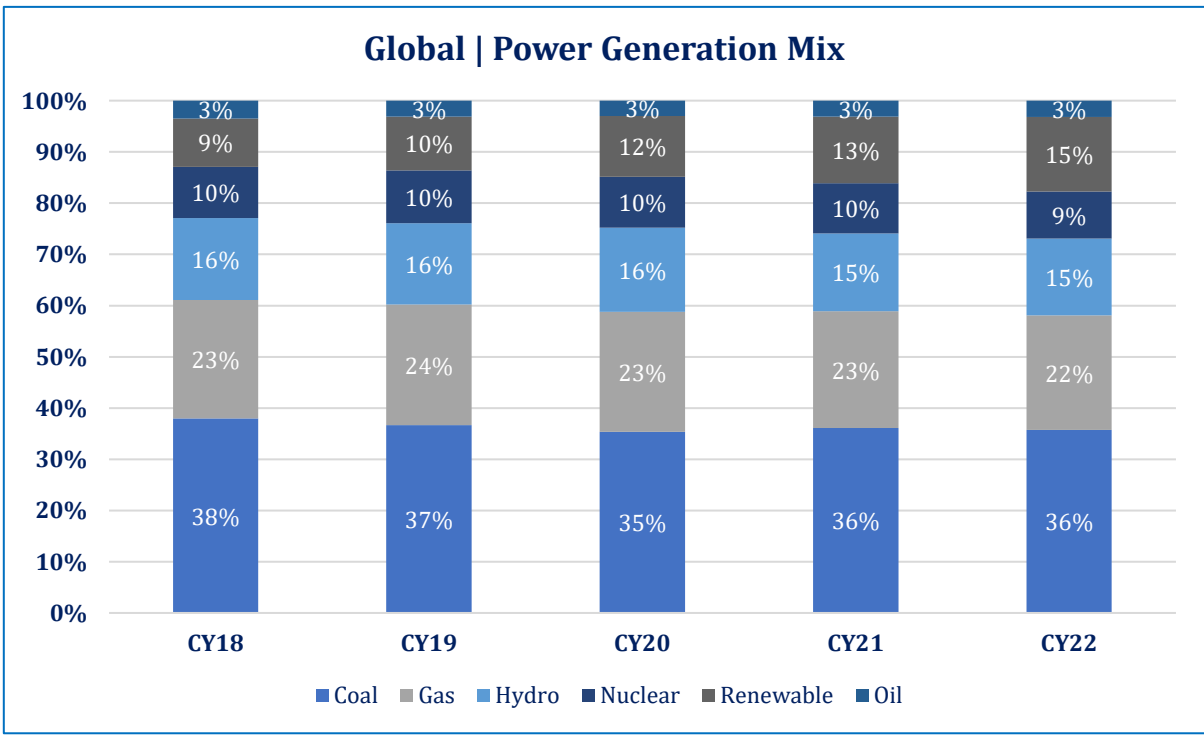


Note: Local power generation data is reflective of the CPPA-G system.

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Power Generation Mix | Global vs. Local

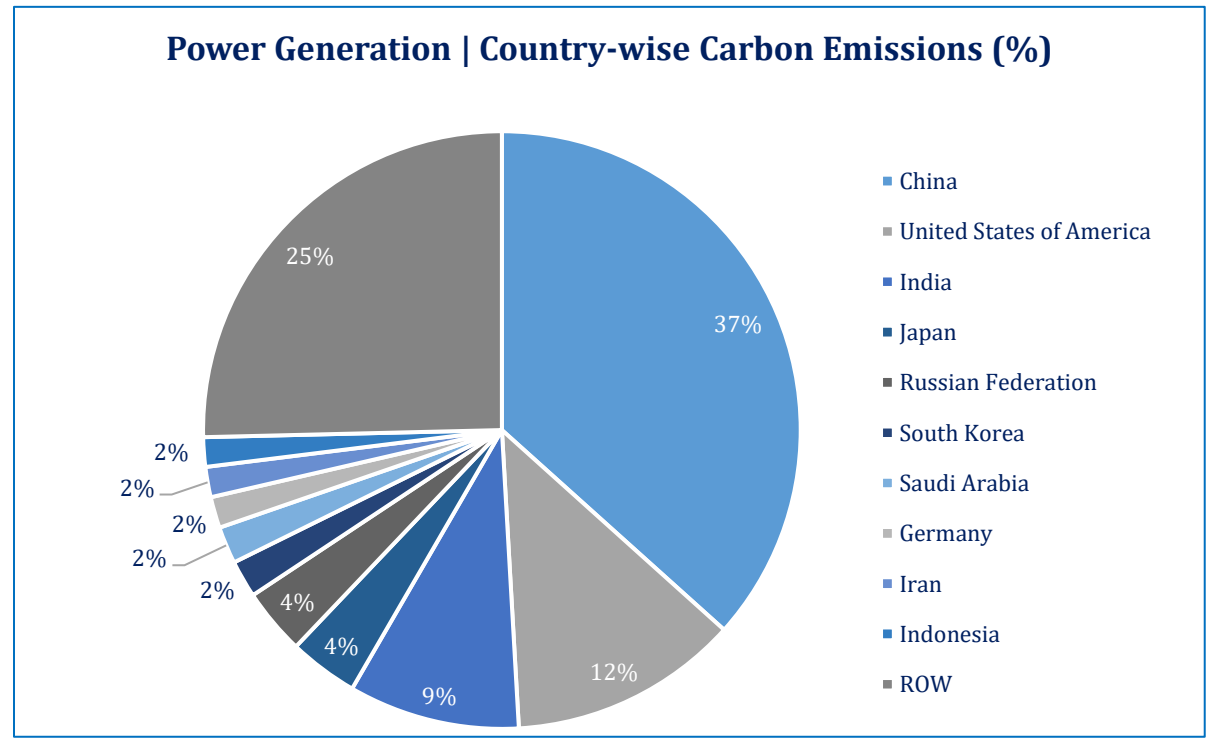
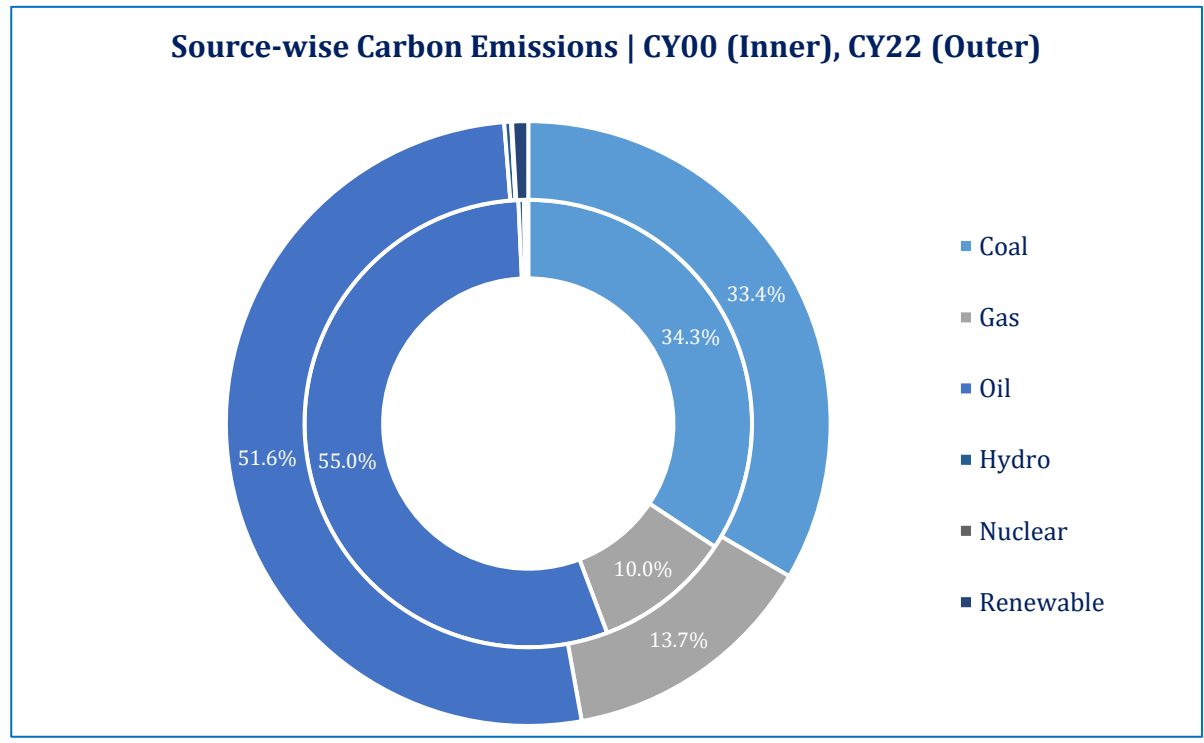
- The global power mix has, over the years (CY18-22), been dominated by fossil fuels, with oil being the major contributor, followed by coal and gas. For the said period, oil, on average, comprised ~32% of the total power generation mix. Therefore, fossil fuels (Oil, Gas and Coal) comprised the lion's share in the global power generation mix at ~82.0% of total in CY22 (CY20: ~82.3%).
- In Pakistan, a shift is being observed, away from thermal sources (~69% in FY19 to ~60% in FY23) and towards renewables (~3.6% in FY19 and ~4.6% in FY23).



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Global | Carbon Emissions | Power Generation

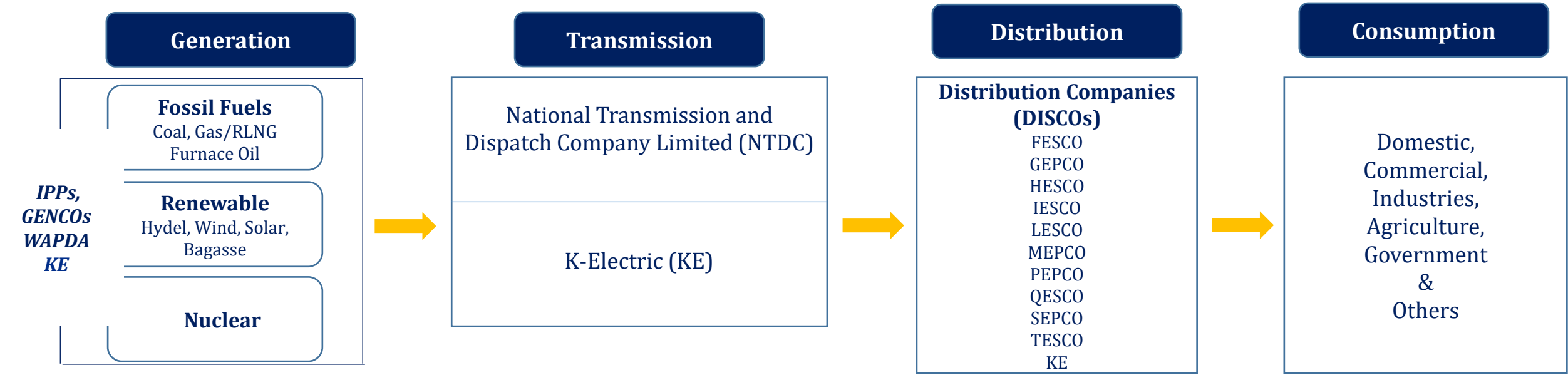
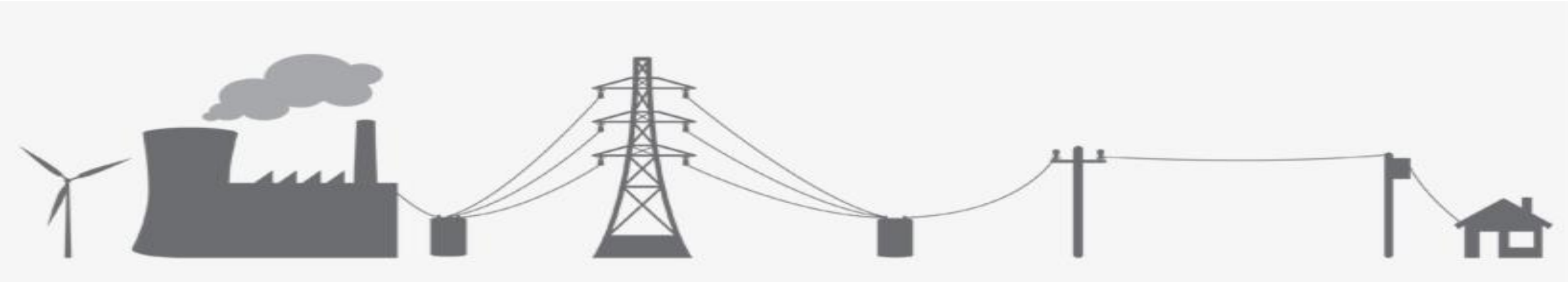
- In CY22, the global carbon emissions from power generation rose to ~14,143 MT, growing at a CAGR of ~2.6% since 2000. Country-wise, the USA and China alone contributed to ~50% of the global carbon emissions emanating from power generation during the same period.
- In CY22, Pakistan contributed just ~0.5% in terms of carbon emissions resulting from power generation (SPLY: ~0.5%). However, it was the fifth most vulnerable country at the risk of climate change during the same time period.



Note: mMT stands for Mega-MT of CO2 emissions per kWh.

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Local | Industry Structure

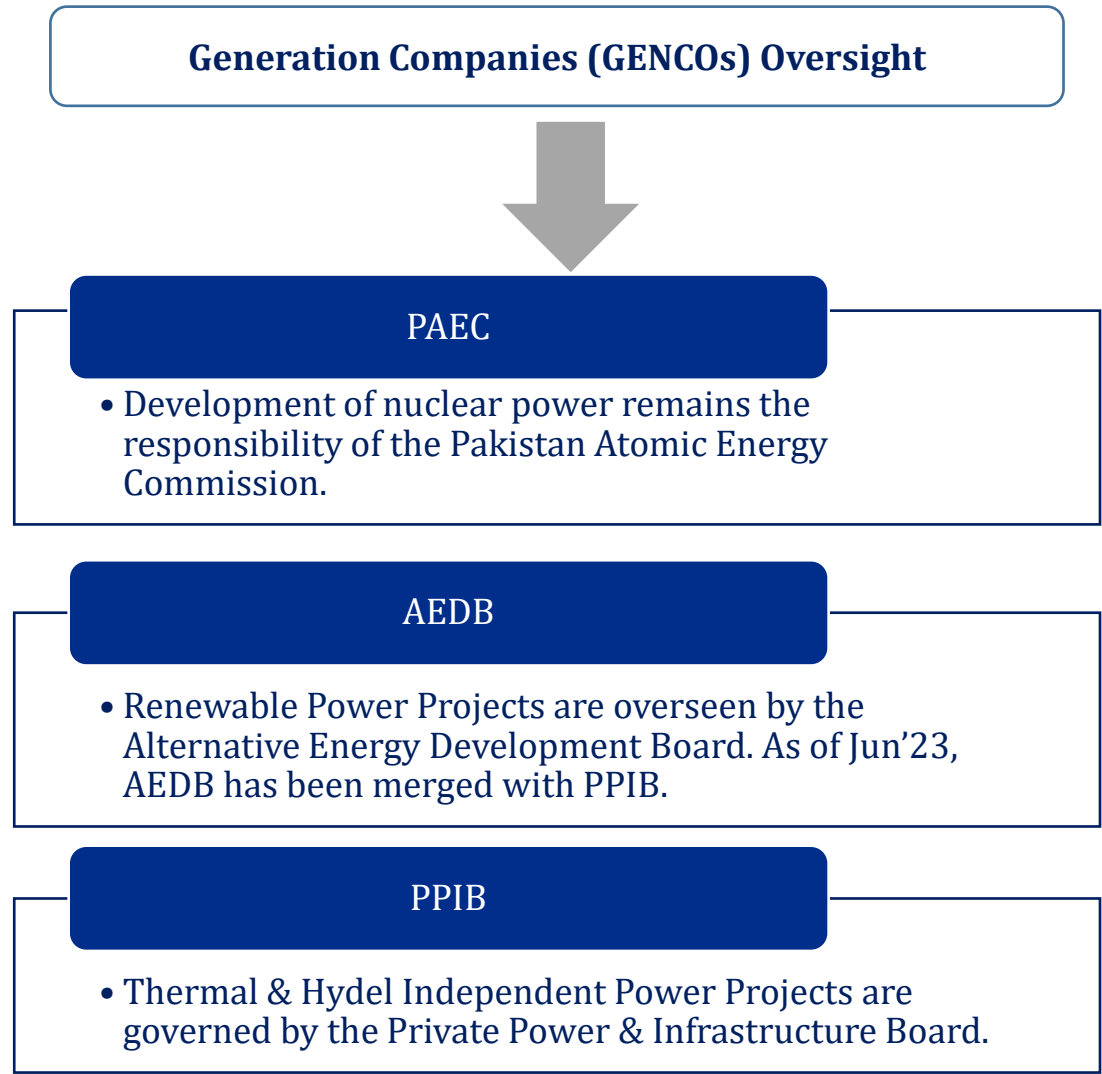


Note: KE Operates in all three segments of the Power Sector

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Local | Regulatory Structure

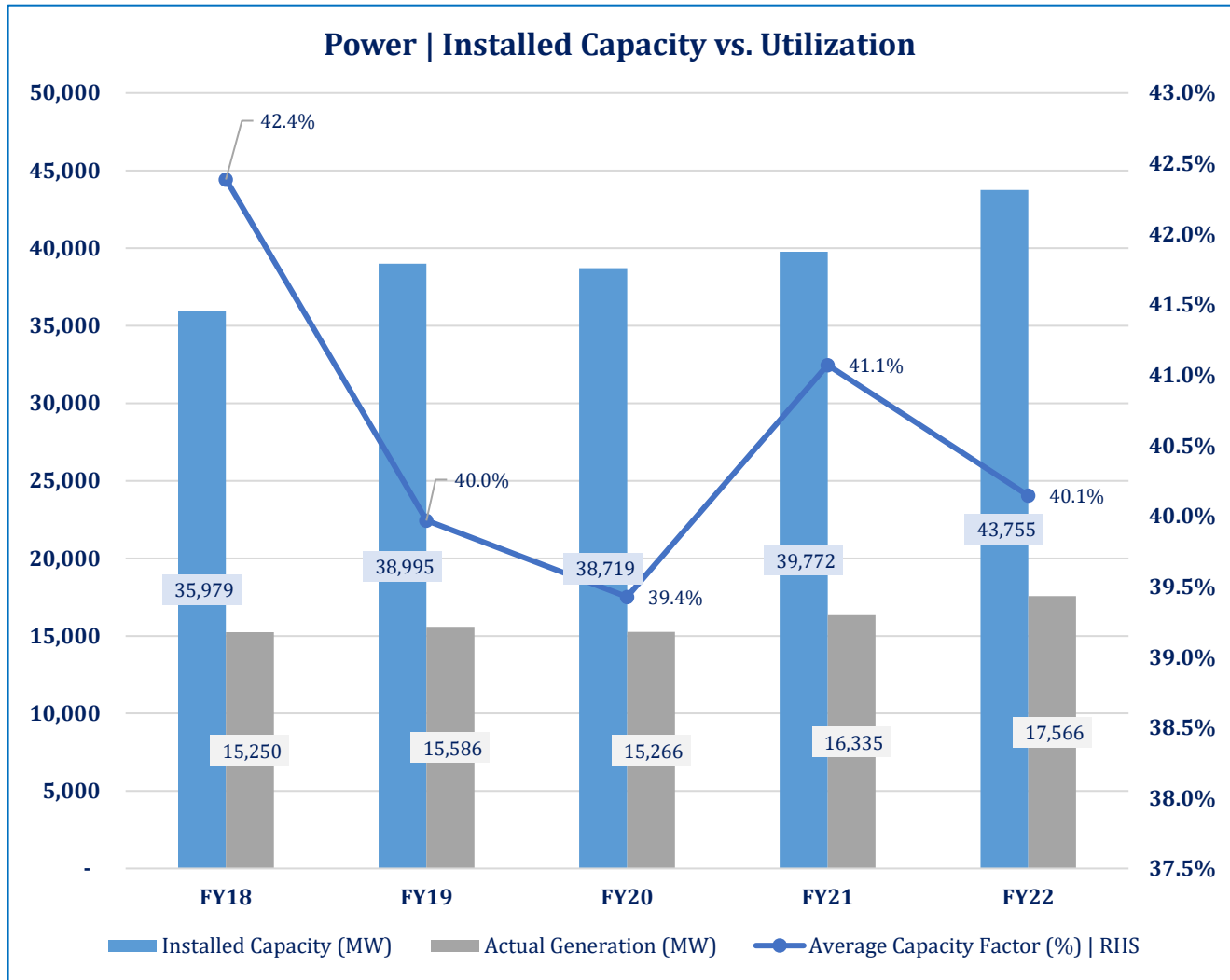
Governance Ministry of Energy	Regulator NEPRA	Market Operator CPPA-G
The Power division oversees the entire power sector of Pakistan.	NEPRA is an autonomous body mandated by the law to regulate the Power Sector to ensure that the interests of investor and customer are protected and the sector moves towards a competitive environment. The authority is also responsible for tariff determination.	Power market is operated by Central Power Purchasing Agency (CPPA-G). It procures power on behalf of DISCOs and settles the balances among all the market players. Its objective is to facilitate the power market transition from current single buyer model to competitive market.



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Local | Installed Capacity vs. Utilization

- The total installed generation capacity was recorded at ~43,755MW in FY22, up ~10.0% YoY, while actual power generation was recorded at ~17,566MW, up ~7.5% YoY.
- Meanwhile, annual capacity factor of the Sector was recorded at ~40% (SPLY: ~41%). Capacity Factor measures the percentage of installed capacity that is utilized. A low capacity factor indicates inefficiency in the system usage. The country’s annual capacity factor has declined gradually from ~48% in FY17 to ~40% in FY22, reflecting reduction in efficient system utilization on a timeline basis.
- The power generation sector comprises public as well as private sector power plants. Total generation from public power plants in FY22 comprised ~51% of the total generation, whereas private sector plants contributed ~49%. Moreover, CPPA-G contributed ~93% to the overall power generated in FY22, while KE comprised the remaining.
- Based on the energy source type, these plants include hydropower plants, thermal power plants, nuclear power plants and renewable energy (RE – wind, solar, bagasse/ biomass). In addition, Pakistan also imports some electric power from Iran.



Disclaimer: Local data, wherever limited to NEPRA’s State of Industry Report is reflective of FY22 data and will be updated once FY23 report is made available.

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Local | Power Plants

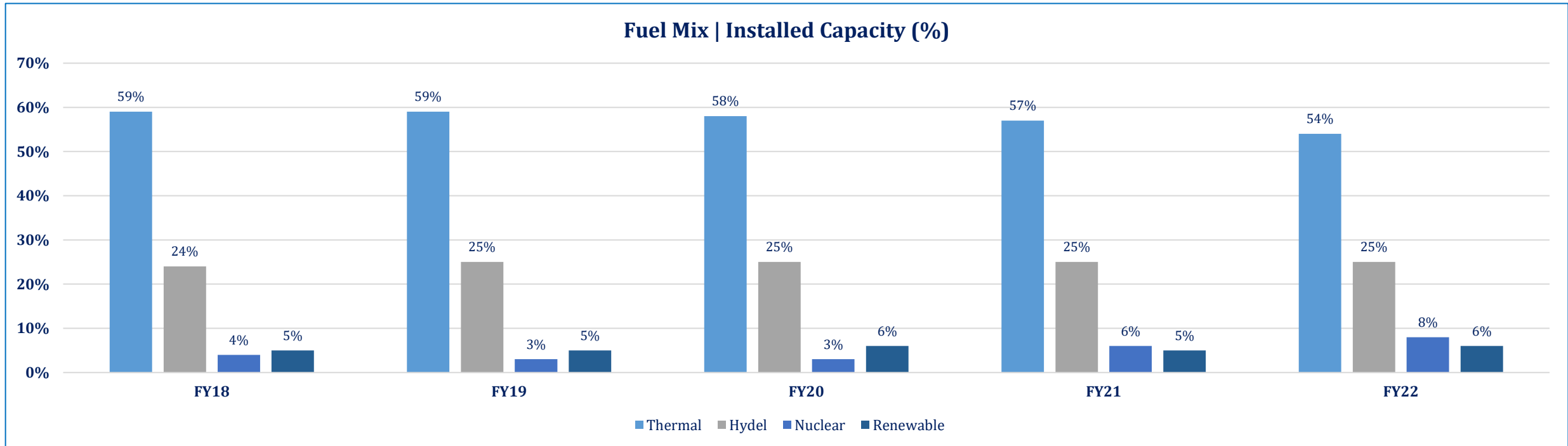
Generation Type	Nature of Entities (Public/Private)	No. of Power Plants	% Share in Country Installed Capacity*	Description
Thermal				
GENCOs	Public	12	10.7%	Major GENCOs include TPS Muzaffargarh and Jamshoro.
IPPs	Private	39	42.9%	Major IPPs include KAPCO, Hub Power, Huaneng Shandong Ruyi, NPPMCL, Port Qasim Electric and China Power Hub.
KE - Own	Public	6	5.4%	Major plant includes Bin Qasim TPS-I.
Total		61	59.0%	
Hydel				
WAPDA	Public	24	21.6%	Major Hydropower units include Tarbela, Tarbela 4 th extension, Ghazi Barotha and Mangla Warsak units. Among the IPPs, Karot Hydropower has the largest installed capacity.
IPPs	Public/ Private	9	2.7%	
Total		33	24.3%	
Nuclear				
CHASHNUPP & KANUPP	Public	7	8.3%	
Total		7	8.3%	
Renewable				
Wind IPPs	Public/Private	36	4.2%	All projects have individual installed capacities of less than 100MW.
Solar IPPs	Public/Private	7	1.2%	All projects have individual installed capacities of 100MW or less.
Bagasse/ Biomass	Public/Private	9	6.3%	All projects have individual installed capacities of 100MW or less except Fatima Energy (installed capacity of 120MW).
Total		53	11.7%	
Total Installed Power Plants		154		

Local | Plant-wise Installed Capacities

The CPPA-G Basket includes all Power Generation Plants of the country except those falling in the ambit of K-Electric (KE), which is responsible for generation, transmission and distribution of electricity to all residential, commercial, industrial and agricultural areas of Karachi and its outskirts.

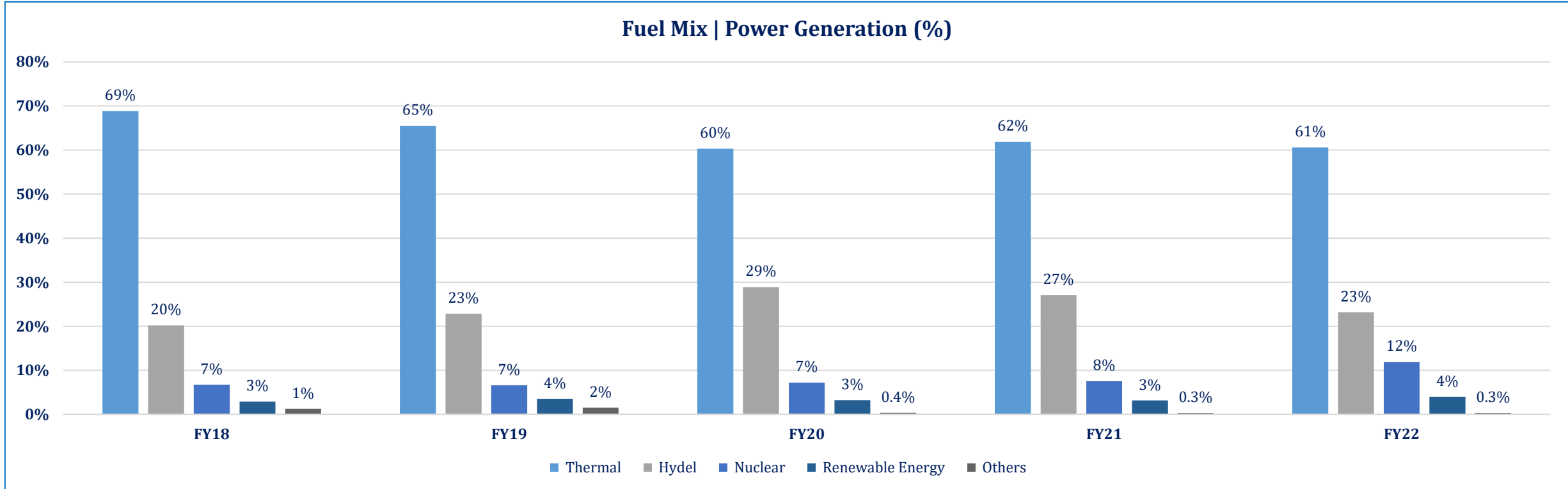
% Share in Installed Capacity (MW)	FY18	% Share	FY19	% Share	FY20	% Share	FY21	% Share	FY22	% Share
CPPA-G System	33,096	92%	36,061	92%	35,735	92%	36,934	90%	40,813	93%
Hydel	8,713	24%	9,761	25%	9,861	25%	9,915	25%	10,635	25%
- WAPDA	8,341	23%	9,389	24%	9,389	24%	9,443	24%	9,443	22%
- IPPs	372	1%	372	1%	472	1%	472	1%	1,192	3%
Thermal	21,274	59%	22,923	59%	22,497	58%	22,497	57%	23,821	54%
- GENCOs	5,637	16%	5,637	14%	4,881	13%	4,881	12%	4,731	11%
- IPPs	15,297	43%	16,946	43%	17,276	45%	17,276	43%	18,750	43%
- SPPs/CPPs	340	1%	340	1%	340	1%	340	1%	340	1%
Nuclear	1,330	4%	1,330	3%	1,330	3%	2,475	6%	3,620	8%
Renewable	1,779	5%	2,047	5%	2,047	6%	2,047	5%	2,737	6%
K-Electric System	2,884	8%	2,934	8%	2,984	8%	2,838	7%	2,962	7%
KE – Own	2,294	6%	2,294	6%	2,294	6%	2,084	5%	2,345	5%
IPPs	366	1%	366	1%	366	1%	366	1%	366	1%
SPPs/CPPs	87	0%	87	0%	87	0%	151	0%	151	0%
KANUPP	137	0%	137	0%	137	0%	137	0%	0	0%
Solar	-	0%	50	0%	100	0%	100	0%	100	0%
Total (CPPA-G + KE)	35,980	100%	38,995	100%	38,719	100%	39,772	100%	43,775	100%

Fuel Mix | Installed Capacity



- The total installed capacity of the country as at End-FY22 stood at ~43,755MW, up ~10.1% YoY and comprised the following:
 - Thermal (~23,821MW), YoY increase of ~5.9%.
 - Hydel (~10,635MW), YoY increase of ~7.3%.
 - Nuclear (~3,620MW), YoY increase of ~4.8%.
 - Renewable (~2,737MW), YoY increase of ~33.7%. During the year, ~12 wind power projects, with cumulative capacity of ~600MW, were added to the CPPA-G system, along with ~100MW solar power project of Zhenfa Power.

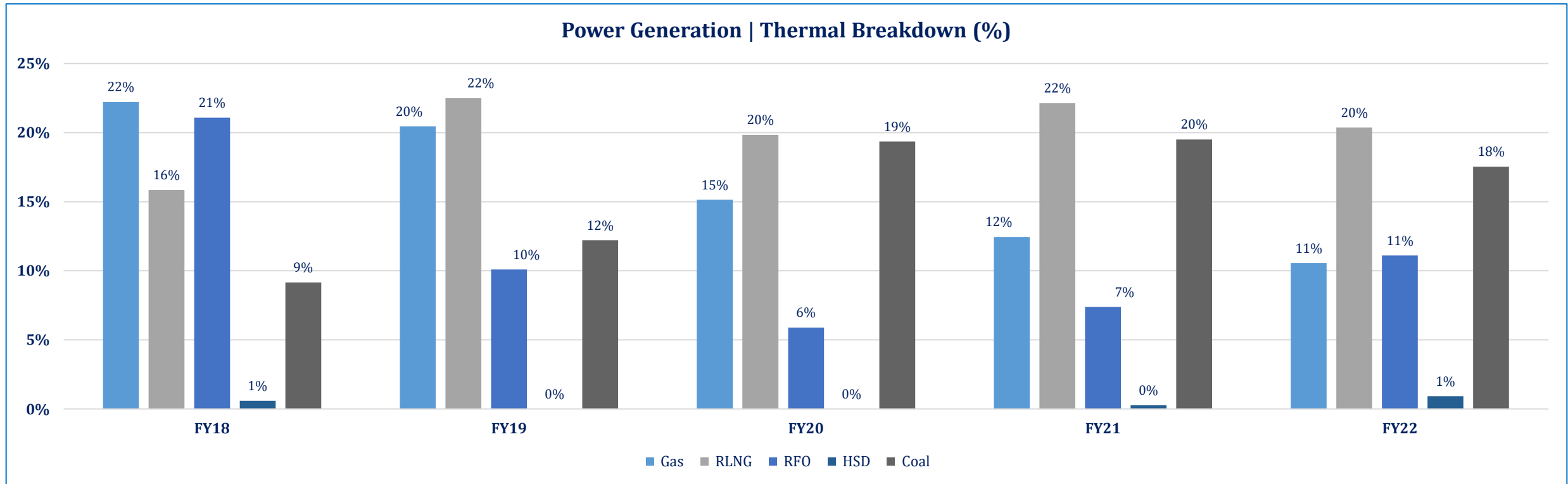
Fuel Mix | Power Generation



- Similar to the case of installed capacity, thermal fuels take the lead in the power generation mix of the country. However, due to costlier fuel charges and depletion of natural gas reserves in the country, the GoP is focused on gradually shifting towards hydel and other renewable sources of energy for power generation.
- While a dip was observed in hydel power share in FY22 power generation, an uptick was recorded in nuclear power generation (~65% increase YoY). This was because KANUUP-III came online and there was a sharp increase in generation in KANUUP-II increasing to ~6,830.4 GWh, a ~302% increase from FY21.

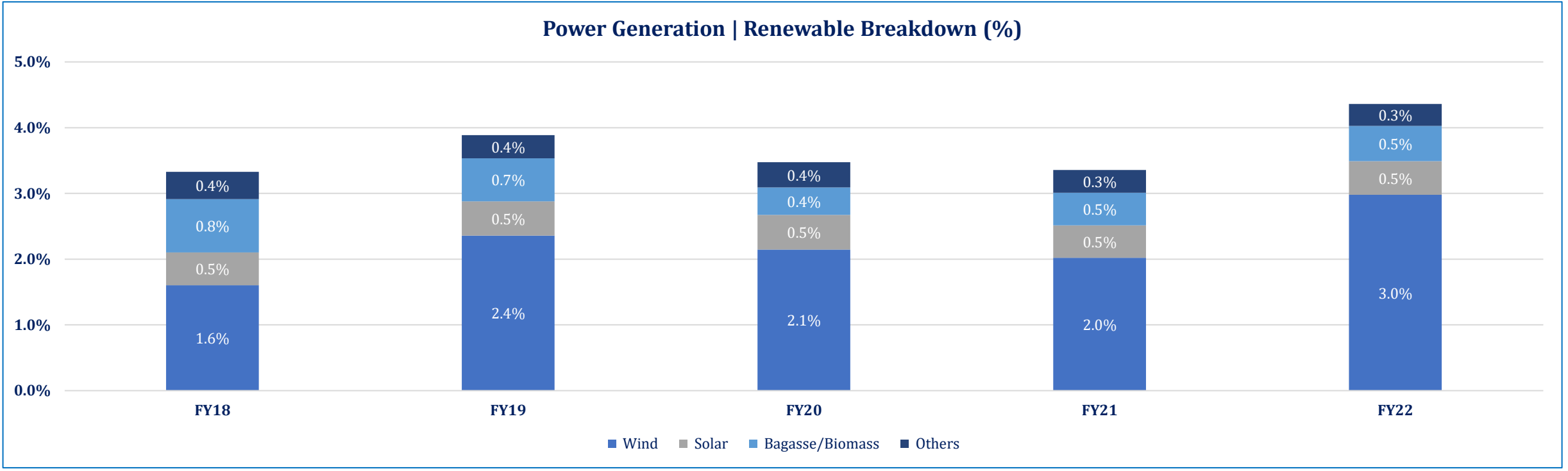
Note: Others include electricity imported from Iran.

Fuel-wise Generation Mix | Thermal Breakdown



- Within the thermal segment, a shift is being observed from Gas (~22%) and RFO (~21%) in FY18 to alternate fuels, i.e., RLNG (~20%) and Coal (~18%) in FY22; the first due to depleting natural resources as the country’s gas reserves have gone down considerably and the latter due to high cost of generation.
- Pakistan’s reliance on thermal, which includes imported coal, local coal, RLNG, natural gas and residual fuel oil (RFO) has been gradually decreasing over the last few years, dropping from ~69% in FY18 to ~61% in FY22 in the total generation mix, however, it still forms the major part of power generation.

Fuel-wise Generation Mix | Renewables Breakdown



- The country’s depleting natural gas reserves are necessitating a shift of fuels . The share of renewable energy has steadily increased over the years. The government is also taking measures to increase the shares of Hydel and Renewables in energy-mix.
- The cheapest sources of fuel are renewable energy sources followed by hydel energy. The fuel cost component in these energy sources is almost negligible. Hydel power contributes around ~23% to the electricity generated from renewable sources while others including solar, wind and bagasse collectively make up a small share of ~4.4%. Wind power has also seen an increase as it grew ~58% YoY, showing a shift towards renewable energy.

Note: Others include electricity imported from Iran.

Power Generation Companies | IPPs

Brief History

- Until the 1980s, Pakistan was continually facing the chronic issue of power shortage due to rapidly increasing power demand (7%-8% YoY) and lower supply. The disruption in power supply was impeding the industrial progress of the country. This situation called for an immediate intervention by the GoP.
- Considering the fact that developing power generation capacity is capital intensive and could absorb a high portion of the allocated federal budget, the GoP made in principle decision to seek private sector investment in power generation. For this purpose, a dedicated organization, PPIB, was created as a one-window facilitator for attracting private investment in the power sector.
- HUBCO was the first private power generation project in Pakistan, founded in 1994.
- As of Jul'23, there are ~54 (conventional fuel) and ~51 (renewable sources) IPPs commercially operating within the country. Private Power Projects include Foreign-Local partnerships, including groups like Nishat, Sapphire, Attock, Engro and Fauji group.

Key Features

- IPPs are governed under (Implementation Agreement (IA), Power Purchase Agreement (PPA) and fuel/gas supply agreements.
- The long term nature of PPAs (spanning 25-30 years) shields them from adverse macroeconomic changes. Moreover, the underlying take-or-pay mechanism, established under PPAs, insulates them from risk arising due to variations in the quantity of power purchased from them (through capacity charges).
- IPPs operate in a single buyer market – the CPPA-G (and KE in its respect geography). Under the IA between the GoP and the IPPs, a Guarantee is provided by the GoP of the payment obligations of the Power Purchaser. Any failure of the Power Purchaser to fulfill its payment obligations towards the IPPs is secured by the Government Guarantee.
- Minimum Equity Requirement for the IPPs is set at 20% of the total project cost. Tariffs for the IPPs are determined by NEPRA and can be determined via (i) Upfront Tariff, (ii) Cost-Plus Tariff and (iii) Competitive Bidding.

Power Generation Companies | WAPDA

- Pakistan Water & Power Development Authority (WAPDA), established through an Act of Parliament in 1958, is an autonomous and statutory body under the Federal Government's control. It operates with four verticals, namely, (i) Power Wing (ii) Water Wing (iii) Finance Wing and (iv) Administration Wing.
- The Power Wing is responsible for the operation and maintenance of the Hydel Power Stations, electricity produced from which is delivered to NTDC grid system and invoices are raised to CPPA-G according to the Tariff approved by NEPRA.
- Presently, WAPDA is operating ~21 Hydel Power Plants with an installed capacity of ~8,420MW (~23% of the total system capacity) The Net Electrical Output stands at ~32,000 GWh/annum.
- Hydel generation is the cheapest electricity source in the country, therefore, plays a pivotal role for the development in the economic and social sectors by stabilizing the overall power tariff for the consumers. The impact of hydel electricity on the national economy can be gauged from the fact that generation cost of hydel electricity by WAPDA stood at PKR~3.56/kWh in FY22, while generation cost from thermal sources averaged PKR~17.0/kWh during the same period.



Upcoming Hydel Projects | WAPDA

Projects Under Construction

Sr.	Project Name	Generation Capacity (MW)	Annual Energy (GWh)	Location	Expected Completion Date
1.	Mohmand Dam	800	2,862	Swat River, KP	Dec'25
2.	Diamer Basha Dam	4,500	18,097	Indus River, Near Chilas	Feb'29
3.	Dasu Hydropower Project	4,320 (Stage-I: 2,160)	21,485	Indus River, ~74Km downstream of Diamer Basha	-
4.	Tarbela 5 th Extension	1,530 (3 units 510 each)	1,347	Indus River, KP	May'26
Total		11,150	43,791		

- Of the total ~10 projects under construction, the table above depicts four, with the potential of providing ~43,791GWh. The rest include Kachhi Canal, Nai Gaj Dam, Kurram Tangi Dam, Keyal Khwar Hydropower, among others.
- Moreover, ~5 projects are ready for construction, namely, Naulong Dam, Bunji, Lower Spat Gah, Lower Palas Valley Hydropower and Chashma Right Bank Canal Project.



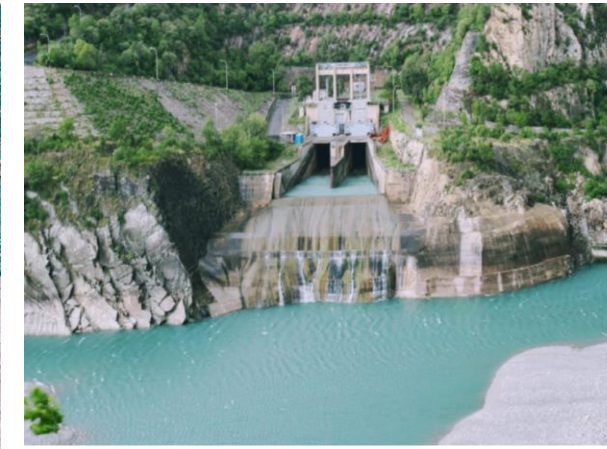
Mohmand Dam



Diamer Basha Dam



Dasu Hydropower Project



Tarbela 5th Extension

Upcoming Hydel Projects | IPPs

Sr.	Projects	Expected Capacity (MW)	Location	Expected Completion Date	Status
1.	Suki Kinari Hydropower*	884.0	Kunhar River, Mansehra KP	Nov'24	Under Construction.
2.	Raili-II Hydropower**	7.08	Ghori Wala Nullah, Muzafarrabad AJK	Dec'25	LOS issued. Under Construction.
3.	Kathai-II Hydropower	8.00	Kathai Nullah Hattian, AJK	Dec'26	LOS issued. FC in progress.
4.	Azad Pattan Hydropower*	700.7	Jhelum River, Sudhnoti, AJK	Sep'30	LOS issued. FC in progress.
5.	Kohala Hydropower*	1,124.0	Jhelum River, Kohala, AJK	Mar'31	LOS issued. FC in progress.
6.	Athmuqam Hydropower	450.0	Neelum River, AJK	Dec'28	LOI Issued. FS completed and approved by POE. Further processing will be as per IGCEP.
7.	Turtonas- Uzghor Hydropower (Candidate project in the IGCEP portfolio)	82.3	Golen Gol River, Chitral, KP	Dec'29	LOI Issued. FS completed and approved by POE. Further processing will be as per IGCEP.
8.	Mahl Hydropower (Candidate project in the IGCEP portfolio)	640.0	Jhelum River, AJK/PUNJAB	Dec'32	LOI Issued. FS completed and approved by POE. Tariff determined by NEPRA. Further processing will be as per IGCEP.
9.	Ashkot Hydropower	300.0	Neelum River, AJK	Sep'31	Project has been transferred by GoAJK to PPIB for further processing as per IGCEP.
10.	Rajdhani Hydropower Project	132.0	Pooch River, AJ&K	Dec'31	To be processed as per the requirements of new capacity in IGCEP
11.	Kaigah Hydropower Project	548.0	Kaigah, Indus River, KP		
12.	Chakothei-Hattian Hydropower Project	500.0	Muzaffarabad, AJ&K		To be processed as per the requirements of new capacity in the IGCEP.
13.	Neckeherdim-Paur Hydropower Project	80.0	Yarkun River, Chitral Valley KP		
Total		5,456.0			

Note: Data is updated as of Nov'23. FS (Feasibility Study), LOI (Letter of Intent), LOS (Letter of Support), POE (Panel of Experts), IGCEP (Indicative Generative Capacity Expansion Plan). *CPEC Project **Likely to get late due to various issues,

Upcoming Solar Projects | IPPs

- Presently, seven (07) solar power projects of ~530MW capacity are operational, four of which fall under the ambit of CPEC, with cumulative capacities amounting to ~400MW and are situated in Bahawalpur. The upcoming solar projects are depicted in the table below.

Sr.	Upcoming Projects	Expected Capacity (MW)	Location	Expected Completion Date	Status
1.	Meridian Energy Pvt. Ltd.*	50.0	Sukkur, Sindh	Dec'23	Under Construction.
2.	HNDS Energy Pvt. Ltd.*	50.0	Sukkur, Sindh	Dec'23	Under Construction.
3.	Helious Energy Pvt. Ltd.*	50.0	Sukkur, Sindh	Dec'23	Under Construction.
4.	Access Solar Pvt. Ltd.	11.5	Jhelum, Punjab	Sep'24	LOS issued. FC in progress.
5.	Access Electric Pvt. Ltd.	10.0	Jhelum, Punjab	Sep'24	LOS issued. FC in progress.
6.	Zorlu Solar Pakistan Ltd.	100.0	Bahawalpur, Punjab	Mar'25	LOS issued. FC in progress.
7.	Safe Solar Pakistan Ltd.	10.3	Bahawalnagar, Punjab	Aug'25	LOS issued. FC in progress.
8.	Siachen Energy Ltd.	100.0	District Thatta, Sindh	Oct'25	Generation license acquired. Tariff determination is awaited from NEPRA.
Total		381.8			

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Upcoming Projects | Wind | IPPs

- Thirty-Six (26) wind power projects of ~1,845 MW cumulative capacity have achieved Commercial Operation and are supplying electricity to National Grid.
- Of these, ~5 (located in Thatta) fall under the ambit of CPEC with cumulative capacity amounting to ~297MW.

Wind Power Plants To be Constructed				
Project Name	Expected Capacity (MW)	Expected Commissioning Year	Location	Status
Western Energy Pvt. Ltd.	50	Feb'26	Jhampir District, Thatta	Decision on LPM and tariff petition awaited
Trans Atlanstis Energy Pvt. Ltd	50	Feb'26	Jhampir District, Thatta	Decision on LPM and tariff petition awaited
Total	100			

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Upcoming Projects | Bagasse | IPPs

- There are ~90 sugar mills presently operating in the country, producing more than ~5mln MT of sugarcane (~6.0mln MT during MY18-23). It is estimated that, for every ~3 MT of sugarcane, ~1 MT of bagasse can be processed.
- The sugar industry in Pakistan offers good potential for energy efficiency, vis-à-vis High-Pressure Cogeneration (HPC) technology. Only ~3 sugar mills have HPC technology, while majority utilize low-pressure steam boilers (~23 bar against ~66 bar per HPC), which are inefficient and do not optimize the use of bagasse. With annual production of ~4.4mln MT of bagasse, the country has the potential to generate ~830GWh of excess electricity.
- The installed capacity of bagasse/biomass power plants connected with the NTDC system as of Jul'23 amounted to ~260MW, with ~8 sugar mills/ companies having achieved commercial operational dates (CODs).

Sr.	Project Name	Expected Capacity (MW)
1.	Shahtaj Sugar Mills Ltd.*	32.0

Local | Generation License & CODs

New Capacities – Generation Licenses										
Type of Fuel	FY18		FY19		FY20		FY21		FY22	
	No. of Licenses	Capacity	No. of Licenses	Capacity	No. of Licenses	Capacity	No. of Licenses	Capacity	No. of Licenses	Capacity
Thermal		-		-	4	316	1	55	-	-
Hydel	6	30.0	1	11.8	2	117	4	294.1	1	152.1
Wind	8	410.0	1	50	4	138.7	-	-	-	-
Solar	6	450.0	3	66.2	16	621.4	18	49.7	9	34.7
Nuclear		-		-	1	1,145	1	1,145.0	-	-
Bagasse	8	237.0	4	148	-	-	3	47.6	-	-
Coal	2	65.0	2	336.5	-	-	-	-	1	10
Solid Waste		-	1	40	-	-	-	-	-	-
RLNG	1	1,279.0		-	-	-	-	-	1	
Total	31	2,471.0	12	653.0	27	2,338.0	27	1,591.0	12	201.4

During FY22, the following power plants, with cumulative capacities amounting to ~1,380MW, achieved/expected Commercial Operations Date (COD):

- **Hydel:** Karot Project – Capacity 720MW – COD – Dec’21.
- **Local Coal:** Lucky Electric Thar Coal Project – Capacity 660MW – COD Jun’21.
- **RLNG:** RLNG based PTPL Project – Capacity 800MW – COD Oct’21.

Local | Tariff Determination

- In accordance with NEPRA Tariff Standard & Procedure Rules, 1998, NEPRA is responsible for determining the tariffs for all generation, transmission and distribution companies of the Sector.
- Tariffs are structured to recover costs charged by GENCOs, energy charges, and DISCOs' margin to cover operation and maintenance (O&M) and administrative costs, depreciation, and rate of return. The GoP-notified rates are notified with an average delay of ~9-12 months and also deviate from the recommended rates, thereby creating cash shortages for the DISCOs.

Generation

- At the generation level, the tariff is determined based on the power purchase agreements (PPAs) between power producers (IPPs and GENCOs) and a single buyer – Central Power Purchasing Agency (CPPA-G).
- This tariff has three components: (1) Capacity Charge (CC) – majorly including construction and design costs of power units, debt financing charges and ROE (2) Energy Charge (EC) – majorly including price of fuel and (3) Variable Operations & Maintenance Costs (O&M).
- The Capacity Charge is indexed with parameters such as exchange rates and interest rates. Also, the capacity charge is based on 'take or pay' method, which implies that power producers are allowed to impose it irrespective of the amount of electricity produced and sold, unlike variable charges which are based on the amount of electricity produced and sold, reference fuel mix and their price.

Transmission

- At the transmission level, the tariff includes the 'Use of System Charge (UoSC) payable to NTDC. This amount is calculated using NTDC's required revenue (after incorporating certain permissible expenses) divided by the sum of maximum demand index of all DISCOs and bulk power consumers connected to the NTDC transmission network.

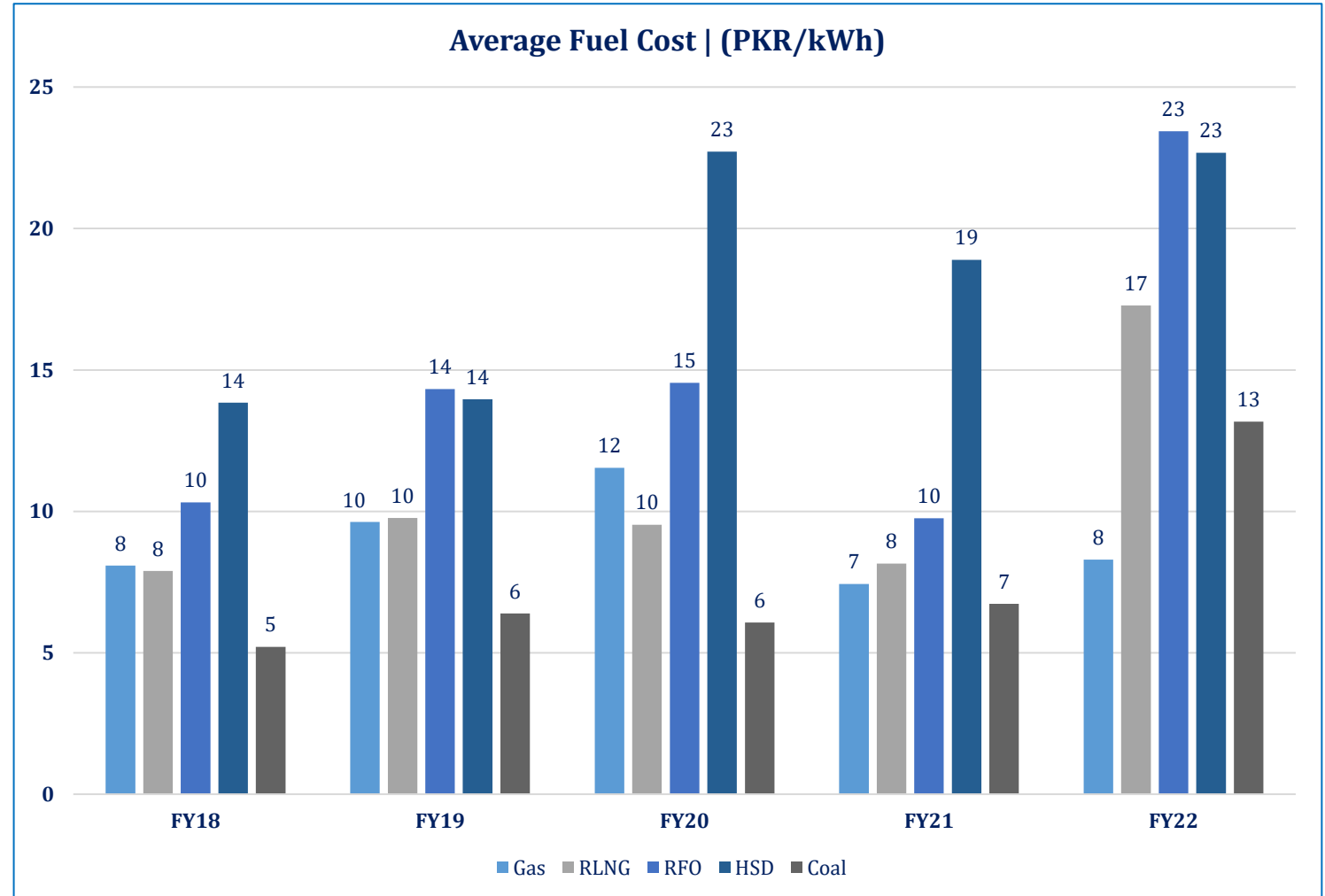
Distribution

- Finally, the retail tariff is determined at the distribution stage. This includes tariff determined at the generation and transmission levels (CC + EC + O&M + UoSC) as well as fixed distribution margins of the DISCOs. Additionally, this tariff also includes allowed transmission and distribution losses.
- While the end-user tariff is determined by NEPRA, the actual tariff is notified by the Government to unify tariff across all DISCOs.

POWER

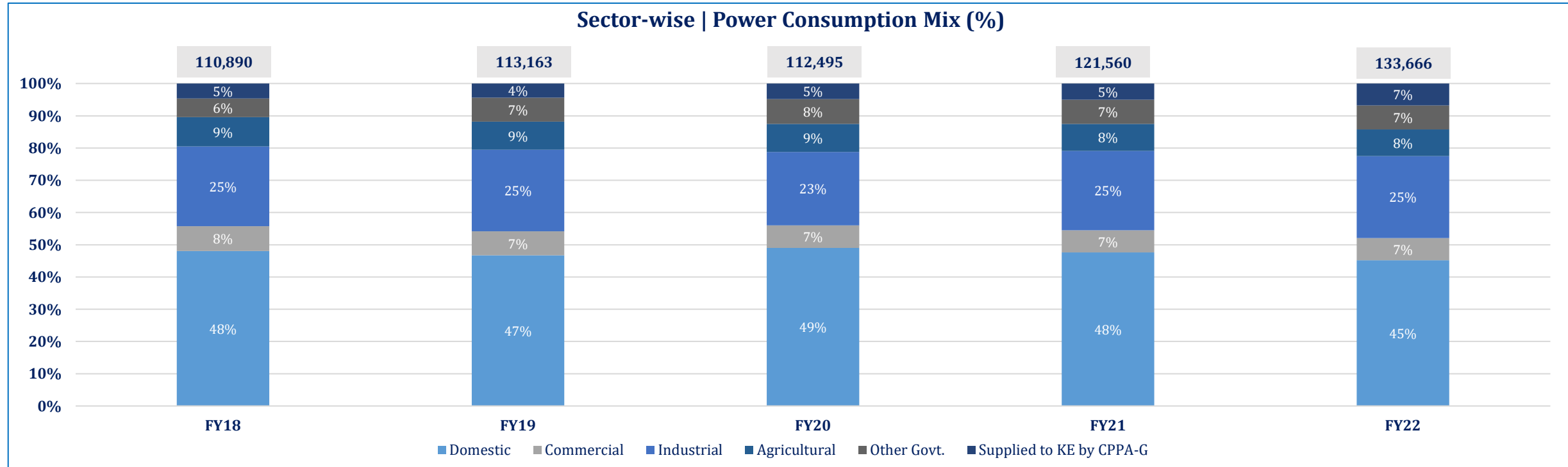
Local | Average Fuel Cost

- The generation cost of power is ~80% of the consumer-end tariff, net of taxes. The cheapest source of fuel are renewable energy sources followed by hydel energy. Average cost of hydel electricity produced by WAPDA was assessed at PKR~3.56/kWh for FY22 (FY21: PKR~4.1/kWh; FY23: PKR~4.9/kWh), while generation cost from thermal sources averaged PKR~17.0/kWh during FY22 (FY21: PKR~10.0/kWh).
- During FY22, HSD and RFO were the most expensive sources of fuel for power supply, with combined share in the country's generation mix at ~12.0%.
- On the other hand, power produced from coal has been the cheapest among fossil fuels during FY18-22 (averaged at PKR~8.0/kWh). Meanwhile, RLNG fuel cost increased ~112% increase on the back of ~29.7% YoY increase in imported RLNG cost, owing to the high global prices of the commodity (its share in power generation mix recorded at ~28.0% in FY22 (FY21: ~32.0%))



Local | Sectoral Power Consumption

Totals stated in GWh

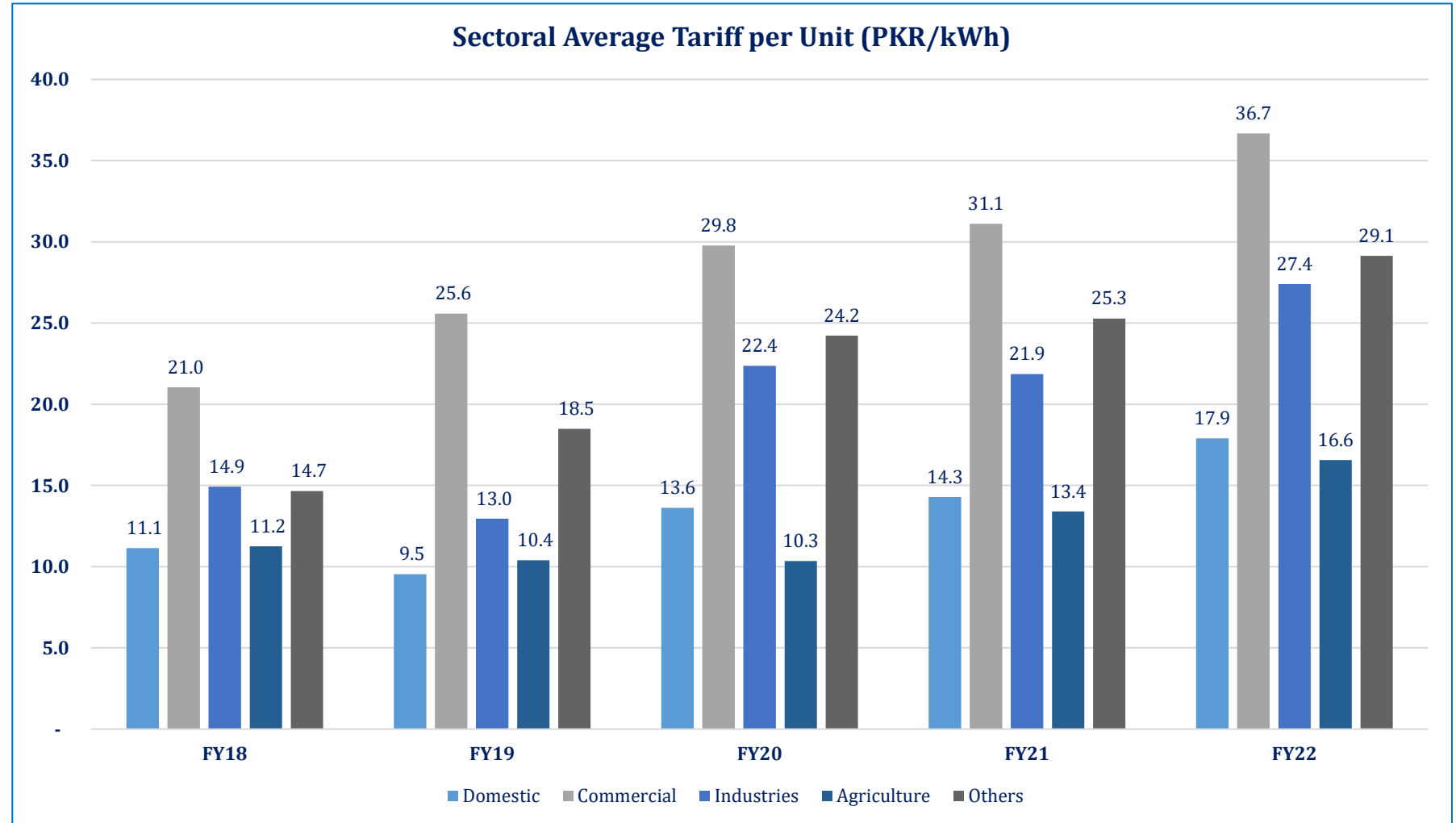


- Pakistan’s overall power consumption was up ~9.9% YoY in FY22, equivalent to ~86.8% of the total power generated during the same year. Average power consumption per capita recorded at ~588KWh in FY22 (SPLY: ~586KWh). A regional comparison reveals that this recorded at ~12,672KWh in the USA, ~6,206KWh in China and ~1,311KWh in India during CY22.
- It is pertinent to mention here that in FY22, transmission losses clocked in at ~2.6% (SPLY: ~2.7%), higher than the allowable limit of ~2.5%, with cost effect of PKR~72bln.. Moreover, distribution losses accrued to ~17.1% during the same year, against allowable losses of ~13.4% (cost effect: PKR~113bln).

Note: "Others" refers to 'public lighting, bulk supply and Others', as per NEPRA's disclosure. The data includes both systems i.e., CPPA-G and KE.

Local | Sectoral Tariffs

- During FY22, power consumption in the country grew ~9.9% YoY, whereas installed capacity increased ~10.0% YoY. This supply-demand gap is one of the contributing factors of increasing consumer-end tariffs.
- In terms of Sectors, Commercial and Industrial consumers are charged the highest average tariffs, while agricultural and domestic sectors are charged the lowest, due to different subsidies provided for the end consumers as well as low base effect of hydel fuel charges.

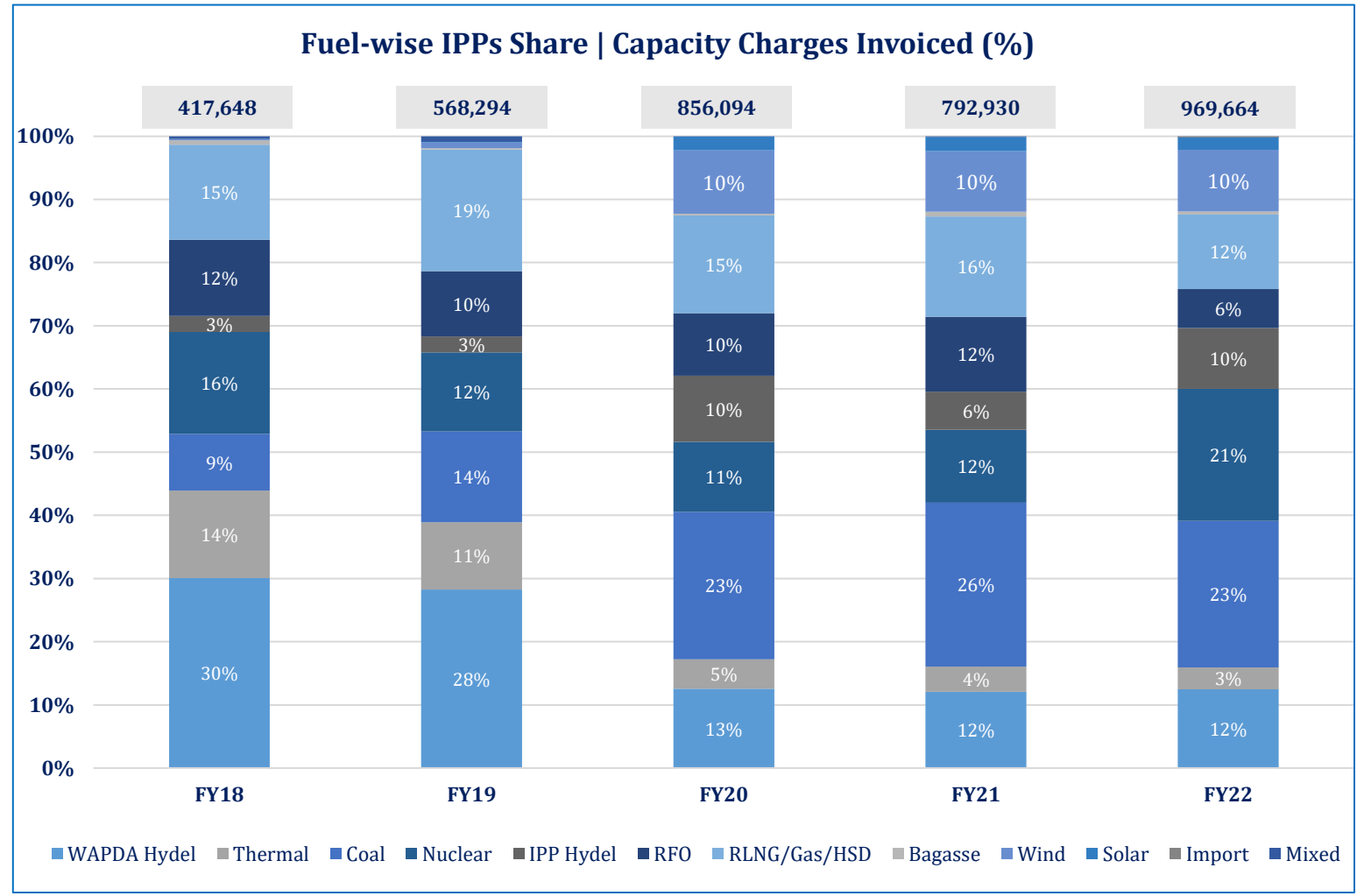


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Local | Fuel-wise Capacity Charges

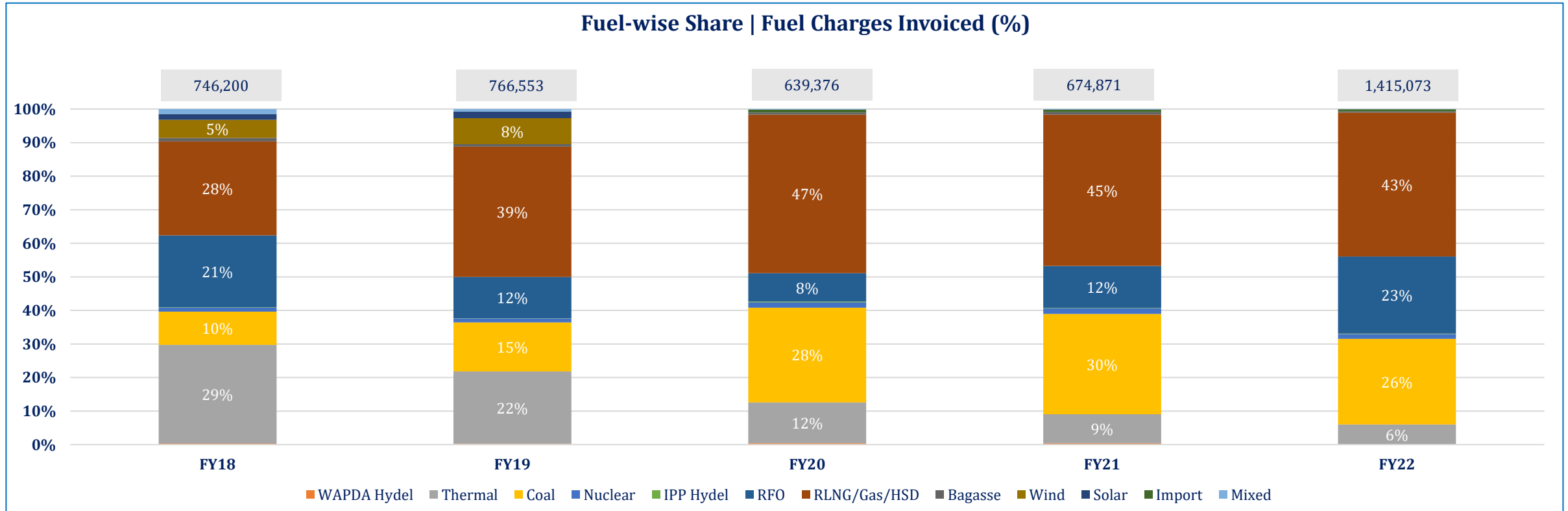
- Most of the PPAs with base load thermal power plants are capacity based ‘Take or Pay’ contracts under which capacity payments are necessarily required to be paid against available generation capacity irrespective it was utilized or not.
- The ‘Take or Pay’ compulsion calls for maximum utilization of such power plants to avoid unnecessary capacity payments which translate into a higher per unit cost of electricity for the end-consumer.
- During FY22, capacity payments amounted to PKR~721bln (SPLY: PKR~614bln), representing ~74.3% of the total capacity payments charged (SPLY: ~65.8%).

Totals stated in PKR mln.



Local | Fuel-wise Energy Charges

Totals stated in PKR mln.



- Energy charges invoiced by the IPPs rose ~109% YoY in FY22, on the back of rising fuel prices, with RLNG/Gas/HSD, RFO and coal making up ~92% of the total energy charges.

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Demand & Supply during Peak Hours | NTDC & KE

NTDC			
Period	Generation Capability (MW)	Demand During Peak Hours (MW)	Surplus/(Deficit) MW
Actual			
FY18	23,766	26,741	(2,975)
FY19	24,565	25,627	(1,062)
FY20	27,780	26,252	1,528
FY21	27,819	28,253	(434)
FY22	27,748	24,564	3,184
Projected			
FY23	34,729	25,779	8,950
FY24	37,226	28,027	9,199
FY25	40,213	29,389	10,824
FY26	43,380	30,814	12,566
FY27	44,950	32,276	12,674

KE			
Period	Generation Capability (MW)	Demand During Peak Hours (MW)	Surplus/(Deficit) MWh
Actual			
FY18	3,008	3,527	(519)
FY19	3,196	3,530	(334)
FY20	3,202	3,604	(402)
FY21	3,424	3,604	(180)
FY22	3,383	3,670	(287)
Projected			
FY23	4,056	4,011	45
FY24	4,656	4,168	488
FY25	4,405	4,290	115
FY26	4,710	4,404	306
FY27	4,825	4,522	303

Note: '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.

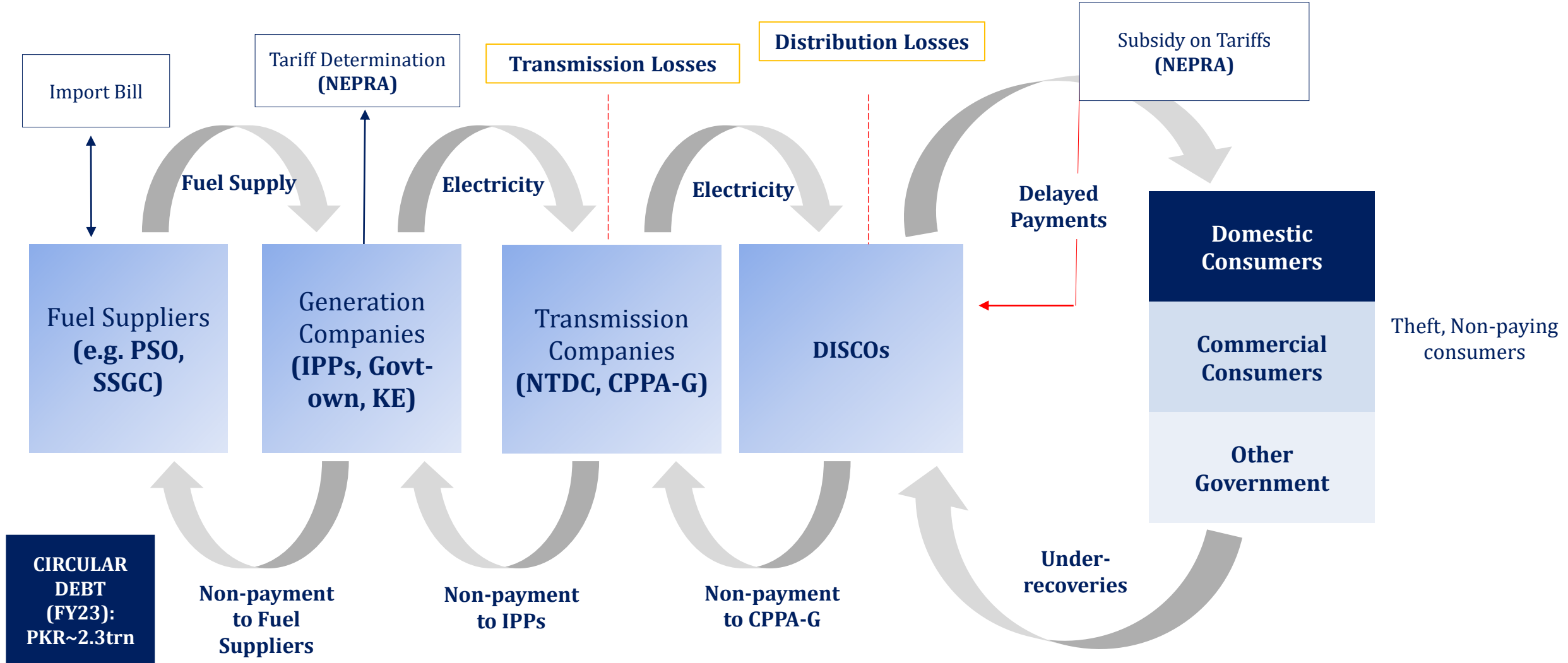
Circular Debt | The Unfortunate Menace

- **Circular Debt is the net unfunded outstanding liability position of the power distribution companies (DISCOs) to the Central Purchasing Power Authority-Guarantee (CPPA-G)**, which further cascades into delayed settlement of payment obligations by the CPPA-G to the Power Generation Companies (GENCOs)/ Independent Power Producers (IPPs). The cash gap at the CPPA-G is bridged through borrowings by the Power Holding Private Limited (PHPL) to settle CPPA-G's debts.
- The **five key contributors** include, (i) High cost of power generation, (ii) delays in tariff determination, (iii) high transmission and distribution (T&D) losses and poor revenue collection by the DISCOs, (iv) partial (and often delayed) tariff deferential subsidies (TDS) payment by the GoP to the DISCOs and K-Electric (KE), and (v) high financial costs on PHPL borrowing and late-payment penalty charges on CPPA-G payables.

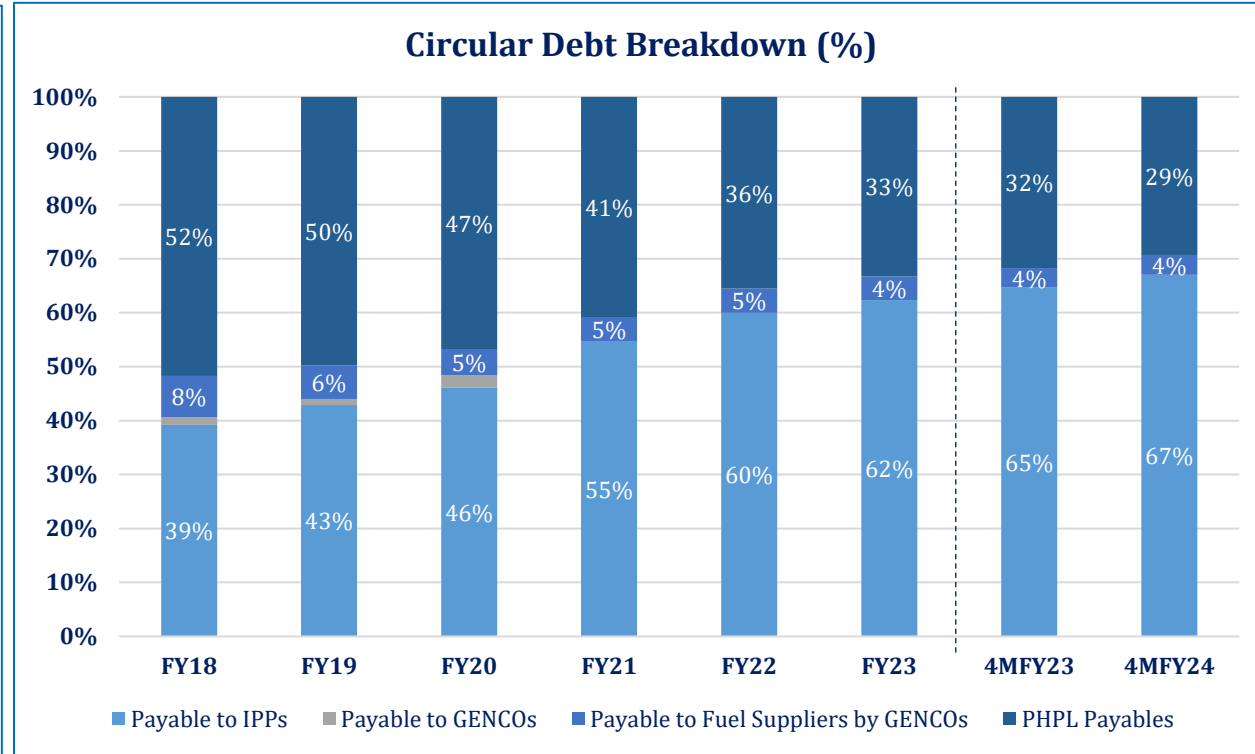
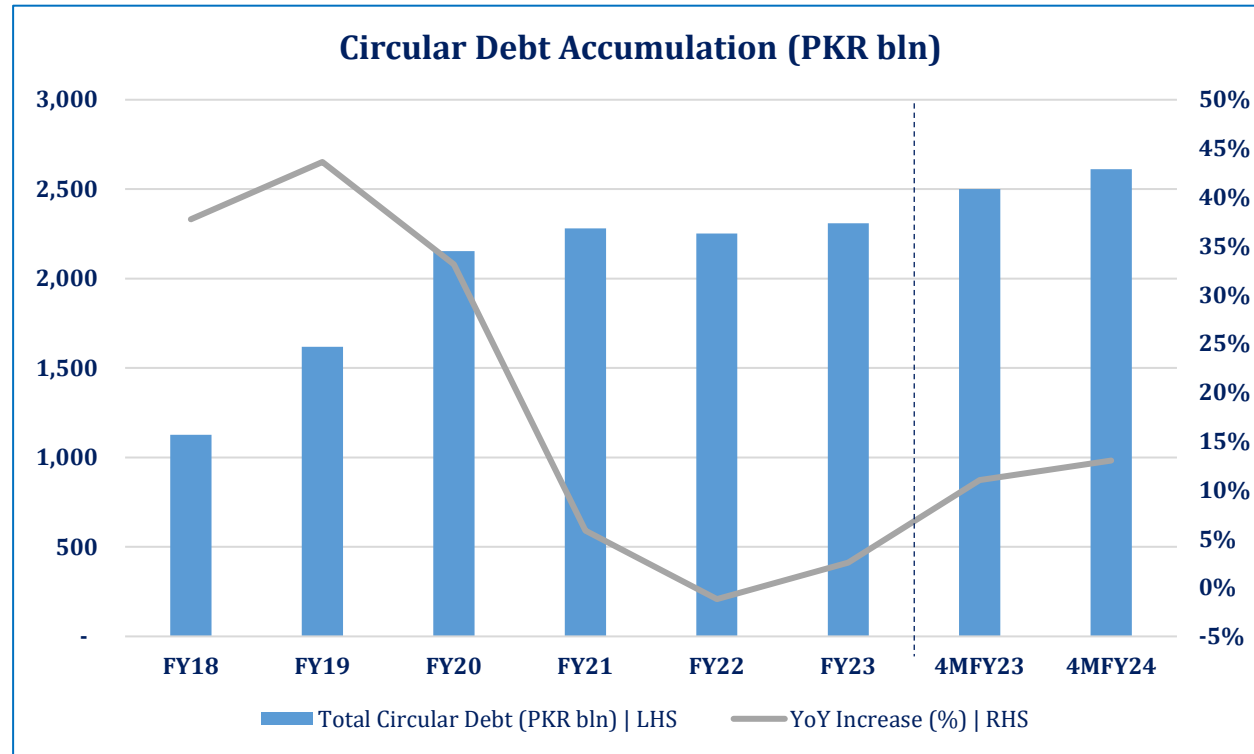


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Circular Debt | How it Flows



Local | Circular Debt Stock



- Pakistan’s total circular debt soared to PKR~2.3trn as of End-Jun’23, ~2.5% YoY (or PKR~57bln), reflecting further accumulation of Circular debt. A further breakdown of circular debt flow is described later. During the said period, circular debt made up ~2.9% of the country’s GDP (taken at current prices) (SPLY: ~3.6%).
- Moreover, as of End-Nov’23, the stock has filed up to PKR~2.6tln, growing by ~13.0% as compared against End-Jun’23 (SPLY: PKR~2.5tln, ~11.0% growth as against End-Jun’22). Payables to IPPs and PHPL payables together accounted for ~95% of the circular debt stock in FY23 (SPLY: ~96%).

Local | Circular Debt Flow

- Circular debt affects not only the liquidity of the fuel supplier, generation, transmission and distribution companies but also increases the cost of electricity for the end-consumer.
- The increase in circular debt since End-FY23 exceeded GoP's target for 4MFY24 due to lower-than-anticipated tariff rebasing and large DISCOs' under-recoveries in Aug'23 when the re-basing was implemented. Moreover, collections dipped to ~77% during Aug'23 on account of prices hike and greater average monthly consumption per household.
- Higher T&D losses (~16.9% in FY22; ~17.4% in FY21), low recoveries from DISCOs (PKR~2,518bln collected in FY22 as against PKR~2,696bln billed), delay in subsidy payments, and increasing receivables from public and private consumers are few of the major contributing factors to the mounting power circular debt.

Figures are stated in PKR bln.

Break-up of Increase/ (Decrease)	FY22	FY23	4MFY23	4MFY24
Budgeted but unreleased subsidies	(12)	(0)	74	8
Unclaimed Subsidies	(133)*	(70)*	(10)	-
IPPs Interest Charges on delayed payments	105	100	54	45
PHL Markup paid out of IPPs' claims	29	43		
Pending Generation Cost (QTAs + FCA)	414	250	103	110
Non-payment by K-Electric	107**	53**	65	43
DISCOs Losses Inefficiencies	133	160	61	77
DISCOs Under Recoveries	180	236	163	165
Other Adjustments	(285)	(447)	(254)	(147)
PHL Principal Repayments	(130)	(35)	(7)	-
PHL Unpaid Markup	-	-	-	-
Stock Payments	(434)	(127)	-	-
Total Debt Increase/ (Decrease)	27	57	249	301

*Includes release of PKR~21bln in respect of previous year zero-rated outstanding claims.

**PKR~346bln is receivable from KE as of Jun'23 pending due to subsidy dispute between KE and GoP.

Local | Recalibrating Circular Debt

Circular Debt Management Plan (CDMP) 2021-23

- The Government has devised a comprehensive two year Circular Debt Management Plan to curtail the growing circular debt at PKR~2,310bln FY23 level (i.e., zero debt accumulation in FY24) and includes budgeted subsidy of PKR~976bln (~0.9% of the GDP) to the power sector during the year including direct support of PKR~584bln (~0.6% of GDP) and circular debt stock payments of PKR~392bln (~0.4% of the GDP) [PHPL principal settlements of PKR~82bln and payments to IPPs/ GPPs to the tune of PKR~310bln]. Under the IMF SBA, in Jan'24, following key measures were established in order to achieve these targets:
 - Continued timely alignment of tariffs with cost recovery levels.
 - Collections enhancement. Under-recoveries are expected at PKR~263bln (~0.3% of GDP) for FY24. Enhanced collection efforts initiated in Sep'24 will complement tariff increases.
 - Further progress on reforms to improve input prices, moving towards private sector management of DISCOs through long-term concession from FY24 and renegotiating the terms of remaining power purchase agreements (covered later).
- The CDMP was formulated when the currency parity stood at USD~296/PKR and gained approval from the federal cabinet after NEPRA's endorsement of tariff re-basing in Jul'23 (covered later). Despite this, circular debt swelled further in 3MFY24, mostly due to lower recoveries, driven in part by a delay in the rebasing's billing application.

IPPs | Amendments to the PPAs

- IPPs, falling under pre-1994/2002 and renewable energy 2006 policies, agreed to renegotiate Power Purchase Agreements (PPAs) with the GoP in Aug'20, which was expected to result in cost savings of ~1.8% of the GDP over the next two decades of remaining life of these IPPs. These agreements sought to reduce capacity payments by lowering – and converting into domestic currency – the Return on Equity (ROE) and sharing excess returns on operational and maintenance expenses from contractual efficiencies.
- In return, the GoP agreed to settle outstanding arrears to these IPPs, of which it scheduled to pay two-fifth by End-May'21 and the remainder for Aug'21. Thereafter, the stock of CPPA-G payables to power producers was expected to decline through a payment of up to PKR~180bln by End-May'21.

Local | Recalibrating Circular Debt

IPPs | Amendments to the PPAs

- Despite resolving the PKR~180bln payment by May'21 to 47 IPPs, there were delays in the matter subject to NAB investigation against 12 IPPs falling under the 2002 Policy. The GoP, therefore, had to pay PKR~400bln to these IPPs by Dec'21. As of Jun'21, Power Division, in coordination with the SBP, paid ~40% as first instalment to 20 IPPs amounting to PKR~89.2bln, out of the total PKR~400bln committed under the settlement agreements. The instalment included payments through cash, PIBs and Sukuks and were adjusted in subsidy claims of FY21. An additional PKR~139bln was later approved by the ECC in Nov'21, taking the aggregate disbursed to PKR~225bln.
- Moreover, the ECC approved PKR~64bln (~40% of the outstanding amount) in Jan'22 to the IPPs falling under 2002 policy, whereas PKR~96bln was cleared as second instalment payment (remaining ~60%) in Jun'22. Both these tranches included equal part payments (i.e., ~33.3%) via cash, floating PIBs and Sukuks.
- For FY24, the GoP has planned to clear PKR~310bln for IPPs and GPPs with revised PPA terms, using the established contract structure (10-year floating rate PIBs and 5-year Sukuks in equal parts, or a more efficient financial instrument). As aforementioned, the IMF, per Pakistan's first successful review (Jan'24) of the 9-month SBA (signed in Jun'23), still has in place the mandate for GoP to renegotiate the remaining PPAs. However, the issue of Chinese IPPs in this regard remains unresolved.

Local | Policy Framework

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 decarbonization 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 consumer affordability.

Indicative Generation Capacity Expansion Policy (IGCEP 2022-31)

- The **IGCEP 2022-31**, developed by NTDC and approved by NEPRA in Feb'23, is to act as a primary document for *adding new capacity for generation* to meet future electrical demand in a scientific and systematic manner.
- The document, covering a horizon of 10 years and to be revised annually, builds on the plans laid down by the preceding iteration and proposes a gradual shift from an energy mix heavily dominated by imported fossils like Coal, Furnace Oil and RLNG towards one pillared by indigenous sources of energy, including Hydel, Thar Coal, Wind and Solar. Moreover, it targets utilization of indigenous and renewable Energy resources for generation of low cost, environment-friendly electricity.
- Furnace oil is expected to be phased out by CY31. Similarly, electricity generation from RLNG and Imported coal will drop to 2% and 8%, respectively, in 2031. At the same time, there will be a substantial increase in the electricity generated by hydel, wind and solar PV. The contribution of hydel, wind and solar PV which currently stands at ~28%, ~4% and ~1% respectively will be increased to ~39%, ~10% and ~10% respectively, thereby increasing the total share of green electricity to ~59%.
- Out of ~120 countries, Pakistan was ranked 107 on the Energy Transition Index (ETI) in CY23, with ETI score of 46.9, reflecting lack of sufficient initiatives aligning with the country's commitment to energy transition efforts. A further bifurcation of this score reveals that with respect to System Performance (SP), the country's score recorded at 55.2, whereas on the Transition Readiness (TR) indicator, it scored 34.5. TR includes factors such as skilled workforce, innovation and physical and digital infrastructure.

Policy Framework | Recent Developments

▪ **National Electricity Plan 2023-2027 (First Plan)**

- The plan outlines the implementation framework for National Electricity Policy 2021 under the umbrella of 6 overarching objectives that include diversification, resilience & accessibility, self-sufficiency, affordability, financial viability and sustainability.
- It also includes a tangible action plan covering 20 priority areas including investments, subsidies, fiscal incentives, regional integration, localization, digitalization, tariff design, climate change mitigation, governance, research & development, and capacity building.

▪ **Fast Track Solar PV Initiatives 2022**

The main objectives of these initiatives are as follows:

- Substitution of expensive imported fossil fuels used for power generation with Solar PV energy deployments.
 - Utilization of existing transmission networks to the maximum for offtake of electric power for Federally-owned public power utilities (FPU's).
 - Easing the pressure on foreign exchange reserves through reduced reliance on imported fossil fuels.
 - Solarization of Public Buildings.
 - Solar PV Generation on 11 kV Feeders
- In continuation with the above, the GoP has set the target for renewable energy share to 20% by 2025 and 30% by 2030 according to the ARE Policy, 2020, in order to bring down high prices of electricity and ensuring sustainable use of resources.
 - Moreover, a total of ~20,846 FIRs have been registered during FY23 in the matter of electricity theft, while PKR~1,503mln was recovered from anti-theft campaigns. To increase the base of electricity consumers, a total of ~1,468,865 new connections were installed during FY23.

Policy Framework | Recent Developments

- As per AMI Roll out plan in DISCOs, 1,064,448 AMI meters are to be installed till June-2025. Aerial Bundled Cable (ABC) is another project to control and pre-empt illegal connections through direct hooking thereby controlling the menace of *kundas* and reducing line losses in high losses areas. PESCO and SEPCO have already started installation of these cables.
- Installation of Asset Performance Monitoring System (APMS) has been initiated on distribution transformers for:
 - i. Real-time control
 - ii. Energy audit
 - iii. Theft control
 - iv. Targeted commercial load shedding
 - v. Protect transformer against overloads and short circuits.
- Apart from large scale solar PV projects, the Government of Pakistan also encouraged utilization of solar energy technology at consumer end across domestic, commercial, industrial sectors. As of Jun'23, the number of Net-Metering based solar installations reached up to ~63,703 with a cumulative capacity of ~1,055.03 MW. During FY23, the addition in number of Net-Metering based solar installations amounted to ~33,472 with capacity addition of ~546.93 MW.
- As per IMF directives pertaining to the Staff-Level Agreement (SLA) of Jul'23, the federal government raised the base tariff of electricity across the country by PKR~4.96/unit w.e.f. July 01, 2023, taking the base tariff to PKR~29.78/unit. Moreover, NEPRA was directed to continue with automatic notifications of regular QTAs and FPAs in line with established formulas in a timely manner, supported by efforts to spare the protected slabs (with the aim of efficient cost recovery and progressivity of tariff structure for residential consumers).
- The Government of Pakistan (GOP) also launched the Alternative and Renewable Energy (ARE) Sector in CY19 in order to increase the usage of ARE technologies (ARETs) in Pakistan. Apart from guaranteeing affordable and universal electricity access nationwide, ARE also commits to expanding its portion of the country's energy supply mix. The Ministry of Energy (Power Division) and key stakeholders collaborated to create the ARE Policy 2019, which further leverages the GOP's strategic objectives of energy security, affordable and universal access to electricity, environmental protection, sustainable development, social equity and climate change mitigation.

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Local | Business Risk

This Sector Study focuses on the Business & Financial Risk of Independent Power Producers (IPPs) (majorly thermal).

Plant Performance Risk: This includes, but is not limited to, plant availability, dependable capacity, efficiency measured in terms of electricity generated per type of fuel, penalty payments under the PPA, higher operational costs and loss of revenue due to breakdown of machinery.


Completion & Performance Risk: Completion Risk is the pre-COD risk related to the physical construction of the power plant and process parameters. Performance Risk, although begins even before COD, generally refers to the challenges relating to the operations & maintenance of the power plant post-COD.

Fuel Supply Risk: In the event of non-performance of an FSA, the IPPs may be subject to operational risks due to underutilization or even closure of plants. This can further include risks associated with supply of fuels, distance from the source, reserve availability, contractual obligation of the seller and price of supply. In the latest PPAs, the GoP does not guarantee the fuel supplier's obligations. For renewable sources, risks may include wind speed, solar irradiation and availability of sufficient crop for bagasse.



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Local | Financial Risk



Off-taker Risk: IPPs operate in a single buyer market (CPPA-G/K-Electric). Although, dependence is concentrated on one Entity, the obligations of the off-taker are protected by a Sovereign Guarantee through the Implementation Agreement. This acts as a mitigant to the financial risk relating to the off-taker.

Working Capital Financing: This risk emanates from the same factor as for liquidity risk. Volatility in recoveries from the off-taker balloons the receivable days for the IPPs – a component of the CD. Resultantly, IPPs are forced to obtain STBs to manage their Working Capital Needs, exerting pressure on their debt burden.

Liquidity Risk: The DISCOs are subject to risk of non-payment by consumers which results in delayed payments to power purchaser ultimately creating volatility in cash payments to the IPPs. Any extended delays in payments compels the IPPs to obtain Sponsor Loan or external funding (short-term borrowing).

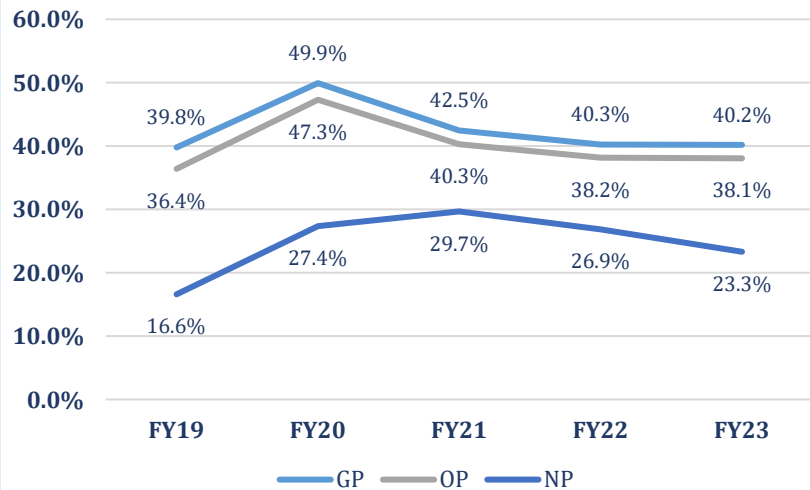
Coverages & Capital: The minimum equity requirement for IPPs is ~20% of the project cost, the other component being debt. The IPPs, therefore, have a high exposure to External Funding. Financing Structure, including Minimum Debt Service Coverage Ratio, debt to equity movement and debt repayment schedule is critical.

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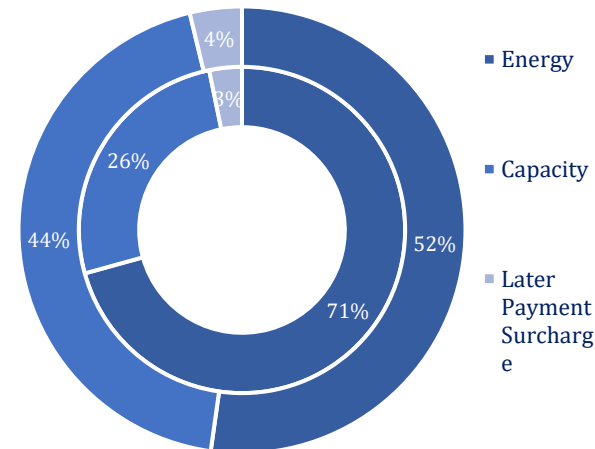
Business Risk | Margins

- Revenue comprises energy and capacity purchase prices resulting from sale of electricity to the CPPA-G. These payments are based on the output delivered and capacity available at rates as specified under Power Purchase Agreements (PPAs), as amended from time to time. Energy payments further comprise fixed and variable fuel costs.
- A breakdown of the revenue reveals that energy and capacity payments comprised ~96% of the overall revenue earned, with the mix staying relatively stable when compared against SPLY. Moreover, raw material comprised ~47.4% of the total costs incurred by the Sector (SPLY: ~56.9%), whereas energy made up ~26.9% in FY23 (SPLY: ~28.1%). Depending on the type of fuel used, raw material usually includes coal, furnace oil, HSD, RLNG and others.
- While average ROE in FY23 remained largely stable compared against the previous year, the free cash flow generated from sales declined, likely on account of lower recoveries and slow pass-through impact of revised tariffs.

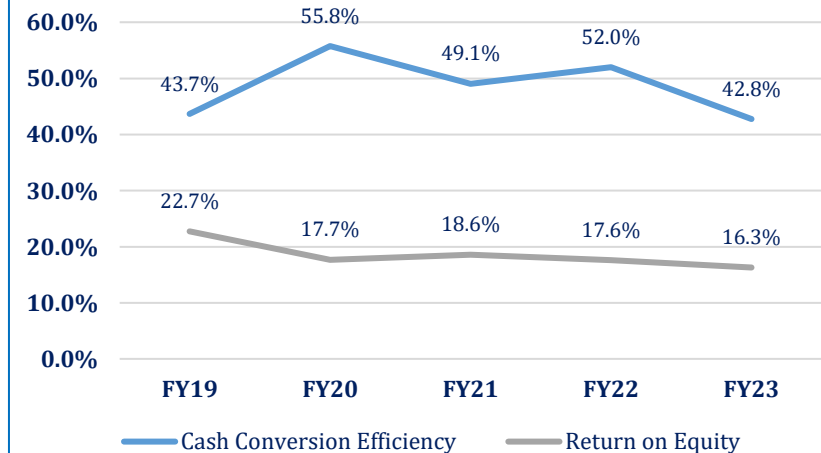
Margins



Revenue Breakdown | FY23 (Outer), FY22 (Inner)



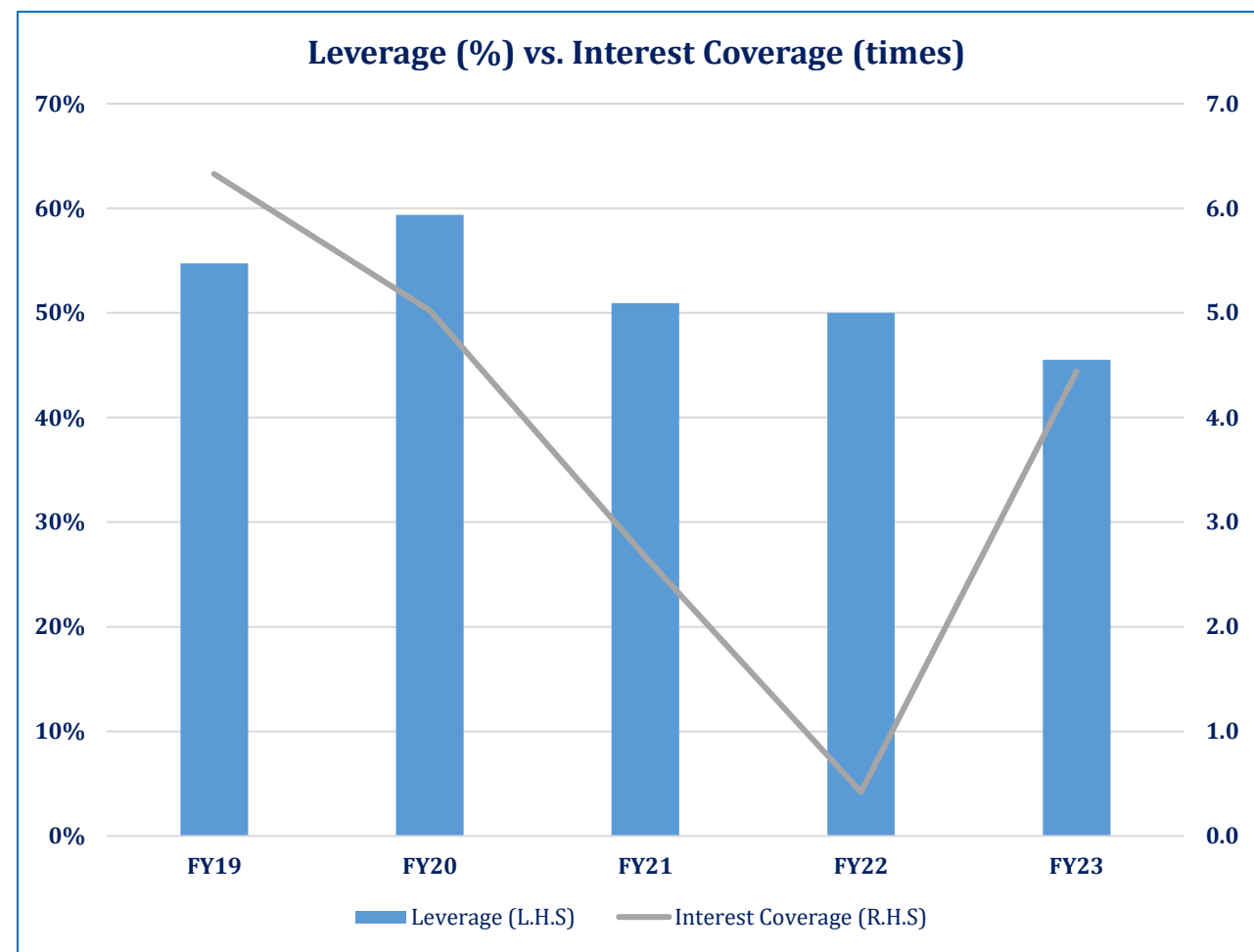
Efficiency Ratios (%)



Financial Risk | Leverage & Interest Coverage

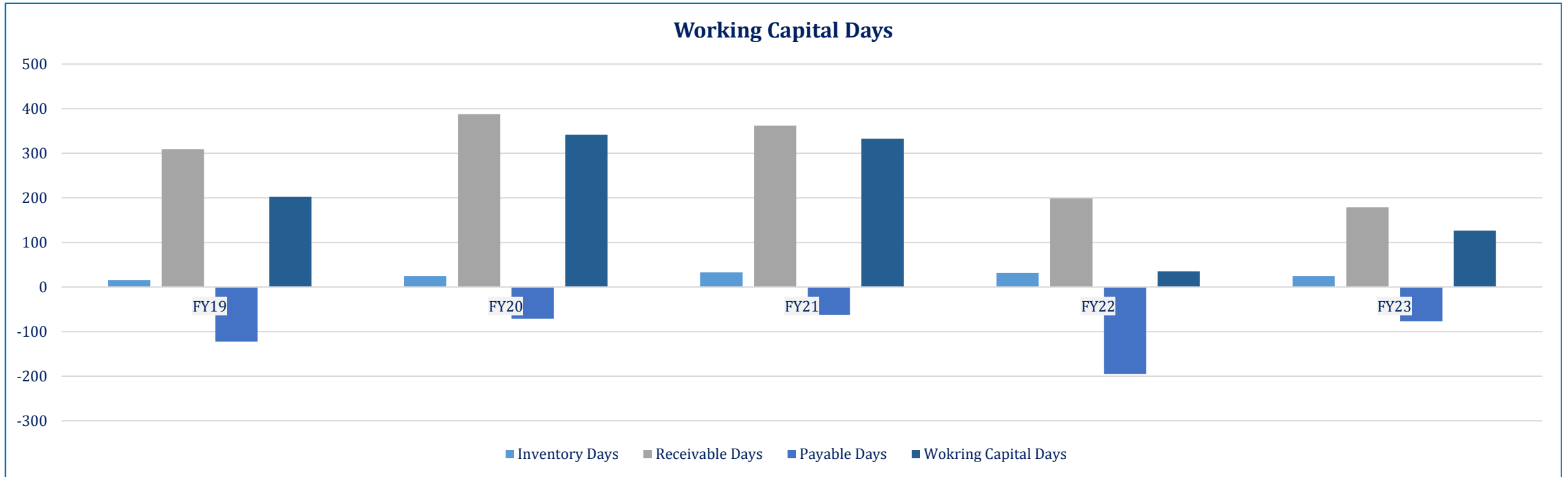
The debt servicing capacity of the IPPs has improved over the years due to a decrease in finance cost resulting from the decline in borrowing as significant portion of long-term debt of IPPs has been paid off.

The total leverage of the Sector went down from ~52% in FY17 to ~50% in FY22 and further to ~46% in FY23, reflecting lower reliance on borrowing on the back of cash flow being generated vis-à-vis regular payments by the power purchaser.



Note: Data is reflective of ~36 rated sector players from FY22 onwards. For the previous years, data is reflective of ~29 rated players.

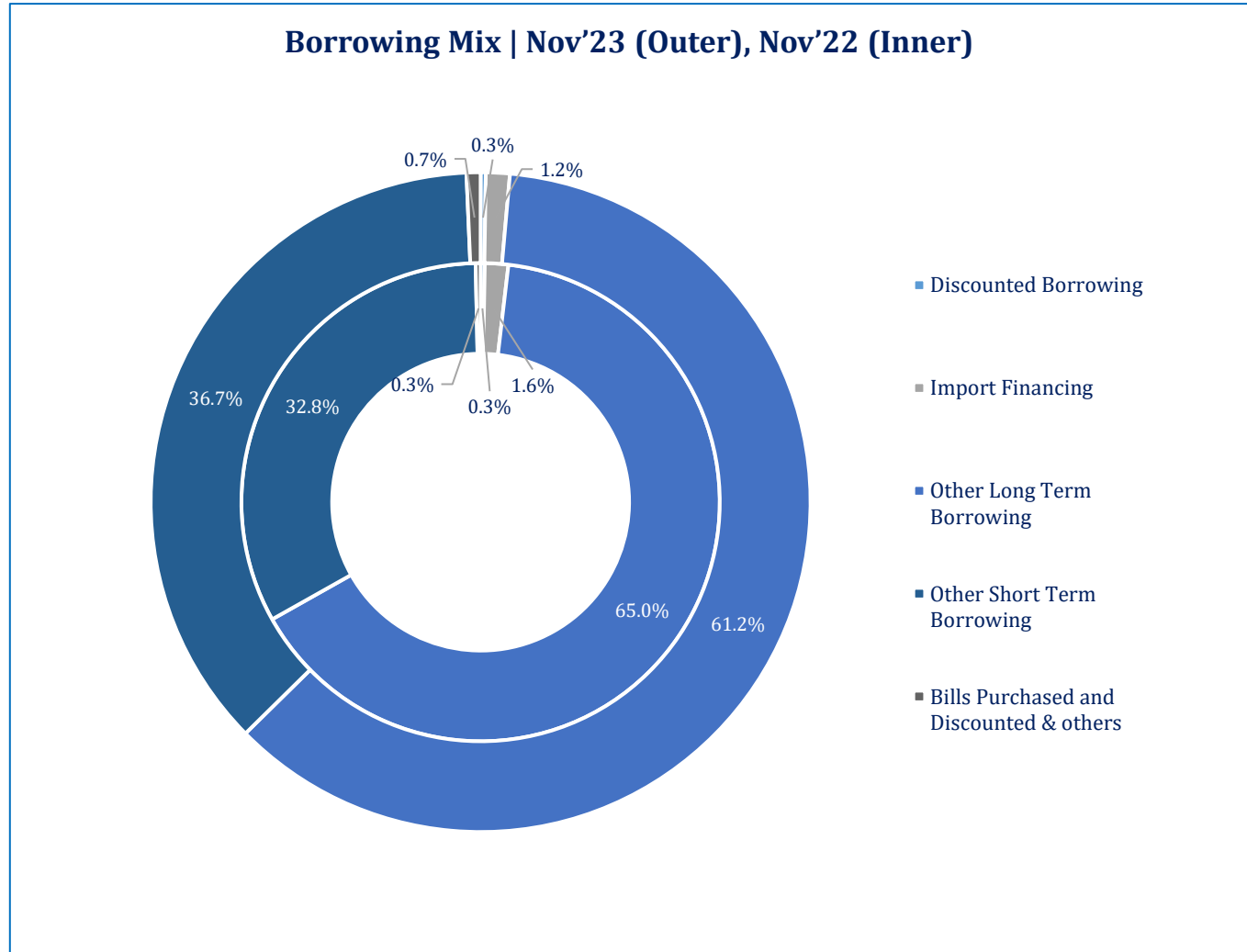
Financial Risk | Working Capital Management



- The Working Capital Cycle of IPPs is largely a function of their receivables and payables.
- In FY23, average receivable days in the power sector fell ~10% YoY, signifying better receivable management by the Sector. The sector players frequently receives payments from CPPA-G. The payable days also decreased to ~77 days from ~179 days showing a better prospect for loan repayment of the sector.

Financial Risk | Borrowing Mix

- The total borrowing of “Electric Power Generation, Transmission and Distribution” (as per SBP) stood at PKR~496,907mln as of End-Nov’23 (SPLY: PKR~581,876mln), down ~14.6% YoY.
- The largest component of borrowing is other long-term loans which constitutes ~65.0% of total borrowing and stood at PKR~322,938mln (PKR~356,152mln End-Nov’22).
- Working Capital component is ~34.8% of the total borrowing and stood at PKR~172,744mln as of End-Nov’23.
- 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 (wind and solar, excluding Hydel) stood at PKR~67,204mln as at End-Nov’23, forming ~13.5% of the total outstanding loans in the power sector.



Financial Risk | Borrowing Mix

Fuel-wise Borrowing	Total Borrowings		YoY Change (%)	Short-term Borrowing			Long-term Borrowing		Foreign Bills Discounted
	Nov'22	Nov'23		Import Financing	EFS	Other Short-term	LTFF	Other Long-term	
Hydel	38,357	18,598	-51.5%	0	0	6,920	0	11,679	0
Thermal	164,410	126,819	-22.9%	1,150	0	64,890	0	58,748	0
Coal-based	109,341	113,013	3.4%	0	0	31,224	81	53,921	0
Wind	67,984	57,740	-15.1%	0	0	1,279	0	55,115	0
Solar	8,037	9,284	15.5%	0	0	982	1	8,113	0
Other*	193,747	171,453	-11.5%	6,696	484	50,406	828	106,327	315
Industry Total	581,876	496,907	-14.6%	7,845	484	155,701	910	293,903	315

POWER

SWOT Analysis

- Backbone of the economy.
- Players operate in a regulated environment.
- Low business risk due to risk mitigating factors such as sovereign guarantees on payment by purchaser and Performance Guarantees by the Contractors.



- Single Buyer Market with two generation baskets, creating inefficiency in the generation system.
- Under-utilization of efficient plants: GENCOs efficiency scale has deteriorated over the years.
- Low Available Capacity Factor.
- Delay in commissioning of cheap indigenous fuel power plants.
- Weak governance of DISCOs.

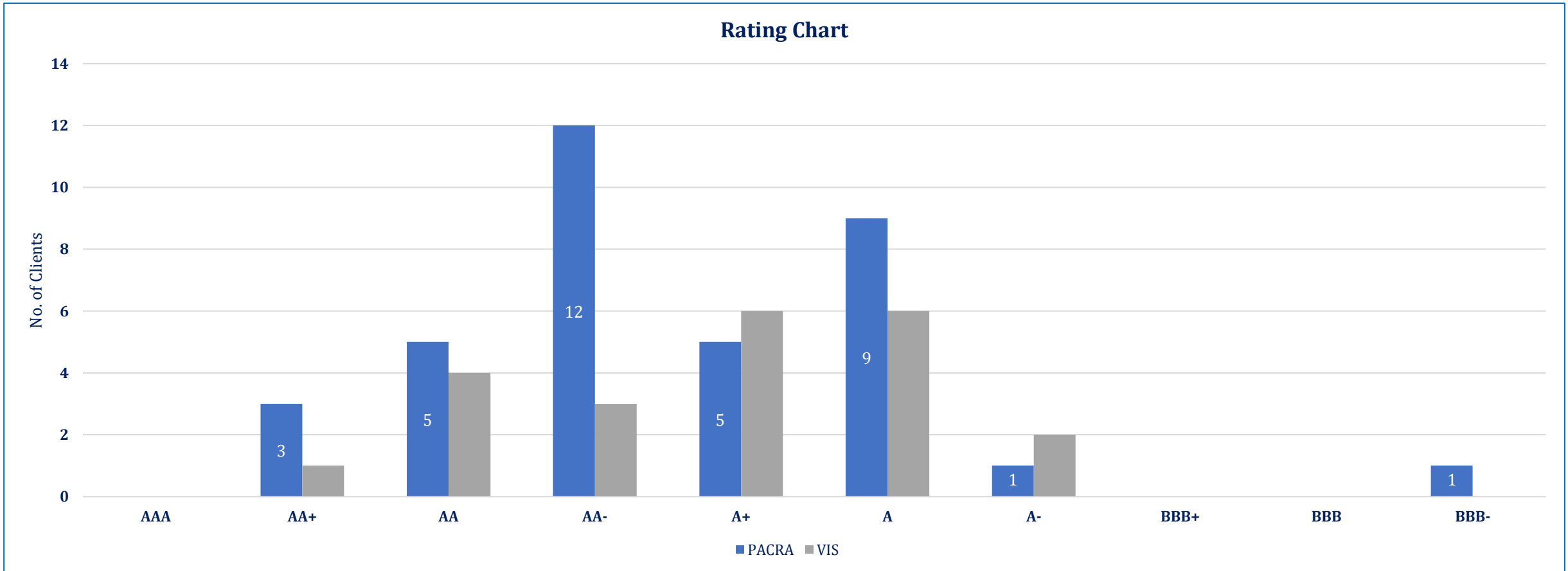
- Circular debt pile-up.
- T&D Losses weakening the financial discipline of power supply chain.
- Liquidity Damages (LDs) on account of non-performance of FSA.
- Change in regulatory environment leading to lower/or no guaranteed off take for new plants and change of terms for existing ones.

- 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.
- Exploration of Coal reserves leading to significant coal based power projects; coal is a cheaper fuel of energy.
- Investments in the Hydel and Renewable Energy Power plants.

POWER

Rating Curve

- PACRA rates 36 entities in Pakistan’s Power Sector, in the rating bandwidth of AA+ to BBB-.



Outlook: Stable

- Pakistan's Power Sector has been confronting deep-rooted issues since long, with key risks being weak financial discipline and inefficiencies across 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. A shift is being observed, away from thermal sources (~69% share in FY19 to ~60% in FY23) and towards renewables (~3.6% share in FY19 and ~4.6% in FY23). However, the country ranks 107 (out of 120 countries) on the global Energy Transition Index (ETI) in CY23, with ETI score of 46.9, reflecting lack of sufficient initiatives aligning with the country's commitment to energy transition efforts.
- Other major bottlenecks comprise high circular debt that stood at PKR~2.3tn in FY23, a YoY build-up of PKR~57bln. Payable to IPPs form ~60% of these delayed payments (T&D losses and delayed payments by the GoP as tariff subsidies contribute to the accumulation as well), under-utilization of "Take or Pay" power generation capacity leading to increasing capacity payments by the CPPA-G, increasing tariffs for the customers (inclusive of QTAs/ FCAs), which leads to lower recoveries by the DISCOs, especially in the presence of high inflationary pressures and dependence on imported fuel.
- The IPPs falling under pre-1994/2002 and renewable energy 2006 policies agreed to renegotiate Power Purchase Agreements (PPAs) with the GoP in Aug'20, which was expected to result in cost savings of ~1.8% of the GDP over the next two decades of remaining life of these IPPs. In exchange for reducing capacity payments, the GoP agreed to settle outstanding arrears to these IPPs, all of which were paid by FY21-23.
- For FY24, the GoP has planned to clear PKR~310bln for IPPs and GPPs with revised PPA terms, using the established contract structure (10-year floating rate PIBs and 5-year Sukuks in equal parts, or a more efficient financial instrument). As aforementioned, the IMF, per Pakistan's first successful review (Jan'24) of the 9-month SBA (signed in Jun'23), still has in place the mandate for GoP to renegotiate the remaining PPAs. However, the issue of Chinese IPPs in this regard remains unresolved.
- Although Pakistan's generation capability is now sufficient to meet its demand, it is essential to strengthen and expand the T&D network of the country in order to achieve optimal utilization of the generation capacity. Creating demand generation is another need. 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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