Alternate Development Services
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Industrial Decarbonization Monitor

Pakistan's Textile Sector
April – June 2026
(2nd Quarter)

- Industrial Policy
- Renewable Energy
- Energy Transition
- Shared Responsibility Transition
- Climate Finance
- Net Zero

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Industrial Decarbonization Monitor

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Highlights of the Quarter

Fuel Prices

1. Fuel prices remained **highly volatile** during **January–May 2026**, with multiple revisions driven by global oil markets and geopolitical tensions.
2. **A record fuel price hike** on **2 April 2026** raised petrol by **Rs137.24/L** and diesel by **Rs184.49/L,** pushing prices to **Rs458.41/L** and **Rs520.35/L.**
3. Diesel experienced **greater volatility than petrol,** reflecting its higher sensitivity to industrial demand, transport, and taxation.
4. Government interventions reduced petrol by **Rs80/L** on **5 April,** followed by further cuts of Rs**11.83/L (petrol), Rs134.81/L (diesel),** and **Rs5/L for both fuels** on **16 May,** aiding market stabilization.

Importance of Electricity Price

1. Electricity tariffs remained **highly volatile** throughout **2026,** ranging from a l**ow of approximately Rs32.45/unit after January relief to effective consumer costs exceeding Rs45–60/unit** after taxes and surcharges.
2. Industrial consumers received the **largest tariff relief of up to Rs4.58/unit,** improving competitiveness and reducing electricity costs for export-oriented industries.
3. **Fuel Charge Adjustments (FCAs)** caused significant monthly bill fluctuations, including a Rs1.42/unit increase in April and relief measures of up to **Rs1.99/unit** through **Quarterly Tariff Adjustments (QTAs).**
4. Structural challenges, including **circular debt, IMF-supported reforms, LNG shortages,** and **capacity payment obligations,** continued to keep electricity prices elevated despite periodic tariff reductions.

CTBCM in Practice

1. Open Market, Hidden Barriers, and the Decarbonization Equation for Pakistani Industry
2. Pakistan's **first competitive wheeling auction** opens **200 MW** (or modified **400 MW in Sep. 2026)** of direct RE access for industrial consumers.
3. Proposed **UoSC floor of Rs. 9.92/kWh** (inc. **Rs. 2.5 cross-subsidy** and Rs. 3.23 DSS) before energy cost risks neutralizing **CTBCM's decarbonization value proposition.**
4. **ISMO** mandates minimum **10% BESS co-location + 2-hour discharge** for VRE projects to qualify for firm capacity.
5. **System Marginal Price (SMP)** hit **Rs. 94/kWh** in **April 2026;** deregulated energy imbalance is **CTBCM's most underestimated commercial risk.**
6. **Equity IRRs** for wheeling-based RE projects fall to **3–4%** (from **15–16%**) under the current UoSC framework; investor concern is rising.

Short Analysis of Sapphire Textile Mills

1. **STML** targets a 50.4% reduction in **Scope 1 & 2 emissions** and a **30% cut in Scope 3 emissions** by **2032** under **SBTi-validated 1.5°C climate targets.**
2. The company has already achieved a **54.7% reduction in Scope 1 & 2 emissions** through renewable energy adoption, coal phase-out, and biomass-based cogeneration.
3. **STML operates 28.5 MW of solar capacity,** supplying around **40% of weaving/processing operations** and **70% of home textile production** with renewable electricity.
4. Resource efficiency initiatives have enabled the reuse of **60,064 tons of water** and recycling of **7,916 tons of cooling water,** strengthening operational sustainability despite ongoing **Scope 3 challenges.**

Brand-Supplier Shared Responsibility (STRM)

1. **Debt servicing (Rs 8.054 trillion)** absorbs **68.5% of net federal revenue,** leaving little room for green investments.
2. **89% of green subsidies go to energy,** while industry receives only **1.7% (Rs 8 billion).**
3. **Large-scale manufacturing declined by 1.53%,** underscoring the need for decarbonization support.
4. **Renewables make up 20.3% of installed capacity,** with **7,319 MW of net-metered solar.**
5. **No dedicated solar incentive** is included in the **FY2026–27 budget.**

Trionda Exports: Pakistan's Sports Industry

1. Pakistan's sports goods exports increased by **15.86%,** reaching **US$179.33 million,** led by strong global demand.
2. Football exports grew by **23.64%** to **US$113.64 million,** with **Sialkot** supplying major global brands and producing the official **2026 FIFA World Cup** match ball, **"Trionda".**
3. **Sialkot** produces **50–60 million footballs annually** and is rapidly adopting **advanced thermo-bonding and automated manufacturing technologies** to meet international standards.

1. Analysis of Fuel Prices

Pakistan's industrial decarbonization is increasingly constrained by energy pricing rather than **technology availability.**

The most significant shock occurred on 2 April, when petrol and diesel prices increased by Rs137.24/L and Rs184.49/L, reaching Rs458.41/L and Rs520.35/L, respectively (approximately 43% and 55% increases), following a severe Gulf-region energy crisis that disrupted global oil supplies and sharply increased transportation, logistics, and industrial costs. To ease the economic burden, the government reduced petrol prices by Rs80/L on 5 April, followed by further reductions on 11 April of Rs11.83/L for petrol and Rs134.81/L for diesel as international oil prices eased after regional ceasefire developments. However, volatility persisted with another Rs26.77/L increase for both fuels on 25 April due to higher petroleum levies and renewed global oil price pressures. By mid-May, both petrol and diesel prices declined by Rs5/L, indicating gradual market stabilization.

In short in Table 1, the January–June 2026 period highlights Pakistan's strong dependence on global energy markets, with diesel exhibiting greater volatility than petrol, emphasizing the need for diversified sources and resilient fuel pricing policies to reduce vulnerability to external shocks.

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2. Importance of Electricity Prices

Pakistan’s electricity pricing landscape in 2026 was characterized by significant fluctuations driven by regulatory adjustments, fuel cost variations, and broader energy sector reforms, in Table 2. During the first half, several tariff reductions provided relief to consumers, including a base tariff reduction of Rs0.62 per unit and a fuel charge adjustment (FCA) reduction of Rs0.93 per unit in January. Additional relief measures were introduced in March through FCA and Quarterly Tariff Adjustment (QTA) revisions, while industrial consumers benefited from a substantial tariff reduction of up to Rs4.58 per unit under the government’s industrial competitiveness package. These measures lowered the average electricity price to approximately Rs32.45 per unit at its lowest and supported economics, particularly within the export-oriented industries.

Despite these reductions, electricity consumers continued to face considerable financial pressure throughout the year. Fuel charge adjustments resulted in tariff increases, including a notable rise of Rs1.42 per unit in April. Moreover, structural challenges such as circular debt, IMF-supported energy sector reforms, LNG supply shortages, and capacity payment obligations contributed to higher electricity costs. Although average tariff rates appeared moderate, the effective cost of electricity for many consumers exceeded Rs45–60 per unit once taxes, surcharges, and other charges were included. The reduction in solar electricity export buyback rates from approximately Rs21 per unit to Rs8–11 per unit further affected the economic attractiveness of net-metering systems. Overall, in Table 3, the electricity sector remained highly sensitive to fuel market dynamics and policy decisions, highlighting the strong link between energy pricing, industrial competitiveness, and consumer affordability in Pakistan.

Electricity bills effectively exceeded **Rs45–60/unit** despite average tariffs appearing much lower due to taxes and surcharges.

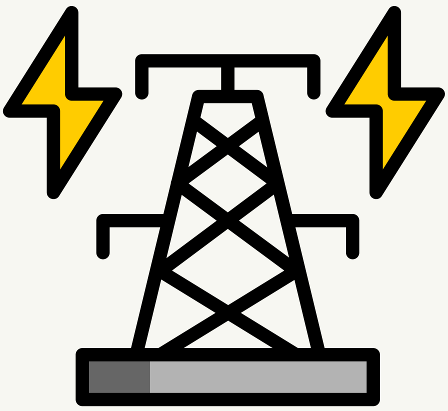

Table 1: Updated Pakistan Fuel Price Changes (2026)

Effective Date	Petrol Change	Diesel Change	New Petrol Price	New Diesel Price	Type	Type
Jan 1, 2026	↓ Rs10.28/L	↓ Rs8.57/L	Rs253.17	Rs257.08	Decrease	International oil trend adjustment
Feb 1, 2026	No Change	↑ Rs11.30/L	Rs253.17	Rs268.38	Increase	Diesel market fluctuations
Feb 16, 2026	↑ Rs5.00/L	↑ Rs7.32/L	Rs258.17	Rs275.70	Increase	Global oil price pressure
Mar 1, 2026	↑ Rs8.00/L	↑ Rs5.16/L	Rs266.17	Rs280.86	Increase	Crude oil volatility
Mar 6, 2026	↑ Rs55.00/L	↑ Approx. Rs55/L	Rs321.17	Rs335.86	Massive Increase (+~20%)	Middle East/Iran conflict oil shock
Apr 2, 2026	↑ Rs137.24/L	↑ Rs184.49/L	Rs458.41	Rs520.35	Historic Increase (+43% Petrol, and +55% Diesel)	Gulf War-driven fuel crisis
Apr 5, 2026	↓ Rs80.00/L	No major reduction	Rs378.00	——	Major Reduction (-Rs80/L)	Public backlash after record hike
Apr 11, 2026	↓ Rs11.83/L	↓ Rs134.81/L	Rs366.58	Rs385.54	Huge Reduction	Global oil prices eased after the ceasefire
Apr 25, 2026	↑ Rs26.77/L	↑ Rs26.77/L	Rs393.35	Rs380.19	Major Increase (+Rs26.77/L)	Petroleum levy increases and global oil rise
May 16, 2026	↓ Rs5.00/L	↓ Rs5.00/L	Rs409.78	Rs409.58	Reduction (-Rs5/L)	Government relief amid inflation pressure
May 23, 2026	↑ Rs5.00/L	↑ Rs5.00/L	Rs414.78	Rs414.58	Increase	Rising international oil prices and import costs
Jun 13, 2026	↓ Rs41.00/L	↓ Rs35.80/L	Rs373.78	Rs378.78	Major Reduction	Declining global crude oil prices and easing geopolitical tensions
Jun 20, 2026	↓ Rs74.00/L	↓ Rs67.00/L	Rs299.78	Rs311.78	Historic Reduction	Sharp fall following U.S.–Iran deal

Table 2: Major Electricity Price Highlights 2026

Category	Details
Largest Reported Increase	↑ Rs1.42/unit (April 2026 FCA increase)
Largest Industrial Relief	↓ Rs4.58/unit
Lowest Average Unit Price	~Rs32.45/unit after January FCA relief
Highest Effective Consumer Billing	Above Rs45–60/unit after taxes and surcharges
Solar Export Rate Reduction	From ~Rs21/unit to ~Rs8–11/unit
Main Causes of Increases	IMF reforms, LNG shortages, circular debt, fuel costs
Main Causes of Reductions	FCA savings, hydropower recovery, industrial subsidies

Table 3: Pakistan Electricity Price Changes (2026) – Detailed Tariff Table

Effective Date	Electricity Unit Price Change	Approx. Avg Unit Price After Change	Type	Consumer Impact	Key Reason
Jan 1, 2026	↓ Rs0.62/unit	~Rs33.38/unit	Base Tariff Reduction	Relief for domestic consumers nationwide	Annual tariff rebasing approved by NEPRA
Jan 1, 2026	↓ Rs0.93/unit	~Rs32.45/unit effective billing impact	FCA Reduction	Reduced January electricity bills	November 2025 Fuel Charges Adjustment
Feb 17, 2026	↓ Up to Rs4.58/unit	Industrial tariff reduced near ~Rs34–36/unit	Industrial Relief	Major relief for export and industrial sectors	Govt industrial competitiveness package
26 Feb 2026 (proposed) 31 Mar 2026	↑ Proposed major hike	Expected above Rs35/unit average	Proposed Increase	Expected rise in domestic and commercial bills	Circular debt and IMF-linked reforms
Apr 9, 2026	↓ Rs0.71/unit	~Rs32.67/unit	Tariff Reduction	Rs46.56 billion relief passed to consumers	FCA and QTA adjustments
Apr 16, 2026	↑ Rs1.42/unit	~Rs34.09/unit	FCA Increase	Additional burden in April bills	February 2026 fuel adjustment
Apr 17, 2026	↑ Indirect cost pressure	Effective generation cost surged above Rs40/unit in peak usage	Energy Crisis Pressure	Increased load-shedding and expensive generation	LNG shortage and furnace oil dependency
Apr 22, 2026	↓ Solar export buyback reduced to ~Rs8–11/unit	Previous export rates were ~Rs21/unit	Net Metering Reduction	Lower income for solar users exporting electricity	Shift from net metering to net billing
May 19, 2026	↓ Solar export buyback reduced to ~Rs8–11/unit	Previous export rates were ~Rs21/unit	Net Metering Reduction	Lower income for solar users exporting electricity	Shift from net metering to net billing
Jun 4, 2026	↓ Net relief ~Rs0.20/unit	Average tariffs broadly stable	FCA + QTA Relief	June bills largely protected from expected increases	Government intervention offset fuel-cost surge
Jun 9, 2026	↓ Rs1.99/unit (QTA)	Average billing reduced to ~Rs32–33/unit range	Quarterly Tariff Relief	Relief for June–August bills	Negative Quarterly Tariff Adjustment approved by NEPRA
Jun 2026 Bills	↓ Rs1.9857/unit	Similar relief level maintained	NEPRA Tariff Relief	Approximately Rs67 billion relief for consumers	Quarterly Tariff Adjustment (QTA)
Jun 2026 Bills	↑ Rs1.19/unit FCA	Partially offset by QTA relief	FCA Increase	Small increase in fuel cost component	April 2026 Fuel Charge Adjustment
Jun 2026 Bills	↓ Net ~Rs0.80/unit	Further reduction in summer billing period	Combined FCA–QTA Adjustment	Consumers received overall reduction despite FCA increase	Rs1.99/unit relief exceeded Rs1.19/unit FCA charge

3. CTBCM in Practice

Open Market, Hidden Barriers, and the Decarbonization Equation for Pakistani Industry

3.1. Pakistan's Competitive Power Market: From Policy to Live Auction

Pakistan's Competitive Trading Bilateral Contract Market is no longer a regulatory aspiration. The Framework Guidelines for Wheeling Auctions, 2025 were formally gazette on 22 January 2026 through S.R.O. 92/(I)/2026. ISMO has published a Draft Request for Proposals for the first 200 MW wheeling auction; the opening tranche of an 800 MW aggregate allocation programme spanning five years from the Competitive Market Operation Date (CMOD). For the first time in Pakistan's electricity sector history, eligible Bulk Power Consumers (BPCs) can legally procure power directly from generators and competitive suppliers, transporting it through the national grid under bilateral contracts. For export-oriented industries facing growing international buyer pressure on renewable energy sourcing, this represents a structural turning point, in principle.

CTBCM creates an open **electricity market,** but hidden grid charges threaten its **decarbonization benefits.**

3.2. The Decarbonization Paradox: UOSC as a Market Barrier

The proposed uniform Use of System Charge (UoSC) framework, presented at the NEPRA consultation on 11 June 2026, illustrates why market design matters as much as market creation. The stated policy intent – a single, consistent wheeling charge across all DISCOs and K-Electric – is defensible as an administrative simplification. But the mechanism achieves uniformity by averaging very different cost structures into a single nationalized charge, embedding legacy inefficiencies, cross-subsidy obligations (Rs. 2.5/kWh for a B-4 consumer) and stranded-cost recovery (Debt Service Surcharge: Rs. 3.23/kWh) directly into the wheeling bill.

The result is an effective wheeling floor of Rs. 9.92/kWh before a single unit of energy is priced, leaving a marginal or negative commercial saving versus the existing B-4 regulated tariff once a competitive energy price and T&D loss gross-up are added. Industry stakeholders, including FPCCI and APTMA, have raised the concern clearly: equity IRRs for wheeling-based renewable projects are falling to 3–4% under this framework, which is not sufficient to mobilize private capital at decarbonization scale. Table 4 shows the breakdown of UoSC charges for a standardized B4-consumer, and Figure 1 shows the wheeling mechanics after operationalization of upcoming CTBCM framework, and Figure 2 shows hidden risks under CTBCM for industrial decarbonization (emerged as a result of the June 11, 2026 NEPRA public hearing).

Table 4: Tariff components for energy trading under CTBCM (for a B-4 consumer)

Cost Component	Rate (PKR/kWh)	Description	Assessment
Base UoSC (NEPRA, 11 Jun 2026)	Rs. 6.69	Includes a cross-subsidy element	Tariff component
Debt Service Surcharge (DSS)	Rs. 3.23	Grid debt recovery: not a network charge	Structural burden
Sub-total: Wheeling Floor	Rs. 9.92	Before any energy price is added	High
Bilateral RE Energy Price (indicative)	Rs. 8–11	Negotiated with the generator	Market-driven
T&D Loss Gross-Up (~10%)	Rs. 0.8–1.1	Buyer bears the undelivered energy cost	Hidden cost
TOTAL ALL-IN CTBCM COST	Rs. 18.7–22+	vs. B-4 regulated tariff ~Rs. 22/kWh	Marginal saving

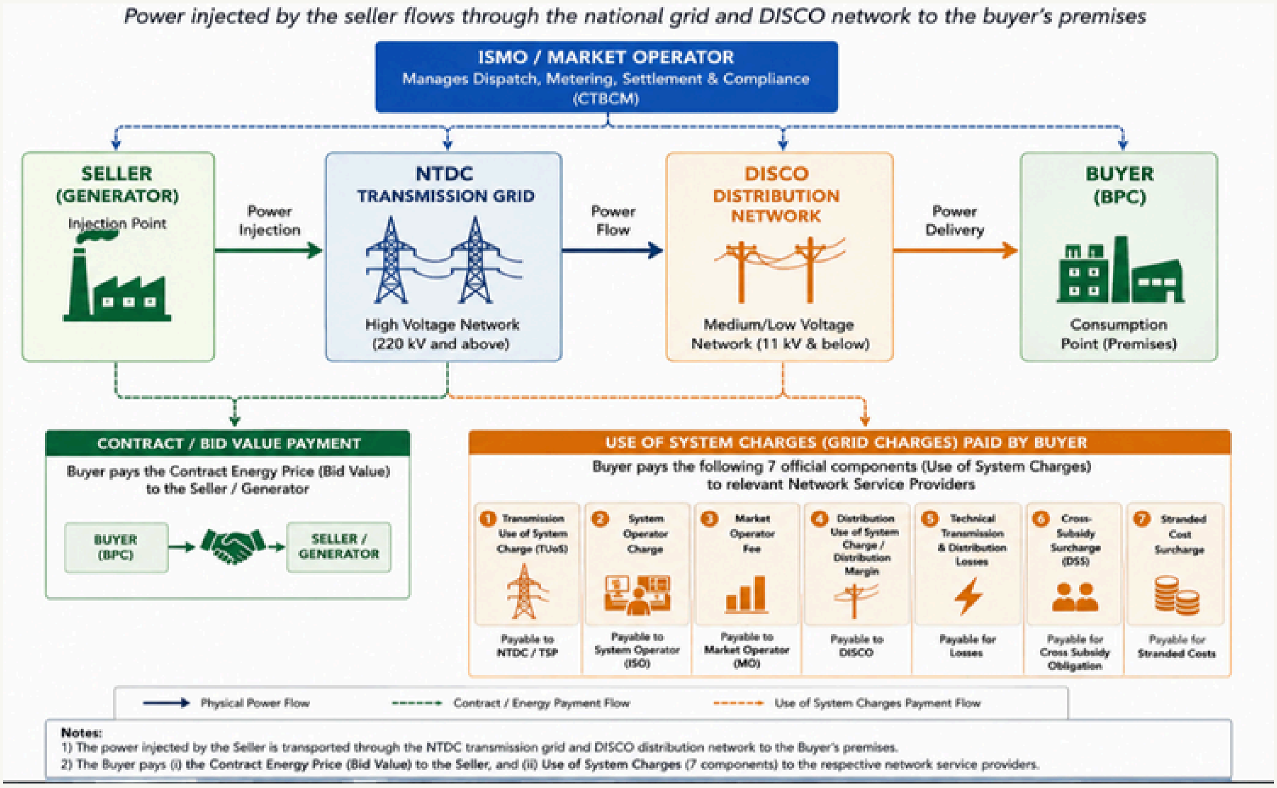

Figure 1: Wheeling process, power by a seller flows through the national grid to the buyer's premises.

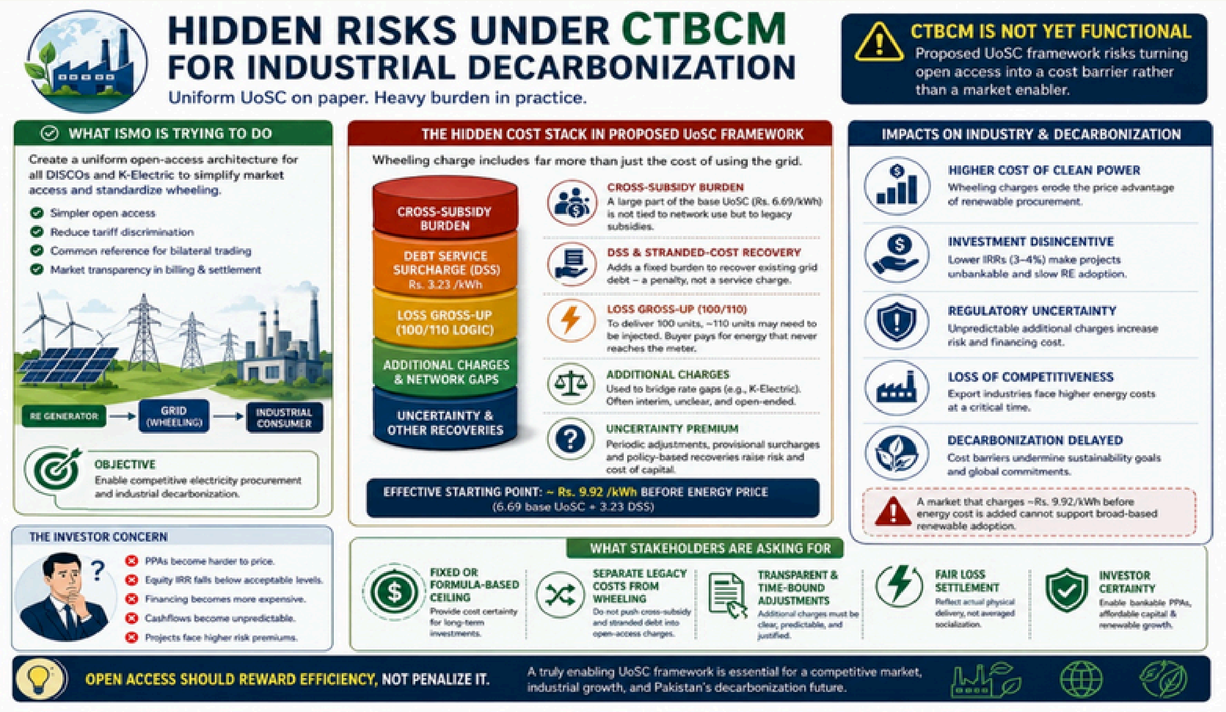

Figure 2: UoSC: A hidden risk to Industrial decarbonization under CTBCM framework

3.3. BESS IMPERATIVE: Why Storage is Non-Negotiable Under CTBCM?

Battery Energy Storage Systems (BESS) are no longer optional—they are essential under **CTBCM.**

Standalone solar plants receive zero firm capacity credit during CTBCM Critical Hours (18:00–22:00 evening peak), and wind projects receive only 5–10%. Without Battery Energy Storage Systems (BESS), VRE-based bilateral contracts expose BPCs to full capacity deficit charges under the Capacity Balancing Mechanism (CBM); destroying the commercial case for renewable procurement.

ISMO Final Rule (14 May 2026 consultation): Minimum 10% of plant nameplate capacity as BESS power rating + minimum 2-hour discharge duration. Fig. 3 shows BESS imperative proposed by ISMO under CTBCM framework.

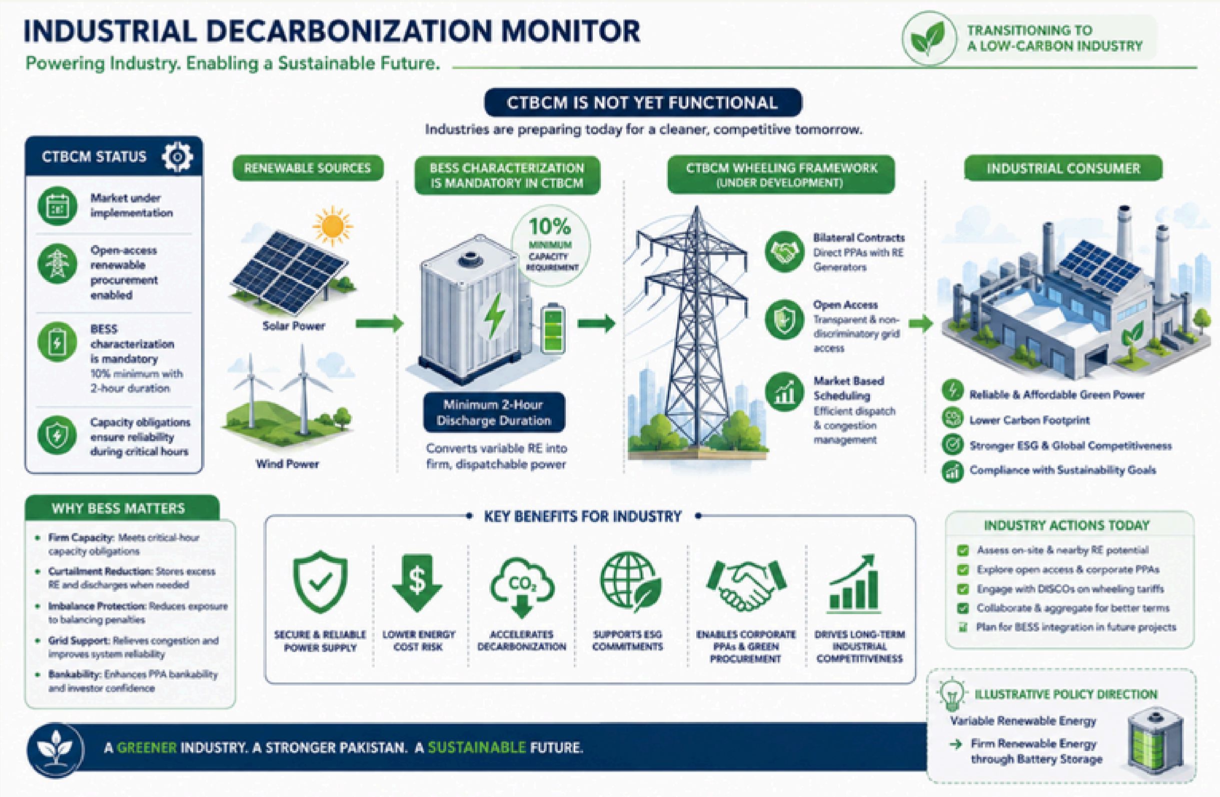

Figure 3: RE-procurement and BESS integration pathways under CTBCM

4. FY 2026-2027 Budget and Industrial Decarbonization Analysis

Pakistan's FY2026–27 budget reveals a significant gap between its green transition ambitions and fiscal capacity, while Figure 4 shows FY2026-2027 budget and industrial decarbonization analysis. Of the Rs18.771 trillion federal budget, debt servicing consumes Rs8.054 trillion (68.5% of net federal revenue), while only Rs1.276 trillion is allocated to development spending, limiting investment in climate and industrial initiatives. Although the budget introduces climate-responsive budgeting, just 1% of current expenditure and 11% of development expenditure are climate-related. Furthermore, of the Rs476 billion in green subsidies, 89% (Rs423 billion) is directed to the energy sector, whereas industry receives only Rs8 billion (1.7%), despite large-scale manufacturing contracting by 1.53% in FY2025.

> Debt servicing consumes **Rs8.054 trillion (68.5%)** of net federal revenue, leaving little **fiscal space for green investment.**

Meanwhile, renewable energy has expanded to 20.3% of installed capacity, with 7,319 MW of net-metered solar, but declining industrial electricity demand and the absence of dedicated solar incentives suggest that renewable adoption is being driven more by market forces than by government policy.

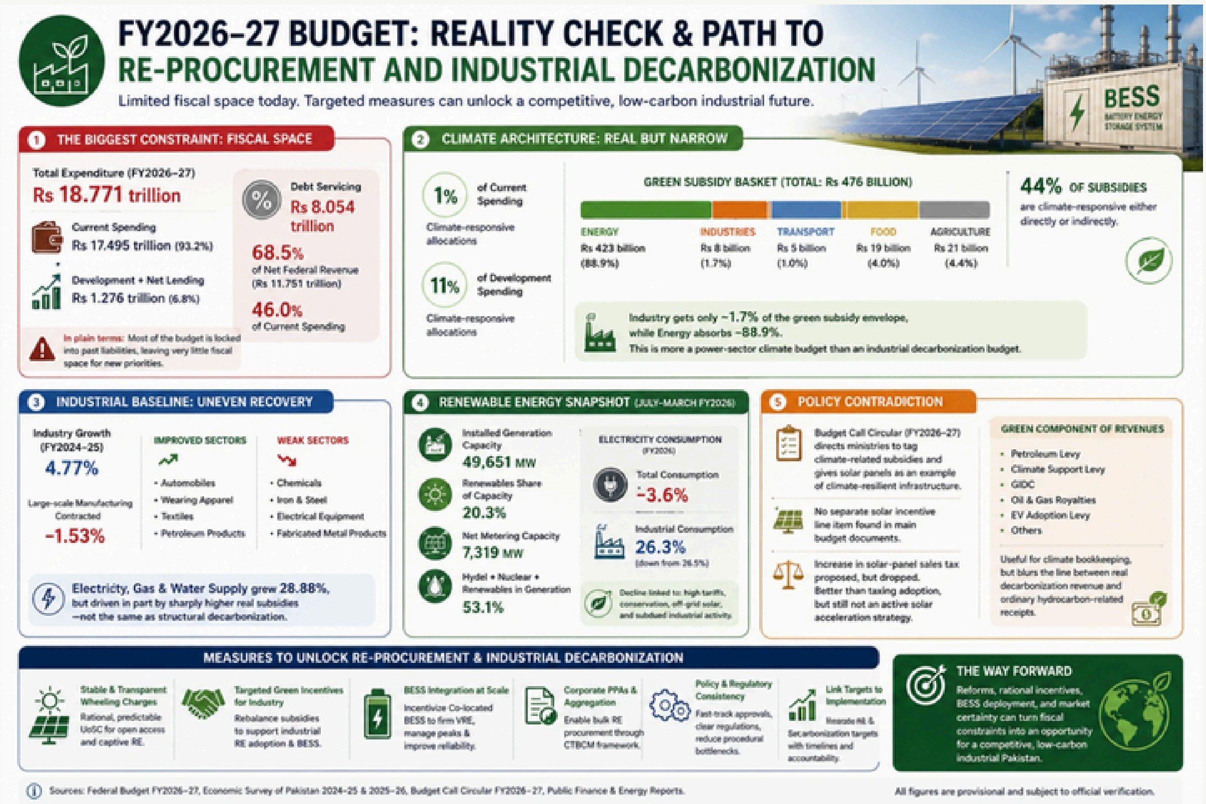

Figure 4: FY2026-2027 Budget and Industrial Decarbonization Analysis

5. Short Analysis of Sapphire Textile Mills (STML)

STML is one of Pakistan’s largest textiles, and its short analysis is presented below:

5.1. Why Sapphire Textile Mills

Sapphire Textile Mills Limited (STML) was selected as the case study because, as one of Pakistan's largest vertically integrated textile manufacturers and exporters, it covers the entire textile value chain and operates energy-intensive processes that enable comprehensive assessment of GHG emissions across direct, indirect, and supply-chain activities. Its advanced sustainability initiatives, including renewable energy investments, wastewater treatment, and resource-efficiency programs, also make it a suitable benchmark for evaluating climate performance within Pakistan's textile sector.

5.2. MRV Systems (Monitoring, Reporting, Verification)

At Sapphire Textile Mills, the MRV (Monitoring, Reporting, and Verification) system in Table 5 shows, how to track energy and resource consumption across operations, enabling reliable reporting of Scope 1 and Scope 2 emissions through standardized carbon accounting aligned with international sustainability standards. However, it relies on activity data and emission factors rather than real-time carbon monitoring, with limited integration of Scope 3 and supplier-level emissions tracking.

Table 5: Comprehensive MRV Framework for Sapphire Textile Mills Decarbonization

MRV Component	Data Source/ Activity	What is Measured	Scope	Monitoring Type	Accuracy Level	Key Strengths	Key Limitations / Gaps
Boiler Fuel Monitoring	Natural gas/steam boilers across processing units	Fuel consumption (gas volume, energy input)	Scope 1	Near real-time operational monitoring	High (operational data reliable)	Direct measurement of combustion activity; strong internal control	No direct carbon measurement
Captive Power Generation	On-site generators	Diesel/gas usage for electricity generation	Scope 1	Operational + periodic logging	High	Captures direct fuel-based emissions within the factory	Does not reflect upstream fuel lifecycle emissions
Electricity Consumption (Grid)	Utility bills + smart meters	kWh consumed across units (spinning, weaving, finishing)	Scope 2	Real-time/daily tracking possible	High	Easy to measure and verify; consistent reporting	Carbon depends on the Pakistan grid emission factor
Production Line Data	Machine-level and department-level monitoring	Output vs energy use ratios (efficiency metrics)	Indirect Scope 1 and 2 support	Semi-real-time	Medium	Helps link production efficiency with energy consumption	Not directly carbon-linked; varies by product mix
Steam Generation Systems	Boilers + thermal distribution systems	Steam output and energy conversion efficiency	Scope 1	Operational monitoring	Medium–High	Critical for dyeing and wet processing emissions tracking	Efficiency losses not always captured in carbon accounting
Water and Chemical Usage Tracking	Processing and dyeing units	Water consumption, dye/chemical input	Indirect Scope 3 relevance	Periodic reporting	Medium	Supports environmental footprint understanding beyond carbon	Not directly integrated into carbon MRV systems
Scope 1 Emissions Calculation	Internal fuel + boiler data	CO_2 from direct combustion	Scope 1	Post-processing calculation	High (if data quality strong)	Most reliable emissions category in textile MRV	Still not real-time carbon; it relies on emission factors
Scope 2 Emissions Calculation	Electricity consumption × grid	Indirect emissions from electricity use	Scope 2	Annual/periodic	Medium–High	Standardized global reporting method	Highly sensitive to grid emission factor changes
Scope 3 Estimation	Supplier data + industry databases	Cotton, chemicals, transport, outsourcing	Scope 3	Model-based estimation	Low–Medium	Enables full footprint reporting for ESG disclosures	Weak supplier-level verification; largely assumption-driven
Third-Party Verification	External auditors/ ESG assurance	Validation of reported emissions data	All Scopes (Scope 3 limited)	Annual	Medium–High	Enhances credibility for international buyers	Verification is document-based
Digital MRV Integration Level	Internal sustainability dashboards	Consolidated emissions reporting	All Scopes	Semi-digital/ periodic dashboards	Medium	Improves visibility across departments	Not a continuous “carbon real-time system”
Overall System Reality	Combined MRV structure	Energy → emissions conversion model	All Scopes	Hybrid (real-time + retrospective)	Medium overall	Strong operational data backbone	Carbon accounting remains indirect, delayed, and partially modeled

5.3. Scope 1 vs Scope 2 vs Scope 3 — The Real Gap

At Sapphire Textile Mills, emissions control is strongest for Scope 1, moderate for Scope 2, and most challenging for Scope 3 presented in Table 6, reflecting increasing complexity from on-site operations to grid electricity and upstream supply chains. While Scope 1 can be reduced through operational improvements, Scope 2 depends on renewable electricity adoption, and Scope 3 remains constrained by supplier data availability, emission factors, and limited supply-chain traceability.

Table 6: Scope-wise Emissions Structure

Scope	Emission Sources	Control Level	Key Characteristics	Major Challenges	Key Decarbonization Levers
Scope 1	Boilers, captive power generation, thermal processes	High (direct control)	Most measurable and plant-level verifiable	Dependence on fossil fuels; hard-to-abate heat demand	Fuel switching, energy efficiency, electrification, waste heat recovery
Scope 2	Purchased electricity from national grid	Medium	Easy to track via billing; grid-dependent emissions factor	High grid emissions; limited renewable penetration	Solar PV, net metering, renewable procurement, energy optimization
Scope 3	Cotton farming, chemicals, transport, subcontracted mills	Low (indirect)	Largest share of emissions; supply-chain intensive	Data gaps, weak supplier traceability, rely on estimates	Supplier engagement, traceability, databases, LCA , sustainable sourcing

5.4 Top Emitters Watch" What it looks like in reality

At Sapphire Textile Mills, a hypothetical "Top Emitters Watch" would rank performance based on operational emissions intensity, energy consumption, and fuel efficiency. However, such benchmarking captures only part of the company's environmental impact, largely excluding emissions from cotton cultivation, chemical production, logistics, and outsourced processing. Consequently, these rankings often reflect reporting quality rather than actual decarbonization progress, while sustainability certifications improve reporting credibility as shown in Table 7, but do not fully address upstream Scope 3 emissions.

Table 7: Certifications of Sapphire Textile Mills

Certification/ Standard	Focus Area	What It Covers in Practice	Relevance to Emissions and Sustainability	Relevance to Emissions and Sustainability
ISO 9001	Quality Management Systems	Standardization of production quality across textile operations	Indirect support via process efficiency and reduced waste	Does not measure or reduce carbon emissions directly
ISO 14001	Environmental Management Systems	Environmental monitoring, compliance, and continuous improvement systems	Supports structured tracking of energy, waste, and emissions	Focuses on management systems, not absolute emissions reduction
ISO 45001	Occupational Health and Safety	Worker safety and industrial risk management	Improves operational discipline and compliance culture	No direct linkage to decarbonization outcomes
OEKO-TEX Standard 100	Textile chemical safety	Restriction of harmful substances in textile products	Reduces hazardous chemical exposure	Does not address upstream cotton or energy emissions
GOTS (Global Organic Textile Standard)	Organic textile supply chain	Organic fiber sourcing and processing controls	Reduces agricultural chemical footprint	Limited penetration across total production volume
SEDEX / SMETA	Social and ethical compliance	Labor conditions, ethics, supply chain audits	Improves transparency in social governance	Weak linkage to env. or carbon performance
WRAP Certification	Responsible manufacturing	Compliance with lawful, ethical, and humane manufacturing standards	Strengthens governance and compliance credibility	Does not quantify emissions intensity or Scope 3 impacts

5.5. Decarbonization Progress at STML

At STML, the sustainability trajectory represents one of the most advanced decarbonization pathways in Pakistan's textile industry, where progress is increasingly driven by structured governance, renewable energy integration, and science-based targets rather than ad-hoc efficiency improvements. According to its sustainability disclosures and ESG reporting, the company has committed to SBTi-validated targets, including a ~50% reduction in Scope 1 and 2 emissions by 2032 and ~30% reduction in Scope 3 emissions (base year 2022), aligning with a 1.5°C pathway. Operationally, Sapphire has already made measurable progress through large-scale energy transition measures, including ~28.5 MW of installed solar capacity powering ~40% of selected weaving and processing operations and ~70% of home textile production, alongside significant use of biomass (rice husk, bagasse, corn cob, wood residues) in thermal systems to replace fossil fuels. Industry reporting further indicates that Sapphire has already achieved ~54.7% reduction in Scope 1 and 2 emissions, supported by coal phase-out in major captive systems and a shift toward renewable-based cogeneration infrastructure. Furthermore, Table 8 describes STML's decarbonization progress vs structural limits.

STML targets **50.4% Scope 1 & 2** and **30% Scope 3 emission** reductions by **2032 under SBTi.**

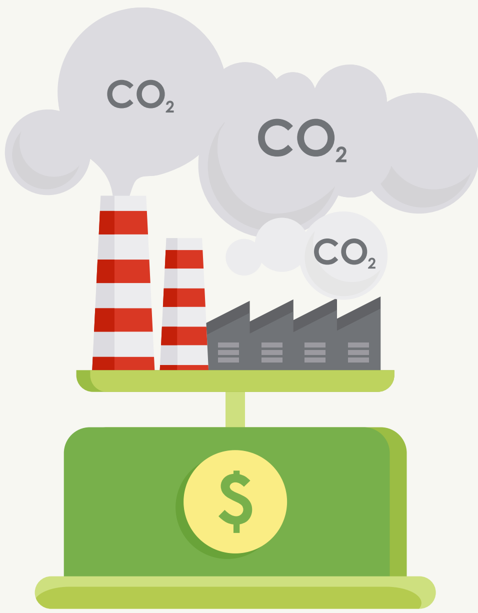

Table 8: Sapphire Textile Mills Decarbonization Progress vs Structural Limits

Dimension	Current Status at Sapphire Textile Mills	Quantified Evidence / Indicators	Interpretation for "Best-Case Reality"	Key Limitation
Science-based targets	SBTi-validated (1.5°C aligned)	~50.4% Scope 1 and 2 reduction target by 2032; ~30% Scope 3 reduction target (Textile World)	Strong governance alignment with global climate frameworks	Targets do not guarantee absolute decarbonization speed
Current emissions performance	Already, significant reductions have been achieved	~54.7% reduction in Scope 1 and 2 emissions (base year reported) (Textile World)	Among the highest-performing textile manufacturers in Pakistan	Gains largely from energy switching, not system redesign
Renewable energy adoption	Partial energy transition	~28.5 MW solar capacity; ~40% weaving/processing energy and ~70% home textiles powered by solar	Strong on-site renewable integration for industrial scale	Limited coverage for full thermal replacement
Biomass transition	Major fuel substitution in boilers and cogeneration	Biomass (rice husk, bagasse, corn cob, wood residue) replacing fossil fuels	Significant coal displacement in captive systems	The biomass supply chain is still resource-intensive
Water and resource efficiency	Operational efficiency improvements	~60,064 tons of water reused + ~7,916 tons of cooling water recycled (Jan–Jun 2023)	Strong circular resource management in operations	Water efficiency ≠ carbon elimination
Scope 3 emissions	Largely modeled	Includes cotton, chemicals, logistics, and subcontracting	Expanding traceability via digital systems	Weak supplier-level verification beyond Tier 1
Circularity initiatives	Emerging closed-loop systems	RESTORE recycling + regenerated fiber programs	Early move toward textile waste recovery	Scale is still limited vs virgin production
Structural transition status	Partial decarbonization	Mix of solar + biomass + efficiency upgrades	One of Pakistan's most advanced textiles decarbonization cases	Heat electrification and full fossil exit are still incomplete

6. Brand-Supplier Shared Responsibility

Pakistan's textile and sports & apparel industries are critical drivers of national economic stability, yet they are increasingly exposed to global climate mandates and volatile energy prices. The sector must decarbonize to stay competitive, but manufacturers carry a disproportionate share of the burden: high capital costs and technical barriers for green upgrades, electricity tariffs that make Pakistani textiles roughly 20 percent more expensive than regional peers, ageing machinery, and heavy dependence on the EU and US, which together absorb around 88 percent of shipments. This is compounded by a client paradox. Global brands pledge net zero by 2040 or 2050 and require suppliers to install solar, cut water use and adopt advanced monitoring, yet the fast-fashion model of high volumes and low prices means they rarely pay a premium for green production. Short-term sourcing and the threat of shifting orders to cheaper markets leave factory managers choosing between costly compliance and short-term survival, while green finance seldom reaches the small and medium enterprises that form the bulk supplier base. While Figure 5 shows commitments vs. commercial realities in RE transition.

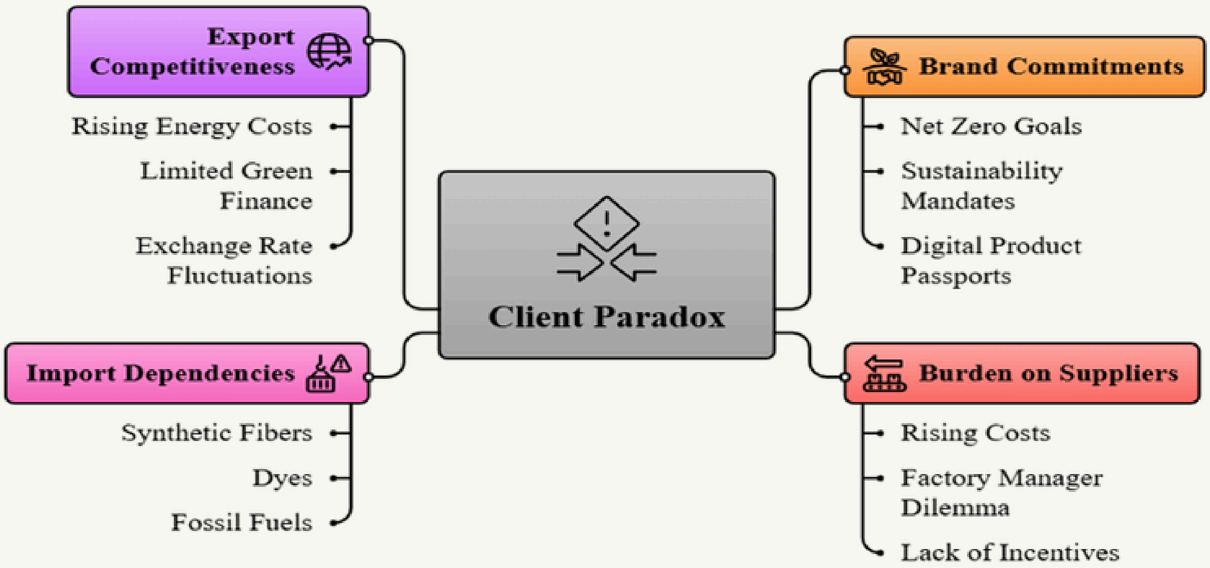

Figure 5: Commitments vs. Commercial realities in renewable energy transition.

A shared responsibility model in Figure 6 shows a way out by redistributing the costs and benefits of sustainability across the supply chain. Under it, global brands move from passive monitors of compliance to active facilitators of the transition: co-investing directly in supplier renewable energy, offering five-to-ten-year purchase agreements that unlock green financing, and providing technical support for complex energy technologies. By giving manufacturers volume certainty, brands lower their risk profiles and make large-scale projects such as rooftop solar and electrification viable. Collective initiatives like the Future Supplier Initiative show the model in action, with multiple brands pooling low-cost financing for shared suppliers to meet science-based climate targets, while partnerships with bodies such as the Asia Clean Energy Coalition help mobilize institutional capital and standardize green finance. For Pakistan the case is urgent: retaining GSP plus status and preparing for the EU Carbon Border Adjustment Mechanism both demand strict environmental compliance. A system-level approach, anchored in a shared charter for emission reductions, is what will keep the industry resilient and competitive in global markets.

Figure 6: The brand supplier shared responsibility model

The brands' narrative: shared responsibility, shared cost

> Decarbonizing our supply chain is one of the most important keys to further reduce our emissions. It requires commitments from brands and investors who are willing to invest. We encourage others to join our efforts."
> *Daniel Ervér, CEO, H&M Group*

> "[The initiative] unites brands, technical partners, and financial institutions to drive meaningful climate action across the industry, better and faster than any one company can on its own."
> *Richard Dickson, President & CEO, Gap Inc.*

> "Emissions in our value chain require ambitious efforts on a scale that calls for innovative, joint solutions."
> *Anders Holch Povlsen, Owner & CEO, Bestseller*

The facilitators and financiers

> "No single business alone can solve this challenge, but by sharing the costs, risks and responsibilities of the transition to renewable energy, we can build an ecosystem of solutions."
> *Eva von Alvensleben, Secretary General, The Fashion Pact*

> "Suppliers can self-finance some of these projects, or at least a large portion of them, if there is confidence in the relationship to the brand longer term." (suppliers, he adds, want brands to have "skin in the game")
> *Lewis Perkins, President, Apparel Impact Institute*

The suppliers' narrative: who pays, and who decides

> "Who pays to upgrade the supply chains? Is it the suppliers or the buyers, or both?"
> *Mostafiz Uddin, MD, Bangladesh Apparel Exchange / Denim Expert Ltd*

> "Every facility operates under its own set of constraints. Financial returns and carbon impacts can vary tremendously based on local factors such as energy prices, solar potential, policy, infrastructure, and equipment costs."
> Jimmy Summers, VP Sustainability, Elevate Textiles

> "Overlapping, brand-by-brand sustainability mandates compound into compliance theater, satisfying multiple scorecards without cutting emissions at the site."
> *Kritika Chauhan, Senior Manager, Sustainability, Shahi Exports*

7. Trionda Exports: Pakistan's Sports Industry

According to the latest finalized figures released by the PBS, the overall export of sports goods from Pakistan grew by a staggering 15.86% year-on-year. Total export earnings within the specific multi-month tracking cycle jumped to $179.33 million, compared to $154.79 million in the corresponding baseline.

The primary driver of this double-digit growth rate is, unsurprisingly, the football segment. Driven by the international roll-out of premium match and replica balls, football export revenues witnessed an explosive 23.64% increase, reaching $113.64 million. This represents a monumental vote of confidence from global mega-brands like Adidas, Nike, Puma, Select, and Reebok, which rely heavily on Sialkot's regional manufacturing cluster to execute their global retail supply chains.

Over the second quarter of 2026, spanning April through June, Sialkot's sports manufacturing sector has experienced an unprecedented surge in industrial activity, driven by a confluence of macroeconomic factors, technological adaptations, and seasonal tournament spikes. ADS organized an extensive 2-day training workshop under its FIFA program, for the sector, helping them to approach clean and green processes according to international standards on 15th and 16th May, 2026. Known globally as the "football factory of the world," Sialkot is responsible for an astonishing 70% of the world's hand-sewn and high-end thermo-bonded football production. Local factories turn out more than 40 million units annually during regular periods, a figure that industry specialists note has swollen significantly in recent months as global sports brands aggressively secure their inventories for upcoming international fixtures.

Sialkot's modern dominance on the global sports stage is intimately tied to its relationship with German sportswear giant Adidas, a partnership that has once again culminated in the exclusive production of the official 2026 FIFA World Cup match ball, named 'Trionda'.

The Trionda is a masterclass in aerodynamic design, featuring advanced polyurethane materials and a revolutionary configuration of thermally bonded panels that ensure near-zero water absorption and a highly predictable flight trajectory under diverse weather conditions.

The exclusive contract to manufacture the Trionda was awarded to Forward Sports Private Limited.

> “We export roughly 50 to 60 million individual football units annually. In World Cup season cycle, our total outbound export volumes expand by an immediate 20% to 30%, adding immense liquidity and employment opportunities across the entire regional economy."
>
> *Mohsin Masood, Secretary-General, PSGMEA*

> “Sialkot has transitioned seamlessly from a purely labor-intensive, hand-stitched hub into an advanced automated center utilizing state-of-the-art thermo-bonding and automated cutting technologies. We are proving to the world that Pakistani engineers and artisans can meet and exceed the most demanding standards of professional athletic competition."
>
> *Khawaja Masood Akhtar, Founder & CEO, Forward Sports*