RENEWABLES FIRST

Pakistan's Climate Tech Opportunity

In partnership with

NEW ENERGY NEXUS

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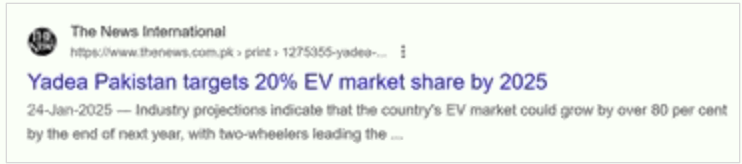
Pakistan's Climate tech ecosystem is gradually mainstreaming its presence

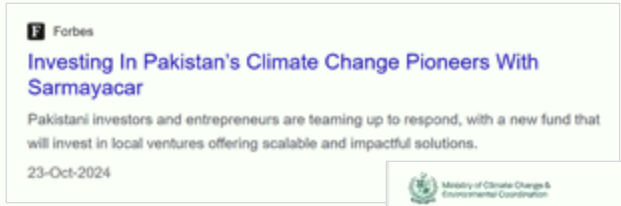
Cheap energy in sight
Pakistan is set to import **USD 15 billion** (B) (4% of GDP) of fuel in FY25, but within a decade this could drop as rapid solar and EV adoption curb oil demand.

Record solar uptake
The country imported ~ **21 GW of solar panels** between July 2023 and January 2025 in one of the largest solar booms seen in the global south. This growth is a bottom-up "survival response" by households and businesses facing high costs and power outages.

Electric 2-wheelers surging
With around 30 million motorbikes on the road in Pakistan, e-mobility is taking off on two wheels. Startups like Zyp Technologies are rolling out battery-swappable electric bikes that significantly reduce operating costs, tackling fuel expenses and urban pollution.

Source: RF insights, The News, Bloomberg, Forbes, Business Recorder, Ignite





While a laggard in investments, the proposition has recently captured investors' eye

Climate ventures as a niche

Climate tech startups attracted only ~ **2–3% of Pakistan's venture funding** between 2019–2023, with deal sizes far below the startup ecosystem average. Globally, the vertical accounted for 6-10% of total private equity and venture funding during the same period.

First climate-focused venture capital (VC) fund

2024 saw Pakistan's first dedicated climate tech venture fund launch. Climaventures Fund (targeting ~ USD 40 million (M)) secured **a USD 15 M anchor commitment** from the Green Climate Fund (GCF), a milestone for the local ecosystem.

Notable climate tech deals

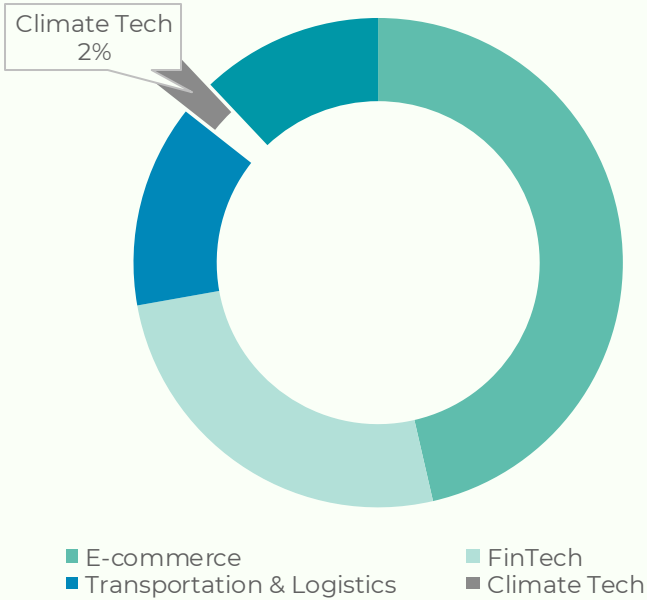
Local climate startups are beginning to secure significant capital. E-mobility venture Zyp raised **USD 1.2 M** seed funding in Sept 2023 and a **USD 1.5 M** pre-series A in July 2024, to expand electric bike deployments.

Investors pivoting to climate

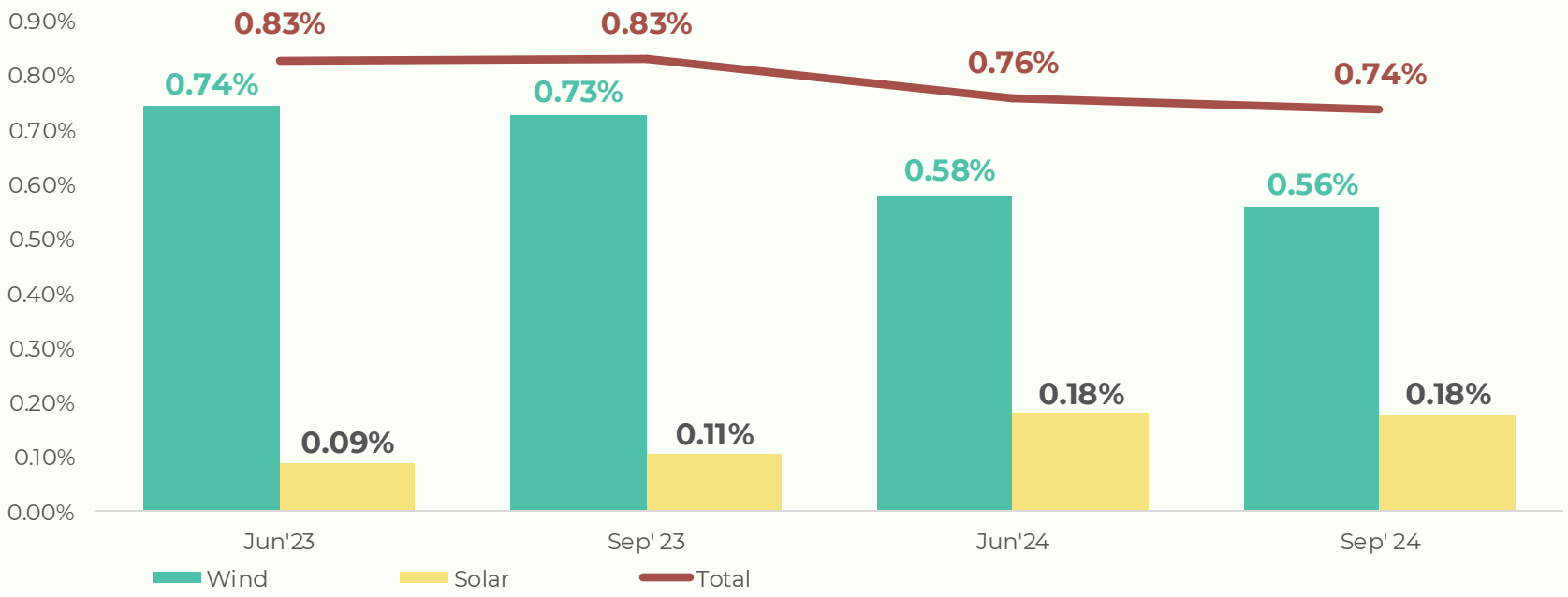
Mainstream VCs are now actively screening climate tech opportunities. Industry insiders note that all new Pakistani VC funds "**have a cleantech or climate allocation**", a stark shift from a few years ago.

Source: Data Darbar, Profit Magazine, PwC

Sector breakdown | Funding | 2019 - 2023

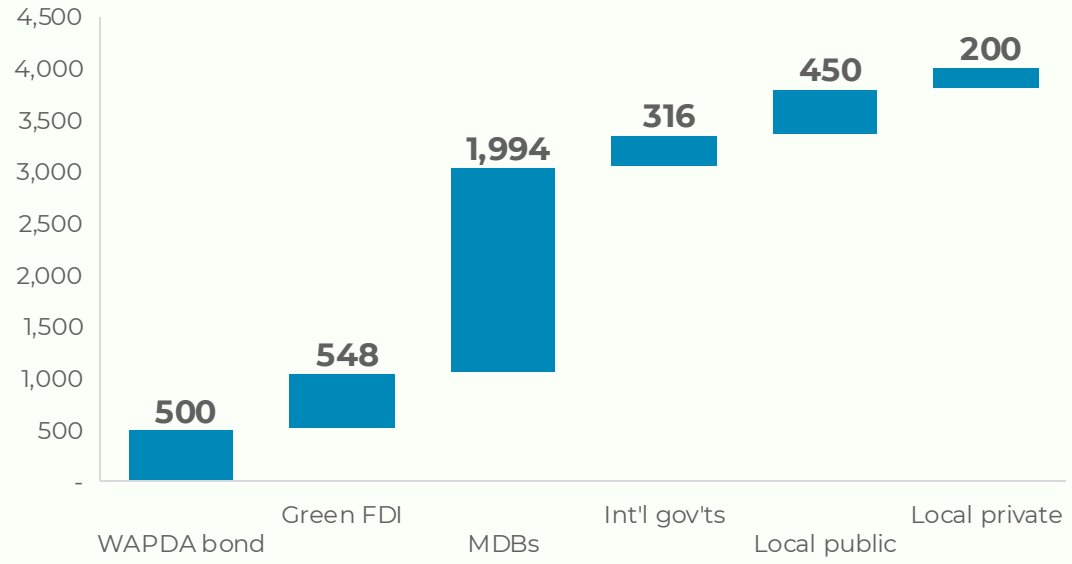


But private credit for key verticals like renewables remains negligible



Source: State Bank of Pakistan

Limited access to various sources of climate financing has also impeded the country's climate tech ambitions



Source: World Bank, BCG

Pakistan's Climate Finance Requirements

Investment needs equivalent to 10% of GDP

- USD 348 B of total investment required (2023 - 2030)
- USD 152 B for adaptation
- USD 196 B for mitigation

Ambitions vs Reality

14% of it can be met through existing sources

- 5x funding gap for adaptation
- 16x funding gap for mitigation

Intl. financing Remains the Key

84% of financing was channeled from abroad

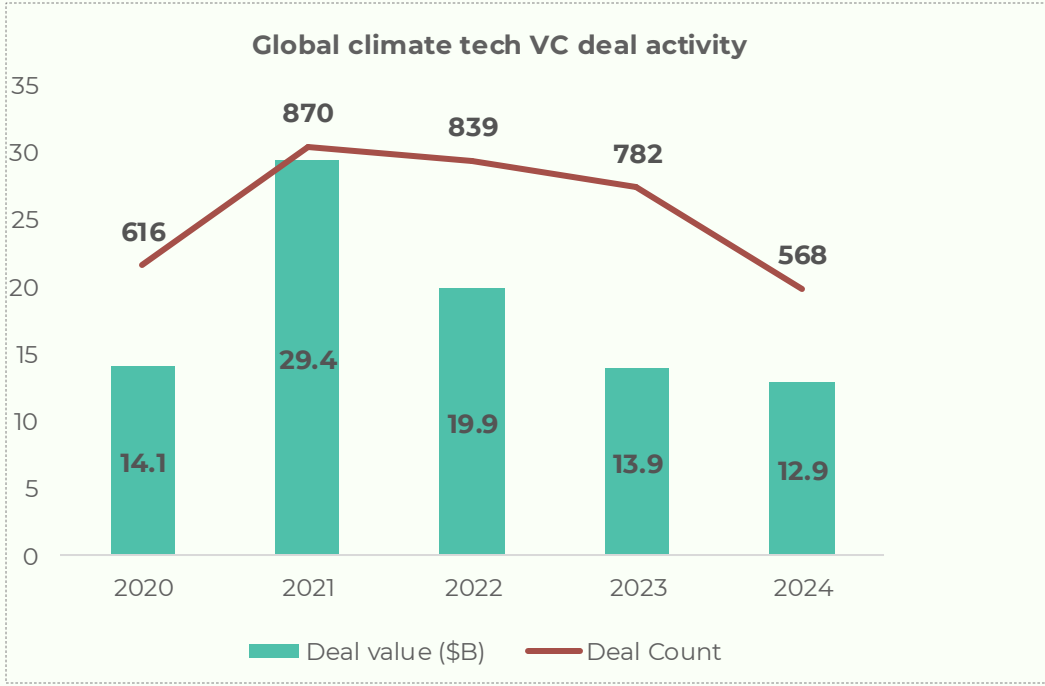
- Intl. development partners – 58%
- Intl. private sector – 26%
- Domestic public sector - 11%
- Domestic private sector - 5%

This coincides with a global downturn in climate venture investing

Market Downturn
Higher borrowing costs and economic uncertainty has dampened climate tech investments over the past year.

Quality Focus
Mediocre "green-only" propositions are losing traction while companies with compelling value continue to secure funding.

Later-Stage Concentration
With fewer IPOs and exits, activity has shifted from early-stage to mid/late-stage deals that comprised 37% of all climate tech transactions in Q1-Q3, 2024.



Source: PwC, Pitchbook

The Ecosystem At A Glance

The evolution of Pakistan's growing startup ecosystem

Untapped Potential
Youth bulge (median age 22) with 100M+ mobile broadband users created fertile ground for tech startups to emerge in the latter half of the last decade.

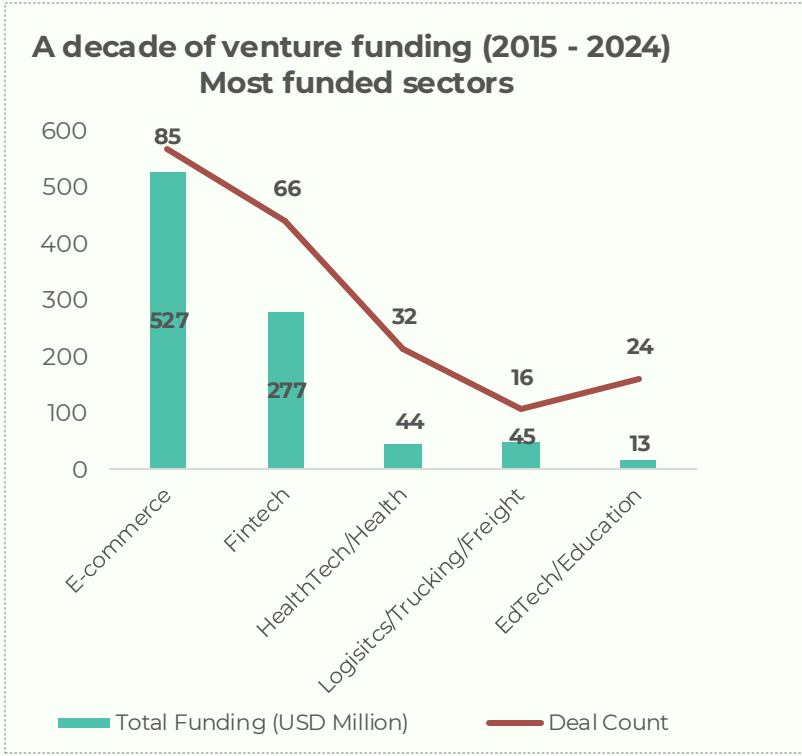
Investment Journey
VC funding stagnated at just USD 10M/year (USD 0.05 per capita) during 2016 - 2018.

Breakthrough
Funding surged to ~USD 352M in 2021 and ~ USD 355M in 2022 as regulatory barriers eased and global investors made significant bets.

Market Focus
Early ventures targeted largest offline markets, bringing retail and supply chains online.

Sector Distribution
Over half of 2021 funding went to e-commerce (B2C and B2B), from rapid grocery delivery to digitizing "kirana" stores.

Ecosystem Growth
Logistics providers scaled in parallel while fintech boomed following new electronic money and digital banking licenses.



Source: McKinsey, Invest2innovate

The ecosystem's potential remains largely untapped

Source: McKinsey, PTA, Invest2innovate

Economy

Nominal GDP (2024)	**$375B**
GDP per capita	**~$1,500**
Real Growth	**~2%**
Inflation	**0.7% (Mar 2025 YoY)**

Population

Population	**240M+**
Pop CAGR 22 – 27E	**1.84%**
Population Under 30	**64.6%**
Rural Population	**61.2%**

Ecosystem Outlook

Venture Funding (2024)	**$42.5M**
Venture Penetration	**0.01%**
Venture Funding Gap	**0.74%**
Broadband Penetration	**60%**
Mobile Teledensity	**80%**

With a nascent investor ecosystem supporting deal activity

Investors	Startups	Origin	AUM	Category
Zayn VC	22	Local	USD 47 M+	VC
SOSV	21	Foreign	USD 1.5 B	Accelerator
Fatima Gobi Ventures	19	Local	USD 30 M	VC
Indus Valley Capital	16	Local	USD 40 M+	VC
Sarmayacar	15	Local	USD 25 M	VC
I2i Ventures	15	Local	Undisclosed	VC
Deosai Ventures	13	Local	Rolling Fund	VC
Y - Combinator	12	Foreign	Undisclosed	Accelerator

Source: Data Darbar (As of 2023)

In parallel, different verticals within climate tech are gaining traction as "Green" becomes mainstream

Climate tech Sub-sector	Value-Chain Focus & Pressure points	Market Maturity	Financing Needs	Tech Dependencies
Distributed Solar Power	Delivering energy solutions to remote users involves challenges like collecting payments (e.g., through PayGo systems) and maintaining equipment. In cities, solar providers concentrate on net-metering and backup power options.	**Moderate**	**High up-front cost**	**Hardware-heavy**
Electric Mobility	Challenges include setting up EV manufacturing and conversion units, building out the battery supply chain, and expanding charging infrastructure. There's intense competition for battery procurement and difficulties in rolling out citywide charging points.	**Nascent**	**Capital-intensive**	**Import dependent**
Waste-to-Energy & Circular	Ensuring a steady supply of organic waste (like agricultural leftovers and city waste) is crucial. It must be efficiently converted into usable energy (like biogas or fuel) and distributed as power or materials. This process needs to include informal waste collectors to function effectively.	**Nascent**	**High Capex**	**Tech-intensive**
Sustainable Agriculture & Food	Techniques such as precision irrigation, cold storage, and recycling of farm waste (into fuel or compost) are vital. However, there's a need to align with existing agricultural supply chains and offer dependable solutions for farmers.	**Early**	**Varied**	**Agri-science dependent**
Energy Efficiency & Buildings	Smart technologies like IoT audits, intelligent appliances, and eco-friendly materials help reduce energy use. A significant hurdle is persuading established companies to adopt these innovations without being required by law.	**Nascent**	**Moderate**	**Tech-enabled**

Source: World Bank

These unique verticals have their own set of challenges (continued)

1 Lack of Tailored Support Programs

As per our survey, around 80% incubated startups in the vertical are hosted by government's National Incubation Centers (NICs) which **don't offer specialized programs**.

A dearth of homegrown success stories in the space coupled with the nascency of the climate tech ecosystem has **kept local expertise from developing**.

This has a cascading effect on attracting enterprising individuals to the vertical, effectively **choking the pipeline of scalable startups**.

2 Longer Gestation Period

Capital intensive processes alongside the need for sourcing raw materials from abroad like in the case of solar and EV technologies, increases the duration of the product development cycle.

Dynamic regulatory landscape and licensing complexities delay the launch of climate tech startups, notably seen in electric two-wheeler companies **taking 2 - 3 years to bring products to the market.**

Limited local manufacturing and testing facilities increases the lead time for MVP development as startups waste considerable time to gain access to these services**.**

These unique verticals have their own set of challenges

3 Lack of Cohesive Business Models

Most founders are forced to be market creators due to a lack of local precedents, requiring **significant business acumen** alongside product knowledge.

Challenges around market sizing and lack of available data makes it difficult for startups to gauge market readiness resulting in promising **solutions failing to make it beyond the MVP stage**.

A large segment of the climate tech space is dominated by sophisticated offerings that fail to bring down the cost of development thus, **remaining constrained to a niche sub-segment**.

4 Customer Adoption

Lack of customer awareness around climate tech products coupled with missing regulatory initiative has translated **into limited early adopters.** A prime example is range anxiety around EVs.

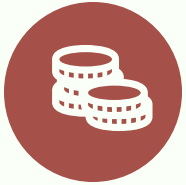
Limited customer traction also originates from a **lack of consumer financing solutions.** A survey by Policy Research Institute for Equitable Development indicates that more than 90% of the banks abstain from EV lending.

Non-existent ancillary infrastructure means that there is limited use case for consumers to adopt many climate tech solutions**.** e,g. no demand for flexi grid solutions due to single buyer model in Pakistan.

Barriers That Are Keeping The Ecosystem From Growing

Climate venture ecosystem has suffered due to the weak discourse around the country's climate challenges

Weak Public Discourse
Limited public and private awareness of climate urgency and solutions resulting in little societal or market demand/urgency.



Investor Skittishness
Climate ventures are perceived as high-risk low-return bets further limiting potential for growth capital.

Policy-action gap
Unclear execution and coordination resulting in a fragmented, siloed institutional response.

Low Adoption & Pipeline
Fewer incentives or narratives to drive green uptakes resulting in a scant climate venture pipeline.

Ambiguity around implementation frameworks for climate policies adds to the challenges

- **Fragmented climate policy ownership**
- **No Execution blueprint/siloed implementation**
- **Low venture awareness and risk aversion among investors**
- **Unfunded, misaligned climate startup ecosystem**

Barrier	Implications for the Climate Venture Ecosystem
Policy-Action Disconnect	While Pakistan has adopted ambitious climate policies (e.g. NDCs, National Adaptation Plan), there is no unified roadmap for how these will be implemented across sectors.
Siloed Institutional Ownership	Climate mandates are scattered across ministries without clear coordination mechanisms (e.g. MoCC, MoST, provincial and federal level), diluting policy translation into operational support. Private sector finds it hard to align or comply, reducing investment traction.
Low Public-Private Dialogue	Few structured forums exist for public-private climate dialogue. As a result, climate tech ventures are excluded from policy feedback loops, and innovation lags behind evolving policy needs.
Fragmented Awareness Across ESO & Finance	Incubators, VCs, and entrepreneurship enablers exhibit limited understanding of climate policy incentives, tax benefits, or compliance requirements. This restricts both funding access and venture creation.

Limited availability of early stage derisked capital has kept the ecosystem from taking off

Supply side

Aspiring climate founders
Academic prototypes
ESO graduates

No early-stage de-risked capital

Few grants or concessional funds
High risk perception
No climate-specific funds

Blocked outcomes

MVPs are stalled
No pipeline to Series A
Investors end up sitting out
Climate impact delayed

Later stage investments are also a rarity leading to challenges in scaling

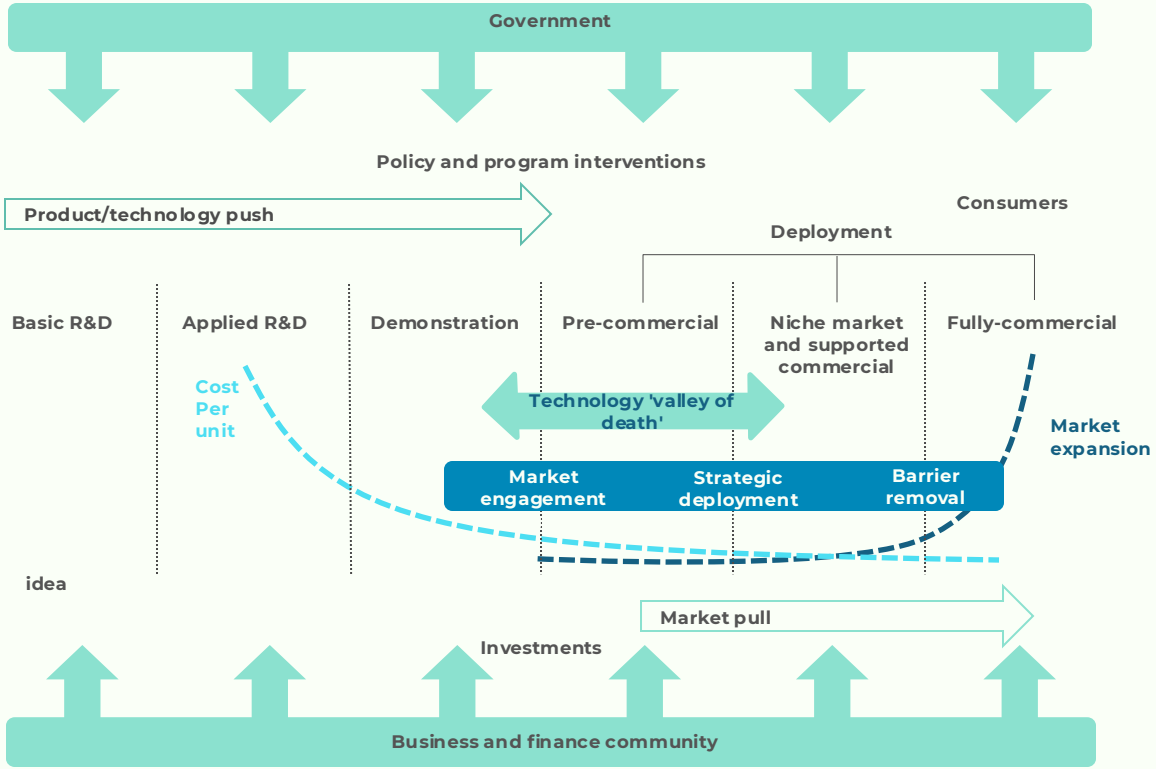
No domestic growth-stage climate funds	Ventures with proven pilots cannot access Series A/B financing
VCs remain early-stage or risk-averse	Most investors focus on MVPs or quick exits, as scaling hardware-heavy climate ventures is seen as capital intensive
Weak pipeline credibility	Only a few ventures have the potential for scale vs hundreds in ideation stage due to insufficient traction for VC confidence
Absence of anchor buyers or public procurement	Without guaranteed offtake (e.g. utilities, municipalities), startups struggle to demonstrate market demand at scale

Lack of private sector capital has led to inadequate funding opportunities

Macroeconomic volatility, weak green asset frameworks, and no concessional de-risking instruments have stalled capital flow at every stage. Generalist investors remain cautious, and climate ventures lack the tailored financing structures needed to bridge from pilot to scale.

 Stage	 Startup Need	 Private Capital Willingness	 Gap
Ideation	Grants, pre-seed de-risked capital	No instruments or vehicles	High-ecosystem neglect
MVP/Pilot	Seed funding and technical assistance	Generalist VCs are cautious	Blended finance missing
Growth (Series A)	Scaling, infrastructure and partnerships	No active green growth VC	No channels for follow-on capital

These barriers have culminated into challenges around market expansion



Adopted from World Bank

Having a market focus is key to help bridge the technology valley of death.

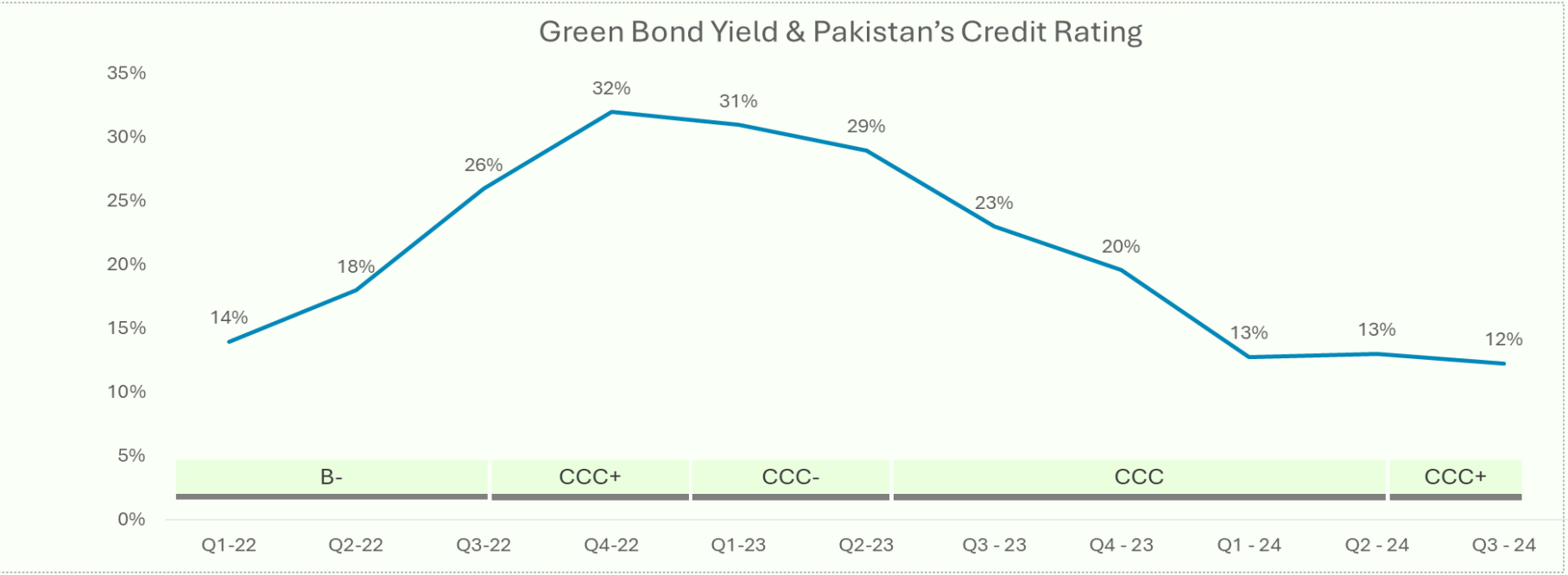
Venture Capital and other finance enter once there is evidence of potential market expansion.

Market and system barriers can prevent significant scale potential of climate tech startup.

The Compelling Investment Opportunity

Previously, high yields on Pakistan's green bond had priced out many investment opportunities for foreign investors

Structural reforms over the past six months have strengthened the macroeconomic outlook, with Fitch upgrading the country rating to B- from CCC+, improving the risk-return profile for foreign investors.



Source: Fitch Ratings, Bond Blox

However, post macro correction, multiple bankable opportunities have emerged

Derisking instruments like concessional financing remain key for enhancing viability of opportunity areas in climate tech. However, the country has underutilized avenues like global climate funds, securing just $250M from GCF versus India's $782M and Bangladesh's $441M despite similar climate challenges.

De-risking instruments for bankable climate opportunities in Pakistan

Opportunity	RE Generation	Evs	Distributed Generation	Energy Efficiency
Potential for intervention in export industries	Low	Low	Medium	Medium
Typical economic viability				
Risk considerations specific for Pakistan	Political Risk Credit risk	Political Risk Credit risk	Political Risk Credit risk	Political Risk Credit risk
Derisking instrument	✓ Concessional financing ✓ Partial credit guarantees ✓ Political risk guarantees	✓ Concessional financing ✓ Partial credit guarantees ✓ Political risk guarantees	✓ Concessional financing ✓ Partial credit guarantees ✓ Political risk guarantees	✓ Concessional financing ✓ Partial credit guarantees ✓ Political risk guarantees

Source: World Bank, BCG

With renewables presenting an attractive investment case

Massive Growth: From July 2023 to January 2025, Pakistan imported 21 GW of solar panels, enough to power half the country and 23 times more than all existing large-scale solar projects.

Everyone's Going Solar: Businesses, factories, and homeowners are rapidly adopting renewable energy solutions.

Strong Returns: Projects using power purchase agreements or leasing models are delivering impressive returns of over 25%.

Ancillary Services Opportunity: This solar boom has opened lucrative markets for installation specialists, maintenance providers, and suppliers of mounting hardware, inverters, and batteries.

Viable Exit Strategy: With a new publicly listed solar investment fund, investors now have a proven way to cash out their clean energy investments.

Existing Players	Value Chain Presence
NIZAM ENERGY	Nizam Energy is in the business of design, construction, operation, management, and financing of solar energy projects
Reon Energy	Reon Energy is in the business of design, deployment, and maintenance of solar solutions for commercial and industrial entities
ShamsPower	Shams Power offers economically priced solar power solutions
K	K-solar provides clean and green energy solutions
BURJ	Burj solar is in the business of Design, construction, operation, management, and financing of solar energy projects
PRISM ENERGY	Prism energy invests in solar equipment, engaging installers for the installation of solar equipment and selling solar generated power to the site owners

Distributed RE projects can generate attractive returns with less than USD 1M in capital outlay

Illustrative Example

2 MWp of Solar deployment	PKR
Project Cost	244,297,300
Debt @ 80%	195,437,840
Equity @ 20%	48,859,460
Rental - Monthly per KWp	4,000
Cost of Equity	25%
Cost of Financing	15%

NPV	79,405,736
Project IRR	25%

P&L (PKR)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000
O & M Cost	3,020,000	3,322,000	3,654,200	4,019,620	4,421,582	4,863,740	5,350,114	5,885,126	6,473,638	7,121,002
Insurance Cost	420,036	420,036	420,036	420,036	420,036	420,036	420,036	420,036	420,036	420,036
Operating Profit	92,559,964	92,257,964	91,925,764	91,560,344	91,158,382	90,716,224	90,229,849	89,694,838	89,106,326	88,458,962
Financial Charges	28,812,573	27,348,701	25,652,586	23,687,382	21,410,398	18,772,168	15,715,383	12,173,637	8,069,992	3,315,302
Profit Before tax	39,317,661	40,479,532	41,843,447	43,443,231	45,318,254	47,514,325	50,084,737	53,091,471	56,606,604	60,713,930
Margin	41%	42%	44%	45%	47%	49%	52%	55%	59%	63%

The viability of EVs have also risen with two wheelers leading the charge

Pakistan's two-wheeler market presents a significant investment opportunity, with 30 million motorcycles on roads and 1.5 million annual sales establishing a strong foundation.

The electric transition is gaining momentum with 50,000 e-bikes currently in use, and monthly sales reaching 3,000 units.

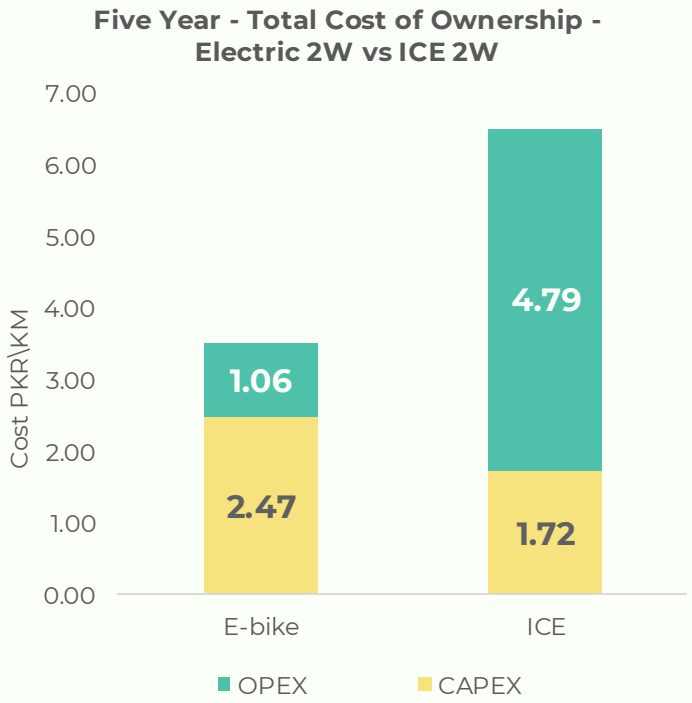
Government policy supports this growth with targets for 30% market share (500,000 units annually) by 2028.

The economic case for demand is compelling. Traditional motorcycles cost Rs. 6.51/km over five years, while electric alternatives cost only Rs. 3.52/km..

This substantial cost advantage is driving consumer adoption, reinforced by favorable government policies.

The early-stage market presents significant growth potential within Pakistan's established two-wheeler ecosystem.

Source: Pakistan Automobile Manufacturing Association, Profit Magazine



Setting up EV infrastructure also has potential to generate lucrative returns

Our economic model of an EV charging station with 12 batteries performing a total of 40 daily swaps demonstrates strong viability. With Rs. 2.18 million in setup and battery costs, plus ongoing expenses of Rs. 80,000 monthly rent and maintenance at 2% of revenue, the government's reduced PKR 34 tariff significantly improves economics, enabling **payback of around 3 years** at a Rs. 150 per-charge fee.

Assumptions	Unit	Year 1	Year 2	Year 3	Year 4	Year 5
Number of 2W Batteries	#	12	12	12	12	12
Milage per charge	KM	70	70	70	70	70
Average Traveling/Day -B2C	KM	50	50	50	50	50
Swap Fee	PKR	150	150	150	150	150
Unit Cost of Electricity	PKR	34	34	34	34	34
Unit Consumed per charge	Kwh	1.4	1.4	1.4	1.4	1.4
2W - Swap Station Cost	PKR	800,000				
2W - Swap Station Rent - Monthly	PKR	80,000	88,000	96,800	106,480	117,128
Battery Investment	PKR	1,380,000				

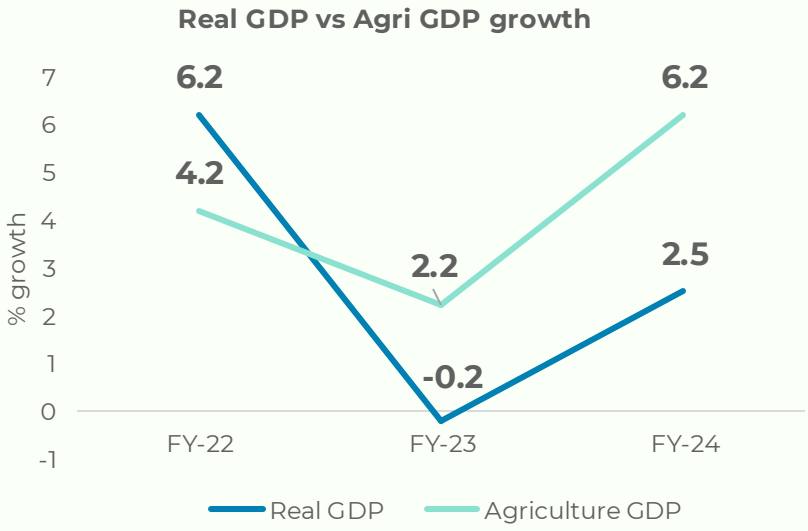
Agri-tech also offers immense return potential due to its scale and fundamental importance

Agriculture accounts **for 24% of Pakistan's GDP** and employs over one-third of the workforce, creating substantial opportunities for agri-tech innovation across multiple high-growth segments: including

Farmer Platforms & Financial Solutions: Connecting farmers with financing, quality inputs, and value chain stakeholders through high-yielding inputs, information platforms, and bundled financial services.

Smart Farming Technologies: Enhancing productivity and climate resilience through small-farm mechanization, crop monitoring systems, alternative farming methods for degraded lands, and regenerative agriculture practices.

Post-Harvest Solutions: Reducing food loss while improving quality and distribution efficiency via end-to-end value chains connecting smallholders to premium markets and farm-gate storage systems that eliminate intermediaries



Source: Economic Survey of Pakistan 2023-24, World Bank

Acumen's bet on the sector highlights its potential to generate PE level returns

Breakdown of Acumen's Pakistan focused climate fund

Component	Output	Indicative Cost (USD' M)	GCF Financing		Co-Financing	
			Amount (USD' M)	Instrument	Amount (USD' M)	Instrument
Investment Fund	Setting up the Fund	0.8	0.2	Equity	0.6	Equity
	Fund capital disbursed to venture, early-growth, growth-stage agribusinesses	67.1	20.9	Equity	46.2	Equity
	Strengthened business performance of portfolio companies	8.4	2.6	Equity	5.8	Equity
	Monitoring & evaluation of the financial performance & climate impact of investments	3.6	1.1	Equity	2.5	Equity
Technical Assistance Facility (TA)	Strengthened business performance of portfolio companies	1.6	0.5	Grants	1.1	Grants
	TA deployed across strategic themes to maximize portfolio viability and fund impact	1.7	0.5	Grants	1.2	Grants
	Monitoring & evaluation of the financial performance & climate impact of investments	2.4	0.7	Grants	1.6	Grants
	Increase in inclusivity and climate impact of portfolio companies	2.4	0.7	Grants	1.6	Grants
	Establish platforms to catalyze stakeholder engagement, collaboration on and awareness of climate adaptation	1.9	0.6	Grants	1.3	Grants
Total		**90**	**28**		**62**	

Acumen's climate fund for Pakistan represents a pioneering approach to climate financing, leveraging USD 25 M from the Green Climate Fund to potentially unlock USD 55 M in co-financing for agricultural startups.

The fund utilizes a 1:2 junior to senior equity structure that de-risks investment in this vital sector by assuming the majority of risk.

This blended finance approach is crucial for mobilizing capital and enabling investments in climate-focused agribusinesses that might otherwise struggle to secure funding.

Source:: Acumen

An Ecosystem Approach Can Provide the Necessary Impetus

A systematic approach to developing an investable climate tech startups pipeline from ideation to market-ready businesses is required

Ideation Stage

Assisting entrepreneurs in the journey from an idea to a viable business model.

Approach

Bootcamps/hackathons can guide ideation stage entrepreneurs.

Specialized trainings can provide the necessary technical exposure to startups.

Operational Stage

Helping startups to establish a viable business model alongside a feasible product/offering.

Approach

Cohort based incubation program to fast-track market entry for startups.

Parallel tech support and consultancy to address startup specific challenges.

Growth Stage

Facilitate startups with lead generation, access to experts and investors.

Approach

To mobilize and educate existing ecosystem players and stakeholders.

Unlocking access to international networks and communities.

Source: World Bank

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

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