



RENEWABLES FIRST

# PAKISTAN E ELECTRICITY REVIEW 2024

**Analysis Lead**

Rabia Babar

**Report Coordinator**

Huma Naveed

**Reviewer**

Muhammad Mustafa Amjad

**Acknowledgment**

We would like to extend our appreciation to Sohaib Malik, an energy analyst at a European Renewable Energy Company, for his valuable contribution to the external review.



We extend our sincere acknowledgment to Herald Analytics for partnering with us in the collation of data and insights.

**Disclaimer:**

All the information and analysis provided in this document are accurate and to the best of our knowledge and understanding, in case you identify any error, feel free to reach out to us at: [info@renewablesfirst.org](mailto:info@renewablesfirst.org)

**© Renewables First**

You are actively encouraged to share and adapt the report. Please cite as **“Renewables First, “Pakistan Electricity Review”, 2024, [www.renewablesfirst.org](http://www.renewablesfirst.org)**



# Pakistan Electricity Review 2024

The Pakistan Electricity Review 2024 report aims to improve technical accessibility and awareness of critical aspects of power generation, transmission, and consumption. Focusing on the Fiscal Year 2022-23 (FY23), this thorough analysis also explores key aspects such as K-Electric (KE), Circular Debt, and China-Pakistan Economic Corridor (CPEC) projects. The report utilizes publicly available data for the power sector, with NEPRA's State of Industry Report (SIR) and Energy Yearbook serving as primary data sources.

# Contents

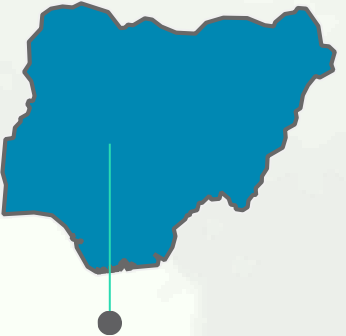
- 1 Global Electricity Trend**
- 2 Primary Energy Supplies**
- 3 Key Highlights**
- 4 Power Sector Overview**
  - Generation
  - Transmission
  - Distribution
- 5 Power Projects Added in Generation Fleet**
- 6 Case Studies**
  - K-Electric
  - CPEC Projects
  - Circular Debt
- 7 Financial Overview**
- 8 Outlook**
- 9 Abbreviations**



# Global Electricity Trends:

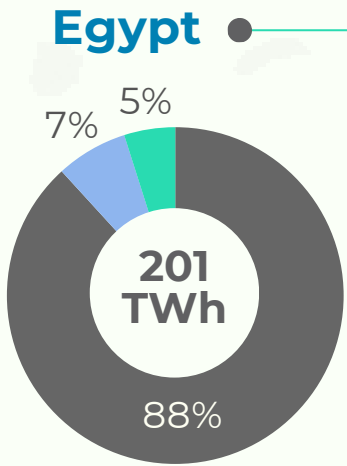
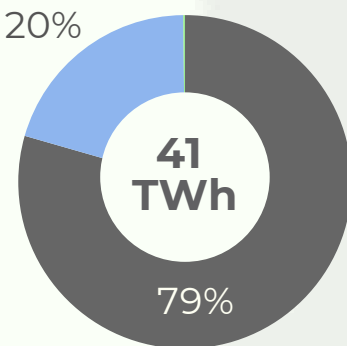
## Fossil Fuels, Renewables, & Growth

(Data Source: Ember-Climate 2023, World Bank, SIR 2023, RF Calculations)



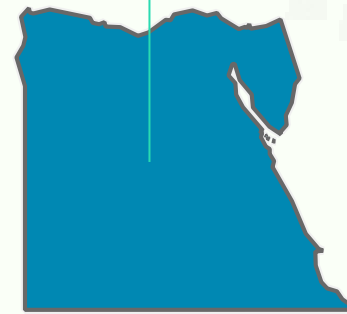
**Nigeria**

GDP Growth	2.9%
Population	224M
Generation (per capita)	182 kWh



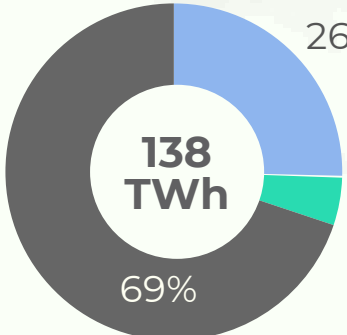
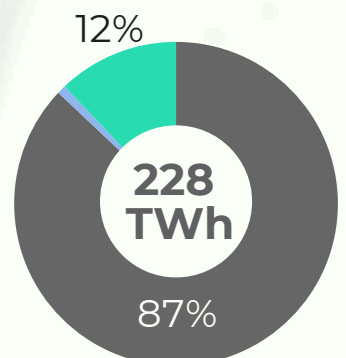
**Egypt**

GDP Growth	3.8%
Population	113M
Generation (per capita)	1783 kWh



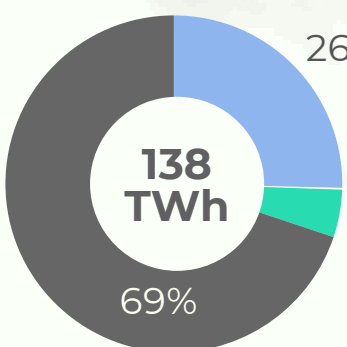
**South Africa**

GDP Growth	0.6%
Population	60M
Generation (per capita)	3780 kWh



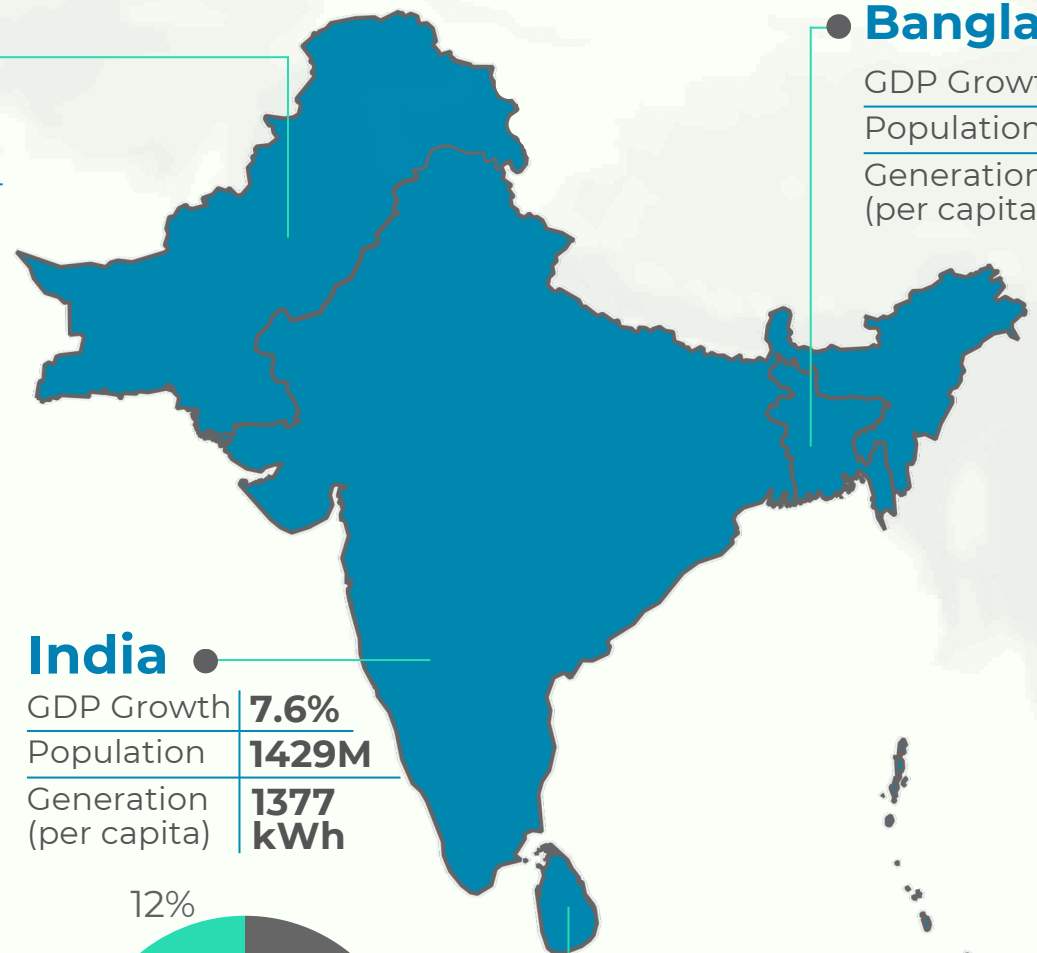
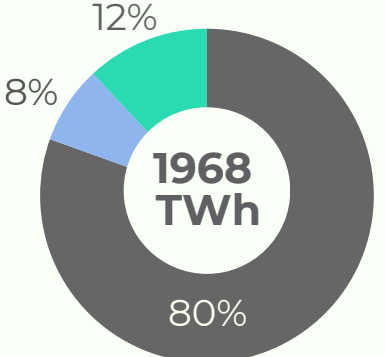
**Pakistan**

GDP Growth	-0.2%
Population	241M
Generation (per capita)	574 kWh



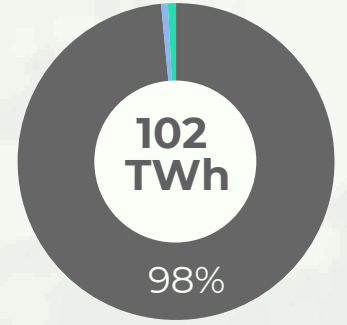
**India**

GDP Growth	7.6%
Population	1429M
Generation (per capita)	1377 kWh



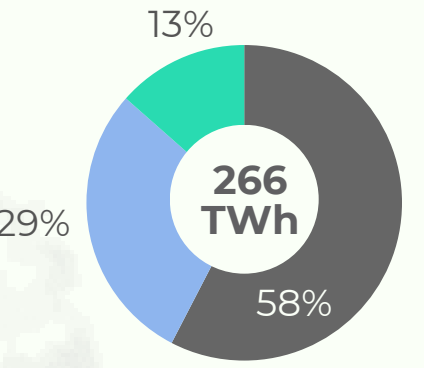
**Bangladesh**

GDP Growth	5.8%
Population	173M
Generation (per capita)	590 kWh



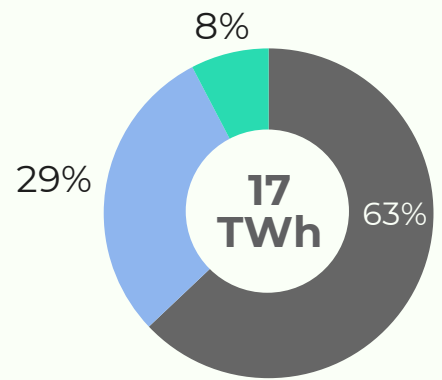
**Vietnam**

GDP Growth	5.0%
Population	99M
Generation (per capita)	2688 kWh



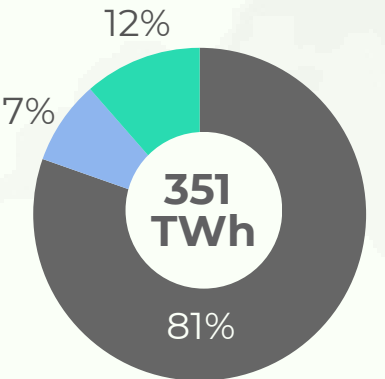
**Sri Lanka**

GDP Growth	-2.3%
Population	22M
Generation (per capita)	772 kWh



**Indonesia**

GDP Growth	5.0%
Population	278M
Generation (per capita)	1263 kWh

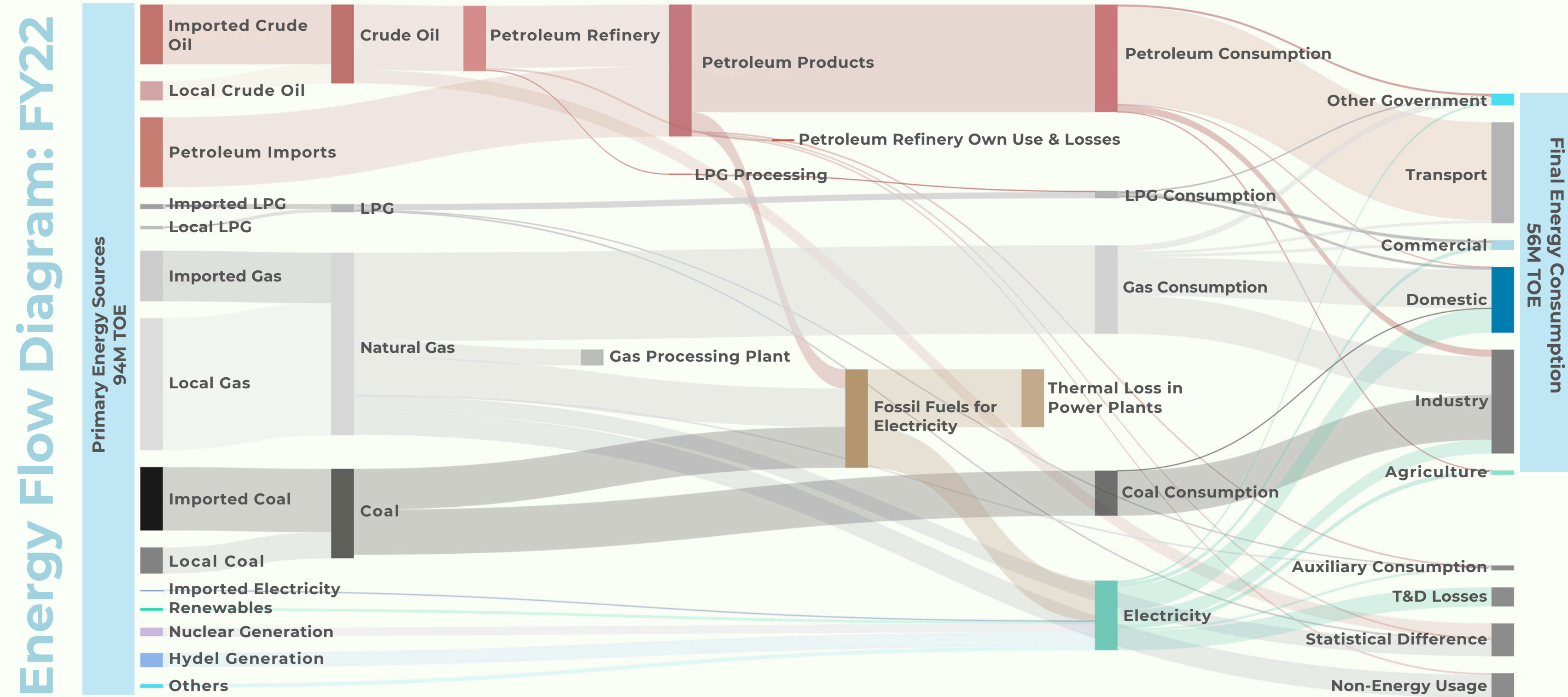


Renewables   Hydro   Fossil Fuels

# Primary Energy Supplies

Final energy consumption saw a ▼7.4% decline from the previous year, largely attributed to reduced industrial consumption. The industrial sector accounted for 35% of the total energy consumption.

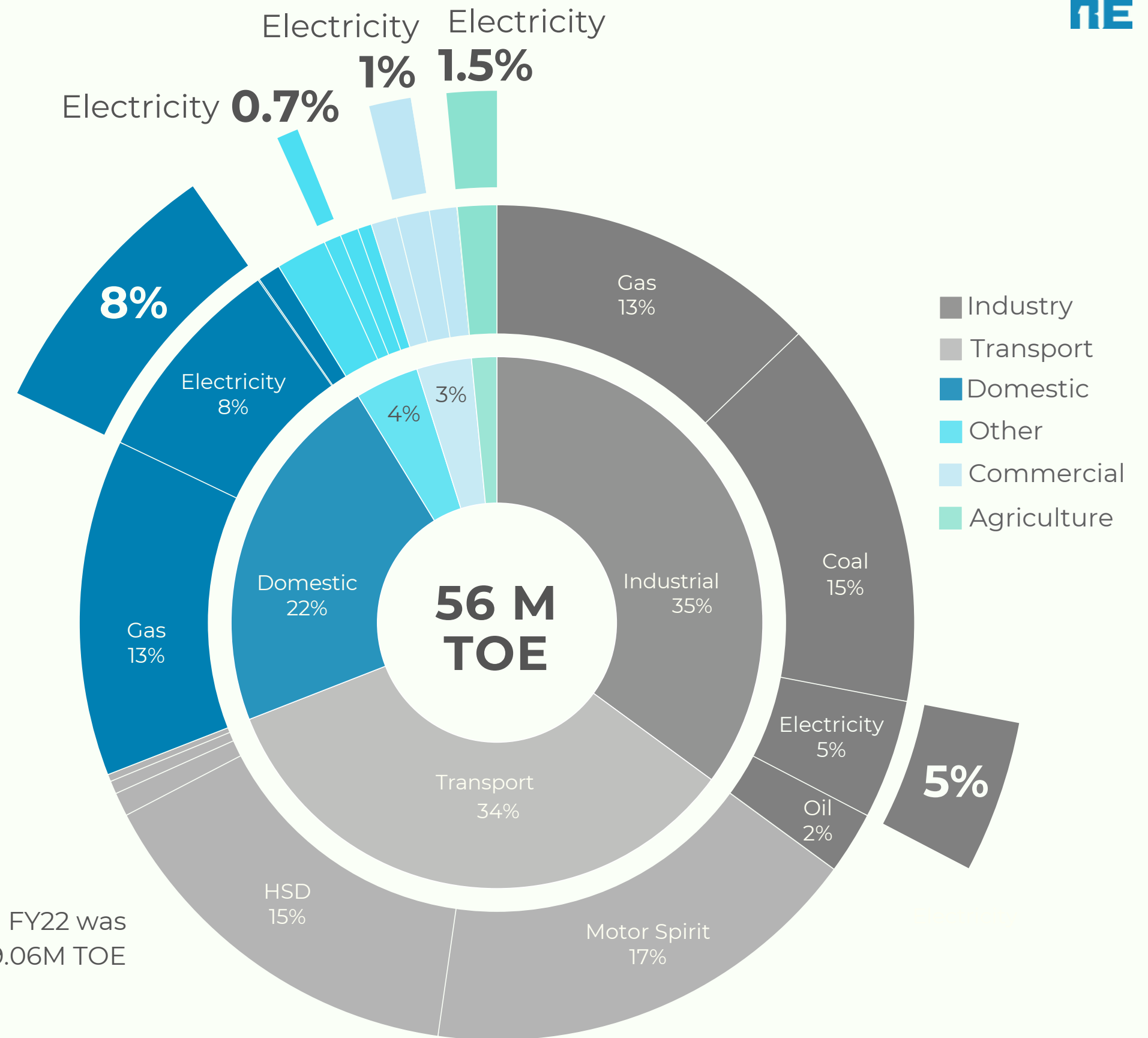
To view the interactive version, please visit the following link: <https://renewablesfirst.org/resources/pakistanelectricityreview>



## In FY22, final energy use decreased despite increased energy supplies.

Total energy supplies in the country were 94 million (M) tons of oil equivalent (TOE) with a growth rate of **▲7.9%** compared to the previous year. However, on the energy consumption end, the final energy consumption in FY22 was 56M TOE, with a decline in consumption of around **▼7.4%**.

Electricity consumption in FY22 was **16%** totaling 9.06M TOE



Energy consumption across different sectors in FY22

**Key Highlights**

## Key highlights of Pakistan's power sector FY23

The increase in installed capacity was undermined by declining electricity generation and usage, rendering excess capacity ineffective.

In FY23, there was a significant decline of ▼10.4% in electricity generation. Higher fuel costs and other macroeconomic headwinds led to increased electricity costs, resulting in a decline in electricity generation.

The ▼10.4% drop in sales in FY23 highlighted the situation's complexity. Due to high electricity costs, consumers attempted to reduce their electricity usage and increasingly turned to alternative options.

In FY23, capacity payments saw a ▲29% Year-on-Year (YoY) increase, emerging as a significant factor in driving up power tariffs across the country. By FY25, the power purchase price was forecasted to reach PKR 3.3 trillion (T) i.e. ▲17.5% YoY increase. This significant increase was expected to further escalate electricity costs in the upcoming years.

As of January 2024, the power sector's circular debt had reached PKR 2.6T. While efforts had contained it in recent years, it continued to pose a significant threat to the financial stability of the power sector.

## From generation to consumption, how we powered the year?

### Installed Capacity

45.8 GW  
▲4.7% YoY

### Electricity Generated

138 TWh  
▼10.4% YoY

### Electricity Transmitted

132 TWh  
▼5.7% YoY

### Electricity Sold

112 TWh  
▼10.4% YoY



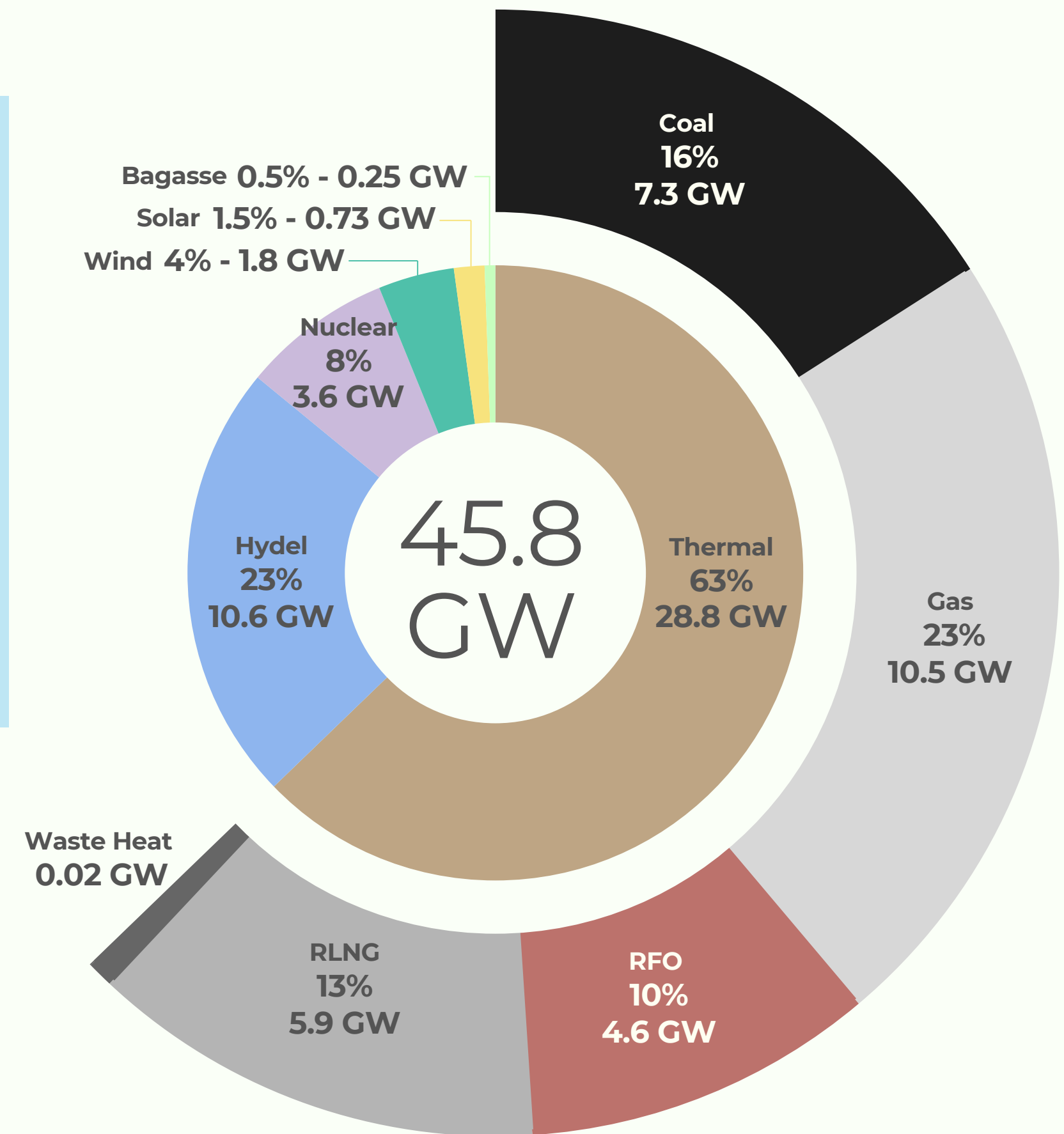
**Generation FY23**

## In FY23, Pakistan's installed capacity saw a growth of **▲4.7%** on YoY basis.

With the addition of three coal-based projects, the country's thermal installed capacity increased by **▲7.9%** YoY, reaching 28.8 GW, taking the share of thermal to 63% of the total installed capacity.

Wind energy experienced no growth, remaining flat at 1.8 GW for the past two years. In contrast, solar energy saw a minor increase of 0.04 GW during the same period.

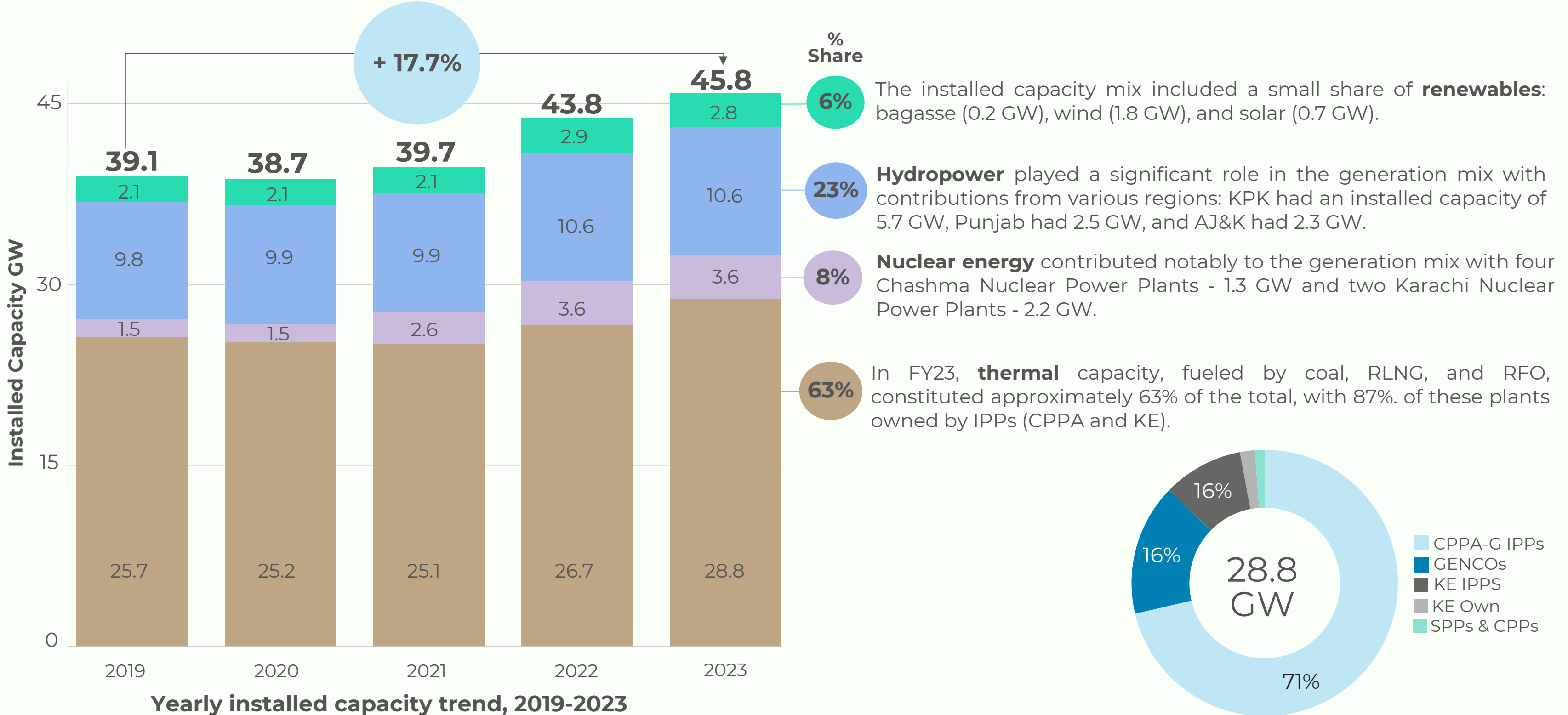
The private sector held approximately 50.2% share (23 GW) of the country's installed capacity, primarily in thermal power and under "take-or-pay" terms.



Pakistan's installed power generation capacity in FY23

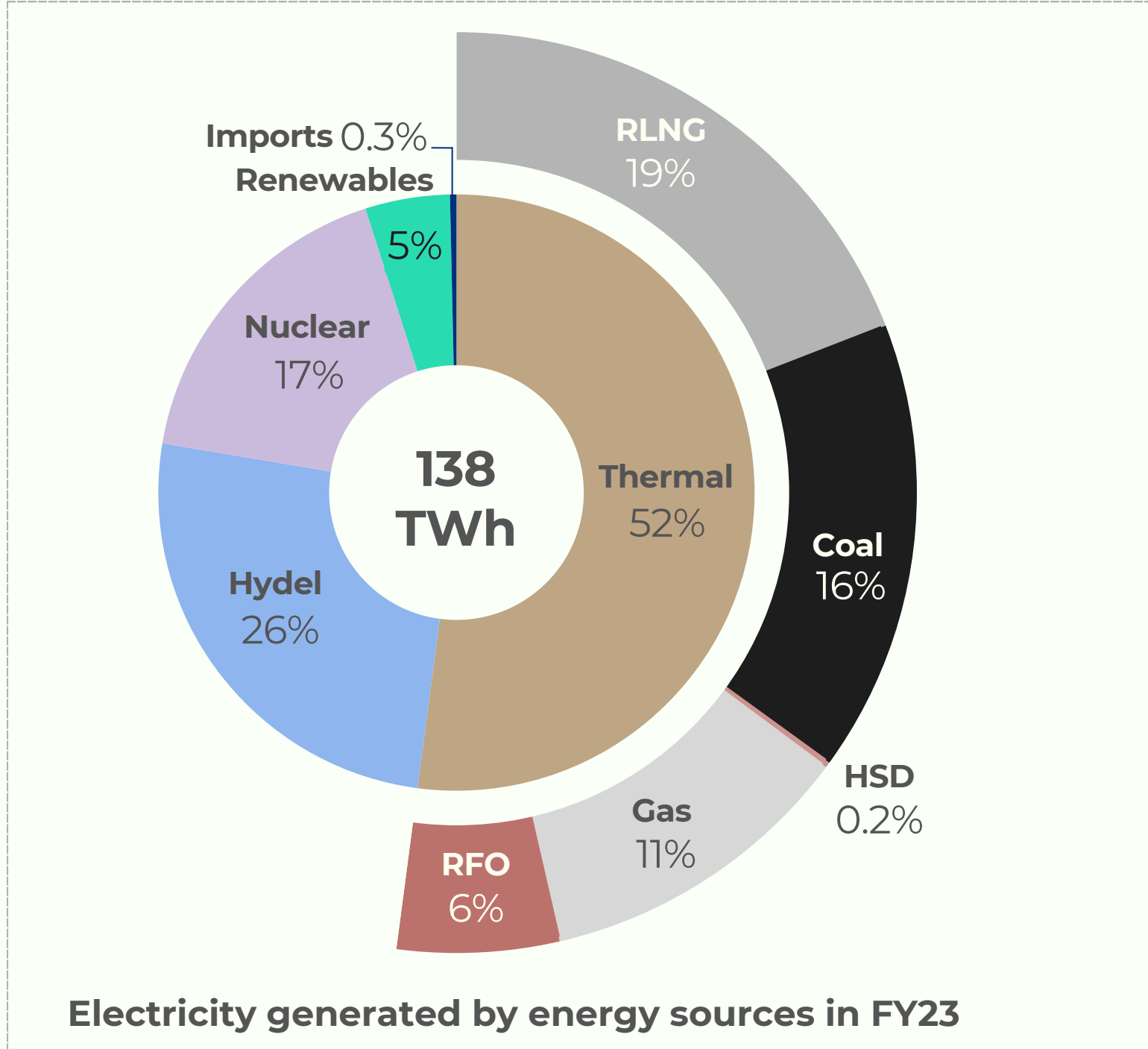
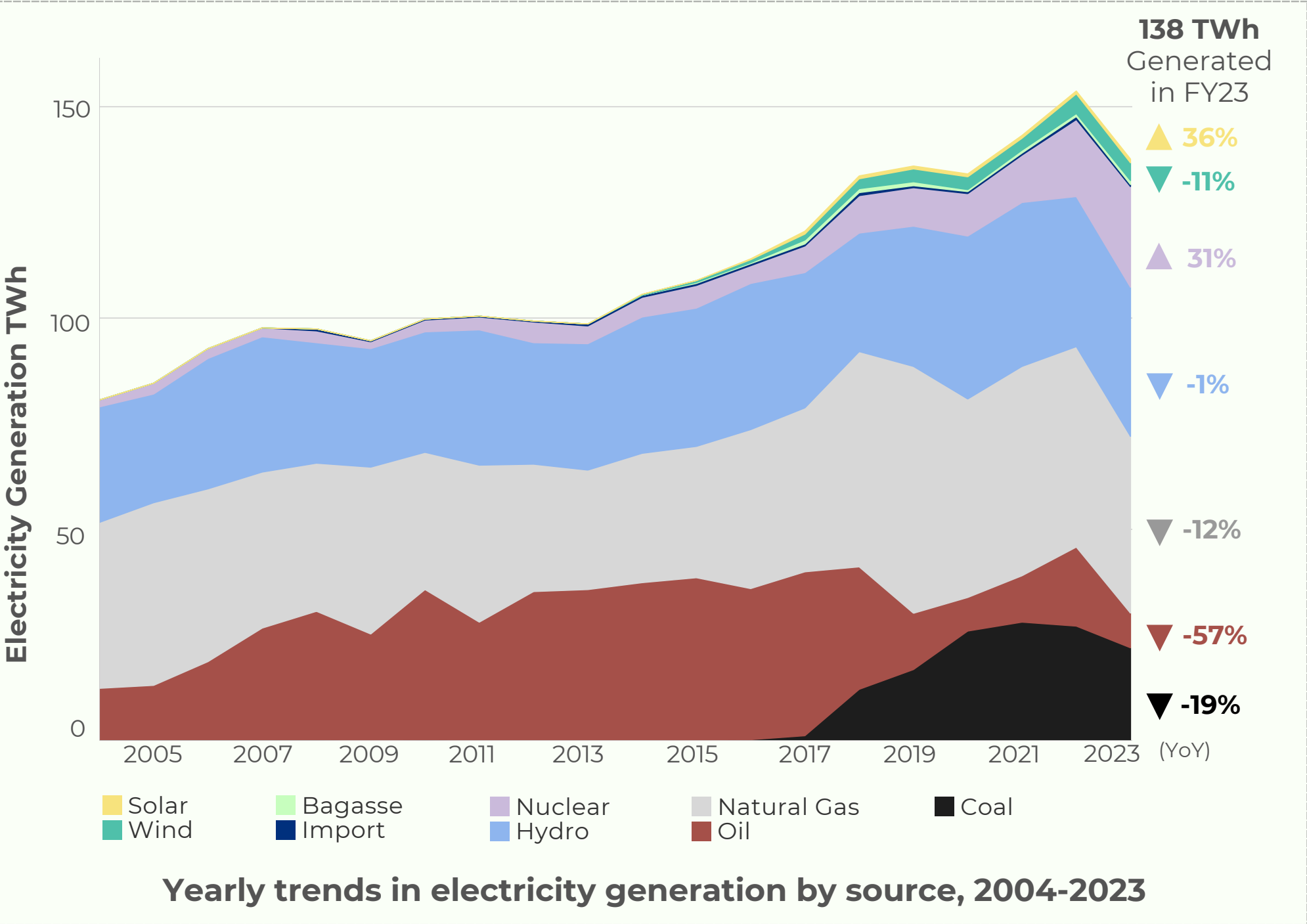


# Renewable Energy (RE) deployment remained elusive despite the government’s target to achieve 30% Variable Renewable Energy (VRE) capacity by 2030.



# Despite the growth in generation capacity, electricity generation fell by 10.4%.

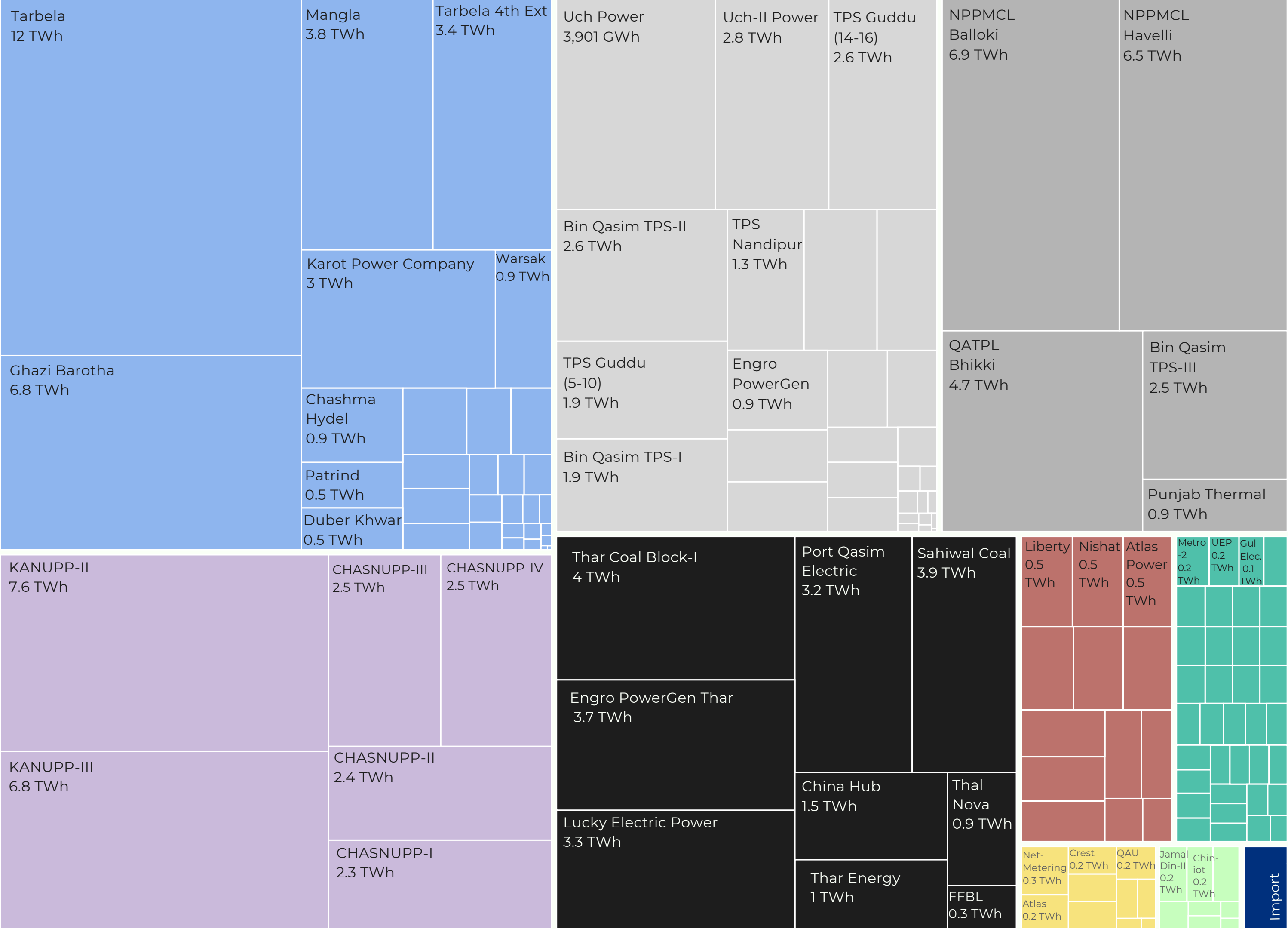
During FY23, electricity generated was 138 TWh, representing a significant decline of ▼10.4% on a YoY basis. This decline could be linked to higher fuel prices and macroeconomic stresses, following the Russia-Ukraine war, as generation from fossil fuels decreased compared to the previous year. The share of renewables, totaling 6.3 TWh in FY23, also decreased by ▼1.7% on a YoY basis.

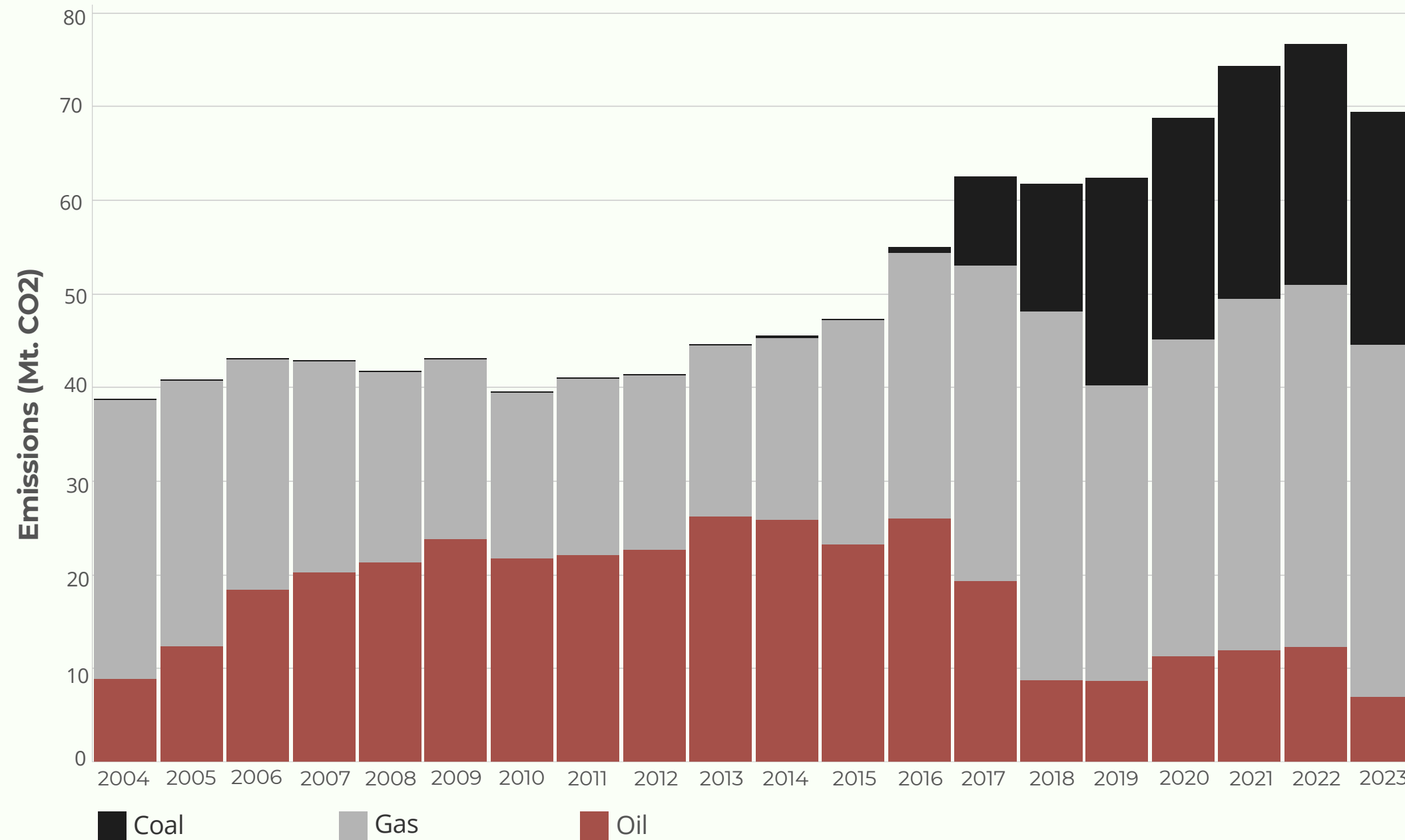
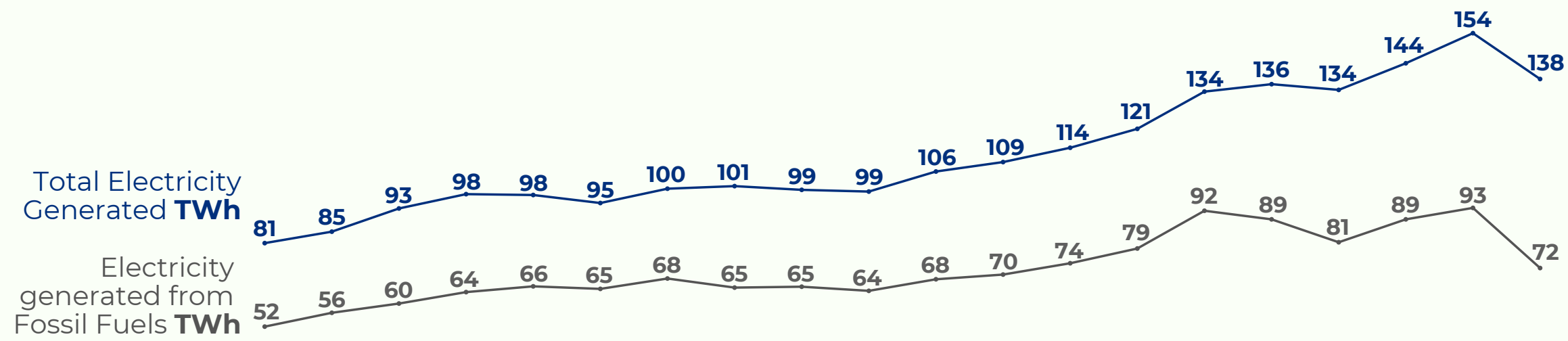




A quick look at  
where our power  
came from in FY23.

	Electricity Generation TWh	% Share
Hydel	35.2	26%
Nuclear	24.0	17%
Gas	23.6	17%
RLNG	21.4	16%
Coal	21.0	15%
RFO	5.5	4%
Wind	4.0	3%
Solar	1.3	1%
Bagasse	0.8	0.6%
Import	0.4	0.3%





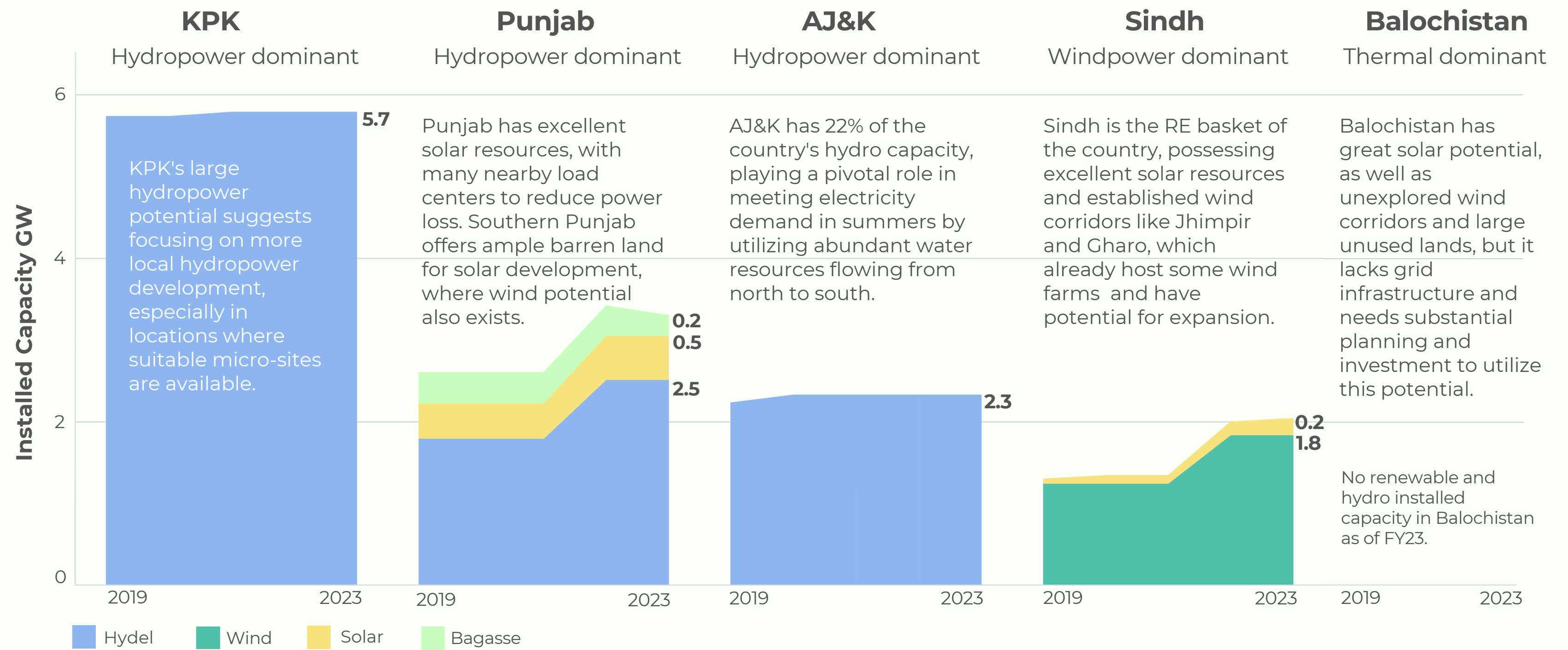
Yearly trend of electricity generation and CO2 emissions from fossil fuels, 2004-2023

## Increasing reliance on fossil fuels for electricity generation continues to contribute to higher CO2 emissions.

Over the past few years, growing use of coal in the country's energy mix has resulted in increased emissions.

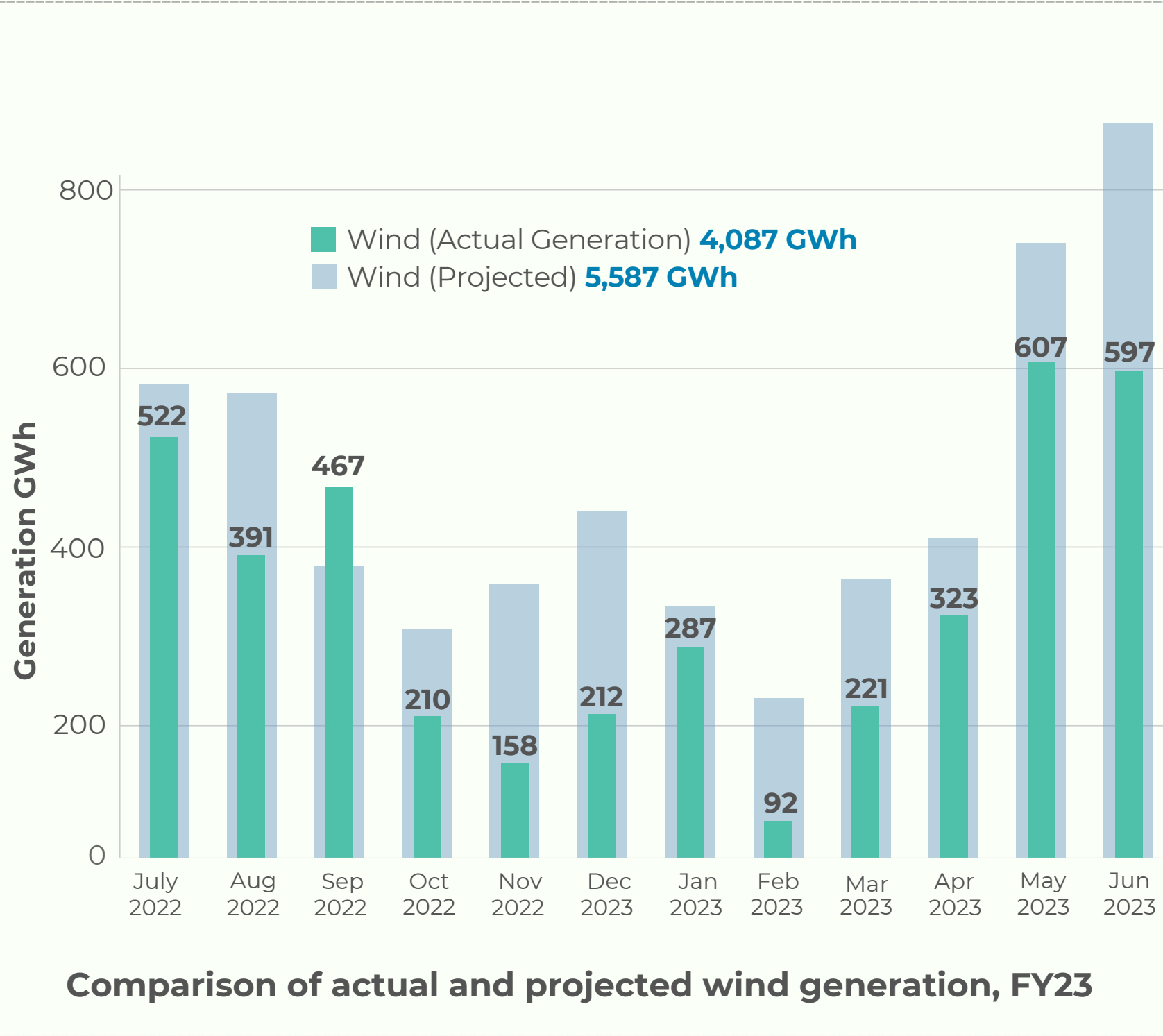
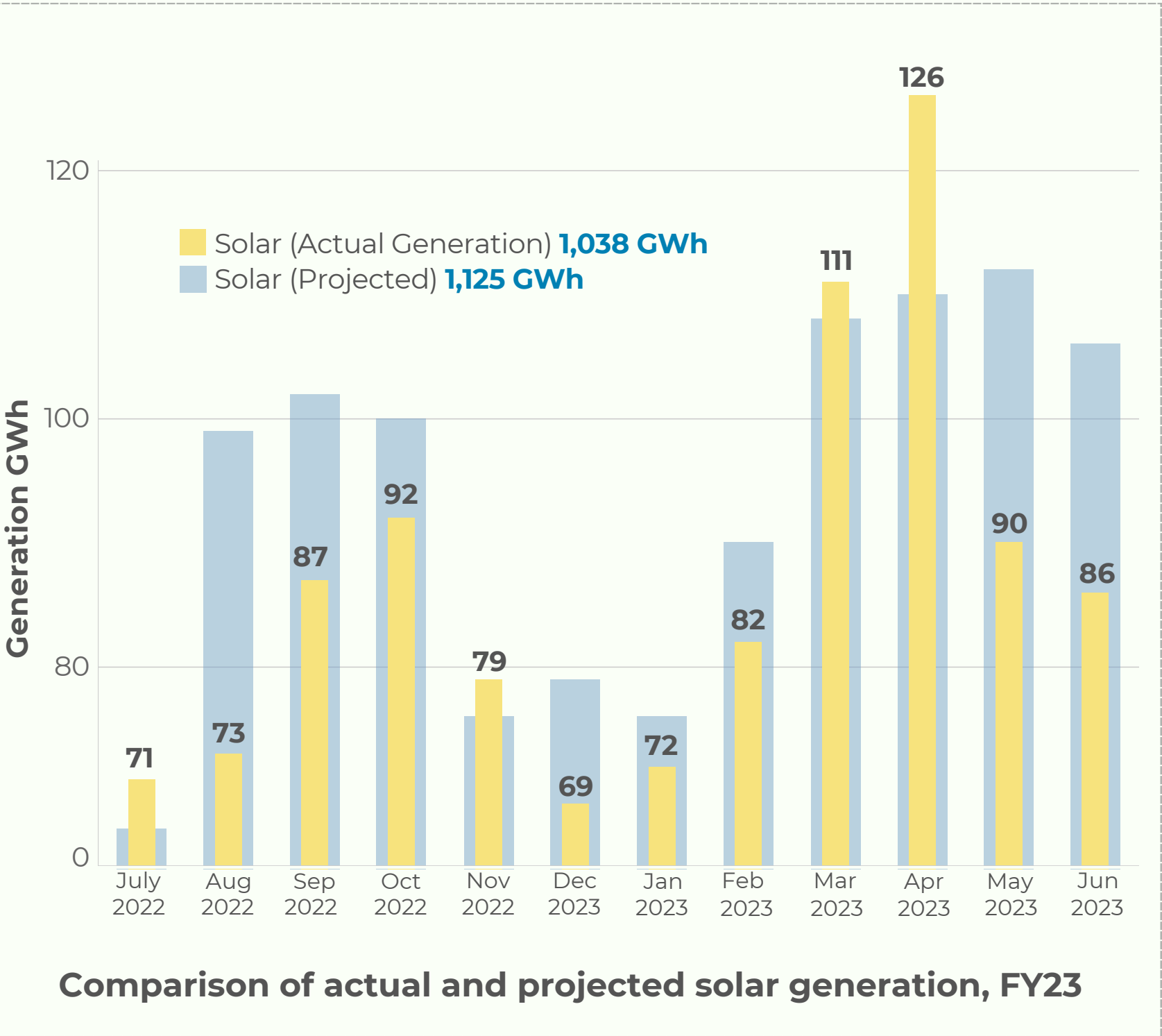
For FY23 however, reduced fuel imports due to imported fuel price volatility led to a modest decrease in emissions.

# Pakistan's renewable and hydro power capacity stood at 13 GW in FY23, however, Balochistan's renewable resource potential remains untapped.



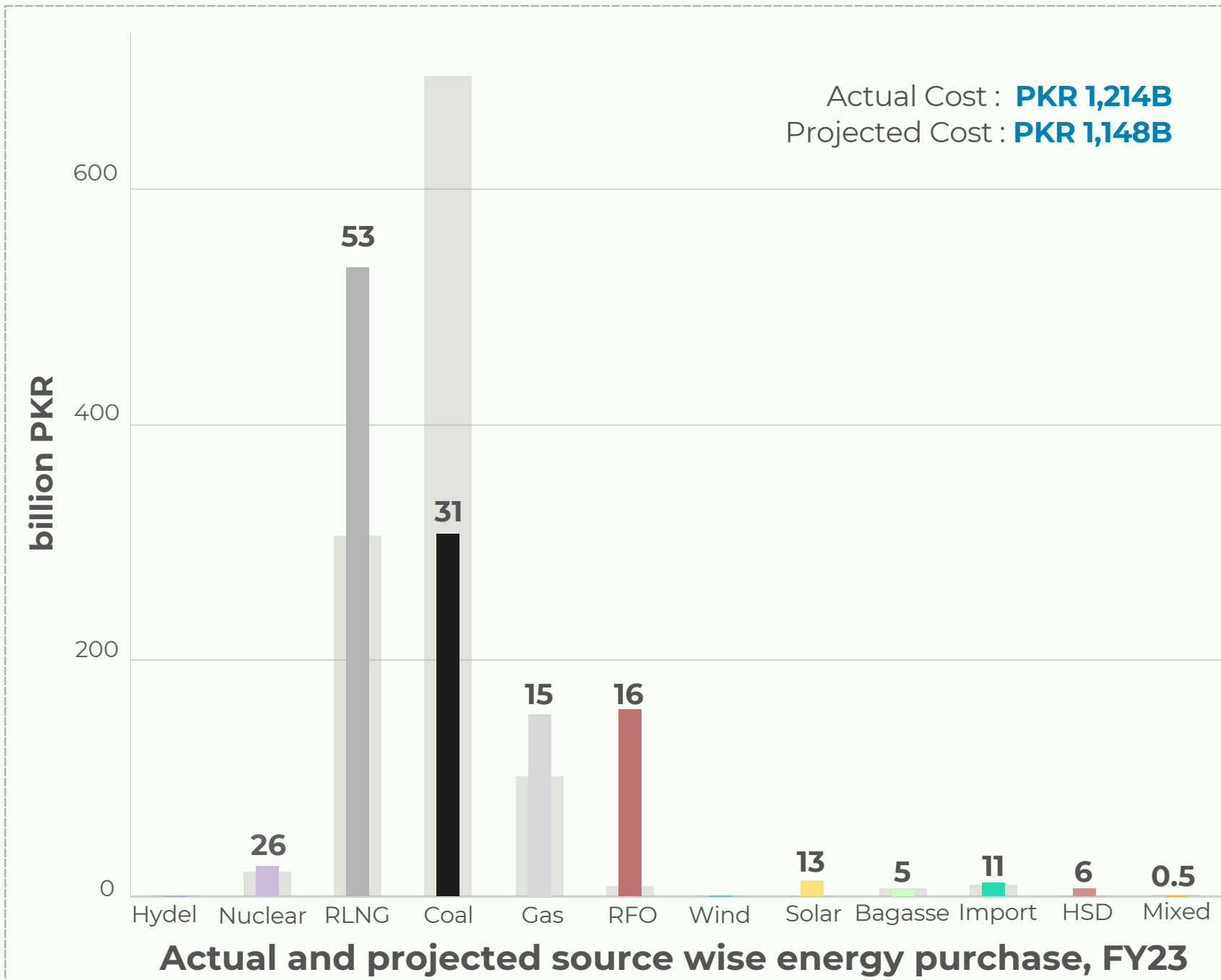
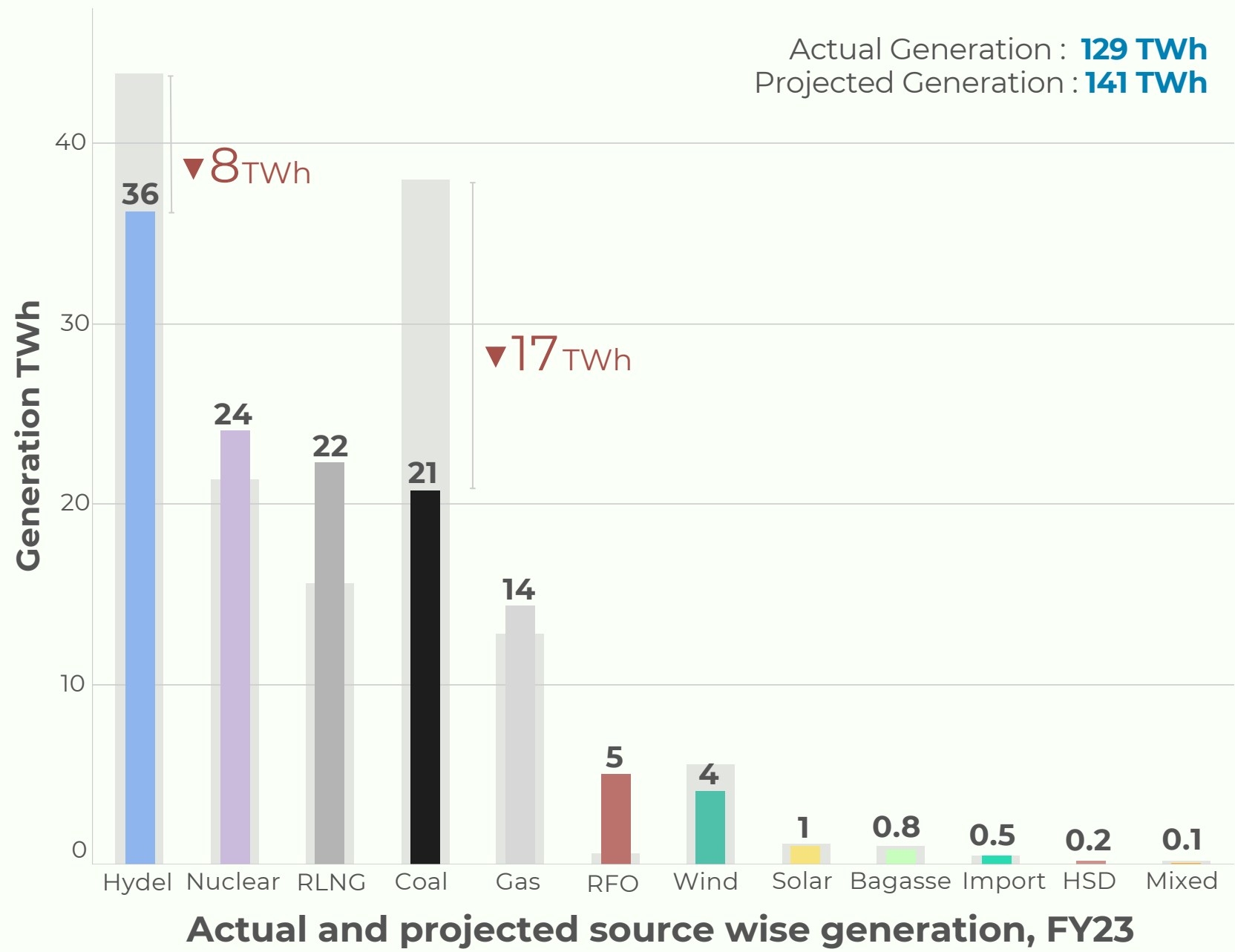
Yearly growth trends in renewables and hydropower across various provinces, 2019-2023

# Actual RE generation across the fiscal year trailed the projected generation from wind and solar.



In FY23, electricity generation from Hydel and Coal sources was projected at 82 TWh; however, actual generation totaled 57 TWh, reflecting a 30% shortfall.

Reduced generation from coal and hydropower resulted in an over-reliance on RLNG, gas, and RFO, which subsequently led to higher costs for these thermal sources.

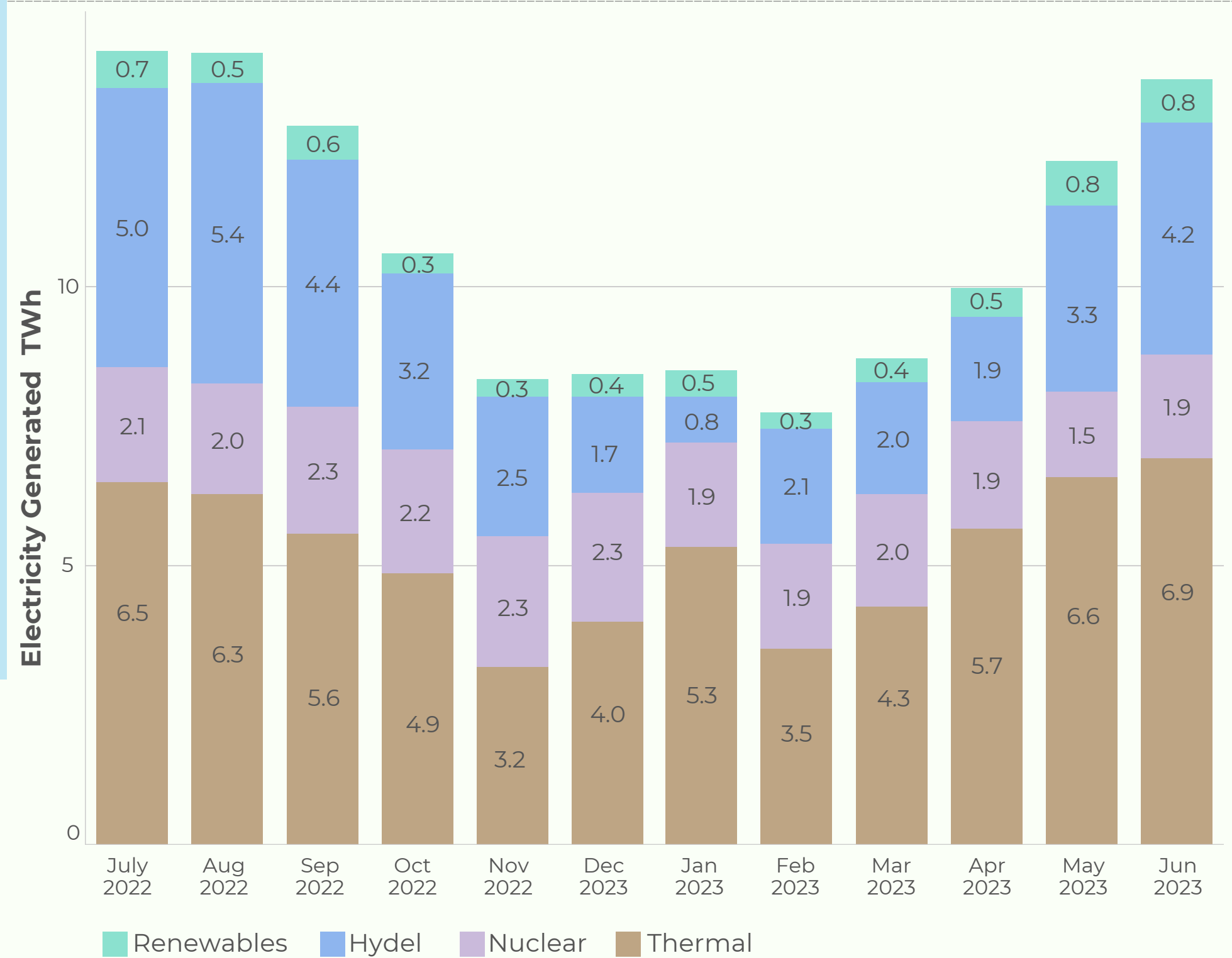


Note: Grey wider bars represents the projections. KE figures are not included in above graphs.

# Renewables can play a significant role in meeting flexible load demand during months with seasonal hydro variation.

Pakistan’s peak demand occurs in summer when hydropower generation is high. During winter months, when hydro generation is low, thermal power generation primarily meets the demand. Renewable energy, such as solar and wind, can serve as reliable substitutes for flexible loads during periods of low hydroelectric generation and as an ideal complement during high demand in summer months.

Pumped storage can also be explored as a solution to address intermittency issues associated with wind and solar power generation, as well as to supplement peak demand.



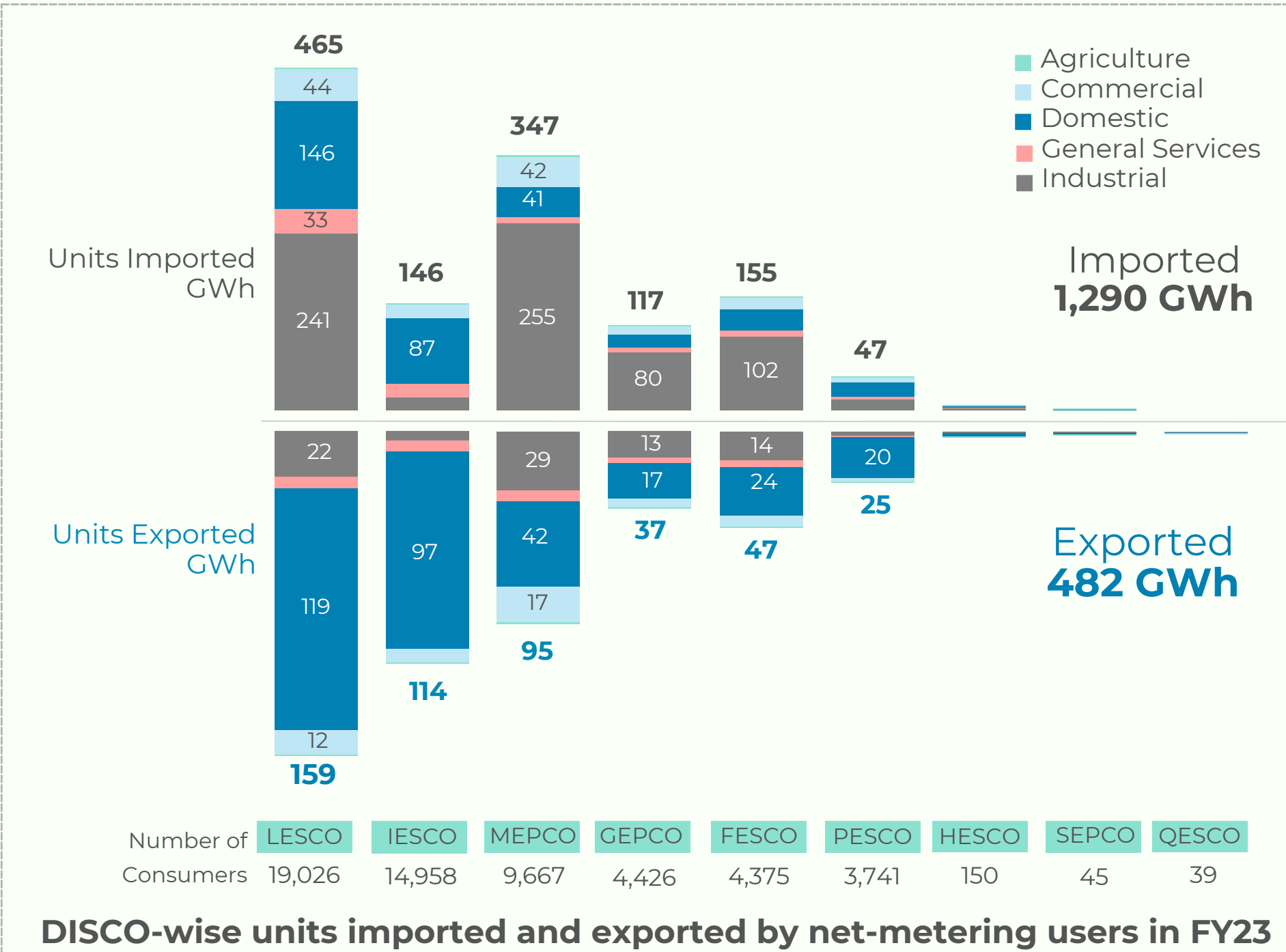
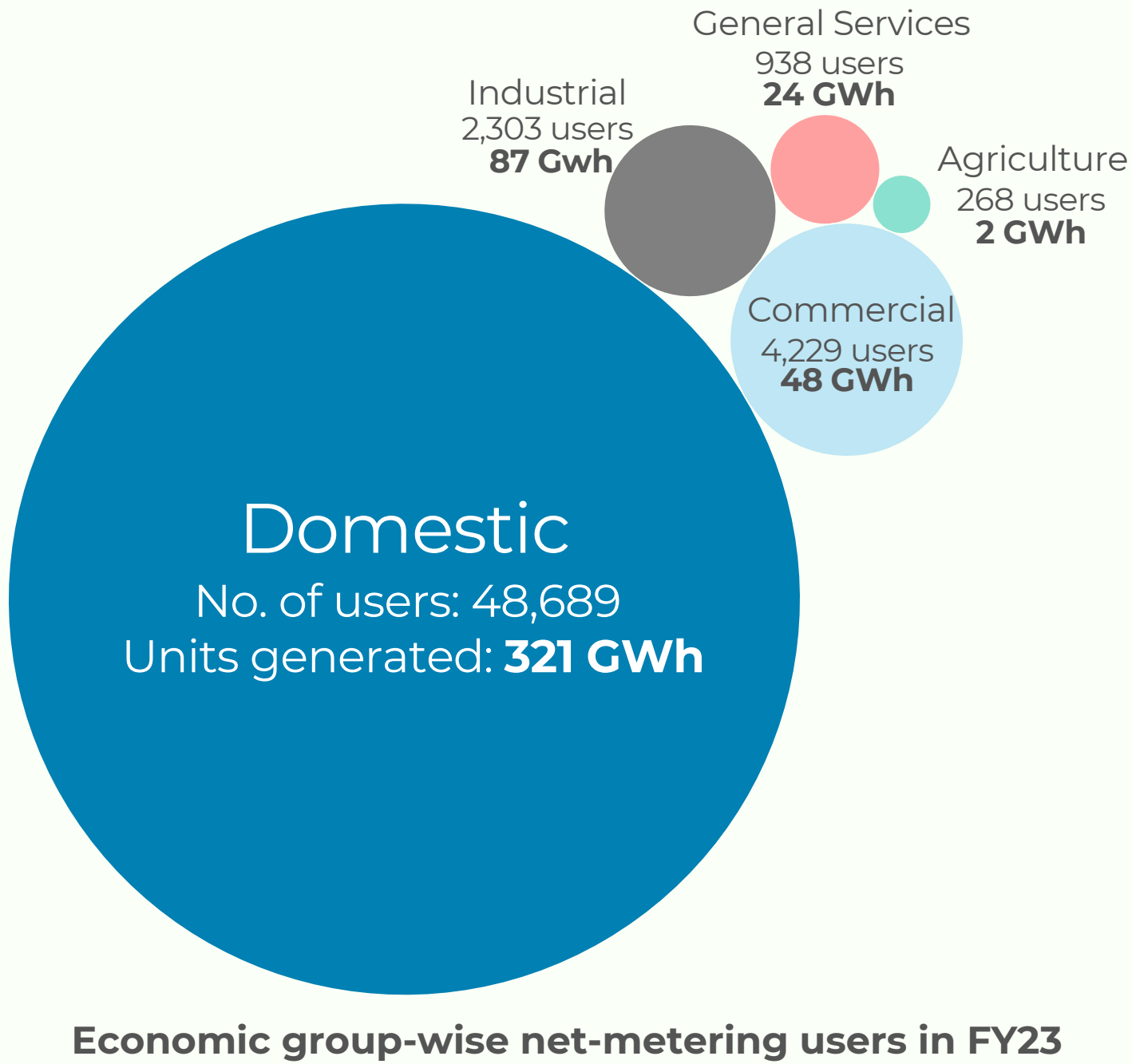
Note: Renewables represent electricity generated by solar, wind and bagasse.

Monthly source wise electricity generation in FY23



# In FY23, net-metering users accounted for less than 1% share in total electricity generation.

The net-metering users nearly doubled in Pakistan on a YoY basis, with the accumulated generation by net-metering users in FY23 totaling 482 GWh, marking an increase of ▲220% YoY.





## Karot Hydro Power

Hydro

**732  
MW**

**USD1720M**

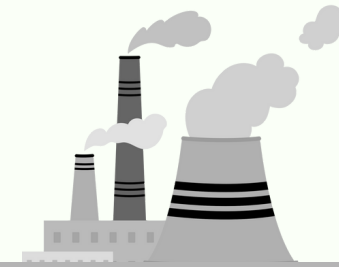
COD: 29-June-23

Location: Village  
Karot, District  
Rawalpindi, Punjab

**Debt to Equity Ratio:  
Debt 80% : Equity 20%**

Debt Servicing Schedule  
30 Years

Electricity Generated in  
FY23: 3 TWh



## Punjab Thermal

RLNG

**1230  
MW**

**USD708M**

COD: 23-June-23

Location: Near  
Trimmu Barrage,  
District Jhang, Punjab

**Debt to Equity Ratio:  
Debt 75% : Equity 25%**

Debt Servicing Schedule  
30 Years

Electricity Generated in  
FY23: 0.9 TWh



## Thal Nova

Local Coal

**330  
MW**

**USD498M**

COD: 17-Feb-23

Location: Thar Coal  
Fields Block-II, District  
Tharparkar, Sindh

**Debt to Equity Ratio:  
Debt 75% : Equity 25%**

Debt Servicing Schedule  
30 Years

Electricity Generated in  
FY23: 0.9 TWh



## Thar Block-I

Local Coal

**1230  
MW**

**USD1912M**

COD: 5-Feb-23

Location: Thar Coal  
Fields Block-I, District  
Thar, Sindh

**Debt to Equity Ratio:  
Debt 75% : Equity 25%**

Debt Servicing Schedule  
30 Years

Electricity Generated in  
FY23: 4 TWh



## Thar Energy

Local Coal

**330  
MW**

**USD498M**

COD: 1-Oct-22

Location: Thar Coal  
Block-II, District  
Tharparkar, Sindh

**Debt to Equity Ratio:  
Debt 75% : Equity 25%**

Debt Servicing Schedule  
30 Years

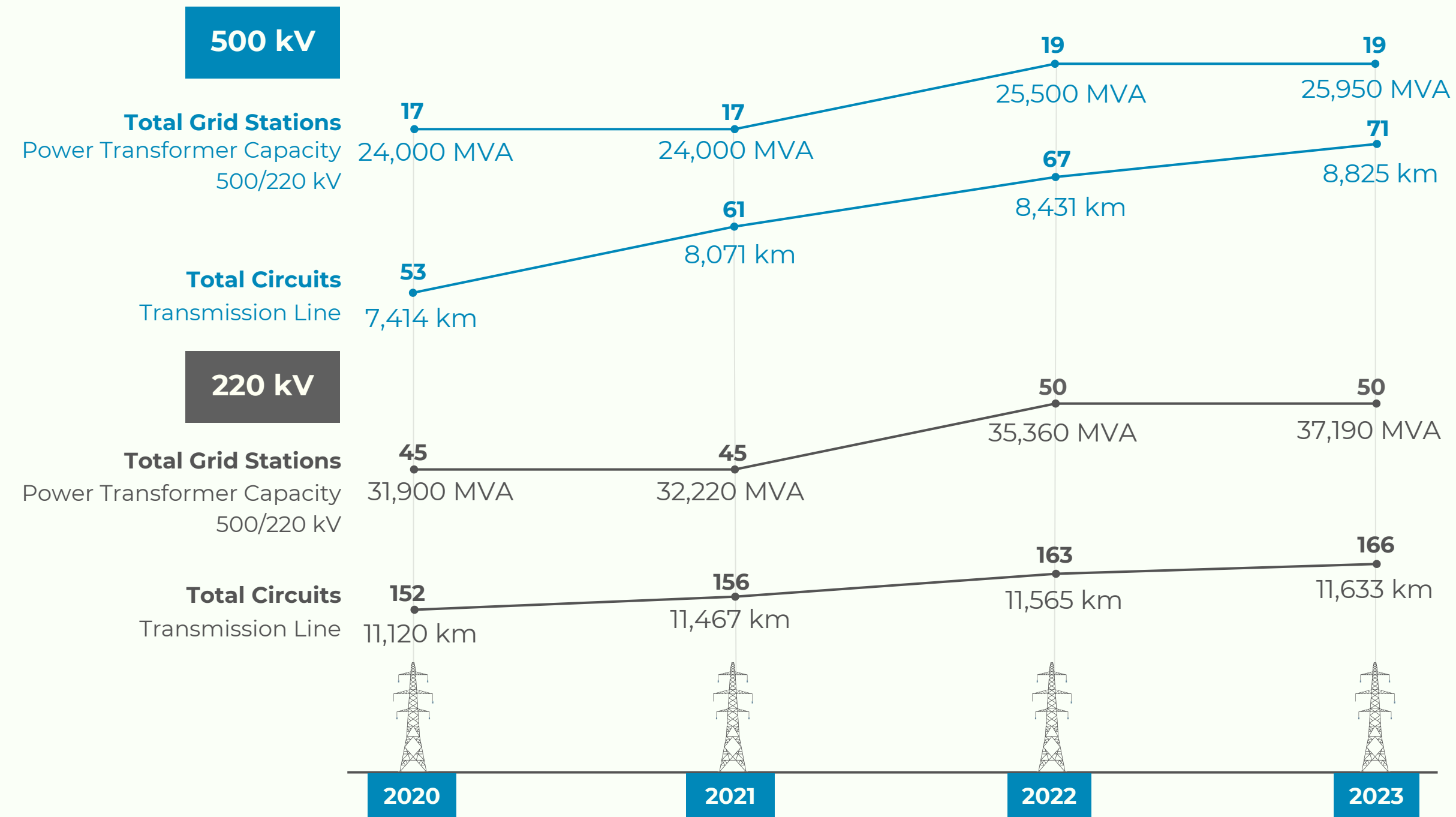
Electricity Generated in  
FY23: 1 TWh

**New  
generation  
plants added  
in Pakistan  
in year 2022  
& 2023**

**Transmission FY23**

# No new grid station was added to the NTDC system in FY23.

During FY23, NTDC incurred a **PKR 20B** loss due to its inability to evacuate electricity efficiently. NTDC aimed to expand its transmission system by 30% and increase total transformation capacity by 58% by 2026. The Transmission Investment Plan (TIP) for FY 2023-25 allocated **PKR 37B**, which was still awaiting approval from NEPRA by the end of FY23.



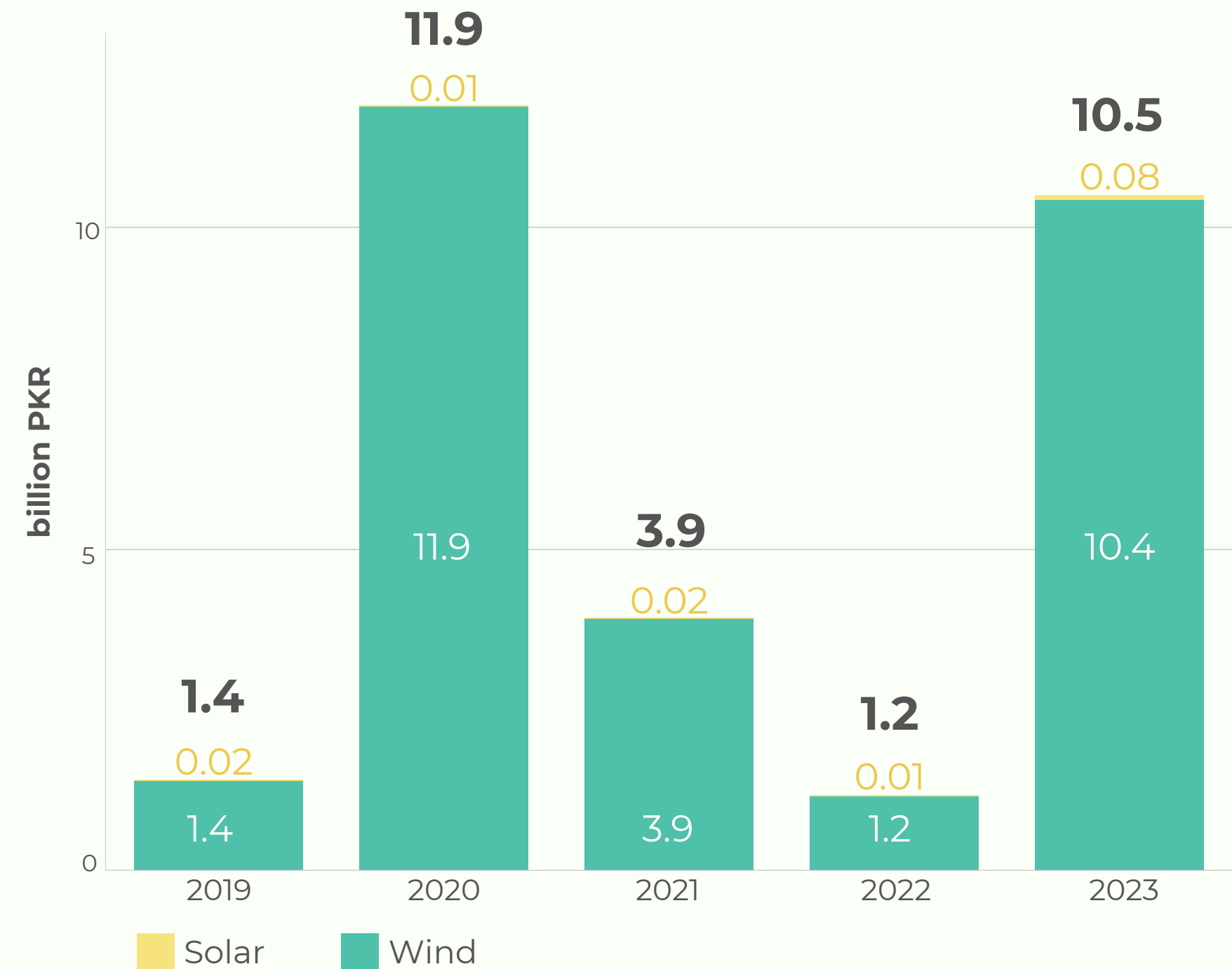
Year-wise expansion of NTDC network, 2020-2023

# Wind curtailment: When the wind gets held back!

In FY23, the payment obligation for Non-Project Missed Volume (NPMV) rose significantly to PKR 10.5B, up from PKR 1.2B in FY22. Excessive curtailment due to transmission constraints has greatly undermined investor confidence.

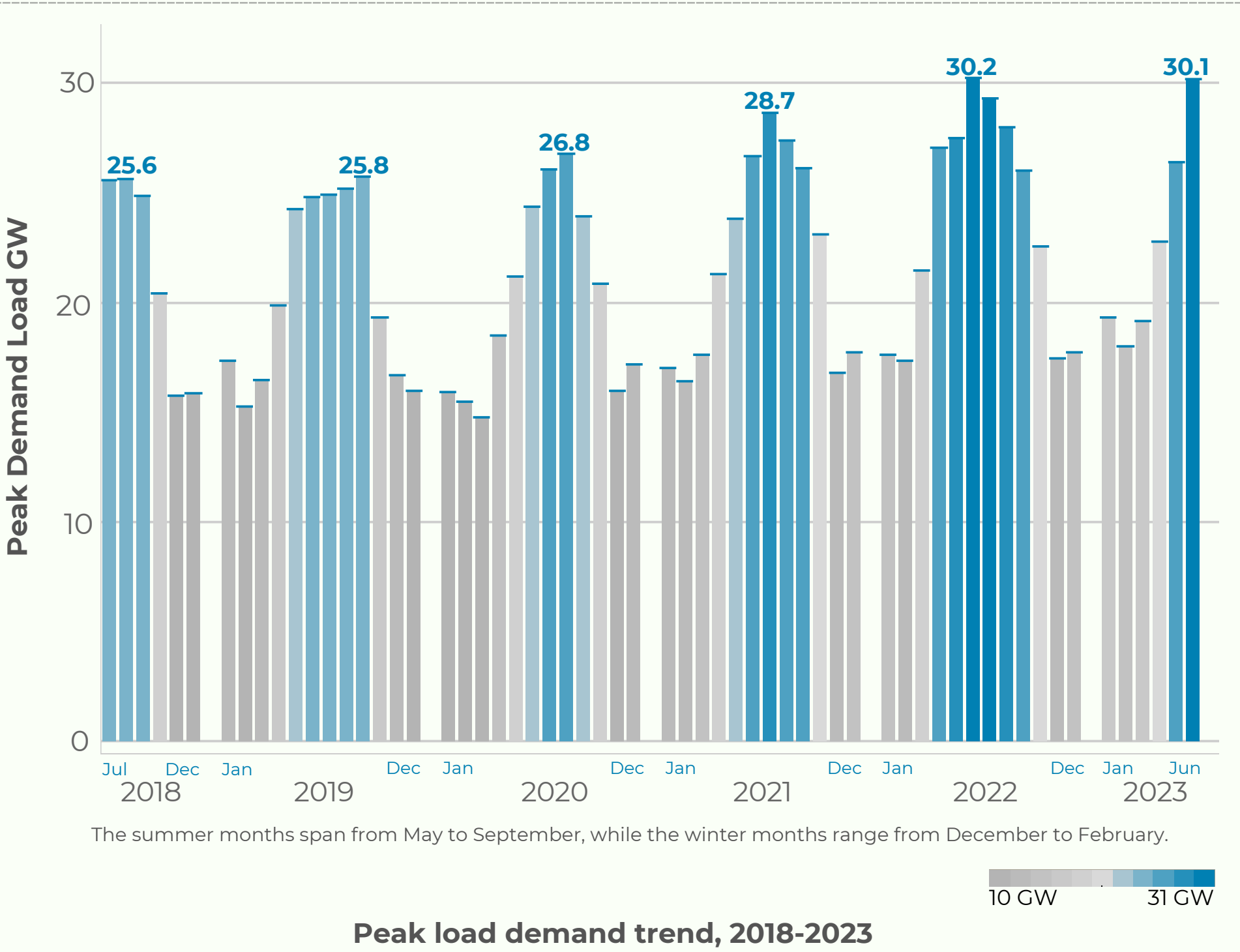
Rather than paying for unused electricity through NPMV, those funds could be allocated towards the transmission capacity of the network, allowing for better integration of cheaper RE sources.

The existing power transfer interface between the south and north cannot handle the full generation capacity available in the south, which includes 1,845 MW from wind energy. To avoid power curtailment, upgrading this south-to-north transmission interface is essential. Therefore, the construction of a 500 kV DC Matiari-Moro- R.Y. Khan overhead line is prioritized in the Transmission System Expansion Plan.

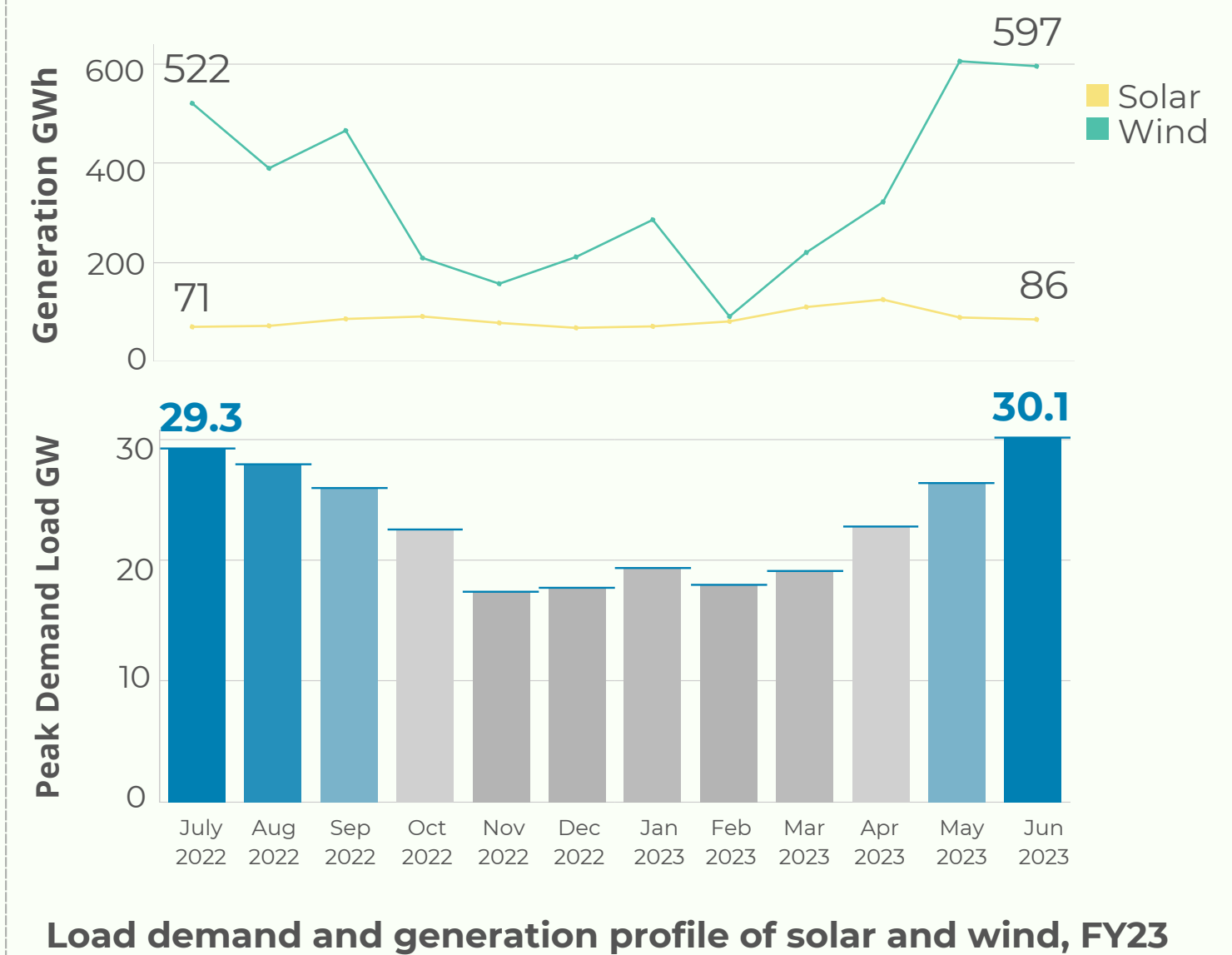


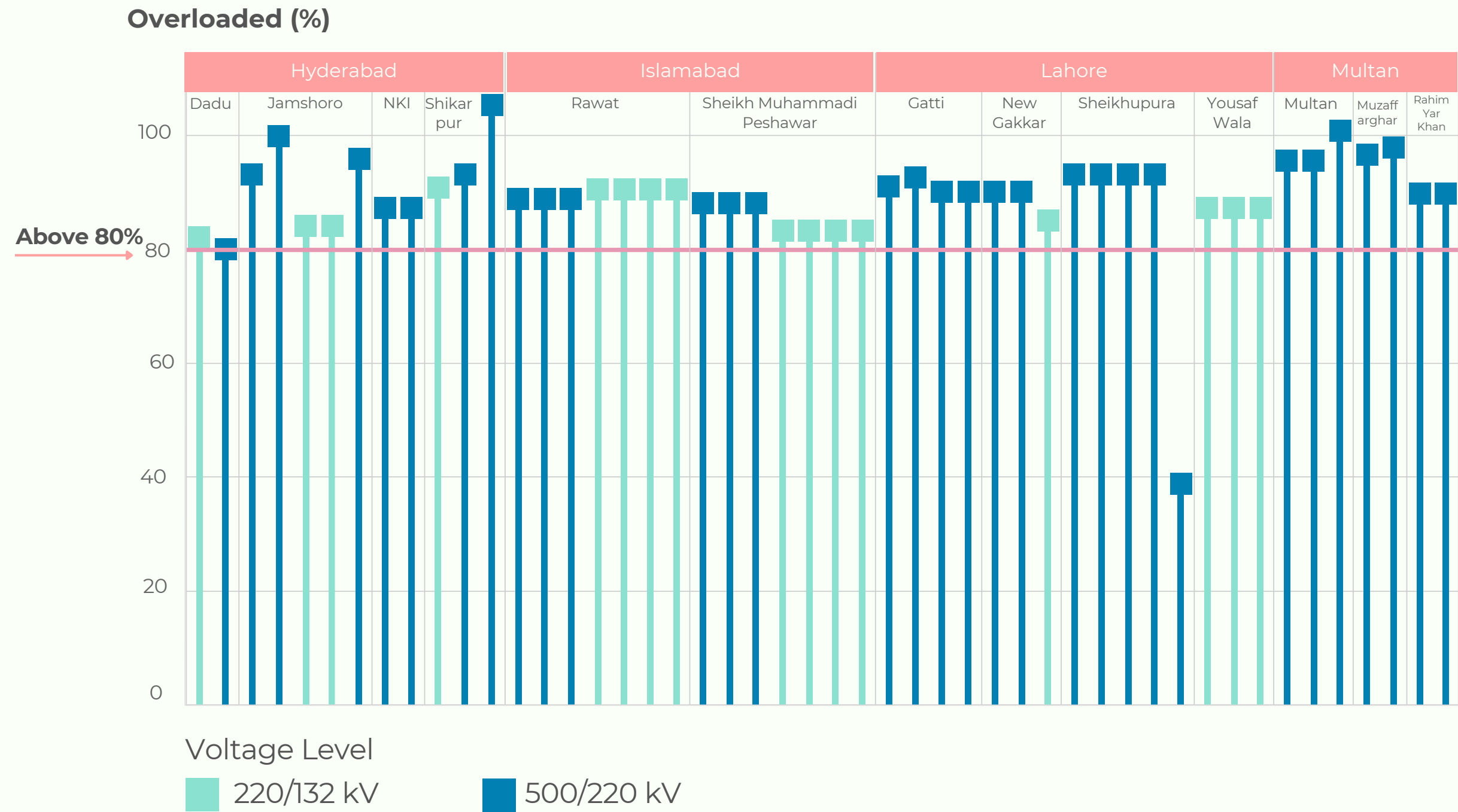
Yearly trend of payment on account of NPMV, 2019-2023

Over the years, peak demand load has continued to increase during summer, while winter demand stagnates below 20 GW.



During summer, peak demand is usually met through expensive imported fuel-based "Peaker Plants," which remain idle outside of peak periods. A more effective solution for managing peak demand in summer could be the utilization of RE hybrid solutions.





Region-wise overloaded transformers installed at 500kV grid stations, FY23

## Overloaded transformers at 500kV grid stations are struggling to keep up with the current demand

The congestion of key grids, like Gatti, Multan, and Sheikhupura has forced the use of expensive power plants and violated grid protocols. Priority should be given to the transmission augmentation outlined in the Transmission System Expansion Plan (TSEP) to address issues with overloaded grid stations.

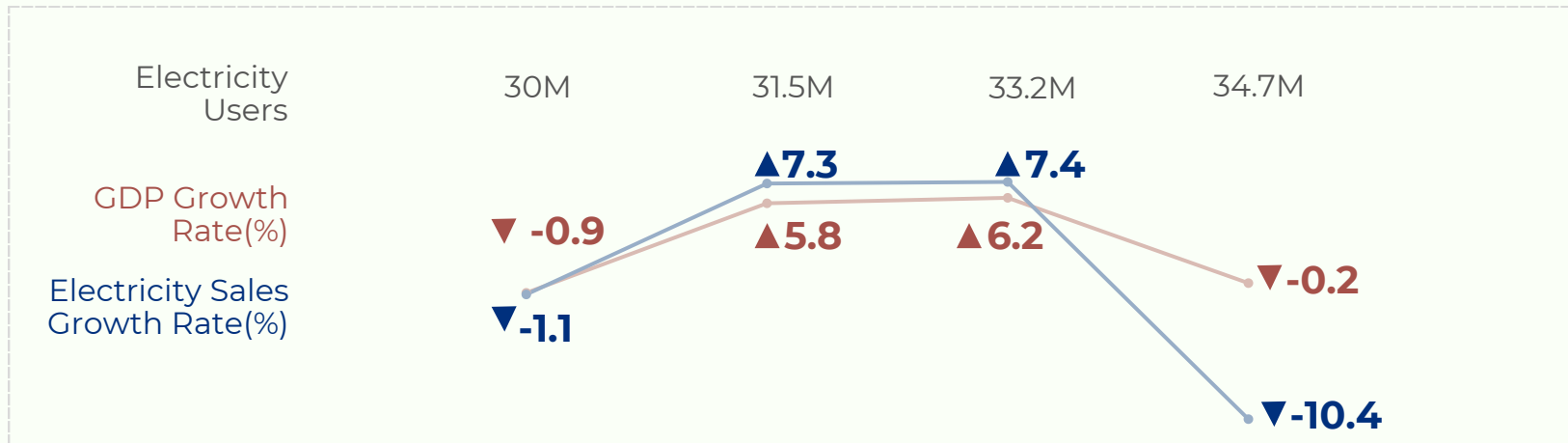
### Transformers installed at 500 kV Grid Stations

**500/220 kV Transformers**  
Total : 47  
Overloaded: 31

**220/132 kV Transformers**  
Total : 38  
Overloaded: 16

**Distribution FY23**





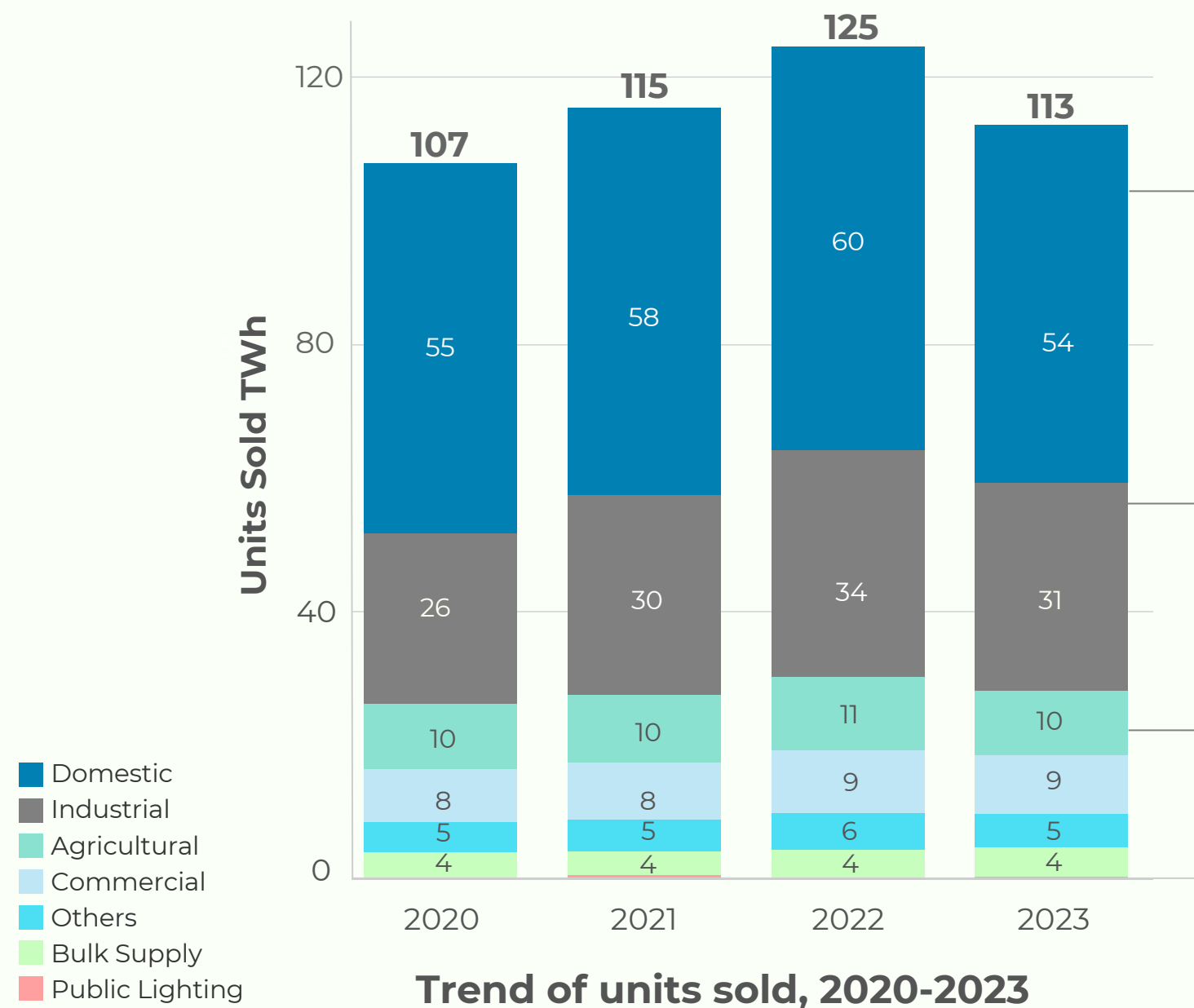
## Pakistan experienced a significant 10.4% drop in electricity sales in the FY23.

There was a **▲4.5%** growth in the number of consumers; however, the sales figures decreased by **▼10.40%**. This decline in electricity sales suggests a further under-utilization of the "take-or-pay" generation capacity.

Due to high electricity costs, consumers attempted to reduce their electricity usage and increasingly turned toward distributed generation via rooftop solar installations.

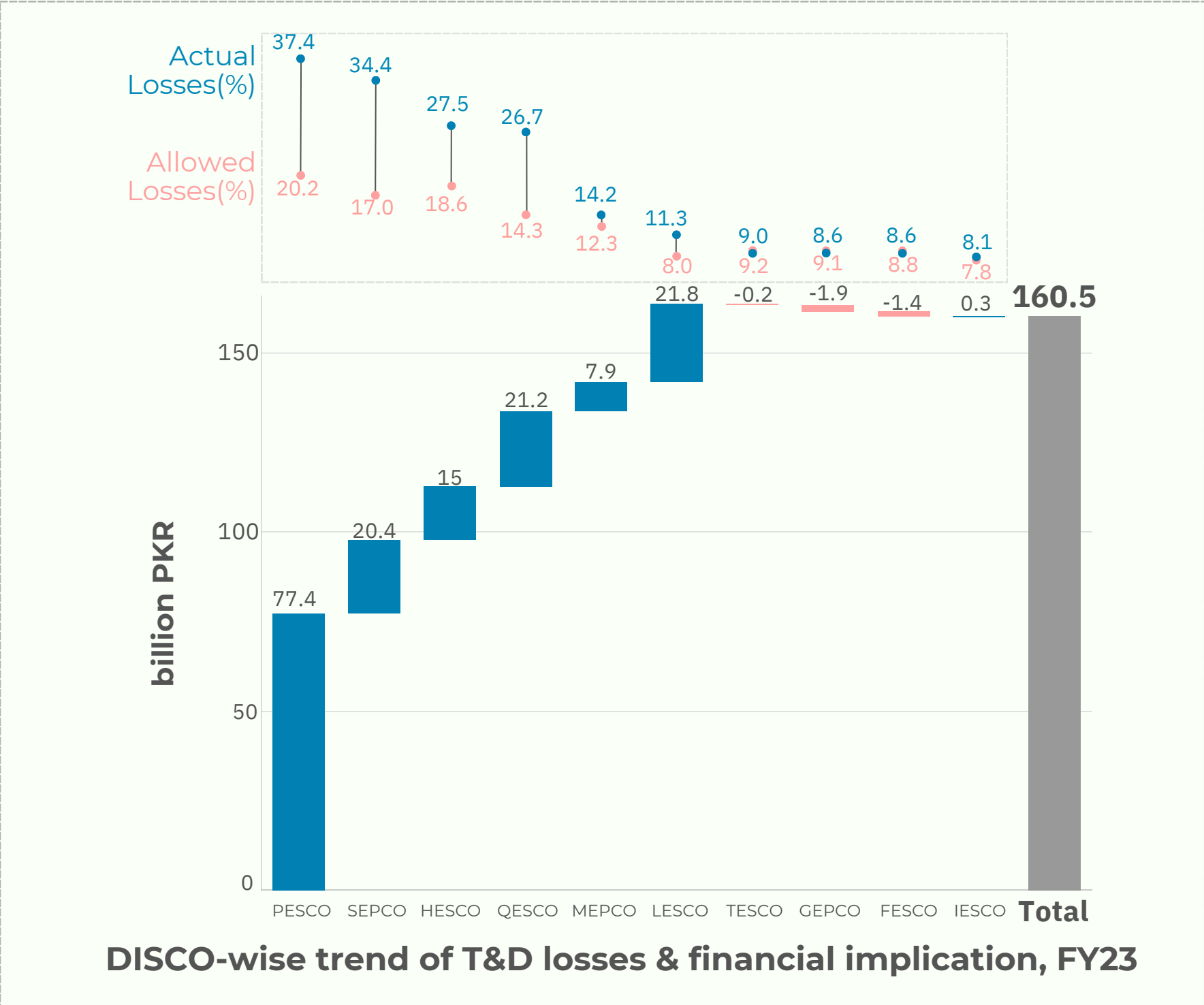
In FY23, macroeconomic conditions and the lack of GDP growth affected electricity consumption in the industrial sector. Another contributing factor was industries shifting towards captive and solar power generation.

Agriculture is gradually transitioning from reliance on the grid to the adoption of solar tube wells.



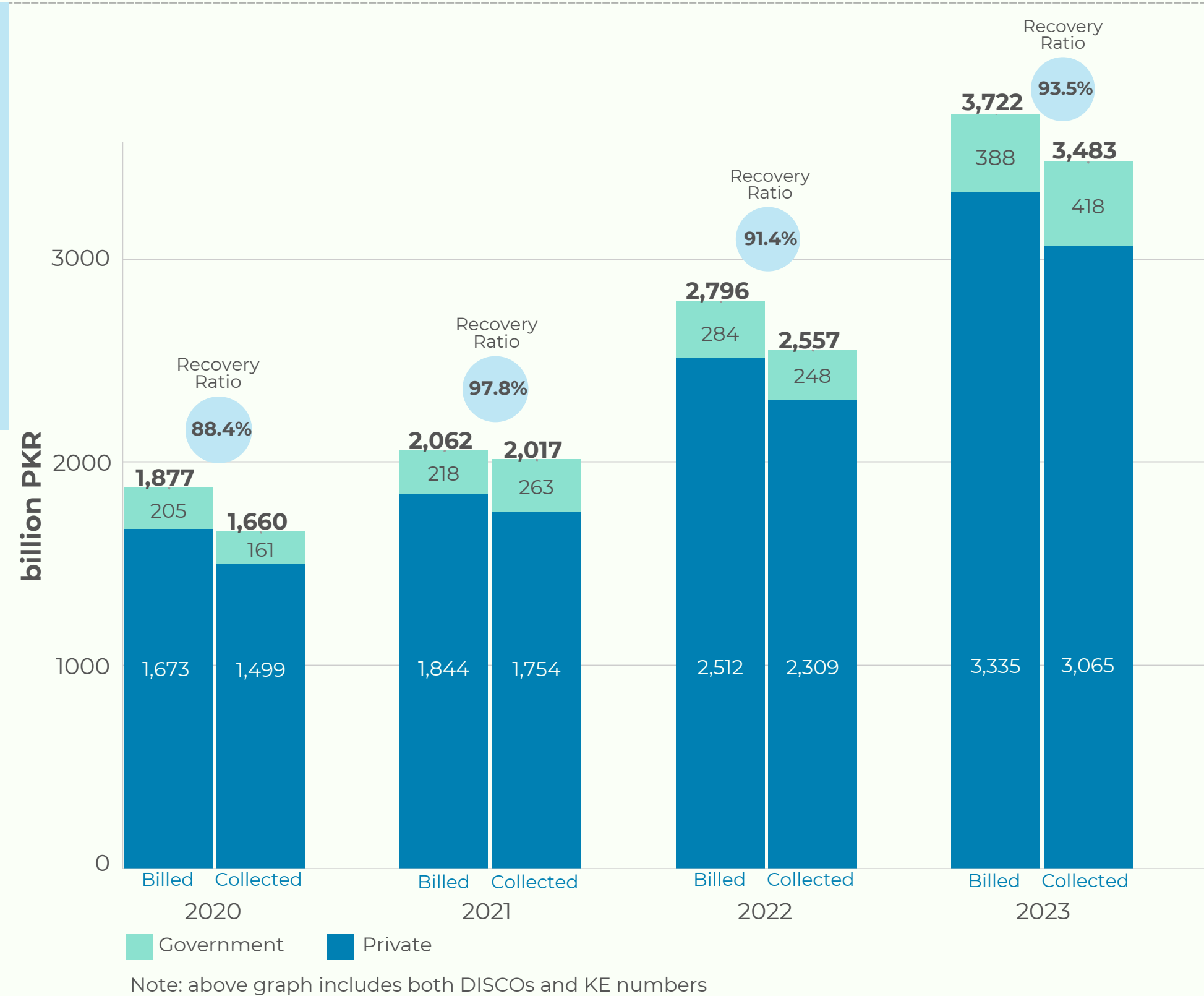
# In FY23, T&D losses of 16.5% added PKR 160.5B to the Circular Debt.

While there has been some improvement in actual losses in the annual trend, the disparity between allowed losses and the increased cost of electricity units has led to higher cost implications.



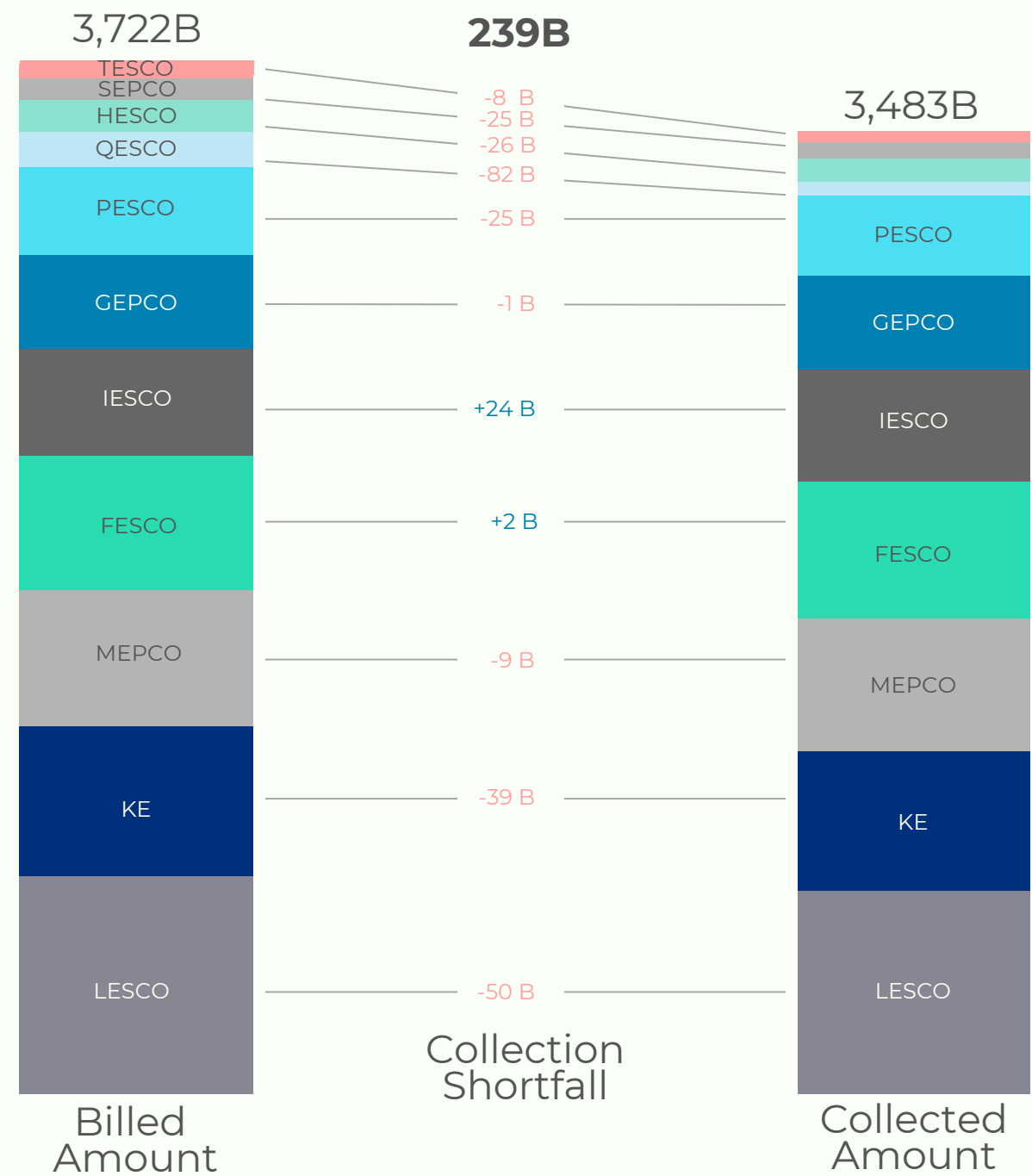
# In FY23, the collection ratio saw an improvement of ▲2.2% YoY.

When KE and DISCOs data are analyzed together, a slight improvement is observed in the recovery ratio. Additionally, payments from the government sector also showed improvement in the reported fiscal year.

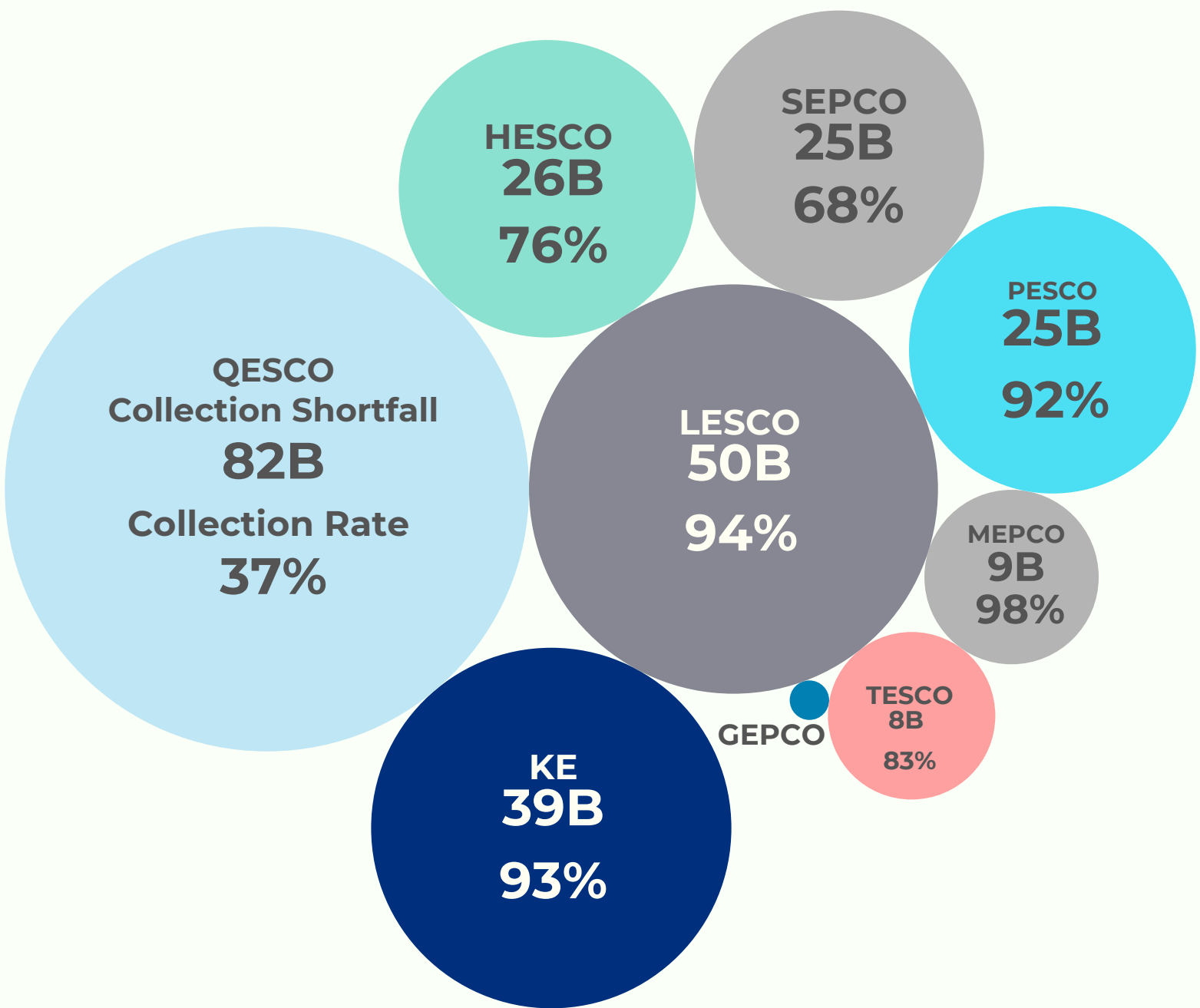


Yearly trend of billing, collection and recovery, 2020-23

In FY23, a collection shortfall of PKR 239B was reported. The highest collection losses were reported in QESCO region with 37% collection rate.



Comparison of amount billed and collected in FY23 across different DISCOs

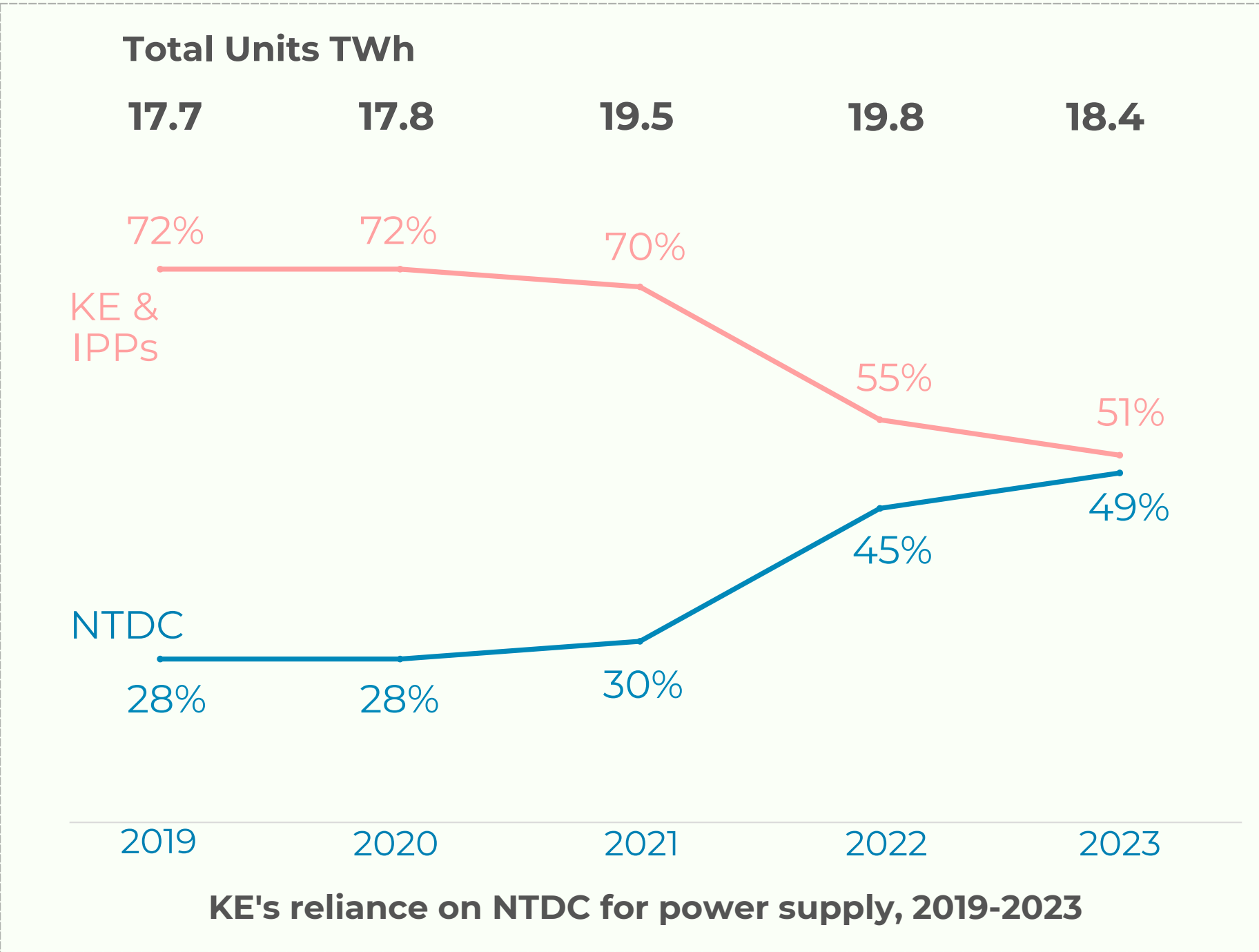
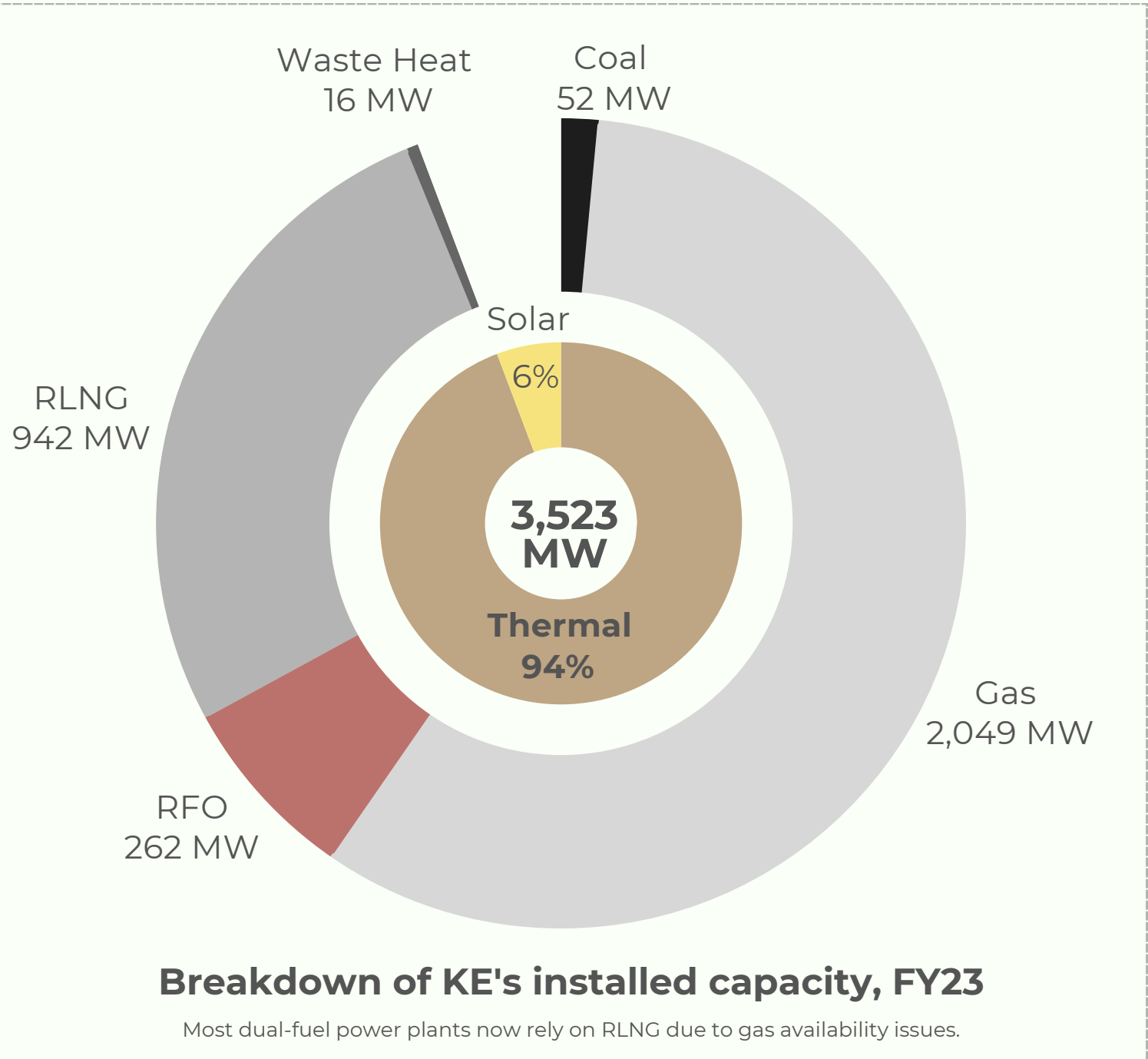


DISCO-wise breakdown of collection shortfall in FY23

# Case Study: K-Electric

# Due to high costs from its thermal-dominant generation mix, KE's reliance on NTDC power supply increased.

Under the power acquisition program, KE's base rate was 11.1 cents, compared to NTDC's 8.2 cents. NTDC has committed to supplying 2050 MW of electricity to KE from July 2024 at a more cost-effective rate to meet its rising demand.

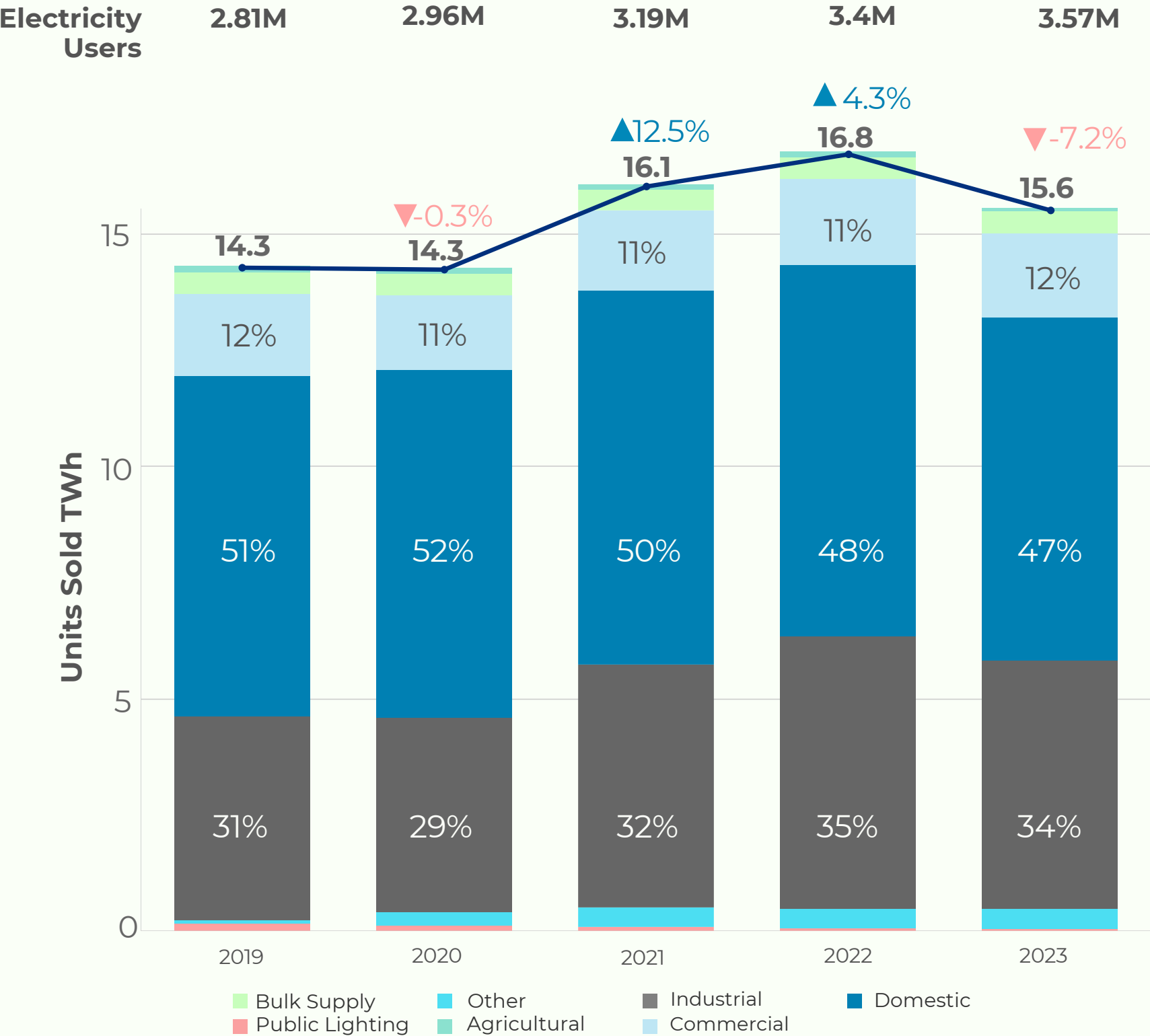


## FY23 marked a sharp decline in KE annual electricity sales growth!

Within KE, electricity sales decreased to 15.5 TWh i.e. ▼7.2% in FY23, as compared to 16.8 TWh in FY22.

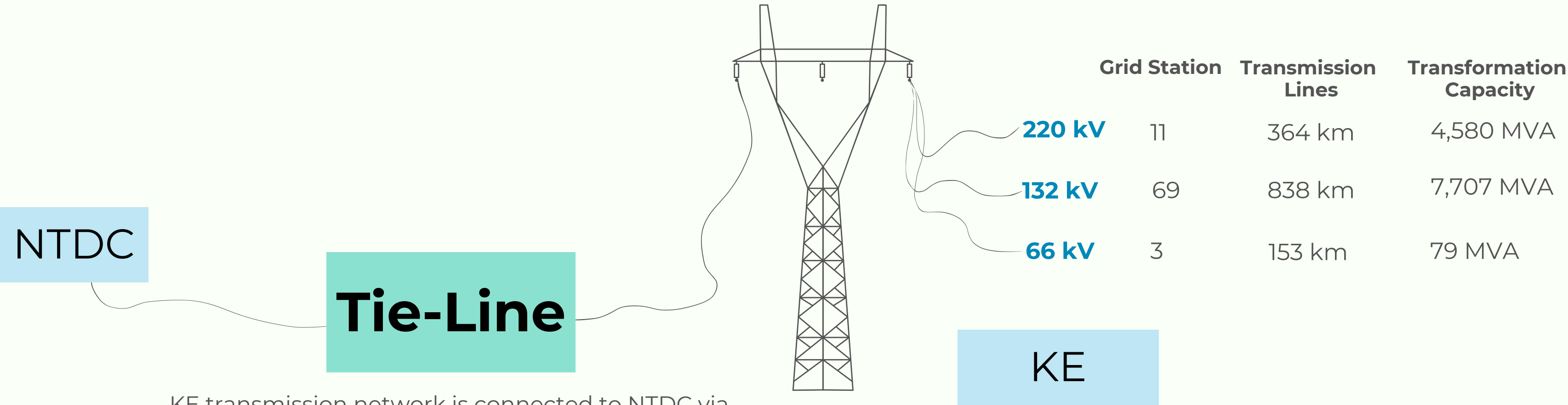
Industrial consumers make up just 0.6% of the KE total customer base, yet they consumed 34% of the electricity sold in the KE region in FY23.

Meeting the clean energy requirements of industrial consumers and addressing Scope 2 emissions, along with the Carbon Border Adjustment Mechanism (CBAM), requires clean and dependable energy sources for the industrial hub of Pakistan.



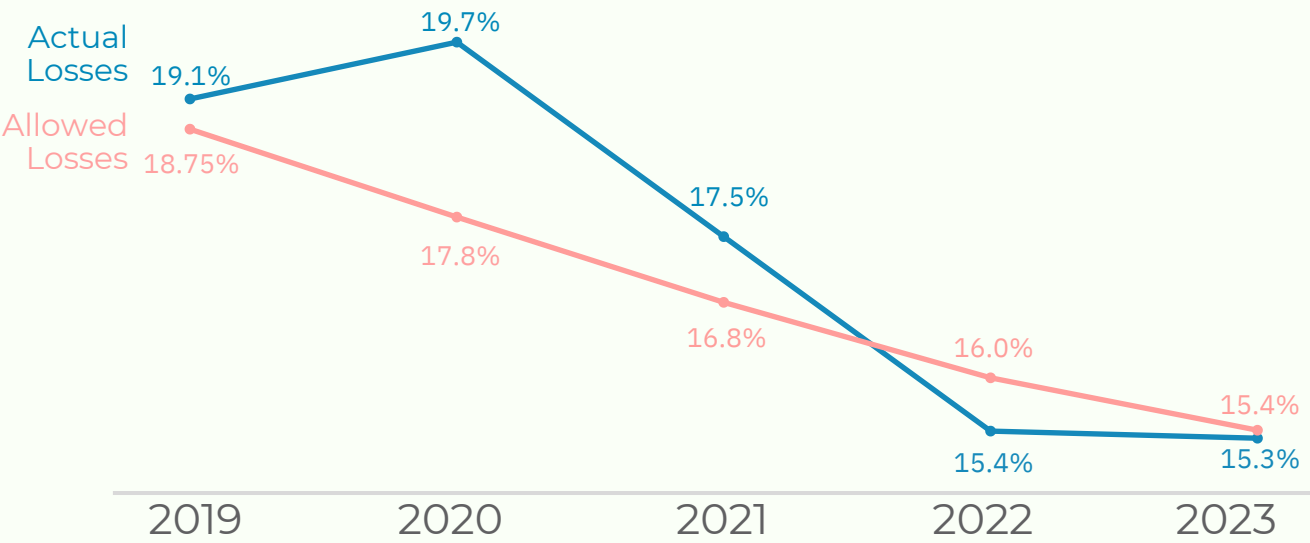
Trend of units sold in K-Electric, 2019-2023

# KE's Transmission Infrastructure: Keeping Karachi Connected!



KE transmission network is connected to NTDC via Tie-Line with import capacity upto 1100 MW.

With new nuclear generation facilities like K2 and K3 and coal-based plants coming online, interconnection capacity between the National Grid and KE needs to be enhanced.



T&D losses in KE, 2019-2023



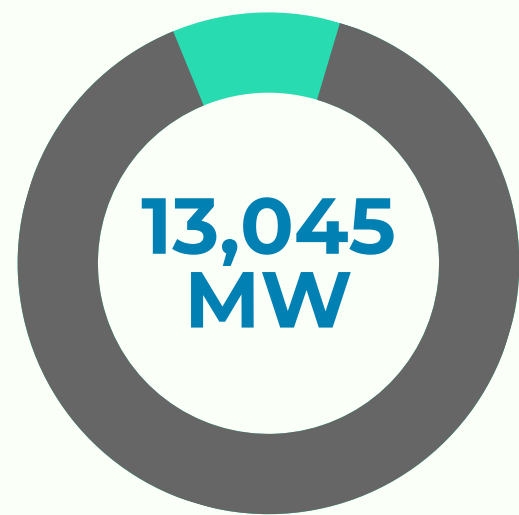
# Case Study: CPEC Projects

# CPEC projects played a pivotal role by generating 16% of Pakistan's electricity in FY23.

To address Pakistan's energy shortage, CPEC focused on developing coal, hydro, solar, and wind energy projects across the country, along with the 660 kV High Voltage Direct Current (HVDC) Pak Matiari-Lahore transmission line.

## Capacity Additions

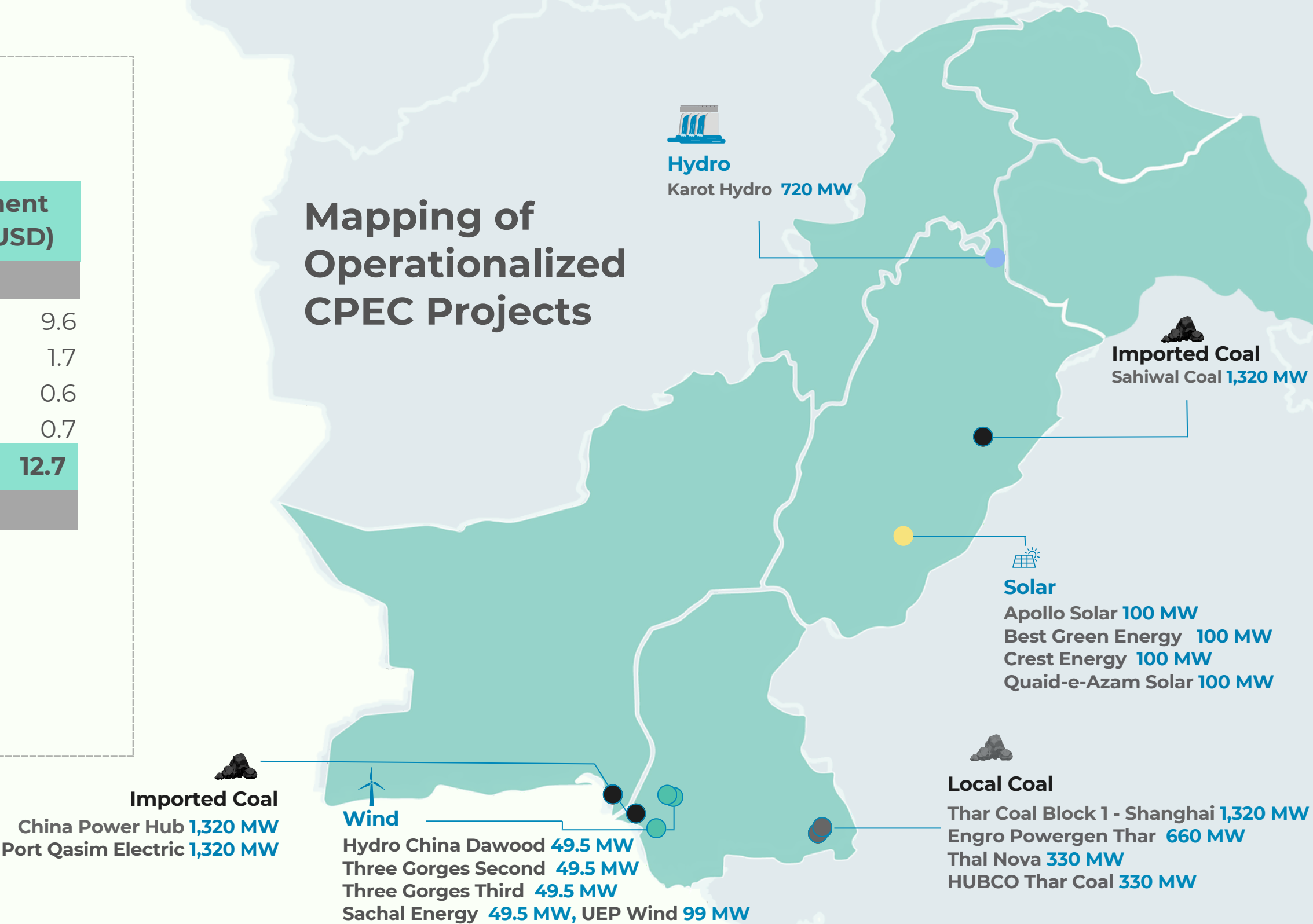
**11%** - 1,397 MW  
Renewable Projects



**89%** - 11,648 MW  
Fossil Fuel Projects

Capacity Additions (MW)		Investment (billion USD)
Operational Projects		
Coal	6,600	9.6
Hydel	720	1.7
Solar	400	0.6
Wind	297	0.7
8,017 MW		12.7
Pipeline Projects		
Hydel	2,708	
Coal	1,620	
Solar	600	
Wind	100	
5,028 MW		

## Mapping of Operationalized CPEC Projects



**Hydro**  
Karot Hydro **720 MW**

**Imported Coal**  
Sahiwal Coal **1,320 MW**

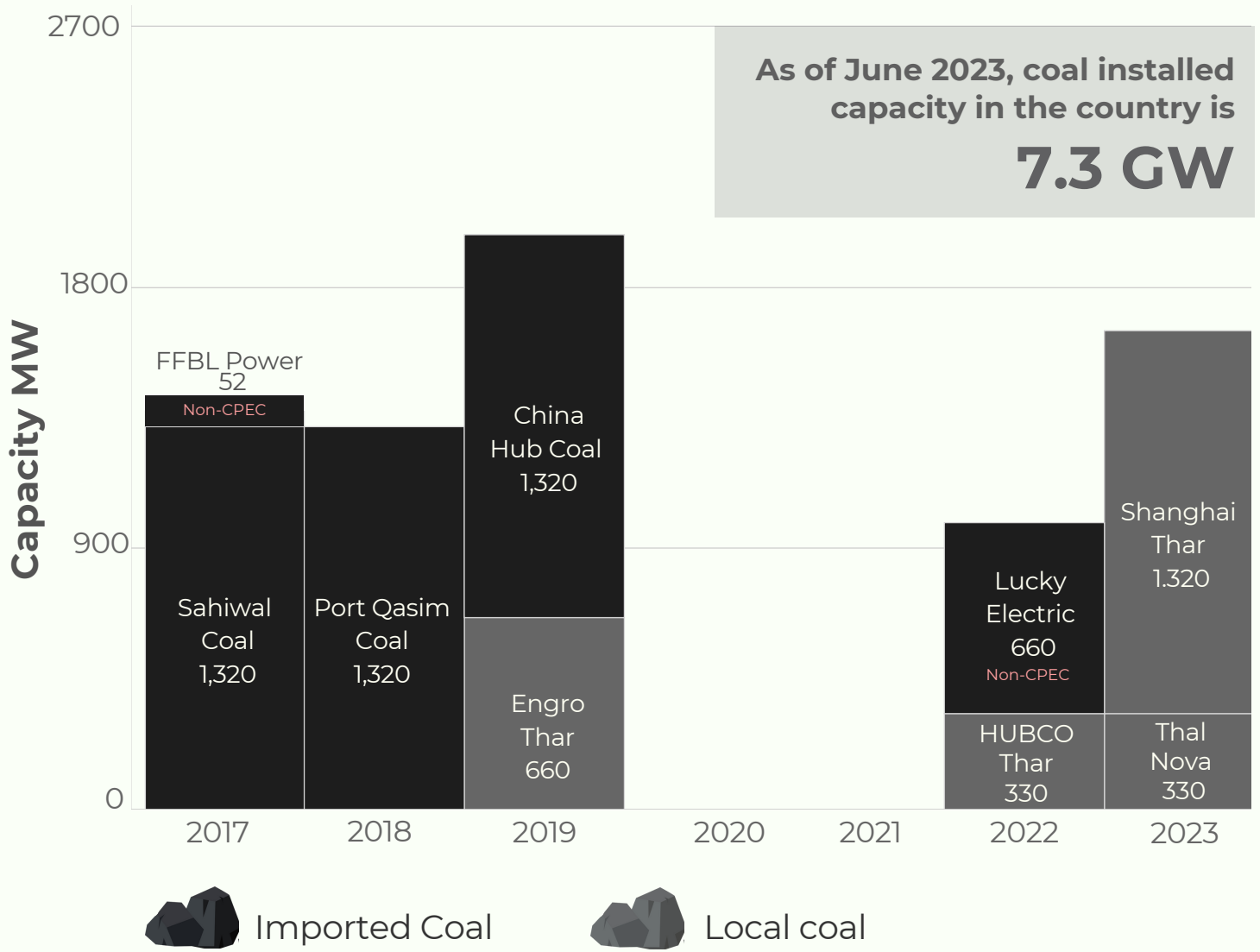
**Solar**  
Apollo Solar **100 MW**  
Best Green Energy **100 MW**  
Crest Energy **100 MW**  
Quaid-e-Azam Solar **100 MW**

**Local Coal**  
Thar Coal Block 1 - Shanghai **1,320 MW**  
Engro Powergen Thar **660 MW**  
Thal Nova **330 MW**  
HUBCO Thar Coal **330 MW**

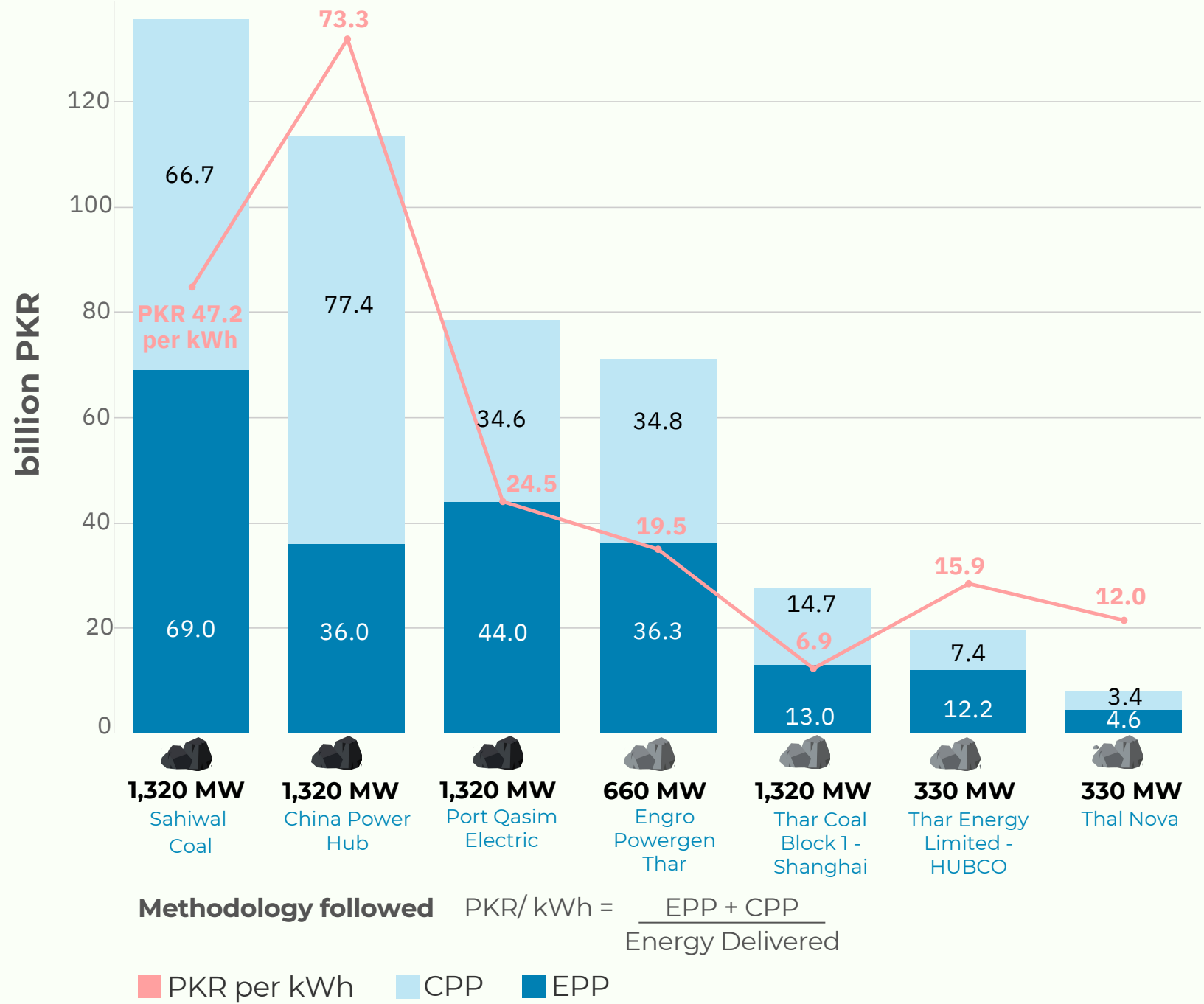
**Imported Coal**  
China Power Hub **1,320 MW**  
Port Qasim Electric **1,320 MW**

**Wind**  
Hydro China Dawood **49.5 MW**  
Three Gorges Second **49.5 MW**  
Three Gorges Third **49.5 MW**  
Sachal Energy **49.5 MW**, UEP Wind **99 MW**

In FY23, the country had 7.3 GW of coal capacity, with a 90% share from CPEC projects. Global fuel price hikes increased costs for imported fuel-based coal power plants.



Coal capacity addition trend, 2017-2023



Comparison of coal project's purchase prices and unit costs for FY23

The country’s transmission capacity increased with the addition of the Pak Matiari-Lahore transmission line; however, the average utilization of the line remained at 40% in FY23.

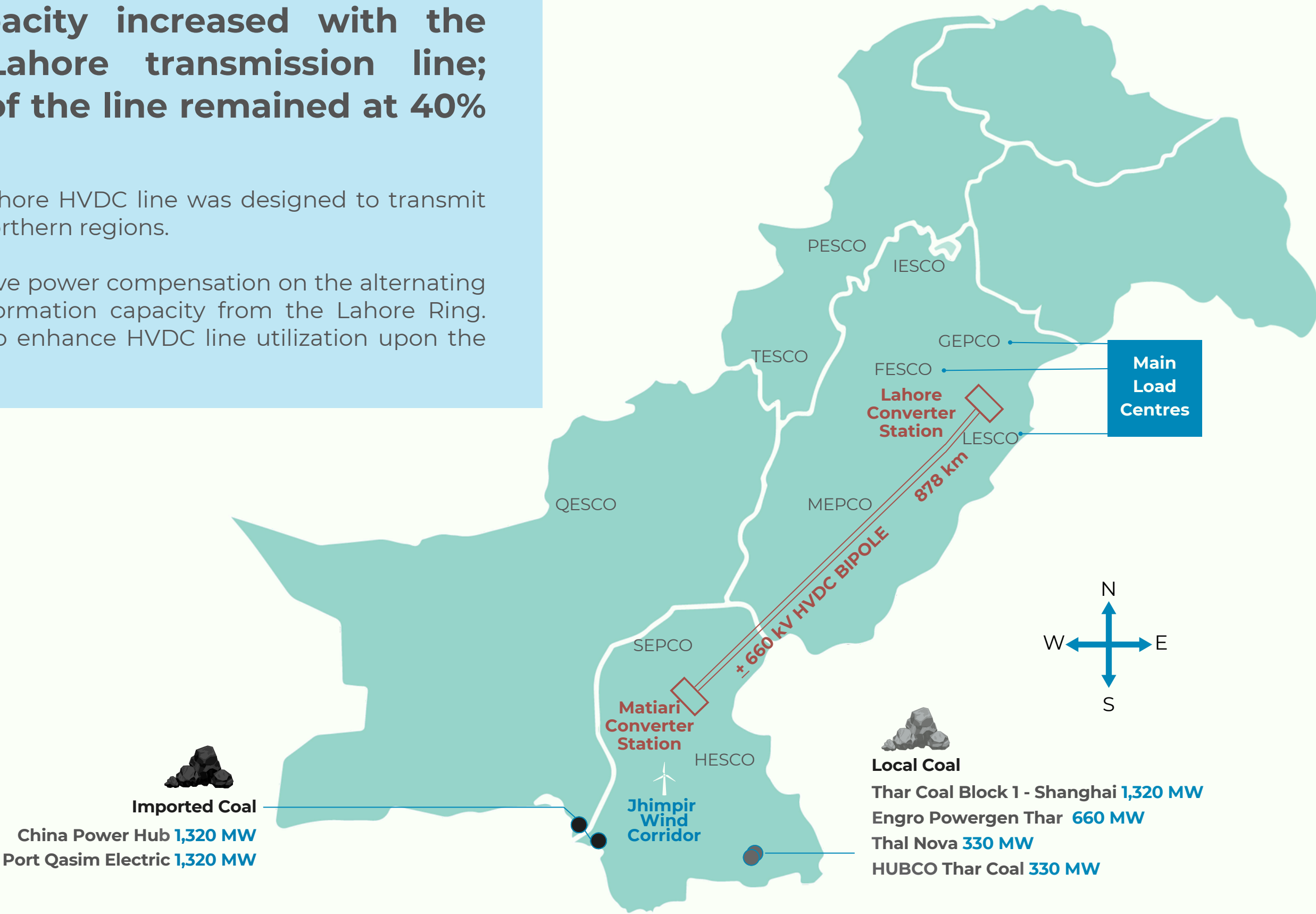
Commissioned in September 2021, the Matiari to Lahore HVDC line was designed to transmit power from southern coal-based thermal plants to northern regions.

Current full utilization is limited by inadequate reactive power compensation on the alternating current (AC) corridor, as well as insufficient transformation capacity from the Lahore Ring. Progress on the Lahore North project is expected to enhance HVDC line utilization upon the completion of the grid station.

**FY23**

Energy delivered: 13.5 GWh  
 Losses: 2.7% losses  
 Avg. utilization: 39.6%  
 Invoiced Amount:  
 PKR 73.3B

Company: Pak Matiari-Lahore Transmission Company Limited (PMLTC)  
 Contract Type: Take or Pay  
 Length : 878 km  
 Capacity: 4,000 MW

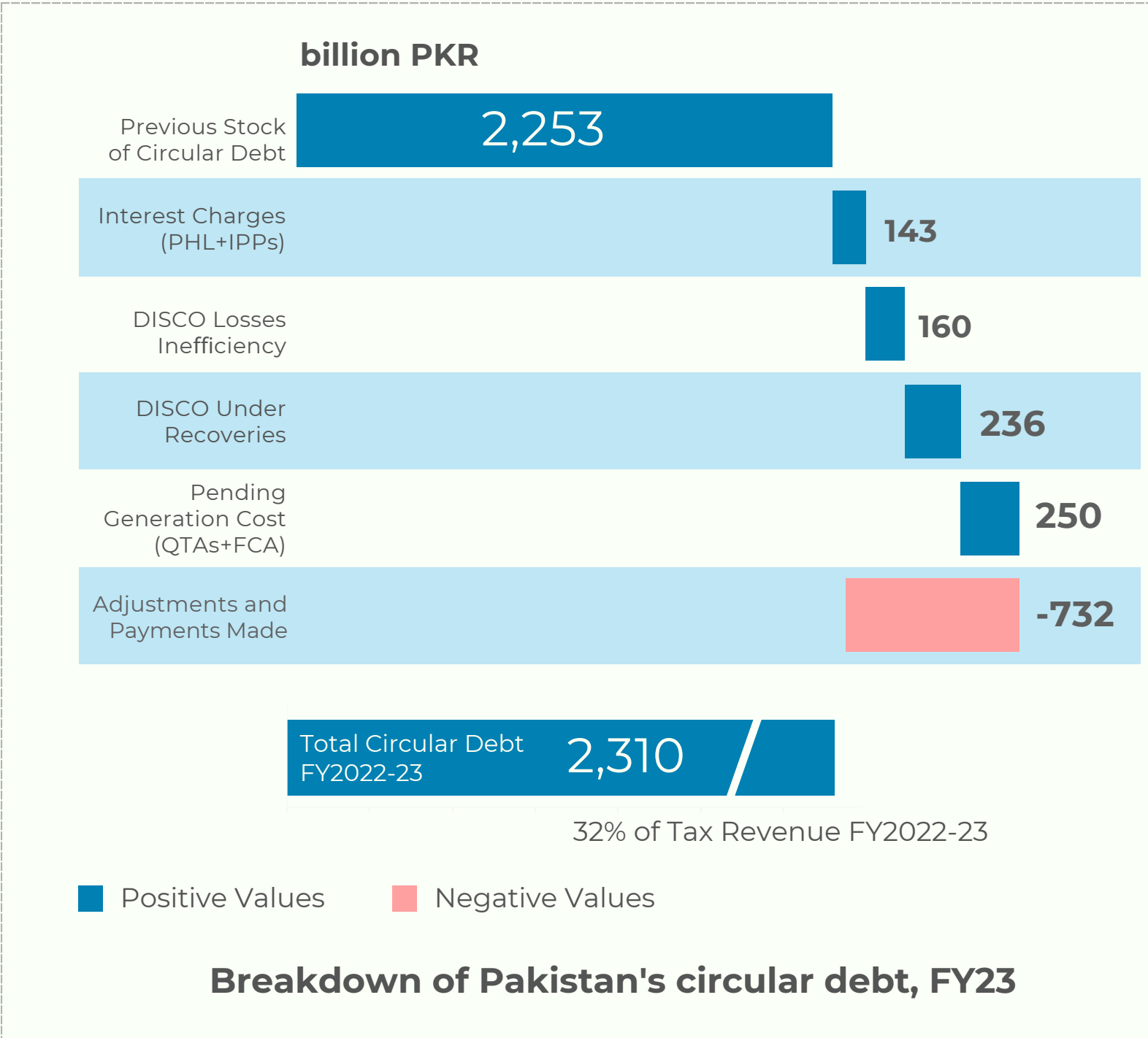
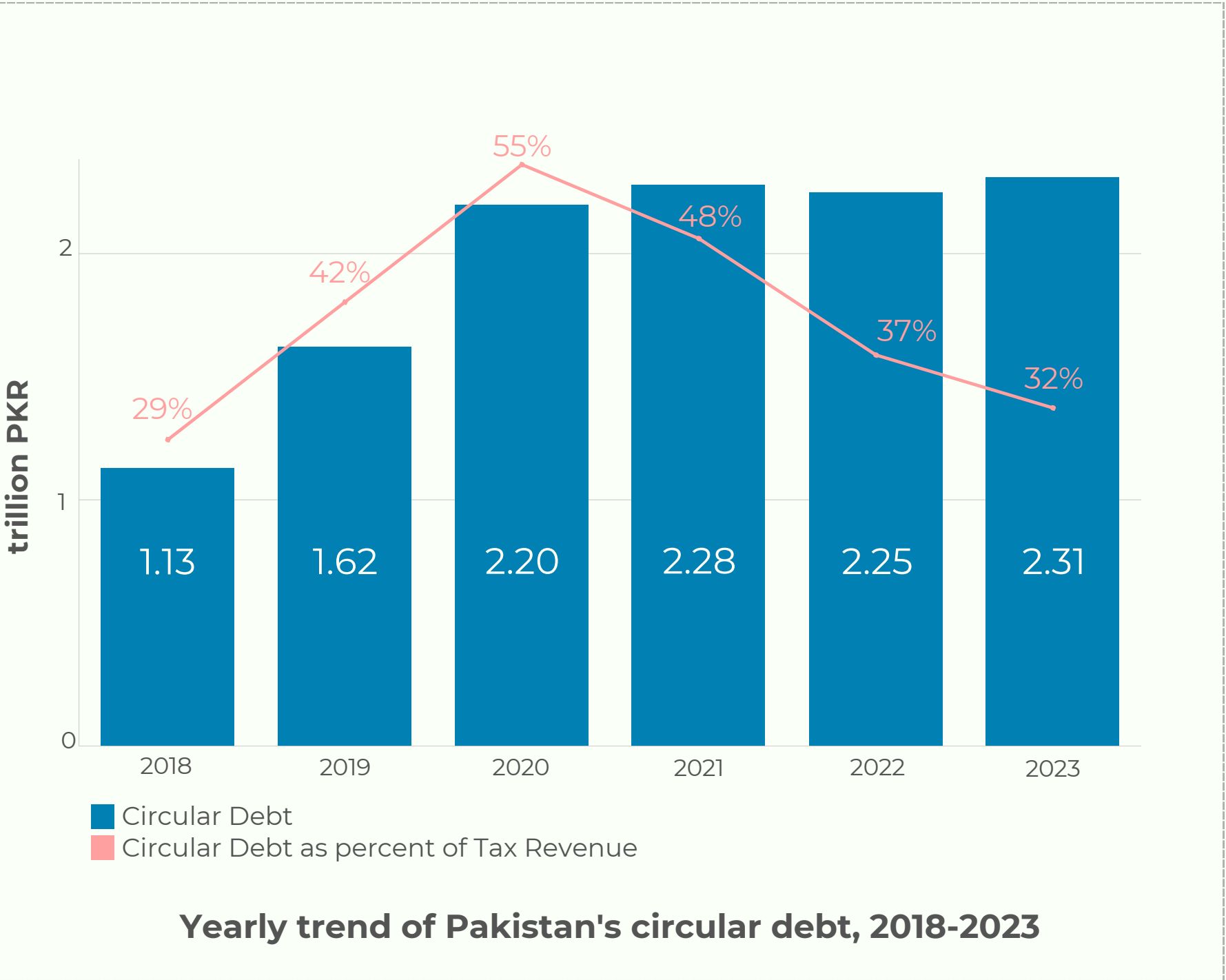


Data Source: State of Industry Report, RF Calculations

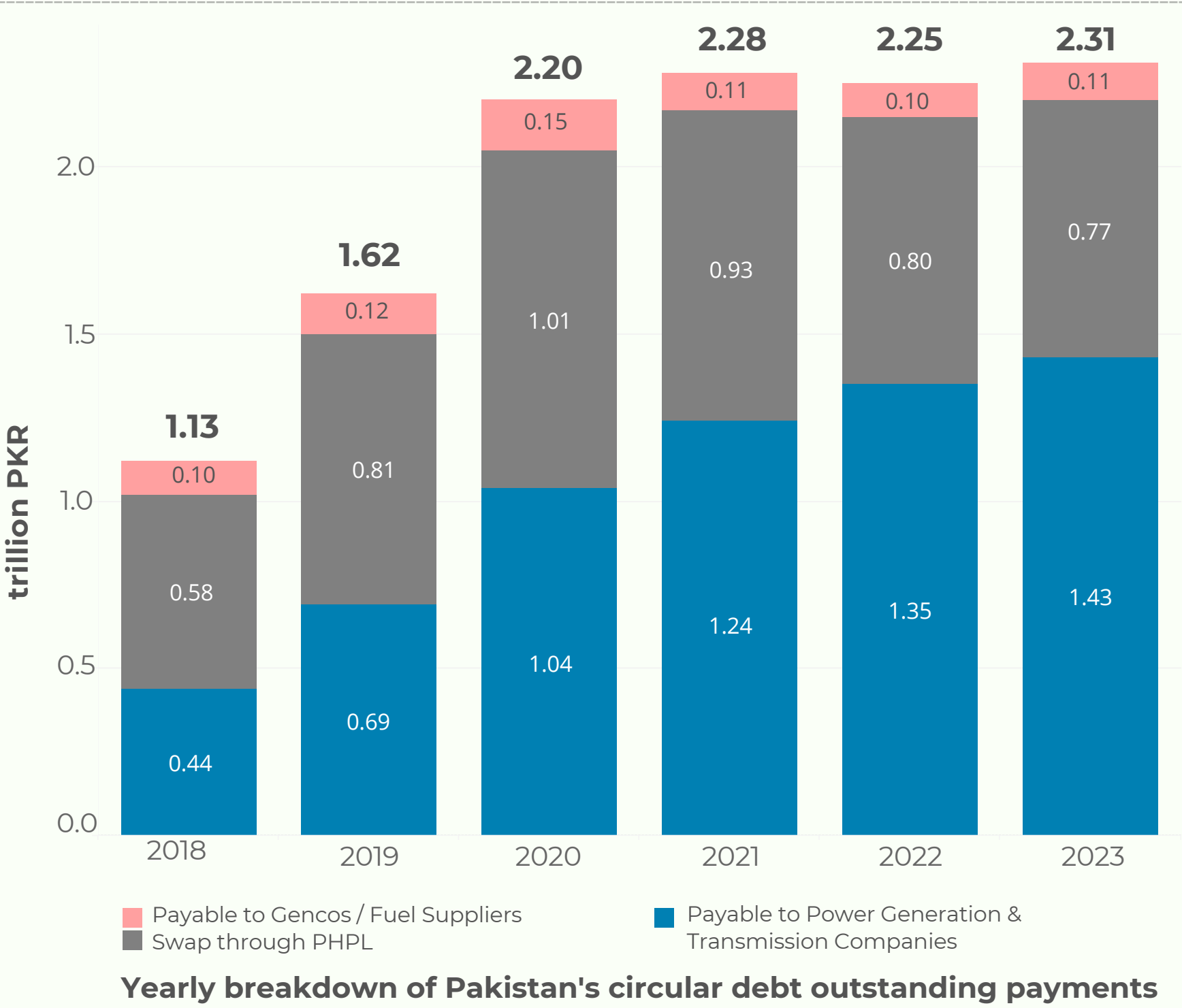
# Case Study: Circular Debt

# The circular debt issue escalated with the induction of "take-or-pay" contracts in FY19, which were intended to alleviate energy shortages.

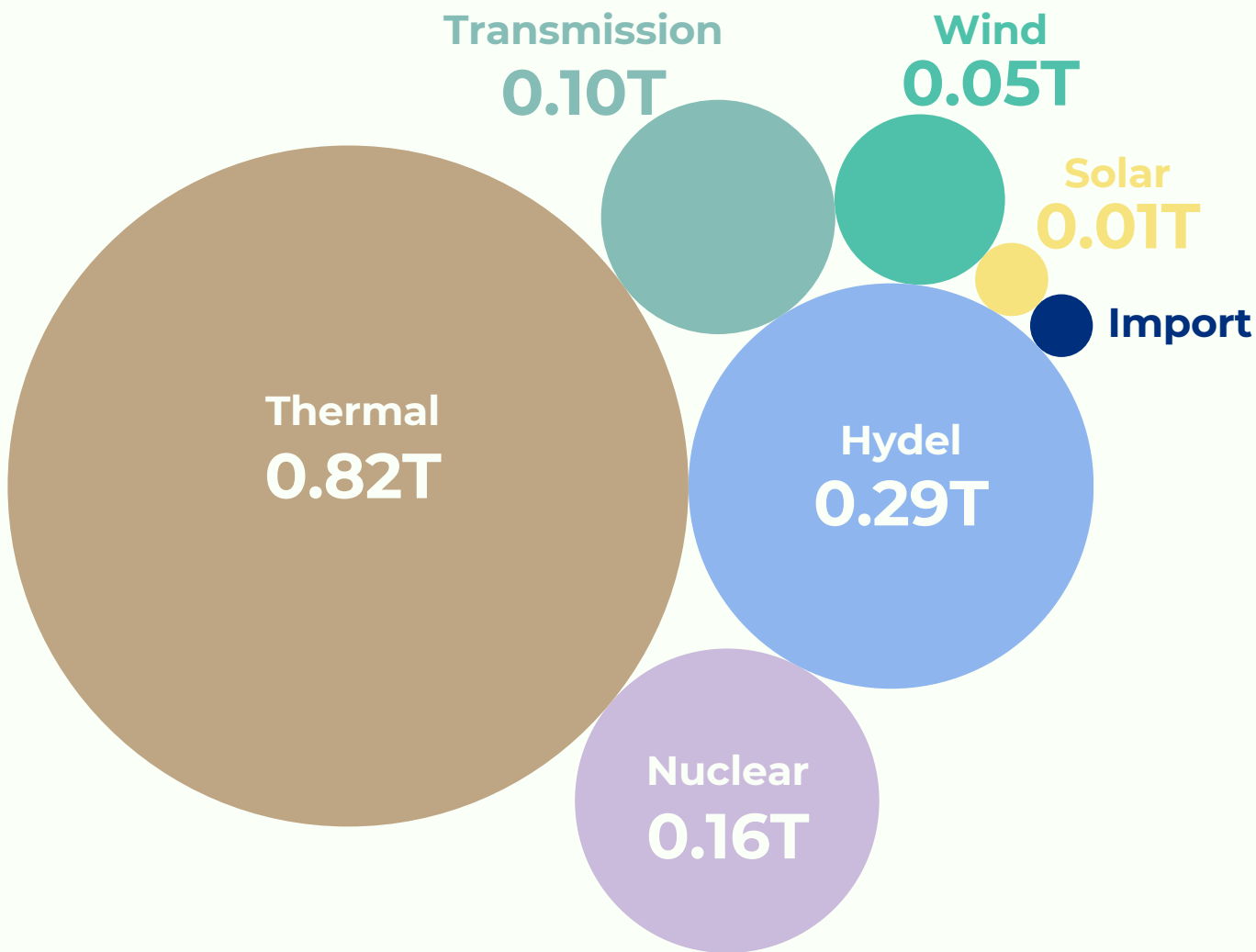
As of January 2024, the power sector's circular debt has reached **PKR 2.6T**, with an additional **PKR 463B** accrued since June 2023.



In FY23, 64% of the Circular Debt comprises of amounts payable to power generation companies.



In FY23, around **PKR 1.33T** was outstanding to power generation companies. Additionally, **PKR 0.1T** was outstanding to NTDC and PMLTC, making a total of **PKR 1.43T** payables to power and transmission companies.



**Breakdown of outstanding payments to power companies, FY23**

# Financial Overview FY23

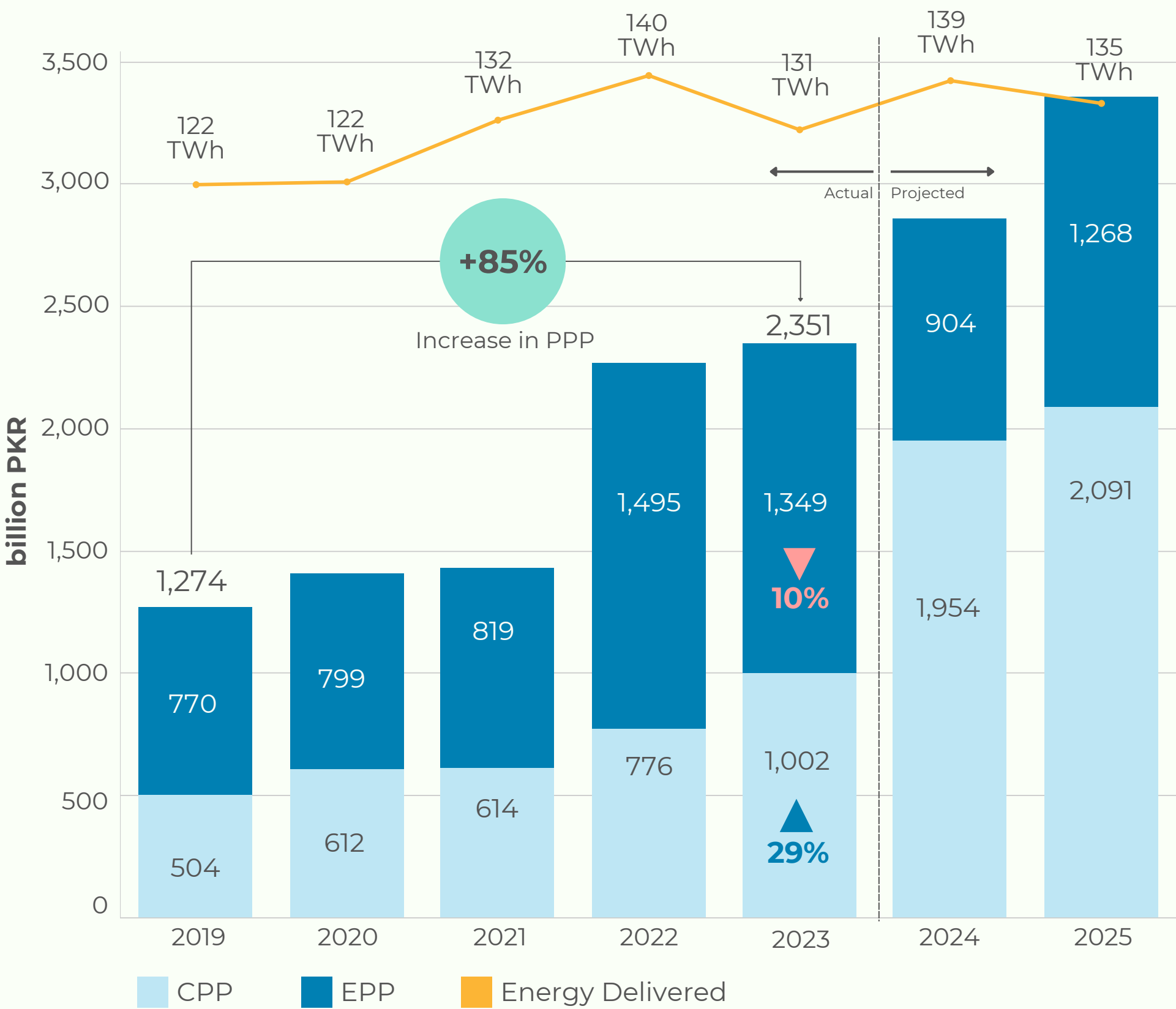


**In FY23, capacity payments saw a 29% YoY increase, emerging as a significant factor in driving up power tariffs across the country.**

The exchange rate parity is one of the major factors impacting electricity prices in Pakistan. Since the country's power sector costs are predominantly tied to the dollar, fluctuations in the exchange rate directly influence energy and capacity charges in the generation segment.

Sales-growth policies are crucial now, especially with capacity payments increasing annually. The recent 10.4% drop in sales in FY23 highlights the complexity of the situation.

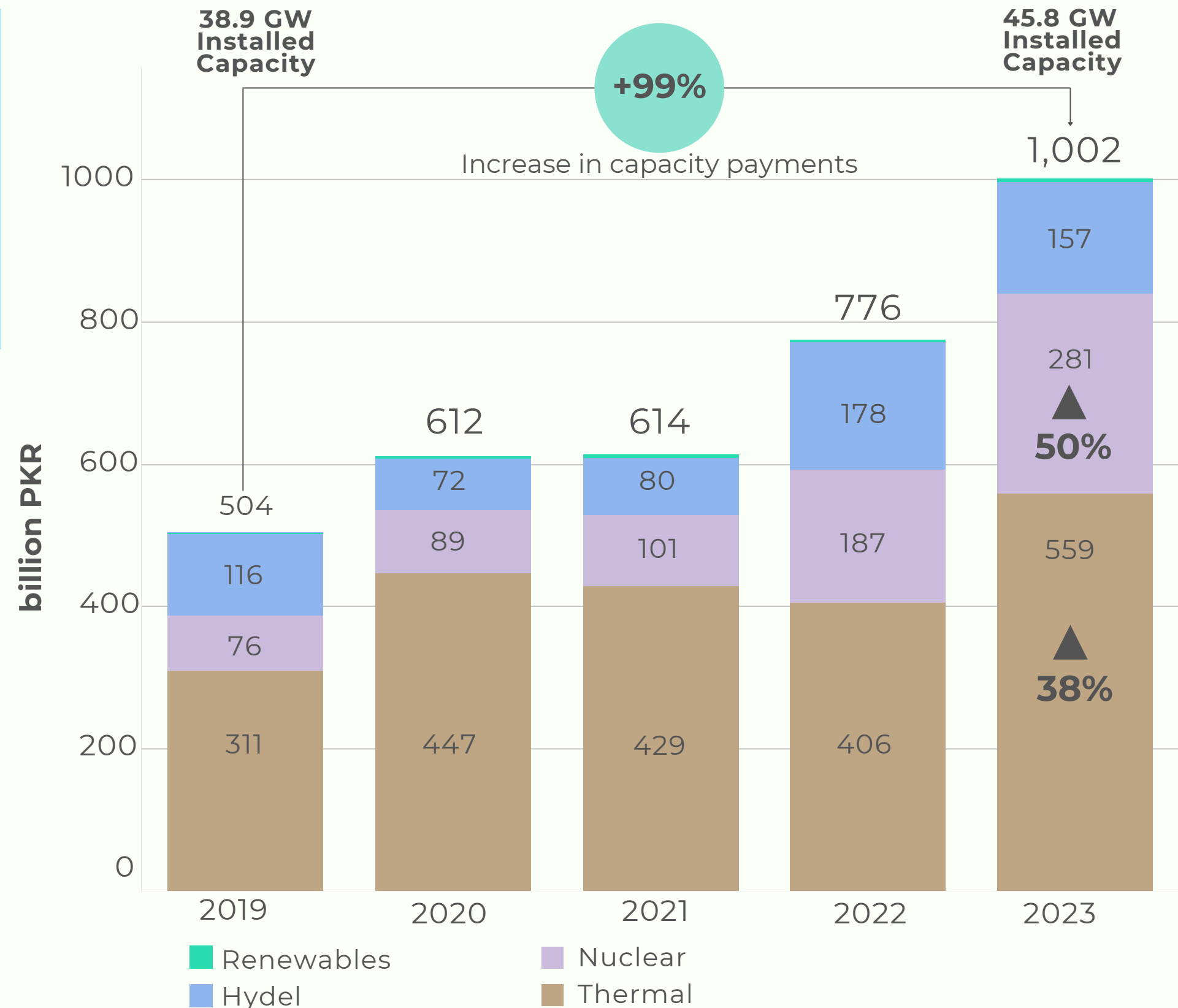
Efforts should focus on bringing all consumers back to the National Grid. The current approach will not ensure the long-term viability of the sector, as a shrinking consumer base will further strain the system's cost recovery.



**Energy purchase price and energy delivered trend, 2019-2025**

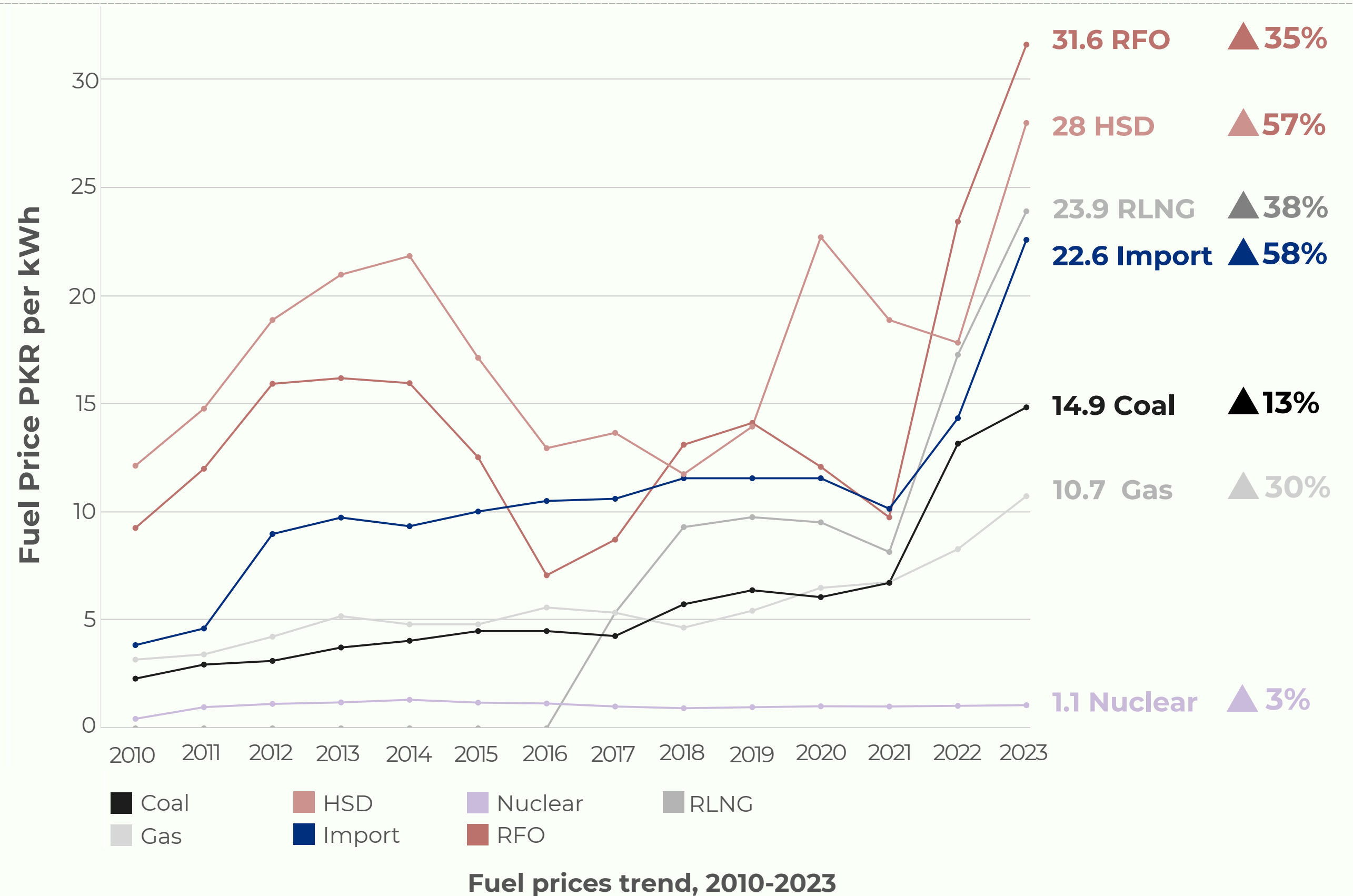
# In FY23, the capacity payments for nuclear and thermal energy increased to PKR 840B.

In FY23, the thermal share increased by ▲38% YoY, and nuclear's share in capacity payments increased by ▲50% on YoY basis.



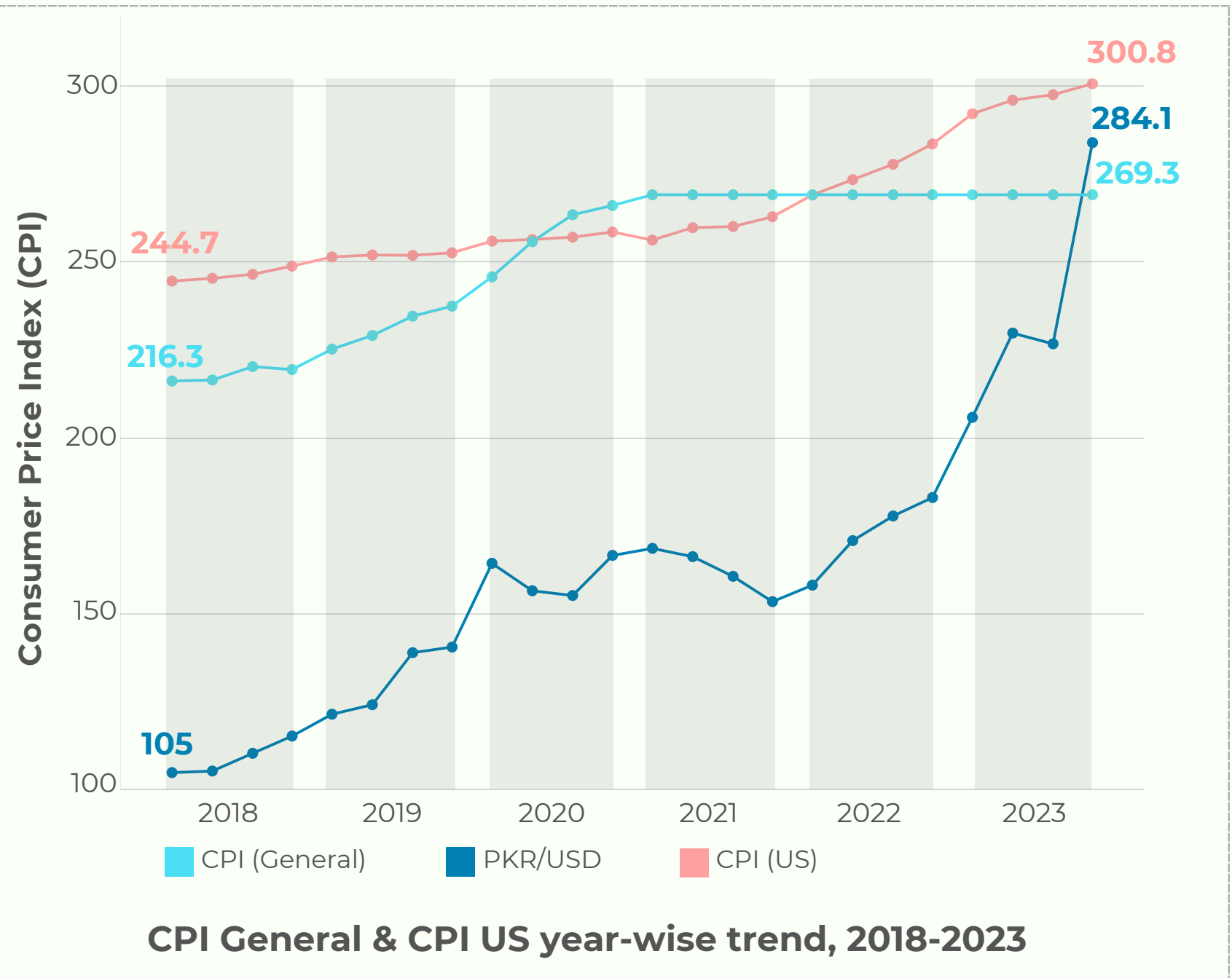
## The Russia-Ukraine war disrupted global energy supplies, causing a significant price hike!

Due to the war and Pakistan's reliance on imported fuel, inflation had surged. Higher fuel and energy prices had placed additional financial pressure on both consumers and businesses



# Economic Pulse Check: The Latest on CPI, KIBOR, and LIBOR Trends.

Global and domestic inflation rates have increased significantly since 2021, prompting central banks worldwide to aggressively tighten monetary policy by rapidly raising interest rates. In Pakistan, there is an anomaly in the Consumer Price Index (CPI) data due to a change in the base year for calculations. NEPRA continued using old CPI figures until June 2023, as they did not immediately adopt the new base year (i.e. 2015-16) implemented by the Pakistan Bureau of Statistics (PBS) in July 2020.



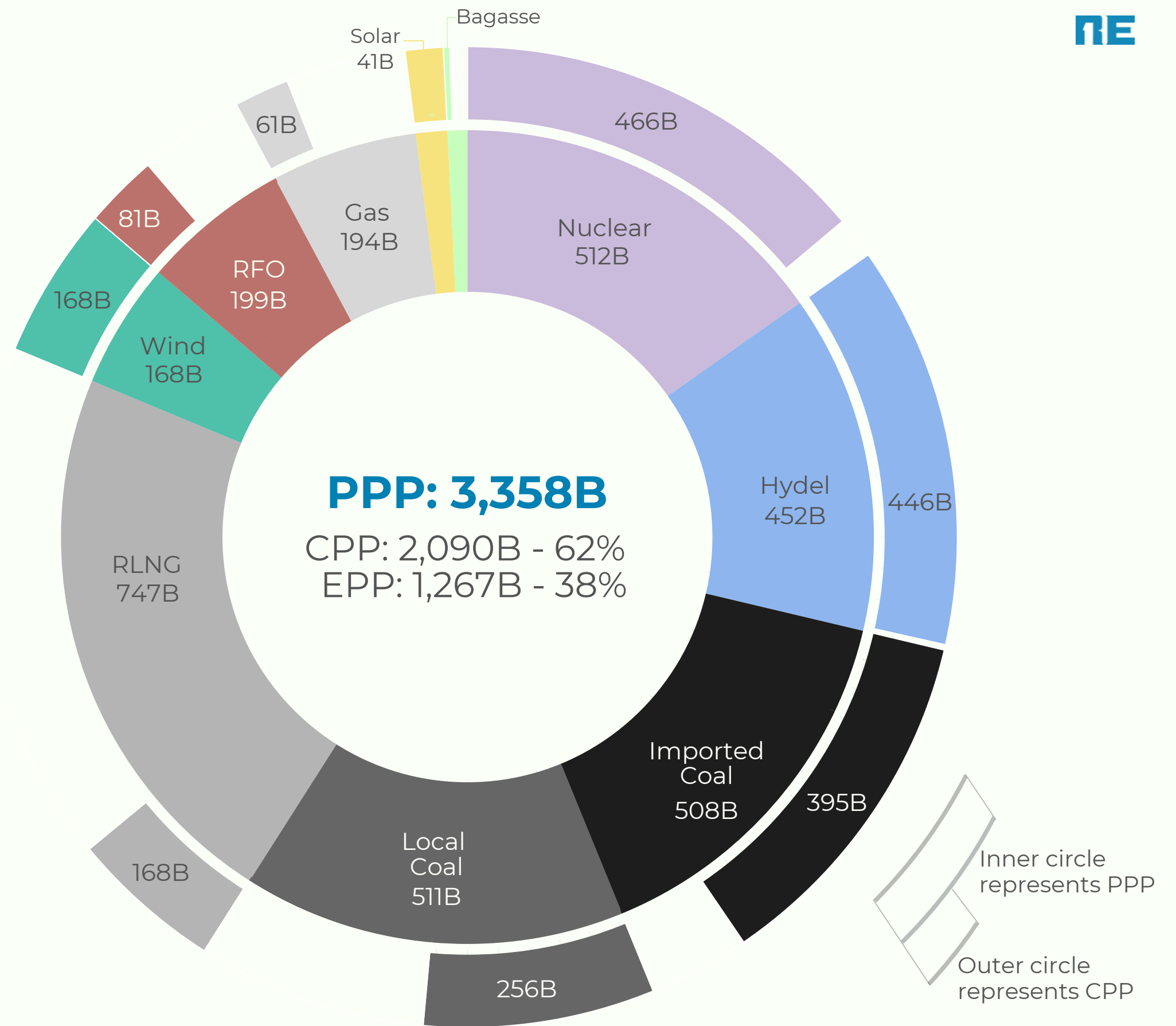
**The Power Purchase Price for FY25 is forecasted to reach PKR 3.3T, ▲17.5% YoY, corresponding to an energy generation of 134 TWh ▼3% YoY.**

The Power Purchase Price (PPP) comprises of:

- Energy Purchase Price (**EPP**) that comprises fuel charges and variable operations and maintenance charges.
- Capacity Purchase Price (**CPP**) are payments to the power producers to cover their cost of availability of its capacity, regardless of the power generation.

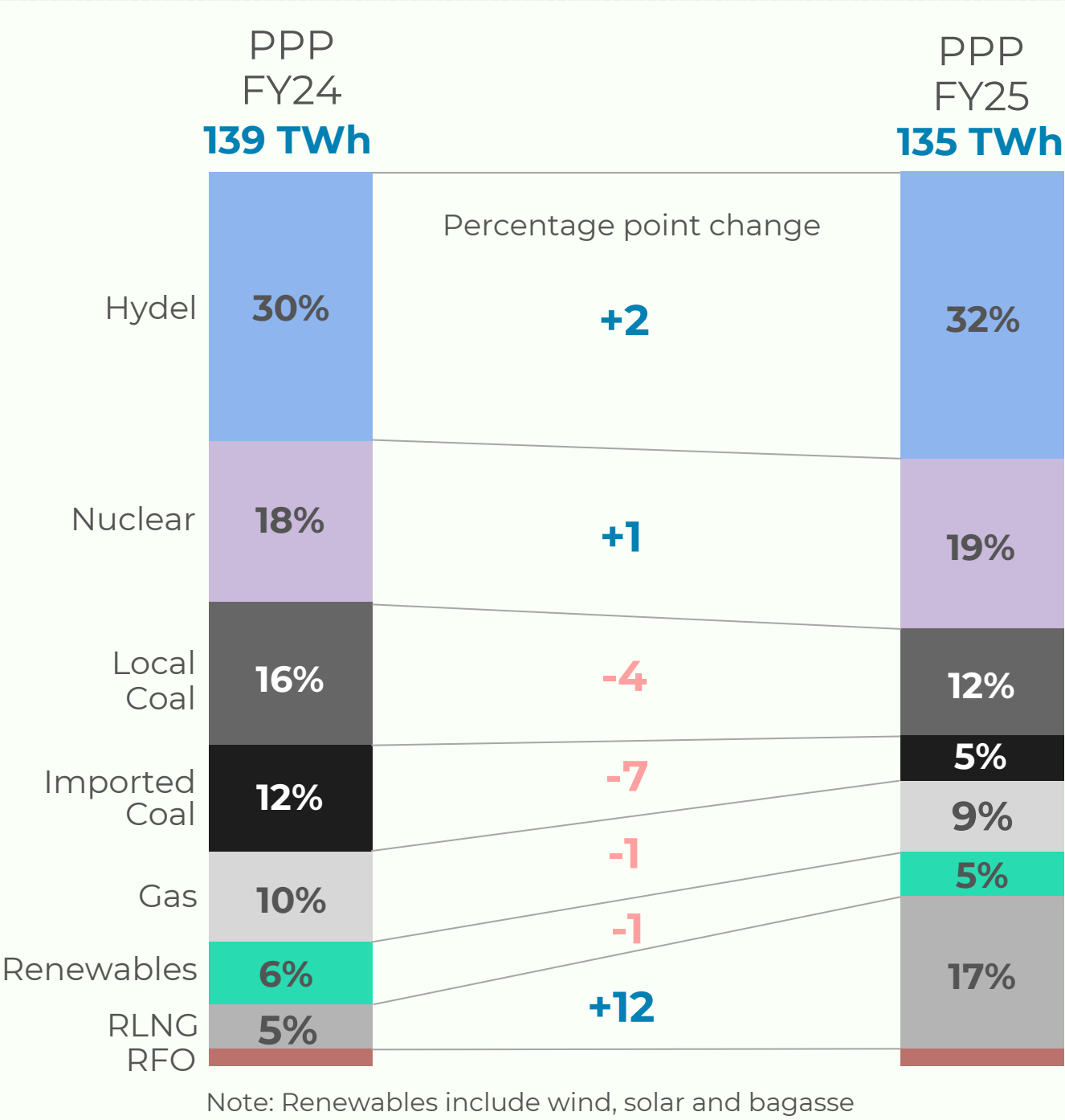
The variation in projected fuel costs or changes in the generation mix is adjusted through monthly **Fuel Cost Adjustment (FCA)**.

In contrast, any variations in projected capacity charges, Use of System Charges (UoSC), or Market Operator fees, among others, are adjusted through **Quarterly Adjustments (QTA)**.

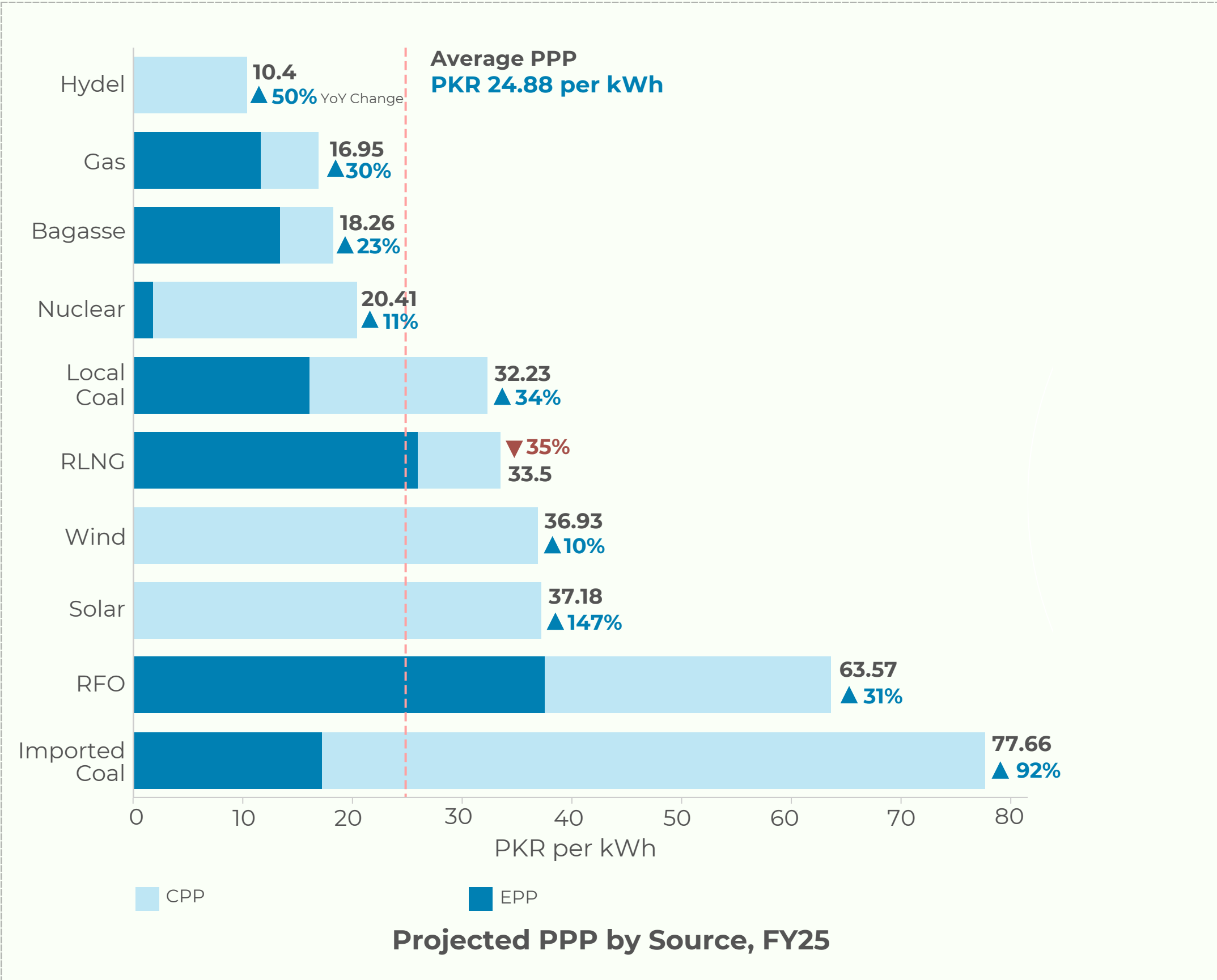


**Energy source-wise break-down of projected power purchase price, FY25**

# Power Purchase Projection for FY25



PPP comparison of FY24 and FY25



Projected PPP by Source, FY25



# Outlook

- Thermal power made up 63% of the installed capacity as of FY23, with most plants dependent on imported fuel. This reliance is expected to continue impacting power generation in the coming years.
- The Pak-Matiari transmission line has increased evacuation capacity from south to north, but its underutilization and other transmission constraints remain challenges that need to be addressed. To resolve these issues, transmission system upgrades advised under the TSEP should be expedited to alleviate network constraints and address wind power curtailment.
- Capacity payments rose from PKR 776B in FY22 to PKR 1,002B in FY23, a 29% YoY increase, and are expected to hit PKR 2,091B by FY25. To ease this financial burden, the government should renegotiate contracts with power producers and consider early retirement of underutilized plants as well as those nearing the end of their contracts.
- Consumer tariffs have risen significantly and are expected to continue increasing. If this trend continues, reliance on the National Grid will decrease, reducing demand and potentially pushing utilities into a "utility death spiral" worsening DISCO's financial health and complicating the government's management or privatization efforts.
- Accelerating the integration of renewable energy can curb rising electricity costs by reducing reliance on imported fossil fuels, lowering the electricity tariff, and decreasing the import bill.



AC	Alternating Current	LIBOR	London Interbank Offered Rate
B	Billion	LESCO	Lahore Electric Supply Company Limited
CHASNUPP	Chashma Nuclear Power Plant	LPG	Liquefied Petroleum Gas
CPEC	China–Pakistan Economic Corridor	M	Million
CPP	Capacity Purchase Price	NDTC	National Transmission and Despatch Company Limited
CPI	Consumer Price Index	NPMV	Non-Project Missed Volume
CPPs	Captative Power Plants	PESCO	Peshawar Electric Supply Company Limited
CPPA	Central Power Purchasing Agency	PHPL	Power Holding Private Limited
DC	Direct Current	PHL	Power Holding Limited
EPP	Energy Purchase Price	PKR	Pakistani Rupees
FCA	Fuel Cost Adjustment	PMTLC	Pak Matiari-Lahore Transmission Company Limited
FESCO	Faisalabad Electric Supply Company Limited	PPP	Power Purchase Price
FY	Fiscal Year	QESCO	Quetta Electric Supply Company Limited
GENCO	Generation Company	QTA	Quarterly Adjustments
GEPCO	Gujranwala Electric Power Company Limited	RE	Renewable Energy
GW	Giga Watt	RF	Renewables First
HESCO	Hyderabad Electric Supply Company Limited	RFO	Residual Fuel Oil
HSD	High-Speed Diesel	RLNG	Re-Gasified Liquid Nitrogen Gas
HVDC	High Voltage Direct Current	SEPCO	Sukkur Electric Power Company Limited
IPPs	Independent Power Producers	SPP	Small Power Producer
IESCO	Islamabad Electric Supply Company Limited	TESCO	Tribal Area Electricity Supply Company Limited
KE	K-Electric Limited	T&D	Transmission and Distribution
kV	Kilo-Volt	TOE	Tons of Oil Equivalent
km	Kilometer	TSEP	Transmission System Expansion Plan
kWh	Kilo-Watt Hour	TWh	Tera-watt Hour
K2	Karachi Nuclear Power Plant 2	USD	United States Dollar
K3	Karachi Nuclear Power Plant 3	VRE	Variable Renewable Energy
KANUPP	Karachi Nuclear Power Plant	YoY	Year on Year
KIBOR	Karachi Interbank Offered Rate		

# Abbreviations



Renewables First (RF) is a think tank for energy and environment. Our work addresses critical energy and natural resource issues with the aim to make energy and climate transitions just and inclusive.



RENEWABLES FIRST

10 - 11, 3rd Floor,  
Executive Complex,  
G-8 Markaz,  
Islamabad  
+9251 - 8773676  
[info@renewablesfirst.org](mailto:info@renewablesfirst.org)