

POWER

Sector Study Report by VIS

Pakistan's power sector has expanded to around 46.6 GW of installed capacity, with hydel, nuclear, and renewables contributing 44% while thermal still dominates generation. Renewable capacity—mainly solar—has nearly doubled in FY2025, yet utilization remains uneven due to weak demand and grid constraints. Indigenous coal use is rising, improving energy security but raising emissions. Structural issues persist, including circular debt exceeding PKR 2.7 trillion, overcapacity, and tariff distortions. The sector stands at a crossroads—balancing fiscal stability, supply security, and a policy-driven shift toward renewables under the IGCEP and ARE frameworks.

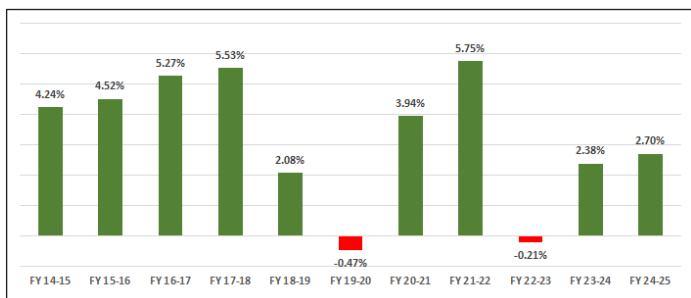
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Pakistan Macro-economic Overview

Pakistan has made notable progress in pulling back from crisis, with inflation easing significantly, the current account recording a temporary surplus, and the fiscal deficit narrowing. However, the economy continues to grapple with high debt, import dependence, and a persistently narrow tax base. While short-term conditions indicate relative stability, medium-term sustainability will depend on comprehensive reforms—expanding the tax net, restructuring the energy sector, and diversifying exports beyond traditional textiles.

Growth, Prices, and Employment

GDP Growth: Pakistan stabilized growth at 2.5% in FY24 following near-stagnation in FY23. In FY25, growth inched up to 2.7%, supported by a gradual recovery in agriculture and certain service sectors. For FY26, multilateral institutions such as the IMF and World Bank project growth in the range of 3.5–3.6%, conditional on sustained policy discipline.



Inflation: Inflation was the dominant challenge in FY24, averaging above 23%, primarily due to elevated energy costs, currency depreciation, and supply disruptions. A sharp disinflation followed in FY25, with average CPI declining to 4.6%, and further easing to 3.6% during July–August FY26. This improvement reflects currency stability, moderation in food prices, and a tight monetary stance.

Employment: The official unemployment rate stands at 6.3%, based on the 2020–21 Labor Force Survey. The absence of updated surveys obscures the current labor market dynamics. Anecdotal evidence suggests limited job creation, rising underemployment, and continued informality, despite a stable headline unemployment figure.

Implication: While growth recovery is progressing, it remains fragile, with employment gains lagging behind. Inflation is now firmly under control, creating scope for monetary easing and potential adjustments in interest rates.

Fiscal and Debt Dynamics

Fiscal Deficit: The consolidated deficit remained elevated at 6.9% of GDP in FY24 but narrowed to 5.4–5.6% in FY25, supported by record FBR collections and curtailed federal development spending. The FY26 budget sets an ambitious target of 3.9% of GDP.

Tax Revenues: FBR collections rose from Rs 9.3 trillion in FY24 to Rs 11.9–12.0 trillion in FY25, with a target of Rs 14.1 trillion for FY26. Despite this improvement, the tax-to-GDP ratio remains in single digits, significantly below emerging-market benchmarks.

Public Debt: Debt sustainability continues to pose the most significant macroeconomic risk. Public debt increased to 73.2% of GDP in FY25, compared to 72% in FY24, with the nominal stock reaching Rs 74.9 trillion by April 2025. Domestic debt forms the majority, standing at Rs 54.5 trillion as of June 2025.

Debt Servicing: Interest payments now absorb over 60% of FBR revenues, severely constraining fiscal space for development and social sector spending.

Implication: Fiscal consolidation has shown progress, but debt dynamics remain highly vulnerable. Without meaningful tax base expansion, dependence on borrowing will persist, keeping debt ratios elevated.

External Sector and Balance of Payments

Remittances: A key positive, remittance inflows rose from USD 30.3 billion in FY24 to a record USD 38.3 billion in FY25, largely driven by strong contributions from the Gulf region. Momentum continued in July 2025, with inflows of USD 3.2 billion.

Exports & Imports: Exports of goods and services increased modestly from USD 38.9 billion in FY24 to

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Indicator	FY24	FY25	Commentary / Direction
GDP Growth (%)	2.4%	2.7%	Gradual recovery driven by agriculture and stabilization policies.
Inflation (CPI, % avg)	23.4%	4.6%	Sharp moderation but still elevated vs peers.
Policy Rate (%)	20.5% (Jun-24)	11.0% (Jun-25)	Tight stance easing slightly with inflation fall.
Exchange Rate (PKR/USD)	278 (Jun-24)	284 (Jun-25)	Relative stability post-IMF SBA, but pressure persists.
Fiscal Deficit (% of GDP)	6.9%	5.4%	Some consolidation via revenue measures.
Current Account Balance (\$ bn)	-2.0	+2.1	Slipped back into deficit as imports rose.
Trade Balance (\$ bn)	-24.0	-29.0	Import rebound outpaced exports.
Exports (Goods & Services, \$ bn)	30.7	40.7	Modest growth, led by textiles & IT.
Imports (Goods & Services, \$ bn)	54.7	70.1	Stronger import demand with partial recovery.
Workers' Remittances (\$ bn)	30.3	38.3	Steady inflows, supporting FX reserves.
Foreign Direct Investment (\$ bn)	1.4	2.3	Still weak but some uptick in energy & telecoms.
Foreign Exchange Reserves (\$ bn, SBP)	9.4 (Jun-24)	14.5 (Jun-25)	Import cover 1.7 months, still thin.
Public Debt (% of GDP)	70%	73%	Rising burden amid high interest payments.
Energy Prices (Avg Power Tariff, Rs/ kWh)	29.8	36.0	Significant rise, eroding industrial competitiveness.
Gas Price (\$/MMBtu)	5.0 to 11.0	10.0 to 11.0	High regional disadvantage.
Unemployment Rate (%)	6.3%	6.3%	Latest official LFS 2020–21 figure

USD 40.7 billion in FY25. However, imports expanded more sharply, rising from USD 64 billion to USD 70 billion, thereby widening the trade deficit. July 2025 reinforced this trend, with exports at USD 3.5 billion against imports of USD 6.3 billion.

Current Account: Despite the widening trade gap, record remittances drove the current account into a surplus of USD 2.1 billion in FY25 — a rare outcome after years of persistent deficits. However, July 2025 saw a return to deficit (USD 254 million), underscoring the fragility of this balance.

Implication: The external sector has strengthened due to robust remittances, but remains exposed

to import dependence, elevated energy costs, and vulnerability to global oil price volatility.

Future Outlook (FY26 and beyond)

Growth: GDP growth in FY26 is projected to improve moderately to 3.5–4%, contingent on political stability and continued progress in power sector reforms.

Inflation & Monetary Policy: With CPI easing to around 3–4%, the central bank has scope to gradually reduce policy rates, which could support investment and credit expansion. Nonetheless, risks persist if fiscal slippages erode market confidence.

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Fiscal and Debt: Meeting the FY26 fiscal deficit target of 3.9% appears challenging. Pressures from energy subsidies and weaker petroleum levy collections may widen the gap, necessitating additional borrowing. Public debt is expected to remain elevated, near 77% of GDP, raising concerns about long-term sustainability.

External Accounts: Remittance inflows are likely to remain strong, but exports will require structural reforms in value addition and market diversification to accelerate meaningfully. Imports are expected to rise alongside growth, potentially straining the current account. Adequate SBP reserves will depend on sustained support from the IMF, EU, and China.

The macroeconomic outlook remains finely balanced. Political uncertainty — whether in the form of contested reforms, governance slippages, or delays in decision-making — poses a key risk to investor sentiment and external financing flows. Similarly, slow or incomplete implementation of energy and tax reforms could reverse the recent stabilization gains by perpetuating fiscal imbalances and structural inefficiencies. Externally, Pakistan remains vulnerable to global commodity price swings, particularly oil, which could quickly widen the import bill and reignite inflationary pressures.

On the upside, steadfast adherence to the IMF program and continued engagement with bilateral and multilateral partners would help secure external financing and maintain reserve adequacy. Robust remittance inflows are also expected to provide a vital cushion to the current account, partially offsetting the structural trade deficit. If complemented by credible reforms in taxation, energy pricing, and export competitiveness, these factors could not only consolidate short-term stabilization but also lay the foundation for a more durable growth trajectory.



Global Power Industry

Global power generation is moving decisively toward low-carbon sources: record renewable additions in 2024 (~585 GW) lifted total renewable capacity to roughly 4,448 GW and put solar and wind at the center of the global build-out — led by China, which supplied the lion's share of new capacity. By mid-2025 variable renewables (mostly solar PV and wind) generated more electricity than coal in several regions and are on track to overtake coal globally by the end of 2025–2026, according to multiple agency estimates. Despite that momentum, natural gas and remaining coal assets still provide essential firming and seasonal flexibility in many countries, and global energy supply remains dominated by fossil fuels overall — so the transition is increasingly about integrating renewables while keeping systems reliable. At the same time, faster renewable deployment exposes urgent needs for grid upgrades, storage, and financing innovations (to close regional gaps and avoid stranded assets), even as financing for new unabated coal is tightening in advanced markets

Market Size and Growth

Global electricity generation and capacity continue to expand strongly, with total generation growing by approximately 4% in 2024 (an increase of over 1,200 TWh) — nearly double the decade-average growth rate. Renewables and nuclear provided over 80% of the growth in generation in 2024, while fossil-fuel generation increased by just around 1%. On the investment front, while detailed global dollar-volume splits are less explicitly published, the global trend is for capital flows into renewable project development (utility-scale and distributed) to outpace new investment in fossil-fuel generation. At the same time, system integration costs (grid upgrades, storage, firming capacity) are emerging as a significant portion of required investment, so the

market size of the sector is expanding beyond pure nameplate megawatts to include ancillary services, grid infrastructure and flexible capacity.

Key Regions and Players

Asia-Pacific: This region remains the primary growth engine in the global power sector. Massive new solar and wind capacity are being added yearly, and Asia-Pacific also hosts the supply-chain infrastructure (manufacturing of modules, turbines, batteries) that supports global deployment. At the same time, many nations in the region continue to expand coal and gas generation to meet industrial demand and reliability needs. The result is a dual-track dynamic: while capacity is greening at the margin, legacy

thermal investment remains large — raising the risk of stranded assets or inefficient asset turnover if demand growth slows. Grid integration and storage are under pressure, given the scale of variable renewables, and the region must manage both rapid build-out and system stability.

Europe: Europe is at the forefront of integrating high shares of low-carbon generation into a mature grid-system and doing so under stringent regulatory frameworks. Renewables now form a majority of generation in many markets, and there is a clear shift toward hydrogen, offshore wind and battery storage. However, growth of new capacity is comparatively slower than in regions with higher demand growth, and Europe faces structural challenges: retiring fossil plants, rising network upgrade costs and smaller incremental demand. The transition is less about volume expansion and more about optimization, flexibility and cost-containment. The critical question is how Europe maintains system reliability and affordability while retiring thermal capacity and scaling new technologies.

North America: North America presents a mixed but promising picture. On one hand, policy support and corporate demand are driving significant investment in solar, wind, storage and grid modernization. On the other, fossil-fuel generation — particularly gas — remains deeply embedded in the system, and legacy infrastructure still dominates parts of the market. The region must tackle permitting delays, transmission bottlenecks and inflation in capital costs. The key performance differentiator will be how effectively utilities manage the transition — replacing thermal plants, integrating flexible resources and aligning cost recovery without disrupting reliability or driving tariff shocks.

Middle East & Africa: These regions are among the fastest-growing in terms of electricity demand, but currently have one of the lowest shares of renewables in generation. Heavy reliance on gas, oil or coal for power makes them vulnerable to fuel price swings and import dependency. While solar and wind projects are being developed, success will depend on grid expansion, policy stability, financing access and local skills. The risk here is uneven execution: if growth disappoints, investments may deliver lower

returns, and renewables may remain peripheral rather than foundational.

Latin America & Emerging Markets: In Latin America and comparable emerging markets, hydropower remains a dominant renewable foundation, supplemented increasingly by solar and wind. These markets offer strong upside potential because generation growth and grid modernization requirements are substantial. That said, they face higher execution risks: regulatory change, financing cost, grid reliability, and climate/hydrological variability all weigh heavily. For investors, these markets can deliver aggressive growth but demand higher risk tolerance and deeper due-diligence on project viability and policy consistency.

Technologies and Processes

Solar PV & Wind: Deployment continues at an unprecedented pace, driven by modular designs and sharply falling costs (US\$27–35/MWh in leading markets). Projects now require sophisticated integration into the grid to manage variability and curtailment, with system flexibility achieved through complementary storage, flexible dispatch, and smart monitoring. Operational efficiency increasingly depends on careful planning, interconnection, and balancing supply with peak demand.

Natural Gas (LNG/RLNG): Gas plants remain essential for providing reliable and flexible power, particularly in systems with high renewable penetration. Their performance relies on efficient fuel management, optimized dispatch, and integration with storage to respond to fluctuating demand. Long-term contracts and exposure to global price swings present economic risks, while the focus is shifting toward low-emission adaptations and flexible operation rather than pure baseload generation.

Coal (local/imported): Coal-fired generation continues to supply baseload in many high-demand regions, with plants requiring careful management of fuel procurement, emissions, and operational flexibility. Retrofitting older units for ramping capability or partial biomass co-firing increases complexity and cost. Long-term contractual obligations and capacity-payment structures, combined with tightening environmental standards, create operational and

financial pressure.

Storage & Distributed Resources: Battery systems, rooftop solar, and demand-response programs are increasingly critical for aligning supply with variable demand. Their effectiveness depends on grid integration, market mechanisms, tariff structures, and operational coordination with central generation. Falling costs are accelerating deployment, but the success of these assets hinges on careful planning, regulatory alignment, and managing the interface between distributed and central power systems.

Emerging Trends:

Grid Flexibility & Storage Integration: High penetration of variable renewables is driving investment in grid-scale storage, demand-response programs, and smart-grid technologies. System operators are increasingly relying on hybrid solutions to maintain reliability and optimize dispatch across variable generation.

Electrification of End-Use Sectors: Transport, heating, and industrial processes are gradually being electrified, increasing overall electricity demand. This trend accelerates renewable uptake but also raises system planning and capacity requirements, particularly in regions still dependent on thermal generation.

Digitalization and AI for Operations: Advanced analytics, AI, and digital control systems are enhancing forecasting, real-time grid management, and predictive maintenance, reducing operational inefficiencies and optimizing the integration of both renewable and conventional generation assets.

Low-Carbon and Repurposed Thermal Assets: Thermal plants are increasingly being retrofitted with carbon capture, co-firing, or hybridization with renewables, extending their operational life while lowering emissions and complying with evolving regulatory frameworks.

Key Trends

Distributed Energy Uptake: Rooftop solar, net-metering, and behind-the-meter storage are rapidly expanding in residential, commercial, and industrial sectors. This is changing load profiles,

peak demand patterns, and utility revenue models, forcing traditional utilities to rethink planning, grid management, and tariff structures.

Fuel Mix Rebalancing: Countries continue to pivot between natural gas and coal depending on fuel prices, supply security, and short-term demand fluctuations. This creates dynamic shifts in emissions intensity and generation costs while highlighting the importance of flexible dispatch and hedging strategies in power systems.

Policy and Financing Transformation: Stricter financing standards, ESG-linked lending, and climate-aligned policy are reducing investment in unabated coal projects. Utilities and developers increasingly focus on repurposing assets, retrofitting plants, or integrating low-carbon alternatives to remain financeable and compliant.

Challenges

System Integration and Flexibility: High penetration of variable renewables increases the complexity and cost of grid operations. Utilities must invest in balancing mechanisms, curtailment management, and ancillary services, while ensuring reliable supply from both renewable and conventional sources. Lack of flexibility in generation or storage can lead to inefficiencies, higher operational costs, and occasional reliability risks.

Fuel Price and Contract Volatility: Fossil-fuel-based generation (coal, LNG, gas) faces exposure to commodity price swings and long-term take-or-pay contracts, which can create fiscal and commercial risks if demand or prices deviate from forecasts. Volatile fuel markets affect generation costs, tariffs, and profitability, particularly in regions with high import dependence or rigid contractual obligations.

Policy and Regulatory Uncertainty: Evolving climate policies, emission targets, and financing standards can disrupt project economics. Stricter ESG requirements and reduced financing for unabated coal or inefficient thermal plants create uncertainty, slowing investment and forcing retrofits or repurposing.

Infrastructure and Grid Constraints: Aging transmission and distribution networks in many regions struggle to accommodate both centralized and

distributed generation, limiting the speed at which renewable and flexible resources can be deployed. Inadequate grid reinforcement increases congestion, curtailment, and operational inefficiencies.

Technology and Operational Complexity: Rapid adoption of new technologies — storage, hybrid plants, digital grid solutions — increases operational complexity. Utilities must develop advanced forecasting, maintenance, and control capabilities, or risk reliability issues, underperformance, or higher costs.

Opportunities

Grid Modernization & Storage Expansion: Rapid growth of variable renewables is creating a critical need for investment in transmission, distribution automation, and energy storage systems. Upgrading grids and integrating smart technologies not only improves reliability but also enables higher renewable penetration, peak load management, and flexible dispatch of conventional generation.

Local Manufacturing & Value Chain Development: There is significant opportunity to localize production of solar PV balance-of-system components, inverters, wind turbine parts, and batteries, capturing economic spillovers and reducing dependence on imports. This also applies to manufacturing and service infrastructure for conventional generation, including modular gas turbines, coal plant retrofits, and hybrid solutions.

Hybrid & Flexible Generation Solutions: The transition creates opportunities to develop hybrid plants combining renewables with gas or storage, providing reliable low-carbon supply while optimizing investment costs. Such solutions allow utilities and developers to respond dynamically to demand peaks and integrate intermittent generation efficiently.

Decarbonization and Retrofitting of Thermal Assets: Existing coal and gas plants can be repurposed with carbon capture, co-firing, or efficiency upgrades, extending operational life while meeting emissions targets. These retrofits represent both technical and financial opportunities in markets where new-build renewables alone may not meet reliability requirements.

Electrification of End-Use Sectors: Rising electrification of transport, heating, and industry increases electricity demand, creating investment opportunities in generation, grid reinforcement, and distributed energy systems. Regions with growing demand can leverage this trend to deploy a balanced mix of renewables and flexible conventional generation.

Pakistan Power Industry

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Market Size and Export Performance

Pakistan's electricity market in FY 2024-25 (July–March) saw consumption shrink to 80,111 GWh, down about 3.6% from the same period last year, driven by weak industrial and agricultural demand, rising tariffs, and increased off-grid solar uptake. Residential consumption rose in share to nearly half of total usage. Export activity remains negligible, meaning that domestic demand dynamics—rather than cross-border trade—largely define market size. Although generation capacity has grown (to ~46,605 MW by March 2025), utilization remains challenged and market expansion is constrained unless demand recovers and the distributed generation effect is better integrated.

Capacity and Structure

As of March 2025, Pakistan's installed generation capacity stands at around 46.6 GW, reflecting years of expansion through both public and Independent Power Producers (IPPs). The power mix remains dominated by thermal sources (~56%), though hydropower, nuclear, and renewables—including rapidly growing distributed solar—now collectively account for over 40% of capacity. Structurally, the market operates under a single-buyer model through the CPPA-G, with generation concentrated among IPPs and public utilities, transmission managed by NTDC, and distribution through regional DISCOs. Despite sufficient installed capacity, utilization remains uneven—hydel and nuclear plants show higher capacity factors, while imported coal and RLNG units suffer from under-dispatch amid fuel cost pressures and weak demand. This imbalance contributes to rising capacity payments and underscores structural inefficiencies within the sector's market design.

Price Trends

Electricity tariffs in Pakistan have recently been adjusted downward to an average of approximately Rs 34.00 per kWh for the FY 2025-26 period, down from about Rs 35.50 per unit in the prior year. Although this appears as relief, the underlying cost burden remains high: power purchase rates rose from around Rs 16.77 per unit in FY 2022 to approximately Rs 24.88 per unit by FY 2025, driven by rupee depreciation and large capacity-payment obligations. The effective tariffs paid by different consumer segments continue to vary significantly due to lifeline subsidies, net-metering arrangements (notably for rooftop solar), and tariff differentials between DISCOs, which creates distortion in cost recovery across the utility network. Policy discourse now centers on reforming net-metering buy-back rates and restructuring rooftop solar incentives—moves that aim to restore revenue integrity for DISCOs and reflect the true cost of supply across both renewable and thermal generation.

Raw Material Prices

International LNG prices remain in the range of US\$10–13 per MMBtu in mid-2025, heightening cost pressures for Pakistan's long-term RLNG contracts. The government has responded by deferring or cancelling LNG cargoes and negotiating terms, indicating that fixed-take obligations are becoming unmanageable. Meanwhile, greater use of domestic coal has pulled down average fuel cost to roughly Rs 12.2 per unit in March 2025 — a decline of about 27 % from Rs 16.8 the prior year. Domestic natural gas prices for generation rose by approximately 17 % in July 2025 (from Rs 1,050 to Rs 1,225 per unit) adding to cost burdens. Overall, fuel-and-commodity volatility remains a major driver of generation cost

differentials across thermal and renewable sources and exerts strain on tariff-setting, cost recovery and utility financial stability.

Key Challenges

- Circular debt remains a major structural issue: by March 2025 the sector's outstanding circular debt stood at approximately PKR 2.396 trillion, with payables to power producers at PKR 1.633 trillion
- Distribution companies (DISCOs) continue to suffer revenue shortfalls and operational inefficiencies: T&D losses rose to 18.31% in FY 2023, well above the regulatory target of ~11.8%.
- Long-term contracts and capacity payments for imported coal and LNG plants create rigid cost burdens even when utilization is low, squeezing fiscal space and undermining cost-efficient dispatch.
- Rapid uptake of rooftop solar (net-metering) is altering load profiles and reducing grid sales, but the distribution grid and tariff structure have not adapted fully, causing cross-subsidy pressures and higher fixed-cost burdens on remaining consumers.
- Ongoing policy and tariff uncertainty — including revisions to net-metering buy-back rates, PPA renegotiations and unclarity over future generation planning — undermines investment confidence and complicates financial modelling for both renewable and conventional assets.

Opportunities

- Pakistan's utility-scale and distributed renewable market is rapidly expanding: net-metered solar capacity has already surpassed ~4 GW and is expected to become the second-largest source of generation by mid-2026, offering significant upside for developers and investors.
- The country's grid infrastructure and storage requirement provide large opportunity: as renewables account for growing share, investment in transmission, distribution automation, grid reinforcement (especially from south to north), and battery storage becomes

critical and commercially attractive.

- Massive value-chain and local manufacturing potential exists: Pakistan enjoys high solar irradiance (5.5 – 6.5 kWh/m²/day) and vast land/sun-belt regions, meaning localization of PV modules, inverters, battery systems and integrated solutions represent a strong long-term opportunity.
- Thermal assets and existing generation structures also present retrofitting and hybridization opportunities: Coal and gas plants can be upgraded, co-fired, or paired with storage and renewables in hybrid models, improving asset utilization and reducing costs rather than simply building new capacity.
- Surplus generation capacity (arising partly from delayed demand growth) opens up the opportunity to develop new demand-centers and non-traditional loads (such as data-centers, crypto-mining, industrial clusters) which can absorb capacity and improve load-factors across both conventional and renewable assets.

Future Outlook (2025-2030)

Over the next three to five years Pakistan is poised to significantly expand its generation base — IGCEP 2025-35 projects installed capacity rising toward ~64 000 MW, with roughly 60 % of generation coming from hydel, solar and wind combined. At the same time, the fuel mix is expected to shift: reliance on expensive imported LNG and coal is likely to come under pressure, as indigenous resources (domestic coal, local gas) and renewables gain priority in cost- and security-based dispatch decisions. However, structural and fiscal risks remain substantial — weak off-take, capacity underutilization, high fixed-cost obligations and regulatory uncertainty will test the sector's resilience. Notably, effective reform of tariff structures, payment mechanisms and grid-integration of distributed generation will be critical if the sector is to manage the transition without exacerbating financial stress.

Pakistan Power Sector – Key Statistics

Indicator	Latest Figure	Commentary / Direction
Contribution to GDP	Utilities (Electricity, gas & water): value-added ≈ PKR 467,614 million (Q2-2025)	Official statistics report utilities together; the direct GDP share of electricity alone is small but the sector has outsized macro impact via costs, subsidies and circular-debt effects.
Employment (direct + indirect)	WB/sector studies estimate ~190k direct + ~137k indirect jobs by 2030 under an ambitious RE scenario	Formal permanent direct employment in generation/transmission/distribution is modest; construction and RE rollout drive temporary direct jobs. World Bank & local studies show large upside job potential under scaled renewable deployment — greatest gains in project construction, BOS assembly and O&M.
Annual Production (generation)	Jul–Mar FY2025 (9 months): ≈ 90,145 GWh; FY2023–24 (full year): ≈ 137,196 GWh	Generation has been volatile year-on-year: hydrology, demand softness and rooftop solar all affect grid offtake.
Installed Capacity (dependable)	≈ 46,605 MW (as of July–Mar FY2025) — notable concentration in Sindh (Thar coal + Karachi load), Punjab (thermal + large load centers) and the Northern/Hydel corridor (large hydro sites).	Capacity rose markedly due to distributed (net-metering) solar additions (~2.8 GW net-metering additions reported in FY25). Regional pattern: Sindh = coal & solar expansion; Punjab = thermal & load centers; North = hydro & reservoirs.
Capacity Utilization (average / by type)	System average indicative CF: ~33–34% (using FY24 full-year generation vs installed capacity);	Average capacity factor understates heterogeneity: large thermal IPPs report low dispatch in weak demand periods, raising capacity payments and fixed-cost burdens; hydro/nuclear typically run at higher capacity factors when available.
Domestic Consumption (grid off-take)	Jul–Mar FY2025: ≈ 80,111 GWh (≈3.6% decline vs prior period).	Consumption has softened due to weak industrial demand; tariff increases and rise of off-grid/rooftop solar reducing net offtake. Household share rose to ~50% of consumption.
Number of producers (approx.) & 5 leading names	Commissioned IPPs & generators: list of commissioned projects > 40–60 (active IPPs + GENCOs + K-Electric etc.). Leading names: The Hub Power Co. (HUBCO), Lucky Electric (Lucky Cement group), Thar Energy / ThalNova (Thar coal cluster), Attock / Nishat group (Nishat Power), K-Electric.	Large mix of public GENCOs + many private IPPs; concentration of generation ownership in major private groups and state entities (GENCOs, K-Electric). Many small RE developers active in rooftop/utility scale.
Carbon emissions profile / CBAM exposure	Power sector ≈ 25–30% of Pakistan's energy-related CO ₂ emissions (sectoral estimates vary); Pakistan's total national emissions modest globally but rising. CBAM: EU CBAM covers electricity (and key industrial sectors) — Pakistan faces indirect exposure through CBAM on goods (cement/steel/aluminum) and some exporters may face compliance costs. Domestic formal CBAM compliance capacity is limited.	Power is a major national CO ₂ source; growing renewables reduce intensity but thermal reliance and coal expansion raise exposure. CBAM does not “target” Pakistan per se, but exportable products using grid electricity (cement, steel, aluminum) face EU compliance costs; local readiness requires emissions tracking & cleaner power inputs.

Sector Risk Profile: HIGH TO MODERATE

Pakistan's power sector is high to moderate risk (4.2/5.0) in the near term. The two dominant negative drivers are energy/fuel price sensitivity (severe) and structural financial stress (high). These create a setting where even modest shocks — such as LNG/coal price spikes, currency depreciation, or delays in PPA payments — can sharply increase generation costs, compress margins, and disrupt DISCO cash flows.

Defensive strengths include a diverse generation mix (hydel, nuclear, thermal, utility-scale and distributed renewables), ongoing policy support through IGCEP 2025–35 and ARE targets, and rapidly growing renewable capacity, which provides long-term low-cost generation potential. The sector's medium-term resilience will therefore depend on three levers:

- **Energy & cost mitigation** — fuel mix rebalancing, LNG/captive gas optimization, imported coal management, and storage solutions to reduce dependence on volatile fuel markets.
- **Grid & operational efficiency** — modernization of transmission and distribution networks, integration of rooftop solar and distributed resources, and deployment of storage and smart-grid technologies to improve reliability and reduce operational stress.
- **Policy & financing support** — predictable tariff structures, DISCO governance reforms, and concessional financing for renewable and hybrid projects to enable sustainable investment.

If policymakers and companies act decisively on these levers, the sector can transition from a high-risk, cost-sensitive system toward a more resilient, low-carbon, and flexible power network over the medium term. Absent credible progress on energy management, grid modernization, and investment frameworks, downside risks — including high tariff pressures, circular debt persistence, and underutilized thermal assets — will remain elevated.

Cyclicalities

Score: 4.0/5.0 | Risk Rating: Moderate to High ●●

Electricity demand in Pakistan is cyclical, influenced by macroeconomic activity, industrial demand, agriculture output, and seasonal patterns:

- Industrial and commercial cycles: Slower private sector growth and subdued industrial activity reduce electricity consumption.
- Hydrology and seasonality: Seasonal variability in hydropower availability and winter/summer peaks create intra-year fluctuations.
- Policy shocks: Tariff adjustments, PPA renegotiations, and sudden policy interventions can create short-term demand/supply imbalances.
- DER impact: Growth in rooftop solar reduces grid consumption, magnifying the effect of economic cycles on DISCO revenues.

Overall Cyclicalities Risk Assessment: Cyclicalities risk is moderate-high. While residential consumption provides a stable baseline, industrial and commercial slowdowns, combined with policy and seasonal fluctuations, amplify financial stress.

Competition

Score: 2.5/5.0 | Risk Rating: Low to Moderate ●●

Competition varies by segment:

- Generation: Competitive renewable IPP tenders exist, but legacy thermal IPPs remain protected under long-term PPAs.
- Distribution: DISCOs operate as regional monopolies with limited competitive pressure.
- Retail/DERs: Rooftop solar and third-party service providers are emerging, creating localized competition.

Overall Competition Risk Assessment: Competition risk is moderate to low. While renewables and DERs introduce some competitive pressures, the lack of wholesale market competition for distribution and entrenched legacy generation contracts limit the impact on credit risk.

Capital Intensity**Score: 5.0/5.0 | Risk Rating: High** ●

The sector is highly capital intensive:

- Generation: Thermal, hydel, and renewable plants require large upfront investments.
- Transmission & distribution: Grid reinforcement, automation, and storage infrastructure demand long-term financing.
- Financing model: Heavy reliance on project finance, government guarantees, and PPAs with capacity payments.

Overall Cyclical Risk Assessment: High fixed costs and long asset lives make the sector vulnerable to under-utilization, low demand, and payment delays. Capital intensity is a key driver of the sector's overall high credit risk.

Industry Medians	2012-14	2017-19	2022-24
Capex/Sales	0.75%	0.42%	0.46%
Asset Turn-over	0.98x	0.48x	0.33x
Depreciation/Sales	2.5%	5.33%	5.58%

Sources: VIS proprietary database

Technology Risk**Score: 3.0/5.0 | Risk Rating: Moderate** ●

Rapid technological evolution affects the sector:

- Renewables integration: Solar and wind require grid flexibility, storage, and advanced dispatch mechanisms.
- Stranded asset risk: Coal and RLNG plants may become underutilized if renewables expand faster than projected.
- DER complexity: Rooftop solar adds operational and forecasting challenges.

Overall Competition Risk Assessment: Technology risk is moderate. While most renewable and DER technologies are proven, integration challenges and potential underutilization of thermal assets present transitional risks.

Regulatory Framework**Score: 4.0/5.0 | Risk Rating: Moderate to HIGH** ●●

Regulatory risks arise from evolving policy:

- Policy guidance: IGCEP 2025–35 and ARE targets provide planning direction.
- Implementation uncertainty: Frequent PPA renegotiations, net-metering reforms, and tariff adjustments create investor uncertainty.
- Government intervention: Actions such as LNG cargo cancellations and capacity payment modifications increase contractual and legal risks.

Overall Regulatory Risk Assessment: Regulatory risk is high to moderate. Policies are constructive but ad-hoc interventions elevate risk perception for lenders and investors.

Energy/Fuel Sensitivity**Score: 5.0/5.0 | Risk Rating: High** ●

Fuel and energy costs strongly influence sector credit risk:

- International exposure: LNG and imported coal prices fluctuate significantly, impacting generation costs.
- Domestic gas: Limited availability and price adjustments affect thermal dispatch order.
- Recent government actions: Cargo renegotiations and shifts toward domestic coal highlight strong cost sensitivity.

Overall Energy/fuel Sensitivity Assessment: High energy/fuel price sensitivity is a major credit risk driver, as short-term price swings directly affect generation costs, tariffs, and DISCO cash flows.

Financial Metrics	2016-18			2019-21			2022-24		
	Upper Quartile	Median	Lower Quartile	Upper Quartile	Median	Lower Quartile	Upper Quartile	Median	Lower Quartile
Current Ratio (x)	1.85	1.29	0.95	3.46	1.79	1.16	3.21	1.50	1.01
Days to Sell Inventory	45.75	29.13	4.96	56.17	10.14	0.00	40.21	10.79	0.00
Collection Period (Days)	264.97	179.62	111.34	385.38	173.09	0.00	284.04	176.65	98.71
Creditors Period (Days)	45.52	11.95	0.00	76.74	4.96	0.00	106.29	25.90	0.92
Net Trade Cycle (Days)	250.24	167.43	42.26	311.31	120.87	0.00	242.00	116.31	0.00
Asset Turnover (x)	0.68	0.57	0.12	0.50	0.25	0.02	0.74	0.33	0.13
LT & ST Debt (Rs. M)	11,124	7,250	227	11,018	4,661	56	13,350	6,546	1,001
Leverage (x)	1.78	0.81	0.39	1.83	0.98	0.15	2.78	0.96	0.29
Gearing (x)	1.38	0.59	0.04	1.25	0.59	0.00	2.10	0.62	0.14
Cash Margins (%)	31.92	18.88	8.25	44.31	19.89	0.00	63.71	23.36	13.10
Gross Margin (%)	26.70	15.12	7.69	40.55	17.87	0.00	63.71	23.36	13.10
Operating Margin (%)	23.86	11.98	2.16	38.80	15.98	0.00	59.07	19.88	8.23
Net Profit Margin (%)	19.23	11.24	0.00	29.51	11.14	0.00	33.85	14.39	1.26
Return on Assets (%)	9.60	5.53	-0.29	10.27	3.95	-0.45	12.36	7.09	0.93
Return on Capital Employed (%)	17.04	9.78	1.47	16.79	10.95	0.00	18.95	12.98	4.46
Return on Equity (%)	19.23	11.24	0.00	29.51	11.14	0.00	33.85	14.39	1.26
EBIT/ Total Debt (%)	39.46	23.16	1.09	38.81	19.61	0.00	58.83	20.76	0.61
EBIT/ Interest (x)	4.86	2.94	0.20	3.66	2.40	0.00	4.49	2.51	1.15
FFO/Total Debt (%)	37.79	21.44	0.00	35.51	17.73	0.00	41.40	13.35	0.00
Free Cash flow/ Total Debt (%)	9.51	0.00	-6.59	22.31	5.34	-0.64	42.53	11.49	0.00
Data Count	68			108			112		

Sources: VIS proprietary database

Recent Events related to the Sector

Pakistan's power sector has witnessed a series of significant developments in recent months, reflecting the complex interplay between energy transition imperatives, fiscal restructuring, and shifting consumption dynamics. These events underscore the sector's ongoing evolution—balancing between renewable expansion and the fiscal, operational, and policy challenges inherent in conventional power generation.

Government Secures PKR 1.275 trillion Financing to Address Circular Debt (June 2025)

In June 2025, the government finalized a PKR 1.275 trillion (≈ US\$ 4.5 billion) Islamic financing facility with 18 commercial banks to partially retire the stock of circular debt and ease liquidity pressure on power producers and fuel suppliers. This refinancing package, spread over six years, is tied to fiscal and energy sector reforms under the IMF program.

Impact: Temporarily eases liquidity constraints and payment backlogs for IPPs and fuel suppliers, but sustainability depends on tariff recovery and DISCO reforms.

Proposed Revision of Net-Metering Buyback Rates (September 2025)

The government has proposed halving the solar net-metering buyback rate from roughly Rs 22/unit to Rs 11.30/unit, citing cross-subsidy burdens on non-solar consumers and lost DISCO revenue. Rooftop installations had doubled over FY 2024–25, reaching 2.8 GW of distributed capacity.

Impact: Reflects policy push to rebalance the grid and fiscal sustainability, but risks slowing distributed renewable adoption and investor confidence in the short term.

Shift in Fuel Mix Amid Global LNG and Coal Volatility (April–August 2025)

Amid global LNG price spikes and coal supply disruptions from Indonesia and South Africa, Pakistan renegotiated long-term LNG cargoes and increased reliance on cheaper Afghan and domestic Thar coal. LNG spot cargo cancellations were also reported to limit fiscal outflows.

Impact: Highlights high energy-price sensitivity; while reducing import bills, it raises environmental concerns and exposes generation costs to domestic supply chain constraints.

Grid Bottlenecks and Curtailment of Renewable Power (May 2025)

NTDC reported increased curtailment of hydel and wind generation due to overloaded south-to-north transmission corridors and weak grid flexibility. Despite ample renewable generation potential, dispatch priorities favored higher-cost RLNG plants to maintain grid stability.

Impact: Undermines cost efficiency and clean-energy gains, reinforcing the urgency for grid modernization and regional transmission upgrades.

Surge in Imports of Solar Equipment and Battery Storage (FY 2024–25)

Pakistan imported approximately 17 GW worth of solar PV modules and a growing volume of lithium-ion batteries, driven by declining global prices and high domestic tariffs. Commercial and industrial consumers increasingly adopted solar-plus-battery systems for reliability and cost control.

Impact: Accelerates renewable penetration and decentralization of power supply, though import dependence and quality-control challenges pose operational risks.

Allocation of 2,000 MW for Digital Infrastructure (May 2025)

The government announced a plan to allocate 2,000 MW of surplus power for bitcoin mining and AI data centers, aiming to monetize excess generation capacity and attract foreign investment in high-tech industries.

Impact: Reflects an innovative approach to absorb idle capacity and diversify demand, but raises questions over grid readiness, energy pricing, and environmental compliance.

Glossary of Key Term

IEA (International Energy Agency): An intergovernmental organization that provides comprehensive data, policy analysis, and forecasts on global energy demand, supply, and transition dynamics.

IRENA (International Renewable Energy Agency): A global agency supporting countries in their transition to sustainable energy, promoting renewable deployment, technology transfer, and policy frameworks.

IEEFA (Institute for Energy Economics and Financial Analysis): An independent think tank analyzing energy markets, stranded asset risks, and the financial implications of transitioning away from fossil fuels.

WEO (World Energy Outlook): The flagship publication of the IEA, offering detailed projections and scenarios for global energy markets, technology trends, and policy impacts.

ESG (Environmental, Social, and Governance): A framework used by investors and organizations to assess sustainability, ethical impact, and long-term financial performance.

DER (Distributed Energy Resources): Small-scale, decentralized power generation and storage systems (e.g., rooftop solar, batteries) that reduce grid demand and promote energy efficiency and sustainability.

CBAM (Carbon Border Adjustment Mechanism): A European Union regulatory mechanism imposing carbon costs on imports from carbon-intensive industries, including power and cement sectors.

PPA (Power Purchase Agreement): A long-term contract between electricity producers and buyers (utilities or the government), outlining price, duration, and supply terms.

IPP (Independent Power Producer): A private entity that generates and sells electricity to utilities or industrial customers under contractual agreements.

LNG (Liquefied Natural Gas): Natural gas that has been cooled to a liquid state for transport and later regasified for use in power generation.

RLNG (Regasified Liquefied Natural Gas): LNG that has been converted back into a gaseous form for distribution and consumption.

WHR (Waste Heat Recovery): A technology that captures excess heat from industrial processes to generate electricity, improving energy efficiency.

GW / MW / TWh (Gigawatt / Megawatt / Terawatt-hour): Units used to measure electricity generation capacity and energy output at various scales.

IFC (International Finance Corporation): A member of the World Bank Group that supports private sector projects through financing and advisory services, including renewable energy ventures.

EU (European Union): A political and economic union of European countries implementing regional policies, including emissions regulation and CBAM compliance.

NEPRA (National Electric Power Regulatory Authority): Pakistan's power sector regulator responsible for licensing, tariff determination, and overall governance of generation, transmission, and distribution.

DISCOs (Distribution Companies): Regional utilities in Pakistan responsible for the distribution and billing of electricity to end consumers.

GENCOs (Generation Companies): Publicly owned power generation companies operating thermal and hydroelectric plants in Pakistan.

NTDC (National Transmission and Dispatch Company): The entity managing Pakistan's national transmission network and dispatching electricity from generators to DISCOs.

CPPA-G (Central Power Purchasing Agency – Guarantee Limited): Acts as the single buyer of electricity from IPPs and public generators on behalf of distribution companies.

K-Electric (KE): A vertically integrated private utility company responsible for generation, transmission, and distribution in Karachi and surrounding areas.

IGCEP (Indicative Generation Capacity Expansion Plan): Pakistan's long-term strategic plan outlining generation mix, capacity additions, and energy diversification targets (2025–2035).

ARE Policy (Alternative and Renewable Energy Policy): Government policy framework aimed at increasing renewable energy share through incentives and investment facilitation.

MoE (Ministry of Energy): Federal ministry overseeing Pakistan's energy policy, including petroleum, power, and renewable sectors.

MoF (Ministry of Finance): Government body managing fiscal policy, including power sector subsidies, circular debt management, and financial reforms.

SBP (State Bank of Pakistan): Pakistan's central bank; monitors economic indicators, provides sectoral analyses, and regulates financial exposure to energy projects.

PBS (Pakistan Bureau of Statistics): National statistical agency that compiles official data on industrial output, energy consumption, and production trends.

PBC (Pakistan Business Council): A business policy advocacy group providing research and analysis on competitiveness, taxation, and energy sector reforms.

APCMA (All Pakistan Cement Manufacturers Association): Industry association compiling data on cement sector performance, capacity, exports, and energy utilization (used in comparative analysis).

GoP (Government of Pakistan): The federal government; key authority behind sectoral policy formulation, regulatory approvals, and energy transition planning.

Global & Regional Sources

- International Energy Agency (IEA) – Global electricity generation, renewable and thermal capacity trends, energy transition analysis, and system integration requirements.
- International Renewable Energy Agency (IRENA) – Solar, wind, storage deployment, distributed energy trends, cost analysis, and global market sizing.
- Financial Times / RenewablesFirst.org – Distributed energy uptake, rooftop solar, net-metering, grid modernization, storage integration, and regional deployment dynamics.
- Argus Media – Global fuel price trends (coal, LNG, gas), fuel mix rebalancing, and supply/demand shifts.
- IEEFA (Institute for Energy Economics and Financial Analysis) – Coal and gas generation economics, stranded asset risks, capacity payments, and financing challenges.
- Reuters – International fuel volatility, renewable integration, policy developments, and investment dynamics.
- World Bank / World Energy Outlook – Global energy market sizing, investment flows, and regional generation mix trends.
- International consultancy reports (McKinsey, Deloitte, PwC Pakistan) – Sectoral analysis, market sizing, and investment risk assessment.
- Local energy think tanks / research institutes (IEEFA Pakistan, NEPRA Research) – Operational challenges, policy assessment, energy transition trends, and credit risk analysis.

Pakistan-Specific Sources

- Power Division / Ministry of Energy (GoP) – Installed capacity, generation mix (hydel, thermal, nuclear, renewables), IPP/PPA structures, and expansion priorities.
- NEPRA (National Electric Power Regulatory Authority) – Tariff structures, DISCO revenue collection, net-metering buyback rates, regulatory reforms, and operational performance.
- Finance Division / Government of Pakistan – Circular debt updates, fiscal risks, policy interventions (PPA renegotiations, LNG cargo adjustments), and energy pricing.
- State-owned IPPs and DISCOs reports – Capacity utilization, dispatch order, fuel mix, and rooftop solar integration.
- Local media and industry reports (Dawn, Express Tribune, Business Recorder, etc.) – Updates on renewable capacity additions, grid upgrades, distributed solar adoption, and policy developments.

Disclaimer: Information herein was obtained from sources believed to be accurate and reliable; however, VIS does not guarantee the accuracy, adequacy or completeness of any information and is not responsible for any errors or omissions or for the results obtained from the use of such information.

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