China–Pakistan Investment Pitch Book
Battery Energy Storage Systems, Power Storage & Advanced Batteries Manufacturing Sector

1. Strategic Overview: Pakistan as China's Regional Energy Storage Manufacturing Base

Pakistan's Battery Energy Storage and Advanced Battery sector is emerging as a strategic manufacturing and export base, particularly for Chinese firms leveraging CPEC connectivity to access South Asia, the Middle East, Africa, and Central Asia. Rapid growth in solar energy rising to ~24% of the generation mix by 2025 has created strong, sustained demand for battery storage to support grid stability, renewable integration, and backup power.

The market is expanding quickly but remains import-dependent. Lithium-ion battery demand reached ~1.25 GWh in 2024 and is expected to scale to ~8.75 GWh by 2030, potentially translating into an annual import bill of USD 2.0–3.15 billion without local production.

Pakistan's domestic ecosystem lacks core capabilities, including cell manufacturing, materials processing (cathode/anode), component production (electrolytes, separators), and accredited testing and recycling infrastructure. This creates a clear greenfield opportunity for vertically integrated investments across the battery value chain.

The Pakistan Next Generation Energy Storage Policy 2026–31 provides a structured roadmap with phased localization, fiscal incentives, and tariff protection, ensuring policy certainty and enabling industrial scale-up for long-term growth and export competitiveness.

2. Why China Should Invest in Pakistan

Strategic Location Advantage

Factor	Benefit
CPEC Connectivity	Gwadar, Karachi, Port Qasim access. Access to ports handling >USD 100B trade corridors
Regional Reach	GCC, Africa, CIS, Central Asia. Access to USD 80–100B regional energy storage markets
Transit Time	Reduced through regional integration. 20–30% logistics cost savings
Shipping Cost	Gateway to multi-regional export markets such as GCC, Africa, CIS.

Market & Scale

Indicator	Value
Population	240+ million
Battery Demand (2025–26)	~5–6 GWh
CAGR (Demand)	~35–40%
Market (2031)	USD 1.5B+
Imported LIB Packs (2024)	1.25 GWh
Demand (2031)	~40–51 GWh
Import Dependence	High (cells, packs, materials) >80%
FX Exposure	Rising due to imports

Pakistan provides immediate volume scale and long-term growth visibility.

Cost Competitiveness

Cost Component	Pakistan Advantage
Labor	40–60% lower than China
Land	Low-cost industrial estates (SEZ-based industrial zones)
Power (SEZ)	Facilitated tariffs
Machinery	Duty concessions under policy
Financing	Export schemes + incentives
Fiscal Support	1% sales tax + accelerated depreciation
Overall Cost	20–30% lower vs ASEAN/GCC (Competitive for regional exports)

However, Policy also acknowledges higher electricity tariffs (~$0.12–0.15/kWh) impacting competitiveness, with intent for rationalization .

3. China–Pakistan Battery Cooperation Opportunity

Current Gap

Area	Status	Economic Gap
Cell Production	Absent	USD 2–4B import substitution potential
Pack Localization	<20% DVA	USD 1–2B value leakage
BMS	Limited domestic capability	USD 300–500M opportunity
Testing	No accredited labs	Export constraint
Recycling	Informal / absent	USD 200–400M recoverable value lost
Raw Material Processing	Not developed	USD 1.5–2.5B upstream value capture opportunity

Opportunity for China

Chinese firms can lead:

- LFP/NMC cell production
- Module automation lines
- BMS firmware platforms
- Containerized BESS systems
- Battery analytics & monitoring
- Second-life & recycling

4. Priority Investment Segments for Chinese Firms

Segment	Opportunity	Market
Cell Manufacturing	Import substitution	Regional
Pack/Module Lines	EV + Solar	South Asia
BMS Electronics	Safety systems	OEM supply
Grid BESS	Frequency regulation	Utilities
Recycling	Material recovery	Export
Testing Labs	IEC/UN	EU/GCC

5. Flagship Projects for China–Pakistan JVs

Project	Location	Capacity	Model
Cell Gigafactory	Punjab/Sindh SEZ	2–5 GWh	Tech JV
LFP Manufacturing Hub	Faisalabad	3 GWh	OEM JV
BESS Park	Port Qasim	1.5 GWh	EPC+JV

BMS Plant	Islamabad	1M units	Licensing
Recycling Plant	Punjab	20k t/yr	PPP

Supporting evidence:

- Current capacity: **~1–1.5 GWh assembly only**
- Target demand: **40–51 GWh by 2031**
- DVA target: **≥70% (Phase I), ≥80% (Phase II)**

6. Policy & Incentives for Chinese Investors

Financial & Fiscal Support

Instrument	Value
Reduced Sales Tax	1% for local manufacturers (~10–15% cost reduction vs imports)
Accelerated Depreciation	Up to 90% (Year 1)- ~20–25% CAPEX recovery benefit
Export Facilitation	EFS + Duty Drawback (5–8% export margin improvement)
Customs Policy	Duty-free inputs (10–12% cost advantage)
Tariff Protection	20% FED on CBU batteries (Strong import substitution protection)
HS Code Reform	Cell vs battery separation

Localization Roadmap

Phase	Period	DVA	Focus
Phase I	2026–28	≥70%	Components including Lithium-Ion cell, metal/PVC/plastic casings, wires & harnessing and packaging
Phase II	2029–31	≥80%	BMS, communication board for BMS. Metal casing, DC breaker, DC output connectors, bus bar / Nickle strips, Silicon coated DC cables, Battery communication board.

7. Export Market Access for Pakistan-Based Production

Region	Market Opportunity
GCC + Africa	High demand growth
Middle East	Grid-scale BESS
Central Asia	Solar-linked storage
Africa	Off-grid storage

Policy highlights **regional export potential** once standards compliance is achieved .

Export Target (Policy):

- USD 300M+ annually by 2031

8. What Pakistan Offers to Chinese Partners

Partnership Models

Model	China	Pakistan
OEM JV	Tech/Brand	Production
EMS	Orders	Capacity
Supplier Park	Components	Clusters
Licensing	IP	Access
R&D	Design	Engineers

Strategic Commitments

- Policy stability (2026–31 framework)
- Phased localization roadmap

- One-window approvals
- Battery industrial ecosystem development
- Export facilitation mechanisms

9. Facilitation & Government Interface

Lead Agencies

- Ministry of Industries & Production
- Engineering Development Board

Proposition for Chinese Investors

Pakistan offers Chinese battery and energy storage firms a high-growth, policy-backed manufacturing base anchored on a USD 6.5–9 billion domestic market by 2031, with immediate demand scale (40–51 GWh) and strong import substitution potential.

With clear policy incentives (1% tax, 90% depreciation, 20% CBU protection), low-cost production advantages (20–30% lower than regional peers), and access to USD 80B+ regional markets (GCC, Africa, CIS), Pakistan enables Chinese partners to establish integrated value chains from cells to BESS systems, while securing early-mover advantage in an underdeveloped but rapidly expanding ecosystem.

In essence: Pakistan is a demand-driven, cost-competitive, and policy-secured platform for Chinese firms to localize production, capture a multi-billion domestic market, and expand exports across emerging regions.

ANNEX-B-1

Pakistan-China B2B Investment Conference

Sector Snapshot *(To be attached with the investment pitch book)*

BATTERY ENERGY STORAGE SYSTEMS & POWER STORAGE DEVICES

I. Market Overview & Opportunity

a. Pakistan BESS Market Size & Growth

Indicator	Value
Total Market Size (2025–26)	Demand-driven (5–6 GWh)
Growth Outlook	High (multi-sector driven)
2031 Demand	40–51 GWh
Key Segments	EVs, Solar, BESS

b. Category-Wise Market Breakdown

Category	Market Size (USD) – 2025–26	Market Size (USD) – 2031	CAGR (%)
EV Battery Packs	~USD 300–400 M	~USD 3,500–4,500 M	35–40%
Solar & Distributed Storage	~USD 150–250 M	~USD 1,000–1,500 M	30–35%
Grid-scale BESS	~USD 200–300 M	~USD 1,500–2,000 M	35–40%
Telecom / Data Backup & Industrial	~USD 150–200 M	~USD 300–500 M	15–20%
Agriculture & Others	~USD 50–100 M	~USD 200–300 M	25–30%

c. Demographic Tailwinds

Indicator	Metric
Population	240+ million
Median Age	21–23 years
Urbanization Rate	38–39%
Middle-Class Size	40–50 million households
Avg. Disposable Income	PKR 1.2–1.5 million/year

d. Demand Drivers

Driver	Current Status
Solar Expansion	~26,000 MW imported (2022–24), creating ~USD 13–15 billion solar asset base and strong demand for storage
EV Adoption	Rapid growth under NEV/PAVE, driving ~20–25 GWh demand (~USD 3.5–4.5 billion) by 2031
Grid Stability	Rising renewable penetration requiring 10–12 GWh BESS (~USD 1.5–2.0 billion market) for grid balancing
Industrial Backup	Shift from lead-acid to lithium systems, creating 2–3 GWh demand (~USD 300–500 million market)

II. Local Production vs Imports

e. Import Bill of Batteries & Storage Systems

Year	Import Value (USD)	Import Volume
FY 2024	USD 280–320 Million	~1.25 GWh
FY 2025	USD 600–750 Million	~2.5–3.0 GWh
FY 2026 (Proj.)	USD 900 Million – 1.2 Billion	~3.5–5.0 GWh

f. Cost Comparison (Localization vs CBU Imports)

Cost Component	Local Manufacturing	CBU Imports
Freight	Low (localized supply chain; ~3–5% of cost)	High (~8–12% of landed cost)
Customs Duties	Preferential (0% on inputs; 1% sales tax; no FED)	Applicable (10–20% duties + 20% FED on CBU batteries)
Lead Time	3–5 weeks (domestic production cycles)	8–12 weeks (import + clearance delays)
Working Capital Lock	Lower (~20–30% less inventory holding)	Higher (long shipping cycles + duty payments)
Energy Cost Impact	Higher tariffs ($0.12–0.15/kWh) but offset by incentives	Embedded in import price
Policy Incentives	Strong (90% depreciation; EFS; DDT)	None
Supply Chain Risk	Low (domestic control)	High (FX volatility + import dependence)
Total Cost Index	70–80 *(with policy incentives applied)*	100–115 *(with FED & duties)*

g. Government Policy Direction

Policy Instrument	Description
Pakistan Next Generation Energy Storage Policy 2026–31	Comprehensive national framework to develop a USD 6.5–9 billion battery market, focusing on localization, export competitiveness, and supply-chain integration
Fiscal Incentive Regime	1% reduced sales tax for local manufacturers and up to 90% accelerated depreciation, lowering production cost by ~15–25% and improving project IRR
Customs & Tariff Framework	0% duty on cells till 2028, duty-free inputs for manufacturing, and 20% FED on CBU batteries to promote local production and import substitution
Export Facilitation (EFS & DDT)	Duty-free import of inputs for exports and tax refunds, enabling 5–8% margin improvement and integration into global supply chains
Localization Roadmap (DVA Targets)	Phase I (2026–28): ≥70% DVA, Phase II (2029–31): ≥80% DVA, capturing USD 5–7 billion domestic value addition
HS Code Rationalization	Separate HS codes for lithium cells and battery packs to prevent misuse and ensure proper tariff application
Standards & Compliance Framework	Mandatory compliance with IEC, UL, UN 38.3, ISO standards, enabling export readiness and safety assurance
Circular Economy & Recycling Policy	Introduction of Battery Passport, EPR, and recycling ecosystem, unlocking USD 200–400M material recovery potential

III. Export Potential & Market Access

h. Preferential Trade Access

Market	Trade Framework	Concessional Duty / Access
China	Pak–China Free Trade Agreement (Phase-II)	Preferential (declining tariffs; near-zero on multiple lines)
EU	GSP+ Scheme	Zero / Reduced (duty-free access on majority tariff lines)
GCC	Bilateral / Regional Trade Engagements	Low (generally 5% or below; high demand for BESS)
Africa	Bilateral / Transit Trade (via ports)	Low (duty advantages under emerging trade corridors)
Central Asia	Transit Trade Agreements (CPEC-linked)	Low (land connectivity advantage; reduced logistics cost)

i. Regional Demand Snapshot

Region	Application	Demand Growth	Estimated Market Size (USD)	Strategic Relevance for Pakistan
Middle East (GCC)	Grid-scale BESS, Utility Storage	High	USD 40–50 Billion	Large-scale grid stabilization, renewable integration, high-value projects
Central Asia	Solar-linked Storage, Hybrid Systems	Medium–High	USD 7–10 Billion	Emerging solar markets, proximity advantage, lower competition
Africa	Off-grid & Mini-grid Storage	High	USD 30–40 Billion	Energy access solutions, strong demand for low-cost modular systems

IV. Cost & Resource Analysis

j. Raw Material & Component Availability

Input	Local Capacity	Standards / Compliance	Remarks (Policy-Aligned)
Casings (Metal / PVC / Plastic)	Available (Scalable)	IEC / ISO compliant	Identified for localization in Phase I (≥70% DVA)
Wiring, Harnesses & Cables	Available	IEC compliant	Already locally produced; part of early localization
Lithium-ion Cells	Not available (assembly only)	Imported (IEC / UN 38.3 compliant)	Local cell manufacturing absent; targeted for localization under phased roadmap
Battery Management System (BMS)	Limited (assembly level)	IEC / UL applicable	To be localized in Phase II (≥80% DVA)
Electrolyte & Separator	Not available	Imported (IEC / ISO standards)	No domestic production; high-value upstream gap
Cathode / Anode Materials (LFP, Graphite etc.)	Not available (raw minerals exist)	To be aligned with international standards	Minerals available but no beneficiation or battery-grade processing
Testing & Certification Labs	Not available (fragmented)	IEC / UL / ISO required	Critical gap for exports and compliance
Recycling Infrastructure	Informal / absent	Environmental & ISO standards required	Policy introduces EPR + recycling ecosystem

k. Utility Costs

Utility	Industrial Tariff	SEZ Tariff
Electricity	~USD 0.12–0.15/kWh (reflecting higher industrial tariffs impacting competitiveness)	Facilitated / concessional tariffs under SEZ framework (lower than national average)
Gas	~USD 6.5–9.0/MMBTU	Competitive / priority allocation for industry (policy-supported)
Water	Moderate (location dependent)	Subsidized / infrastructure-supported in SEZs

l. Labor Cost Structure

Category	Avg. Monthly Cost
Unskilled	$120 – $180
Semi-Skilled	$180 – $280
Skilled	$280 – $450
Engineers / Technicians	$500 – $900

V. Fiscal & Tariff Incentives

m. Tax Regime Overview

Tax Type	Rate
Corporate Tax	29%
SEZ Holiday	5–10 years
Withholding	As applicable
PST (Services)	13–16%

n. Tariff Differential

Category	Duty Rate (Updated)
Raw Materials (Electrolytes, Graphite, Foils, Chemicals)	0% (across policy period)
Lithium-ion Cells (Import Stage)	0% till 2028 → Gradual increase thereafter (up to ~10%)
SKD / Components (BMS, Connectors, Casings, etc.)	0% initially → 5–10% (phased increase 2028–31)
CBU Battery Packs (Finished Batteries)	20% FED + existing customs duties (effective protection layer)

VI. SEZs & Facilitation

o. Priority SEZs

SEZ	Province	Status	Suitability
Rashakai	KP	Operational	High
Allama Iqbal City	Punjab	Operational	High
Port Qasim / Dhabeji	Sindh	Developing	High

p. Approval Timelines

Authority	Timeline
SECP	1–3 days
BOI / SEZ	1–3 months
EDB	1–2 months
EPA	1–2 months

VII. Investment Projects

q. Available Projects

Project	Location	Investment	Structure	IRR
Pack Assembly (EV + Solar + BESS Modules)	Faisalabad / Lahore Industrial Cluster	USD 80–150 Million	JV / OEM Partnership	20–24%
Cell Gigafactory (LFP/NMC – Phase I 2–5 GWh, scalable)	Punjab (Allama Iqbal SEZ) / Sindh (Port Qasim / Dhabeji)	USD 500–800 Million	Tech JV / Strategic Partnership	22–28%
BESS Park (Containerized Storage + Grid Systems)	Port Qasim / Karachi	USD 200–350 Million	EPC + JV / BOO Model	18–22%

r. Land Availability

Location	Plot Size	Rates	Utilities
SEZ	10–100 ac	Subsidized	Available
Non-SEZ	Variable	Market	Partial

VIII. Financing Ecosystem

s. Financing Sources

Source	Instrument	Terms
Local Banks / DFIs (SBP, EXIM, Commercial Banks)	Project Finance / Working Capital	KIBOR + 2–4% spread, tenor 5–10 years, local currency exposure
Chinese Policy & Commercial Banks (CDB, Exim Bank of China, ICBC)	Long-Term Debt / Supplier Credit / EPC Financing	Concessional or commercial rates, tenor 10–15 years, linked to EPC/JV structures
State Programs (SBP)	LTFF / TERF-type Schemes / Credit Guarantees	3–5% subsidized financing, tenor 5–10 years, CAPEX support for manufacturing
Multilateral Institutions (IFC, ADB, World Bank)	Blended Finance / Climate Finance / Guarantees	Low-cost debt + risk guarantees, tenor 10–20 years, ESG-linked
Equity / JV Investment (Chinese OEMs + Local Partners)	Direct Equity / Strategic JV	IRR 17–22%, long-term industrial investment
Export Financing (EFS / Buyer Credit)	Export Refinance / Buyer's Credit	Preferential rates, linked to export orders, FX earnings backed