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DISCOURSE

NAVIGATING A NEW REGIONAL ORDER

Connectivity, Energy, and Economic Resilience



PIDE

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As Pakistan navigates a rapidly changing global and regional economic landscape, the strategic importance of geography alone is no longer sufficient. The real challenge and opportunity is to transform geographical advantage into meaningful economic value through connectivity, competitiveness, institutional reforms, and resilience.

This issue of PIDE Discourse explores how Pakistan can respond to an emerging regional order that is shaped by trade fragmentation, energy disruptions, and shifting global supply chains. All of these factors are not distant geopolitical concerns; we are living with them, and they are directly influencing fuel and electricity prices, logistics costs, investment decisions, foreign exchange pressures, declining remittances, and the competitiveness of Pakistani Businesses.

The contributions in this issue approach the subject from different perspectives, yet collectively highlight an important proposition: connectivity, energy, and economic resilience must be understood as interconnected elements of one strategic economic system. This issue also examines resilience through the concept of “optionality”, the ability to engage with multiple markets, energy sources, transport routes, suppliers, technologies, and sources of capital. In an increasingly interconnected world, resilience does not require isolation or complete self-sufficiency. Instead, it requires sufficient alternatives to withstand disruptions while sustaining economic activity and growth. A central theme emerging from this discussion is the importance of institutions and incentives. Pakistan's challenge is not the absence of strategies or policy documents, but the limited capacity to translate them into measurable

outcomes. Progress must therefore be evaluated through practical indicators, time and cost saved in moving goods, energy prices faced by productive firms, and the trade, investment, technology, and market access generated through economic diplomacy.

At PIDE, we believe that research must move beyond diagnosing problems to challenging assumptions and informing better policy choices. This issue seeks to contribute to that mission by connecting evidence, policy debates, and the economic realities shaping Pakistan's future.

We hope this edition encourages thoughtful reflection on how Pakistan can convert its location into connectivity, connectivity into competitiveness, and competitiveness into lasting resilience.

We trust that this issue of PIDE Discourse will contribute meaningfully to the ongoing policy conversation and that you will enjoy the reading.



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FROM LOCATION TO LEVERAGE: Pakistan in a New Regional Order

Dr. Nadeem Javaid (SI)

Pakistan is entering a regional order in which geography alone will no longer confer strategic advantage. Connectivity must be commercially usable, energy competitively priced, and diplomacy increasingly geared towards economic outcomes. The countries that prosper will not necessarily be those best located on the map, but those best able to convert location into productive economic relationships.

The global economic order that shaped the last three decades of policymaking is changing. Energy disruptions, trade fragmentation and technological rivalry are reshaping globalization. Supply chains once organized primarily around efficiency are increasingly being redesigned around security, resilience and strategic alignment.

For Pakistan, these shifts carry particular significance. The Gulf remains vital for energy, investment and remittances. Central Asia is emerging as a market, energy partner and bridge to wider Eurasia. China is moving rapidly up the technological and industrial value chain, creating

new opportunities for its economic partners. South Asia, meanwhile, remains one of the world's least economically integrated regions despite its enormous market potential.

None of this is abstract. Geopolitics reaches Pakistan through fuel and electricity prices, freight costs, border disruptions, investment decisions, pressure on foreign exchange and, ultimately, the competitiveness of a Pakistani firm.

That is why this issue of PIDE Discourse asks a deceptively simple question: how should Pakistan navigate this new regional order?

The contributions approach that question from different directions. Yet, taken together, they point towards a larger proposition: connectivity, energy and economic resilience are not three separate policy files. They are one strategic problem. Our policy architecture, however, has too often treated these interconnected challenges in isolation rather than as parts of a single economic system.

CONNECTIVITY IS A SYSTEM, NOT A ROAD

Pakistan's location at the intersection of South Asia, Central Asia, China and the Middle East has been described as a strategic asset for decades. It is true in principle, but remains insufficiently reflected in economic outcomes.

We have built ports, motorways and energy infrastructure on the correct premise that physical connectivity is essential for regional integration. But infrastructure alone does not create connectivity.

A corridor is not a pipe that moves goods on its own. It is a system. Roads and railways are only its physical layer. Customs, border management, standards, logistics, digital systems, financing, security and diplomatic arrangements determine whether infrastructure actually carries commerce.

A motorway that ends in hours of border clearance is not an efficient corridor. A port without competitive logistics is not connectivity. A railway without predictable transit arrangements may be infrastructure, but it is not yet integration. The lesson is not that Pakistan needs less infrastructure. It is that physical investment must be accompanied by institutional reforms that make infrastructure economically productive.

The same principle should shape our engagement with Central Asia. The opportunity is reciprocal: providing Central Asian economies efficient access to Pakistan's ports and the Arabian Sea while connecting Pakistani firms to new markets, energy sources and production networks across Eurasia.

Geography creates possibility. Connectivity converts it into economic opportunity.

A corridor Pakistan cannot clear efficiently, price competitively or finance predictably risks carrying someone else's trade past us rather than generating value within our economy.

FROM CONNECTIVITY TO COMPETITIVENESS

Connectivity creates value only when firms can use it competitively. This is where energy becomes central.

Pakistan has traditionally viewed energy security primarily as a supply problem. But the more consequential question is what the energy system does to the productive economy.

Energy security should no longer be measured only in megawatts available. It must also be measured in the cost at which a Pakistani firm can produce, compete and export.

PIDE research provides a useful empirical reminder. A study of export-oriented industries finds a robust negative relationship between electricity tariffs and exports: a 1 per cent increase in electricity tariffs is associated with a 0.5 per cent decline in textile exports and a 0.4 per cent decline in other manufactured exports.

The chain is straightforward. Energy costs shape production costs; production costs influence competitiveness; competitiveness determines exports, investment and participation in regional and global value chains. These, in turn, determine the economy's capacity to withstand external shocks.

Pakistan's rapid adoption of distributed solar offers another lesson: households and firms respond quickly when technology, incentives and economics align. Regulation, grid management, tariffs and financing must evolve with equal speed.

The objective cannot realistically be complete energy independence. It should instead be energy optionality: a diversified mix of domestic and imported sources, renewables and conventional fuels, centralised and distributed generation, and stronger regional energy linkages.

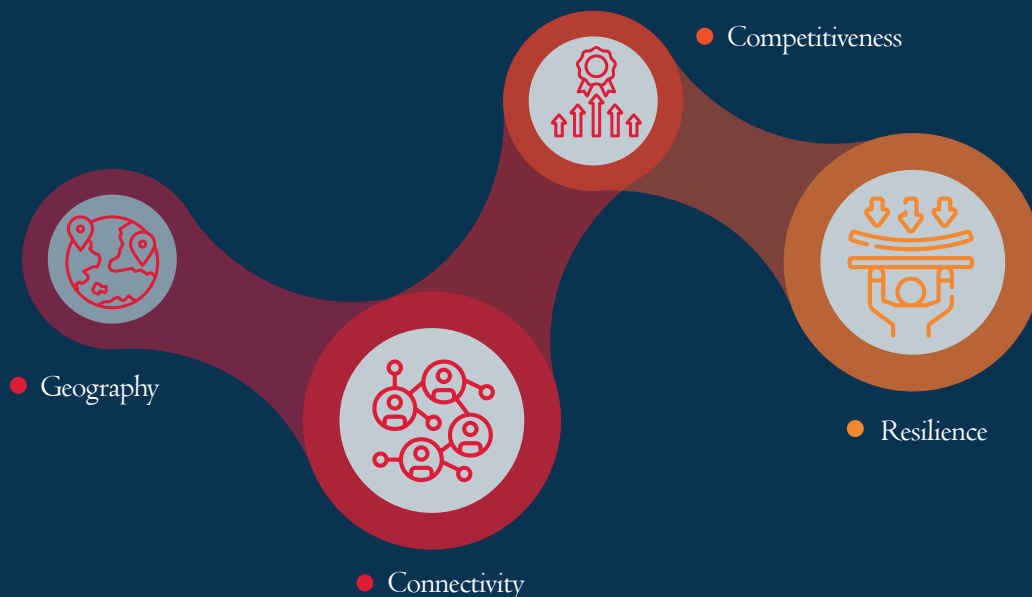
RESILIENCE THROUGH OPTIONALITY

Economic resilience is sometimes confused with self-sufficiency. They are fundamentally different. In an interconnected world, resilience does not mean producing everything ourselves or retreating behind national boundaries. It means maintaining enough options that disruption in one market, supplier, route or technology does not paralyse the economy.

Resilience comes from optionality: multiple markets, multiple energy sources, multiple transport routes, diversified suppliers and diversified sources of capital.

Pakistan's geography provides precisely this possibility. We can engage China, Central Asia, the Gulf, South Asia and global maritime markets. Strategic economic space will come not from choosing among these relationships, but from developing the domestic capability to engage productively across them.

The central causal chain is clear:



Geography provides the opportunity. Connectivity makes it accessible. Competitiveness determines whether Pakistani firms capture value from it. Resilience emerges when the economy develops sufficient productive capacity—and sufficient alternatives—to absorb shocks without repeatedly sacrificing growth.

DIPLOMACY AS ECONOMIC STATECRAFT

This logic also requires us to rethink economic diplomacy. Energy diplomacy, trade diplomacy, investment promotion and regional connectivity cannot operate as parallel conversations. Whether Pakistan is negotiating transit rights, market access, energy arrangements, technology partnerships or investment, the objective should be to expand the country's productive economic space.

Recent regional arrangements, including the emerging Makkah framework between Pakistan, Saudi Arabia and Türkiye, also point to a wider search for greater regional agency. The economic test, however, will be whether such strategic cooperation widens the space for trade, investment, technology and productive partnerships.

Geography gives Pakistan relevance; institutions determine whether that relevance becomes economic value.

That requires a shift from transactional diplomacy towards economic statecraft. Credibility, contracts, regulatory consistency and border efficiency all matter. An investor or trading partner ultimately evaluates Pakistan not through the strategic importance we attribute to ourselves, but through the predictability and profitability of doing business with us.

INSTITUTIONS, INCENTIVES AND OUTCOMES

Pakistan does not suffer from a shortage of strategies or policy documents. The more persistent challenge lies in the institutions and incentives through which they are implemented.

Nor is this merely a coordination problem. Fragmented systems can persist because they distribute protections, discretion and economic rents. Reform therefore requires more than better administrative design; it requires changing incentives. Trade facilitation, competitive energy pricing and regulatory predictability inevitably challenge arrangements from which particular interests benefit. The political economy of connectivity may therefore prove harder than building the infrastructure itself.

The answer is not necessarily another institution. It is to make existing institutions work around common economic outcomes.

This suggests a simple test for policy. A corridor should be judged not by kilometres built, but by the time and cost saved in moving goods. Energy policy should be judged not simply by installed capacity,

but by what productive firms ultimately pay. Economic diplomacy should be judged not by agreements signed, but by the trade, investment, technology and market access actually generated.

Evidence, too, must travel further—from research into policy design, from policy into implementation, and from implementation into measurable outcomes. That is where PIDE has a particular responsibility: not merely to diagnose constraints, but to challenge assumptions and help translate evidence into better policy choices.

Pakistan's geography has not changed. The economics surrounding that geography has.

Our task now is to convert location into connectivity, connectivity into competitiveness, and competitiveness into resilience. Optionality—across markets, routes, energy sources, technology and capital—is what can make that resilience durable.

The new regional order will not reward Pakistan simply for being strategically located. It will reward us only if we become strategically connected, economically competitive and institutionally capable of turning geography into opportunity.

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BEYOND PSDP:

Tokenizing Pakistan's Power Sector for New Investment

Dr. Sardar Mohazzam

Pakistan's power sector has long been caught between large investment requirements and limited fiscal space. The Public Sector Development Programme (PSDP) remains an important vehicle for financing public infrastructure, but it was never designed to carry the full weight of a modern power-sector transformation. For FY2025–26, the Power Division received roughly Rs 104 billion under the federal PSDP, while the throw-forward of committed projects exceeds Rs 1 trillion. Circular debt was also around Rs 1.84 trillion by early 2026. The implication is increasingly difficult to ignore: Pakistan cannot finance transmission expansion, grid modernization, storage and the energy transition through public resources alone. The question, therefore, is not whether the PSDP should continue, but how it can be complemented by new forms of private and institutional capital.

Asset tokenization offers one such possibility. In simple terms, tokenization converts rights over a real asset, revenue stream or financial claim into digitally represented units that can be issued, transferred and settled through a regulated digital platform. Applied carefully, it could allow a power project, a defined stream of receivables, or another

bankable energy asset to be divided into smaller, tradeable interests. This does not mean placing the power sector “on crypto,” nor does it remove the need for sound project appraisal, credible tariffs or effective regulation. It is better understood as a financing infrastructure: a way of widening access to assets that are currently illiquid and available mainly to governments, banks and a relatively narrow group of investors.

This distinction matters as Pakistan moves toward greater private participation in electricity distribution. The proposed privatization of FESCO, GEPCO and IESCO may bring capital and management discipline, but privatization alone will not create deeper capital markets for power-sector investment. Tokenized instruments could eventually complement conventional equity, debt and public-private partnership structures by opening carefully selected assets to pension funds, institutional investors and, subject to appropriate safeguards, overseas Pakistanis and smaller domestic investors. In this sense, tokenization should not be presented as an alternative to privatization or the PSDP. Its value lies in adding another financing channel where conventional

public funding is constrained.

International experience provides useful signals, although Pakistan should avoid importing models mechanically. Platforms such as Power Ledger, Sun Exchange and other token-based energy ventures have experimented with peer-to-peer electricity trading, fractional solar investment and digitally represented energy contracts. The broader lesson is more important than any individual platform: digital ownership and settlement can reduce transaction frictions, improve traceability and connect a wider investor base to identifiable energy assets. Yet technology cannot compensate for weak underlying economics. A token is only as credible as the asset, cash flow, metering system, contractual rights and regulatory framework behind it.

Pakistan is now better placed to test this proposition because a regulatory architecture for virtual assets is emerging. The Virtual Assets Act, 2026 and the Pakistan Virtual Assets Regulatory Authority (PVARA) provide a potential institutional entry point, while NEPRA and the Securities and Exchange Commission of Pakistan already regulate essential parts of the energy and securities landscape. Rather than creating another institution, Pakistan should establish a clear division of responsibilities. PVARA can oversee licensing and market conduct for eligible tokenized structures; NEPRA can validate the underlying power asset, relevant licenses, and metering arrangements; and SECP should retain its role where an instrument falls within securities regulation. Banking and settlement arrangements would similarly need to remain within the applicable State Bank framework.

The most sensible starting point is not a sector-wide rollout but two or three tightly controlled pilots. A renewable IPP revenue stream, a ring-fenced infrastructure asset, or a carefully defined tranche of DISCO receivables could be considered, provided the underlying cash flows and legal claims are transparent. Each pilot should use a licensed special-purpose structure, independent verification of the underlying asset, auditable smart-meter or SCADA data where relevant, clear investor disclosures, and strict limits on retail exposure during the experimental phase. A permissioned or hybrid ledger may be more appropriate initially than a fully open system, particularly where data sovereignty and critical infrastructure are involved.

The PSDP itself can become part of this

transition. Instead of viewing every power project as either publicly funded or privately financed, government could identify commercially viable components within the PSDP portfolio that can graduate toward blended, securitized or eventually tokenized financing. Projects with predictable revenue streams could be separated from those that are fundamentally social or strategic public investments. This would help scarce PSDP resources concentrate on projects where public financing is genuinely necessary, while bankable infrastructure increasingly attracts private capital. PIDE/RASTA and similar research platforms can contribute by assessing regulatory readiness, identifying suitable pilots and developing evidence before large-scale adoption.

For Pakistan, the real promise of tokenization is therefore not technological novelty. It is the possibility of changing how infrastructure capital is mobilized, monitored and broadened beyond the public balance sheet. If introduced gradually, with strong asset verification, regulatory clarity and investor protection, tokenization could become a useful bridge between PSDP constraints and Pakistan's substantial power-sector investment needs. The objective should be practical: use digital finance to make credible energy assets more investable, transparent and accessible. Done well, tokenization would not replace the PSDP; it would help the PSDP do what it should do best, direct limited public resources toward strategic priorities while enabling viable power-sector assets to reach deeper pools of capital.

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POWERING ECONOMIC SECURITY

Afia Malik

Global shocks are no longer rare; they have now become a frequent aspect of the international landscape. In recent years, two major shocks (the Russia-Ukraine war and the Iran-Israel-US conflict) have highlighted vulnerabilities in the global energy system, particularly for Pakistan, which is heavily reliant on energy imports (41% in FY2025). These events led to soaring fuel prices and disrupted fuel supply chains.

Economic security is increasingly defined by a country's ability to ensure a stable and affordable supply of oil, gas, and electricity when global markets turn against it. But in Pakistan, the oil, gas, and electricity sectors are each fighting a different version of the same battle. For Pakistan, global energy crises translate into higher import bills, inflationary pressures, fiscal strain, balance-of-payments challenges, reduced industrial competitiveness, and a further weakening of the already fragile growth path.

In today's world, energy resilience has become a defining factor for economic security amid not just geopolitical uncertainty but also climate change and technological disruption.

OIL: PERPETUAL IMPORT DEPENDENCY

Pakistan meets approximately half (52% in FY2025) of its petroleum product needs and about 20% of its crude oil requirements domestically, relying on imports for the remainder. This structural dependence makes the country's import bill vulnerable to fluctuations in global crude and petroleum product prices and freight rates.

The deeper problem is refining capacity. Pakistan has five refineries with a combined annual capacity of 20.22 million tons; utilization has remained below 60% in recent years because the plants are low-complexity "hydro-skimming" units that overproduce furnace oil, a fuel with shrinking domestic demand. As a result, Pakistan imports roughly 70% of its petrol and 29% of its diesel (in FY2025), the two main consumed products, primarily from Gulf producers. A 2023 Refining Policy aimed at modernization, upgrading to Euro-V standards, and cutting furnace oil output

has moved slowly.

This refining weakness became visible during the Iran-Israel-US conflict. When the Strait of Hormuz came under threat, Pakistan's refineries pushed utilization up to nearly 80-100%, sourcing crude from alternate routes, Fujairah and Yanbu, and temporarily restricting furnace oil exports. However, it was just a stopgap that cushioned the shock as it underlined how little flexibility the system normally has.

Beyond that, governments in many countries use strategic crude reserves to protect their economies from supply disruptions and market fluctuations during crises. Pakistan has yet to develop such storage, which could protect against international oil market instability and geopolitical concerns.

GAS: FROM GLUT TO CRISIS

Pakistan's energy vulnerability has been starkly exposed through the gas sector during the recent crisis. It was a story of oversupply: LNG demand fell from 9.9 million TOE in FY2021 to 7.1 million TOE in FY2025. The decline was caused by distributed solar power reducing grid electricity demand and lower industrial gas demand due to high tariffs, worsened by an off-the-grid levy on captive power plants.

Without sufficient storage capacity to accommodate the surplus, the government was forced to divert unused gas into subsidized domestic networks at a loss, or to shut local gas wells entirely to prevent damage from oversupplying pipelines. In December 2025, the government was negotiating with Qatar to offload around 177 unwanted LNG shipments over the next five years.

Then the war reached Qatar; the Ras Laffan export facility declared force majeure. The shipments that had previously ranged from 8 to 12 cargoes per month collapsed to just 2 in March. Pakistan's power sector, which relied on more than 50% (in FY2025) on LNG, lost access to about 5,000 megawatts of generation capacity almost overnight. This caused a power shortage of 2500 to 4500 MW during peak hours in April 2026.

When the war disrupted Hormuz, the contracts that were once in surplus became a shortage crisis, as 90% of Pakistan's LNG comes from Qatar via this route - a textbook case of concentrated supplier risk.

Moreover, Pakistan's response to the energy shortage has highlighted another institutional weakness: Pakistan's limited bargaining power in global energy markets. Since the Russia-Ukraine war, Pakistan has been effectively shut out of the LNG spot market, relying heavily on inflexible long-term contracts with Qatar. When Pakistan sought emergency cargoes in the spot market, it faced steep premiums; one purchase was made in April at \$18.40/MMBtu, another in June at around \$19.10/MMBtu, and in July, Pakistan LNG Ltd purchased a cargo for \$20.70/MMBtu, the highest since 2022. At these prices, LNG-based power generation costs can soar to above Rs50/kWh, up from Rs20/kWh in February-2026.

Pakistan's case differs from countries that built strategic stockpiles during low prices to cushion against shocks and avoid economic pain. Lacking the storage infrastructure and resources to convert its LNG surplus into a usable buffer, Pakistan tried to divert it in December 2025, only to end up at a disadvantage for the same commodity weeks later.

Setting aside the global shock, gas fundamentals are deteriorating on their own. Domestic gas production came in at 2,890 MMCFD in FY2025 from 3597 MMCFD in FY2020, as mature gas fields continue to deplete faster than discoveries can replace them. While pursuing import-based supply security, Pakistan allowed domestic production to erode, curtailing local fields to make room for take-or-pay LNG, which hurt exploration and production (E&P) companies' revenues (e.g., OGDC's PKR 43bn net revenue loss in FY2025) and discouraged drilling investment, besides damaging local oil and gas reservoirs. For many years, E&P companies faced distorted price signals and payment delays, leading to a rise in receivables.

Reforms aimed at allowing third-party access were intended to revive the E&P industry by enabling producers to sell directly to private buyers (35% of

new gas discoveries) instead of through the financially troubled state utilities - SSGCL and SSGC. However, the implementation of these reforms has been slow, and increasing off-grid levies are threatening the economics of third-party gas sales.

Each ton of domestic production capacity lost due to underinvestment undermines Pakistan's resilience. This loss not only affects current output but also diminishes future production capacity, which may take years to restore.

ELECTRICITY: A GENERATION MIX THAT IS FRAGILE

Generation capacity has improved, but the mix (diversification) that looks resilient on paper has proven to be operationally hollow the moment a single node in the supply chain fails. The installed capacity mix includes hydro (28%), local coal (8%), imported coal (11%), domestic gas (6%), RLNG (22%), nuclear (9%), oil (3%), bagasse (1%), and a rapidly growing wind (4%) and solar (8%) base.

When a crisis hit, weaknesses became exposed. Hydro depended on seasonal factors and irrigation demand, not available all the time; local coal ticked up modestly; imported coal was already expensive due to massive capacity payments; domestic gas was limited by declining local production; nuclear did provide support, and wind power surged but from too small a base to close the gap; while LNG-fired generation collapsed.

In other words, technical diversification offered limited support when one major fuel source, heavily relied upon during peak hours, was suddenly discontinued. A portfolio that depends significantly on one supplier and one transit route is not meaningfully diversified, no matter how many different fuels appear on the generation mix chart.

Further adding to the pain are transmission bottlenecks, caused by aging infrastructure and limited transformation capacity despite the expensive addition of the HVDC Matiari-Lahore line, which hinders the flow of electricity from the South (where it is produced) to the North (where

there is demand), stranding thousands of megawatts.

SOLAR: AN UNPLANNED SHOCK ABSORBER

A silver lining in Pakistan's 2026 experience is that grassroots, largely unplanned, solar adoption has softened the blow. Due to high tariffs and an unreliable electricity grid, Pakistani households, factories, businesses, and farmers turned to rooftop solar. Net-metered solar capacity surged from 190 MW in FY2020 to nearly 7,000 MW by June 2026, driven by a 140% increase in grid electricity tariffs and a 60% to 70% drop in the prices of imported solar panels.

The panel imports and behind-the-meter solar numbers are even more striking. Pakistan's cumulative solar panel imports had reached 54 GW by March 2026. Field surveys suggest 34 GW of capacity was already installed by 2025, including 19 GW in behind-the-meter systems. Grid electricity demand dropped by nearly 10% from FY2022 to FY2025.

This unplanned buffer proved vital when the conflict in Iran put Pakistan's LNG supply at risk. Though adopted for personal cost savings, it helped Pakistan avoid prolonged nationwide blackouts that its dependence on LNG might have caused. However, the grid could not utilize this alternative fully. Solar benefits are limited to daytime, while peak demand typically occurs in the evening. The grid's inflexibility limits its ability to use renewables to respond to fluctuating demand, particularly during peak evening hours.

The outdated transmission network, obsolete distribution grid, limited flexibility due to a lack of storage capacity, and tariff design are major obstacles to Pakistan's energy transition and future energy security amid global shocks, making reliance on LNG unavoidable.

Today, the grid has become complex, and its role is changing. It has become a smart and interactive network that manages electricity coming from different sources - rooftop solar panels, battery storage, wind and solar farms, and electric vehicles.

But Pakistan is still stuck in the past, defying change.

CIRCULAR DEBT: A FINANCIAL FAULT LINE

The sector is facing financial problems that keep getting worse. In April 2026, the combined sector circular debt (CD) was at Rs. 5.2 trillion, with gas contributing Rs. 3.4 trillion and power Rs. 1.8 trillion. Despite injecting over Rs. 1.2 trillion (commercial bank loans) last fiscal year to clear liabilities, the power sector CD continues to rise and misses the IMF-mandated target of Rs 1.614 trillion. Structural issues like capacity payments to IPPs (estimated annual cost of Rs 1.9 trillion in CY2026), unpaid dues (e.g., from K-Electric - about Rs 200 billion), and massive system losses in DISCOs mean the debt continues to accumulate. As demand slows due to distributed solar, DISCOs sell fewer units while facing the same fixed costs, widening the financial gap and often resulting in higher tariffs for non-solar grid consumers.

In the gas sector, the issue is self-reinforcing: imported LNG, priced in dollars and much costlier than domestic gas, is channeled into low-paying residential and commercial networks during times of high demand and oversupply. Utilities recover only a fraction of actual costs; losses from theft and aging infrastructure exacerbate the shortfall, leading to a growing debt pile, whether there's too much gas or too little.

THE COMMON THREAD

In Pakistan's energy sector, oil, gas, and electricity systems rely on reactive improvisation rather than proactive planning. Refineries increase production only during supply crises. Their outdated designs limit them to lighter Gulf crude blends, making it difficult to diversify into alternatives like Russian Urals crude.

The situation is complicated by significant dependence on a single LNG supplier and a critical choke point that can quickly transform surplus to shortage. More than 7 million individual solar installations offer some resilience, but the outdated

outdated grid struggles to integrate this solar energy effectively to utilize its benefits more broadly.

Pakistan's ongoing crises illustrate the consequences of weak institutions, fragmented governance, and inconsistent policies. Sometimes, the issue is not the absence of sound policies, but the inability to implement them effectively.

WHAT RESILIENCE REQUIRES

Diversification of suppliers and transport routes, extending beyond just fuel types.

Procurement flexibility, as rigid long-term LNG contracts that resulted in oversupply became problematic during the crisis.

Accelerating energy transition as a comprehensive package that includes battery storage, smart grids, and, above all, developing technology locally to enhance energy security more effectively.

Transport electrification, but again with indigenized technology and a robust electricity strategy for reliable, affordable, and clean electricity while maintaining grid stability.

Addressing the circular debt crisis through governance, pricing reforms, and technology adoption rather than taking more loans to clear it and putting the burden on already stressed consumers.

However, achieving these goals requires stronger institutions - the rules, incentives, and governance arrangements that enable organizations to plan, invest, coordinate, and respond. Resilient grids,

markets, and energy security are not created by technology alone. They require arrangements that reduce policy uncertainty, align incentives, enforce contracts, make informed decisions, enable long-term investment and adaptive governance, and operate independently of political patronage. Establishing robust institutional structures is complicated, as it involves shifting power from temporary political control to market-based mechanisms, which some may be hesitant to relinquish.

A country that underinvests in diversification, refining, storage, and grid modernization will ultimately face repercussions in the form of price shocks, negotiations with the IMF, currency pressures, supply shortfalls, and shrinking economic growth. Pakistan must choose the other path.

Afia Malik is a Former Senior Research Economist at the Pakistan Institute of Development Economics (PIDE), Islamabad





FINANCING PAKISTAN'S DECENTRALISED ENERGY FUTURE

From private escape to a shared energy market

S. M. Naeem Nawaz

Pakistan's energy transition is already underway, although not how most official plans anticipated. The most visible additions are not large plants connected to the transmission system. They are solar panels in houses and factories, pumps on farms, batteries in commercial premises and, gradually, electric vehicles. The scale is no longer marginal. The Pakistan Economic Survey 2025-26 records 7,319 megawatts (MW) of net-metered capacity in March 2026, close to 15 percent of total installed capacity. Yet finance has largely supported the purchase of individual systems rather than their integration into a shared power system. Pakistan is acquiring decentralised assets faster than it is developing the networks, markets and institutions required to coordinate them^{1,2}.

That imbalance has distributional consequences. Households and firms that finance their own daytime supply buy fewer grid units but still depend on the network at night and during failures. Where reduced revenue exceeds avoided variable costs while fixed network costs remain, future

tariffs shift unrecovered costs towards non-adopters, especially tenants, small firms and low-income households. Decentralised energy can strengthen energy security and reduce fuel-import exposure. Poorly designed financing and tariffs, however, could weaken grid revenue and make the shared network more expensive for those who cannot invest.

Pakistan must therefore move from financing private escape from the grid to financing participation in a shared energy market.

The transition is ahead of the institutions.

The Pakistan Economic Survey 2025-26 reports installed capacity of 49,651 MW in March 2026, including 10,101 MW classified as renewable and 7,319 MW from net metering. Yet its non-hydro renewable category accounted for only 4.5 percent of recorded generation during July-March. This capacity includes net-metered assets, while behind-the-meter output appears not to be fully captured in system generation. Pakistan, therefore, cannot yet see what its decentralised assets generate, supply to licensees or provide as grid services.³

1 Dr. S. M. Naeem Nawaz, "Energy Transition: What It Means, What the Evidence Shows, and What It Implies for Pakistan," PIDE Knowledge Brief No. 2026:158, July 2026.
2,3 Government of Pakistan, Pakistan Economic Survey 2025-26, Chapter 14, "Energy," pp. 244-245.

Households accounted for 47.5 percent of recorded electricity consumption during July-March fiscal year 2025-26 (FY2026), while industry accounted for 31.5 percent. Both have strong incentives to reduce exposure to high tariffs and unreliable supply. Their response is rational. Policy failure lies in treating thousands of private investments as exceptions to the power system rather than as components of it⁴.

Power systems globally are increasing investment in both integration and generation. The International Energy Agency expects global spending on electricity grids to approach US\$550 billion in 2026 and battery-storage investment to exceed US\$100 billion. In Pakistan, however, discussion has narrowed to what a rooftop producer should receive for surplus power. That is only one price in a much larger financing problem. The grid must also pay for metering, feeder reinforcement, storage, data systems and flexible demand, while lenders need workable products for households, communities and small businesses⁵.

WHY DECENTRALISED ENERGY IS DIFFICULT TO FINANCE

Four weaknesses in the present arrangement explain why finance has not kept pace with adoption.

Small loans carry large appraisal costs. Before financing a rooftop or battery system, a bank has to assess the customer, installer, equipment, warranty, output estimate and regulatory treatment. The loan amount is modest, but the checks are much the same as for a larger project. Inconsistent equipment standards and little operating data add to the uncertainty, so lenders shorten tenors or stay out altogether.

The second problem is regulatory risk. Net billing is no longer a proposal. The Prosumer Regulations issued by the National Electric Power Regulatory

Authority (NEPRA) took effect on 9 February 2026 and provide that the kilowatt hours (kWh) supplied by the licensee to the prosumer shall be billed at the applicable tariff, while the kWh supplied by the prosumer to the licensee shall be billed at the national average energy purchase price. The April amendment protected the earlier terms of valid pre-9 February agreements until expiry, unless a significant change increases the facility's maximum output. What investors still cannot see clearly is how the national average energy purchase price applicable to the kWh supplied by prosumers to licensees will be revised, how expiring agreements will be treated, and whether future network charges will be predictable. These questions affect monthly cash flow and therefore loan size, tenor and interest cost. For an asset paid for upfront but earning over many years, uncertainty is not an abstract concern; it enters the financing rate^{6,7}.

The third constraint lies in the condition of the power sector itself. Circular debt stood at Rs 1.614 trillion as of 30 June 2025. The Power Division subsequently confirmed a Rs 1.225 trillion Circular Debt Settlement Plan, under which existing circular debt is to be refinanced on favourable terms and repaid over six years. This is a system-wide liability rather than the debt of any one distribution company (DISCO). Nevertheless, weak recoveries, distribution losses and limited investment budgets leave DISCOs with little room to modernise feeders. Two-way power flows require smart meters, stronger transformers and digital control. Without that investment, distributed resources remain visible on customer premises but largely invisible to system operators⁸.

Finance also reaches the wrong households. Ownership-based solar naturally favours people with a suitable roof, savings, collateral and a formal credit history. Tenants, apartment residents, small farmers, public facilities and poorer consumers cannot participate on the same terms, even when their electricity costs are high. If policy recognises only individual systems, the transition will widen access to equipment without widening access to its savings.

4 Government of Pakistan, Pakistan Economic Survey 2025–26, Chapter 14, "Energy," p. 245.

5 International Energy Agency, "Impacts of Middle East Conflict Set to Reshape Energy Investment Plans as Disruptions Put Focus on Security," 28 May 2026.

6 National Electric Power Regulatory Authority, Prosumer Regulations, 2026, S.R.O. 251(I)/2026, 9 February 2026; and Amendment in Prosumer Regulations, 2026, S.R.O. 547(I)/2026, 2 April 2026.

7 International Energy Agency, Reducing the Cost of Capital, Paris, 2024.

PUT THE SHARED GRID AT THE CENTER OF REFORM

Pakistan's tariffs already contain fixed charges, including those recently introduced or revised for non-lifeline domestic consumers, as well as demand-based charges for other categories.⁹ The task is therefore to allocate network costs transparently rather than add an unexplained solar charge. Any connection or capacity charge should follow a cost-of-service assessment, reflect sanctioned capacity or measured demand, and protect lifeline consumers. The applicable tariff for kWh supplied by the licensee to the prosumer and the national average energy purchase price for kWh supplied by the prosumer to the licensee should reflect the time and system value of electricity. This is more defensible than either loading every cost into the per-unit tariff or treating solar users as the sole cause of the grid's financial weakness.

Transition arrangements are as important as the tariff formula. Existing agreements protected under the April amendment should be honored, while future changes follow a pre-announced schedule. Lifeline consumers should remain protected from regressive fixed charges. Prosumers should also be treated as providers of verified grid services. Battery discharge during feeder peaks, load shifting by factories, and voltage support can create measurable system value and should be compensated when independently measured and verified.

DISCO network finance should be linked to measurable outputs. Each DISCO should be required to make public feeder capacity hosting maps, connection queues, investment plans, and reliability goals. Sukuk and performance-related borrowing could finance metering equipment, transformer banks, and control systems. Such a facility should be required to disclose its sponsor, the use of the funds, source of repayment, and an independent verifier. Repayment should come from ring-fenced regulated network revenues, and independent verification should confirm the improvements in losses, interruptions, and hosting capacity.

BUILD A PORTFOLIO BEFORE APPROACHING CAPITAL MARKETS

A Clean Energy Asset Warehouse could fill this gap without becoming another lending institution. It would standardise and pool qualifying retail loans for solar, batteries, efficient equipment, electric vehicles, and small commercial installations.

The Warehouse should be an open-access, special-purpose entity that sets eligibility and data standards, verifies compliance and pools qualifying loans, but does not originate them. Participating conventional and Islamic banks would use standardised loan documents, equipment and installer requirements, warranties and reporting rules while retaining a meaningful share of the credit risk. Seasoned conventional receivables could back asset-backed securities. Islamic asset pools could support green sukuk, subject to Shariah requirements governing asset composition and tradability. The State Bank of Pakistan (SBP) and the Securities and Exchange Commission of Pakistan (SECP) would supervise these instruments within their respective statutory mandates.

The government had announced the Pakistan Green Taxonomy in 2025, with SBP distributing it in December. From July 2025 to March 2026, SECP had granted Shariah compliance certificates for 53 corporate sukuk issuances worth Rs 229.6 billion. Hence, there are mechanisms for green classification and Islamic issuance. However, what is missing is a standardised and verifiable portfolio of small-scale clean energy assets for evaluation by institutional investors.

8 Ministry of Energy, Power Division, "Rebuttal: Claims of Rs. 223 Billion in Circular Debt Are Wrong and Misleading," 2026; National Electric Power Regulatory Authority, State of Industry Report 2024, sections on distribution losses, recoveries and investment requirements.

9 National Electric Power Regulatory Authority, "Rationalization of Tariff for XW DISCOs and K-Electric," determination dated 11 February 2026.

At the outset, the public sector should absorb risks that private investors cannot yet assess or price. A government- or development-partner-backed facility could provide limited first-loss protection while the Warehouse builds a verifiable performance record. This protection should be capped, time-bound and conditional on participating lenders retaining a meaningful share of the credit risk.

PAY BATTERY OWNERS FOR MEASURABLE GRID SERVICES

Batteries are now contributing to backup power, improved solar self-consumption, and better bill management. In addition, battery ownership may help avoid feeder peaks, voltage stabilization, absorption of surplus solar photovoltaic (PV) generation, and deferred investments in the distribution network. Nevertheless, there are no commercial terms and pricing for these grid services in Pakistan, meaning that storage plays only the role of a personal resilient asset and not that of grid infrastructure.

The Market Commercial Code of NEPRA provides a framework for bilateral wholesale agreements but no way for small-scale distributed assets. A functional aggregation regime will require licenses, interconnection, metering, baseline setting, dispatching, and settlement mechanisms. The solution for Pakistan will be the creation of a new type of legal and regulatory status for aggregators, which combine batteries, PV, electric vehicle charging stations, and flexible industrial/commercial loads into a virtual power plant. Aggregators will be able to provide firm capacity, balancing services, or demand reduction when any single customer cannot participate in the electricity market by himself.

Pakistan needs to implement this idea in three different districts of the distribution network, including industrial, urban residential, and agricultural areas. Competitive contracts have to compensate measurable peak reduction and feeder assistance. Every test has to define the baseline, metering, settlement, and verification procedure before the test. The results need to be published. If

the price of service will be cheaper than that of regular network expansion or peaking capacity, the model must be expanded.

MAKE DECENTRALISATION INCLUSIVE

Community energy should become a recognised asset class. Under a new virtual-credit and community-energy framework, a solar project on a school, hospital, market, or public building could sell subscriptions to nearby consumers who lack their own roofs. Small firms could join an energy-purchasing cooperative. Municipalities could pool public sites and procure solar, storage, and efficiency through energy service contracts, with repayments linked to verified savings.

An amount of validated savings generated by improved loss recovery and reduction in peak investment can form the basis of a Community Energy Account for lifeline customers. Transfer should be made only when the savings are accounted for in the audited cash flow. This account will fund the purchase of energy-efficient devices and wiring safety. Criteria for eligibility and auditing standards need to be clearly published.

Pakistan's decentralised energy transition will succeed not when more consumers escape the grid, but when finance, regulation and markets enable every rooftop, battery and flexible load to strengthen a shared, reliable and inclusive power system.

Pakistan's current take-or-pay power purchase agreement approach necessitates careful sequencing. Distributed power supply should not be thought of as simply another capacity expansion plan. The capacity payments already made will continue to come due until new contracts have been negotiated and old ones have expired, even if rooftop power cuts into network power sales. Thus, the Warehouse needs to admit resources only where the savings in fuel, losses, peak demand, network cost avoidance, and improved reliability are more than offset by higher integration costs and the cost of any increase in fixed costs left unrecovered. The priority has to

go to storage, efficiency, load management, and solar power with productive daytime use. The distributed resources need to be incorporated in the Indicative Generation Capacity Expansion Plan.

A DECENTRALISED ENERGY FINANCE COMPACT

The Power Division should lead a two-year implementation compact with NEPRA, SBP, SECP, DISCOs, provinces, the market operator and private lenders. The first six months will cover the methodology and timeline for reviewing and amending the national average electricity purchasing price, contracts' expiry, standard documentation, equipment certification, and feeder data specification. The next six months will kick off the pilots for the Warehouse, portfolio guarantees, hosting capacity maps, and network finance. The second year of the project will see an evaluation of virtual power plants and community energy.

The measures of success will include capital mobilisation, cost of financing, reliability, storage integration, and participation of under-served communities. However, the aim of the project is not to create more uncoordinated electricity generation or make consumers electricity traders but to bring together dispersed assets without creating overproduction or compromising the common grid.

The future is already arriving, one roof and one battery at a time. Policy, regulation and finance must now catch up.

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BEYOND ENERGY INDEPENDENCE: Pakistan's Case for Strategic Energy Optionality

Why the June 2026 fuel-cost shock shows that resilience depends on substitute options, not installed megawatts

Khalid Waleed

June 2026 exposes Pakistan's real energy-security problem: import-exposed sources supplied 24.8 percent of generation but absorbed 72.6 percent of the reported fuel bill. Resilience therefore depends less on adding megawatts than on creating low-cost substitutes at the hour and location of stress.

Pakistan's grid generated 13,431 GWh in June 2026. Hydel supplied 39.03 percent, nuclear 13.40 percent, domestic coal and gas 16.56 percent, and wind, solar and bagasse another 6.20 percent. Roughly three-quarters of output therefore came from domestic or zero-fuel sources. Yet the average reported generation cost was Rs8.9885/kWh and the effective fuel cost of electricity delivered to DISCOs was Rs8.9138/kWh - Rs1.20 above NEPRA's June reference of Rs7.7138/kWh. The same month looked resilient by volume and fragile by cost¹⁰.

That contradiction is the starting point for a more useful concept of energy security. Pakistan will not become independent of international energy markets: it will continue to import oil, selected fuels, technology, capital and critical equipment. The practical objective is to ensure that disruption in one route, fuel, contract or technology does not become a macroeconomic emergency.

Strategic optionality is the ability to change course without destroying value. It rests on four qualities: diversity of supply and technology; flexibility in dispatch and demand; substitutability between fuels, routes and services; and recoverability after a shock. Installed megawatts matter, but only if the system can use, replace or repurpose them at tolerable cost.

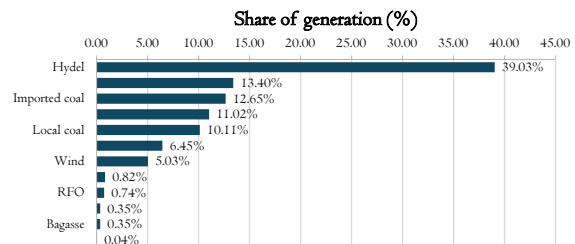
THE COST OF THE MISSING SUBSTITUTE

NEPRA's CY2026 determination projects a total power purchase price of Rs3.186 trillion for 125.8 TWh. Capacity and use-of-system charges account for Rs2.163 trillion, or about 68 percent; fuel and variable O&M account for about 32 percent. The national-average power purchase price is Rs25.32/kWh, while the national-average energy purchase price is Rs8.13/kWh. This is the system's rigidity tax: large fixed obligations remain before an external fuel shock arrives.¹¹

June's dispatch shows how fuel risk sits on top of that fixed burden. Imported coal, HSD, RFO, RLNG and electricity from Iran supplied only 24.80 percent of generation but absorbed 72.61 percent of the reported generation fuel bill. RLNG

alone produced 11.02 percent of electricity and accounted for 43.53 percent of fuel cost. A quarter of output can therefore dominate the monthly adjustment when the system lacks a cheaper substitute at the hours those plants are needed.¹²

Figure 1: June generation was diverse by volume but concentrated by fuel exposure



Source: CPPA-G, XWDISCOs Energy Purchase Data - June 2026. Shares are calculated from reported generation.

The implication is not that imported energy should be prohibited. Imports can improve reliability and discipline domestic monopolies. The vulnerability arises when an imported source is simultaneously expensive, indispensable at the margin and protected by an inflexible contract. Optionality requires storage, responsive demand, multiple suppliers, interruptible procurement and enough network capability to move lower-cost electricity to the point of stress.

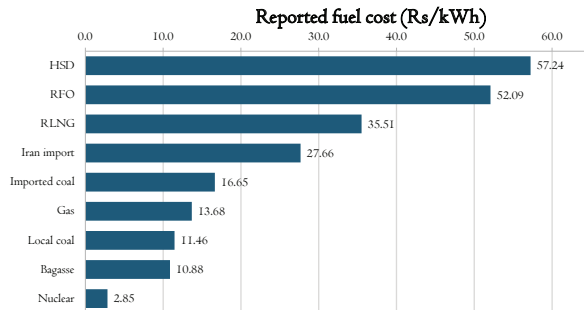
The same distinction applies to hydel, wind and solar. Their reported fuel component may be zero, but their system value is not automatic. A megawatt available at noon is not a substitute for a megawatt required after sunset; hydrology cannot be dispatched independently of water constraints; and a congested line can strand low-cost generation. Energy security is therefore a property of the system, not a label attached to a technology.

10 Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), "XWDISCOs Energy Purchase Data - June 2026," official FY2025-26 energy-purchase-data filing published by CPPA-G and used in NEPRA monthly fuel-charges-adjustment proceedings, July 2026.

11 National Electric Power Regulatory Authority (NEPRA), Decision of the Authority on CPPA-G's Power Purchase Price Forecast for Calendar Year 2026, 7 January 2026, paras. 24 and 36 and Annex I.

12 Author's calculations from CPPA-G June 2026 data. Imported coal, HSD, RFO, RLNG and electricity imported from Iran supplied 24.80 percent of generation but accounted for 72.61 percent of the reported generation fuel bill; RLNG alone accounted for 43.53 percent.

Figure 2: The fuel-cost component differs by a factor of twenty



Source: CPPA-G, XWDISCOs Energy Purchase Data - June 2026.
Fuel cost is not the full tariff; zero-fuel entries are omitted.

SOLAR THE PLANNERS CANNOT SEE

Pakistan's fastest-growing source of electricity increasingly sits outside the dispatch stack. Planners observe power entering and leaving the grid, but much of the generation behind household, commercial and agricultural meters is inferred rather than measured in real time. Gross demand may therefore rise while net grid demand stagnates because rooftop photovoltaic systems serve load before the meter records it. NEPRA's CY2026 determination reflects this uncertainty: net generation in January-September 2025 increased by only 0.51 percent year on year, and the Authority accepted demand growth of just 1 percent for 2026 after accounting for net-metering, captive supply and changing grid drawal.¹³

The Prosumer Regulations 2026 changed the economics of this hidden generation. Imports from the grid and exports by a prosumer are now settled separately, raising the value of self-consumption relative to export. For a household with capital, the rational response is to add a hybrid inverter and batteries, minimize evening imports and, at the limit, build a largely autonomous system. That may be privately efficient but systemically awkward: generation and flexible demand disappear further behind the meter, while the grid must still provide backup during prolonged cloud cover, equipment failure or seasonal peaks.¹⁴

The technical issue is the duck curve, not an annual shortage of energy. As distributed solar expands, net demand falls around midday and rises steeply after sunset. Pakistan must then move from a low daytime operating point to the evening peak over a short interval. That ramp interacts with nuclear and hydel constraints, thermal minimum-loading levels, start-up costs and contractual obligations. Imported-coal units are poorly suited to repeated deep cycling, while RLNG plants can ramp but expose consumers to fuel and foreign-exchange volatility. Keeping conventional units online at minimum load preserves reserves but can reduce efficiency or force solar curtailment; shutting them too early risks evening ramp and reserve shortages. The duck is therefore a dispatch, reserve and contract-design problem before it is a solar problem.

Distribution networks face another problem. High rooftop penetration can cause voltage rise, reverse power flow, phase imbalance and protection failures. A feeder may have ample annual capacity but be unable to absorb simultaneous noon exports, then face a sharp evening peak when solar output falls. Without interval meters, inverter telemetry and feeder-level hosting-capacity studies, DISCOs see the symptoms only through losses, complaints or transformer failures. National rooftop capacity alone says little; location, timing and controllability determine system value.

The response should not make grid-connected solar unattractive and accelerate uncoordinated off-grid migration. Household net metering should remain available as a targeted instrument, linked to disaggregated battery energy storage and operational visibility. An unfirm noon export should not receive the same value as energy stored and delivered during the evening ramp.

13 NEPRA, Decision on CPPA-G's Power Purchase Price Forecast for Calendar Year 2026, paras. 27-29. NEPRA reported net generation of 89,589 GWh in January-September 2025, compared with 89,130 GWh a year earlier, and accepted a 1 percent demand-growth assumption for 2026.

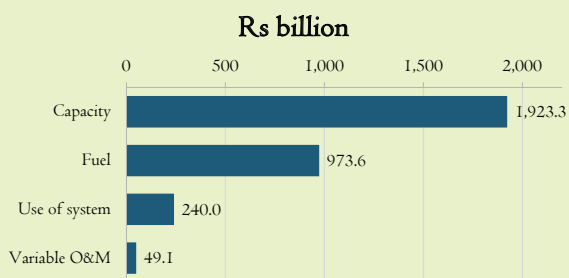
14 National Electric Power Regulatory Authority (NEPRA), National Electric Power Regulatory Authority (Prosumer) Regulations, 2026, notified vide S.R.O. 251(I)/2026 on 9 February 2026, as amended by S.R.O. 547(I)/2026; see also S.R.O. 709(I)/2026 under Schedule IV and the NEPRA Technical Standards for Grid Connectivity Regulations, 2026, notified vide S.R.O. 693(I)/2026.

Time-differentiated credits, a modest availability payment for controllable battery capacity, and payment for verified voltage or frequency support would reward the service the grid needs. Participation should require smart inverters, interval metering and aggregator access within consumer-defined limits.

A durable settlement should price energy, network access, time of delivery and system support separately. Network users should contribute transparently to backup and balancing infrastructure, while storage-backed exports during constrained hours should earn more than surplus midday injections. This is more defensible than either universal one-for-one crediting or a bluntly low export rate.

Aggregators should combine household batteries, solar systems and flexible loads into virtual power plants. Their obligation should be measurable delivery against a dispatch instruction, supported by telemetry and settlement data, not a claim based on installed nameplate capacity. This would convert solar that is invisible to planners into a forecastable and procurable resource.

Figure 3. Fixed obligations dominate NEPRA's CY2026 power-purchase forecast



Source: NEPRA, Decision on CPPA-G's Power Purchase Price Forecast for CY2026, 7 January 2026. Figures are Rs billion.

CONNECTIVITY SHOULD BE INSURANCE, NOT ANOTHER LOCK-IN

Open access and wheeling are not side reforms. They are the institutional machinery that allows a

generator, industrial load, storage project or aggregator to find an alternative counterparty when the incumbent arrangement is costly. NEPRA's open-access framework and current wheeling work should therefore be judged by whether settlement, congestion pricing and credit support make trade usable in practice.¹⁵

Cross-border interconnection should be designed in the same way: as insurance rather than a new source of dependence. CASA-1000 can provide seasonal Central Asian hydropower, but future links should also permit short-duration balancing, interruptible imports and, where economics allow, exports. Capacity contracted in layers is more resilient than a permanent baseload take-or-pay obligation.¹⁶

REPURPOSE IMPORTED-FUEL PLANTS AS STORAGE INFRASTRUCTURE

Coal and thermal transition presents a similar choice. Early retirement is legally and financially complex where plants are protected by sovereign guarantees, debt covenants, power-purchase agreements and fuel commitments. A closure announcement does not extinguish those obligations. The starting point should be an asset-by-asset screen of heat rate, availability, remaining debt, minimum loading, ramp capability, grid location, workforce and interconnection value. NEPRA's plant-performance evidence can identify where continued fuel-based operation is weak but the site remains strategically useful.¹⁷

¹⁵ NEPRA, National Electric Power Regulatory Authority Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022; see also NEPRA's 2026 regulatory work on the wheeling auction process.

¹⁶ World Bank, "Updated Q&A on CASA-1000 Resumption in Afghanistan," 15 January 2026.

¹⁷ NEPRA, State of Industry Report 2025, published 16 January 2026; and NEPRA, Performance Evaluation Report of Operational Power Plants 2024-25, published 26 February 2026.

Imported-coal and RLNG sites are strong candidates for staged conversion into battery-energy-storage and grid-service hubs. Their substations, high-voltage bays, evacuation lines, control rooms, access roads and technical staff can reduce storage deployment costs and lead times. Batteries at these nodes can absorb low-cost solar or hydel electricity, discharge during the evening ramp, provide reserves, support frequency and voltage, offer black-start capability and relieve congestion. At imported-coal plants, storage reduces dependence on inflexible units exposed to maritime fuel risk. At RLNG sites, batteries can handle short ramps and reserves, allowing gas turbines to be retained for longer emergencies rather than routine high-cost dispatch.¹⁸

Repurposing is not a one-for-one replacement of thermal MW with battery MW. Storage is energy-limited; value depends on both power in MW and duration in MWh, alongside cycle duty, degradation, charging source and network need. Site studies should optimise a defined service - such as evening shifting, fast frequency response or congestion management - rather than the retired plant's nameplate. Refinancing can then exchange lower debt costs for reduced guaranteed availability, competitive storage procurement, interconnection-release milestones and worker-transition plans.

Policy matrix. A strategic optionality test for energy policy

Intervention	Option created	Rigidity avoided	Immediate policy move
BESS at imported-coal and RLNG sites	Evening shifting, reserves and grid services	Stranded interconnection and fuel lock-in	Require a storage and grid-services assessment before rehabilitation or retirement
Household net metering plus BESS aggregation	Firm exports, peak reduction and local support	Invisible solar and unmanaged off-grid migration	Use time-based credits, telemetry and aggregator dispatch
Open access and wheeling	Alternative counterparties for generators, industry and storage	Single-buyer lock-in	Publish bankable settlement, congestion and credit-support rules
Regional interconnectors	Seasonal imports, exports and balancing	Baseload dependence on one corridor	Contract capacity in layers rather than as a permanent take-or-pay block
Fuel-risk stress testing	Pre-agreed substitutes when imported fuels spike	Monthly FCA surprises	Publish source-level output, cost concentration and replacement options
Transition refinancing	Lower debt service in exchange for flexible contracts and reuse rights	Sovereign-guarantee disputes and stranded sites	Link refinancing to dispatch flexibility, storage conversion and worker plans

The test is deliberately practical: does an intervention create a usable substitute; can it respond within the time horizon of the shock; does it preserve valuable infrastructure; and is the fiscal exposure disclosed before the contract is signed?

¹⁸ NEPRA, State of Industry Report 2025, published 16 January 2026; NEPRA, Performance Evaluation Report of Operational Power Plants 2024-25, published 26 February 2026; and International Energy Agency, Accelerating Just Transitions for the Coal Sector, on repurposing coal assets for flexibility and alternative economic uses.

A SIX-STEP POLICY SEQUENCE

Firstly, make distributed energy visible. NEPRA, ISMO and the DISCOs should establish a common registry of rooftop photovoltaic systems, batteries, inverter capabilities and feeder locations, with privacy-preserving access for planning and operations. Interval meters and standard telemetry should be phased in first on high-solar feeders. Forecasting must estimate gross demand and behind-the-meter production separately; otherwise every forecast error will be misread as weak demand or consumer non-compliance.

Secondly, redesign household net metering around time and firmness. A limited, rules-based facility should remain available to residential consumers that install compliant BESS and permit aggregated dispatch. Midday exports may receive the notified energy value, while evening or constrained-hour delivery should receive a higher credit. A small availability payment can remunerate batteries held for contingencies. The aim is not unrestricted one-for-one settlement, but payment for converting intermittent solar into a dependable service.

Thirdly, procure storage at the distribution level. Each DISCO should publish feeder hosting-capacity maps and identify locations where batteries can defer transformer reinforcement, manage reverse flows or reduce evening peaks. Competitive tenders should admit utility storage, independent operators and household aggregators. Payments should be based on verified availability and performance, with penalties for non-delivery. Storage would then be placed where it creates network value, not merely where land is cheapest.

Fourthly, launch a thermal-site repurposing programme for imported-coal and RLNG assets. NEPRA and the system operator should require a storage and grid-services assessment before approving major rehabilitation, life extension or retirement expenditure. It should disclose contractual liabilities, interconnection value and alternative roles. Where BESS is least-cost, refinancing and contractual amendment should be tied to competitive procurement, transparent milestones and workforce redeployment.

Fifthly, plan against net-load ramps rather than annual energy alone. The IGCEP and operational plans should publish representative hourly curves for high-solar weekdays, weekends, holidays and low-demand seasons, with uncertainty bands for behind-the-meter output. Resource adequacy tests should measure ramping, reserves, minimum generation and storage state of charge, not simply installed capacity against peak demand. This would turn the duck-curve debate into a measurable procurement requirement.

Finally, separate network equity from solar suppression. Consumers relying on the grid for backup should contribute transparently to network costs, but charges should reflect connection capacity and service use rather than penalise each self-generated unit. Lifeline consumers should be protected through explicit social policy, not opaque cross-subsidies that make grid electricity progressively less competitive. Stable rules will retain consumers on the grid; abrupt changes will encourage the wealthiest to leave first.

FROM FUEL ADJUSTMENT TO NATIONAL RESILIENCE

Pakistan operates three partially disconnected energy economies: a contracted grid, a rapidly expanding distributed-electricity system and an oil-dependent mobility and logistics system. Their risks are usually managed in separate plans even though the same shock can move through all three. A disruption to imported fuel raises generation costs, transport prices and foreign-exchange demand; high grid tariffs then accelerate rooftop solar and reduce sales available to recover fixed power-sector obligations. Strategic petroleum reserves can buy time, but only demand substitution - efficient freight, mass transit, electric two- and three-wheelers and managed fleet charging - can reduce the size of a prolonged petroleum shock. The same principle applies in electricity: storage and responsive load are valuable because they substitute for expensive marginal fuel at the hour of scarcity, not because they add another headline megawatt.

For exporters, resilience is increasingly a competitiveness requirement. Firms need predictable rather than merely subsidised tariffs, access to cleaner power through wheeling, credible emissions accounting and protection against abrupt fuel-cost pass-through. Industrial parks should be able to contract renewable supply, share storage and manage demand against transparent network charges. A grid that can observe and absorb distributed solar, batteries and regional trade is more valuable than one that simply holds a larger stack of contracted capacity, because it can deliver lower volatility as well as lower emissions.

Every major energy decision should therefore disclose five things: its fixed obligation, its substitute routes, the speed with which output or demand can change, the value of the site if the original technology is retired, and who pays when the demand forecast is wrong. June 2026 supplied the warning in numbers. Pakistan did not lack electricity; it lacked enough low-cost alternatives at the point of stress. Closing that optionality gap is the practical route from energy assets to economic resilience.

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PAKISTAN'S ENERGY TRANSITION IN A WARMING WORLD: Integrating Decarbonization, Climate Resilience and Economic Security

Muhammad Arif Goheer

1. INTRODUCTION

Pakistan's transition to renewable energy is not anymore a matter of policies. The transition has already begun, and the visible signs of this transition can be found in the rapid growth of solar energy systems at household, agricultural, commercial and industrial levels. Imports of solar photovoltaic modules have grown from less than 1 GW in 2018 to more than 51 GW up until early 2026¹⁹. Import capacity does not necessarily mean installed capacity, but it indicates the scale and speed of the change. Official statistics about Pakistan's power sector also support this trend – net metering capacity has increased from 2,813 MW during July-March FY2025 to 7,319 MW during July-March FY2026, which means a jump of 160 percent within one year²⁰.

There are several factors which are responsible for driving this change – reduction in the cost of solar technology, high price of grid electricity, issues related to energy security and increasing demand for electricity among consumers. What is particularly important is that most of the changes are decentralized and demand-driven and thus independent of investments made by the state sector.

19. Centre for Research on Energy and Clean Air (CREA). The Hedge That Paid Off: How Pakistan's Solar Boom Is Shielding It from the Hormuz Crisis. Helsinki: CREA; 2026.

20. Government of Pakistan, Finance Division. Pakistan Economic Survey 2025–26. Islamabad: Government of Pakistan; 2026.

While for Pakistan, the solarisation process cannot be considered merely a development process within the power sector, but rather something that directly impacts its national commitment to mitigating greenhouse gas emissions, climate change resilience, water security, economic competitiveness and energy independence. Hence, the relevant policy issue is not one of increasing solar capacity, but whether a fast technology deployment process can contribute to achieving emission reductions, resilience, and enhanced energy system security.

In other words, the policy approach advocated in this study is that Pakistan should shift from focusing exclusively on an energy transition to adopting a climate compatible energy transition where mitigation and adaptation efforts are undertaken in tandem. Solarisation provides momentum, yet its full potential hinges upon the processes of grid connection, climate risk assessment, GHG accounting, MRV and NDCs, and climate finance.

2. ENERGY TRANSITION AS A CLIMATE-DEVELOPMENT IMPERATIVE

Any discussion of Pakistan's energy transition needs to consider the issue within the larger framework of emissions in Pakistan, which also experiences significant vulnerabilities to climate change. Pakistan's First Biennial Transparency Report indicates that energy, along with agriculture, forestry and other land use, is among the major sectors that contribute to Pakistan's national GHG emissions²¹. The emissions related to energy are not just those associated with power production, but also include emissions from transport, industry, buildings, agriculture, and wider fossil fuel usage in the economy.

The crucial point here is that while de-carbonizing electricity generation is important, it is not enough. Clean electricity should increasingly be used in the lower carbon transport, more energy-efficient industry, better quality buildings and agriculture energy usage. The goal should therefore be the de-carbonization of energy services across the economy.

Pakistan's development needs make this distinction particularly important. Energy demand will continue to rise with population growth, urbanization and economic expansion. A climate strategy based on restricting energy use would be neither realistic nor desirable. The appropriate objective is to improve energy efficiency while meeting growing demand through progressively lower-carbon sources.

At the same time, energy infrastructure itself is increasingly exposed to climate change. Rising temperatures increase cooling demand and can affect power-system performance. Changes in rainfall, snow and glacier dynamics influence hydropower availability, while floods and extreme weather can damage transmission and distribution infrastructure. The energy sector is therefore both a contributor to climate change and a system vulnerable to its impacts.

A successful transition must address both dimensions.

3. PAKISTAN'S SOLAR BOOM AND THE CHANGING ELECTRICITY SYSTEM

The extent of the growth in solar capacity in Pakistan has now become one of the distinguishing characteristics of its energy transition. According to the Pakistan Economic Survey 2025–26, total installed electricity generation capacity stood at 49,651 MW as of March 2026. Hydropower, nuclear and renewables together constituted 50.8 per cent of the installed capacity and produced 53.1 per cent of electricity generated in July–March FY2026.

However, what is really happening now is that distributed solar capacity is increasing rapidly. Solar photovoltaic is being installed in rooftops, agricultural farms, businesses and industries.

21. Government of Pakistan, Ministry of Climate Change & Environmental Coordination. Pakistan's First Biennial Transparency Report under the Paris Agreement. Islamabad: Government of Pakistan; 2024.

The scope of net metering is not an accurate indicator of the trend as much of the capacity is installed behind the meter.

This is important as the traditional planning framework for electricity assumes that the bulk of electricity is generated centrally and is supplied to the consumer via grid. Distributed solar makes this less true. Consumers will keep consuming substantial quantities of electricity but will purchase less from utilities as their demand is partly being satisfied through independent means.

The Economic Survey is one such illustration of this changing trend. Electricity consumption by agriculture from grid sources fell by 42.3 per cent during July-March FY2026 as compared to the same period of the previous year, with adoption of alternate power sources, including solar energy, being counted among the reasons for this. This implies that some of the falling demand from grid might be attributed to technological substitution rather than decrease in productive effort. Pakistan thus is headed toward a system where the consumers themselves would become producers of electricity.

4. FROM SOLAR DEPLOYMENT TO MEASURABLE DECARBONISATION

Solar power installation at a rapid pace is another form of mitigation that deserves consideration, but in no way can installed or imported capacity be considered equivalent to emission avoidance. It all depends on the amount of power generated through such means, the kind of power generation displaced by solar energy, and whether or not there is absorption of this energy.

The process is fairly simple and includes translation of technology installation into electricity generation, which should displace fossil fuel generation and result in verified emission reductions. The latter can then be evaluated against NDC criteria.

Each stage requires reliable data.

In cases where solar energy replaces oil, coal or

gas-fired generation, the mitigation effect may be significant. When renewable energy generation is curtailed, displaces lower-carbon generation or is not well integrated into the grid, the emissions benefits will be much smaller. Hence, there is a need for Pakistan to move from measuring renewable energy capacities to measuring renewable energy generation, emission factors, fuel displacement and avoided CO₂-equivalents.

This has obvious implications for GHG inventories and NDC monitoring at the national level. In view of an increasingly large share of generation taking place "behind the meter," energy data collection must change in order to accommodate that reality. Otherwise, Pakistan may significantly underestimate the changes in electricity consumption, displacement of fossil fuels and mitigation benefits.

Solar energy growth brings about certain practical considerations. High levels of electricity generation during the daytime cause a sharp decline in demand, while the need for electricity increases after sunset. This makes battery storage, demand response, flexible generation, smart metering and better forecasting increasingly important. Thus, the deployment of solar energy without system integration may cause inefficiencies.

System integration should become the priority of the next stage of energy policy.

5. CLIMATE RESILIENCE MUST BE BUILT INTO THE TRANSITION

It is important to note that low-carbon energy infrastructure does not automatically equate to resilient infrastructure. This point is especially relevant for Pakistan because much of the energy infrastructure currently under construction will run for many years under climate conditions very different from those of the past period that was used in the design.

Hydropower generation is subject to changes in river flow, snow melt and hydrological variability. Power lines and substations are susceptible to floods, storms and extremely high temperatures.

Output of photovoltaic panels and performance of the equipment may depend on high temperature, dust and extreme weather. Efficiency of thermal generation may decrease due to high ambient temperature and water-cooling limitations. Thus, climate risk assessment should become an integral part of energy infrastructure development. Major projects need to pass two tests at once – their mitigation credibility and resilience under future climate scenarios.

This is not only a precaution for the environment but also an economic necessity, where infrastructure built on the basis of historical climates could incur greater maintenance costs or even early replacement due to disruption. The use of future projections of climate within the design phase can alleviate these problems and enhance investment.

Consequently, energy transition in Pakistan must rely on one fundamental idea: Low carbon infrastructure must also be climate resilient infrastructure.

6. WATER, ENERGY AND FOOD LINKAGES

Solar irrigation shows how climate policies must be examined holistically as opposed to in isolated sectors. Switching from diesel-powered pumps to solar irrigation systems will bring about reductions in energy costs, dependence on foreign energy and greenhouse gas emissions. In turn, this cheaper form of pumping can lead to greater groundwater exploitation where regulation is poor.

A climate policy that has a positive effect in terms of emission reduction might thus lead to maladaptation. The challenge is not in the solar technology per se, but in its implementation without proper natural resources governance.

This implies that solar irrigation should be accompanied by more efficient irrigation management, groundwater monitoring and accounting, planning for crops and incentivizing increased water productivity. This will allow for retention of emission reduction while minimizing the risks of maladaptation.

The broader point is that there are clear linkages between Pakistan's water, energy, and food systems. Energy choices affect water withdrawals; water availability impacts agriculture and hydro power production; farming practices impact energy and water consumption; and climate change impacts all of these at once. This means that climate policy in Pakistan cannot optimize one system at the cost of another.

7. NDC 3.0 AND THE NEED FOR MEASURABLE IMPLEMENTATION

Pakistan's NDC 3.0, which was submitted in September 2025, constitutes the major national framework within which climate actions should be undertaken. Under this framework, the country pledges to reduce its projected GHG emissions up to 50 per cent in 2035, with 17 per cent reduction being unconditional and 33 per cent being conditional on the provision of financial, technological and capacity-building support from the international community.

The main elements of the national mitigation pathway under the NDC are considered to include renewable energy, energy efficiency, upgrading of transmission systems and storage. Yet the importance of the framework will remain subject to the extent to which national pledges will be turned into measurable sectoral actions.

The presence of such activity as renewable energy capacity, electric vehicles or energy efficiency programs is a good indicator but does not necessarily mean that any progress is made in achieving the national emissions goal.

As such, GHG inventories and MRV become key in climate governance. A comprehensive inventory offers insight into the sources of emissions, variations in emissions and whether the expected results are being achieved through mitigation interventions. It is important that Pakistan maintains and enhances its institutional set-up for data generation, quality assurance/quality control, uncertainty assessments, archiving of data and formulation of country-specific emission factors where necessary. In the long run, the goal must be a

continuous process of national inventory management as opposed to occasional production of inventories mainly for reporting purposes to the international community. The inventory will serve as a yardstick to evaluate energy and climate policies based on emissions trends.

8. CLIMATE FINANCE, INVESTMENT AND SCIENTIFIC CREDIBILITY

Transitioning to a low-carbon future will need investment which will exceed the resources that would be raised by means of the usual fiscal outlay by Pakistan. It will need to raise concessional finance, blended finance, private finance, green bonds and sukuk, international climate finance and, where possible, carbon market finance. Quality of climate evidence will become more important for gaining access to these resources. Baselines, emissions reductions and reporting mechanisms must be reliable in case of mitigation. Climate hazards, vulnerability baselines and improvements must be reliable in case of adaptation investments.

This is how science connects directly with finance. More precise climate forecasts make infrastructure design better²²; better GHG inventories make prioritizing mitigation projects easier; MRV makes us more confident in the results and better-quality evidence makes climate investments more bankable.

So Pakistan needs to move from ad hoc climate projects to ready-to-invest transition programs. Solar storage, grid improvement, transmission infrastructure improvement, efficient cooling, clean energy and renewable public services offer immediate opportunities. Such programs can bring mitigation, adaptation and economic value at the same time.

Furthermore, Article 6 of the Paris Agreement could present some scope for raising more funds for mitigation efforts. Nonetheless, involvement in the carbon market needs to be done cautiously by taking into account the issues of additionality, conservative baselines, transparency in monitoring, avoidance of double counting, and the effects of transferring mitigation outcomes on Pakistan's own Nationally Determined Contributions.

9. TOWARDS A CLIMATE-RESILIENT ENERGY SYSTEM

The solar revolution in Pakistan is a clear example of how technology can progress much faster than traditional planning processes. Now the structures and tools around the energy transition need to play catch-up.

The future power system will have to include more decentralized generation, storage, and flexibility. Climate forecasts will shape infrastructure planning. Energy accounting needs to take account of behind-the-meter generation. GHG inventories need to measure emissions changes. NDCs need to be matched with investment plans, and climate finance proposals need to prove their mitigation and resilience impacts.

All of these aspects should work as part of one cycle of policy: climate science detects risks; GHG inventories detect emission priorities; integrated modeling assesses pathways; policy shapes investments; implementation creates measurable results; and MRV creates the information base for NDC reporting and further policy adjustments.

This approach will give a more meaningful definition of success for Pakistan's transition: it should not be measured by installed renewables capacity. Instead, it should be measured by the ability of the energy system to reduce emissions, enhance resilience, reduce dependence on fossil fuel imports and support economic competitiveness.

10. CONCLUSION

Pakistan is at a crucial crossroads in its climate and energy transition journey. The leap from less than 1 GW of cumulative solar PV imports in 2018 to more than 51 GW by early 2026 and official records of net-metered capacity of 7,319 MW as of March 2026 illustrates the rapid pace of technological change.

22. Intergovernmental Panel on Climate Change. Climate Change 2023: Synthesis Report. Geneva: IPCC; 2023.

These are measures of different aspects of the transition and are not to be confused, but they both prove the transformation of solar power from an emerging technology to a structural part of Pakistan's energy system.

The solar energy transition presents many chances for emission reductions, improved energy security, and decreased dependency on imported fossil fuels. However, renewable deployment alone will not bring success to the climate transition process. More solar deployment will need storage, grid flexibility, increased forecast capacity, and improved management of distributed generation systems. It is also necessary to take into account the climate challenges that the infrastructure will face over its lifecycle.

Pakistan's NDC 3.0 gives the strategic vision, while the Enhanced Transparency Framework, GHG Inventories, and Biennial Transparency Reports²³ are the tools to assess the progress.

The policy challenge is to connect these elements through science-based planning, measurable implementation and investment. Pakistan should thus transition from the technology-led energy transition to a climate resilient development transition. Solar energy should be pursued hand-in-hand with grid modernization; mitigation along with adaptation; energy policy with water and food security; and NDCs with investment and MRV systems.

A low carbon energy system that is vulnerable to climatic extremes will not be resilient; similarly, a resilient energy system that depends on carbon heavy fuels will not be sustainable. The ultimate aim of Pakistan needs to integrate both these aspects.

The boom in solar energy has given Pakistan this momentum; now the task is to translate this momentum into an energy system which is not only low carbon and climate resilient but is economically viable and can ensure sustainable development in the warming world.

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23. United Nations Framework Convention on Climate Change. Biennial Transparency Reports under the Enhanced Transparency Framework. Bonn: UNFCCC.





MORE VEHICLES, LESS MOBILITY:

Understanding the Urban Transport Paradox in Pakistan

Raheel Hasan Qadar and Irem Batool

Pakistan is experiencing rapid motorization driven by urbanization, infrastructure development, the expansion of formal housing colonies and informal settlements (katchi abadis), urban sprawl, and a sharp increase in private motor vehicle ownership facilitated by consumer auto financing. Private motor vehicles have grown substantially faster than public transport and other vehicle categories, becoming the dominant component of the national vehicle fleet. Normalized trends for 1990-2025 indicate a strong co-movement among total vehicles, population growth, GDP per capita, and road transport CO₂ emissions. Without targeted policy interventions, transport-related emissions are likely to continue increasing alongside population growth and rising incomes.

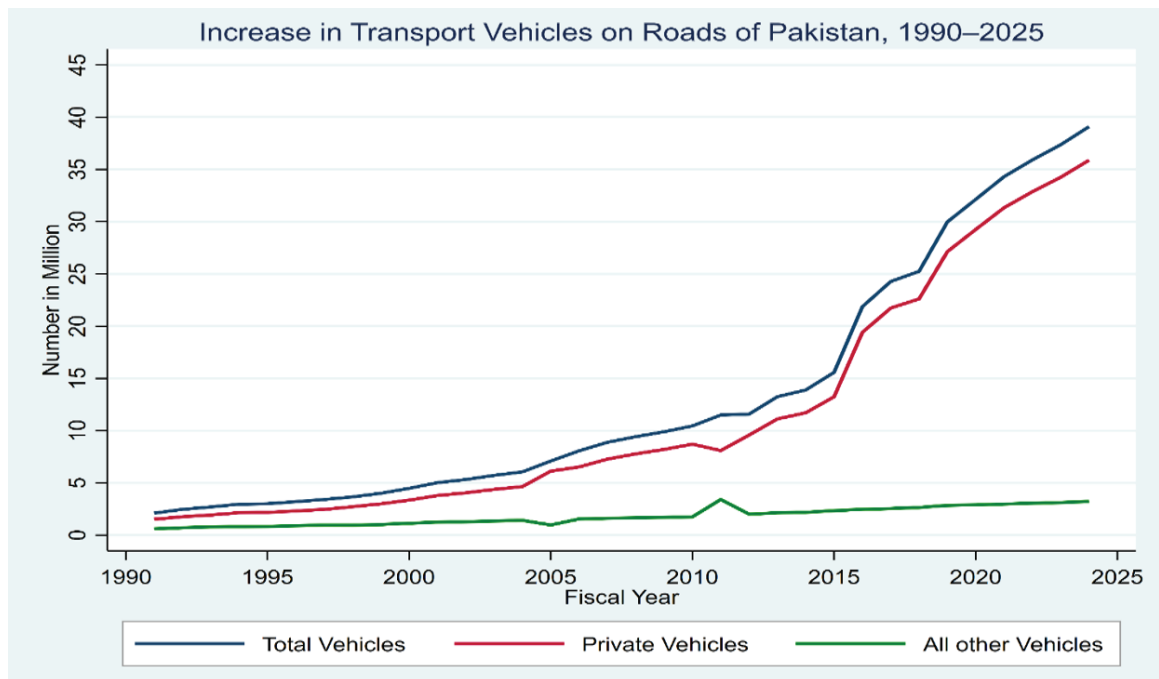
RIISING POPULATION, URBANIZATION AND RIISING TRAVEL DEMAND

Population growth, rapid urbanization, and changing land-use patterns in Pakistan's major cities have substantially increased travel demand²⁴. Urbanization has consistently shifted travel behavior toward greater automobile dependence²⁵ across many countries. As travel demand rises, trips are undertaken through either non-motorized modes, such as walking and cycling, or motorized modes, including private motor vehicles and public transport²⁶.

Statistics revealed that national vehicle fleet expanded from approximately 4.47 million vehicles in 1990 to 39.08 million in 2025. Private vehicles, including cars, motorcycles, and jeeps, accounted for most of this increase, rising from 1.42 million in 1990 to 35.87 million in 2025 (Figure I). In contrast, public transport vehicles, including buses, vans, and rickshaws, increased at a much slower rate. Government policies emphasizing road infrastructure development, urban transport

investments, incentives for private vehicle. Meanwhile, the outward expansion of cities through low-density residential developments and informal settlements has increased travel distances and reinforced automobile dependence. These trends have contributed to higher fuel consumption, greenhouse gas emissions, traffic congestion, road accidents, and declining urban livability, particularly in large metropolitan areas such as Karachi, Lahore, Islamabad and Rawalpindi.

Figure I: Increase in Transport Vehicles on Roads in Pakistan (1990 – 2025)



Source: Author's compilation from Economic Survey of Pakistan and related official series

24. (Aslam et al., 2023; Poumanyvong et al., 2012);

25. (Barter & Kenworthy, 2009; Chaudhry et al., 2025; Newman & Kenworthy, 2006; Yadav et al., 2026);

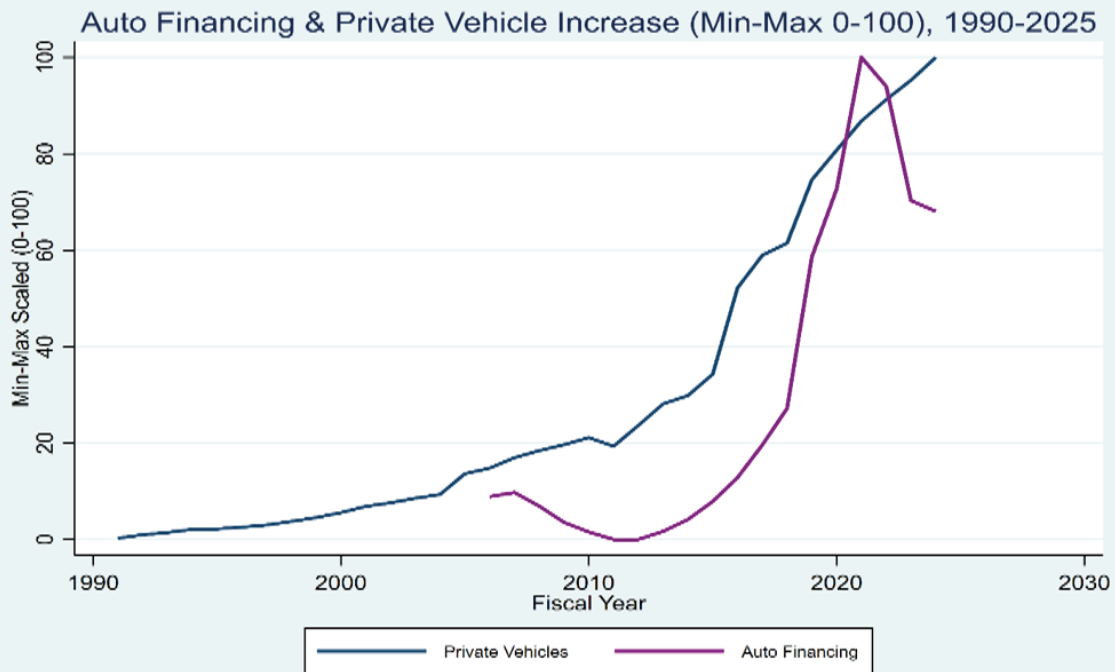
26. (Yadav et al., 2026).

PUBLIC VS PRIVATE VEHICLES

Figure 1 illustrates the widening gap between private and other motor vehicle categories. Private vehicle ownership increased from a few million vehicles in the early 1990s to more than 35 million by the mid-2020s, while the number of other motor vehicles remained relatively stable at approximately 3-4 million throughout the period. The acceleration in private vehicle ownership became particularly pronounced after the mid-2010s. This divergence confirms that Pakistan's rapid motorization has been driven overwhelmingly by private vehicles.

Figure 2 reflects that auto financing has played a significant role in facilitating this growth. Although private vehicle ownership increased steadily throughout the study period, the sharp expansion of auto financing after 2015 closely coincided with accelerated vehicle purchases, suggesting a strong association between access to credit and motorization. By lowering upfront purchase costs and enabling households to spread payments over time, auto financing has expanded vehicle ownership to a broader segment of the population.

Figure 2: Trends in Private Vehicle Ownership and Auto Financing in Pakistan (Min-Max Scaled, 1990-2025)

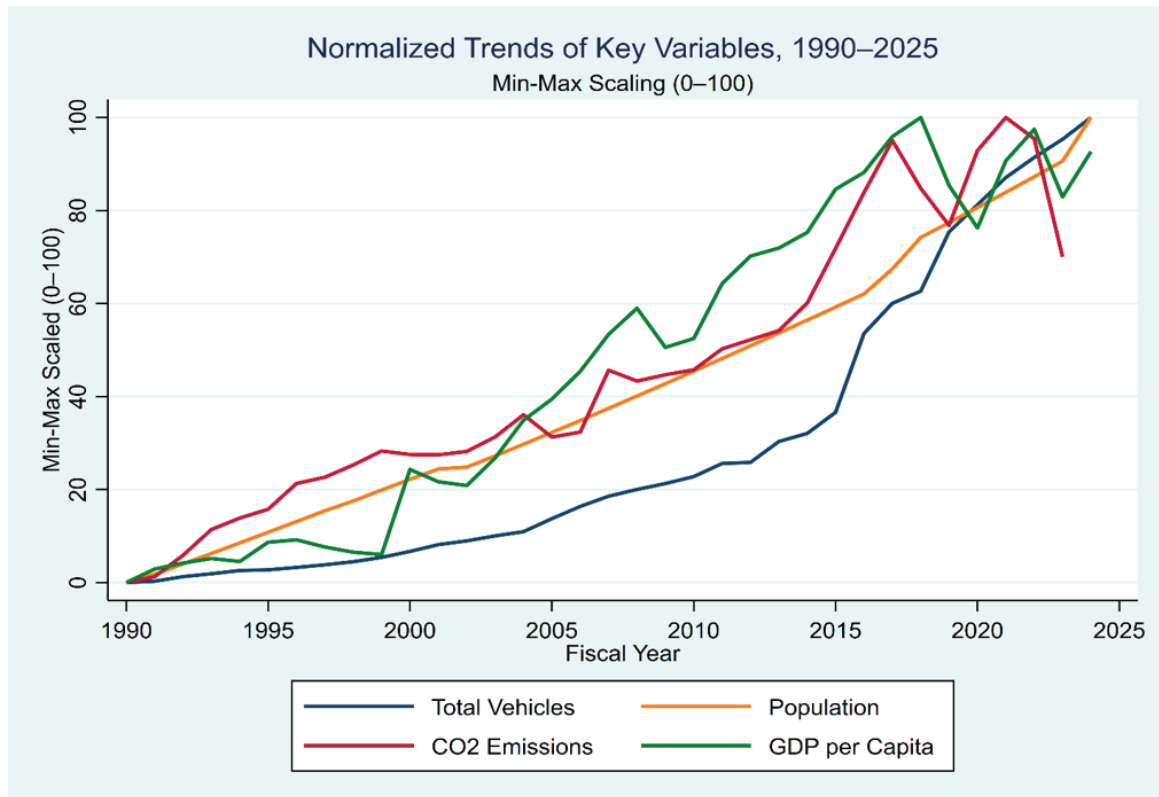


Source: Author's compilation based on data from the Pakistan Economic Survey and the State Bank of Pakistan (SBP), 2025

Figure 3 presents normalized (min-max scaled, 0-100) trends for four key variables between 1990 and 2025: total vehicles, population, road transport CO₂ emissions, and GDP per capita. The four variables exhibit a strong degree of co-movement. Population growth has been accompanied by increases in income levels and a rapid expansion of the vehicle fleet. Road transport CO₂ emissions

have followed a broadly similar upward trajectory. This pattern supports the proposition that urbanization, economic growth, and motorization jointly contribute to increasing transport-sector emissions.

Figure 3: Normalized Trends of Key Variables (1990 - 2025)



Source: Author's calculations based on data from the Government of Pakistan, Pakistan Economic Survey, the World Bank Open Data and the IEA-EDGAR.

MOTORIZATION AND ENVIRONMENTAL EMISSIONS

The transport sector is a major source of air pollution and greenhouse gas emissions in Pakistan²⁹. Road transport CO₂ emissions increased from approximately 13.8 million tonnes

in 1990 to 43.6 million tonnes in 2023³⁰. According to The Urban Unit (2023), transport accounts for approximately 81.3% of Lahore's estimated CO₂ emissions³¹. Beyond its contribution to greenhouse gas emissions, road transportation is also an important source of urban air pollution in Pakistan. Evidence from major cities highlights the broader environmental and public-health costs associated with transport activity.

Poor air quality in Lahore is estimated to reduce average life expectancy by approximately seven years. Similarly, transport contributes approximately 53% and 51% of total emissions in Islamabad-Rawalpindi and Peshawar, respectively, and accounts for 33% of emissions in Karachi. During severe smog episodes in November 2024, Air Quality Index (AQI) values exceeded 1,900 in Lahore and 2,000 in Multan, highlighting the magnitude of the air pollution challenge³².

Two temporary interruptions to the long-term upward trend are evident:

2020: A substantial decline in transport emissions coincided with COVID-19 lockdowns, which significantly reduced travel demand and mobility.

2022: Another decline coincided with catastrophic flooding and a sharp increase in fuel prices, which may have constrained transport activity.

Following these disruptions, the long-term growth trajectory resumed. By the mid-2020s, population, vehicle ownership, GDP per capita, and transport-related CO₂ emissions had all returned to, re-accelerated to their highest normalized levels.

Figure 4 provides additional evidence of the close relationship between motorization, energy consumption, and transport-sector emissions. Transport-sector petroleum consumption, primarily gasoline and diesel, increased alongside the rapid expansion of the vehicle fleet. The growth in private vehicle ownership raised demand for transport fuels, contributing to higher energy consumption and transport-related CO₂ emissions. The upward trend in transport-sector oil consumption closely mirrors the growth in vehicle ownership presented in Figures 1 and 3, indicating that rising motorization has been accompanied by increased fuel use and, consequently, higher road transport CO₂ emissions. A notable interruption occurs in 2020, when COVID-19 lockdowns and restrictions on vehicular movement led to a

temporary decline in transport activity, resulting in lower oil consumption and reduced transport-related emissions. This decline is consistent with the downturn observed in road transport CO₂ emissions in Figure 3. Following the easing of restrictions, transport-sector oil consumption resumed its upward trajectory, further reinforcing the co-movement among vehicle ownership, economic growth, energy consumption, and transport-related emissions. A further decline in oil consumption was observed in 2022, coinciding with the widespread flooding and sharp increases in petroleum prices. The close co-movement suggests that rapid motorization is an important contributor to rising petroleum demand and road-transport CO₂ emissions in Pakistan.

Pakistan has historically introduced Euro-II vehicular emission standards for petrol and diesel vehicles. These vehicle emission standards should be distinguished from fuel-quality standards, which concern the characteristics of transport fuels, including sulfur content. The National Clean Air Policy identifies the upgrading of transport fuel-quality standards toward Euro 5 and Euro 6 as an important measure for improving air quality and reducing transport-related pollution³³. The gap between policy targets and effective implementation highlights the importance of strengthening fuel-quality regulation, monitoring, and enforcement as Pakistan's vehicle fleet continues to expand.

COSTS OF RAPID MOTORIZATION

The observed growth in motorization and its close co-movement with fuel consumption and road-transport CO₂ emissions have broader economic, environmental, and social implications. Although rapid motorization has generated benefits for consumers, the automotive industry, and government revenues, its social, economic, and environmental costs are substantial, particularly in large urban centers.

29. (Omar & Pakistan Air Quality Initiative, 2025).

30. (Crippa et al., 2024).

31. (The Urban Unit, 2023)

32. (Omar & Pakistan Air Quality Initiative, 2025).

33. (Ministry of Climate Change, 2023)

Sustainable Transportation: Automobile-oriented urban development encourages sprawl, lengthens travel distances, reduces opportunities for active transportation, and creates barriers for pedestrians and cyclists.

Environmental Vehicle Emissions: Vehicle emissions contribute significantly to greenhouse gas accumulation and urban air pollution, frequently exceeding recommended health standards.

Traffic Congestion: Traffic congestion increases travel time, wastes fuel, and further elevates emissions.

Social Inequality: People without private vehicles—including many low-income households, women, students, elderly people, and persons with disabilities—may face greater mobility constraints.

Road Accidents: Road traffic injuries and fatalities remain a major public health concern.

Balance of Payments Disequilibrium: Transport accounts for a significant share of Pakistan's petroleum consumption, increasing dependence on imported fuels and placing pressure on the balance of payments.

The policy paradox: Road widening and additional flyovers may temporarily improve traffic flow but can eventually encourage additional vehicle use—often described as induced demand.

These challenges underscore the urgent need for policies that reduce unnecessary private vehicle use while preserving accessibility and mobility.

POLICY RECOMMENDATIONS

The strong positive association among motorization, population growth, income growth, and transport-related emissions suggests that targeted policy interventions are necessary to mitigate future emissions, particularly those driven by the rapid expansion of private motor vehicle use. The following complementary regulatory, infrastructural, behavioral, and fuel-quality measures are recommended.

1. Strengthen Public Transport Systems

Public transport should be actively promoted through improvements in service frequency, reliability, affordability, comfort, safety, and last-mile connectivity. High-quality and accessible public transport can encourage a shift away from private vehicles and help moderate the growth of transport-related emissions even as population and incomes continue to rise. Particular attention should be given to integrating different public transport modes and improving connectivity between residential areas, employment centers, and major urban destinations.

2. Introduce Nationwide Car-Free Sundays

Major Pakistani cities should consider introducing regular car-free days, initially on selected Sundays or other low-disruption d, drawing on experiences from cities and countries that have implemented car-free days, including Jakarta and the Netherlands³⁴. Car-free Sundays could reduce traffic volumes and transport-related emissions while creating opportunities for walking, cycling, recreation, and greater use of public transport. Such initiatives could also raise public awareness of alternative modes of mobility and demonstrate the potential environmental benefits of reducing dependence on private vehicles. To maximize effectiveness, car-free periods should be supported by adequate public transport services and clear arrangements for essential and emergency mobility.

3. Implement Sustained Public Awareness Campaigns

Long-term public awareness campaigns should educate citizens about the environmental, economic, and public health consequences of

34. (EngX Editorial, 2023; Supertravelr, n.d.)

excessive private vehicle use. By highlighting the links between transport choices, air pollution, climate change, fuel consumption, congestion, and public health, such campaigns can encourage behavioral shifts toward more sustainable mobility options. Awareness initiatives should be continuous rather than limited to short-term campaigns and should be complemented by practical alternatives, particularly reliable and affordable public transport.

4. Accelerate the Adoption and Implementation of Euro 5 and Euro 6 Fuel-Quality Standards

Pakistan should accelerate the adoption, implementation, and effective enforcement of Euro 5 and, subsequently, Euro 6 fuel-quality standards for transport fuels. Pakistan has historically introduced Euro-II vehicular emission standards, while the National Clean Air Policy identifies the upgrading of transport fuel-quality standards toward Euro 5 and Euro 6 as an important measure for improving air quality and reducing transport-related pollution (Ministry of Climate Change, 2023). Given the continued growth in private vehicle ownership and road-transport activity identified in this study, delays in implementing higher fuel-quality standards may constrain progress toward reducing the environmental impacts of motorization.

The government should therefore establish a clear and time-bound roadmap for the effective nationwide implementation of Euro 5 fuel-quality standards, followed by a transition toward Euro 6. This should be supported by strengthened fuel-quality monitoring, regular testing at refineries

and fuel distribution points, transparent compliance mechanisms, and effective enforcement. Improvements in fuel quality should also be accompanied by progressively stronger vehicle emission standards so that cleaner fuels are complemented by cleaner vehicle technologies. Together, these measures could contribute to reductions in harmful transport-related pollutants and support Pakistan's broader objectives of improving urban air quality and promoting more sustainable mobility.

Collectively, these regulatory, infrastructural, behavioral, and fuel-quality interventions can help reduce the environmental costs associated with rapid motorization while preserving mobility and access to economic opportunities. In the longer term, these measures should be complemented by integrated land-use and transport planning, stricter regulation of low-density peripheral development, transit-oriented development strategies, and continued investment in high-capacity public transport systems. Taken together, these measures can help decouple growth in mobility and vehicle ownership from growth in transport-related emissions. In the longer term, they should be complemented by integrated land-use and transport planning, stricter regulation of low-density peripheral development, transit-oriented development, and continued investment in high-capacity public transport systems.

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BEYOND FORECASTING:

Making Integrated Energy Planning Work for Pakistan's Economic Resilience

Shafqat Abbas and Maria Jawad Khan

Pakistan has planned its energy future before. The opportunity today is to make Integrated Energy Planning more than a projection of demand and supply—to make it a framework for preparing the economy for geopolitical shocks, technological change, the energy transition and regional competition.

For Pakistan, economic resilience is increasingly tied to energy resilience. An energy shock rarely stays within the energy sector. A disruption in international fuel markets can raise the import bill, put pressure on the exchange rate, and increase the domestic cost of energy. These pressures eventually reach businesses and households, affecting production, exports, and growth³⁵.

The Russia–Ukraine war showed how quickly geopolitical tensions can disrupt energy markets and supply chains³⁶. Continuing instability in the Middle East offers another reminder that energy security is closely linked to both geopolitics and its economic consequence.

For an energy-importing country, energy security is therefore about more than having sufficient energy. It is also about the economy's ability to absorb an external energy shock without compromising competitiveness or macroeconomic stability. Energy resilience is, in this sense, part of economic resilience.

35. Malik, S., Qasim, M., Saeed, H., Youngho, C., & Taghizadeh-Hesary, F. (2019). Energy security in Pakistan: A quantitative approach to a sustainable energy policy (No. 1024). ADBI Working Paper Series.

36. International Energy Agency. World Energy Outlook 2022. Paris: IEA, 2022.

This is why Pakistan's emerging Integrated Energy Plan (IEP) matters. The National Electricity Policy 2021 calls for power-sector planning to be integrated with the wider energy value chain. The National Electricity Plan 2023–27 builds on this approach by linking IEP with long-term planning, investment and the energy transition. The task now is to make IEP more than a projection of future energy demand and supply. A forecast tells us what energy requirements might look like. Planning must go a step further: what should Pakistan invest in today if demand, fuel prices, energy transition, technology or geopolitics take a different path tomorrow?

That is the real challenge for Pakistan's emerging integrated energy plan. It cannot predict or prevent every future energy shock. However, it can help ensure that when a shock occurs, it does not turn into an economic crisis. The IEP should consider the following areas that will shape Pakistan's energy future.

From Forecasting to Resilience

Pakistan has not lacked energy plans. It has developed the Energy Security Action Plan 2005–2030 and the Pakistan Integrated Energy Model, alongside subsequent electricity generation-expansion plans³⁷. The problem has been less the absence of planning than the weak connection between planning, investment and implementation. Pakistan's earlier experience offers an important lesson: a model has limited value if its findings do not translate into actual policy and investment decisions³⁸.

The challenge now is not simply to develop a better energy model. It is to integrate the analysis into an ongoing decision-making process. A long-term plan built around a single forecast can quickly lose relevance. Demand may grow faster or slower than expected; electric vehicles may expand more rapidly; distributed solar and batteries may change how consumers use the grid; international oil and LNG prices may remain high; and climate conditions may affect hydropower. Technological change could also make some investments less economical before the end of their expected life.

Pakistan's energy planning needs to look beyond the conventional low, medium, and high demand scenarios. It should also examine how changes in fuel prices, technology, climate, geopolitics, and consumer behavior could alter the energy system. It should test several plausible futures and identify investments that continue to make economic sense as conditions change. This means considering not only the expected cost of an investment, but also the cost of getting the assumptions wrong.

Forecast accuracy will always matter, but it is not enough. A good plan should also help policymakers distinguish between investments that remain valuable across different futures and those that depend heavily on uncertain assumptions. This is particularly important when large, long-lived infrastructure investments are involved, because the wrong decision can create costs that persist for decades. Pakistan's experience with Independent Power Producers (IPPs) illustrates why these decisions matter.

Integrated Energy Planning should therefore do more than tell Pakistan how much energy it may need. It should help the country decide what to invest in, what risks to prepare for, and how to keep the energy system adaptable as conditions change.

Connecting Pakistan's Energy System with the Region

Pakistan's energy resilience will increasingly depend on how effectively it connects with regional energy markets. Its geographical location offers opportunities to connect with Central Asia, China, South Asia and the Middle East. However, geography alone is not enough. Regional energy trade requires investment for reliable domestic networks, and cross-border infrastructure. Pakistan will also need investment in energy storage, transmission, distribution and grid flexibility as its energy system changes.

37. Asian Development Bank, Pakistan: Integrated Energy Model, Technical Assistance 4982-PAK; and Bashir et al. (2022).

38. Bashir, S., Kanwal, S., Zeb, H., Baber, Z. B., & Majeed, A. (2022). Integrated energy planning and modeling (IEPM) for sustainable electricity generation in Pakistan: Challenges and limitations. *Energy Exploration & Exploitation*, 40(6), 1806-1836.

Some of these opportunities are already on the table, and their record so far is instructive. The CASA-1000 transmission project, intended to bring surplus hydropower from Central Asia into Pakistan, remains incomplete years after its original timeline, showing how financing gaps and security constraints on the Afghan transit route can stall connectivity even when the underlying economic logic is sound³⁹. The long-discussed Iran-Pakistan gas pipeline illustrates a related constraint: Pakistan has reportedly moved to shelve the project over the threat of US sanctions, while leaving the door open to revive it should a sanctions waiver be granted⁴⁰. Both cases show that regional energy connectivity is not simply a construction challenge; it depends on sustained diplomacy, workable financing structures and active risk management alongside the physical infrastructure itself.

The IEP should therefore look beyond domestic energy demand and supply. It should identify opportunities for regional energy connectivity, the infrastructure required, and the investment needed to develop them. This would allow Pakistan to prepare for regional energy opportunities rather than respond only when they emerge.

Regional energy links could diversify energy sources and markets, support industrial competitiveness, and reduce exposure to external shocks. For Pakistan, regional connectivity is therefore an important part of energy security and a source of greater energy resilience.

Climate Risk and Energy Planning

Climate change is another reason Pakistan's energy planning must look beyond historical patterns. Rising temperatures can increase electricity demand, while changes in rainfall and water availability can affect hydropower. Floods and extreme weather can also damage transmission and distribution infrastructure.

These risks matter for long-lived energy investments. An energy infrastructure built today may operate for decades under very different climate conditions. IEP should therefore consider climate risks when deciding where, when, and what

to invest in. This includes assessing the resilience of infrastructure, the reliability of different energy sources, and the need for storage and grid flexibility.

Climate change also affects the economics of the energy transition. Renewable energy can reduce fuel-import dependence, but integrating more variable generation will require stronger networks, and storage and system flexibility⁴¹. For Pakistan, the task is not simply to add cleaner energy, but to build an energy system that remains reliable as climate conditions change.

Planning for a Changing Energy System

Pakistan's energy system is changing on both sides of the market. The Competitive Trading Bilateral Contract Market (CTBCM) is introducing greater competition in electricity⁴². Rooftop solar, captive generation, and battery storage are changing how consumers produce and use electricity. Electric vehicles could shift some transport demand from oil to electricity. Pakistan will also remain exposed to changes in international oil and gas markets.

These developments are increasingly connected. More EVs could increase electricity demand. Solar and captive generation could reduce purchases from the grid. Batteries could change when consumers draw electricity. Changes in gas supply or LNG prices could affect power generation and industrial costs. Investment needs will therefore change across the energy system, not just within individual sectors.

IEP should bring these developments into a common planning framework. It should consider how electricity, oil, and gas markets may evolve alongside new technologies and consumer choices. Pakistan needs to plan where and when energy will be produced, stored, and consumed, while keeping investment flexible enough to respond as the system changes.

39. World Bank, Updated Q&A on CASA-1000 Resumption in Afghanistan, January 2026.

40. Malik, M. (Federal Minister for Petroleum), statement to the National Assembly on the Iran-Pakistan Gas Sales and Purchase Agreement, reported in Dawn, 2023; Pakistan Today Profit, 'Pakistan might shelve the Iran-Pakistan Gas Pipeline project', January 2026.

41. International Energy Agency. World Energy Outlook 2022, discussion of energy security and clean-energy transitions.

42. National Electric Power Regulatory Authority (NEPRA).

Lessons from International Experience

International experience shows that energy planning works when it is linked to actual decisions and can adapt when conditions change. Australia provides a useful example. Its Integrated System Plan is updated regularly and links generation, storage, and network investment. It also considers different future conditions before setting investment priorities.

Brazil offers another lesson. Its Ten-Year Energy Expansion Plan is prepared annually and takes an integrated approach with different energy sources. This gives investors clearer signals about future system needs and allows capacity to adjust as demand and market conditions change. South Africa provides a cautionary example. Its Integrated Resource Plan provides a framework for long-term electricity planning. However, its experience also shows the difficulty of keeping long-term planning aligned with implementation and wider policy as conditions change.

Energy planning is ultimately tested when the assumptions behind the original plan no longer hold. Energy prices can rise sharply, supplies can be disrupted, technology can change investment choices, and climate change can affect energy demand, availability, and affordability. A resilient plan should provide direction without locking Pakistan into investments that no longer make economic sense.

The lesson for Pakistan is clear. A good energy plan cannot end with projections. It must guide investment, infrastructure and policy, while allowing decisions to change when circumstances change. The real test of IEP will be whether it can provide long-term direction without losing the flexibility to respond to a changing energy system.

Strengthening the Role of IEP

Pakistan's energy challenge is no longer simply about adding supply. The country must decide where to invest, which technologies to support, how energy use will change, and how to remain competitive as the regional and global energy landscape evolves. These choices will shape the

economy for decades. The emerging IEP offers an opportunity to consider these choices together. Its value will depend on whether it helps Pakistan avoid costly and inflexible investments, respond to changing conditions and make better use of public and private capital.

The IEP should also serve as a shared planning framework. Its robustness will depend on meaningful input from the Power Division, Petroleum Division, Ministry of Climate Change and Planning Commission. These institutions should also use the IEP in their policy and investment decisions. Coordination among them has faltered before, and not primarily for lack of technical capacity: these institutions operate under separate mandates, budgets and reporting lines, which gives each one limited incentive to align its decisions with a shared plan. Strengthening the role of IEP will therefore require a governance mechanism with real authority to enforce coherence across these institutions, such as a standing inter-ministerial committee or an empowered secretariat, rather than one that simply collects their input. The plan should be reviewed periodically and updated as conditions change.

The benefits will extend beyond the energy sector. Reliable and affordable energy supports industrial production and exports. Greater diversification can reduce exposure to external shocks. Regional energy links can open new opportunities. A more flexible system can also make the transition towards cleaner energy less disruptive. Together, these measures can strengthen Pakistan's economic resilience.

Pakistan should not judge its IEP by the precision of its projections alone. Its real value will be measured by the choices it helps the country make today, and the room those choices leave for tomorrow. That is how an energy plan can become a foundation for economic resilience.

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THE FEATHERS NEVER FALL

Tracing an Energy Shock Through Prices, Markets, and the Revenue Base

Zehra Farooq

SYNOPSIS

Pakistan has absorbed two major energy shocks in four years: the 2022 commodity and currency episode and the 2026 Strait of Hormuz disruption. Both moved through the same sequence: a fast rise in fuel and transport prices, a slower and more persistent rise in the general cost of living that concentrates in rural markets, and, arriving last, a change in the revenue base. This piece traces that sequence using publicly available price and collection data from both episodes and introduces a market-structure disaggregation of a decade of CPI sub-indices, which finds that the

categories with the highest cumulative price growth were not the state-administered ones. It closes on what a reordered regional energy geography implies for the interval between shocks, a variable that matters more than shock depth alone for a transmission chain whose later stages run for quarters rather than weeks. The argument is not that any single instrument, supply diversification, levy design, or forecasting method, resolves this. It is that the chain has at least four distinct stages, each with its own actors and lag, and that framing it as a single event rather than a sequence makes its full economic cost difficult to anticipate.

TWO SHOCKS, ONE SEQUENCE

In February 2022, the invasion of Ukraine moved global energy and commodity prices sharply higher. In February 2026, the closure of the Strait of Hormuz following military operations involving Iran, the United States and Israel did the same. Four years apart, two shocks with unrelated triggers produced closely comparable domestic trajectories: a rapid and visible increase in fuel and transport prices; a slower, broader and more durable increase in the general cost of living; and, later still, a measurable movement in tax collection relative to target.

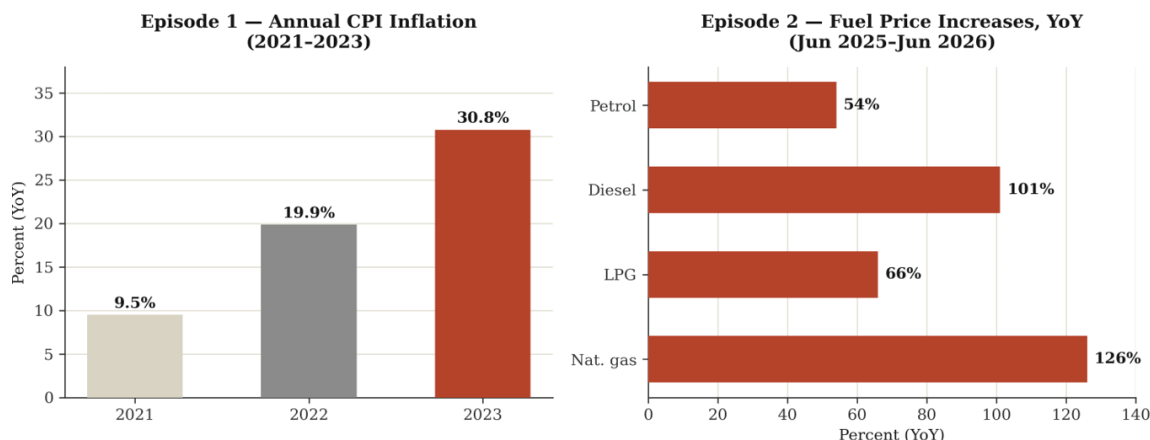
These are commonly reported as three separate stories. This piece treats them as four stages of one sequence, price shock, pass-through, persistence, and fiscal effect, and asks what publicly available data from both episodes can tell us about how long each stage takes and where within the economy it concentrates. The purpose is descriptive. Economic resilience against external energy shocks depends first on an accurate account of how those shocks actually travel, and the evidence suggests they travel further, and for longer, than the initial price movement alone would indicate.

STAGE ONE: THE INITIAL PASS-THROUGH IS RAPID

Energy price pass-through into Pakistan's consumer price index is quick. In March 2026, the month following the Hormuz disruption, transport inflation moved from 0.4 per cent year-on-year to 12.5 per cent. By May 2026 it had reached 36.8 per cent, with housing and utilities inflation at 16.8 per cent. Year-on-year fuel price movements to mid-2026, as compiled by the Lahore School of Economics Modeling Lab, were diesel approximately 101 per cent, petrol 48 to 54 per cent, LPG approximately 66 per cent, and natural gas 126 per cent.

The 2022 episode moved at similar speed. Transport group inflation for July–April FY2022 stood at 19.4 per cent, against a decline of 1.3 per cent in the same period of the preceding year. Headline CPI rose from 9.50 per cent (2021) to 19.87 per cent (2022) to 30.77 per cent (2023), reaching a monthly year-on-year peak of 37.97 per cent in May 2023.

Figure I: Two episodes of comparable magnitude: annual CPI in the 2021–23 shock, and year-on-year fuel price movements in the 2025–26 shock.



Source: Macrotrends/PBS annual CPI series; LSE Modelling Lab, FY2025-26 quarterly assessment.

Both episodes are consistent with the pattern described in the energy pricing literature as rockets and feathers: prices adjust rapidly and close to fully when input costs rise, and slowly and partially when they fall. The pattern is well-documented internationally across fuel and electricity markets. The question this raises for an economy like Pakistan's is where in the price chain the asymmetry is largest, because the answer determines both how long the shock persists and which households carry it.

STAGE TWO: THE PASS-THROUGH IS NOT UNIFORM ACROSS MARKET TYPES

One way to examine this is to disaggregate the CPI not by commodity group, which is the standard presentation, but by market structure, that is, by who sets the price. Applying this classification to sixteen urban CPI sub-indices over July 2015 to January 2025 produces three groups. Administered prices are those set or directly regulated by public authority: piped gas, electricity, motor fuel, wheat flour, and government education. Captured prices are those set in markets with concentrated supply or limited competitive discipline: cooking oil and vegetable ghee, drugs and medicines, doctors' fees, house rent, and fresh milk. Competitive prices are those set in markets with many participants and low barriers to entry: cotton cloth, ready-made garments, communications, and transport services.

The cumulative price paths of the three groups over the decade separate clearly.

Market type	Urban median, cumulative	Rural median, cumulative
Captured	+187%	+191%
Administered	+175%	+161%
Competitive	+126%	+157%
Headline CPI (reference)	+157%	—

Source: Author's classification and calculation.

Two observations follow. First, over the decade, the categories with the highest cumulative price growth in both urban and rural Pakistan were not the administered ones. Captured-market prices exceeded administered prices by twelve percentage points in urban areas and thirty percentage points in rural areas. Second, where competitive discipline is strongest, cumulative increases were substantially lower: communications, the most competitive sub-index in the basket, rose 43 per cent against a headline of 157 per cent, a large decline in real terms.

This matters directly for how an energy shock propagates. An increase in fuel costs enters the economy as an input cost for essentially every sector. Where it enters a competitive market, downward pressure eventually restores some of the price when the input cost falls back. Where it enters a market with concentrated supply or weak price transparency, that restoring mechanism is weaker, and the feather descends more slowly, or not at all. The decade-long data suggest a substantial share of Pakistan's consumer basket sits in the second category, a structural characteristic of the markets themselves that operates independently of any movement in administered prices over the same period.

STAGE THREE: PERSISTENCE CONCENTRATES IN RURAL MARKETS

The 2022–23 episode indicates where an embedded price increase is slowest to unwind. At the May 2023 peak, national CPI inflation stood at 37.97 per cent year-on-year, but this masked a substantial gap: urban CPI rose 35.09 per cent while rural CPI rose 42.18 per cent. The same gap appears in food inflation a year earlier, at 15.6 per cent urban against 17.7 per cent rural in April 2022. It appears again in the market-structure data above, where the captured–administered gap is more than twice as wide in rural markets as in urban ones.

Measure	Urban	Rural
CPI inflation, May 2023 (YoY)	35.09%	42.18%
Food inflation, April 2022 (YoY)	15.6%	17.7%
Captured-market median, cumulative to Jan 2025	+187%	+191%

Sources: PBS, CPI Press Release, May 2023; PES 2021-22, Chapter on Inflation; author's calculation from PBS CPI sub-indices.

The structural features consistent with this pattern are well established: thinner competitive pressure among sellers, less real-time price transparency for buyers, greater reliance on transport-intensive distribution chains where fuel costs compound at each stage, and a higher share of cash transactions outside formal price monitoring. Once a price increase is absorbed into local pricing conventions in such a market, its reversal tracks the slower process by which those conventions reset, rather than the reversal of the original shock.

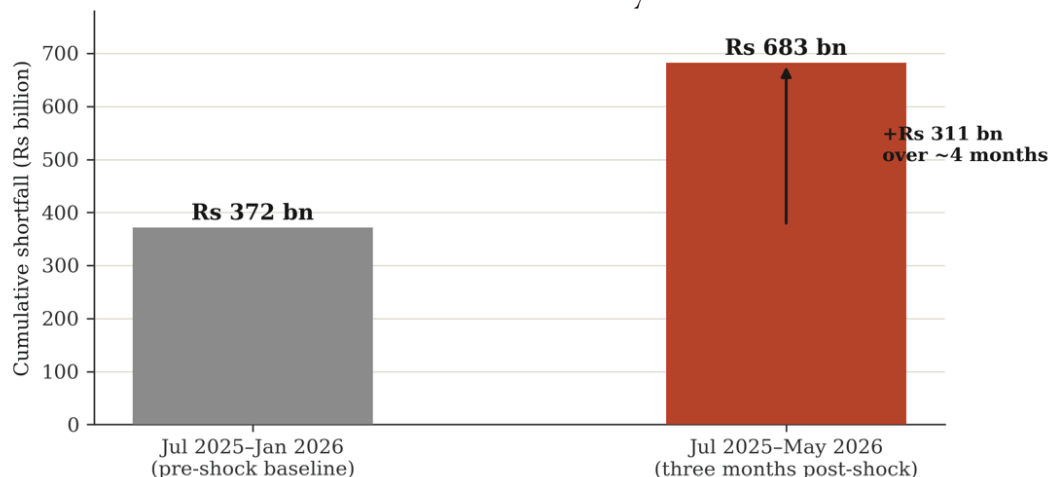
Core inflation data supports this from a second angle. In FY2022, core inflation, which excludes volatile food and energy prices, ran at 7.6 per cent urban and 8.3 per cent rural, well below headline CPI. That gap represents the second-round effect not yet fully arrived. The Pakistan Economic Survey's account of the period attributes the subsequent rise in core inflation to "higher domestic demand, lagged impact of exchange rate

depreciation", describing persistence that arrives after, rather than alongside, the initial trigger.

STAGE FOUR: THE MOVEMENT IN THE REVENUE BASE, AND ITS LAG

The fourth stage is the one most directly relevant to fiscal planning, and its lag can be observed in published collection data from the current episode. For July 2025 to January 2026, that is, before the Hormuz disruption began on 28 February 2026, the Federal Board of Revenue's cumulative shortfall against its in-year assigned target stood at Rs 372 billion. By May 2026, approximately three months after the disruption, the cumulative shortfall for the same fiscal year stood at Rs 683 billion. Figure 2: The cumulative shortfall against in-year target widened by approximately Rs 311 billion between January and May 2026.

Figure 2: FBR Cumulative Shortfall Against In-Year Target, Before and After February 2026



Source: FBR provisional collection data as reported by TechFinPost (February 2026) and The Express Tribune (May 2026). Figures are cumulative shortfalls against in-year targets, not annual totals.

This is an arithmetic difference between two published cumulative figures, not an attribution study. Several factors moved during this window, and the movement cannot be assigned to the Hormuz disruption alone from public data. What can be said is that the timing is consistent with the sequence described above: an energy price shock compresses real household purchasing power through the pass-through and persistence stages, and consumption-linked revenue heads respond to that compression with a lag, while import-linked heads respond to changes in import volume and value on a different and generally shorter timeline.

The 2022–23 episode shows the same lag structure over a longer horizon. Revenue performance in FY2023 was affected by import compression and by the composition of the consumption base during a high-inflation year; sales tax collection underperformed relative to target across the first eleven months even though the general sales tax rate had moved from 17 to 18 per cent in the same period, an illustration of the general point that a rate change and a base change can move in opposite directions simultaneously. The following year, collection grew 29.8 per cent to Rs 9,299 billion, a figure carrying an important caveat for anyone reading it as a recovery signal.

This last point is worth stating precisely, because it applies to both episodes and to any future one. Inflation raises the nominal value of transactions on which ad valorem taxes are levied, supporting nominal collection, while simultaneously compressing real purchasing power and reducing the volume of taxed transactions (*an ad valorem tax is charged as a percentage of a transaction's value, so its yield rises automatically with price; a specific-rate tax is charged as a fixed amount per unit, litre or item, so its yield depends on volume rather than price. If petrol is taxed at 18 per cent of value, a rise in the pump price from Rs 250 to Rs 350 per litre lifts the tax take from Rs 45 to Rs 63 on the same litre. A levy fixed at Rs 60 per liter yields Rs 60 at either price, and moves only when the number of liters sold changes*). These effects run in opposite directions and resolve at different speeds. Which dominates in a given quarter depends on the composition of the consumption basket, the share of ad valorem versus specific-rate instruments in the revenue mix, and how far

through the persistence stage the economy has travelled. It is not knowable from the size of the initial price shock alone.

WHAT THE SEQUENCE IMPLIES FOR RESILIENCE

Economic resilience against energy shocks is most often framed as a supply-side question: diversifying import sources, expanding domestic generation, building storage. These are substantial and well documented. The sequence traced here points to a complementary dimension: the analytical capacity to anticipate how a shock travels once it has arrived.

Three observations follow from the data above, none requiring a claim about which instrument matters most. First, the four stages operate on different timescales, pass-through in weeks, persistence over quarters to years, and fiscal effects with a lag that the 2022–23 episode suggests can extend across more than one fiscal year. A framework treating an energy shock as a single-period event will not capture its full footprint, because most of that footprint arrives after the initial price movement has been reported. Second, where a shock lands matters as much as how large it is: the same input cost increase behaves very differently entering a competitive market than a concentrated one. Third, because rural markets absorb and retain price increases differently from urban ones, national aggregates understate both the depth and duration of the effect for a large share of the population.

The four-stage structure has a direct implication for what a statistical apparatus tracks and how those series are read together. At present the relevant data sit in three places and are published on three separate cycles: the Pakistan Bureau of Statistics produces the CPI and SPI, disaggregated by urban and rural strata and by sub-index; the State Bank produces the core inflation series and the monetary policy assessment; and the Federal Board of Revenue produces monthly collection against target. Each is sound in isolation. What no published series currently does is align them on a common event clock, so that the interval between a fuel price movement and its appearance in rural sub-indices, and then in consumption-linked collection heads, can be observed directly rather

than inferred after the fact. A joint indicator, published quarterly, that tracks an energy price index alongside urban and rural CPI sub-indices, grouped by market structure, and collection performance in the revenue heads most exposed to consumption compression would make the lag structure visible while it is running rather than in retrospect. The component data already exist and are already published. What is absent is the convention of reading them as one series.

There is a broader question underneath this, which the post-growth literature has recently returned to the mainstream of development economics. Kallis and co-authors⁴³, writing in *The Lancet Planetary Health* in 2025, argue that the indicators an economy organizes itself around shape what that economy can notice. The point applies directly here. Pakistan's real GDP per capita grew by roughly 59⁴⁴ percent from 2000 to 2025. Over a broadly comparable period, the prevalence of stunting among children under 5 moved from 41.6⁴⁵ percent in 2000 to 40.2⁴⁶ percent in 2018. A framework that tracks aggregate output closely and distributional outcomes loosely will register an energy shock as a growth and inflation event, and register its persistence in rural consumption baskets, where the market-structure data suggests it lasts longest, considerably later, if at all.

This is not an argument for any particular reform. It is an argument that the first requirement for resilience is an accurate map of the terrain a shock crosses. The four stages described here are each measurable with data that is already published. Whether they are measured together, as one sequence, is a choice about what a fiscal and statistical apparatus is built to see.

That choice is now more consequential, because the frequency of the trigger has changed. The chain traced here is activated by an external price movement, and Pakistan's exposure to such movements is a function of two regional variables: the share of energy that is imported, and the concentration of the routes through which it arrives. Both are determined by the structure of regional energy relationships rather than by domestic policy alone. A regional order in which Gulf supply routes are subject to periodic interruption does not simply raise the cost of a

given shock, it shortens the interval between shocks, which matters considerably for a chain whose later stages run for quarters rather than weeks. Where the persistence stage of one episode overlaps the pass-through stage of the next, the price level does not return to its pre-shock path between them. Connectivity and diversification are usually discussed as measures reducing the depth of an energy shock. The sequence described here suggests they also govern how much time an economy is given to complete its adjustment before the next one arrives.

A NOTE ON METHOD AND SOURCES

This piece draws on publicly available data: Pakistan Bureau of Statistics CPI press releases and monthly sub-indices, the Pakistan Economic Survey, the National Nutrition Survey 2018, World Bank World Development Indicators (NY.GDP.PCAP.KD), FBR Revenue Division Yearbooks, contemporaneous reporting of FBR provisional collection figures, and the Lahore School of Economics Modeling Lab FY2025-26 quarterly assessment. Three caveats apply. The classification of CPI sub-indices into administered, captured, and competitive groups is the author's own and reflects a judgment about market structure rather than any official designation; readers may reasonably classify individual sub-indices differently. The Rs 311 billion figure in Figure 2 is the difference between two published cumulative totals and indicates timing and magnitude, not causal attribution. The fuel price movements cited for 2025-26 are drawn from a single institutional source and presented as that source's compilation.

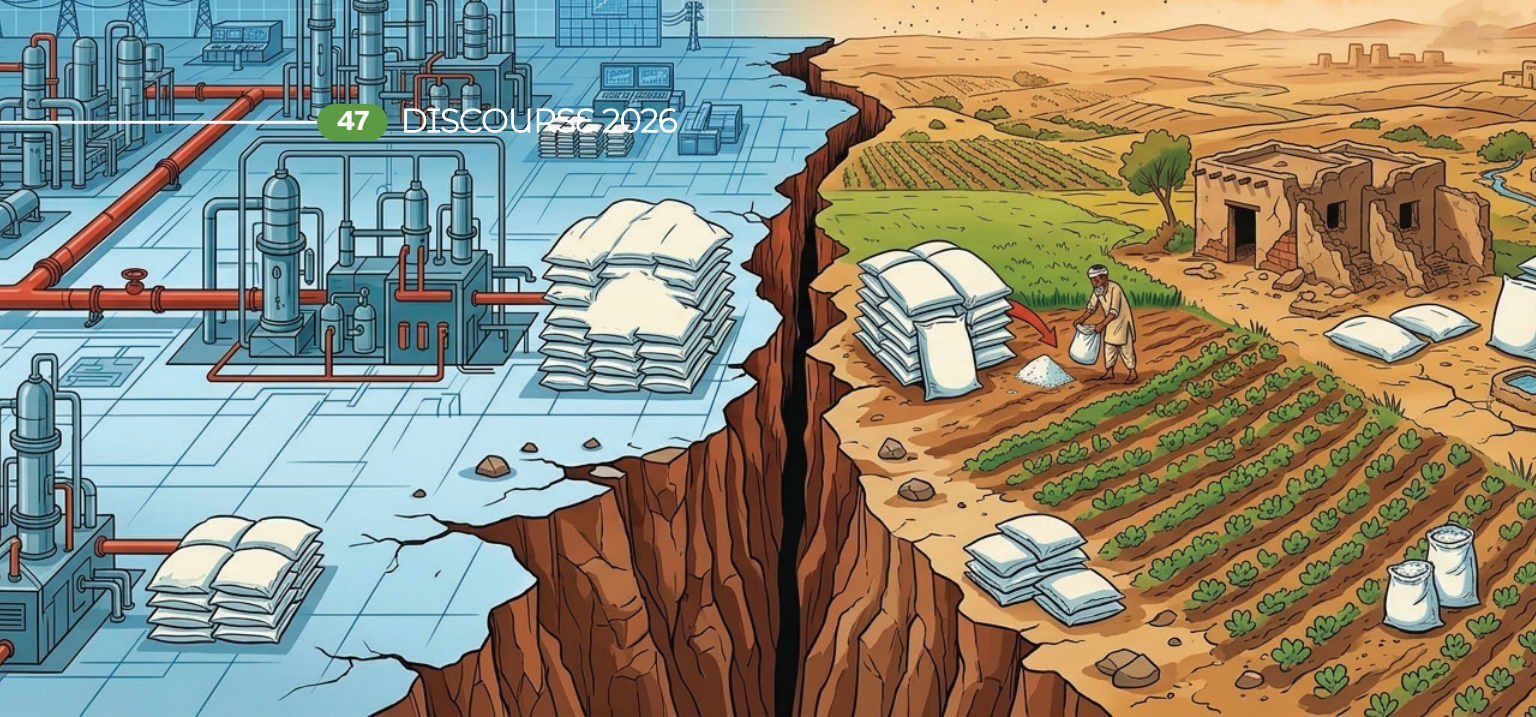
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CHEAP GAS, COSTLY DIVIDE: What Pakistan's Urea Industry Reveals about Energy and Competitiveness

Sobia Rose

Pakistan's domestic fertilizer industry comprises 10 major manufacturing units with a combined urea capacity of 7.3 million metric tonnes (MMT) per annum. Key producers include Fauji Fertilizers Company (FFC), Engro Fertilizer, Fatima Fertilizer, Agritech, and Fauji Fertilizer Bin Qasim (FFBL). During FY2022–23, Pakistan's total natural gas consumption was 3,258 MMCFD (including 631 MMCFD of RLNG), of which 687 MMCFD was consumed by the fertilizer sector, representing 21% of the country's total natural gas consumption. During July–March FY2024–25, total natural gas consumption was 3,143 MMCFD (including 798 MMCFD of RLNG), of which 764 MMCFD was utilized by the fertilizer sector, accounting for 24.3% of total natural gas consumption. During the corresponding period of FY2025–26, total natural gas consumption declined to 2,929 MMCFD (including 613 MMCFD of RLNG), while gas consumption by the fertilizer sector

remained unchanged at 764 MMCFD, increasing its share to 26.1% of the country's total natural gas consumption (GOP, 2026). Two major networks feed this sector's gas requirement: Mari Gas and SNGPL/SSGCL.

Pakistan's debate on competitiveness always revolves around exchange rates, tariffs, and logistics, but an important variable in this debate has always remained upstream: how much a plant is paying for its inputs. In Pakistan's fertilizer industry, feedstock gas is not merely an input cost; it shapes the whole industry's dynamics. Two urea producers produce an identical and price-controlled product at the same retail rate, while their feedstock gas bill differs by more than RKR 1000 per bag. The reason is which of the two gas networks their plants happen to be connected to.

This article traces that gap through three data points: the price divergence between the two

networks since 2023, the redistribution of feedstock subsidies that followed, and what the combination means for the reform's central promise, a fiscal cut that, on closer inspection, widened the competitive distortion it was meant to fix.

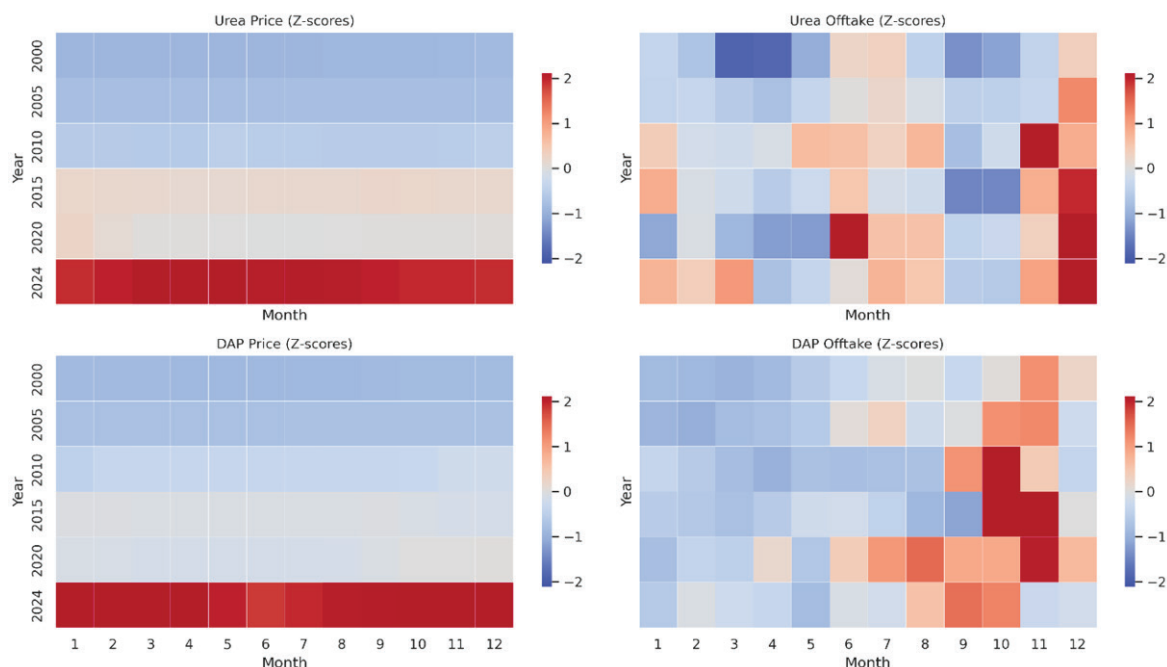
THE PRICE STORY: A STRUCTURAL BREAK, NOT A CYCLE

The heat maps below are the Z-Scores of monthly Urea and DAP prices and offtake from the year 2000 to 2024. They reveal how far each month's value sits from its long-run average, shaded from deep red (well above average) to deep blue (well below average). The figures make two features stand out: the price cycle has a clean structural break rather than a cycle. Before 2018, most of the panels sit consistently in the blue range, while after 2018 that pattern flips decisively: every month every year through 2024 is in the deepest red panel on the

scale. This is not a single bad year or a seasonal spike. It is a sustained climb to the top of a quarter-century distribution and tracks exactly the period when feedstock prices of SNGPL/SSGCL rose 213 percent while Mari Gas prices rose to a comparatively modest level of 92 percent.

Second, the offtake panels in the figure reveal a different story: the DAP shows that Z-Scores are scattered, reflecting seasonality with respect to Rabi and Kharif application windows rather than a demand response to price. A non-directional structural break in price, along with a seasonal, non-trending pattern in offtake, manifests a market condition where rising feedstock cost is being absorbed and passed through rather than competed away because the pattern indicates that fertilizer demand is largely inelastic and the retail price is broadly managed across firms regardless of their input cost base.

Figure I: Z-score heatmaps of urea and DAP prices and offtake by month and year, 2000–2024.



Source: Author's construction, based on NFDC price and offtake series.

In other words, the price escalation visible in Figure I is not evidence of a sector under productive strain. It is evidence of an energy cost base that has been rising steadily, and rising very differently depending on which network a plant is connected.

TWO NETWORKS, ONE INDUSTRY, TWO COST STRUCTURES

That divergence is where the competitiveness story actually lives. As of January 2025, Mari Gas-based plants (FFC, Fatima Fertilizer, and EFERT's Mari-linked operations) paid PKR 580 per MMBTU for feedstock gas. SNGPL/SSGCL-based plants (Agritech, FFBL, Hazara Phosphate, and the SNGPL-linked portions of Fatima and EFERT) paid PKR 1,597 per MMBTU, a gap of PKR 1,017 per MMBTU, or roughly 64 percent lower input cost for Mari

Gas-linked producers. Applying the standard assumption of about 0.8 MMBTU of feedstock gas per 50kg bag of urea, that gap alone is worth roughly PKR 814–815 per bag, before any subsidy is factored in.

The motivation behind the 2023–25 subsidy was supposed to narrow the distortions, and on paper it did, but in reality, the analysis reveals that the implicit feedstock gas subsidy bill fell from PKR 121.2 billion in 2023–24 to PKR 84.49 billion in 2024–25, reflecting a 30.3 percent reduction that reads a genuine fiscal consolidation. However, the analysis of the composition of that reduction tells a different tale. The entire PKR 36.70 billion cut came from eliminating the support to SSGCL/SNGPL lined fertilizer plants. Mari Gas-linked plants were granted subsidy in full and saw it rise slightly. FFCs' support increased 7.3 percent to PKR 60.25 billion, while Fatima Fertilizer's subsidy rose to 2.2 percent, PKR 24.24 billion.

Table I: The feedstock price and subsidy gap between Pakistan's two gas networks, 2023–25.

Metric	Mari Gas Network	SNGPL/SSGCL Network
Feedstock price, Jan 2025 (Rs/MMBTU)	580	1,597
Feedstock price, Jan 2023 (Rs/MMBTU)	302	510
Two-year price increase	+92%	+213%
Implicit subsidy retained, 2024–25	Rs 84.49 bn (full amount)	Rs 0
Subsidy per 50kg bag, 2024–25	Rs 1,009–1,213	Rs 0

Source: Author's calculations, based on NFDC Fertilizer Review 2024–25 data.

By 2024–25, the entire remaining subsidy pool of 84.49 billion flowed to exactly two companies, and both are based on the Mari Gas network. When combined with the underlying price gap the total advantage in cost enjoyed by the Mari Gas-linked producer now exceeds PKR 1000 per bag, roughly equivalent to a quarter of urea's retail price. Two firms selling identical products operate on fundamentally different cost structures.

WHY THIS IS A COMPETITIVENESS PROBLEM, NOT JUST A SUBSIDY PROBLEM

Apparently, it seems like a purely fiscal energy policy story or an industrial competitiveness story. Competitiveness is a firm's ability to control costs

through sourcing, scale, technology, or productivity, but in this case it's the pipeline geography, along with an administered price schedule that treats the two networks asymmetrically.

It can have two implications for the fertilizer sector's competitiveness and energy cost reforms in a broader sense. First, the investment signals get distorted as new investment or expansion decisions will be shaped less by market powers but more by which gas network the site can be connected to, which is not an appropriate basis for industrial capital allocation. Second, it concentrates risk: SNGPL/SSGCL already have structurally higher input costs, and any further increase in gas prices, whether at the local or international level, will expose them to shocks. As they will have little room to absorb this shock, ultimately, the effect will be transferred to the farmers through increased farm gate price or the production capacity will not be fully utilized. For a genuine reform agenda, it shows that a subsidy bill can shrink on paper while the underlying distortion it was meant to correct actually worsens, because a partial, source-based cut simply reallocates who bears the cost, rather than levelling the playing field.

The lesson can be generalized to other sectors where firms in the same sector operate under different price regimes and different energy contracts. In this way, one important aspect of achieving competitiveness becomes input infrastructure access rather than underlying internal firm efficiency.

This leads to say that the remedy should be redirected to the end users rather than producers; providing subsidies directly to the farmers instead of discounting feedstock for specific plants can result in win win situation for both the producers and consumers.

KEY TAKEAWAYS

Urea and DAP price z-scores show a clean structural break from 2018 onward — not a cycle — while offtake remains seasonal and non-trending, indicating rising feedstock costs are being absorbed rather than competed away.

Mari Gas-linked plants pay Rs 580/MMBTU versus Rs 1,597/MMBTU for SNGPL/SSGCL-linked plants (Jan 2025) — a 64% cost gap worth roughly Rs 814–815 per 50kg urea bag before subsidies.

The 2023–25 subsidy reform cut total spending by 30.3%, but the entire cut came from zeroing out SNGPL/SSGCL-linked firms; Mari Gas-linked firms retained their full subsidy and saw it rise.

By 2024–25, the full Rs 84.49 billion remaining subsidy flowed to just two producers — FFC and Fatima Fertilizer — pushing the total per-bag cost advantage for Mari Gas-linked plants past Rs 1,000, roughly 20–25% of the retail price.

The result is a competitiveness gap driven by pipeline geography, not efficiency — a structural risk that recurs wherever Pakistani industry is split across unequal energy pricing regimes.

A durable fix shifts support from plant-level, network-based subsidies toward targeted end-user assistance, removing energy infrastructure history as a determinant of industrial competitiveness.

Data source: NFDC Fertilizer Review 2024–25. Per-bag and per-tonne figures are the author's calculations, derived from NFDC's company-wise subsidy, price, and production tables from Fertilizer Review

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CORRIDOR PERFORMANCE AND PAKISTAN'S CAREC TRADE

Junaid Ahmed

Pakistan's location at the crossroads of South and Central Asia has long been described as a natural gateway for regional trade. However, being well-placed on the map has not translated into meaningful economic integration. Pakistan's trade with CAREC economies (roughly US\$24.7 billion), overwhelmingly concentrated with China, at 92.1 per cent. Once China is excluded, its share of intra-CAREC trade accounts for just under 7.9 per cent. In July 2025, the signing of the framework agreement for the Uzbekistan-Afghanistan-Pakistan (UAP) railway⁴⁷ has renewed this expectation. In this context, the proposed framework could complement the Middle Corridor by providing Central Asian economies with an alternative North-South gateway to Arabian Sea ports, thereby strengthening Pakistan's role in regional connectivity.

Physical connectivity, however, has produced only limited regional trade integration. This piece holds that the principal constraints are institutional rather than geographic, and that they can be addressed. The analysis draws on two sources of evidence: The Corridor Performance Measurement and Monitoring (CPMM) mechanism maintained by the Asian Development Bank and the CAREC Institute, which records the time, cost, and speed of actual shipments along the region's corridors. We document Pakistan's corridor performance and compares it with regional peers. Next, the product-level trade statistics from the International Trade Centre (ITC) to show the structure of Pakistan's trade with CAREC economies, identifies sectors of unrealised export potential, and concludes with the policy implications.

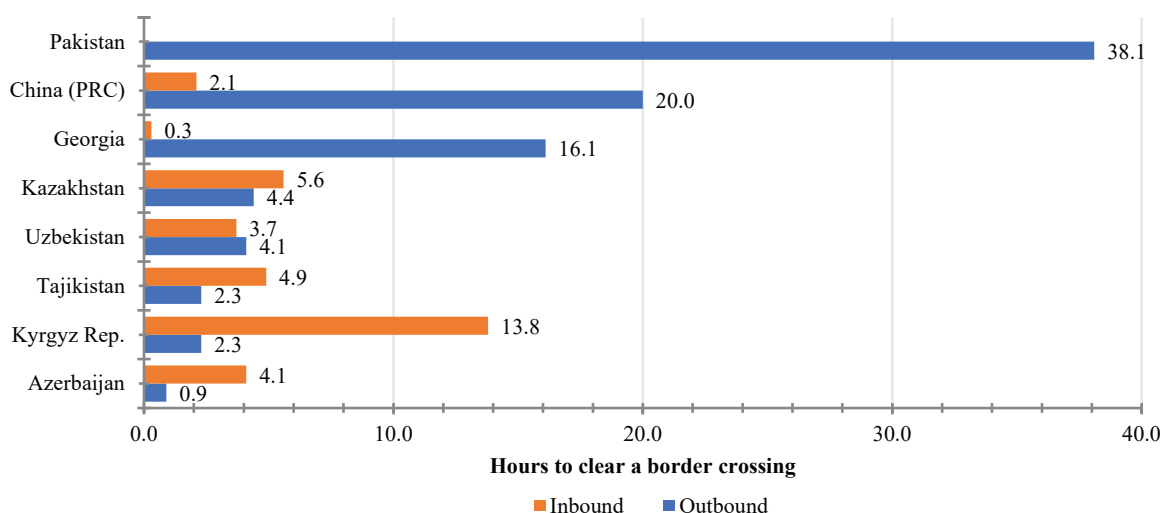
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MEASURING CORRIDOR PERFORMANCE

Assessments of connectivity often rely on infrastructure inventories, which record what has been constructed rather than how well it functions. The CPMM mechanism provides a functional alternative. In operation since 2009, it records four trade-facilitation indicators from commercial shipments along the six CAREC corridors: the time and cost required to clear a border-crossing point, the cost of transporting a consignment along a corridor section, and the speed of travel.⁴⁸ It is compiled from more than two thousand observations each year, and therefore reflects operational reality rather than perception.

For Pakistan, the 2024 results indicate deterioration rather than improvement. The average time to clear a border-crossing point rose further to 38.1 hours, an increase of 15 per cent over the previous year and the highest recorded for any CAREC member. The cost of border clearance rose to about US\$259, and the cost of moving a standard consignment along a corridor section edged higher. Average corridor speed, measured with delays included, declined to 10.4 kilometres per hour, from 11.4 in 2023.⁴⁹ The longest delays occur at the Torkham and Chaman crossings with Afghanistan, where border charges rose most sharply on outbound movements.⁵⁰ Because approximately 95 per cent of Pakistan's freight moves by road, these frictions apply to nearly the entire volume of overland trade.

Figure I: Time to clear a border crossing (TFII), outbound and inbound, 2024 (hours)



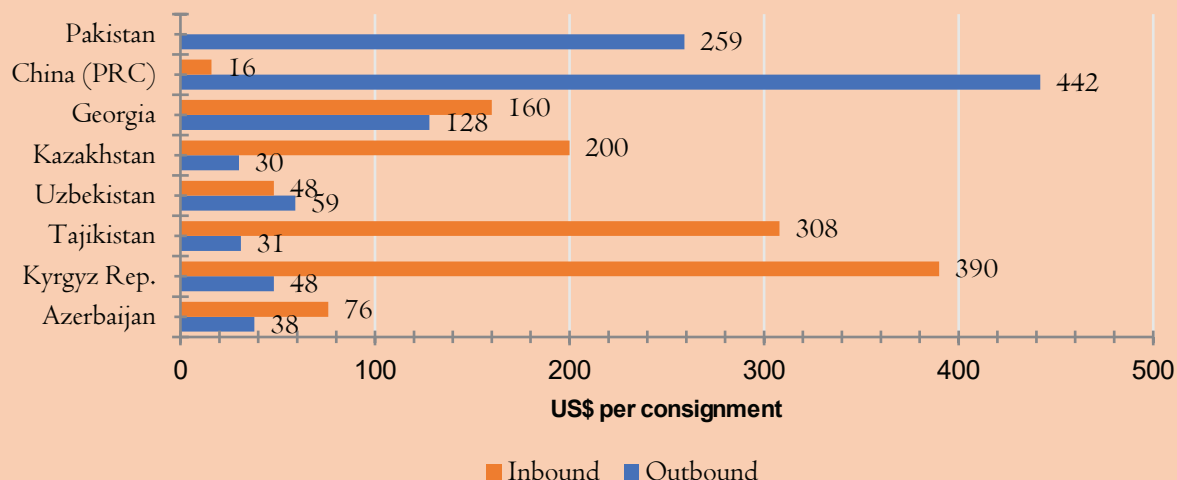
Source: CAREC CPMM Annual Report 2024. Outbound unavailable for Mongolia and Turkmenistan.

48. CAREC Corridor Performance Measurement and Monitoring (CPMM) Annual Report 2024, Asian Development Bank and CAREC Institute; data portal at cpmm.carecprogram.org/data. The mechanism records around 2,000 shipment samples annually on the six CAREC corridors.

49. CPMM Annual Report 2024, Table 6.7 (Trade Facilitation Indicators for Pakistan, road transport, 2022 to 2024).

50. CPMM Annual Report 2024, Pakistan country update (Table 6.7; Torkham and Chaman border-crossing points).

Figure 2: Cost to clear a border crossing (TFI2), outbound and inbound, 2024 (US\$ per consignment)



Source: CAREC CPMM Annual Report 2024. Outbound unavailable for Mongolia and Turkmenistan.

The significance of these figures is clearer in comparison. Pakistan's CAREC neighbours operate under comparable geographic conditions, including mountainous terrain, long distances and landlocked markets, yet their border performance is markedly better. In 2024 outbound clearance still took under five hours in Azerbaijan, the Kyrgyz Republic, Tajikistan, Uzbekistan and Kazakhstan, against 38.1 hours in Pakistan (Figure 1). The cost of clearance follows a similar pattern: Pakistan's outbound border cost, about US\$259 per consignment, was several times the US\$30 to US\$59 recorded in the Central Asian republics, although below the level reported by the People's Republic of China (Figure 2).⁵¹

In most CAREC economies inbound clearance is slower or costlier than outbound: inbound border costs reach US\$390 in the Kyrgyz Republic and US\$308 in Tajikistan, for example. In 2024 Georgia's outbound clearance time fell significantly as the congestion from the 2023 rerouting of Middle Corridor traffic eased, while border charges increased in the Kyrgyz Republic, Tajikistan, and Kazakhstan. Pakistan did not separately report inbound figures for 2023; when last measured, in 2021, its inbound clearance averaged 120 hours and US\$525 per consignment. These differences are difficult to attribute to geography or income alone. In 2024 Azerbaijan and Georgia reduced their outbound clearance times to under one hour and about sixteen hours, respectively. Likewise, Uzbekistan kept clearance among the fastest in the region through customs digitisation, fee rationalisation, and improved coordination among border agencies. These gains were achieved through administrative and institutional reforms rather than new infrastructure. On the other hand, Pakistan recorded higher border-clearance times and costs, along with slower corridor speeds, indicating limited progress in addressing procedural and inter-agency coordination constraints.

51. CPMM Annual Report 2024, country tables: Azerbaijan (6.1), People's Republic of China (6.2), Georgia (6.3), Kazakhstan (6.4), Kyrgyz Republic (6.5), Pakistan (6.7), Tajikistan (6.8) and Uzbekistan (6.10); CAREC road averages from the Key Results chapter.

THE STRUCTURE OF PAKISTAN'S TRADE WITH THE CAREC REGION

Corridor inefficiency is reflected in the volume and composition of trade. In 2025 Pakistan's bilateral merchandise trade with the ten other CAREC members constitute about approximately US\$24.7 billion, of which imports accounted for US\$20.9

billion and exports for US\$3.7 billion, producing a regional trade deficit of about US\$17 billion⁵². China accounts for approximately 92 per cent of the regional total. That concentration is primarily a feature of imports: Pakistan imported roughly US\$20 billion in machinery, electronics, iron and steel, and chemicals from China, and exported approximately US\$2.3 billion in return, predominantly raw copper and cotton (Table I).

Table I. Pakistan's trade with CAREC members, 2025 (US\$ million)

Partner	Exports	Imports	Balance	Export growth 2021 to 2025 (%/yr)
China	2,283.5	20,434.2	-18,150.7	-6.9%
Afghanistan	1,104.8	458.4	+646.4	+7.2%
Kazakhstan	196.1	1.0	+195.1	+0.3%
Uzbekistan	106.0	32.2	+73.8	+21.3%
Tajikistan	14.3	4.4	+9.9	+54.8%
Other Central Asia and Caucasus*	21.6	11.3	+10.2	3.3%
Total CAREC	3,726.3	20,941.5	-17,215.2	-2.6%

Azerbaijan, Georgia, Kyrgyz Republic, Turkmenistan and Mongolia. Growth is compound annual, 2021 to 2025. Source: Author's calculations from ITC Trade Map.

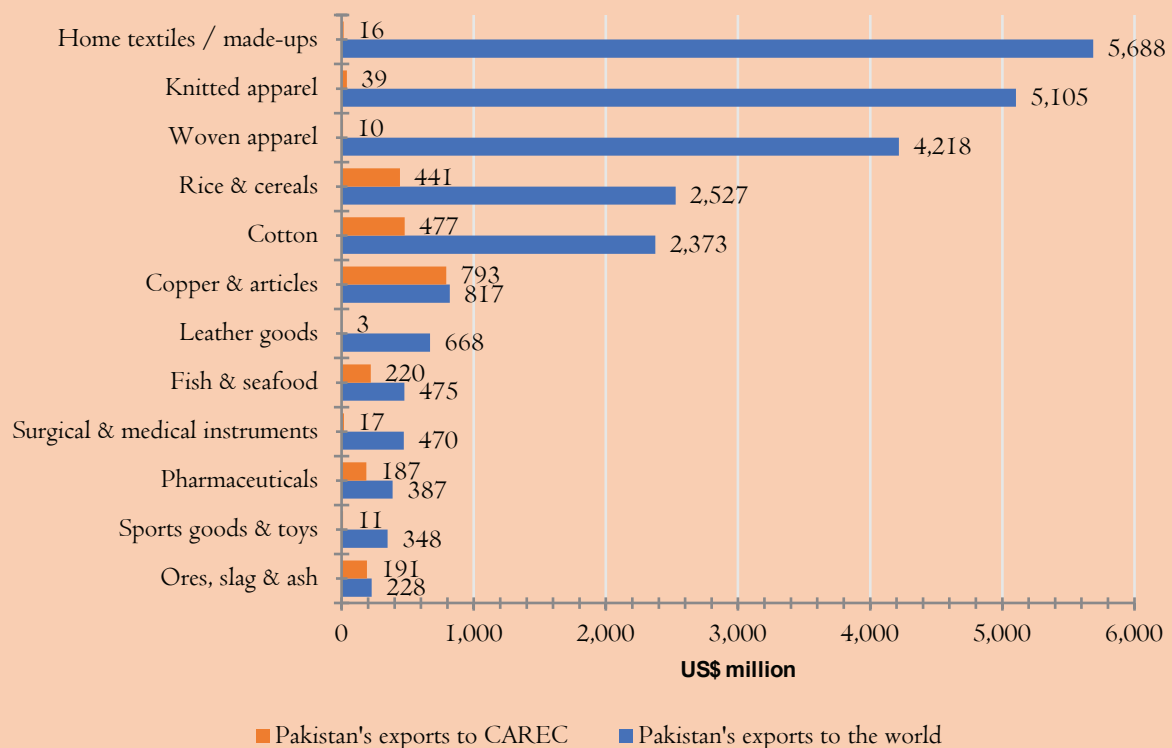
On the hand, the export side is more diversified but limited. China absorbs 61.3 per cent of Pakistan's exports to CAREC and Afghanistan 29.6 per cent, leaving the five Central Asian republics a combined share of around 8.6 per cent. The composition is concentrated in primary and low-processed commodities. The four largest export categories are copper, cotton, rice and ores, and copper alone, almost all of it destined for China, constitutes approximately one-fifth of regional exports. Manufactured goods, which account for the majority of industrial employment, are largely absent. One favourable trend is evident in the

geographic distribution of growth: exports to China contracted by an average of 6.9 per cent per year between 2021 and 2025, whereas exports to Uzbekistan grew by 21.3 per cent per year, and those to Tajikistan and the Kyrgyz Republic at higher rates from smaller bases.

The difference between Pakistan's global export capacity and its regional trade indicates untapped potential. Pakistan is an established exporter of several labour-intensive product groups that CAREC economies import in large quantities from other suppliers.

52. Author's calculations from International Trade Centre, Trade Map (trademap.org): Pakistan's exports to, imports from and trade balance with CAREC members, 2025.

Figure 3: Pakistan's exports to the world compared with exports to CAREC, selected products, 2025 (US\$ million)



Source: Author's calculations from ITC Trade Map, 2025 (HS 2-digit).

In 2025 Pakistan exported US\$5.1 billion of knitted apparel, US\$4.2 billion of woven apparel and US\$5.7 billion of home textiles to the world, however directed less than 1 per cent of each to CAREC markets (Figure 3). The same pattern is evident in leather goods, footwear, sporting goods and surgical instruments, all of which are established Pakistani exports.

What Pakistan actually sells the region is different: its regional exports are concentrated in a few primary and low-processed commodities, led by copper, whose exports go almost entirely to CAREC, together with rice, cotton, fish and ores.

Table 2 quantifies this opportunity by comparing Pakistan's competitive export lines with CAREC economies' imports of the same products from the rest of the world. In apparel, home textiles, leather, and footwear, the region imports several billion dollars annually while sourcing well under 1 per cent from Pakistan. In surgical instruments and pharmaceuticals, the market potential is even larger. These are established export products rather than new export opportunities. Pakistan already exports them competitively, although their presence in regional markets remains limited. Reorienting a larger share of these exports toward the emerging Central Asian economies would contribute more to Pakistan's export diversification and growth objectives than increasing commodity exports to a single destination.

Table 2. High-potential export sectors for CAREC markets, 2025 (US\$ million)

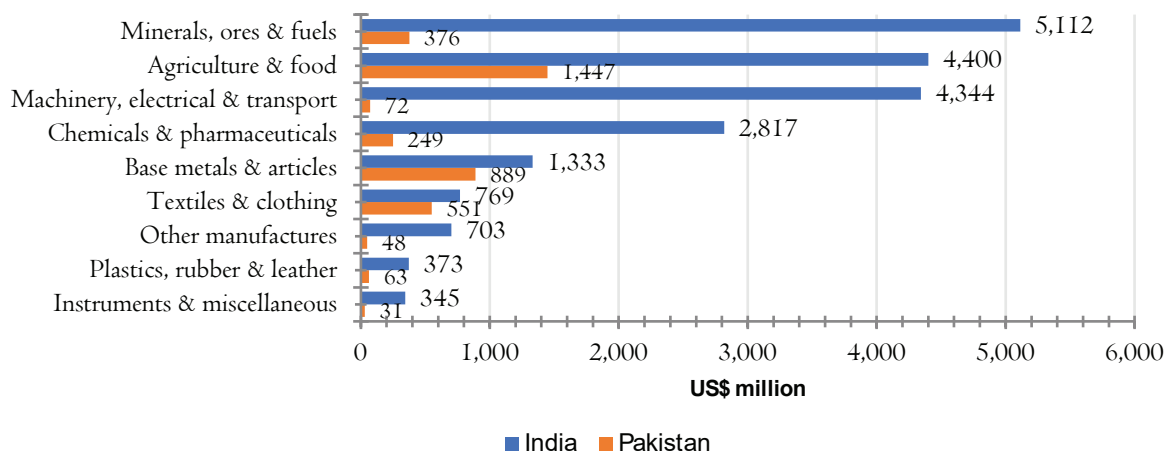
Sector (HS code)	CAREC imports from world	Pakistan to world	Pakistan to CAREC	Pakistan share of CAREC market
Surgical and medical instruments (90)	80,763	470	17	0.02%
Pharmaceuticals (30)	46,947	386	187	0.40%
Woven apparel (62)	7,271	4,218	10	0.14%
Footwear (64)	6,797	179	2	0.03%
Leather goods (42)	6,150	668	3	0.05%
Knitted apparel (61)	5,644	5,105	39	0.69%
Sports goods and toys (95)	3,878	348	11	0.28%
Home textiles and made-ups (63)	2,003	5,688	16	0.80%

Note: HS 2-digit product groups. "Pakistan share of CAREC market" denotes Pakistan's exports to CAREC as a share of CAREC economies' imports of that product from the world. Source: Author's calculations from ITC Trade Map, 2025.

The magnitude of the gap becomes even clearer when comparing Pakistan's exports with India's exports to the CAREC region. Despite similar constraints of distance and border access, and

without Pakistan's overland route, India exported roughly US\$20 billion to CAREC economies in 2025, more than five times Pakistan's US\$3.7 billion.

Figure 4. Exports to CAREC by product category, Pakistan and India, 2025 (US\$ million)



Note: Agriculture & food (01–24); Minerals, ores & fuels (25–27); Chemicals & pharmaceuticals (28–38); Plastics, rubber & leather (39–43); Textiles & clothing (50–63); Base metals & articles (72–83); Machinery, electrical & transport (84–89); Instruments & miscellaneous (90–99); Other manufactures (44–49 and 64–71: wood, paper, footwear, stone, glass and gems; for India mainly articles of human hair, HS 67). Source: Author's calculations from ITC Trade Map, 2025.

53. Asian Development Bank, Digitally Connected CAREC: Digital Trade, Emerging Regulatory Challenges, and Solutions Shocks (2025), carecprogram.org: intra-CAREC trade excluding the People's Republic of China was approximately 7 per cent of the bloc's total, compared with about 24 per cent for ASEAN.

India exported more than Pakistan in every broad product group. Its machinery, electrical and transport exports alone, at about US\$4.3 billion, surpassed Pakistan's entire regional export basket. Similarly, India outperformed in minerals and fuels (US\$5.1 billion), agriculture and food (US\$4.4 billion) and chemicals and pharmaceuticals (US\$2.8 billion). However, the two are closest in textiles and clothing (See Figure 4). These difference reflects productive capacity and trade facilitation rather than geographic access.

These conditions are mutually reinforcing. Intra-CAREC trade excluding China represents approximately 7 per cent of the bloc's total, compared with about 24 per cent for ASEAN, a difference attributable in part to overlapping export structures and to the border frictions documented above. A trade profile in which the majority of regional trade depends on a single partner, and in which overland access to remaining markets passes through one transit economy, also carries a concentration risk.

THE IMBALANCE BETWEEN INFRASTRUCTURE AND FACILITATION

The regional pattern of investment helps to explain these outcomes. Since 2001 the CAREC programme has mobilised more than US\$53.8 billion across its eleven member states. Approximately 69.5% of this total was allocated to transport, followed by energy 22.8% and about 2.2 % to trade facilitation.⁵⁴ The region, including Pakistan, has therefore invested heavily in physical infrastructure and comparatively little in the administrative systems that determine its use, namely customs modernisation, standards harmonisation, digital documentation and the institutions required to operate them.

Pakistan's principal constraints are predominantly administrative. They include duplicative customs procedures; non-tariff barriers, in particular the sanitary and phytosanitary requirements that restrict access for food and agricultural exports; reliance on informal transit arrangements through Afghanistan; limited trade financing and

correspondent-banking links with Central Asia; and, with respect to the movement of persons, restrictive visa regimes and an absence of direct air links. None of these constraints is addressed by additional road or rail capacity. Together they will determine whether the UAP railway, once completed, operates near its stated capacity of 20 million tonnes per year.

CONCLUSION AND POLICY IMPLICATIONS

Pakistan's national export strategy, URAAN Pakistan, sets a target of US\$60 billion in exports⁵⁵. This objective is not attainable under prevailing corridor performance and an export structure dominated by textiles and raw materials. The constraints identified in this analysis, however, are administrative and institutional rather than geographic, and are therefore amenable to policy reform within existing resources.

In the emerging regional configuration, economic integration depends on institutional capability as well as on physical infrastructure. Pakistan has established its physical position within regional networks. Whether that position **translates into** trade integration will depend on the parallel development of the administrative and regulatory systems required to make the infrastructure productive.

Since the constraints are primarily administrative, the appropriate policy responses are administrative and can largely be implemented without major new infrastructure.

Performance measurement. Pakistan should treat border and corridor performance as key economic performance indicators and adopt CPM-style metrics as national performance benchmarks, with clear institutional accountability for achieving them.

Trade facilitation. The Pakistan Single Window is operational and should be extended through interoperability with neighbouring customs administrations, risk-based inspection, mutual recognition of Authorised Economic Operators, and expanded use of the TIR transit regime.

Export diversification. Pakistan's most promising opportunities lie in the labour-intensive products in which it is already internationally competitive, including apparel, home textiles, leather goods, footwear, surgical instruments and sporting goods, processed foods, particularly halal products, and pharmaceuticals. Special Economic Zones and the Special Investment Facilitation Council should be prioritise investment and export promotion in these sectors rather than toward import substitution.

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Mobility and payments. Liberalised business visa arrangements, direct air connections to Tashkent, Almaty, and Baku, and reliable banking channels are comparatively low-cost measures that lead towards trade promotion.

Infrastructure sequencing. The projected benefits of the UAP railway, including a reduction in Uzbekistan to Pakistan transit time from about 35 days to under one week and a cost reduction exceeding 40 per cent, will be realised only if border procedures, product standards and payment systems are operational when the infrastructure is completed⁵⁶.

54. CAREC Implementation Progress Report, 24th Ministerial Conference (2025), carecprogram.org.

55. Government of Pakistan, URAAN Pakistan: National Economic Transformation Plan (Ministry of Planning, Development and Special Initiatives), export target of US\$60 billion by 2029.

56. The UAP railway (Termez to Kharlachi via Afghanistan) is projected to carry up to 20 million tonnes per year at an estimated cost of US\$4.8–7 billion, cutting Uzbekistan–Pakistan freight transit time by up to five days and transport costs by about 40 per cent. The Uzbekistan–Afghanistan–Pakistan (UAP) Railway: A Bridge to Geoeconomics, 2025, Issue Brief, Institute of Strategic Studies Islamabad.





DECARBONIZING HEAVY INDUSTRY: Global Trends, Technological Pathways and Policy Challenges

Muhammad Usman, Sana Noor, Sana Affan & Amna Karim Bajwa

1. INTRODUCTION

Heavy industry drives roughly 30% of global CO₂ emissions, with steel, cement and chemicals alone accounting for close to a quarter of the world total. The technologies to cut that footprint- electric arc furnaces, waste heat recovery, clinker substitution, and green hydrogen are largely proven; the remaining question is deployment speed and who pays for the transition.

Pakistan's industrial sector emitted 86 MtCO₂e in 2022, 16% of national emissions. That is small next to China, which alone accounts for around 60% of global steel-sector emissions and over half of world cement and aluminium output, but it is

concentrated in cement, steel and textiles, sectors that now sit directly in the path of Europe's carbon border regime and Pakistan's own NDC 3.0 commitments.

Two pressures converge on this industrial base. The EU's Carbon Border Adjustment Mechanism (CBAM) entered its definitive phase on January 1, 2026, with a planned extension to chemicals and textiles that would hit Pakistan's largest export categories. And Pakistan's NDC 3.0, submitted in September 2025, commits to cutting projected 2035 emissions by 50% relative to business-as-usual, 17% unconditionally, and 33% conditionally on international finance. Industry sits inside both tracks, a compliance cost abroad and a mitigation target at home.

This article maps Pakistan's industrial emissions landscape, the pathways realistically available to cement, steel and textiles, the policy instruments now in motion, and the barriers, capital cost above all, standing between current practice and net zero.

2. PAKISTAN'S INDUSTRIAL EMISSIONS LANDSCAPE

Globally, cement is roughly twice as carbon-intensive per dollar of output as steel due to clinker calcination, while steel remains the largest absolute industrial emitter, accounting for around 11% of global CO₂ emissions. Pakistan broadly follows this pattern, with cement as the heavier emitter and steel smaller but strategically important.

Cement is Pakistan's largest industrial emitter. Estimates range from about 16 MtCO₂ in 2023 to nearly 25 Mt based on plant-level clinker data, highlighting gaps in monitoring, reporting and verification (MRV). With installed capacity of around 69 Mt/year projected to reach 77.5 Mt by 2030, absolute emissions could continue rising despite efficiency gains. Steel emits an estimated 1.9–2.5 MtCO₂ annually. Unlike many countries, Pakistan relies mainly on induction and electric arc furnaces, with induction furnaces accounting for over 85% of production. This gives the sector a lower-emission advantage, but weak MRV and product-level carbon certification limit its ability to demonstrate this advantage in regulated export markets.

Textiles represent the major trade exposure. They account for roughly 53–60% of Pakistan's exports and around three-quarters of exports to the EU. While only about 1.23% of current exports fall under CBAM, its planned 2026–2030 expansion to textiles and apparel could bring Pakistan's largest export sector under direct carbon pricing.

3. CORE DECARBONIZATION PATHWAYS

The pathways available to Pakistan's industry are the same ones scaling elsewhere: efficiency and electrification first, fuel switching and material substitution next, carbon capture and new feedstocks as longer-term bets, just applied at a different starting point and a different pace.

3.1 Energy efficiency and waste heat recovery

Cement kilns discharge exhaust gas at high temperature and volume; waste heat recovery captures that stream to generate a meaningful share of a plant's own power needs. It is the cheapest lever available and does not require new chemistry, but it needs upfront capital that many mid-sized producers cannot self-finance without concessional support.

3.2 Renewables and captive power

Solar and wind are already being deployed at plant level. Lucky Cement's captive solar and wind portfolio at its Pezu and Karachi plants now produces over 212 GWh annually and displaces more than 100,000 tonnes of CO₂ a year, and the World Bank estimates that solar PV on under 1% of Pakistan's land area could meet the country's entire electricity demand, resource enough to power EAF steelmaking on clean grid or captive power rather than fossil-fired induction furnaces.

3.3 Fuel switching and alternative fuels

Cement kilns can co-fire refuse-derived fuel (RDF), biomass and industrial waste oils in place of coal. Scenario modelling for Pakistan's cement sector finds that fuel switching alone could avoid roughly 17 Mt of CO₂ under a 2050 net-zero pathway, but this depends on a formal RDF and alternative-fuel market that does not yet exist, along with quality-assured biomass supply chains.

3.4 Clinker substitution and material efficiency

Blending clinker with supplementary cementitious materials, fly ash and slag among them, cuts embodied carbon per tonne of cement without new capital plant. On the steel side, the existing scrap-based induction and EAF base gives Pakistan more room here than most developing steel producers; the constraint is domestic scrap collection infrastructure, not technology.

3.5 Carbon capture

CCUS remains distant for Pakistan's industry, capital cost and the absence of storage infrastructure rule it out at scale for now, but it stays relevant for the calcination-linked process emissions that efficiency and fuel switching cannot reach.

3.6 Green hydrogen for fertilizer

Fertilizer, not steel or cement, is where green hydrogen has the clearest near-term case in Pakistan. The sector already runs on ammonia produced from natural gas, so swapping in electrolytic hydrogen is a feedstock substitution rather than a new industrial process. Punjab's draft green hydrogen policy targets 100 kilotonnes a year of green hydrogen and ammonia capacity by 2030, backed by electricity duty exemptions and capital subsidies for early biomass-to-hydrogen projects. Pakistan's gas reserves are depleting and increasingly import-dependent, which gives green ammonia an energy-security rationale on top of its climate one, though cost remains the constraint until domestic renewable power and electrolyzer prices fall further.

4. POLICY AND ECONOMIC INSTRUMENTS

CBAM is the sharpest edge of a broader global shift toward carbon pricing and border measures, but it is not the only one; Indonesia, Japan and Vietnam are each standing up their own carbon markets, and US disclosure requirements are tightening in parallel. For an export economy like Pakistan's, that trend means compliance costs are unlikely to stay confined to the EU market alone.

4.1 CBAM exposure

CBAM's compliance requirement, embedded-emissions reporting per product, is where Pakistan is least prepared. Industry representatives have publicly flagged the country as under-equipped for the 2026 standard, and the steel sector in particular lacks a formal MRV framework despite using comparatively low-emission EAF and induction technology. Building that verification capacity, and expanding

Pak-EPA's legal mandate to cover it, is a precondition for capturing any competitive advantage from the sector's existing technology mix.

4.2 NDC 3.0 and green finance

NDC 3.0 puts a price tag on the transition: an estimated USD 565.7 billion in investment is needed to meet the 2035 target, alongside a planned shift to 60% renewable electricity and a 30% increase in electric vehicle adoption. The Securities and Exchange Commission of Pakistan's revised ESG disclosure guidelines, aligned to the new Pakistan Green Taxonomy, are the first domestic instrument meant to channel private capital toward these targets, industrial decarbonization included.

4.3 Digital compliance requirements

Beyond carbon pricing, the EU's Digital Product Passport will require textile exporters to document material origin, production stage and environmental performance for every shipment. For an export base still building basic emissions MRV, that is a second, parallel compliance burden layered on top of CBAM.

5. BARRIERS AND CHALLENGES

Capital cost is the binding constraint across all three sectors. Waste heat recovery, solar retrofits and clinker substitution all carry high upfront cost against thin margins, and Pakistan's cement and steel producers operate in a market without a domestic carbon price to make the low-carbon option commercially preferable.

Institutional capacity is the second constraint. Pakistan currently lacks the MRV systems, third-party certification protocols and international compliance alignment that CBAM will demand, a gap that a research assessment attributes to weak regulatory frameworks and an absence of transition incentives, not a shortage of viable technology.

Trade competitiveness is the third. India's pending free trade agreement with the EU threatens to erode Pakistan's tariff advantage in textiles just as compliance costs are rising, meaning exporters face

margin pressure from two directions simultaneously, market access and carbon cost.

Stranded asset risk sits underneath all three. Pakistan's post-2022 energy crisis pushed the government toward expanding domestic coal capacity to cut reliance on imported gas, and coal already supplies roughly 60% of the power sector fuel mix. Industrial electrification bets on a grid that is still being decarbonized on its own separate, slower timeline, meaning a cement or steel plant that switches from direct coal firing to grid electricity today may only be trading one fossil-linked emissions source for another until the power sector's own renewable buildout catches up.

6. CASE STUDY: LUCKY CEMENT'S RENEWABLE TRANSITION

Lucky Cement, roughly 18 to 19% of national cement output, released about 7.3 million tonnes of CO₂ across its Pezu and Karachi plants in FY2025. Its renewable build-out, a 42.8 MW solar plant with battery storage at Pezu, a 31.5 MW solar project at Karachi, and a 28.8 MW

wind project, is now Pakistan's largest on-site captive solar installation and avoided over 100,000 tonnes of CO₂ in a single year. It demonstrates that captive renewables are commercially viable for large integrated producers today; the open question is whether that model can be financed down to the mid-sized plants that make up the rest of the sector.

7. PATHWAYS TO 2030/2035

NDC 3.0's indicative 2035 target is to cut projected emissions from 2,559 MtCO₂e to 1,280 MtCO₂e economy-wide, with industry named explicitly alongside energy, agriculture and transport. Meeting that for cement, steel and textiles will depend less on any single breakthrough technology and more on whether MRV capacity, concessional finance for waste heat and renewable retrofits, and CBAM-readiness converge before the EU's compliance clock runs out. Pakistan's structural advantage, an EAF- and induction-furnace-dominated steel sector and demonstrated captive renewable models in cement, gives it a genuine head start. Converting that head start into certified, exportable low-carbon products is the work still ahead.

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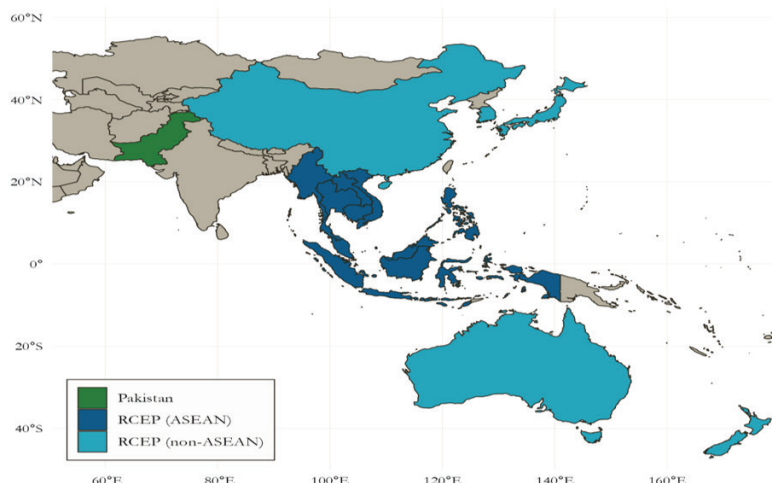
WHY PAKISTAN'S RCEP ACCESSION IS MORE URGENT THAN EVER

Amjad Masood

Regional integration is becoming increasingly pivotal for economies to secure market access, diversify exports, and attain resilience against global disruptions. In this context, Pakistan's engagement with regional blocs such as the Regional Comprehensive Economic Partnership (RCEP) is a matter of strategic necessity. The RCEP brings together fifteen economies across East Asia and the Pacific. The bloc includes ten ASEAN members,

Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam, alongside five non-ASEAN economies, China, Japan, South Korea, Australia, and New Zealand. The agreement signed in 2020 and officially entered into force on January 1, 2022. Figure I, situating Pakistan against this bloc, shows that RCEP is not a distant Asia-Pacific arrangement but a market, and a supply chain network, on Pakistan's own doorstep.

Figure I. Pakistan and RCEP Member Countries



The RCEP bloc forms the world's largest free trade agreement by population and economic weight, anchoring regional value chains and production networks that increasingly define how goods, inputs, and investment move across Asia. Currently, RCEP accounts for 28.0 percent of world trade and 31.8 percent of world GDP⁵⁷.

What sets RCEP apart is momentum, not just size. Table 6 compares the bloc to Pakistan's traditional partners, the US, UK, and EU27, on trade share,

GDP, and growth since 2016. RCEP already leads on GDP (31.8% of world output vs. 23.3% for the US, 16.0% for the EU27, 3.4% for the UK) and trails the EU27 only marginally on trade. More telling: its real GDP is growing at 3.9% annually, roughly 1.5-2x faster than the US and several multiples above the EU27 and UK, while its trade share keeps climbing as the UK's shrinks. RCEP is the fastest-growing bloc Pakistan could realistically integrate with, just as its traditional partners slow down.

Table I. Size and Momentum of RCEP Market Against the USA, UK and EU27

Indicator	Share in world, 2025 (%)				Growth, CAGR 2016-2025 (%)			
	RCEP	USA	UK	EU27	RCEP	USA	UK	EU27
Trade (exports + imports)	28.0	12.0	3.2	30.7	4.9	4.8	3.7	4.6
Population	28.2	4.2	0.8	5.5	0.3	0.6	0.7	0.2
GDP, real (2015 US\$)	31.8	23.3	3.4	16.0	3.9	2.5	1.1	1.4
GDP per capita, real (2015 US\$)					3.5	1.9	0.5	1.3

Source: ITC Trade Map (trade) and World Bank WDI (population, GDP, constant 2015 US\$). Growth is CAGR, 2016-2025. RCEP figures are summed across its 15 members, population-weighted for GDP per capita.

Pakistan's absence from this bloc is structural. When RCEP was signed in 2020, Pakistan was not invited to join, largely because it lacks the prerequisite: a free trade agreement with ASEAN, the ten-country core RCEP is built around.⁵⁸ Five years on, that gap remains.

INDIA'S WIDENING REACH

India continues to expand its network of major trade agreements on its own timeline. The India-UK trade agreement (CETA) gives India duty-free access on 99 percent of UK tariff lines through a binding treaty. The EU-India FTA, finalized after nearly two decades of negotiation, does the same for the EU market. Both land in markets where Pakistan's own exports are concentrated. Pakistan's UK access runs through the unilateral Developing Countries Trading

Scheme, revocable and conditional rather than a negotiated treaty, and India's exports to the UK were already 6.6 times Pakistan's by 2025.⁵⁹ In the EU, which absorbs about a third of Pakistan's total exports, nearly 80 percent of it textiles and apparel resting on preferential access under GSP+, India's improving terms narrow Pakistan's competitive margin further as its own EU tariffs come down.⁶⁰

It is important to note that Pakistan's market access to the EU and UK depends on unilateral, trade preference. Unlike bilateral or multilateral trade agreements, schemes like GSPs are periodically reviewed and are revocable unilaterally by donor country. Moreover, Pakistan needs export diversification both in terms of products and destination markets. RCEP cannot offset potential trade losses in the EU and UK markets directly, but it is one part of the answer, a large, fast-growing bloc where Pakistan could still build a negotiated position from scratch.

57. ITC Trade Map (trade data) and World Bank World Development Indicators (GDP, population), 2025 data; growth rates are CAGR 2016-2025. RCEP figures are summed (trade, population, GDP) or population-weighted (GDP per capita) across its 15 members.

58. Positioning Pakistan for Integration with the Regional Comprehensive Economic Partnership (RCEP), Pakistan Business Council.

59. India-UK Comprehensive Economic and Trade Agreement (CETA) official text summary; UK Developing Countries Trading Scheme (DCTS) guidance; ITC Trade Map, UK import data 2005-2025.

60. ITC Trade Map, India and Pakistan export profiles to the EU, 2025; EU-India Free Trade Agreement text summary.

UNTAPPED POTENTIAL IN A MARKET OF SCALE

Given geographic proximity and diverse market nature of the RCEP, a bloc that imports US\$6.3 trillion a year from the rest of the world, should be a natural destination for Pakistan. However, Pakistan supplies only US\$5.4 billion of its import which amounts to a share of just 0.08 percent. In other words, for every US\$1,250 RCEP spends on imports, imports of less than US\$1 comes from

Pakistan. This is not a small gap; it is a bloc where Pakistan is absent in practical terms.

Even in China, Pakistan's largest single RCEP market, its US\$2.8 billion in exports amounts to only 0.11 percent of China's total import bill.⁶¹ This is not a story of Pakistan lacking competitive products. Pakistan holds a global Revealed Comparative Advantage score above 0.5 across a wide range of goods, from textiles and meat to plastics, copper, and industrial chemicals. The gap is one of market access and positioning, not underlying capability.

Table 2. Pakistan's Exports to RCEP by Sector

Sector	Exports World (m.US\$)	Exports to RCEP Bloc		
		Value (m.US\$)	Share (%)	CAGR (%)
Textiles & Clothing (HS50-63)	17,973.2	1,228.8	6.8	-4.2
Metals (HS72-83)	1,224.7	1,224.7	100.0	24.8
Plant-Based Products (HS06-15)	3,731.1	732.8	19.6	12.4
Minerals (HS25-26)	798.8	500.0	62.6	11.5
Animal-Based Products (HS01-05)	1,098.2	451.9	41.1	9.3
Fuels (HS27)	744.3	414.8	55.7	7.6
Food Products (HS16-24)	1,190.8	258.6	21.7	0.0
Chemicals (HS28-38)	663.5	154.2	23.2	2.5
Miscellaneous (HS90-99)	1,072.4	133.2	12.4	4.2
Hides & Skins (HS41-43)	804.1	109.5	13.6	-8.1
Wood (HS44-49)	118.9	34.8	29.2	-4.9
Stone & Glass (HS68-71)	65.3	20.6	31.6	7.5
Plastics & Rubber (HS39-40)	536.9	16.8	3.1	-6.6
Footwear (HS64-67)	192.1	14.2	7.4	12.2
Machinery & Electronics (HS84-85)	355.5	8.4	2.4	0.1
Transportation (HS86-89)	104.2	4.2	4.0	-8.4

Source: ITC Trade Map. Exports to World is Pakistan-reported; Exports to RCEP is RCEP members' own reported imports from Pakistan, summed across all 15 members, most recent available year (2025 where reported). CAGR uses years actually reported; Laos, Vietnam, and Myanmar have incomplete latest-year data.

Textiles and clothing, Pakistan's largest export category worldwide, is narrowly the largest RCEP-bound sector too, but it is shrinking within the bloc at 4.2 percent a year. Metals, driven almost entirely by copper shipped to China, has overtaken textiles in growth terms, expanding at 24.8 percent annually, while plant-based products and minerals compound at double-digit rates.⁶² Thirteen of Pakistan's top twenty RCEP-bound products are already gaining share in a growing market; the problem is that its largest and most politically prioritized sector is the one losing ground.

A product-level screen against RCEP import demand identifies eleven specific opportunities where Pakistan has demonstrated global competitiveness but almost no current RCEP presence: plastic sheets and film, pneumatic tyres, flat-rolled steel, soap, and inorganic chemicals among them, with China, Japan, South Korea, and Thailand as leading destinations.⁶³ These are products Pakistan already exports competitively to

the rest of the world, sitting largely untapped in a market growing faster than any of Pakistan's traditional trade partners.

CHARTING A PATH TO ACCESSION

Pakistan should pursue preferential access with RCEP's largest economies, rather than waiting on a comprehensive ASEAN FTA that has shown no momentum in over a decade. There is enough trade complementarity to accommodate Pakistan's exports to RCEP economies. Start can be with targeted products as mentioned above. It is noteworthy that export promotion should rebalance away from an over-reliant on textiles, toward plant-based products and other labor-intensive industrial goods. Table 3 below presents products with significant demand from the RCEP side, while Pakistan's exports to the bloc are none or negligible. Focusing on exporting these additional products to the RCEP bloc would also help diversify Pakistan's export portfolio.

Table 3. Candidate New Export Products for Pakistan in RCEP

Product	RCEP Demand (US\$ million)	Top Markets
Plastic sheets and film (non-cellular) (3920)	16,018.7	China, South Korea, Japan
New pneumatic tyres(4011)	9,824.8	Australia, Japan, South Korea
Flat-rolled steel, coated or plated (7210)	9,720.9	Thailand, Philippines, South Korea
Polystyrene, primary forms (3903)	5,859.5	China, Vietnam, Thailand
Edible offal (bovine, swine, etc.) (0206)	4,804.6	China, Japan, Philippines
Carbonates (inorganic chemicals) (2836)	4,746.8	China, South Korea, Indonesia
Fresh or chilled beef (0201)	3,882.0	Japan, South Korea, China
Soap and organic surfactants (3401)	2,986.1	China, Australia, Japan

61. ITC Trade Map, RCEP members' reported imports from Pakistan and from the world, 2025.

62. ITC Trade Map, Pakistan's exports to RCEP by HS2 sector, 2016-2025.

63. Revealed Comparative Advantage (RCA) screen against RCEP import demand, computed from ITC Trade Map, 2025.

Recently, launching the Vietnam-Pakistan PTA is a step toward connecting with RCEP; however, this bilateral opening now needs to be scaled into a systematic accession strategy:

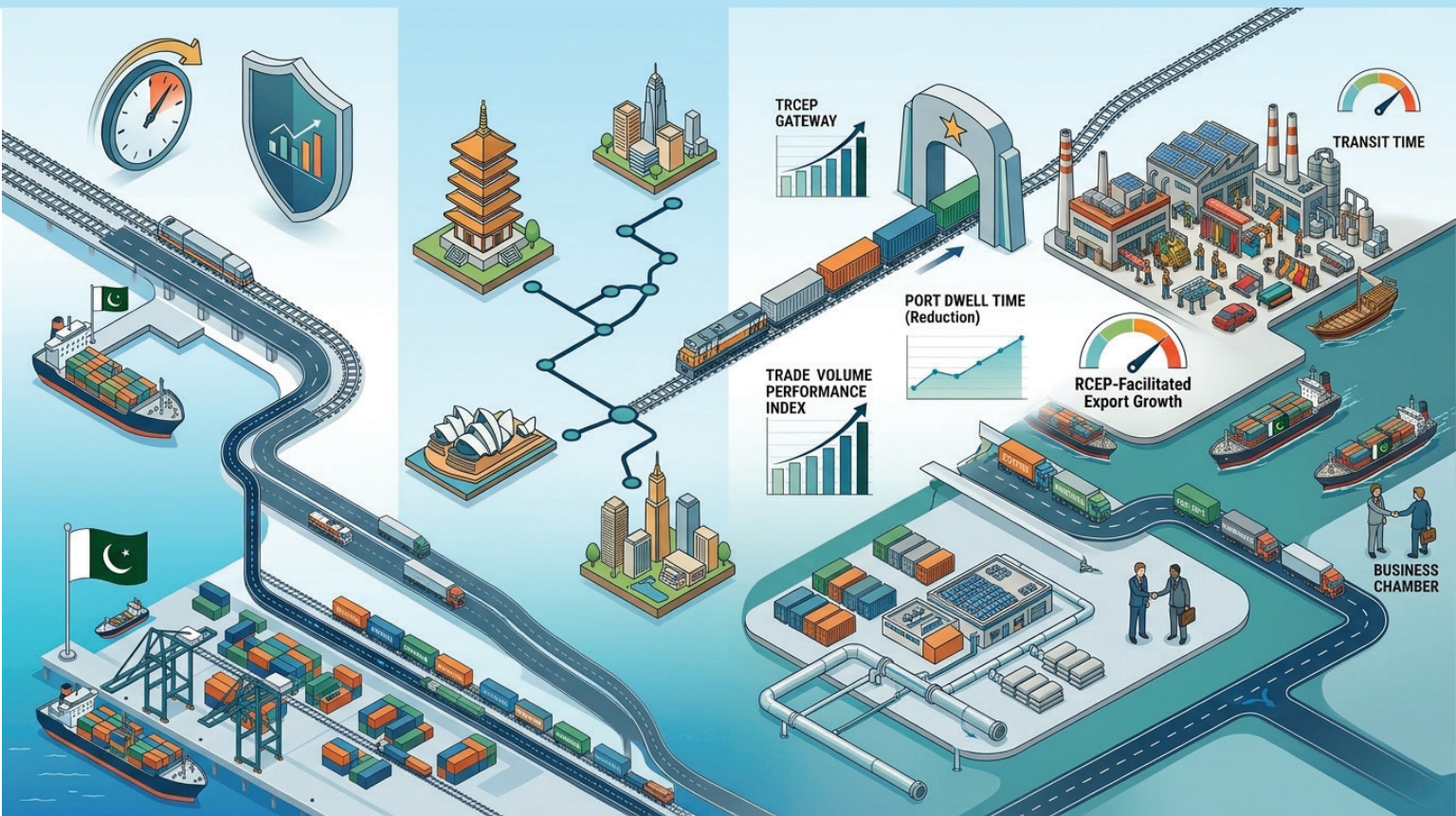
As preparatory measures, Pakistan should design a tariff and para-tariff mapping exercise for relevant inputs, along with aligning Sanitary and Phytosanitary (SPS) regulations, to reduce technical friction and expedite the accession process once negotiations start.

On the diplomatic track, leveraging the existing Pakistan-China relationship, paired with direct ministerial-level visits to key ASEAN capitals, can help lobby for sponsorship. Platforms such as the SCO and BRI summits are valuable opportunities in this regard.

At the institutional level, it is valuable to establish a dedicated RCEP task force or cell, comprising legal and economic expertise, to formulate a prudent accession strategy. This may involve relevant ministries, the FBR, along with business chambers.

Currently it is a good time for a new entrant to get integrated into the bloc. RCEP's first general review is scheduled for 2027, whereas its bilateral trade flows and supply chains are still forming. Every year Pakistan stays outside will be a lost opportunity while RCEP's weight becomes harder to catch up to. While the accession partly accommodates lost market access in the EU and the UK. It is an important lever still open on Pakistan to strengthen its regional integration.

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WHY PAKISTAN CAN NO LONGER AFFORD TO DELAY ITS CLEAN ENERGY TRANSITION

Lessons from Global Energy Shocks and the Case for Clean Energy Investment and Financing

Anjeela Khurram

Since 2007, Pakistan has experienced three rounds of global shocks affecting energy prices: 2007-2008, 2022, and the latest episode in 2025-26, which is linked to the Middle East conflict. Every shock has followed almost the same

sequence of events, such as, a depletion of foreign exchange reserves, weakening of the currency, increase in inflation, and vanishing fiscal space to deal with anything else. Table I highlights the parallels among the three shocks with different causes, but the same mechanism of transmission and the same short-run policy response.

Table I. Three Global Energy Shocks and Pakistan's Exposure

Period	Trigger	Peak Oil Price / Impact	Currency & Inflation	Outcome
2007–08	Global commodity price surge	Oil price roughly doubled, June 2007–June 2008	Reserves fell from >\$13bn buffer, inflation increased, FDI declined by < 20%, foreign exchange reserves fell to \$5bn	Growth slowdown, subsidy-led measures
2022	Russia–Ukraine war	Crude rose > \$120/barrel	Inflation 20%; currency depreciation 28% by mid-2023	LNG cargoes lost to higher bidders; IMF bailout
2025–26 ⁶⁵	Middle East conflict / Strait of Hormuz risk	Monthly oil import bill jumped from \$300m to \$800m	Trade deficit up 43.5% m/m (April 2026)	Renewed austerity; reserve-crisis risk flagged

This isn't a tale of a bad year, but a tale of structural dependency. Only 10% of Pakistan's power comes from indigenous sources (6% from renewable and 4% from nuclear sources). Pakistan's dependency on imported fuel to meet 40% of energy demands has increased its vulnerability in terms of increasing fuel prices globally. For instance, in the 2022 shock alone, Pakistan's cost for LNG imports reached \$4.9 billion per annum, and according to Bloomberg, Pakistan lost the cargoes to richer nations that could afford to pay triple the price, eventually securing replacements at prices 230% higher than the usual rate⁶⁶. Meanwhile, the peak cost of coal imports was \$419/tonne in 2022. These consequences had a far-reaching effect that went beyond the control, such as plant closures, doubling or tripling of household energy bills (that accounted for 15–20% of their income), nationwide strikes, and even an IMF bailout to prevent default. An estimate is that every \$10 rise in Brent crude adds \$1.8–2.0 billion to Pakistan's annual import burden⁶⁷. These episodes teach the same lesson that a country relying on the energy generated mostly by imported fuel will never be able to control its own destiny. The lesson is impossible to ignore now for the next episode.

2- ONE SHOCK AFFECTING EVERY LEVEL OF THE ECONOMY

Dependency on imported fuels serves as a transmission mechanism, driving a global price change into the entire national economy via the whole range of channels, including trade balance and household electricity bills. The fuel shocks increase transport costs and food prices, reducing the purchasing power and raising the cost of living. The perfect example here is the power sector circular debt that continues growing despite the government's efforts to reduce it through refinancing rather than through any structural reforms. Pakistan failed to meet its own IMF target of bringing down its circular debt to Rs 1.614 trillion by end-FY26, and the actual figure stood at about Rs 1.92 trillion in May 2026⁶⁸.

65. Global oil shock shatters Pakistan as trade deficit balloons in April: Report

66. Energy Crisis in Pakistan: New Policy Approach Is Crucial

67. Pakistan's energy challenge

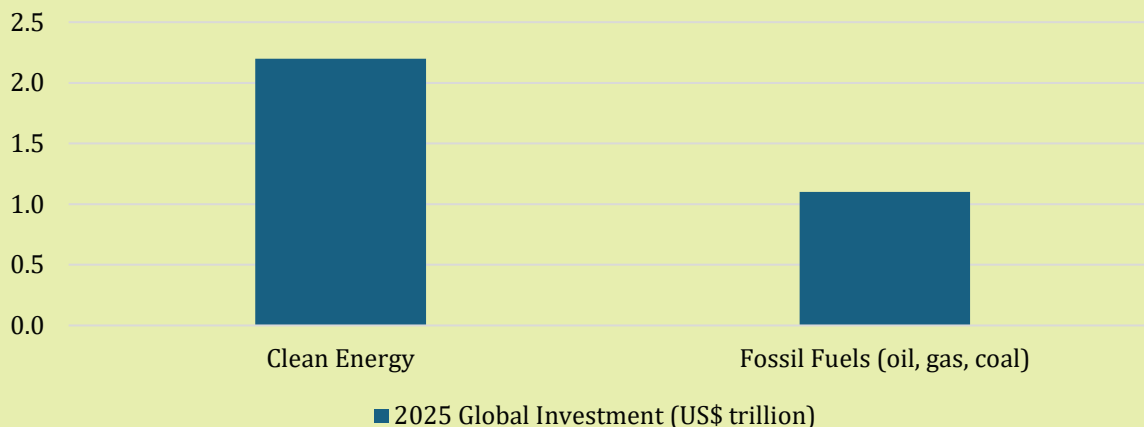
68. Circular debt hits Rs1.84tr

3. THE GLOBAL MONEY SHIFTS TOWARDS CLEAN ENERGY

Calculating the economic costs of fuel reliance, the world has made a decisive shift to invest in clean

energy, which now attracts roughly two times more capital than fossil fuels (Figure 1). The latest IEA's World Energy Investment 2025 forecasts record high global energy investment of \$3.3 trillion in 2025 in clean energy technologies⁶⁹.

Figure 1. Global Energy Investment by Category, 2025 (US\$ trillion)



Globally, investments in solar PV were forecast to attract \$450 billion in 2025⁷⁰. An indigenous shift towards solarization is already underway. Pakistan has imported around 17 GW of solar PV panels in 2024 alone, the highest volume by far for any country in the world that year. Total imports by mid-2025 are estimated at 45-51 GW of solar PV, matching the total installed capacity of the national grid itself⁷¹. Net-metered rooftop solar capacity has grown from 583 MW in 2022-23 to 1,181 MW in 2023-24 and then jumped again to 2.8 GW in only ten months of the FY2024-25 year, taking the total past 5-6 GW⁷². One estimate suggests a total on-grid and off-grid installed solar PV capacity of roughly 34 GW⁷³. One recent industry estimate suggests that this bottom-up solar transition in Pakistan has already resulted in cumulative savings of \$12 billion in avoided fuel imports since 2020, and will continue to deliver savings of \$6.3 billion in FY2026⁷⁴.

4. PAKISTAN NEEDS TO WORK WITH ALREADY EXISTING INDIGENOUS RESOURCES

Pakistan's indigenous renewable resource base is sufficient, so it does not have to import resources for clean energy (Figure 2). The indigenous energy resources sidestep the ship route, the currency exchange, or the Strait of Hormuz to remain accessible. They are the sole energy investment type for which Pakistan's financial outlays remain in-country rather than being exported as an import bill.

69. Executive summary – World Energy Investment 2025 – Analysis – IEA

70. Record energy investment forecast and more top energy stories | World Economic Forum

71. The Perfect Storm Fueling Pakistan's Solar Boom | World Resources Institute

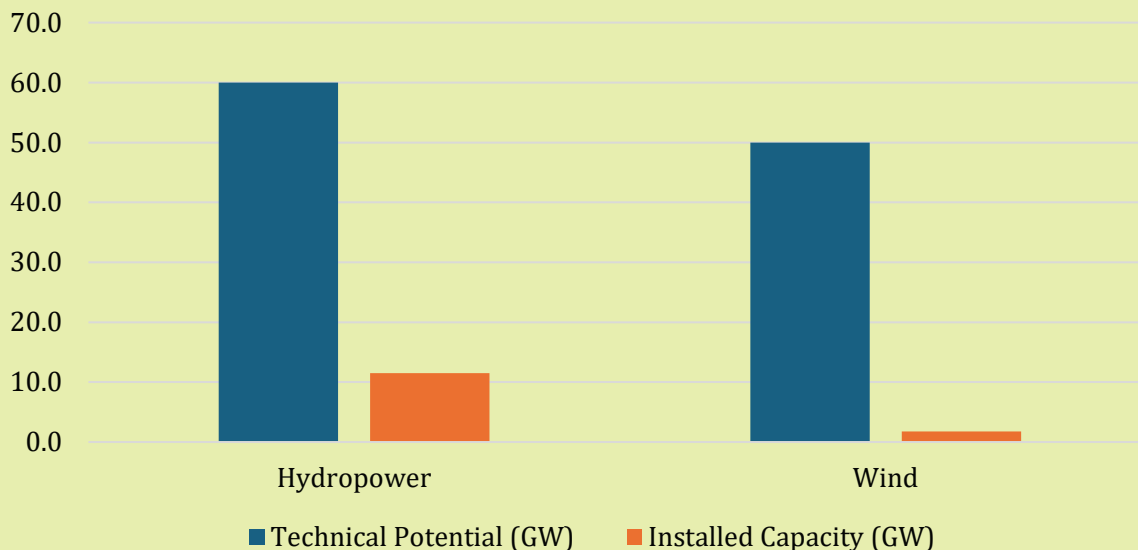
72. GSR 2025 | Snapshot: Pakistan

73. Ibid

74. TransitionZero

75. Pakistan's energy challenge

Figure 2. Hydro and Wind: Technical Potential vs. Installed Capacity (GW)



The technical potential of indigenous renewable resources of Pakistan is significant and is underutilized. A Comparison between technical potential and existing installed capacity⁷⁶ illustrates the magnitude of the opportunity (Table 2).

Biomass supplies an additional 25 million tons/year of feedstock from agricultural and industrial residues (bagasse and crop residue), a resource which is inherently local and rural, not related to port terminals.

Table 2. Pakistan's Indigenous Renewable Potential vs. Installed Capacity (GW)

Resource	Technical/Economic Potential	Installed Today	Utilization
Hydropower	60 GW (IRENA)	11.5 GW	19%
Wind	50 GW (Sindh/Balochistan corridor, IRENA)	1.8 GW	4%
Solar (utility-scale)	Abundant; not resource-constrained	0.8 GW utility + 5.7 GW net-metered	Rapidly growing
Biomass	25 million tonnes/year feedstock	0.25 GW (bagasse)	Early stage

Source: Source: <https://www.irena.org/News/pressreleases/2018/Apr/Pakistan-RRA>

76. Renewable Energy Can Build Prosperity and Improve Energy Security in Pakistan

5. THE FINANCING INSTRUMENTS

Pakistan already has financing instruments that serve as functioning access points into the global clean-capital pool. These financial instruments have been employed previously (Table 3). The problem does not rest on the nonexistence of tools but rather their scale and reliability. A United Nations Common Country Analysis reflects that Pakistan's

international adaptation financing has lagged, when compared to climate-vulnerable counterparts such as Bangladesh and the Philippines, with inferior fiscal buffers. Likewise, Pakistan's adaptation financing gap is significantly larger than its mitigation gap⁷⁷. In late 2026, the Finance Minister of Pakistan emphasized the need to focus more on an efficient utilization of existing tools to build out indigenous capital markets⁷⁸.

Table 3. Pakistan's Green Financing Instruments in Use

Instrument	Year	Size	Purpose
Green bond ⁷⁹	2021	\$500 million	First sovereign green bond issuance
Green Sukuk ⁸⁰	2025	PKR 20 billion	Domestic Islamic green financing instrument
ADB climate resilience loan ⁸¹	2024	\$500 million	Climate & disaster risk reduction; supports green sukuk issuance
Panda bond (ADB/AIIB-backed) ⁸²	2026	CNY 1.75bn (\$258m)	First RMB sovereign bond; water, energy & health infrastructure

According to the analysis by the International Growth Centre (IGC)⁸³, Pakistan's climate action plan aims for 60% of renewable energy generation and 30% of electric vehicles by 2030. The funding required for it will be 15% internal, while 35% will come internationally.

6. WAYS FORWARD AND CONCLUSION

In less than twenty years, Pakistan has had the same shock of imported energy for the third time, and in all instances, the transmission channel has always been the same, fuel prices in international markets increase, import bill increases, reserves deplete, currency depreciates, and inflation ensues, with

households facing the final cost via electricity and food prices. Around the world, financial markets have long figured out that the solution lies in clean energy, with \$2.2 trillion being invested in it in 2025. There is no need for Pakistan to rely on importing itself out of such a cycle; it already has one of the least-tapped hydropower and wind energy resources in the region, a genuine grassroots solar revolution underway, and a few but growing number of instruments for green financing which it has shown it knows how to utilize.

The following are some recommendations to tackle this issue.

1. Institutionalize and manage the risks associated with a citizen-driven solar revolution rather than penalizing it with taxes.

77. CCA 2024 update UN Pakistan_climate financing_CLEAN_ed_26feb25_.pdf

78. Pakistan pursuing green bonds, sukuk to mobilise climate finance: FinMin 9

https://unfccc.int/sites/default/files/2025-09/Pakistan_NDC3.0_24%20Sep.pdf

80. Ibid

81. ADB Approves \$500 Million Loan to Support Climate and Disaster Resilience in Pakistan | Asian Development Bank

82. AIIB, ADB Support Panda Bond Issuance for Green Projects in Pakistan

83. How Pakistan can finance its greenhouse gas emissions reduction | International Growth Centre

The current explosion of rooftop solar projects in Pakistan is clear evidence of the existence of genuine need for energy independence, which is being met through the funding of households and corporates; however, it has been organic in nature and has now led to issues of cost-sharing (equity issues) and integration in the grid as the NEPRA rethinks the net metering policies. Policy can actually harness this trend in its favor by combining the latest changes in the net metering and buy back policies with concessional financing schemes to increase adoption among lower and middle class households.

2. Direct the investments of new electricity generation capacity towards indigenous hydro, wind and solar capacities. Given the fact that there is 60 GW hydro and 50 GW of wind power yet to be harnessed, any additional megawatt of indigenous power generation will reduce the vulnerability of the economy against any future fuel shocks in addition to decreasing the reliance on fuel-import-indexed contracts and thus reducing the circular debt issue. This should be one of the criteria in the IGCEP.

3. Expand green capital market access in a planned and purposeful manner by leveraging the existing tools that have been demonstrated to work. Green sukuk, ADB/AIIB-enabled bonds, and the recently introduced Panda bond demonstrate the potential for Pakistan to access both concessional and market-based green capital provided the instruments are structured properly. The approach would be to leverage these instruments as the financing template – larger and more frequent green bonds or sukuk, blended finance models involving MDBs' guarantees to attract private finance (the Panda bond's guarantee approach) and a focus on adaptation finance, which is lagging behind peers with similar vulnerability levels.

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THE NEW MINERAL GEOPOLITICS: Why Pakistan Must Move Beyond Extraction

Maheen Khan & Bilal Aftab

INTRODUCTION:

Critical minerals are the strategic commodities of the 21st century. Their supply chains are at the heart of global economic and geopolitical rivalry, underpinning the technologies that are powering the global energy transition, digital transformation, and modern defence industries. However, the key to the strategic advantage is not in the control of the mineral deposits in themselves, but in the capacity to refine, process and turn the mineral deposits into high-value products. As the world is reconfigured in the context of new supply chains, Pakistan has the opportunity to secure its place in this new geoeconomic matrix, given its mineral endowment of \$6-8 trillion.⁸⁴ Whether that opportunity pays off will hinge on Pakistan's ability to build industrial capacity rather than

remain a supplier of raw materials, a transformation that must negotiate complex domestic governance and regional competition, deciding whether geology becomes a source of resilience or of continued dependency.⁸⁵

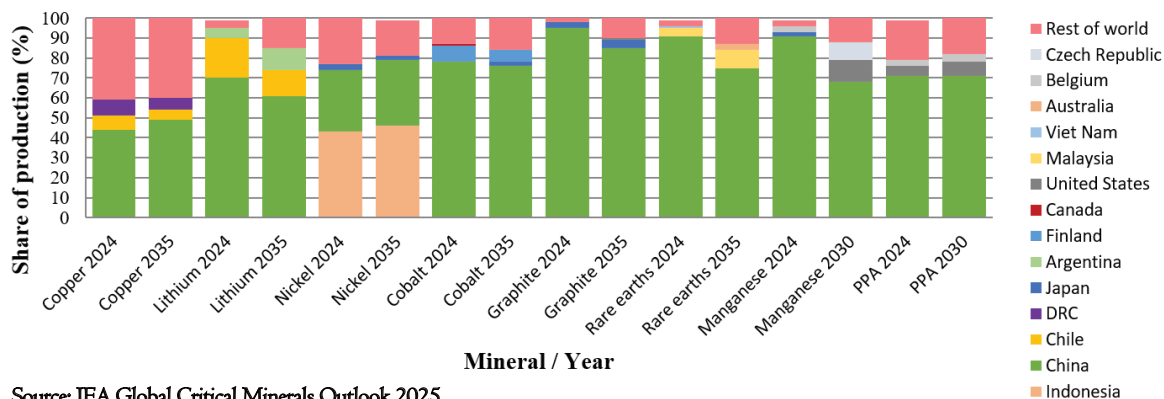
THE NEW GEOPOLITICS OF CRITICAL MINERALS

Critical minerals have become a tool of state power in the global energy transition. Today, lithium, cobalt, nickel, copper, and graphite are no longer commodities, but the building blocks of electric vehicles, renewable energy systems, semiconductors, advanced defence systems, and digital infrastructure. Yet the geography of this transition is profoundly unequal. According to the International Energy Agency's (IEA) Global

Critical Minerals Outlook 2025,⁸⁶ China is the leading refiner for 19 of the 20 strategic minerals

closely tracked by the agency, with an average market share of approximately 70 percent.

Figure I: Geographical Distribution of Refined Material Production (Base Case)



Source: IEA Global Critical Minerals Outlook 2025

PPA = battery-grade purified phosphoric acid; DRC = Democratic Republic of the Congo. The figures for graphite are based on battery-grade graphite, including spherical graphite and synthetic graphite. The figures for rare earths are for magnet rare earth elements only. The figure depicts the value of the top three producing countries in a given year.

For specific minerals, the concentration is even more extreme: China holds 98.7 percent of global refining capacity in gallium, 95.2 percent in graphite, and 95 percent in manganese. Most of these minerals are already subject to some form of export control. China required special export licences for gallium and germanium from July 2023, extended similar controls to graphite by October 2023, and restricted antimony in August 2024. When Beijing barred gallium, germanium, and antimony exports to the USA in December 2024, Chinese antimony shipments fell by roughly 97 percent and prices approximately doubled within months.⁸⁷

The contemporary discourse surrounding critical minerals is often framed as a contest over geological endowment. Yet such a framing obscures the more consequential struggle over industrial capability. China's approach to critical minerals was never confined to securing mineral deposits; it was rooted in a broader developmental discourse that conceived control over the supply chain as the foundation of national power. Through initiatives such as Made in China 2025,⁸⁸ Beijing articulated a vision in which refining, processing, manufacturing, and technological innovation were treated as strategic state objectives rather than outcomes to be left to market forces. Critical minerals were therefore understood not as commodities in themselves but as inputs into high-value sectors, including high-speed rail, electric vehicles, and aerospace, underpinning China's long-term economic and geopolitical influence.

84. Khetran, M. (2025, May 19). Unlocking Pakistan's mineral wealth for sustainable economic growth. Institute of Strategic Studies Islamabad. https://issii.org.pk/wp-content/uploads/2025/05/IB_Khetran_May_19_2025.pdf

85. Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *The Economic Journal*, 116(508), 1-20. <https://doi.org/10.1111/j.1468-0297.2006.01045.x>

86. International Energy Agency. (2025). Global critical minerals outlook 2025. IEA. <https://www.iea.org/reports/global-critical-minerals-outlook-2025>

87. Center for Strategic and International Studies. (2025, April 16). The consequences of China's new rare earths export restrictions. <https://www.csis.org/analysis/consequences-chinas-new-rare-earths-export-restrictions>

88. Kuo, K. (2025, June 26). Made in China 2.0: The future of global manufacturing? *World Economic Forum*. <https://www.weforum.org/stories/2025/06/how-china-is-reinventing-the-future-of-global-manufacturing/>

By contrast, the USA, Japan and most of the liberal industrial world trusted comparative advantage to guarantee mineral supply, seeing little need for state intervention in processing, a stance reinforced by the environmental costs of offshoring such activity. Western nations, therefore, stayed dominant in innovation and finance while slowly ceding the midstream industrial sectors to China. However, it has been argued that a modern day mineral race to catch up with China is an inadequate description of the new geopolitical reality.⁸⁹ The current western approaches are essentially reactive, trying to correct longstanding reliance on mainstream critical minerals instead of predicting which materials can drive new technologies. In doing so, policy discourse has largely overlooked minerals at the margins, i.e., materials that possess emerging strategic significance are already mined and refined predominantly within Organisation for Economic Co-operation and Development (OECD) countries, yet remain peripheral to contemporary geopolitical debates.

The debate, thus, moves the analytical lens from a zero-sum game about the significance of today's value chains to a larger consideration of technological foresight, resource diversification, and strategic advantage moving beyond geographies. The formulated data makes the geopolitical asymmetry real.⁹⁰ Among the seven mainstream minerals, critical for energy transition and defense supply chains, OECD economies regularly have the advantage of mining whereas China has the processing advantage in each case, i.e., extraction does not give strategic control, refining does. However, the eleven minerals at the margin have a different pattern: OECD countries are advantaged in both mining and processing as well as in reserves. At present, such minerals are not in contention, but with increasing usefulness in industry, could become the next choke points.

The lesson for Pakistan is not to specialize in the processing of mainstream minerals (where the bottleneck has already solidified around China), but become capable of processing and midstreaming of still-strategically open minerals. Notwithstanding, the centralization of mineral processing in a handful of countries makes the world's manufacturing sector vulnerable to substantial supply shocks, with the potential to

become a site of geopolitical competition, not beneficiary. In the absence of domestic value addition, Pakistan's mineral wealth may further exacerbate its foreign dependence and undermine its strategic autonomy, putting pressure on Pakistan to deal with competing demands of the major powers without deriving the maximum benefit of its resources in economic and geopolitical terms. But, to leverage the opportunity, Pakistan's possible path of moving up the value chain depends on overcoming binding domestic constraints, including constitutional fragmentation and high energy cost.

FROM GEOLOGICAL WEALTH TO INDUSTRIAL CAPABILITY

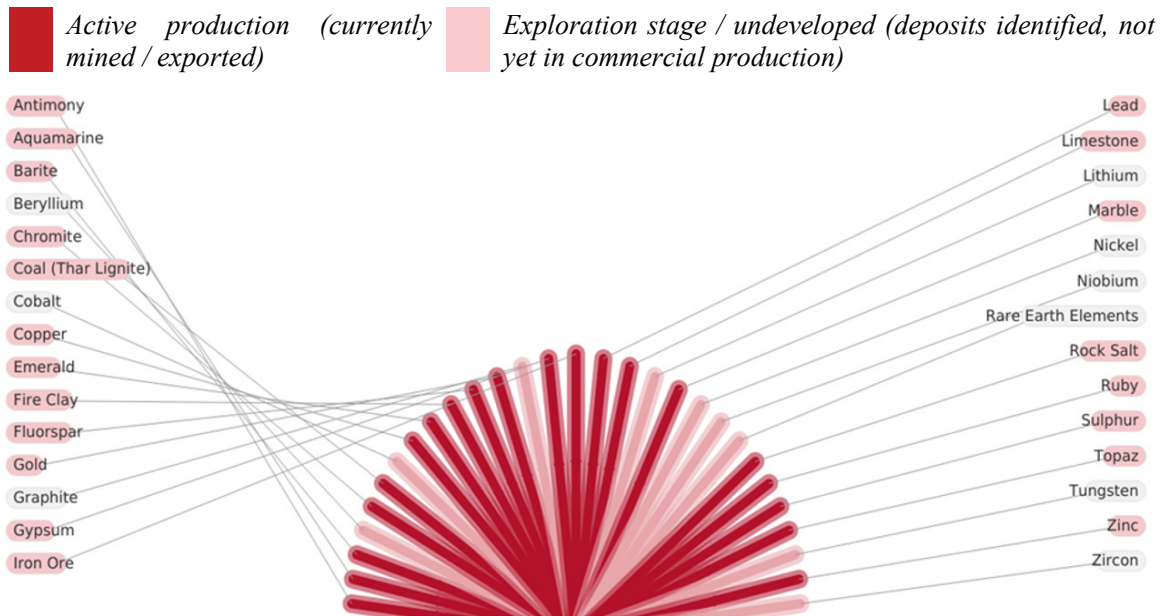
Pakistan is blessed with a geological fortune on an unprecedented scale. The government-affiliated estimates suggest total mineral potential for the country at more than \$6 trillion and one source estimates it at \$8 trillion. This wealth is spread over nearly 600,000 sq kilometres and includes 92 known minerals, of which 52 are commercially extracted.



89. Deberdt, R., & DiCarlo, J. (2026). Minerals at the margins and the new geopolitics of critical minerals. *Energy Research & Social Science*, <https://doi.org/10.1016/j.erss.2026.104601>

90. Deberdt, R., & DiCarlo, J. (2026). Minerals at the margins and the new geopolitics of critical minerals. *Energy Research & Social Science*, <https://doi.org/10.1016/j.erss.2026.104601>

Figure 2: Pakistan's Mineral Resources



Source: Data adopted from the Government of Pakistan. (2025). Pakistan's mineral resources, Pakistan Minerals Investment Forum 2025

Despite this mineral resource base, Pakistan's mining sector has historically contributed less than three percent to GDP. The \$6 trillion figure is an unverified estimate, not an official reserve valuation, but even a fraction of this potential represents a transformative opportunity. Among its most strategic assets is Reko Diq, one of the world's largest undeveloped copper-gold deposits, containing an estimated 5.9 billion tonnes of ore. Commercial production is expected to commence by 2028, with an initial annual output of 200,000 tonnes of copper, rising to 400,000 tonnes after expansion. The project alone is projected to generate approximately US\$2.8 billion in annual exports and over US\$70 billion in free cash flow over its estimated 37-year operational life.⁹¹ Beyond copper, geological surveys have identified at least 12 of the 17 rare earth elements within Pakistan, alongside promising deposits of lithium-bearing pegmatites, chromite, beryllium, and zircon, positioning the country within the emerging critical minerals landscape.⁹²

However, geology does not necessarily equate geoeconomic influence. As discussed before, Pakistan still remains at the bottom of the global mineral value chain. Most minerals are exported in raw or semi-processed form due to the absence of domestic refining and processing facilities, allowing the highest-value stages of production and the associated technology, employment, and industrial learning to accrue elsewhere. This is due to the underlying structural limitations, rather a shortage of mineral resources. The 18th Constitutional Amendment devolved mineral resource authority to the provinces while keeping trade, investment, and industrial policy in the federal domain; hence, creating regulatory uncertainty for investors. This uncertainty is not merely theoretical: in 2019, an International Centre for Settlement of Investment Disputes (ICSID) tribunal awarded Tethyan Copper Company roughly US\$5.9 billion in damages after Balochistan's government denied the company's Reko Diq mining lease in 2011, a sum equivalent to Pakistan's IMF bailout package that year, underscoring how quickly weak regulatory clarity can convert geological wealth into fiscal liability.⁹³

91. Barrick Mining Corporation. (2025). Reko Diq project. <https://www.barrick.com/English/operations/reko-diq/>

92. Geological Survey of Pakistan. Mineral resources of Pakistan. <https://gsp.gov.pk/geology-mineral-exploration/>

93. The News. (2019, July 13). The Reko Diq timeline. <https://www.thenews.com.pk/print/506907-the-reko-diq-timeline>

Meanwhile, high electricity tariffs, limited mineral processing capability, and a lack of technological capacity within Pakistan have hindered efforts to go beyond extraction. These constraints are compounded by growing international expectations surrounding environmental and governance standards, making institutional credibility as important as geological potential. Pakistan's problems are not only domestic: the IEA notes that building a new critical-mineral supply chain outside existing production hubs is inherently costly, with new mining and refining investments running roughly 50 percent higher than in established producers, a structural disadvantage that complicates diversification even as governments elsewhere seek to reduce reliance on concentrated supply chains.

Investment in Pakistan will thus depend upon more than just its geology; it will depend upon the certainty of the policies, modern infrastructure, technology cooperation arrangements, and the coherence of the industrial strategy that can offset these structural challenges. The real issue is not whether Pakistan has critical minerals but if it can break the commodity trap. Reko Diq, therefore, should not be seen as a single isolated mining project but as the base for a larger industrial strategy, which can be realized to create long-term productive capacity from geological wealth. Indonesia's experience offers an instructive precedent: successive bans on unprocessed nickel-ore exports in 2014 and 2020 forced smelting investment onshore, and by 2025, the country accounted for roughly 62 percent of global nickel production coupled with a far larger refined-product export base.⁹⁴ However, the nickel's success rested on ample reserves, rising EV-linked demand, and few viable substitutes, conditions Pakistan's copper and chromite deposits may not share to the same degree. This implies that any beneficiation strategy should be calibrated mineral-by-mineral rather than imported wholesale.⁹⁵

91. Barrick Mining Corporation. (2025). Reko Diq project. <https://www.barrick.com/English/operations/reko-diq/>

92. Geological Survey of Pakistan. Mineral resources of Pakistan. <https://gsp.gov.pk/geology-mineral-exploration/>

93. The News. (2019, July 13). The Reko Diq timeline. <https://www.thenews.com.pk/print/506907-the-reko-diq-timeline>

BEYOND EXTRACTION

Pakistan's mineral strategy should be guided less by ambition than by sequencing:

Rather than attempting to replicate China's capital-intensive refining model, the country should first build the capacities that make downstream industrialization commercially viable. The focus must not be on billion-dollar refineries, but on mineral beneficiation (upgrading the ore before exportation) that generates higher value with significantly less capital investment. On this, Pakistan should build the Reko Diq corridor as a pilot industrial zone which will incorporate processing areas, logistics, technical training, and allied industries, rather than a standalone mining zone.

Equally critical is to mitigate risk in investments, rather than expanding public expenditures. In Pakistan, limited fiscal space requires attention to reforms that enable the crowding in of private capital. These include the publication of high-quality geological data, the co-ordination of federal and provincial approvals within existing structures, the provision of captive renewable energy to processing plants, and negotiating technology transfer and development of local suppliers under future mining concessions. These are not politically or financially costly as subsidy payments but will require institutional coordination.

Pakistan should avoid assessing success based on the quantity of minerals it is able to extract. The competitiveness in an age of green industry increasingly hinges on responsible mineral production.

94. Center for Trade Excellence. (2026, March). How Indonesia's ban on raw nickel exports provides lessons for fiscal and economic policy in the low-carbon transition. <https://cetex.org/publications/how-indonesias-ban-on-raw-nickel-exports-provides-lessons-for-fiscal-and-economic-policy-in-the-low-carbon-transition/>; U.S. International Trade Commission. (2025). Export restrictions on minerals and metals: Indonesia's export ban of nickel. https://www.usitc.gov/publications/332/working_papers/ermm_indonesia_export_ban_of_nickel.pdf

95. Katadata Insight Center. (2024, April 19). Possible missteps in Indonesia's minerals downstreaming policy. <https://dinsights.katadata.co.id/read/2024/04/19/possible-missteps-in-indonesias-minerals-downstreaming-policy>

Integrating robust environmental safeguards, clear community benefits, water stewardship, as well as mine rehabilitation from the beginning, would help build investor confidence and ensure that mineral development is contributing to long-term ecological resilience. Sustainability should not be seen as a compliance requirement but as a strategic opportunity for Pakistan to carve out a niche for itself in the critical minerals market.

CONCLUSION

The changing minerals landscape is an opportunity and a choice for Pakistan. The nation's rich mineral resources fuel the potential for economic change, especially given the increasing attention from global economy.

However, if Pakistan fails to invest in refinement, downstream industries, and a stable industrial policy, it is likely to fall into the same old trap of exporting raw materials and importing high value products. The rising geoeconomic powers will not necessarily be the countries with the most abundant geological resources, but those that turn geological wealth into industrial ecosystems, technological strength, and strategic capacity. It is, therefore, not enough for Pakistan to seek the future but also create it. As the world's race for critical minerals increases, it is not the minerals under Pakistan's soil that is going to translate into an economic advantage, it will be the ability to turn these minerals into an industry.

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WEAVING PAKISTAN INTO REGIONAL VALUE CHAIN

From Gateway Rents to Create Value

Iqra Karamat & Uzma Zia

1 INTRODUCTION

Global trade is becoming more regional. Tariff tensions between the United States and China, disruptions to shipping routes, and the rise of "friend-shoring" are encouraging firms to place more stages of production closer together. Regional value chains divide design, sourcing, production and assembly across neighbouring economies. They are gaining importance within the wider trading system. Cross-border value chains already account for a large share of world trade.⁹⁶ For Pakistan, positioned between South Asia, Central Asia, China and the Middle East, the question is no longer whether regional integration matters, but whether the country will participate in these chains as a genuine value-adding partner or remain, as it largely has, a peripheral transit point collecting

gateway rents while its neighbours capture the manufacturing and services value upstream and downstream. This article explains where Pakistan stands, why regional integration remains weak, and what policy must change.

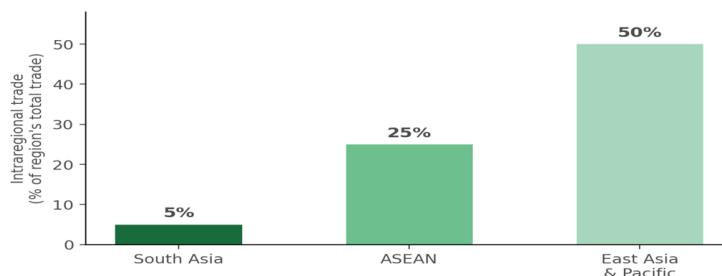
96. Bhusal, L. B. (2025). "South Asian global value chain integration patterns: A value-added perspective." *Asia and the Global Economy*, 5(2), 100110. The article cites an OECD estimate that global value chains account for about 70 percent of world trade.

2. HOW MUCH DOES PAKISTAN TRADE WITH ITS REGION?

2.1 A Region That Barely Trades with Itself

South Asia is one of the least integrated regions in the world. Trade within the region is only about 5 percent of its total trade. The comparable regional trade share is about 25 percent in ASEAN and close to 50 percent in East Asia and the Pacific (WB, 2018). Pakistan follows the same pattern. Trade with its South Asian neighbours is only about 8 percent of its total trade, despite its location in a fast-growing region.^{97 98}

Figure I: Intraregional trade as a share of each region's total trade. Source: World Bank, South Asia Regional Integration Program.



Source: World Bank, South Asia Regional Integration Program, "Trade" (worldbank.org)

Table I: Pakistan and South Asia's Regional Trade Gap

Indicator	Value	Source
Intraregional trade share, South Asia	Approximately 5% of total trade	Kathuria & Mathur ⁹⁹ (2019).
Intraregional trade share, ASEAN	Approximately 25% of total trade	World Bank
Pakistan's trade with South Asia	Approximately 8% of Pakistan's global trade	World Bank (2018)
South Asia average applied tariff	13.6%, 2x greater than the world average	World Bank (2018)
Pakistan's regional trade covered by SAFTA sensitive lists	Approximately 20% of imports and 39% of exports	World Bank (2018)
Container shipping cost premium vs OECD	50% higher than OECD	World Bank (2020) ¹⁰⁰
Estimated annual intraregional trade gap	US\$44 billion	World Bank

97. World Bank. "Trade." South Asia Regional Integration Program. Intraregional trade is about 5 percent of South Asia's total trade, compared with roughly 25 percent in ASEAN. The region trades about US\$23 billion internally against an estimated potential of at least US\$67 billion.

98. World Bank (2018). "Pakistan's Trade with South Asia Can Rise Eight-Fold." Pakistan's trade with South Asia is about 8 percent of its global trade. Intraregional trade in South Asia is about 5 percent, compared with 50 percent in East Asia and the Pacific.

99. Kathuria, S., & Mathur, P. (2019). How Can South Asia Turn Its Proximity from a Burden to an Advantage. World Bank Other Operational Studies.

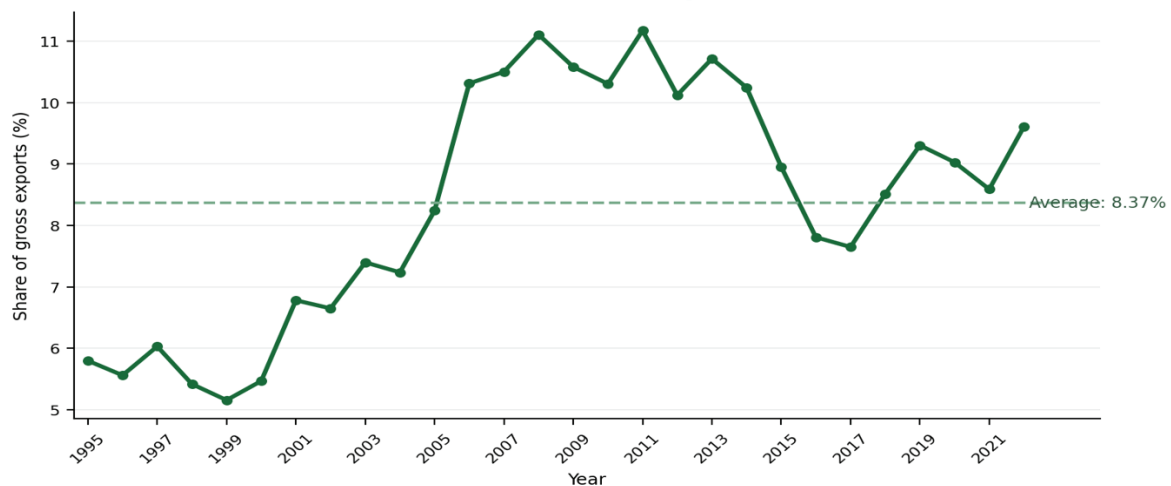
100. <https://mail.google.com/mail/u/1/#inbox/FMfcgzQhVhZVXDgtFJBLXfTzrdgzRDvZ7projector=1&messagePartId=0.1>

2.2 Pakistan's Position in Global and Regional Value Chains

Pakistan's economy-wide TiVA data reveal a GVC structure that is consistently more forward than backward-oriented. Backward participation captures foreign value added embodied in Pakistan's exports, while forward participation

captures Pakistani value added embodied in other economies' exports. During 1995–2022, backward participation averaged 8.37 percent, forward participation averaged 15.20 percent, and their combined total averaged 23.56 percent of gross exports. Forward participation exceeded backward participation in every year, indicating that Pakistan entered global production networks more strongly as a supplier of domestic value added than as a user of foreign inputs.

Figure 2: Pakistan: Backward BVC participation (1995 – 2022)



Source: Author's calculations based on OECD TiVA data, Total – All activities.

Figure 3: Pakistan: Forward BVC participation (1995 – 2022)



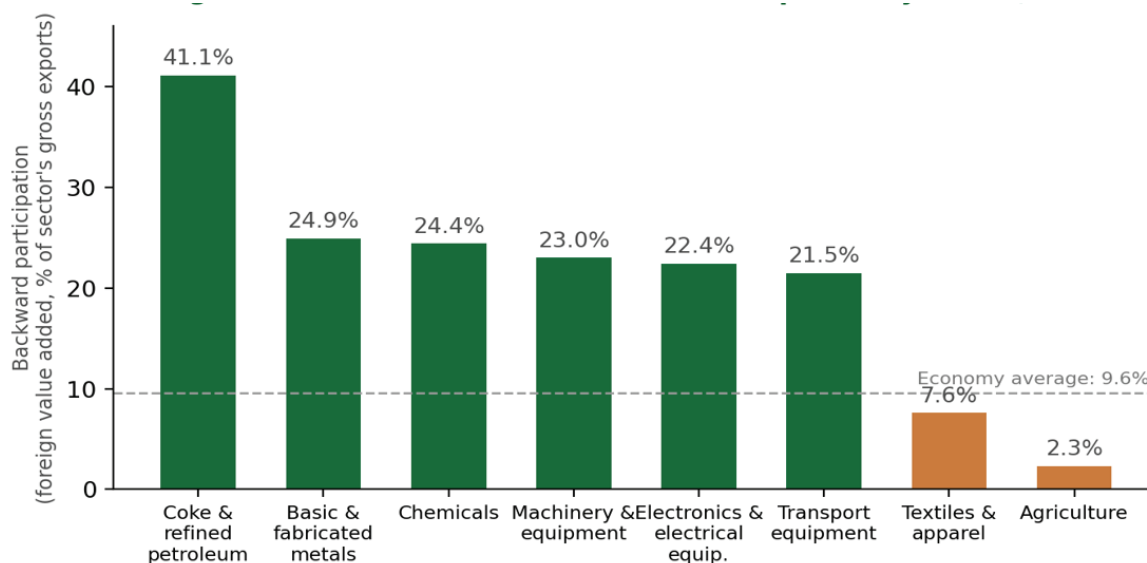
Source: Author's calculations based on OECD TiVA data, Total – All activities.

The distinction matters because backward participation can support productivity, technology transfer and product upgrading through access to better intermediate inputs. Forward participation can also reflect productive specialisation, but when it is concentrated in raw or lightly processed goods, it may keep the country in low-value activities with limited employment generation and weak pricing power.

The sectoral pattern sharpens this picture. Backward participation is highest in import-dependent, capital- and energy-intensive sectors such as coke and refined petroleum at 41.1

percent, basic and fabricated metals at 24.9 percent, chemicals at 24.4 percent, machinery at 23.0 percent, and electronics and electrical equipment at 22.4 percent. These sectors rely heavily on imported fuel, materials and components, largely to serve domestic demand. In contrast, textiles and apparel—Pakistan's main export sector—have a backward participation rate of only 7.6 percent (WB 2020). This suggests that the sector relies mainly on domestic inputs and makes limited use of imported fibres, dyes, machinery, trims and other specialised inputs that could support higher-quality production.

Figure 4: Pakistan's backward GVC participation by sector, 2022.



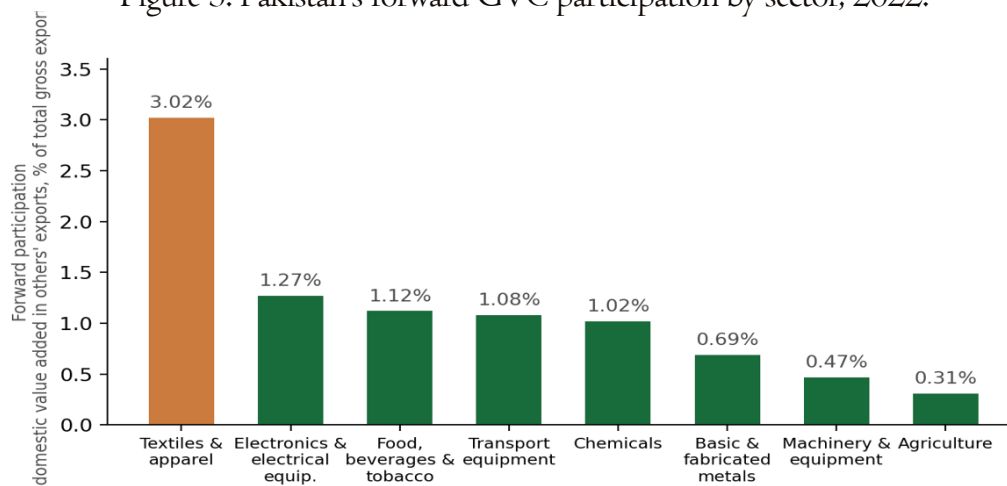
Note: orange bars are Pakistan's two largest export-earning sectors, shown for contrast. Source: Author's calculations from OECD TiVA database (EXGR_FVASH), 2022.

Source: Author's calculations from OECD TiVA database (EXGR_FVASH).

Forward participation shows the reverse pattern. Textiles and apparel contribute 3.0 percent of Pakistan's total gross exports through domestic value added embodied in other countries' exports, well above electronics at 1.3 percent, food products at 1.1 percent, transport equipment at 1.1 percent, and chemicals at 1.0 percent. Pakistan's strongest international production link therefore runs through cotton, yarn, fabric and other intermediate textile products supplied to foreign apparel industries. This creates export earnings, but it also

indicates that Pakistan remains concentrated in upstream and semi-processed stages rather than higher-value functions such as advanced finishing, technical textiles, design, branding and distribution.

Figure 5: Pakistan's forward GVC participation by sector, 2022.



Note: orange bar is textiles & apparel, Pakistan's leading forward-linkage sector by a wide margin. Source: Author's calculations from OECD TiVA database (EXGR_DVAFXSH), 2022.

Source: Author's calculations from OECD TiVA database (EXGR_DVAFXSH).

Pakistan's regional links are similarly uneven. China and the Gulf are important sources of machinery, energy and intermediate goods, while Central Asian trade remains commercially small and South Asian

integration is weak relative to geographical proximity. Pakistan is therefore connected to the region mainly through imports, while much of its export revenue and domestic value added is realised in markets outside the region.

Table 2: Benchmarks for Pakistan's regional trade and value-chain corridors

Partner corridor	Available benchmark	Period	Value-chain reading
South Asia	About 8% of Pakistan's global trade	2018 benchmark	Low for a neighbouring region; indicates weak production sharing and market integration.
China	US\$19.76 billion total goods trade (exports US\$2.37bn; imports US\$17.39bn)	FY2024-25	Large, import-heavy sourcing corridor; machinery, components and investment links dominate reciprocal export integration.
Central Asia (five republics)	About US\$0.40 billion total trade	FY2024-25/current	Commercially small despite transit ambitions; scope exists for agro-processing, energy and logistics chains.
Middle East region (broader Gulf-oriented proxy)	US\$18.77 billion total trade (exports US\$3.21bn; imports US\$15.56bn)	FY2024-25	Import-heavy energy corridor; demand for textiles, food and services offers underused outward opportunities.

Sources and notes: South Asia benchmark from World Bank (2018); China calculated from Pakistan Bureau of Statistics FY2024-25 total exports/imports and country shares; Central Asia calculated from Ministry of Foreign Affairs bilateral figures for Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan; Middle East from Ministry of Commerce, Year Book 2024-25. These are gross-trade benchmarks, not bilateral TiVA values. Reporting periods and regional definitions differ, so the rows are not additive.

The policy challenge is to convert these trade corridors into genuine production-sharing relationships. Chinese investment and machinery should strengthen local supplier capabilities; Gulf demand should be linked to processed food, textiles and tradable services; Central Asian corridors should support two-way agro-industrial, logistics and energy chains; and South Asian trade arrangements should allow cumulative rules of origin across cotton, yarn, fabric, chemicals and garments. The success of regional integration should be judged by whether it increases domestic processing, skilled employment, services content and value capture—not merely imports, transit traffic or gross export volumes.

3 – Four Frictions Holding Pakistan Back

Recent official evidence sharpens rather than changes the diagnosis. Pakistan's exporters face four mutually reinforcing barriers: high and complex border taxation, costly and unpredictable compliance, weak trade logistics, and political or policy uncertainty. Together they raise the cost of imported inputs, interrupt time-sensitive production and discourage firms from forming repeated regional supplier relationships.

3.1 – Tariffs and Para-Tariffs

Pakistan's tariff regime has historically taxed production inputs as well as final goods. The National Tariff Policy 2025–30 reports a 10.3 percent simple-average MFN applied tariff, together with average additional customs duties of 3.65 percent and regulatory duties of 4.57 percent. The World Bank reports that para-tariffs pushed average import protection close to 20 percent and that 30.9 percent of exporters identify tax rates as their largest obstacle. The productivity cost is measurable: a 1 percent increase in upstream protection is associated with a 0.6 percent decline in downstream productivity. For regional value chains, such protection makes fibres, chemicals, machinery and components more expensive and reinforces the incentive to sell into the protected domestic market rather than export¹⁰¹.

3.2 – Non-Tariff Barriers

Non-tariff barriers are often procedural rather than openly prohibitive. Sanitary and phytosanitary requirements, technical regulations, pre-shipment inspection, non-automatic licensing and price controls can all delay inputs even when formal tariffs are low. The World Bank estimates that documentary and border compliance requires about 127 hours and US\$468 in South Asia, compared with 96 hours and US\$384 in South-east Asia. Pakistan-specific firm evidence points in the same direction: 17.9 percent of exporters identify customs and trade regulations as their largest obstacle. These costs fall particularly heavily on smaller firms and on production stages that depend on rapid, repeated cross-border deliveries.¹⁰²

3.3 – Connectivity and Logistics Costs

Physical corridors do not create value chains unless shipments are predictable, traceable and competitively priced. The World Bank's (2025) Pakistan Development Update states that customs-management and logistics costs remain high and identifies inefficient trade facilitation, unreliable energy and insufficient digital infrastructure as constraints on export competitiveness.

101. Ministry of Commerce, Government of Pakistan (2025). National Tariff Policy 2025–30. The policy reports a 10.3 percent simple-average MFN applied tariff, average additional customs duties of 3.65 percent and average regulatory duties of 4.57 percent. World Bank (2025), Pakistan Development Update: Staying the Course for Growth and Jobs, reports that para-tariffs pushed average protection close to 20 percent, that 30.9 percent of exporters identify tax rates as their largest obstacle, and that a 1 percent increase in upstream protection is associated with a 0.6 percent decline in downstream productivity.

102. World Bank (2022). Deepening Linkages between South Asia and Southeast Asia. The report identifies sanitary and phytosanitary measures, technical regulations, pre-shipment inspection, non-automatic licensing and price controls as barriers, and estimates documentary and border compliance at 127 hours and US\$468 in South Asia versus 96 hours and US\$384 in South-east Asia. World Bank (2025), Pakistan Development Update: Staying the Course for Growth and Jobs, reports that 17.9 percent of Pakistani exporters identify customs and trade regulations as their largest obstacle.

The OECD data illustrate the scale of the established sourcing pattern: Pakistan imported US\$21.67 billion from Eastern and South-eastern Asia in 2022 but exported only US\$5.53 billion there. This imbalance does not prove that logistics alone caused the pattern, but it shows the depth of Pakistan's dependence on distant, established supply networks. Regional suppliers will compete only if border clearance, inland transport, energy and information systems become equally reliable.¹⁰³

3.4 – The Trust Deficit and Policy Uncertainty

Value chains depend on repeated contracts and confidence that borders, transit routes and trade rules will remain open. The World Bank's Glass Half Full report estimates that South Asian trade is only about one-third of its potential and identifies discriminatory policies and a persistent trust deficit as central causes. In Pakistan, 12.4 percent of exporters identify political instability as their largest obstacle. Sudden border restrictions, route closures and policy reversals raise the expected cost of nearby sourcing, so firms may prefer more distant but predictable partners even when geographic distance is shorter. Functional agreements on transit, payments, standards and dispute resolution can reduce this commercial risk without waiting for every political dispute to be resolved¹⁰⁴.

103. World Bank (2025). Pakistan Development Update: Staying the Course for Growth and Jobs. The report states that customs-management and logistics costs are high and identifies inefficient trade facilitation and logistics, unreliable energy supply and insufficient digital infrastructure as constraints on export competitiveness and GVC integration. OECD TiVA 2025 data show that Pakistan imported US\$21.67 billion from Eastern and South-eastern Asia and exported US\$5.53 billion there in 2022.

104. World Bank (2018). A Glass Half Full: The Promise of Regional Trade in South Asia; the report estimates that actual intraregional trade is about one-third of its potential and identifies discriminatory policies and the trust deficit as central barriers. World Bank (2025), Pakistan Development Update: Staying the Course for Growth and Jobs, reports that 12.4 percent of Pakistani exporters identify political instability as their largest obstacle.

105. PIDE Discourse (2025). "CPEC Extensions: How Pakistan Can Get More from Bilateral Transit Agreements?" and "A Decade of CPEC – Lessons, Challenges, and the Road Ahead," Pakistan Institute of Development Economics.

106. World Bank (2019). "The Textile-Clothing Value Chain in India and Bangladesh." South Asia Regional Integration Program publications.

107. PIDE Discourse (2025), op. cit. "CPEC Extensions: How Pakistan Can Get More from Bilateral Transit Agreements?"

OPPORTUNITIES TO BUILD REGIONAL VALUE CHAINS

CPEC and Gwadar: CPEC and Gwadar Port remain Pakistan's strongest connectivity asset. The focus is now shifting toward "CPEC 2.0." This means special economic zones, industrial relocation, and agricultural cooperation, not just roads and power plants. This is the right shift. But one question remains: will these zones supply parts to Chinese and regional manufacturers? Or will they simply repeat Pakistan's old pattern of low-value assembly for export?¹⁰⁵

Textiles: Textiles are Pakistan's most naturally regional sector. Studies show that cotton, yarn, fabric, and garments already move across South Asian borders in practice, even where formal trade policy has not caught up.¹⁰⁶ Pakistan has a strong cotton and yarn base. This gives it a real chance to supply a regional textile chain that today trades far below its potential.

Agriculture and Agro-Processing: Agriculture and agro-processing offer a second opening, especially toward Central Asia and the Gulf. Pakistan can supply more than raw commodities. It can supply processed and packaged agri-goods, if it builds better cold-chain and quality-standard infrastructure. This also fits well with the industrial-competitiveness and energy themes running through this issue.

Overland Transit Trade: Overland transit trade is a third lever, and it remains underused. India is already building the International North-South Transport Corridor. This route links Central Asia, Iran, and Russia to global markets without passing through Pakistan. To stay competitive, Pakistan needs to modernise its own transit trade deals with Afghanistan and the Central Asian Republics. Otherwise, Gwadar and Pakistan's northern land routes risk being bypassed altogether.¹⁰⁷

A REFORM AGENDA BEYOND FLAGSHIP PROJECTS

Turning assets into real value chains needs more than one big project. Five reforms matter most.

Fix SAFTA's sensitive lists and cut para-tariffs on intermediate goods. Push for cumulative rules of origin, so inputs from several regional partners can count toward preferential treatment. This one change would do the most to make regional sourcing competitive.

Invest in trade facilitation, not just ports and highways. Strengthen single-window customs clearance. Recognise product standards and testing across borders. Build dedicated freight corridors linking industrial clusters to land borders.

Make special economic zone according to policy demands. Plan zones and research must be conducted around real, documented gaps in Chinese and regional supply chains. Tie incentives to local value addition, not to export volume alone. Modernise transit trade deals with Afghanistan. Build stand-alone trade and transit arrangements with the Central Asian Republics that do not depend on progress in India-Pakistan relations.

Build those institutions and data systems, which are needed in reform agenda. Set up a standing regional value chain unit inside the Ministry of Commerce. Use real value-added trade data, not just gross export figures.



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WHY PAKISTAN NEEDS A REGIONAL ENERGY DIPLOMACY

Maria Mansab

A country's foreign policy is shaped by its domestic politics. The 35th President of the United States, John F. Kennedy, once said, "Domestic policy can only defeat us; foreign policy can kill us." This claim emphasizes the importance of a nation's foreign policy in the context of international relations.

The global energy landscape is changing. Geopolitical conflicts, tensions in the Middle East, disruptions at key chokepoints, and growing fragmentation of worldwide supply chains have shifted how energy security is understood. These changes are especially crucial for Pakistan. The country faces major challenges, such as heavy reliance on imported oil and natural gas, ongoing electricity shortages, rising fuel prices, circular debt, and inadequate transmission infrastructure. Pakistan is a net importer of crude oil; crude oil imports increased by 13.53% to 9.387 million tons in FY25, compared to 8.268 million tons in the same period last year¹⁰⁸.

Similarly, in the gas sector, Pakistan is also experiencing a crisis; the total gas deficit in Pakistan ranges between 7000 and 8000 mmcd. The usual demand is from 6700 to 7000 mmcd, but during winter, it spikes to 8000 mmcd. Saudi Arabia and the United Arab Emirates make up most of Pakistan's oil and gas imports, which are quite costly. LNG imports place a substantial burden on Pakistan's economy and energy sector. According to IEEFA, increased LNG imports in Pakistan could raise the country's LNG import costs from \$5 billion in FY2021 to more than \$32 billion in FY2030.¹⁰⁹

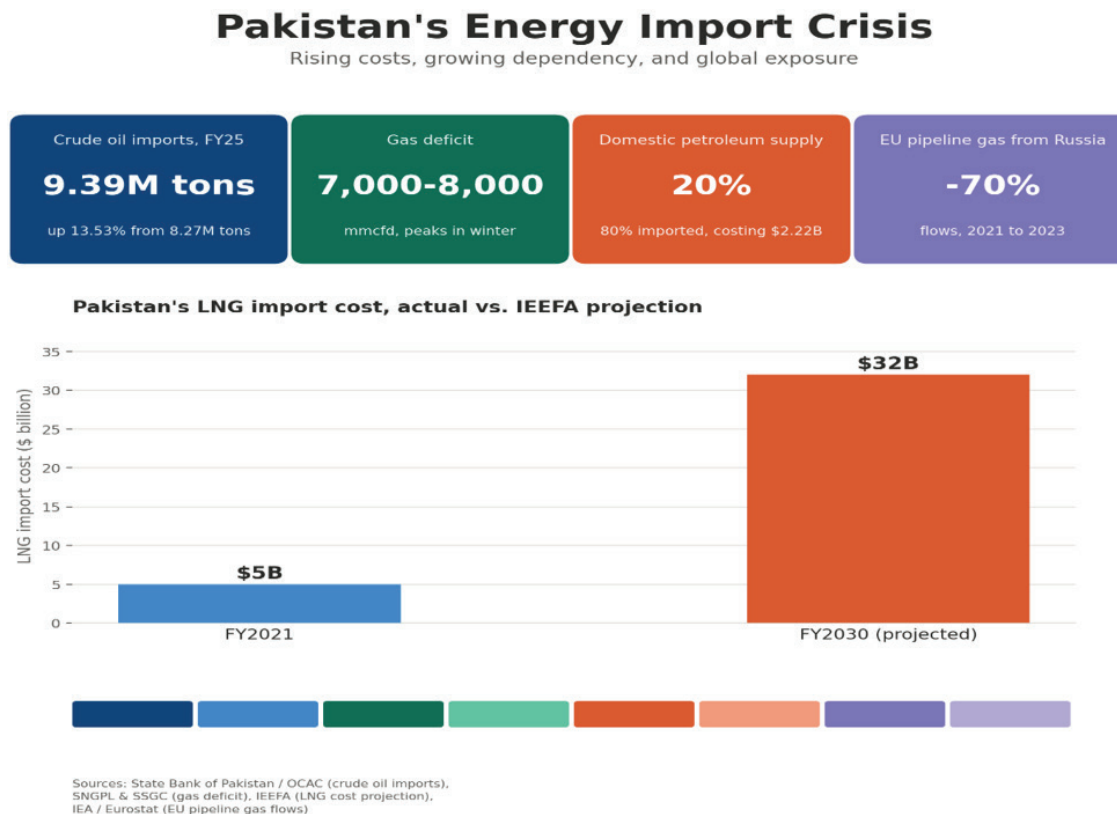
108. Barter Trade, Border Markets and Energy Cooperation," Dawn, 2025, <https://www.dawn.com/news/1920876>

109. Institute for Energy Economics and Financial Analysis (IEEFA), "Pakistan Energy Report Fact Sheet," June 2022, https://ieefa.org/sites/default/files/2022-06/FINAL%20fact%20sheet_IEEFA%20pakistan%20report%20fact%20sheet_A4.pdf

Pakistan's dependence on imported petroleum is also concerning. Only 20% of the country's petroleum needs are met domestically; the remaining 80% must be imported, costing \$2.22 billion in crude oil and processed products.¹¹⁰ This dependency makes Pakistan highly vulnerable to fluctuations in international oil prices and possible disruptions to global shipping. Recent geopolitical

events clearly illustrate these vulnerabilities. The war in Ukraine significantly affected global energy markets due to decreased Russian energy exports to Europe, with Russian pipeline gas flows to the EU dropping over 70% between 2021 and 2023, which caused a sharp increase in worldwide LNG prices.¹¹¹

Figure I: Pakistan Energy Crisis



Source: SBP & EU

Wars in the Middle East have created numerous uncertainties over sea lanes between oil producers in the Gulf and Asian consumers. Meanwhile, attacks on commercial shipping have increased the costs and transit times of energy shipments, leading to a 256% rise in freight rates on Asia–Europe routes in late 2023–2024, and average transit times have grown by 10–14 days due to rerouting via the Cape of Good Hope.¹¹² Pakistan is far from these conflict zones, but its economy is directly affected because its energy security depends on the safe shipping of oil and LNG through the Arabian Sea and the Gulf, which carry over 80% of its oil imports.¹¹³

110 Salman Raza, Dr. Khalid Mustafa, and Suleman Akram, Petroleum Sector of Pakistan and Its Trade Dynamics (Karachi: Trade Development Authority of Pakistan, December 2021), page number, <https://tdap.gov.pk/wp-content/uploads/2022/03/13-Petroleum-Sector-of-Pakistan-and-its-Trade-Dynamics-1.pdf>

111 International Energy Agency (IEA), Gas Market Lessons from the 2022–2023 Energy Crisis (Paris: IEA, 2025), "Anatomy of a Natural Gas Crisis," <https://www.iea.org/reports/gas-market-lessons-from-the-2022-2023-energy-crisis>

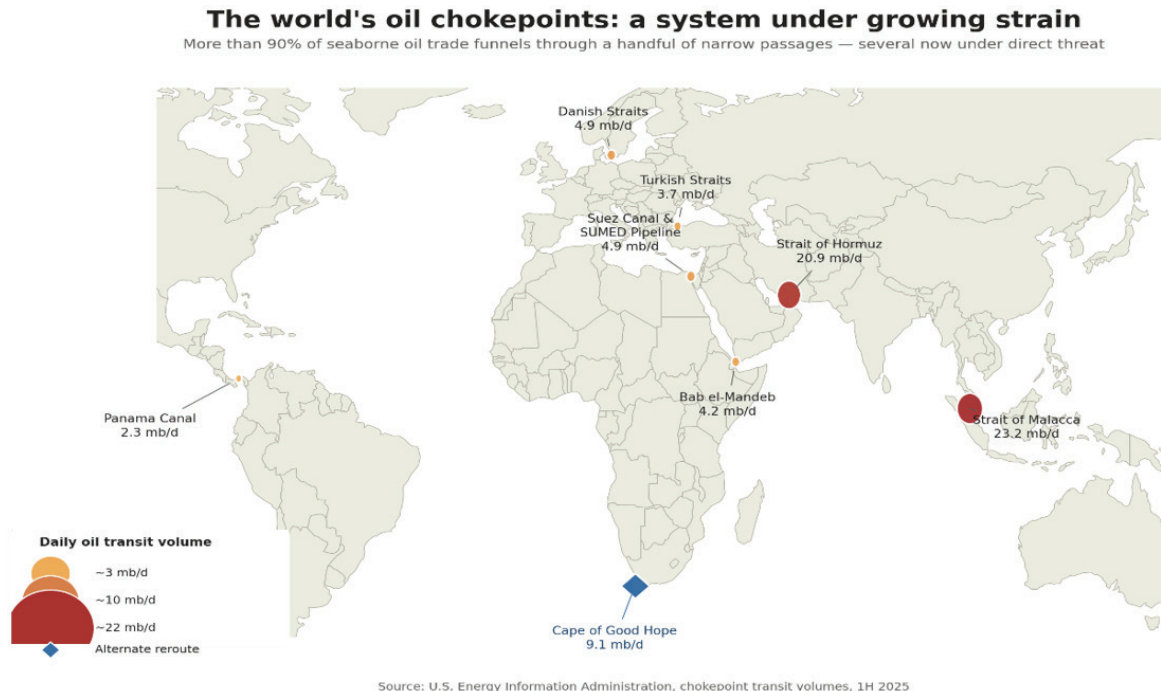
112 United Nations Conference on Trade and Development (UNCTAD), Navigating Troubled Waters: Impact on Global Trade of Disruptions of Shipping Routes in the Red Sea, Black Sea and Panama Canal (Geneva: United Nations, 2024), <https://unctad.org/publication/navigating-troubled-waters-impact-global-trade-disruption-shipping-routes-red-sea-black>

113 Salman Raza, Dr. Khalid Mustafa, and Suleman Akram, Petroleum Sector of Pakistan and Its Trade Dynamics (Karachi: Trade Development Authority of Pakistan, December 2021), page number, <https://tdap.gov.pk/wp-content/uploads/2022/03/13-Petroleum-Sector-of-Pakistan-and-its-Trade-Dynamics-1.pdf>

Perhaps the greatest vulnerability is the Strait of Hormuz. It lies between Iran and the Arabian Peninsula and is one of the world's most vital energy chokepoints, where about 20–21 million barrels of oil flow daily. This accounts for roughly 20% of all petroleum consumption and nearly one-third of all seaborne oil trade. It's also crucial

for LNG shipments, with approximately 25% of global LNG exports passing through this area, mainly Qatar.¹¹⁴ Any disruption of this narrow passage, whether caused by military conflict, sanctions, or political escalation, would lead to global price shocks and severely impact supply chains in Pakistan and other economies that rely heavily on oil imports.

Figure 2: World's Chokepoints



Source: EIA

In this context, Pakistan's energy policy needs to shift from crisis management to resilience building. One of the most effective ways to do this is through regional energy diplomacy. Pakistan's strategic position in South Asia, Central Asia, China, and the Middle East offers great potential to become a regional energy and connectivity hub. Iran is Pakistan's most important neighboring country.

Iran possesses vast oil and natural gas reserves and has a high capacity for electricity production. Regional political dynamics and international sanctions do not hinder Iran's potential as a long-term energy partner for Pakistan, given its geographic proximity and existing cross-border infrastructure.

114 U.S. Energy Information Administration, "The Strait of Hormuz Is the World's Most Important Oil Transit Chokepoint," *Today in Energy*, November 21, 2023, <https://www.eia.gov/todayinenergy/detail.php?id=61002>

Table I: Primary Energy Data in Quadrillion

Pakistan	Iran
Energy Production: 1.927	Energy Production: 16.704
Energy Consumption: 3.35	Energy Consumption: 12.05

Source: EIA

Although Iran has a more diverse economy than many other Middle Eastern countries, the sale of oil and other liquids remains its main source of revenue. Pakistan can meet its energy needs by

increasing its imports from Iran. Iran produces more oil than it exports to Pakistan, but neither country can expand its trade due to ongoing regional and global constraints.

Table 2: Pak-Iran Oil Profile

Indicators	Iran	Pakistan
Proven Crude Oil Reserves	208,600 Mn/Br	83.0 Thousand B/D
Iran Crude Oil Production	2,392 ('000 B/D)	0.179
Oil Consumption	1,512 Thousand B/D	0.989 Thousand B/D
Total Oil Export	2,168 Thousand B/D	-
Total Oil Import	-	\$17.03 Bn
Oil Export to Pakistan	497.26 M\$	-

Designed by Researcher

The two countries can cooperate in the energy sector, and trade can be enhanced by the reopening of the gas pipeline between Iran and Pakistan. Through this, Pakistan can satisfy its 25% of energy needs. The project is expected to cost \$7.50 bn in total, at a cost of roughly \$1.25 billion for Pakistan. The project would provide 750 mcft each day via its 1700 km length, and estimated that at least 5000 MW of power can be produced from Iranian gas.

This pipeline can additionally incorporate the wider China-Pakistan Economic Corridor¹¹⁵.

However, the project's future highlights the economic and geopolitical challenges ahead. To revive the pipeline, Pakistan recently requested a new 10-year extension until 2035 and has been working to avoid an \$18 billion international arbitration fine due to contractual obligations and the impact of U.S. sanctions against Iran.¹¹⁶



115 Kazem Sarabi, "Iran Begins Talks to Export Gas to Pakistan," Caspian News, May 29, 2022, <https://caspiannews.com/news-detail/iran-begins-talks-to-export-gas-to-pakistan-2022-5-29-45/>.

116 Business Desk, "Pakistan Wants Iran Gas Pipeline Project Delayed by 10 Years," ProPakistani, January 23, 2026, <https://propakistani.pk/2026/01/23/pakistan-wants-iran-gas-pipeline-project-delayed-by-10-years/>

Table 3: Pak-Iran Gas Profile

Indicators	Iran	Pakistan
Total Gas Reserves	33.98 tcf	20.91 Tcf
Total Gas Production	257,119 Mm ³	1.165 MMcf
Total Gas Consumption	23.329 bcf	1.482 MMcf
Total Gas Export	18,425 million m ³	-
Total Gas Import of Pakistan	-	\$4,566.2 Mn
Iran's Gas Export to Pakistan	156 M\$	-

Source: Designed by Researcher

Pakistan's energy shortage has forced it to depend on electricity imports from Iran to power parts of Balochistan province. Gwadar receives 14 MW of the 70 MW delivered via a 400 km transmission line from Pishin in Sistan-Baluchistan, Iran, which

borders Mand in Pakistan's Balochistan province. Pakistan has agreed to Iran's offer to supply 3,000 megawatts of electricity. Iran states that it has an official capacity of 85,000 MW for power generation. Currently, Iran exports \$34.8 million worth of power to Pakistan¹¹⁷.

Table 4: Pak-Iran Electricity Profile

Indicators	Iran	Pakistan
Total Electricity Generation	343,108 GWh	46,605 MW
Consumption	236.30 bn kWh	80,111 GW
Electricity Imports	-	0.49 bn kWh
Total Export	36.6 M\$	-
Electricity Shortfall in Peak Periods	-	8000 MW
Iran Electricity Export to Pakistan	34.8 M\$	-

Source: Authors' compilation.

The Pakistani government has agreed to import the necessary coal from Iran. Pakistan is rich in coal

resources. However, it lacks the resources, expensive equipment, and coal-refining infrastructure needed to fully harness this potential.

Table 5: Pak-Iran Coal Profile

Indicators	Iran	Pakistan
Coal Reserves	1,326 million short tons	3,377 million short tons
Coal Production	1,810 thousand short tons	9,306 thousand short tons
Consumption	1,585 thousand short tons	29,254 thousand short tons
Total Coal Export	161 thousand short tons	-
Total Coal Imports	-	21,611 thousand short tons
Export To Pakistan	0.5 million metric tons	-

Source: Authors' compilation.

117 Ayaz Ahmed, "Scholar: Pakistan Relying on Iran to Provide Energy," Islamic Republic News Agency (IRNA), April 28, 2019, <https://en.irna.ir/news/83294542/Scholar-Pakistan-relying-on-Iran-to-provide-energy>.

The Iran-Pakistan (IPL) gas pipeline is the main focus of bilateral energy cooperation, but Pakistan's energy policy for the region should not rely solely on this one project. Instead, it should aim for a diverse strategy that includes pipeline links, cross-border electricity trade, innovative payment methods, and regional energy transportation corridors to protect the energy sector from potential geopolitical shocks in the future.

The best course for Pakistan is to strengthen and grow bilateral relations with Iran while monitoring global and regional political, economic, and other relevant factors. Here are some suggestions that, if implemented, could help Pakistan build positive relationships with Iran.

One practical measurement under development is barter trade. Iran and Pakistan have signed their first barter trade agreement to exchange Pakistani grains for Iranian LPG.¹¹⁸ Pakistani law exempts Iranian vehicles transporting Pakistani cargo within Pakistan from taxes. Iran charges Pakistani trucks US\$1 per three kilometers for the fuel price discrepancy. Trade using both barter and national currencies would enable the two states to fulfil their economic potential¹¹⁹.

Border markets are another underutilized instrument of regional diplomacy. Pakistan and Iran agreed to collaborate on border market construction and truck mobility under the TIR Convention.¹²⁰ Both countries established their first border market on May 18, 2023. Creating

combined border markets would boost economic activity on both sides and create jobs for locals. In the border towns of Pakistan and Iran, food would be easily accessible with the creation of these markets. The Sistan-Baluchestan province's border markets with Pakistan are currently open in Saravan-Jaleq, Saravan-Kuhak, Sarbaz-Pishin, and Chabahar-Rimdan, while the Mirjaveh market has merged with Mirjaveh customs.¹²¹

Similarly, expanding CPEC to Iran could make an "energy nexus" between Pakistan, China, and Iran almost inevitable. The 2,775-km Iran-Pakistan gas pipeline (IP) transports natural gas from Iran to Pakistan. The project has been delayed by local, regional, and global geopolitical issues. Despite these challenges, China and Russia have repeatedly offered to assist Pakistan in building the pipeline. China's influence in the SCO will help Pakistan connect energy corridors, while Iran's new accession will provide another opportunity for economic cooperation among the three countries.¹²²

Moreover, Pakistan can capitalize on the China-Pakistan-Iran-Turkey Energy Corridor (CPIT) through regional diplomacy.¹²³ The CPIT strategic energy corridor can diversify energy supply, boost economic growth, and facilitate industrial restructuring.

118 "Iran, Pakistan look to new era in trade with barter deal," Press TV, 8 November, 2021.

<https://theiranproject.com/blog/2021/11/08/iran-pakistan-look-to-new-era-in-trade-with-barter-deal/>

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120 "Pakistan to establish four joint border markets with Iran," IRNA, 30 November, 2019.

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122 Fatima Raza, "Prospects for Pakistan-China-Iran Trilateral Cooperation: Opportunities and Challenges," *Strategic Studies* Vol.39, No.3 (Autumn 2019): 37-52.

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123 Fei-fei Guo, Cheng-feng Huang, Xiao-ling Wu, "Strategic analysis on the construction of new energy corridor China-Pakistan-Iran-Turkey," *Energy Reports* Vol. 5 (2019): 828-841.

<https://www.sciencedirect.com/science/article/pii/S2352484719300034>

Figure 3: China-Pakistan-Iran-Turkey Energy Corridor (CPIT)



Source: F.-f. Guo, C.-f. Huang and X.-l. Wu / Energy Reports 5 (2019) 828–841

The most noteworthy characteristic of Gwadar and Chabahar ports is their geostrategic significance. Both ports are positioned at the intersection of major energy trade routes, through which 70% of all oil shipments worldwide travel. If geopolitics and geo-economics are kept separate, both ports may catalyze regional growth. China has started implementing its BRI strategy, of which the CPEC is the centerpiece project and Gwadar the keystone¹²⁴.

After re-imposing sanctions on Tehran, the U.S. government has allowed eight countries, including close allies South Korea and Japan, as well as India, Turkey, China, Italy, Greece, and Taiwan, to continue purchasing Iranian oil. Therefore, since all

eight countries received waivers from the U.S. to stabilize their economies, Pakistan must use waivers to buy inexpensive oil from Iran and Russia.

Political commitment, institutional coordination, and regional, sustained engagement will be necessary to shift from energy vulnerability to energy resilience. Pakistan has the geographic location, regional connections, and economic incentives needed to become a key player in the region's energy cooperation. The challenge is no longer about recognizing the opportunity; it's about developing a strategic vision to transform those opportunities into sustainable economic resilience.

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124 "Pakistan Considering to Link Gwadar with Chabahar: Sartaj Aziz," Express Tribune, September 25, 2017. <https://tribune.com.pk/story/1111323/pakistan-considering-link-gwadar-chabahar-sartaj-aziz>



CLEAN ENERGY INVESTMENTS AND FINANCING:

Why Pakistan's Initiatives Do Not Become an Investment Pipeline

Ahmad Fraz

There are numerous clean energy policies and statements in Pakistan. They include renewables targets, concessional lending facilities, Islamic financing, aid mechanisms, Green Sukuk, and Green Taxonomy. Negotiations are ongoing on further grid investments. However, when a serious investor asks what projects will get financial close in the coming year, it becomes quite difficult to give an honest response. The main challenge is the lack of reliable process from policy implementation to financial close.

Clean energy is often presented as a climate concern. For Pakistan, that is too narrow. It is also an energy security, fiscal, and industrial competitiveness issue. During July to March FY2026, Pakistan imported 13.88 million metric

tonnes of petroleum products worth US\$8.9 billion, while transport consumed 82.5 percent of domestic petroleum products. A credible transition must connect clean electricity with storage, efficient industry, public transport, and electric mobility. Financing generation alone will not reduce exposure to imported fuel.

The central problem is not a shortage of sunlight, technology, or investor interest. It is the absence of a financing system that converts clean energy opportunities into bankable, grid ready, locally financed assets.

THE GLOBAL FINANCING RACE HAS A CAPITAL DIVIDE

The International Energy Agency expects global energy investment to reach US\$3.4 trillion in 2026, including US\$2.2 trillion for clean technologies. Emerging and developing economies outside China receive less than 15 percent of clean energy investment, although they account for 65 percent of the world's population. Their cost of capital for utility scale solar can be more than twice the level in advanced economies. This gap is no longer mainly about technology. IRENA reports that more than 90 percent of renewable capacity added in 2025 generated electricity more cheaply than the lowest cost new fossil alternative. The real contest is over contracts, currency risk, regulation, and institutional credibility.

PAKISTAN HAS ATTRACTED CAPITAL BEFORE

The total installed capacity stood at 49,651 MW by March 2026 in Pakistan. Renewable energy comprised 10,101 MW including 7,319 MW from net metering, but still only 4.5 percent of generation was from renewables. The Pakistan Economic Survey 2025–26 reveals that “PPIB managed to bring in 102 IPPs to be commissioned with a total capacity of 25,874 MW and an investment of more than US\$35 billion.” Out of these, 90 were in operation having a capacity of 20,769 MW and an investment of US\$28.7 billion. This model is a very expensive one and must not be repeated. Nonetheless, it proves that capital works when there are clearances, bankable deals, and a supportive state.

INITIATIVES THAT DID NOT BECOME A MARKET

The State Bank of Pakistan introduced the renewable energy financing scheme back in 2009; however, it was later updated in 2016 due to the low level of use. Under the new scheme, there was financing for projects, individual systems, and

accredited dealers, with loan terms stretching to 12 years. By 2019, the interest rate for consumers had been set at 6 percent, along with the Islamic Financing Facility.

The design lowered borrowing costs, but was inadequate to solve issues of land tenure, grid connection, improve a weak buyer, or stabilize an uncertain stream of revenues. Banks continued to evaluate the sponsor, equipment, permits, tariff, and repayment capacity. Where there were any uncertainties in the above components, low-cost refinancing did not result in a loan being made. The lesson here is simple: a lower interest rate will not make a project bankable.

Competitive bidding and increased use of variable renewable energy sources were envisioned by the Alternative and Renewable Energy Policy of 2019. Despite these goals, however, little has been accomplished in this respect. There are problems with the procurement process due to a lack of a realistic timeline, there are delays in increasing transmission capacity, and existing contracts limit the capacity to add new capacity. Although the issuance of the first sovereign green sukuk bond, the Pakistan Green Taxonomy, and the sustainable financing framework are good starting points, they all share one evaluation problem. According to the May 2026 report of the Finance Division, out of the total PKR 32 billion Sukuk bonds, only PKR 11.256 billion, about 35 percent, have been utilized, while the remaining PKR 20.744 billion has remained unallocated.

WHAT THE RECORD SAYS

The Sindh Solar Energy Project is an example of a concept that was well-received but failed during its execution. This project was approved in 2018, with the World Bank committing \$100 million towards it. It was meant to facilitate solar parks, public sector buildings, and 200,000 households. The completion report in 2026 showed the project's results as somewhat unsatisfactory and monitored and evaluated as moderate. Problems related to procurement delays, delayed release of funds, coronavirus pandemic, flooding, and lack of metrics of mobilizing private investment made the project design ineffective. Despite producing

valuable goods, public delivery substituted some market-building goals of the project.

The US\$325 million Access to Clean Energy Investment Program (ACEI) of the Asian Development Bank showed relatively good performance. It assisted in setting up solar systems on the roofs of 10,700 schools in Punjab and 2,000 schools in Khyber Pakhtunkhwa, reaching over 1.4 million children. Yet, one of the loans expected to be concluded in December 2021 was finally signed on 13 May 2025. The program proves that publicly owned clean energy infrastructure could be installed, but shows problems in terms of procurement speed and institutional capacity. Thus, further development of the school solar energy would require another publicly run project or development loan.

Grid Stability Enhancement Project that was recently approved through the BEST PAK program of the World Bank is an attempt at addressing one of the most important barriers within the energy system. The project that is estimated to cost US\$375.9 million hopes to improve transmission, accommodate 640 MW of curtailed wind power, and facilitate 491 MW of planned private renewable capacity. As promising as the project may look in terms of providing funds for necessary transmission infrastructure, its real success will rely on the pace of procurement process, reforming of transmission sector, and resulting private investment.

WHY PROJECTS STALL

The pattern is clear. Policies state the objectives without setting the transaction calendar that accompanies them. The credit initiatives lower the interest rate before the project is ready. Aid programs fund the assets without creating a replicable financing mechanism within the country. The green policy sets out the acceptable actions without having verifiable projects. There is diffusion of responsibility between different ministries, provinces, regulatory authorities, grids, distributors, and the financiers. Nobody is responsible for taking the project from idea to financial closure. Currency and maturity problems compound the problem. The equipment is priced

in dollars, the income in rupees, and the banks finance the assets through short-term deposits.

LESSONS FROM MARKETS THAT DELIVERED

Affordable finance is usually built before bids are invited. In India's Rewa Solar Park, the factors of land preparation, access to transmission, standard contracts, competitive bidding, payment assurance, and rupee financing were all included in the development. South Africa, on the other hand, used a procurement function, standard documentation, and bid rounds. In both countries, government assistance focused on risks that the investors could not control. Pakistan needs the same amount of discipline. Project preparation, common infrastructure, and proper risk support need to be financed by the public.

A FINANCING ARCHITECTURE BUILT AROUND DELIVERY

It is essential for Pakistan to release Clean Energy Investment Prospectus at an interval of every six months. The document will be prepared by the Ministry of Finance, the Power Division, and the Private Power and Infrastructure Board (PPIB), and it must only include those projects which have been proven to meet the criteria of land, permits, demand, grid, safeguards, procurement, and financing. An enduring support facility will fund the feasibility studies, financial modeling, safeguarding process, and transaction advisors. Every project should have a public data room along with the pathway to financial closing.

Different types of assets have different requirements for financing mechanisms. Utility-scale solar and wind power plants need auctions and project financing facilities. Investments in transmission and storage systems need revenue-based financing mechanisms and infrastructure sukuk. The use of energy service contracts and sustainability loans will enable efficiency improvements within industry. Solar irrigation, electric fleet vehicles, and smaller capital equipment need such financial products as leasing,

vendor financing, microfinance, and portfolio guarantee schemes. The Islamic banking institutions will make use of ijara and diminishing Musharakah models to finance equipment. Clean finance must be the driving force behind the adoption of efficient boiler technology, waste heat recovery systems, energy auditing, and reliable renewable supply chains in export oriented industries.

Risk reduction must be at the center of this framework. The concept of competitive bidding must be made a norm for utility-scale projects. Escrow accounts, partial risk mitigation, and stringent contract enforcement will certainly cut costs but not make up for the need for reforms within the distribution companies themselves. The weakness of the buyer makes any project risky right from the start. Public acceptance must also be made through competitive bids. The eligible projects can make bids for the least possible security, currency hedging, and first loss cover to get financed.

This program by the State Bank could be revived through Renewable Energy Finance 2.0 which will include refinancing in rupees for renewable energy, energy storage systems, energy-efficient machinery, solar water pumping, and electrical transport. The financial sector needs to continue to show

discipline in credit risks. Longer maturity periods must be linked to proper equipment, standardized contracts, energy audits, and energy savings. Development partners could provide limited portfolio guarantee or currency risk-sharing until performance improves at home.

Issuance of Green Sukuk must be based on an annual schedule for transmission, storage, public transport, and energy efficiency assets. Reports on allocation and impact should state financing charges, time lags, private capital raised, energy efficiencies achieved, and foreign currency risk. Each publicly sponsored project must have a date of review and a closing provision. Programs which continue to fail readiness and disbursement tests should either be revised or ended, but not extended unjustifiably.

Pakistani government has run enough pilot programs to get to the essence of the matter. The next step forward will not come from another paper but when the ready projects enter the market on time, risk assessment is transparent, financing is available in rupees, and results are communicated after money spent. The clean energy becomes a strategy for investment through institutions' funding of its implementation.

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BEYOND OIL PRICE SHOCKS

Building Pakistan's Energy Security & Strategic Resilience

Namra Saleem

ENERGY SECURITY IN AN ERA OF GEOPOLITICAL UNCERTAINTY

Renewed tensions involving the USA, Israel, and Iran have again exposed the fragility of worldwide energy markets. Any escalation around the Strait of Hormuz, via which nearly 1/5th of global oil supply passes (Power, 2026), raises immediate concerns over supply disruptions and price volatility. For a country like Pakistan, this vulnerability is not merely a result of Middle Eastern geopolitics but a symptom of deeper energy-security weaknesses: heavy reliance on imported energy, an ageing refining sector unable to meet domestic fuel demand, inadequate

strategic petroleum reserves, and delays in critical energy reforms.

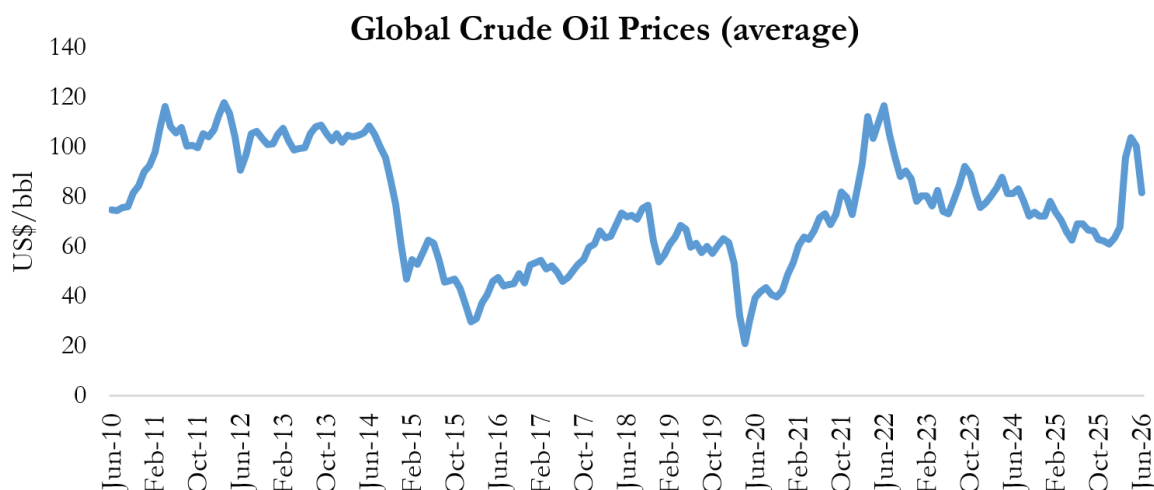
Energy security goes beyond physical availability of fuels and rests on 04 complementary pillars: availability, accessibility, affordability, and resilience. Pakistan faces severe gaps across all pillars, with inadequate local production and refining capacity that sustains import dependence, and reliance on a single maritime route exposes energy supplies to external disruptions.

MIDDLE EAST CONFLICTS & GLOBAL OIL MARKET VOLATILITY

Since 2010, international crude oil prices have experienced repeated cycles of geopolitical shocks, supply disruptions, and changes in global demand. Prices remained elevated at around US\$ 80-110 per barrel during 2010-14 before falling sharply in 2014-16 as US shale production expanded and OPEC maintained output. Prices recovered to about US\$ 70 per barrel by 2018 but fell sharply

during the COVID-19 pandemic, reaching roughly US\$ 23 per barrel in 2020 amid the collapse in global demand. As economies reopened, prices surged above US\$ 120 per barrel in 2022 (World Bank, 2026) following Russia's invasion of Ukraine and tightening global supply conditions. Renewed geopolitical tensions in the Middle East later pushed crude prices close to US\$ 120 per barrel, reaching US\$ 119.5 amid concerns over disruptions via the Strait of Hormuz, before averaging about US\$ 81.7 per barrel in June 2026 (Figure I).

Figure I: Month-wise Global Crude Oil Price Trend



Source: World Bank Commodity Prices

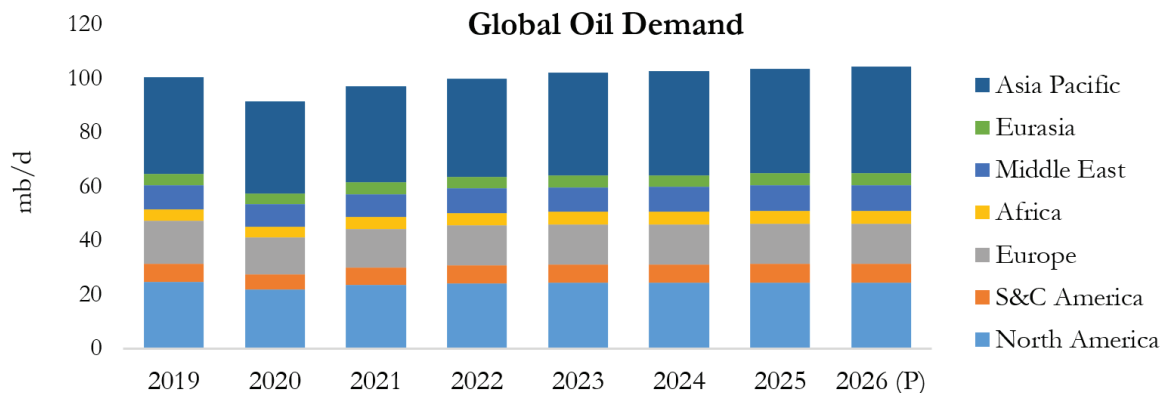
*Crude oil, average spot price of Brent, Dubai and West Texas Intermediate, equally weighted.

*Historical prices are presented in nominal terms; therefore, comparisons across periods can be interpreted with caution as they do not account for inflation.

What has changed is the scale of underlying demand pressing against that supply. Global oil consumption, having fallen from 101 million barrels per day in 2019 to 92 million barrels per day at the height of the pandemic, has since recovered to roughly 105 million barrels per day

(IEA, 2025), driven overwhelmingly by industrial growth across Asia-Pacific alongside steady consumption in North America and Europe (see figure 2). Other regions, including the Middle East and Africa, have seen gradual increases, reflecting rising energy needs in developing economies.

Figure 2: Yearly Global Oil Demand Trend & Projections

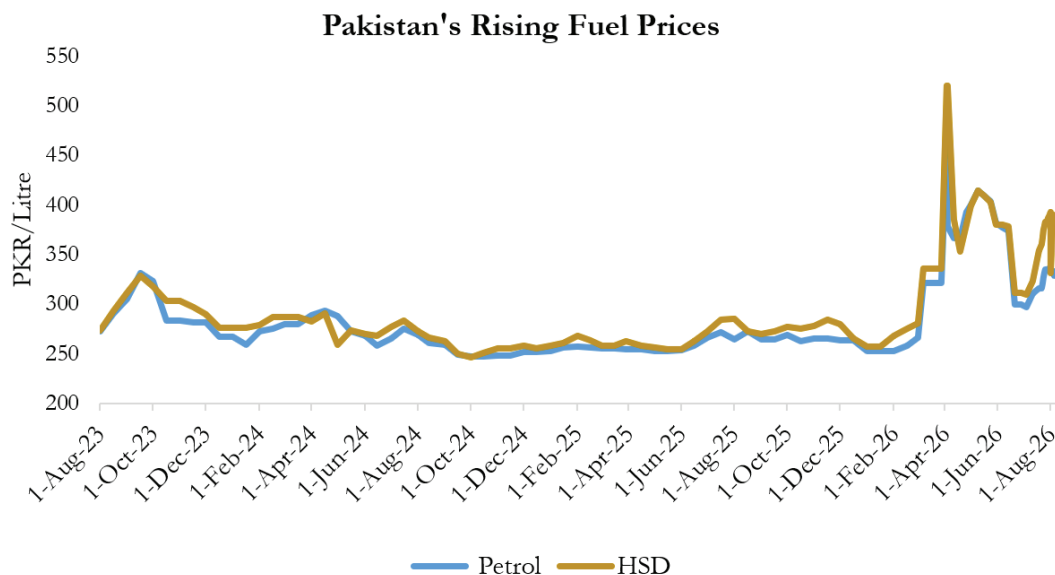


Source: IEA, Oil 2025 Analysis and Forecast to 2030

Pakistan transmits these external shocks into its domestic market almost immediately. As global oil prices rise, the impact is quickly passed through to local fuel prices via government adjustments, as happened when consumer fuel prices were revised upward in Sept-2023, and again through the recent

escalation tied to the US-Israel-Iran conflict. As a result, petrol and diesel prices rose from PKR 272.9 and PKR 273.4 per litre on 1-Aug-2023 to PKR 324.98 and PKR 382.79 per litre by 13-Aug-2026 (Ministry of Energy, 2026), respectively (Figure 3), raising transportation, food and industrial costs across the economy.

Figure 3: Pakistan's Rising Fuel Prices Amid Geopolitical Tensions



Source: Ministry of Energy (Petroleum Division)'s Public Notifications

*The prices reported here are therefore explicitly dated to 13-Aug-26.

PAKISTAN'S STRUCTURAL ENERGY VULNERABILITY

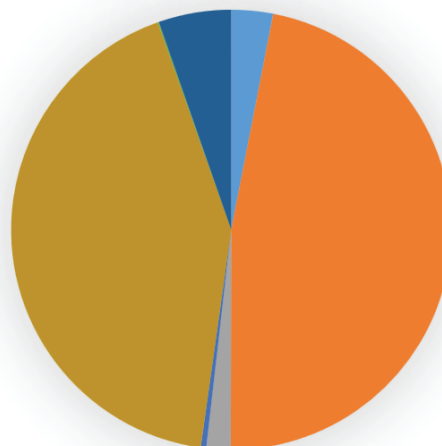
Pakistan's exposure operates via key macroeconomic channels: the current account and foreign exchange, imported inflation, fuel-price adjustments and transport & production costs. The country imported about 8.2 million tonnes of oil equivalent in petroleum products in FY25 alone (HDIP, 2025), on top of constant crude imports

that reached 9.8 million tonnes, a 19.4% increase driven by refineries scrambling to lift capacity utilization and meet transport-led fuel demand. The transport sector, which alone consumed 14.59 million tonnes of petroleum products in FY25 and accounts for 89% (HDIP, 2025) of petroleum-product consumption when petrol (Motor Spirit) and HSD are combined (Figure 4), transmits these cost shocks directly into freight rates, food prices and household budgets.

Figure 4: Pakistan's Petroleum Products Consumption Share by Fuel (FY25)

Pakistan's Petroleum-Products Consumption Share

- Aviation Fuels
- Motor Spirit 87 RON
- HOBC
- Kerosene
- HSD
- LDO
- Furnace Oil

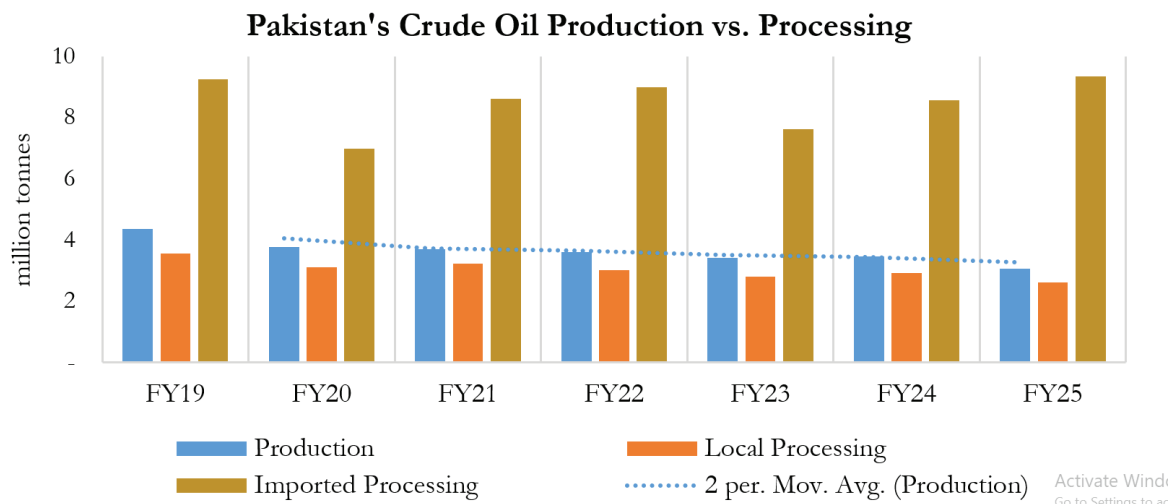


Source: HDIP, Pakistan Energy Yearbook 2024-25

The country's own crude production offers little relief. Domestic output has declined steadily over the past six years, falling to 3 million tonnes of oil equivalent in FY25, with the sharpest contraction

occurring between FY19-20 amid COVID demand collapse and subsequent underinvestment in exploration. Thus, Pakistan's crude throughput remains heavily import-dependent.

Figure 5: Trend Analysis of Pakistan Crude Oil Production vs. Processing

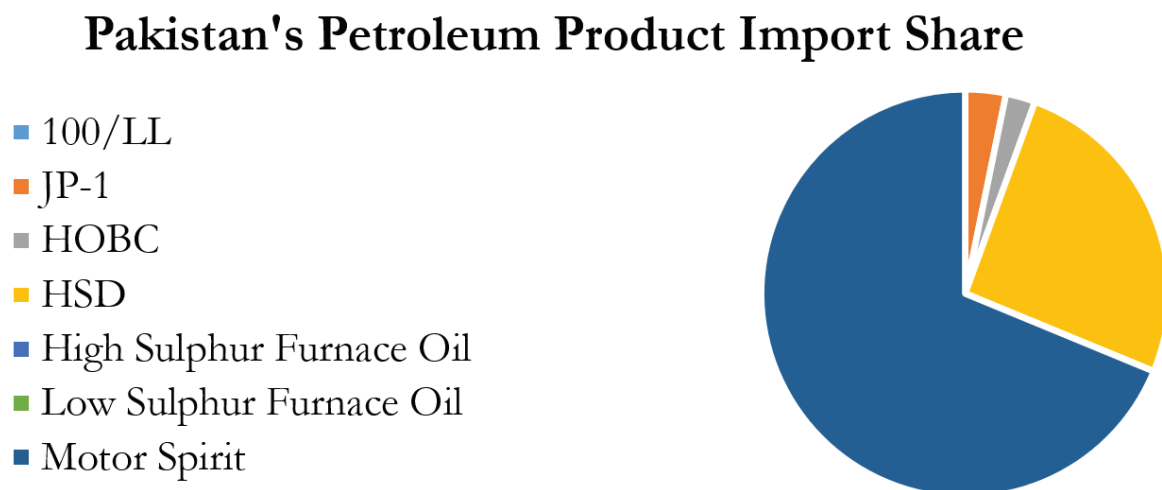


Source: HDIP, Pakistan Energy Yearbook 2024-25

The composition of these imports has also shifted structurally toward transport fuels: motor spirit (petrol) dominates the import basket with a 69% share in FY25 (HDIP, 2025), while furnace oil imports have fallen to near zero as power generation has moved away from oil-fired plants. This is, in

one sense, a positive structural adjustment, but it also means Pakistan's import bill is now concentrated almost entirely in the fuels for which domestic refining capacity is least able to compensate.

Figure 6: Pakistan's Petroleum Products' Import Share by Fuel (FY25)



Source: HDIP, Pakistan Energy Yearbook 2024-25

Import dependency varies substantially across petroleum products. Motor Spirit has the highest IDR at 69%, with imports of 5.35 million tonnes against domestic production of 2.38 million tonnes, indicating a strong reliance on imports. JP-1 has an IDR of 37%, while HSD stands at 29%, reflecting moderate import dependence.

Kerosene and Furnace Oil show 0% IDR because they recorded no imports during the period, although Furnace Oil had significant exports. Overall, the results highlight that transport fuels, particularly motor spirit, remain the most import-dependent segments of Pakistan's petroleum market.

IDR is calculated as:

$$\text{IDR} = (\text{Quantity of Imports}) / (\text{Quantity of Domestic Production} + \text{Quantity of Imports} - \text{Quantity of Exports}) * 100$$

Calculations:

Table I: IDR Calculations – Petroleum Products

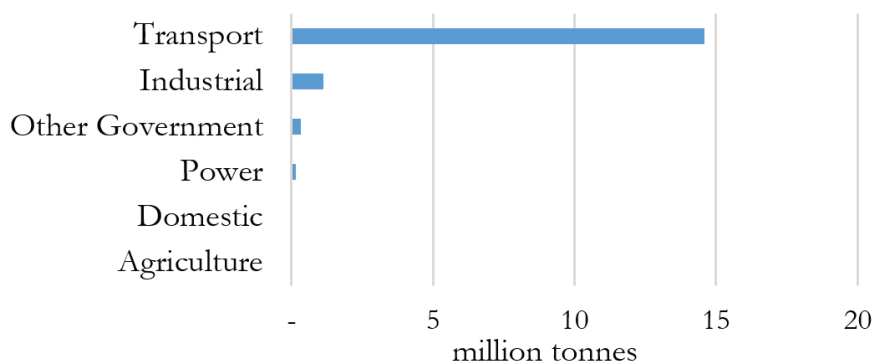
Product	IDR Calculation	IDR
Motor Spirit	$\frac{5,353,022}{2,375,035 + 5,353,022 - 0} * 100$	69%
Kerosene	$\frac{0}{127,763 + 0 - 0} * 100$	0%
HSD	$\frac{1,996,377}{4,947,171 + 1,996,377 - 6,204} * 100$	29%
JP-1	$\frac{250,489}{423,487 + 250,489 - 0} * 100$	37%
Furnace Oil	$\frac{0}{2,496,292 + 0 - 1,473,024} * 100$	0%

Unit: All quantities are in tonnes—data Source: HDIP, Pakistan Energy Yearbook 2024-25 and OCAC.

The values taken for import, production and exports are of FY25.

Figure7: Pakistan's Sectoral Petroleum Consumption by sector (FY25)

Pakistan's Sectoral Petroleum Consumption by Sector (FY25)



Reducing petroleum dependence requires demand-side measures, particularly as transport is the largest consumer of petroleum products. Expanding public transport and accelerating EV adoption can reduce reliance on imported fuels and strengthen resilience to external oil-price shocks. Pakistan should fast-track BRT systems, the Circular Railways, and Pakistan Railways' freight services to shift passengers and freight away from petroleum-intensive road transport. Implementing Karachi's planned BRT projects could potentially save US\$ 0.8-1 billion annually in fuel imports (PRAC, 2026). At the same time, investment in EV charging infrastructure, battery-swapping facilities, and local EV manufacturing can support the gradual electrification of two- and three-wheelers, buses, and other high-use vehicles.

STRATEGIC PETROLEUM RESERVES: THE MISSING PILLAR OF ENERGY SECURITY

Pakistan's greatest energy security gap is the absence of Strategic Petroleum Reserves (SPRs), which buffer economies against external supply disruptions. The IEA requires member countries to maintain oil stocks equivalent to at least 90 days of net imports, providing a global benchmark for emergency stockholding (IEA, 2026). Pakistan, thus, lacks a comparable emergency reserve, leaving short-term supply distortions to quickly affect fuel prices and inflation.

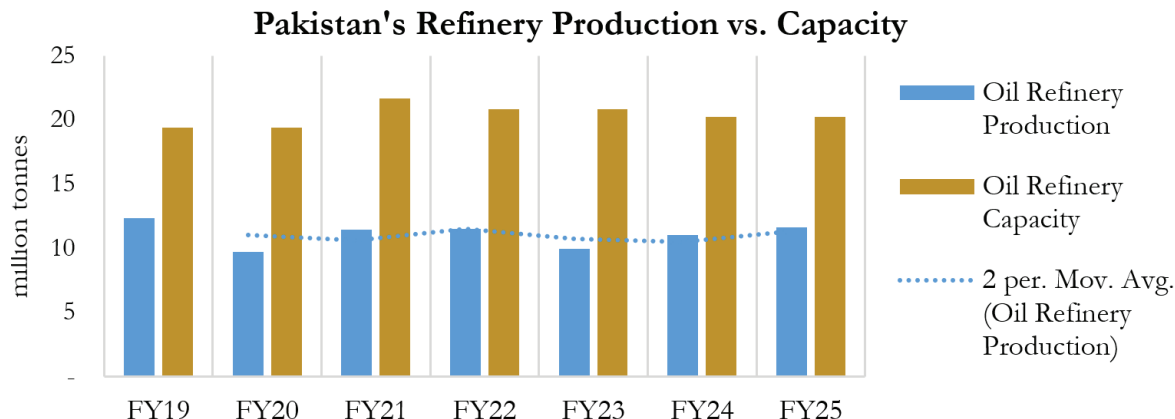
Pakistan should establish a phased SPR, initially targeting 30 days of net petroleum import cover, rising to 45 days by 2030. Based on FY25 petroleum-products imports of 8.2 million tonnes (HDIP, 2025), a 30-day gross-import benchmark is about 0.67 million tonnes; the final requirement

should be based on net imports and critical fuel needs. Storage can be developed around the Hub-Port Qasim corridor, with financing through a ring-fenced petroleum levy. A government framework reported by Reuters proposes allocating PKR 10 per litre (US\$ 0.0359) from the existing petroleum levy, expected to generate around US\$ 700 million annually (Shahid, 2026), while also developing strategic and commercial storage. Stocks must follow a first-in, first-out (FIFO) rotation, with releases limited to formally declared supply disruptions and followed by replenishment. Since initial stock acquisition will require foreign exchange, procurement should be phased to manage pressure on external reserves.

GAP BETWEEN PAKISTAN'S REFINERY PRODUCTION & CAPACITY

Refineries sit at the centre of this vulnerability because they are the one link in the chain where imported crude is converted into the specific fuels an economy actually consumes. Pakistan currently operates six refineries, led by Cnergyico Pk Ltd. & Pak Arab Refinery (PARCO), followed by National Refinery Limited (NRL), Attock Refinery Limited (ARL) and smaller contributions from Pakistan Refinery Limited (PRL) and the ENAR Petroleum Refining Facility, with a combined nameplate capacity of roughly 417,000 to 450,000 barrels per day. Yet actual throughput has hovered closer to 232,000 barrels per day, reflecting capacity utilization in the range of 50 to 60% (HDIP, 2025), a gap visible in the persistent shortfall between refinery production and capacity over FY19-FY25.

Figure 8: Gap between Refinery Production & Capacity



Source: Source: HDIP, Pakistan Energy Yearbook 2024-25

STRUCTURAL AND POLICY CHALLENGES HINDERING REFINERY MODERNIZATION

Sales Tax Non-Recovery: Petroleum products remain exempt from sales tax, preventing refineries from recovering input taxes. The existing reimbursement mechanism is temporary and uncertain, creating persistent liquidity constraints and weakening financial sustainability.

Provincial CESS: CESS imposed by Sindh and Balochistan on imported crude increases refinery operating costs (The Express Tribune, 2025). Since petroleum prices are regulated, these additional costs cannot be passed on to consumers, directly eroding refinery margins.

Petroleum Levy (PL) and Climate Support Levy (CSL): The imposition of PL and CSL on furnace oil has significantly reduced local demand, forcing refineries to export surplus furnace oil at discounted prices and incur financial losses.

Regulatory and Policy Uncertainty: Persistent tax disputes, frequent policy revisions, and delays in executing refinery upgrade agreements have weakened investor confidence and slowed modernization efforts.

High Financing Costs and Exchange Rate Volatility: Refineries are expected to finance more than 70% of the planned US\$5–6 billion upgrade programme themselves, but their limited capacity to undertake projects of this scale has prompted calls for foreign financing (Dilawar, 2026). High interest rates, exchange rate volatility, and macroeconomic uncertainty have increased project risks.

Institutional Fragmentation: Overlapping responsibilities among the Petroleum Division, OGRA, the Ministry of Finance, and provincial governments have created coordination delays, preventing the timely implementation of refinery reforms.

BROWNFIELD REFINERY POLICY: PROGRESS AND PERSISTENT GAPS

Recognizing the need to modernize its ageing refining infrastructure, Pakistan introduced the Pakistan Oil Refining Policy for Upgradation of Existing/Brownfield Refineries (2023), amended in 2024. The policy aims to upgrade existing refineries to Euro-V standards, improve fuel quality, and reduce dependence on imported petroleum products through fiscal incentives,

escrow accounts, tariff protection, and structured upgrade agreements.

Five refineries have signed under the policy with planned investments of approximately US\$ 5–6 billion (Business Recorder, 2026), targeting a 98.5% increase in petrol production, a 47.3% increase in HSD output, and a 77.8% reduction in Furnace Oil production¹²⁵. However, implementation has progressed slowly due to persistent tax disputes, regulatory uncertainty, financing constraints, exchange rate volatility, and institutional coordination failures.

POLICY PRIORITIES: THE WAY AHEAD

Pakistan's energy security cannot be achieved through short-term price interventions or isolated refinery upgrades. Building resilience requires an integrated approach that combines refinery modernization, strategic petroleum reserves, diversified crude import sources, local exploration, and downstream market reforms. Refinery upgrades will only achieve meaningful import

substitution if structural distortions are addressed through a transparent pricing framework that allows legitimate costs to be recovered. Institutionalizing a permanent sales tax refund mechanism, adopting market-based foreign exchange settlement for crude imports, and rationalizing Provincial CESS, PL, and CSL would significantly improve refinery viability and encourage long-term investment.

Strategic petroleum reserves must be complemented by adequate storage and transportation infrastructure to ensure effective emergency response during supply disruptions. Diversifying crude import sources should be accompanied by refinery upgrades capable of processing multiple crude grades, while a data-driven Petroleum Import Management Framework, linking import approvals to refinery inventories, capacity utilization, and domestic demand, would reduce unnecessary imports and strengthen domestic refining. Above all, Pakistan requires stronger institutional coordination through a dedicated Refinery Reform Coordination Cell comprising OGRA, SBP, FBR, Petroleum Division & provincial governments.



125. Author's Calculation using current production capacity data from the Energy Year Book 2024-25 and the Brownfield policy document (<http://www.mpn.gov.pk/SiteImage/Downloads/AmendedBrownfieldPolicy23.pdf>)

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A CASE FOR EXPORT-LED ECONOMIC DIPLOMACY

Moaaz Manzoor

The world is experiencing a period of disorders it has not seen in decades. Escalating tariff rates, high debt, low growth and recurrent geopolitical tensions, especially around the closure of the Strait of Hormuz are aggravating geopolitical fragmentation. In these unprecedented geopolitical shifts, the International Monetary Fund (IMF) has downgraded global growth projections to 3 per cent for 2026, highlighting that pressures felt will be uneven.¹²⁶ The countries that are heavily reliant on imported energy and still recovering from the pandemic and the war in Ukraine will be affected the most. Amid this chaos, Pakistan has emerged as a crucial player in the geopolitical theatre by facilitating the first ceasefire and holding the Islamabad talks between the warring United States (US) and Iran.¹²⁷ Islamabad enjoys the confidence

and support of both sides, which look to Pakistan as the conduit through which they would meet again to formulate a diplomatic framework for a possible future dialogue over the conflict. For a country that was more often described as a problem to be managed, this is a real diplomatic triumph and has raised the international profile of Pakistan to one it has not seen during the past few years.

What was normally anticipated from this endeavour was that Pakistan's stagnating economy,

126. Andrea Shalal, "IMF Lowers 2026 Global Growth Forecast to 3%, Sees Rebound in 2027," Reuters, July 8, 2026, <https://www.reuters.com/world/china/imf-edges-2026-global-growth-forecast-lower-3-sees-rebound-2027-2026-07-08/>

127. Dawn.com, AFP, and Reuters, "Tireless and Courageous Diplomacy: World Reacts to Islamabad-Brokered US-Iran Ceasefire," Dawn, April 8, 2026, <https://www.dawn.com/news/1989778>

which is trapped in a quagmire of low growth and meagre foreign investment, would attract improved trade opportunities and export revenues. But that has not been the case so far. Foreign direct investment fell 34 per cent in FY2025-26 to \$1.64 billion, with net inflows of just \$14 million in June¹²⁸. Meanwhile, merchandise exports contracted about 6 per cent to \$30.13 billion, and the trade deficit widened to a four-year high of \$39.47 billion¹²⁹.

The blockage of the Strait of Hormuz, through which 20% of the world's oil¹³⁰ and liquefied natural gas passes added another layer of strain to Pakistan as it imports a substantial amount of its energy from this channel, which intensified cost-push inflation with headline inflation rising to 11.1 percent year on year in June 2026¹³¹, pushing more households below the poverty line. Pakistan's role as a facilitator definitely strengthened its standing abroad but diplomatic triumph alone can not cover the decades-old economic morass in which Pakistan find itself today.

Hence, the answer lies in enhancing exports by building endogenous sustainable growth model premised on restructuring uncompetitive existing tariff schedules, high energy pricing and revisiting decades-old poor brokered trade agreements. Therefore, the onus lies on the policymakers to convert the hard-earned improved geopolitical dividend into a meticulous trade strategy; otherwise, the moment achieved from this disorder will dissipate quickly.

Any strategy that has to be formulated must begin with textiles, which still account for close to three-fifths of Pakistan's exports. The sector's weakness is well understood by the government: unpredictable business policies, high cost of doing business, expensive energy, costly finance, complex taxation regime and tariffs on man-made fibres (MMFs) that modern apparel increasingly requires¹³². Globally, MMFs dominate yarn and fabric trade. It has surpassed cotton in traded value and accounts for 65-70 per cent of traded value in these categories.¹³³ The future of textile exports is mainly moving in this direction. However, the imposition of high duties on yarns and fabrics restricts domestic producers and exporters from transitioning to MMF-based finished products. Pakistan's transition toward MMF-based apparel will depend on whether these structural issues are addressed to improve the textile sector's regional competitiveness.

Similarly, among the targeted regions, Europe is the first of those markets. Under GSP+, roughly 90 per cent of eligible exports enter the EU duty-free, worth about €7.5 billion in 2024 and €732 million in tariff savings.¹³⁴ But the July 2026 monitoring report flagged limited progress and some regression on the human-rights and governance commitments the scheme requires.¹³⁵ With 40 per cent of Pakistan's exports heading to the EU, efforts must be made to address some concerns. Moreover, GSP+ should be treated as a bridge, not a destination, and Pakistan should aim to graduate from it into a full EU-Pakistan trade agreement, as India and Indonesia have already moved to do.

128. BR Research, "FDI Recovery Remains Elusive," Business Recorder, July 21, 2026, <https://www.brecorder.com/news/40430984/fdi-recovery-remains-elusive>

129. Salman Siddiqui, "Four-Year High: Pakistan Trade Deficit Hits \$39.5bn in FY26," Business Recorder, July 2, 2026, <https://www.brecorder.com/news/40428230>

130. Aref Mohammed and Ahmed Rasheed, "Iraq Declares Force Majeure on Foreign-Operated Oilfields over Hormuz Disruption, Sources Say," Reuters, March 20, 2026, <https://www.reuters.com/business/energy/iraq-declares-force-majeure-foreign-operated-oilfields-over-hormuz-disruption-2026-03-20/>

131. Ali Ahmed, "Pakistan Inflation Hits 11.1% in June 2026," Business Recorder, July 1, 2026, <https://www.brecorder.com/news/40428026/pakistan-inflation-hits-111-in-june-2026>

132. Hassan Abbas, "APTMA Wants Customs Tariff Overhaul," Business Recorder, June 7, 2026, <https://www.brecorder.com/news/amp/40424350>

133. UN Trade and Development (UNCTAD), Trends in Natural and Man-Made Fibres Trade, UNCTAD/DITC/COM/2025/2 (Geneva: United Nations, 2025), <https://unctad.org/publication/trends-natural-and-man-made-fibres-trade>

134. Farooq Awan, "Pakistan Secures €732m Tariff Relief as GSP+ Use Rebounds to 95%," INP-WealthPk, July 20, 2026, <https://www.inp.net.pk/article-detail/inp-wealthpk/pakistan-secures-732m-tariff-relief-as-gsp-use-rebounds-to-95>

135. Naveed Siddiqui, "EU Warns Pakistan GSP+ Hinges on Human Rights Progress," Business Recorder, July 17, 2026, <https://www.brecorder.com/news/40430446/eu-warns-pakistan-gsp-hinges-on-human-rights-progress>

The United States comes next. It is Pakistan's largest single-country market with goods trade between the two countries reaching \$9.4bn last year. But after the imposition of "Great Liberation Tariff" last year, Islamabad negotiated the reciprocal tariff down to 19% from the threatened 29%, which would be in line with Bangladesh, but it does not provide any clear competitive advantage to Pakistan. Meanwhile, the concessions that Pakistan has given on American cotton and crude will call for a preferential trade agreement and that should be negotiated to obtain a genuine duty free access on apparel goods, not tariff relief alone. Meanwhile, Pakistan must facilitate investments and establish an investor-friendly framework in areas including IT, AI, energy manufacturing, critical minerals and agriculture. So that what Pakistan gives is matched by what it gets.

Lastly, the nearer opportunity lies to the north. Central Asia's landlocked economies have looked for a reliable route to a warm-water port for three decades, and with the Afghan route disrupted, Pakistan has begun offering one, through the Gabd-Rimdan crossing into Iran toward Turkmenistan and Uzbekistan, and through the Sost crossing into China toward Kyrgyzstan, Kazakhstan and Tajikistan¹³⁶. Gwadar lies well east of the disrupted Strait and gives them an outlet clear of the war zone. Afghanistan itself must not be written off. Although trade with Kabul has collapsed, costing Pakistan a market worth some \$1.5 billion. However, the shortest natural route to Central Asia still runs through Afghan territory. Thence, a two-track approach is required: bypass Afghanistan completely through Iran and China where necessary, while working to stabilise relations enough to revive the trans-Afghan railway, which remains the most efficient long-term link.

These corridors will help only if Pakistan does more than move goods through them. Transit alone earns a handling fee and the larger gain comes from value addition and processing the goods that pass through. The Ministry of Commerce responded to this opportunity by issuing the Transit of Goods through Territory of Pakistan Order in April 2026, officially announcing six routes for transshipment of goods to Iran and establishing the customs and bonded procedures to facilitate the handling of foreign goods in Pakistan. But given the return of

hostilities in the region, further introspection on this plan is required. Similarly, efforts must be made to increase regional trade, as Pakistan sells less than a billion dollars' worth of goods to Bangladesh, India and Nepal and has barely reached Latin America, Africa and Southeast Asia, where firm-to-firm engagement could achieve more than further intergovernmental agreements.

For Pakistan, the writing is on the wall, and all of these options are reliant on the same conditions, as investors are not going out of Pakistan due to its weak diplomacy. They are exiting because of the high cost of doing business, uncertain taxes and slow permits/refunds. Nothing can make up for those conditions at home; no amount of market access abroad will make up for them. The solution lies in undertaking long overdue structural reforms in energy, regulation, cost of doing business, eliminating input taxes for certified export production and ensuring the tax regime remains stable from one budget to the next. To sum up, the question of whether the diplomatic and geopolitical dividends which Islamabad earned will translate into sustainable export-led growth or will gradually fade like previous windfalls will not be answered in Islamabad's conference rooms, but rather in its tariff schedules, power tariffs, and trade talks.

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136. Nuzhat Nazar, "Central Asia Access: Pakistan Activates Westward Trade Corridors via China, Iran," *Business Recorder*, April 21, 2026, <https://www.brecorder.com/news/4041748transshipment>



CRAFTING THE INDUSTRIAL ECO-SYSTEM: The Pivot Point of Growth

Ahmed Javaid Khan

The concept of ecosystems is born of nature and is based upon the principle of interdependence. Survival & growth of one species is dependent on the existence of some other species. The same rule applies to the industrial world, where one industry is dependent on many other industries for its operations. However, the difference between the two is that the natural ecosystem evolves spontaneously, whereas an industrial ecosystem must be deliberately designed, facilitated, and continuously nurtured.

Over the last century, industrial interdependence has intensified considerably. Advances in science have increased the complexity of industrial processes, while consumers now have greater awareness and higher expectations for product quality and perfection. Higher standards of living,

especially in resource-rich countries, have contributed to increased demand for safer and higher-quality products. At the same time, the expansion of international trade that occurred after a shift in global economic order in the late 1940s has exposed domestic producers to increasingly sophisticated global standards¹³⁷. After the World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement, adoption of harmonized global standards of conformity assessment has become an international norm¹³⁸. This has all contributed to complex industrial environments, resulting in a vicious dependence on the existence of various interconnected industries, and a need for delicately crafted industrial policy.

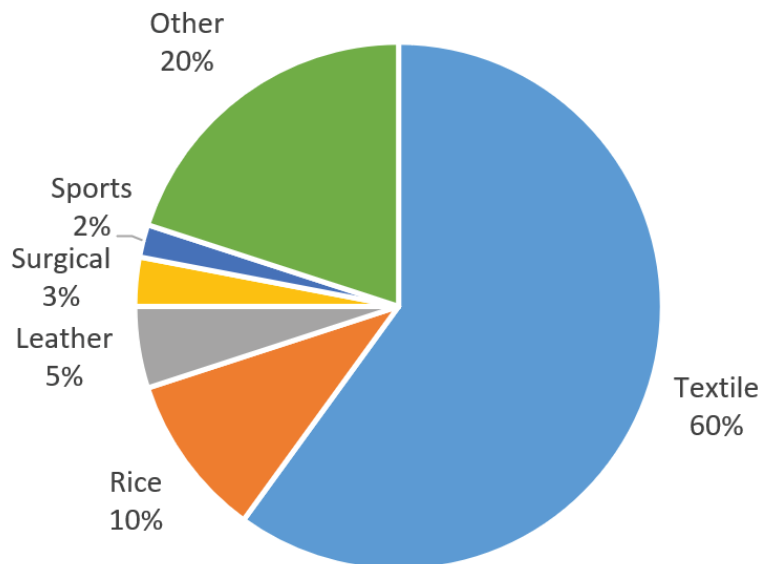
PAKISTAN INDUSTRIAL POLICY

While the country does not lack industrial policy initiatives, these have historically existed alongside one another rather than as components of a single, continuously evolving industrial ecosystem strategy. At the federal level, major policies include the Textiles and Apparel Policy 2020-25, Auto Industry Development and Export Policy 2021-26, New Energy Vehicle Policy 2025-30 and National Tariff Policy 2025-30. At the provincial level, Punjab's Industrial Policy 2018 focused on revamping industrial zones, adoption of good management and operational practices by the industry and expansion in access to financing¹³⁹. Khyber Pakhtunkhwa has similarly pursued industrial-development measures centered on industrial growth and rehabilitation, industrial integration and Small & Medium Enterprise (SME) development¹⁴⁰. Pakistan's policy landscape thus reflects a fragmented growth focus. Nevertheless, policy analysis reveals the presence of many desired components; the real problem is connectivity between them.

THE EXPORT AMBITION OF GOVERNMENT

In February 2025, the Government announced an ambition to increase Pakistan's exports to US\$60 billion within five years, with export-led growth identified as a cornerstone of the Uraan Pakistan vision. This ambition is significant when viewed against Pakistan's existing exports. As per the figures of Pakistan Bureau of Statistics (PBS), exports of the country were approximately US\$32.1 billion in FY2024-25, meaning that reaching US\$60 billion would require almost doubling the exports. The PBS in its quarterly review report export growth of 5.6% QoQ largely led by textile. A representative chart is presented as figure-I. The data of export corroborate Large Scale Manufacturing growth but inter-sectoral variation is very large.

Figure I. Cumulative Exports (By Group), Data aggregated to represent %.



Source: Pakistan Bureau of Statistics, Quarterly Review of Foreign Trade (Jan-Mar, 2025)

137. Gereffi G. The global economy: organization, governance, and development. *The handbook of economic sociology*. 2005;2:160-82.

138. Espitia A, Pardo S, Piermartini R, Rocha N. Technical barriers to trade. *Handbook of Deep Trade Agreements*. 2020;9: 343.

139. Industries, Commerce & Investment Department – Punjab. Punjab Industrial Policy. 2018.

140. KP-BOIT. Industrial Policy 2020-30. 2020;2.

Hence, the bottleneck to achieve the export target would not be production; it will be to produce more competitive products and a diversified product range which will require developing the industrial capabilities and connectivity, to access higher-value markets.

SMALL & MEDIUM ENTERPRISES (SMES)

SMEs are considered an important component of economic growth. They are not only an employment engine, but also a major supplier and innovation base in a diversified and evolving industrial environment. Pakistan's National SME Policy 2021, developed by the Small and Medium Enterprises Development Authority (SMEDA) and approved by the Government, seeks to promote SME growth through improved access to finance, and coping infrastructure and human resource challenges, especially through already existing institutional framework of SMEDA¹⁴¹. Although it has been about 25 years since SMEDA introduced, challenges faced by SMEs are still there, which mainly include market access, appropriate planning, capacity building, environmental and quality issues. Access to finance is important but it is more important to perform sectoral and cross-sectoral needs assessment and appropriate investment planning.

UNDERLYING CAUSES OF LACK OF INDUSTRIAL ECOSYSTEM

The causes can be divided into two categories. The first consists of well-known macroeconomic and structural constraints: economic instability, governance challenges, policy inconsistency, energy in-security, limited access to finance, taxation, regulatory uncertainty etc. The second category is less discussed but is arguably more important for a long-term industrial reform and includes the ecosystem design failures due to following reasons.

PROFESSIONAL BIAS AND INSTITUTIONAL SILOS

Professional bias can be defined as the tendency of institutions or decision makers to approach complex problems predominantly through the lens of a single profession or discipline. While supporting professionals from the same or similar background in a team has some inherent benefits, like it creates specializations, a good team coordination and communication. Excessive specialization can become counterproductive when the problem being addressed is inherently multidisciplinary. Industrial development is exactly such a problem.

Bias in professionalism is especially important when innovation is required to meet market needs. If industrial problems or requirements are viewed only from the perspective of one profession or department, opportunities for cross-sectoral collaboration can be overlooked.

RISK MANAGEMENT

Risk is inherent in every new endeavor. This may be as simple as the risk in a new product launch or the risk of an industrial venture. It is important that risk management is considered in industrial planning, especially in case of SMEs, because they are more vulnerable to risks, due to limited finances and managerial capacity, and less ability to absorb market shocks. In the industrial development perspective, risk management is highly linked with investment strategy. For example, an investment in a component-manufacturing facility may fail if the downstream industry does not develop. Conversely, the downstream industry may fail to emerge because the required component supplier does not exist. Furthermore, risk multiplies when innovation or introduction of new products or services is desired, as the potential benefits and demand of product are not well understood.

In 2024, the State Bank of Pakistan introduced a Risk Coverage Scheme for SMEs but many risk factors cannot be compensated like absence of markets, skills, certification, technology or reliable infrastructure.

141. Small and Medium Enterprises Development Authority. SME Policy 2021. 2021.

PROBLEM ORIENTED RATHER THAN SECTOR-ORIENTED POLICIES

It is the most important aspect of industrial ecosystem development. Traditional approach of vertical policy making takes account of specific sectors or specialties. For example, textile industry is considered different from automobiles, and chemicals from pharmaceuticals, but in fact they are interconnected horizontally and so is the commonality in their problems and needs.

Hence policy making needs a shift to the horizontal approach, where one factor may be important for growth and development of many other industries. For example, a lack of accredited testing capacity may affect pharmaceuticals, medical devices, food, chemicals, cosmetics, engineering products and export-oriented SMEs. Similarly, a technology required to produce a certain component of one industry may produce similar components for many other industries. Such approach will not only foster an ecosystem but also cut the import bills of the country.

WAY FORWARD:

Establishing an industrial ecosystem is not something new and many countries like China, United States and Germany have already provided us footprints. The important thing is to identify and eliminate challenges which are not merely limited to financing, but more relevant to designing and developing a priority framework. A more effective priority framework should begin with the problem or national priority, then identify all sectors affected by that problem and develop a coordinated solution. This requires cross-sectoral efforts and detailed mapping of each sector's problems, needs and opportunities for growth by technical working groups. Such framework shall provide basis for an investment plan, regulatory strategy, labor development and introduction of ecosystem based Key Performance Indicators.

Innovation financing should be considered different from traditional business financing and risks & opportunities for each innovation need to

be thoroughly deliberated. Pakistan has demonstrated a promising model in the IT sector through the establishment of incubation centers. These centers do more than simply support newly established IT businesses; they provide an ecosystem where entrepreneurs can present and refine ideas, engage with experts and mentors, evaluate risks and opportunities, and assess the commercial potential of prospective ventures. This approach helps transform promising ideas into viable businesses while reducing the risks associated with early-stage innovation. Similar mechanisms may be followed in other sectors as well.

Pakistan's current industrial challenge is not simply a shortage of factories. It is a shortage of interconnected industrial capabilities which can only be achieved through an industrial ecosystem where market needs start emerging spontaneously. An environment where a new factory creates demand for suppliers; suppliers create demand for skills; skills create demand for training institutions; innovation creates demand for finance; manufacturing creates demand for testing and certification; and improved quality creates access to international markets. This industrial ecosystem could be the pivot point of Pakistan's economic growth.

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POWERED BY NECESSITY, UNDERCUT BY DEBT

Pakistan's Energy Transition and the Cost of Standing Still

Zuha Aakif and Areej Fatima

In Lahore, Karachi, and in small towns in between, a subtle shift in energy took place without a government 5-year plan: many millions of Pakistani citizens grew weary of paying for electricity that never arrived. When solar panels started appearing on small factories, homes, and farms, it was more due to high tariffs and daily power outages than anything else, and fewer planners than were expected could have foreseen the trend. It's a success story by most standards in the world: a quite small fiscal space and mostly market-based decentralization of decarbonization.

However, success at the household level has revealed a structural failure at the system level. Pakistan's power sector remains bound by contracts written decades ago, under which the government must pay private power producers a fixed sum regardless of how much electricity is actually consumed. As more consumers exit the grid for rooftop solar, the fixed cost of those contracts is spread across a shrinking base of remaining customers, pushing tariffs higher and pushing yet more consumers toward solar. It is a self-reinforcing cycle, and Pakistan is now living inside it.

This article argues that the same institutional failure destabilizing household electricity bills is quietly becoming a trade-competitiveness problem, one that will matter far more once European Union regulation catches up with Pakistan's largest export sector.

THE MECHANISM: HOW EXPENSIVE POWER ACTUALLY WORKS

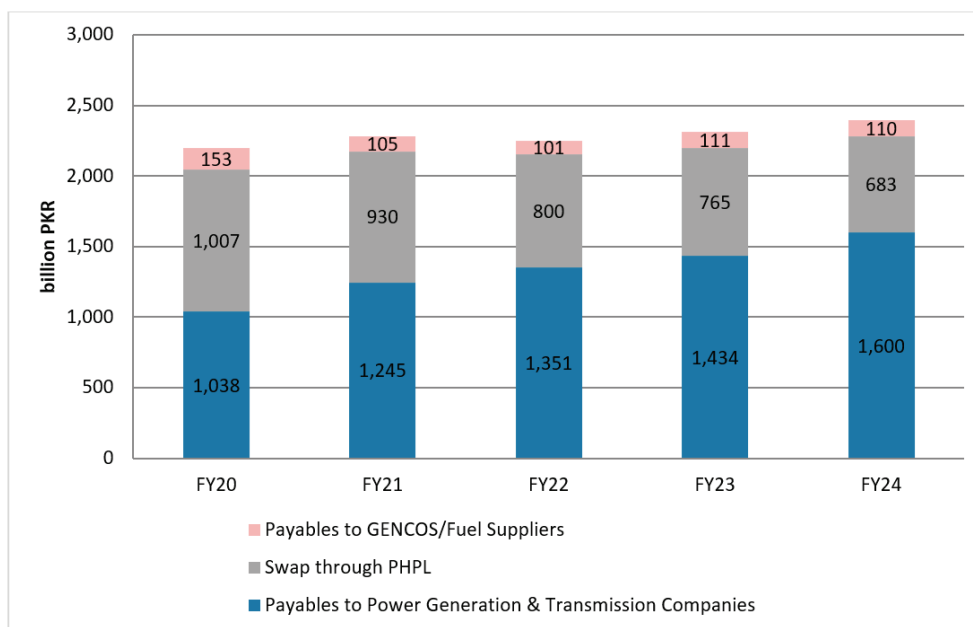
Pakistan's power sector runs on a model inherited from the 1990s, when the government signed long-term agreements with Independent Power Producers (IPPs) to attract private investment into generation. Those agreements included "capacity payments" guaranteed revenue paid to power plants whether or not their electricity was actually used¹⁴².

142. Institute for Energy Economics and Financial Analysis (IEEFA), "Pakistan's PKR2.1 Trillion Capacity Payments Crisis Triggers Power Purchase Agreement Renegotiations," December 2024.

The logic made sense when demand was growing and grid connections were the only source of power. It seems to have little meaning now. As of 30 June 2024, the installed generation capacity in Pakistan stood at approximately 46,000 megawatts (MW), but average annual utilization was around 34 per cent during this fiscal year, which in effect implies that consumers were paying only for two-thirds of the installed capacity. This imbalance has become exacerbated since then, with a 2026 industry projection of more than 51GW of distributed solar off-grid by March of that year, compared to the declining utility-scale power generation, which dropped for four fiscal years in a row.⁴ What you're not doing is moving away from fixed costs, you're moving away from the customers that pay fixed costs. The cumulative effect of this mismatch is circular debt – debts which delay payment from distribution companies to generation companies to fuel suppliers.

As of early 2026, an International Monetary Fund program review cited combined power and gas sector arrears of approximately Rs 5.2 trillion, with gas-sector liabilities alone accounting for over Rs 3.4 trillion¹⁴³, a figure roughly eighteen months on from, and not directly comparable to, the FY2023-24 utilization snapshot above. The government has since moved to renegotiate or terminate a number of IPP contracts; officials involved in the process have estimated potential savings in the trillions of rupees over the remaining life of the agreements, though this figure is self-reported by the task force conducting the renegotiations and its independent verification remains pending¹⁴⁴.

Figure I: Pakistan Power Sector Circular Debt, FY20-FY24



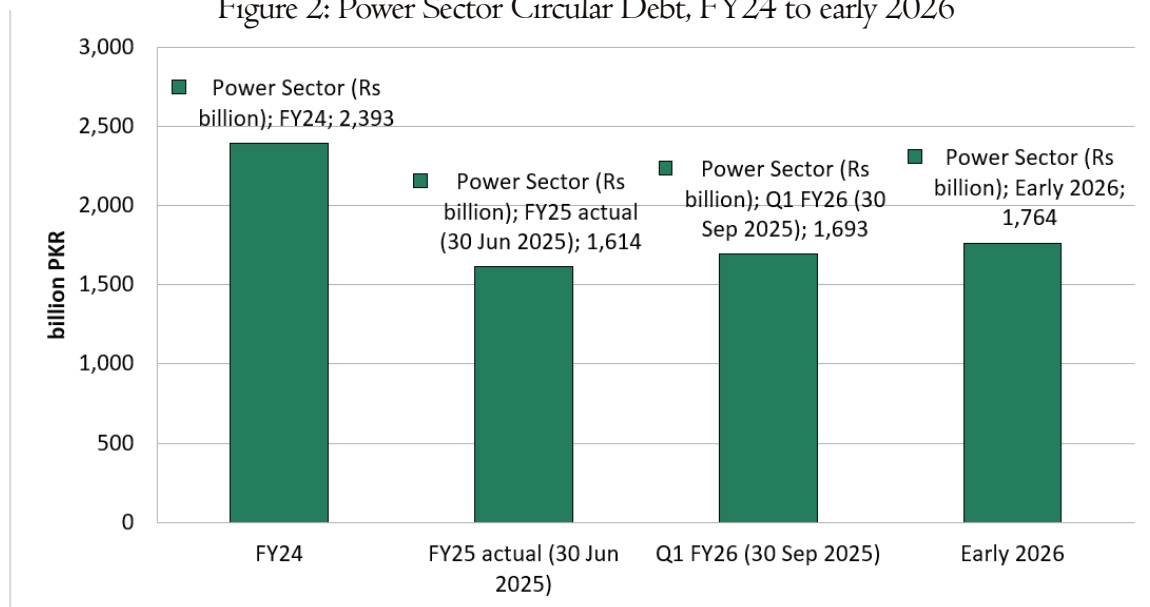
Source: Renewables First, "Pakistan Electricity Review 2025," citing NEPRA State of Industry Report data.

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143. The Nation, 18 May 2026, citing the IMF Extended Fund Facility third review and Resilience and Sustainability Facility second review, early 2026 figures.

144. Bloom Pakistan, "Energy Task Force IPP Reforms," February 2026. Note: this figure is the task force's own self-reported estimate, presented while the same task force requested performance-based financial rewards for its members; it should be read as a claim rather than an independently verified figure.

Figure 2: Power Sector Circular Debt, FY24 to early 2026



Source: Renewables First, "Pakistan Electricity Review 2025," citing NEPRA State of Industry Report data.

WHO ACTUALLY PAYS

The burden of this system does not fall evenly. A 2025 analysis of household tariff data by the Pakistan Institute of Development Economics found that the poorest consumers have absorbed a disproportionate share of debt-recovery costs: effective tariffs for the bottom-income bracket rose from roughly Rs 11.72 per kWh in 2018 to Rs 22.44 per kWh in 2025, with nearly 37 percent of that bill made up of circular-debt-related surcharges rather than the underlying cost of generating electricity¹⁴⁵. Across the wider consumer base, average effective tariffs rose from about Rs 12.5 per kWh in 2015 to Rs 34.45 per kWh in 2025, a rise the same analysis attributes mainly to debt-servicing charges layered onto bills rather than genuine cost increases in generation¹⁴⁶. In effect, circular debt has been converted into a quasi-tax, collected disproportionately from households with the least ability to pay it, or to opt out by installing their own solar systems.

This is the domestic cost of standing still. The external cost is only beginning to take shape, and it centers on Pakistan's largest export sector.

THE EXPORT EXPOSURE: CBAM, ESPR, AND WHAT IS ACTUALLY COMING

Textiles account for an estimated 55 to 60 percent of Pakistan's total exports and around 8.5 percent of GDP, with employment estimates ranging from roughly 4 million (direct, formal employment) to 15 million (the full value chain, including informal and indirect work)¹⁴⁷. The sector's competitiveness has long rested on labor costs and preferential energy tariffs for exporters: a Regionally Competitive Energy Tariff has offered gas at \$6.5 per mmbtu and electricity at 7.5 cents per kWh for export-oriented units since 2018 — rather than on energy efficiency or low-carbon production¹⁴⁸.

145. Pakistan Institute of Development Economics (PIDE), Knowledge Brief No. 135, "Circular Debt and Electricity Tariffs: Unequal Burdens Across Household Quintiles in Pakistan," 2025.

146. Ibid.

147. All Pakistan Textile Mills Association (APTMA), "Achievements"; International Growth Centre, "Phase I - Research on Garments Industry in Pakistan"; Pakistan & Gulf Economist, June 2025. Employment estimates vary by source depending on whether informal and indirect value-chain work is included; figures cited range from approximately 4 million (direct formal employment) to 15 million (full value chain).

148. APTMA, "Achievements," describing the Regionally Competitive Energy Tariff policy in place since late 2018.

That model is now colliding with a shifting European regulatory landscape, and the shift is more layered than most domestic commentary suggests.

It is commonly assumed that the European Union's Carbon Border Adjustment Mechanism (CBAM), which entered its compliance phase on 1 January 2026, already taxes Pakistani textile exports on the basis of embedded carbon. It does not. CBAM's current scope covers six sectors: Iron and Steel, Aluminium, Cement, Fertilizer, Electricity, and Hydrogen and explicitly excludes finished textiles and garments¹⁴⁹. A 2025 analysis published by the Pakistan Institute of Development Economics makes this point directly: Pakistan is not severely affected by CBAM today precisely because textiles fall outside its current scope¹⁵⁰.

The more immediate regulatory pressure comes from a different instrument. In April 2025, the European Commission named textiles, with a specific focus on clothing as one of the first product categories to be brought under its Eco-design for Sustainable Products Regulation (ESPR), which introduces mandatory eco-design standards and a Digital Product Passport tracing a garment's material and environmental footprint. A textile-specific delegated regulation is expected to take effect around 2027, with compliance obligations extending toward the end of the decade depending on company size¹⁵¹. Unlike CBAM, ESPR does not impose a carbon price; it imposes a data and design compliance burden that many Pakistani exporters a large share of them small and medium enterprises without established carbon accounting systems are not currently equipped to meet at scale.

CBAM's exclusion of textiles is also not guaranteed to last. The European Commission has described its current six-sector scope as a first phase, with a review process assessing further expansion expected to report by 2030^a. Industry commentary has raised the possibility that this could eventually include synthetic-fibre polymers such as polyester, nylon, and elastane, though this remains a subject under review rather than a confirmed decision. Should expansion eventually reach finished textile products, the exposure would be material: Pakistan generated an estimated \$2.3 billion in textile export revenue to the European Union in 2022 alone^b. No credible, primary-sourced estimate of the cost a fully expanded CBAM would impose on Pakistani exporters was found in the course of this research, and any such figure circulating without a clearly stated methodology should be treated with caution.

What the same PIDE analysis argues and what this article's broader argument reinforces is that Pakistan currently has no domestic mechanism, such as an Emissions Trading System, that would allow it to price carbon at home and retain that revenue domestically, rather than surrendering it to the European Union in the form of CBAM certificates if and when the mechanism expands^c. Establishing one would require years of preparatory monitoring, reporting, and verification infrastructure that does not currently exist in Pakistan's industrial sector at the scale required.

This is where the domestic and external stories converge. The same expensive, unreliable grid power described earlier is also the obstacle preventing textile manufacturers from adopting the clean energy and efficiency measures that would reduce their carbon footprint ahead of these regulations. A 2025 World Bank assessment identified energy efficiency and de-carbonization as areas of significant untapped opportunity within Pakistan's textile sector^d, though the structural barriers to realizing that opportunity cost, reliability, and financing access are the same ones affecting the wider power sector. Pakistani manufacturers, by one industry assessment, face among the highest industrial electricity tariffs in South Asia^e, which discourages exactly the kind of private investment in clean energy that would otherwise position the sector ahead of, rather than behind, EU compliance timelines.

149. International Carbon Action Partnership (ICAP), "EU CBAM Enters Compliance Phase and Outlines Path Ahead," 2026; European Commission, "Questions and Answers on the Carbon Border Adjustment Mechanism (CBAM)."

150. Syed Sawal Bacha and Muska Mukhtar, "CBAM and the Need for an Emissions Trading System in Pakistan," PIDE Discourse, April 2025.

151. REACH24H, summary of the European Commission's Ecodesign for Sustainable Products Regulation (ESPR) 2025-2030 Working Plan, released 16 April 2025. Readers requiring exact compliance deadlines by company size should consult the European Commission's ESPR working plan directly.

WHAT NEEDS TO CHANGE

Two interventions would address both the domestic and external dimensions of this problem, and neither is a call for a vague "energy transition."

First, the structural drivers of circular debt need to be addressed directly rather than managed through periodic bailouts and tariff hikes. This means renegotiating the remaining IPP contracts on a transparent, standardized basis rather than through case-by-case settlements, and shifting new procurement toward competitive, auction-based mechanisms¹⁵². Reform efforts underway since 2024 have reportedly reduced some of this burden, but their durability and transparency remain open questions rather than settled achievements¹⁵³.

Second, Pakistan should begin the preparatory work for a domestic carbon pricing mechanism now, well ahead of any CBAM expansion, rather than waiting for a compliance deadline to force the issue. This includes building the monitoring, reporting, and verification infrastructure that any future Emissions Trading System would require, starting with the industrial clusters concentrated heavily in Punjab most exposed to evolving EU regulation.

Pakistan's rooftop solar boom shows that the country's households and small businesses are capable of adapting faster than its institutions. The same cannot yet be said for the power sector's contractual architecture or its industrial carbon strategy. Closing that gap is not a climate policy question alone, it is a competitiveness question for the sector that employs and exports more than any other in the country.

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a.ICAP, op. cit.; European Commission CBAM Q&A. The possible inclusion of synthetic-fibre polymers such as polyester, nylon, and elastane has been raised in industry commentary but has not been confirmed as an adopted EU decision; it should be treated as a possibility under review, not a scheduled expansion.

b.Bacha and Mukhtar, op. cit., citing Arisa, "Trends in Production and Trade, Cotton, Textiles and Garments from Pakistan," September 2024.

c.Bacha and Mukhtar, op. cit.

d.World Bank, "Textile Sector: Energy Efficiency and Decarbonization (EE&D) Opportunities," Pakistan Sustainable Energy Series, 2025. This citation refers to the report's existence and general subject matter only; specific figures within the full report have not been independently verified for this article.

e.Consortium for Development Policy Research (CDPR), "Greening Pakistan's Textile Value Chain," 2025. This is the organization's own assessment; no independently verified comparative tariff table across South Asian countries was available at the time of writing.

152. International Monetary Fund (IMF), Pakistan: 2024 Article IV Consultation and Request for an Extended Arrangement under the Extended Fund Facility, IMF Country Report No. 24/310, 2024; National Electric Power Regulatory Authority (NEPRA), Electric Power Procurement Regulations, 2022.

153. International Monetary Fund (IMF), Pakistan: First Review under the Extended Arrangement under the Extended Fund Facility, IMF Country Report No. 25/109, 2025; Institute for Energy Economics and Financial Analysis (IEEFA), Optimizing Pakistan's Economy by Renegotiating Power Purchase Agreements, 2024.



FINANCING RESILIENCE

The Missing Pillar of Pakistan's New Regional Order

Farhad Ullah

A leading brokerage house estimates that the 2025 monsoon floods caused agricultural losses exceeding Rs 302 billion, or roughly US\$1 billion, a private market estimate, not an official government damage assessment¹⁵⁴. This follows the 2022 floods, for which the Government of Pakistan's own Post-Disaster Needs Assessment recorded US\$14.9 billion in direct damages and a further US\$15.2 billion in economic losses, with rehabilitation and reconstruction needs separately assessed at a minimum of US\$16.3 billion three distinct figures, not one combined total¹⁵⁵. German watch's Climate Risk Index, which measures the realized human and economic impact of extreme-weather events rather than a country's inherent structural vulnerability to future climate change, has repeatedly placed Pakistan among the ten most affected countries in the world, despite the country contributing under one percent of global greenhouse gas emissions.¹⁵⁶ In simple terms, Pakistan is not the one creating the problem, but it pays a very high price, almost every year.

Pakistan is currently discussing its position in a new regional order, new connectivity and trade routes, new industries and exports, and new energy pipelines. These are important conversations, but a quieter question deserves equal attention: when the next flood arrives, who pays for it, and how quickly?

154. Arif Habib Limited, 'Economic Impact of 2025 Floods', research note, 8 September 2025, as reported in Arab News and Business Recorder, 8 September 2025. This is a private brokerage-house estimate, not an official government damage assessment; agricultural losses were estimated at Rs 302 billion (approximately US\$1 billion), out of a nationwide estimated loss of Rs 409 billion (approximately US\$1.4 billion, 0.33% of GDP).

155. Government of Pakistan, Ministry of Planning, Development and Special Initiatives, Pakistan Floods 2022: Post-Disaster Needs Assessment (Islamabad, October 2022), prepared jointly with the Asian Development Bank, the European Union, UN agencies (technical facilitation by UNDP), and the World Bank. The PDNA reports three distinct figures: total damages of US\$14.9 billion, total economic losses of US\$15.2 billion, and rehabilitation and reconstruction needs of at least US\$16.3 billion.

156. German watch, Global Climate Risk Index (Bonn: German watch e.V., various editions). The Index analyses the quantified impacts of extreme-weather events, fatalities, and economic losses using Munich Re NatCatSERVICE data; it measures realized impact, not a country's inherent structural vulnerability to future climate change.

This article is based on a thesis examining Pakistan's disaster risk and climate finance system through three lenses: government budget allocations, direct interviews with responsible officials, and the content analysis of the two national policies meant to guide financing decisions. Its central argument is straightforward: making Pakistan resilient requires fixing how the country pays for climate change and disasters, not only how it plans for them.

A SYSTEM THAT REACTS INSTEAD OF PREPARING

Government budget documents point to a consistent pattern. The federal disaster management budget's share of total federal budget outlay fell from 0.35 percent in FY2023-24 to 0.32 percent in FY2024-25 and 0.29 percent in FY2025-26, before rising sharply to 0.62 percent in FY2026-27. This share is calculated as disaster-tagged budgetary allocation in the Preparedness, Response, and Recovery & Rehabilitation categories reported in the Finance

Division's own Climate, Gender and Disaster Budget Statement (Table 18 of the annual Budget in Brief) divided by the total federal budget outlay for the corresponding fiscal year (Table I of the same document)¹⁵⁷. Concretely: disaster-tagged allocation stood at PKR 50,213 million out of a total federal budget of PKR 14,485,000 million in FY2023-24 (0.35%); PKR 60,877 million out of PKR 18,877,000 million in FY2024-25 (0.32%); PKR 50,181 million out of PKR 17,573,000 million in FY2025-26 (0.29%); and PKR 116,238 million out of PKR 18,771,000 million in FY2026-27 (0.62%), the last figure reflecting a newly introduced 'Reconstruction' sub-category (PKR 19,135 million) alongside the existing Preparedness, Response, and Recovery & Rehabilitation lines. These are approved budgetary allocations, not audited actual expenditure; Pakistan does not publish a consolidated, disaggregated account of executed disaster-related spending on a comparably timely basis, so this analysis, like most comparable budget-tracking exercises, relies on approved allocations as the best available proxy for government intent and planning.

Table I: Pakistan's Disaster and Climate Budget Allocations, FY2023-24 to FY2026-27 (approved allocations as reported in the Finance Division's Budget in Brief)

Indicator	FY2023-24	FY2024-25	FY2025-26	FY2026-27
Disaster budget, % of federal budget	0.35%	0.32%	0.29%	0.62%
Mitigation share of climate budget	64.46%	76.48%	84.13%	57.97%
Adaptation share of climate budget	26.65%	16.75%	11.92%	32.93%
Response spending (PKR million)	11,394	12,999	15,876	32,774
Recovery & Rehabilitation spending (PKR million)	1,541	444	1,142	21,485

Source: Finance Division, Budget in Brief, FY2024-25, FY2025-26, and FY2026-27 editions, Table 18 and Table I of each edition.

157. Government of Pakistan, Finance Division, Budget in Brief, FY2024-25, FY2025-26, and FY2026-27 editions (Islamabad: Ministry of Finance), Table 18 ('Climate, Gender and Disaster' / 'Gender, Climate and Disaster' Budget Statement) and Table 1 ('Budget at a Glance') of each respective edition. FY2023-24 figures are drawn from Table 18 of the FY2024-25 edition, which reports Budget 2023-24 as a comparator column. Figures represent budgeted/tagged allocations as approved by Parliament, not audited actual (executed) expenditure.

Response spending rose 106.44 percent, and Recovery & Rehabilitation spending rose 1,781.35 percent between FY2025-26 and FY2026-27, the first budget cycle presented after the 2025 monsoon floods. Neither the Budget in Brief nor the accompanying budget speech explicitly states that this increase was made because of the 2025 floods; the timing of a budget increase concentrated specifically in the Response and Recovery lines, tabled in the first cycle after a major flood, is, however, consistent with a reactive rather than an anticipatory budgeting pattern.

A second pattern appears within the climate budget itself. Government climate-tagged spending is generally reported across three categories: mitigation, adaptation, and cross-cutting or 'support' areas. The National Climate Change Policy 2021 identifies adaptation as the country's top climate priority, given Pakistan's exposure to floods, droughts, heatwaves, and other climate-induced hazards.¹⁵⁸ Budget tagging data shows mitigation spending reaching 84 percent of the climate budget in FY2025-26, and still standing at 58 percent in FY2026-27 even after some correction, against 33 percent for adaptation.¹⁵⁹ Mitigation and adaptation are not, however, strictly zero-sum categories: mitigation investment in sectors such as transport and energy, for example, public transit expansion or grid modernization can also generate co-benefits for energy security, air quality, and climate resilience, and the government's own budget-tagging methodology does not always cleanly separate a single project's mitigation and adaptation contributions. Even allowing for this overlap, the scale and consistency of the gap between mitigation and adaptation shares across the years examined suggests that capital is not flowing toward adaptation at a pace consistent with the policy's own stated priority.

WHY THE SYSTEM KEEPS FALLING BEHIND

These budget patterns were examined alongside nine semi-structured key informant interviews with officials at NDMA, NDRMF, the Ministry of Climate Change and Environmental Coordination, the Ministry of Finance, and UNDP Pakistan. Respondents were selected through purposive sampling of individuals directly engaged in climate and disaster financing decisions, and recurring themes were treated as findings only when corroborated by more than one independent respondent. Five such themes emerged.

First, no single body holds overall responsibility for coordinating climate and disaster financing decisions and investment planning across NDMA, NDRMF, the Ministry of Climate Change and Environmental Coordination, and the Ministry of Finance.

Second, accreditation with the Green Climate Fund (GCF), the specific international fund respondents discussed in most detail, remains limited to two Pakistan-based institutions, JS Bank and the National Rural Support Program (NRSP), both accredited as national Direct Access Entities; other Pakistani institutions must access GCF resources through an international intermediary such as UNDP, ADB, or IFC¹⁶⁰. Respondents linked this narrow accreditation base to weaker proposal competitiveness relative to other countries; this account reflects respondents' own professional judgment rather than an independently verified comparison of proposal approval or rejection rates across countries, which this study did not have access to.

158. Government of Pakistan, Ministry of Climate Change and Environmental Coordination, National Climate Change Policy 2021 (Islamabad, 2021), which identifies adaptation as Pakistan's principal climate priority given the country's exposure to floods, droughts, and heatwaves.

159. Ibid. (Finance Division, Budget in Brief and Climate Change Budget Tagging Statements, FY2023-24 to FY2026-27).

160. Green Climate Fund, 'Pakistan', Country Program page, green climate fund/countries/pakistan (accessed 2026); see also JS Bank, press release, 3 March 2019, and National Rural Support Program, 'NRSP's Partnership with GCF & MoCC'. JS Bank and NRSP are, as of this writing, Pakistan's only two GCF-accredited national Direct Access Entities; other Pakistani institutions access GCF resources through international intermediaries such as UNDP, ADB, or IFC.

Third, respondents described international pledges made after a disaster as often not arriving in full, being disbursed through NGOs and UN agencies rather than directly to government institutions, and requiring counterpart (matching) financing from Pakistan's own budget. This account is drawn from interview testimony rather than a systematic reconciliation of pledged-versus-disbursed amounts by donor, which would require donor-level disclosure this study did not have access to; it is reported here as a recurring perception among the officials most directly involved in negotiating this financing, not as an audited figure.

Fourth, respondents pointed to weak data quality and documentation practices as undermining international donors' trust in Pakistani institutions. Fifth, financing decisions, including whether to launch an international disaster appeal, are shaped as much by political-economy considerations as by technical assessments of need, even as Pakistan's own diplomatic leadership in establishing the Loss and Damage Fund at COP27 remains a significantly underused asset.

WHY THIS MATTERS FOR THE NEW REGIONAL ORDER

Pakistan's plans to strengthen regional trade links, secure its energy supply, and grow its industries will only be as resilient as the fiscal ground beneath them. Climate-induced disasters such as floods do not distinguish between highways, factories, farmland, or power infrastructure; they damage all of them at once, at both economic and environmental cost. Funds spent repairing damaged infrastructure after a disaster are funds unavailable for the new industry, innovation, and connectivity infrastructure this regional order is meant to deliver. Treating climate and disaster risk financing as basic economic infrastructure on the same footing as energy security or trade corridors is therefore not a separate agenda from economic resilience, but a precondition for it.

THE WAY FORWARD

The pattern documented above is not primarily a shortage of goodwill or awareness among officials; it is a financing system that has not been built, end to end, to work proactively. Any reform agenda, however, has to reckon honestly with Pakistan's fiscal position: mark-up (interest) payments alone consumed PKR 8,054 billion of the PKR 18,771 billion FY2026-27 budget 43 percent and the government's own standing contingency line for natural disasters, the 'Provision for Emergency and Others,' is set at just PKR 20 billion a year¹⁶¹. While an active IMF program requires the government to hold a primary surplus rather than take on large new open-ended commitments. The five reforms below are therefore assessed not only on what they would achieve but on whether they are realistic under these constraints; none requires building an entirely new institution from zero, and several are designed to be fiscally neutral or low-cost precisely because large new domestic funding is not currently available.

Protected national resilience fund. A National Climate and Disaster Resilience Fund, established by an Act of Parliament, led by the Ministry of Finance, with an NDRMF similar to Bangladesh's Climate Change Trust Fund, so money is available before disasters, not reallocated after. Funding: ring-fenced share of the new Climate Support Levy, plus reallocated disaster-tagged funds and donor co-financing, not a new fixed budget line. Timeline: legislated in 12 months, operational in 24. Safeguard: annual Auditor-General audit, disclosed in the Budget in Brief.

Minimum adaptation budget share. Amend the Pakistan Climate Change Act 2017 to guarantee adaptation's share of the climate budget, correcting the current tilt toward mitigation.

161. Government of Pakistan, Finance Division, Budget in Brief, FY2026-27 (Islamabad: Ministry of Finance), Table 1 ('Budget at a Glance') and Table 10 ('Current Expenditures'), showing mark-up (interest) payments of PKR 8,054 billion against a total federal budget outlay of PKR 18,771 billion, and a standing 'Provision for Emergency and Others' of PKR 20 billion earmarked for natural disasters, of which PKR 15 billion was earmarked in the FY2024-25 and FY2025-26 editions of the same document. The FY2026-27 edition separately reports a newly introduced 'Climate Support Levy' as a non-tax revenue line (Table 5).

Funding: reallocation within the existing climate budget; no new money needed; this formalizes a shift already underway (mitigation fell from 84% to 58% of the climate budget between FY2025-26 and FY2026-27). Timeline: amended in 12 months, enforced from the next budget cycle. Safeguard: verified annually via the Climate Change Budget Tagging Statement.

One costed national strategy. A single National Climate and Disaster Finance Strategy, jointly built by the Ministry of Climate Change and the Ministry of Finance, Cabinet-approved, stating what resilience actually costs and where the money comes from. Funding: donor-funded technical assistance (e.g., GCF Readiness support), not the exchequer, so it doesn't compete with IMF fiscal targets. Timeline: drafted in 12 months, approved in 18. Safeguard: mid-term review by the Council of Common Interest.

One team in charge. A standing Coordination Committee (PM Office) and a permanent Climate Finance Unit (Ministry of Finance), ending reliance on informal coordination between NDMA, NDRMF, Climate Change, Planning, and Finance. Funding: absorbed into existing ministry budgets; Unit staffed via secondment, not new hiring, near-zero cost. Timeline: operational in 6 months. Safeguard: quarterly minutes published, annual report to Cabinet.

A real three-layer safety net. Turn the 2013 National Disaster Risk Reduction Policy's three-layer plan into something funded and dated, led by NDMA and Finance. Funding, sequenced by cost: a reserve built from already-budgeted funds (no new cost); a contingent credit line like the World Bank's CAT-DDO (zero cost until drawn); insurance/catastrophe bonds feasibility study first, not a purchase, since premiums are a real recurring cost. Timeline: feasibility study in 12 months, full system in 3 years. Safeguard: independent actuarial review, annual NDMA disclosure.

Economic growth, energy security, and regional connectivity are closely linked, but so too is a further factor Pakistan must prepare for and pay for: climate and disaster risk. Disasters such as floods, heatwaves, and droughts damage infrastructure and ecosystems and cost lives in ways that directly impede economic growth. Preparing for and financing climate and disaster risk in advance, rather than after the fact, is accordingly a precondition for, not a departure from, an economically resilient Pakistan.

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