RENEWABLES FIRST

Pakistan's Power Market Insights

September 2025

Introduction

Our power market insights highlight important trends shaping Pakistan's power sector. This document focuses on long-term changes, such as the effects of fuel cost variations and shifts in the generation mix. The goal is to provide businesses and consumers with a monthly overview of how the country's power sector is evolving.

Key highlights

Electricity generation in Sep 25 rose 1% YoY to 12.6 TWh but declined 11% MoM as cooler weather and higher rainfall reduced cooling demand.

Hydel output fell 13% MoM as the monsoon season tapered; local coal, natural gas, and nuclear generation fell short of projections due to outages and refueling- being offset by higher imported coal and RFO generation.

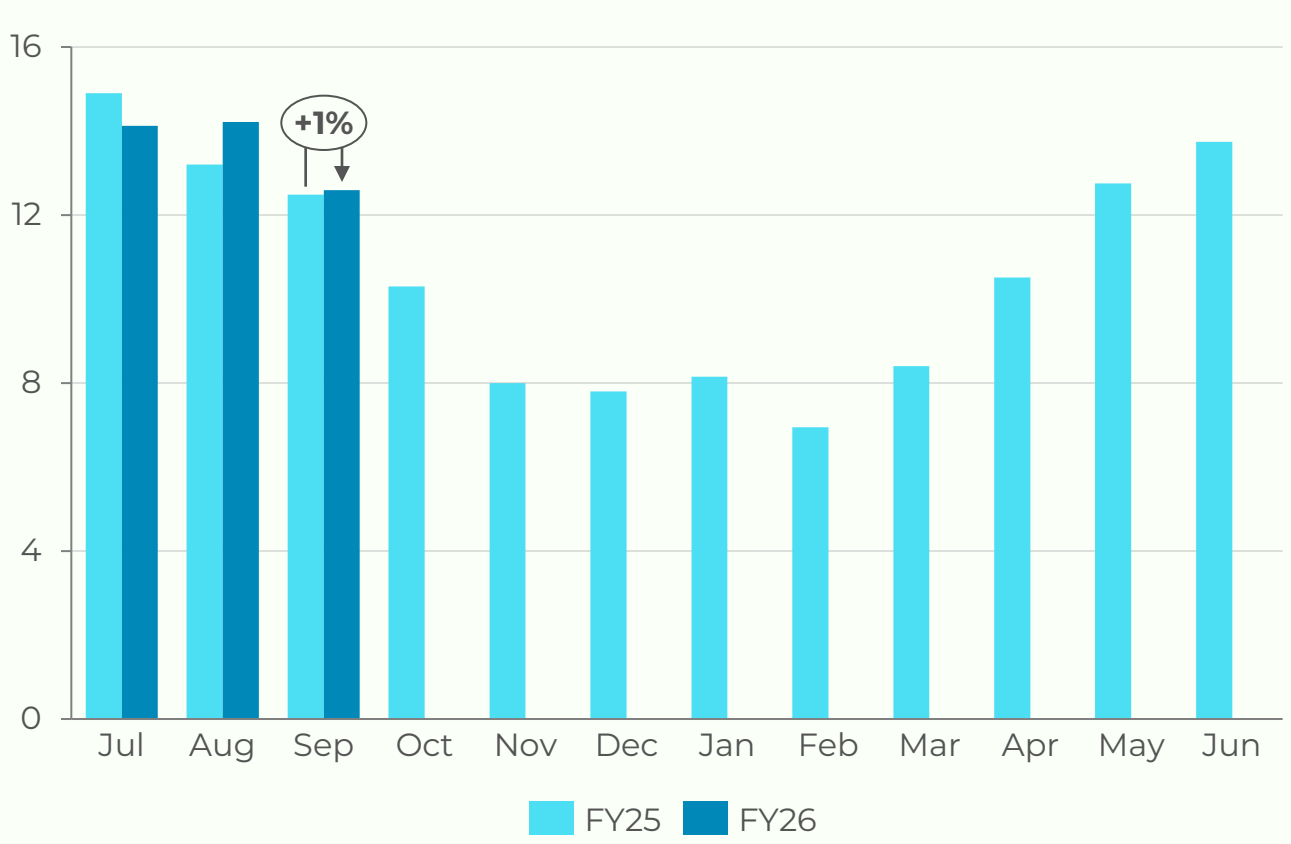
The actual fuel cost was 6.4% below reference with a negative fuel cost adjustment (FCA) of PKR 0.48 per kWh, providing PKR 5.9 billion (B) in consumer relief.

A deeper midday dip in generation reflected growing solar uptake, highlighting the need for greater grid flexibility.

#RFPowerMarketInsights

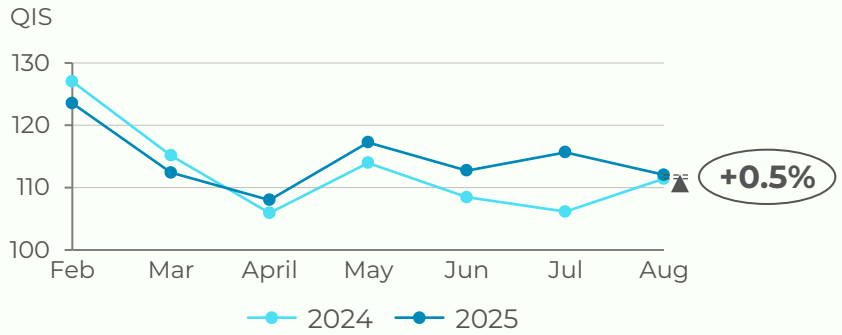
Weather-linked demand stability kept generation largely unchanged YoY in Sep 25

Month-wise electricity generation: FY25 vs FY26



- Generation in Sep 25 totaled 12.6 TWh, down 11% MoM as cooler temperatures (29.13°C vs. 30.64°C in Aug) and above-average rainfall reduced cooling and overall power demand.
- On a YoY basis, generation rose 1%, supported by stable demand under similar climatic conditions (29.13°C vs. 29.25°C in Sep 24).
- While LSM* QIS* data for Sep 25 is unavailable, Aug 25 showed minimal YoY variation indicating broadly stable industrial output despite a slight MoM slowdown.

YoY change in QIS of selected LSM Items (2024-2025)

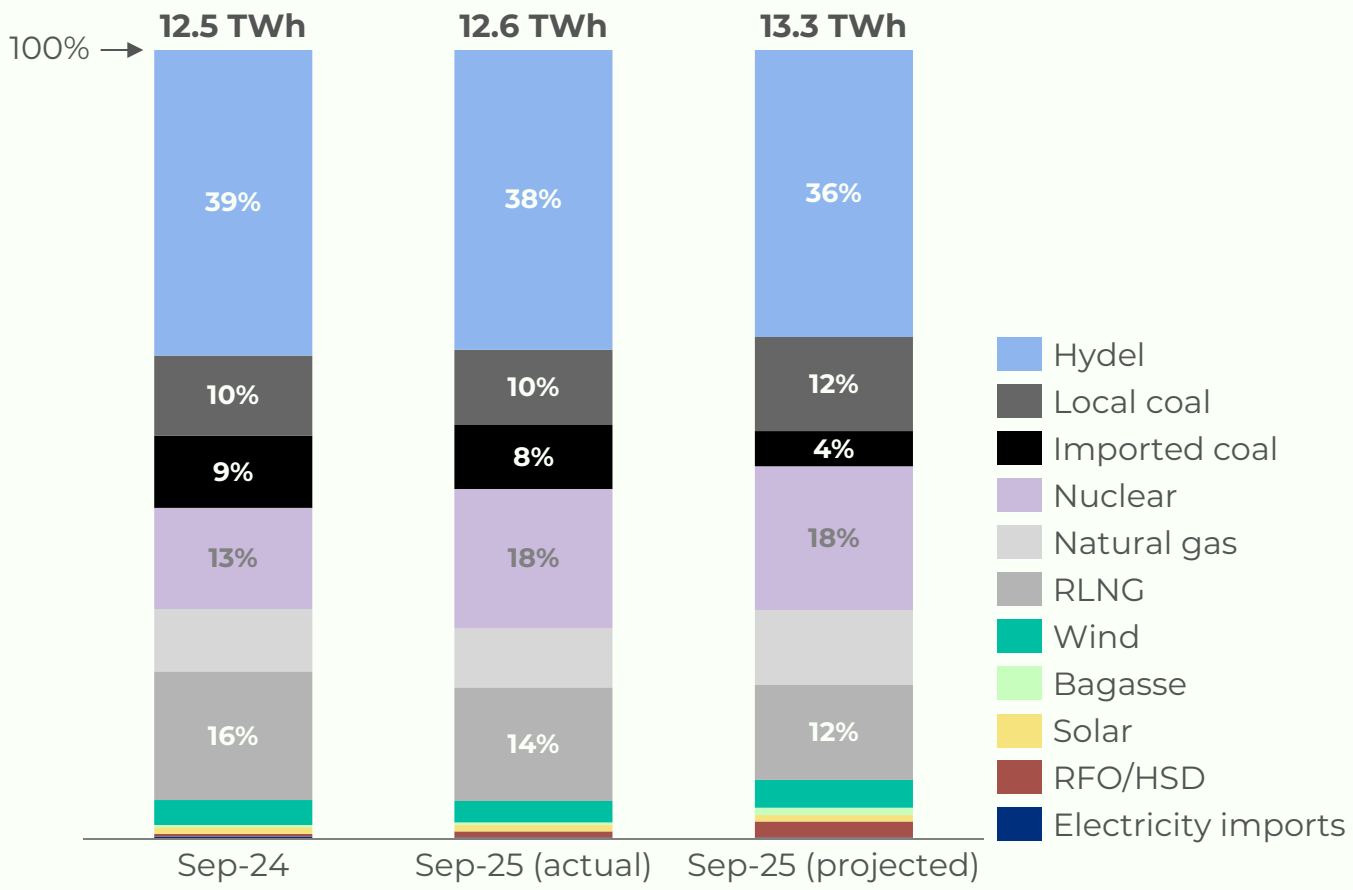


Data Source: NEPRA, Pakistan Bureau of Statistics & Renewables First's calculations

*LSM: Large Scale Manufacturing
*QIS: Quantum Index Series

Hydel and RLNG offset lower-than-projected local coal and natural gas generation

Energy source-wise generation mix , Sept 24 vs Sept 25 (actual) vs Sept 25 (projected)



Data Source: NEPRA & Renewables First's calculations

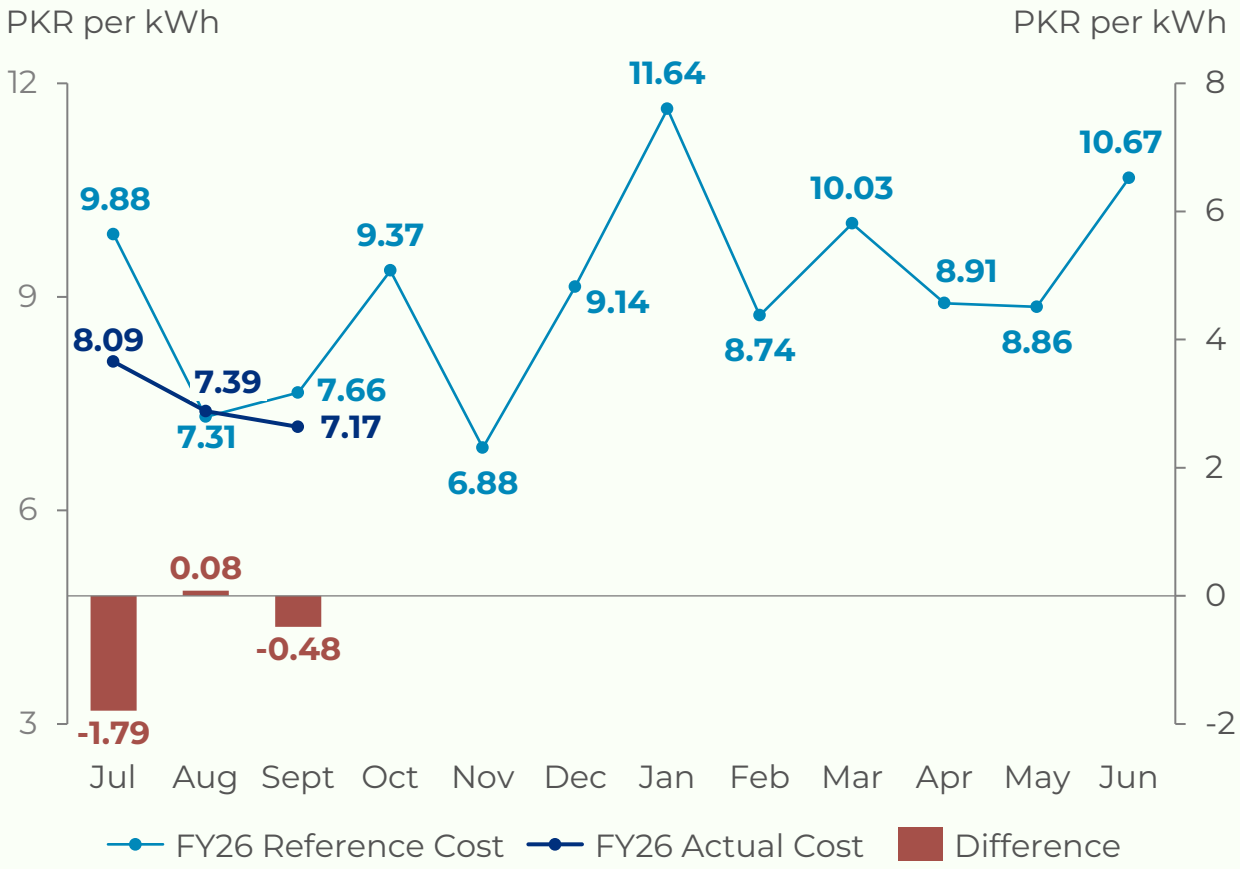
- Hydel generation in Sep 2025 was 4.8 TWh, down 13% MoM as the monsoon tapered off, though its share exceeded projections.
- Local coal (1.2 TWh), natural gas (0.9 TWh), and nuclear (2.2 TWh) generation fell below projections due to forced outages and refueling at major plants, including SECL, HBS, UCH-I/II, Liberty, and C-III/C-IV*.
- Imported coal, hydel and RLNG offset the shortfall with imported coal generating 1 TWh in Sep 25 - 72% above projections.
- Plant factors averaged 69% for local coal and 29% for imported coal plants consistent with higher utilization of domestic coal and declining reliance on imports.
- RFO rose 1.5x YoY amid grid overloading constraints and a gas pipeline rupture on 22 Sep but remained marginal in the mix.
- Solar and wind contributed 0.45 TWh- 3.6% of total generation, down 11% YoY.

*C-III: Chashma nuclear plant unit-3
C-IV: Chashma nuclear plant unit-4
RFO: Residual Fuel Oil

HBS: Haveli Bahadur Shah
SECL: Thar Block-1

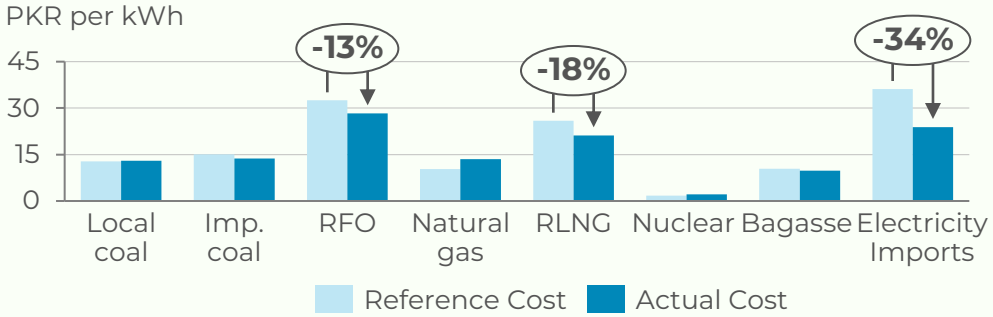
Fuel costs in Sep 25 were 6.4% below reference, with a negative adjustment of PKR 0.48 per kWh providing PKR 5.9 B in consumer relief

Fuel cost adjustments in FY26



- The actual fuel cost for Sep 25 was PKR 7.17 per kWh, 6.4% lower than the reference cost of PKR 7.66 per kWh. NEPRA has set a negative FCA of PKR 0.48 per kWh, to be applied in Nov 25 bills for DISCOs and K-Electric consumers.
- Electricity generation in Sep 25 was overall 5% lower than projected hence the lower total cost.
- A higher hydel share (38% vs. 36%), and lower per unit import (-34%), RLNG (-18%), and RFO (-13%) costs compared to the reference values also contributed to the negative FCA.

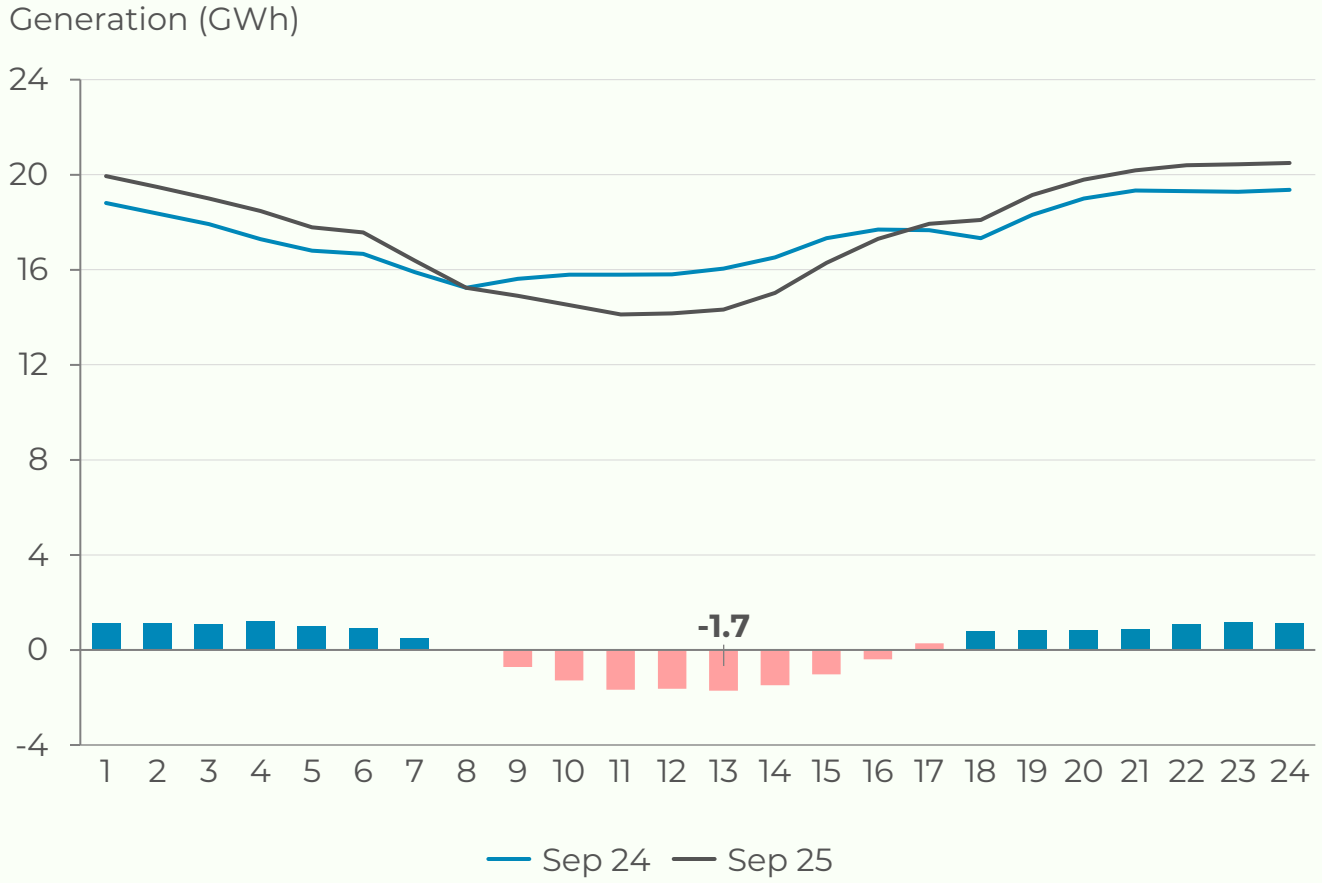
Per unit fuel cost comparison for Sep 25, actual vs reference



Data Source: NEPRA & Renewables First's calculations

Midday generation dip deepened 1.7 GWh YoY in Sep 25 as solar adoption expands

Avg. monthly hourly generation profiles, Sep 24 vs Sep 25

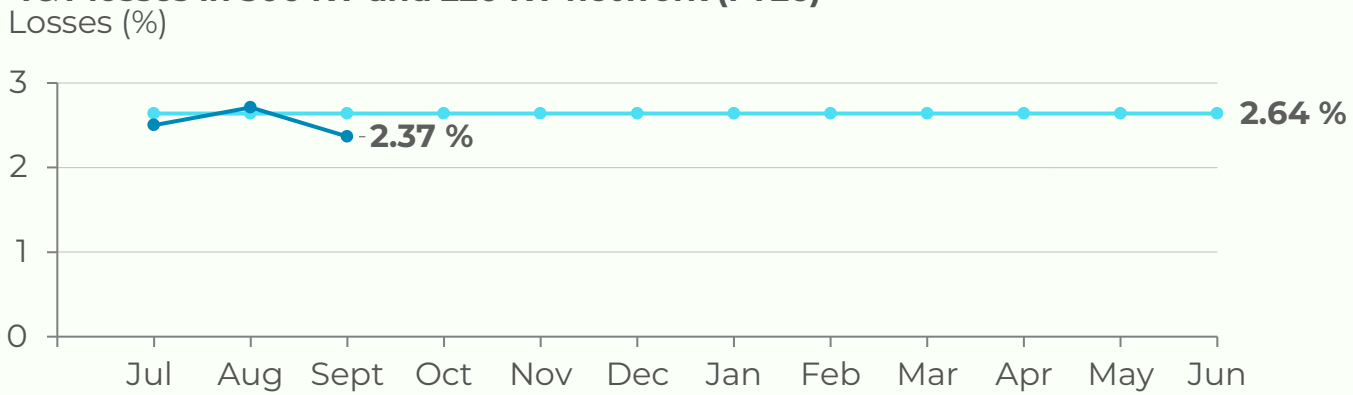


- The gap between maximum and minimum average hourly generation in Sep 25 was 6.3 GWh.
- Compared to Sep 24, the midday dip in generation deepened by 1.7 GWh, indicating a widening duck curve driven by rising solar output, including net-metered, off-grid, and behind-the-meter generation.
- This growing adoption of consumer-owned energy resources highlights the need for greater investment in grid flexibility and enhancement.

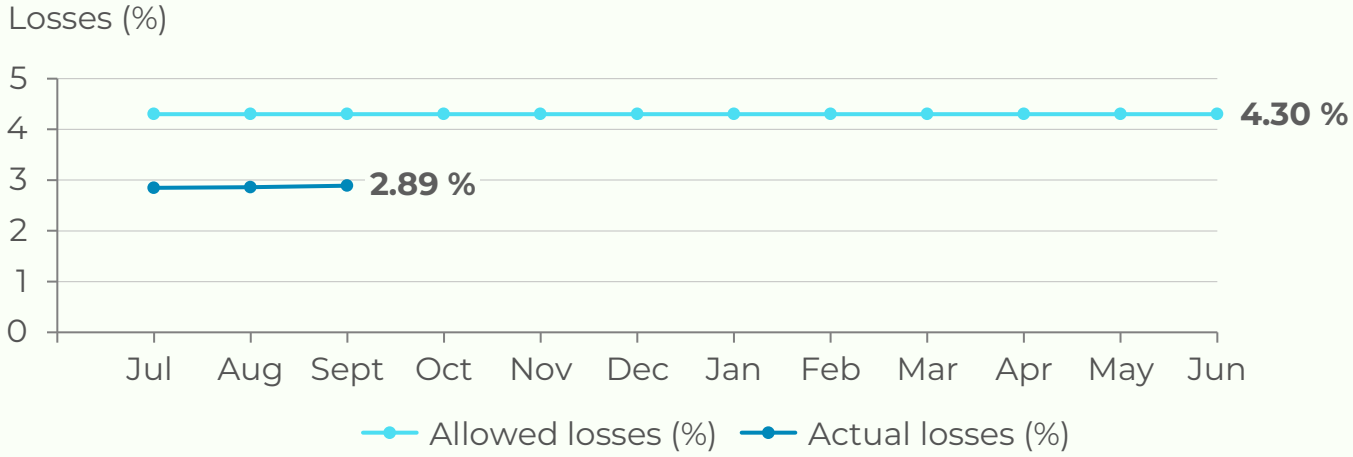
Data Source: Independent System and Market Operator (ISMO) & Renewables First's calculations

T&T losses remained below limits amid high hydel generation during monsoon season

T&T losses in 500 KV and 220 KV network (FY26)



T&T losses in PMLTC (HVDC) line (FY26)



- Transmission and transformation (T&T) losses in 500 KV and 220 KV network in Sep 25 were 2.37%, below the allowed threshold of 2.64%.
- For the PMLTC (HVDC) line*, T&T losses were 2.89% while allowed losses are 4.3%.
- The losses amounting to 353.66 GWh are consistent with Sep seasonal monsoon patterns of higher hydel generation.

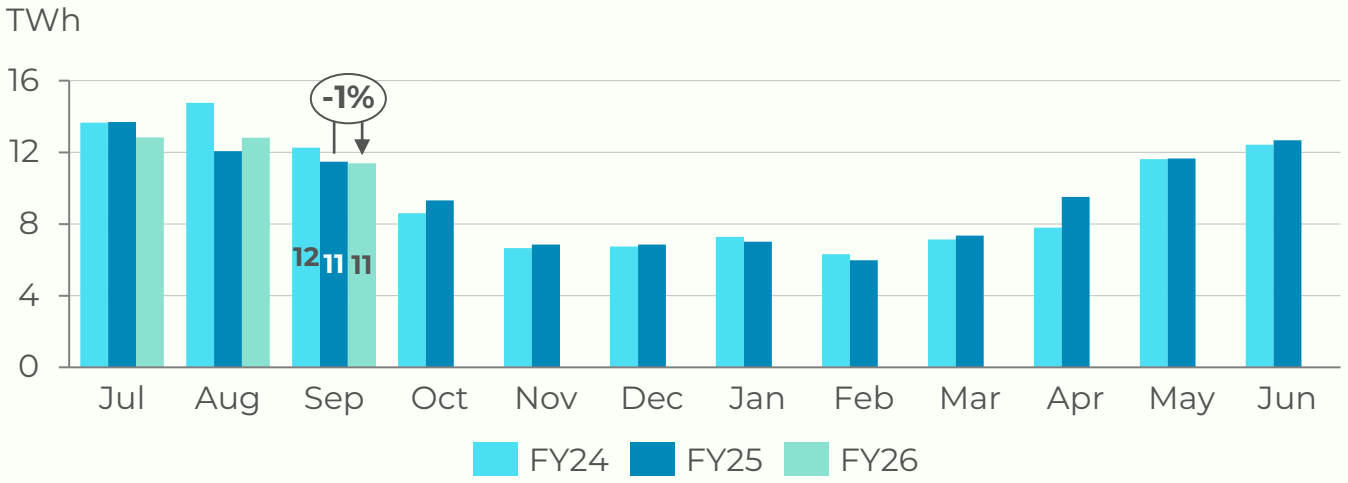
*PMLTC (HVDC) transmission line connects power plants in the south of Pakistan to the major urban and industrial load centers in the north.

PMLTC: Pak Matiari-Lahore Transmission Company
HVDC: High-voltage direct current

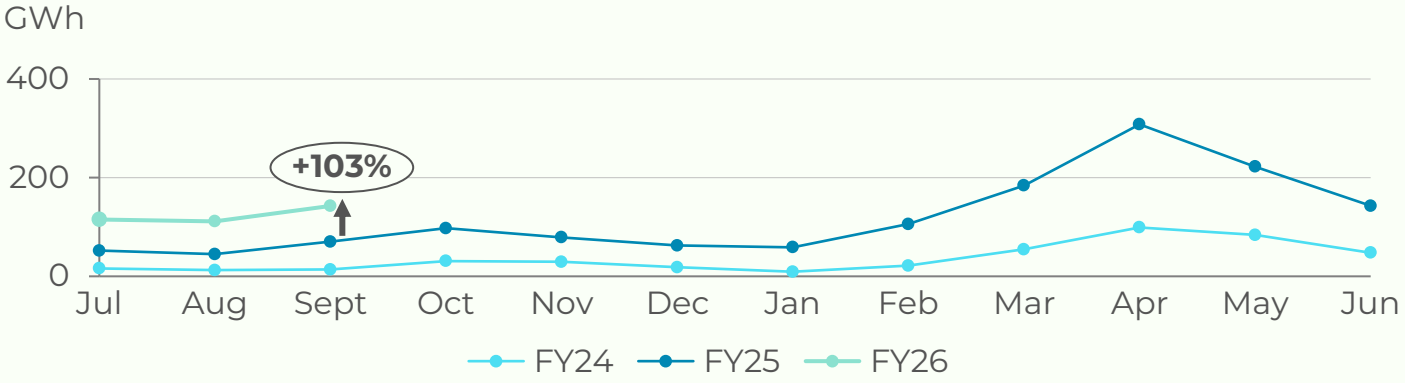
Data Source: NEPRA & Renewables First's calculations

Solar net-metering rose 103% YoY, with a modest 1.25% share signaling huge potential

Total units procured by DISCOs, FY24 - FY26



Comparison of DISCOs' net-metering units procured, FY24 - FY26



- DISCOs procured 11.38 TWh in total in Sep 25. The downward trend in Jul-Sep 25 is consistent with changing seasons and thus electricity demand.
- However, in Sep itself, there is also a declining trend from FY24 to FY26. Reduced industrial activity and accelerating solar adoption explain this trend.
- Net-metering units procured in Sep 25 totaled 142.67 GWh, representing a 28% MoM increase, and 103% YoY increase, showing exponentially growing solarization in the country.
- Despite this growth, net-metering units were only 1.25% of total procurement, indicating untapped potential still.

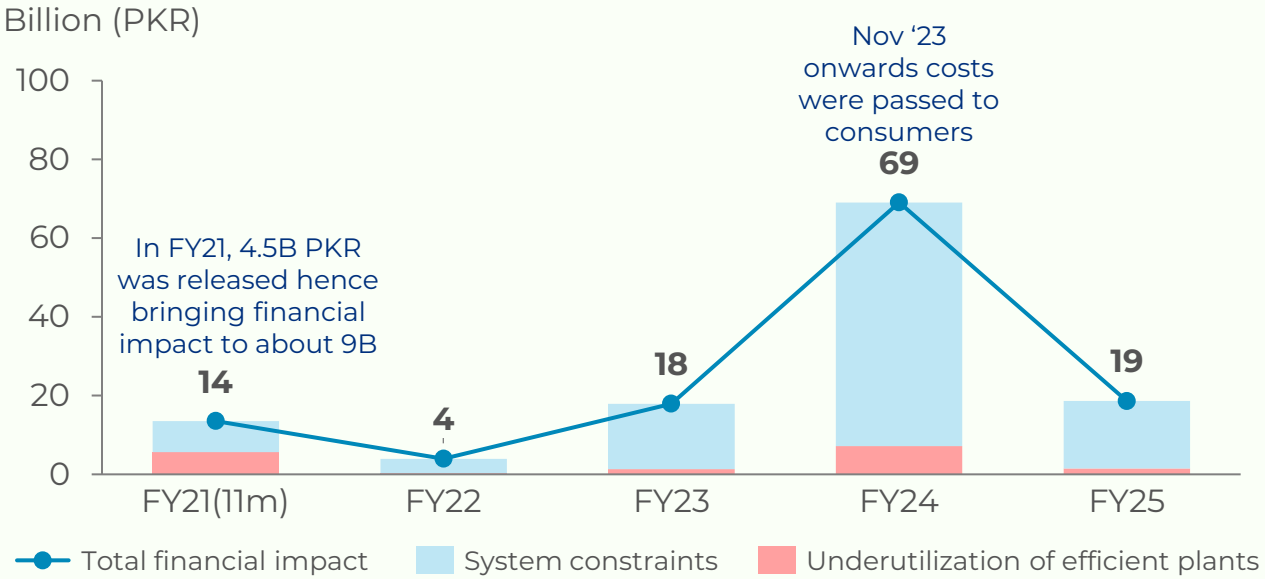
Data Source: NEPRA & Renewables First's calculations

Special Insights

Grid constraints and inefficiencies: A growing burden on consumers

Insufficient preparedness of the grid risks amplifying inefficiency costs on consumers

Financial Impact of merit order violations due to transmission constraints (FY21-FY25)



	Financial impact (including system constraints, underutilization of efficient plants and RLNG shortages)
Aug 20- Oct 23 (withheld from consumers)	82 B PKR
Nov 23- Jul 25 (passed onto consumers)	135 B PKR

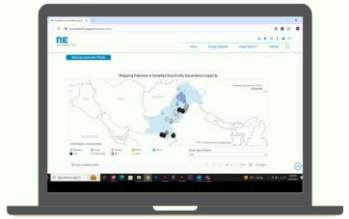
Data Source: NEPRA & Renewables First's calculations

*NTDC: National Transmission and Despatch Company
*DER: Distributed Energy Resources

- Persistent delays in power sector reforms have sustained structural inefficiencies, the costs of which continue to fall on consumers. The National Grid Company (formerly NTDC*) exemplifies this challenge.
- Transmission constraints leading to out-of-merit dispatch imposed an estimated PKR 85 B burden on consumers between Nov 2023 and Jul 2025.
- Weak coordination and misplanning in RLNG supply chain added a further PKR 50 B in inefficiency costs.
- While roughly PKR 82 B of such costs were previously withheld to shield consumers, a May 2024 decision permitted their recovery through tariffs.
- Passing these inefficiencies onto consumers erodes economic efficiency, distorts least-cost dispatch, weakens accountability, and undermines regulatory credibility.
- As DERs* expand and the grid faces increasing stress, constraint-related costs are likely to rise further, disproportionately affecting grid-dependent users.
- Strengthening grid infrastructure and institutional capacity is therefore critical to ensure readiness for future power system needs and to prevent further escalation of consumer burden.

For more insights, visit:

Pakistan Energy and Climate Insights Dashboard



www.peci.renewablesfirst.org

PECI, an initiative of Renewables First, is an innovative platform that consolidates fragmented energy data from various agencies, supporting informed decision-making across Pakistan's energy sector. By centralizing critical energy and climate data, PECI improves accessibility and clarifies environmental impacts and emissions for stakeholders. RF's collaboration with Herald Analytics led to the development of the PECI Dashboard, which drives insights and offers robust analytics for energy data.

Pakistan Electricity Review 2025

https://uploads.renewablesfirst.org/Pakistan_Electricity_Review_2025_80753f62aa.pdf

The Pakistan Electricity Review 2025 report aims to improve technical accessibility and awareness of critical aspects of power generation, transmission, and consumption. It presents a comprehensive analysis of key trends and challenges that shaped Pakistan's power sector during the fiscal year 2024 (FY24). The report utilizes publicly available data for the power sector, with NEPRA's state of industry report (SIR) serving as the primary data source.

Pakistan Energy Market Review 2025

https://uploads.renewablesfirst.org/Pakistan%20Energy%20Market%20Review%202025.pdf

The Pakistan Energy Market Review 2025 offers a concise overview of Pakistan's energy sector in FY24, drawing on the HDIP Energy Yearbook and OGRA's calculations. It highlights key trends in primary energy supplies showing how increasing solarization, LNG contract dilemma, gas circular debt and shifting consumption patterns are reshaping the country's energy market.

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

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 errors, please email: DataTeam@renewablesfirst.org

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